2.0 Location and Context

2.1 Overview of Sydney Harbour

The Project Area is located in Rosehill, on the upper reaches of Sydney Harbour (refer to **Figure 1-1**). Sydney Harbour covers an area of approximately 5,020 ha with a combined foreshore length of 270 km. The Harbour is managed jointly between the SMCMA, Sydney Ports Corporation and NSW Maritime, with the roles of each organisation outlined in **Table 2-1**. Sydney Harbour is one of Australia's greatest cultural and commercial resources, is a valuable natural scenic feature, and is characterised by a combination of port, industrial, residential and recreational land uses. Sydney Harbour acts as a major transport corridor, provides flora and fauna habitat, as well as large areas of recreational space.

Sydney Harbour is a thriving port, catering for recreational and commercial shipping and recreational boating activities. Sydney Harbour accommodates a wide range of commercial vessels through 11 berths, including dry bulk, bulk liquids, general cargo and cruise ships.

Table 2-1 The Roles of the SMCMA, Sydney Ports Corporation and NSW Maritime in the Management of Sydney Harbour

Organisation	Role in the management of Sydney Harbour
SMCMA	SMCMA is responsible for natural resources management within the Sydney Metropolitan Catchment Area by implementing and promoting catchment action plans that address issues of local biodiversity, indigenous and local community involvement and contribution and general land management.
Sydney Ports Corporation	Sydney Ports Corporation is responsible for: - Management and development of port facilities and services to cater for existing and future trade needs; - Management of navigational, security and operational safety needs of commercial shipping movements and activities; and - Protection of the environment associated with commercial shipping movements.
NSW Maritime	NSW Maritime is responsible for the marine safety and regulation of commercial and recreational boating across NSW waterways. NSW Maritime is also responsible for the management of submerged properties in Sydney Harbour, Newcastle Harbour and Port Kembla.

2.2 Overview of Parramatta and Surrounds

2.2.1 Parramatta Local Government Area

The Parramatta LGA is located approximately 24 km west of the Sydney CBD. It is approximately 61 square kilometres (km^2), and has a population of approximately 170,000 (Parramatta City Council, 2012). The LGA is bounded by the Ryde LGA to the east, the Auburn and Bankstown LGAs to the south, the Fairfield, Holroyd and Blacktown LGAs to the west, and the Hills and Hornsby LGAs to the north. Parramatta LGA comprises 29 suburbs. It is also considered to be the second CBD of Sydney, and includes residential, commercial, entertainment and industrial precincts.

The Clyde Terminal is located in the Camellia Industrial Estate within the suburb of Rosehill in the Parramatta LGA, on a section of waterfront land at the confluence of the Parramatta and Duck Rivers. The Clyde Terminal is situated on land both owned and managed by Shell, and also on land owned by RMS (refer to **Section 1.3**). Camellia is considered to be an industrial precinct of Parramatta, with a mixture of heavy and lighter industrial operations and high profile sporting facilities in the vicinity of the Project Area.

The areas surrounding the Clyde Terminal are predominantly heavy industrial and are supported by road and rail infrastructure. The zoning of the area surrounding the Project Area is provided in **Section 1.3**.

2.2.2 Catchment Area

The Project Area lies at the confluence of the Parramatta River sub-catchment and the Duck River sub-catchment, which are both managed by the SMCMA. The Parramatta River sub-catchment is one of the main tributaries of Sydney Harbour, and is one of the most urbanised catchments in Australia. Parramatta River is the

main tributary of Sydney Harbour, extending from Blacktown Creek in the west to the confluence of the Lane Cove River in the east (refer to **Section 13.1.1** for more detail). Historical land uses have highly modified the nature of the Parramatta River estuary. Water pollution is a major environmental issue for Sydney Harbour with sediments and pollution from stormwater, sewer overflows, land contamination, and from vessels impacting on water quality and habitat values. The Duck River sub-catchment is also highly urbanised, yet nevertheless contains the largest remaining sections of estuarine wetlands in Sydney, including mangrove, saltmarsh and mudflat vegetation communities (SMCMA, 2012).

2.2.3 Surrounding Industrial Area

The area surrounding the Project Area is comprised of industrial properties within the Camellia Industrial Estate. Business activities within close proximity to the Project Area include recycling services, building products, waste services, gas supplies and product transport (see **Table 2-2**) (refer to **Figure 2-1**). It also includes companies that lease parcels of land owned by SRAP.

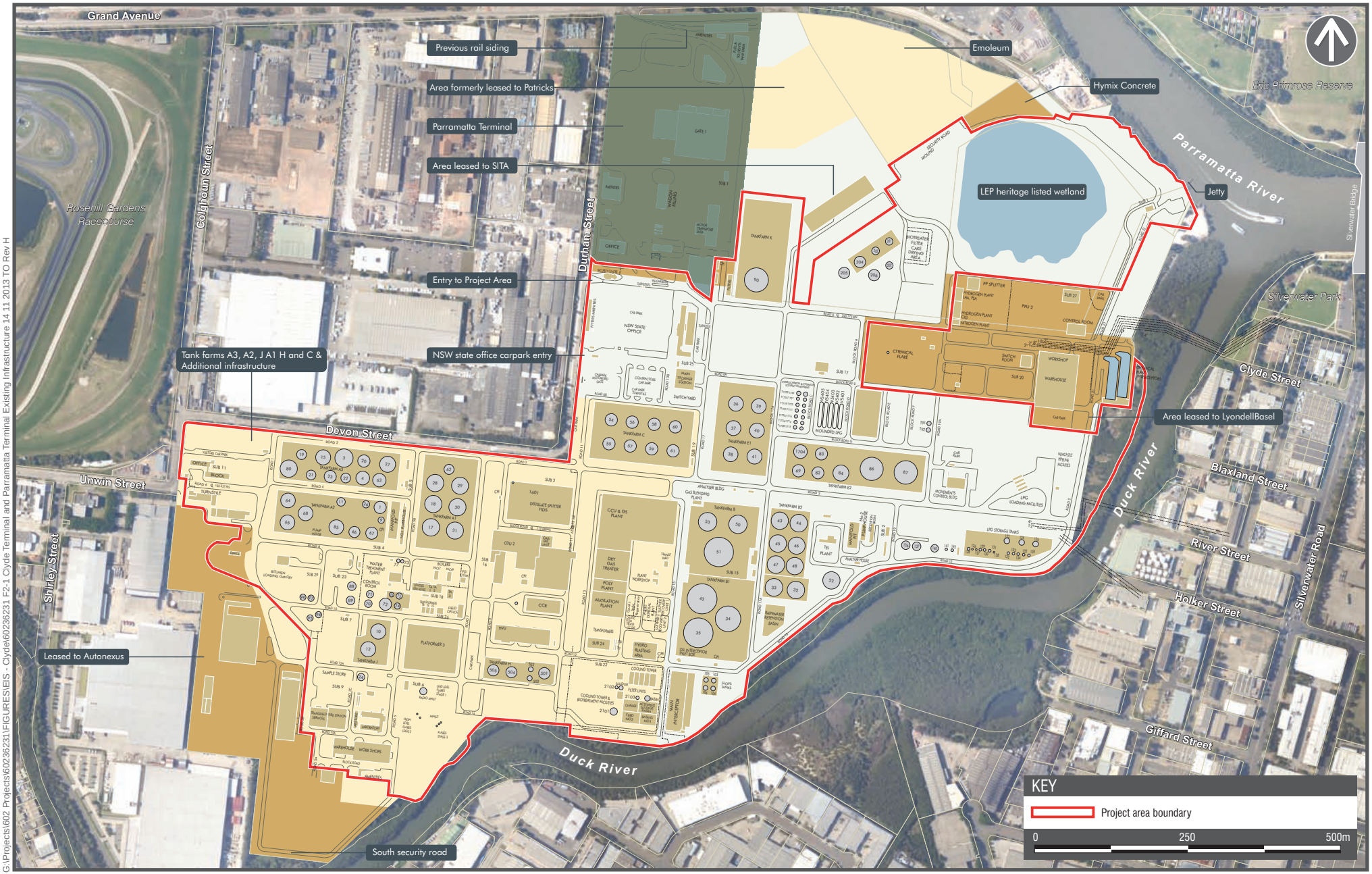
Autonexus currently leases land within the south-western extent of Shell's landholdings. A small section of this lease area falls within the Project Area assessed as part of this EIS. SITA, LyondellBasell, BOC Gases, Air Liquide and Jemena also lease land from SRAP in the vicinity of the Project Area (refer to **Figure 6-1** and **Table 2-2**).

Table 2-2 Surrounding Properties and Business Activities

Property Details	Business Activities	Proximity to the Project Area
LyondellBasell Gate 4 Durham Street Lot 1 DP 109739 and Lot 2 DP 224288	Polypropylene plant commissioned in 1991 with an annual capacity of 170,000 tonnes of polypropylene. The plant uses modern gas phase technology and catalysts to produce a wide range of homopolymer, impact copolymer and random copolymer polypropylene grades.	Currently leasing a section of Shell-owned land adjacent to the Project Area in the north-eastern section of Shell's Clyde Terminal. Accessed through the Clyde Terminal Gate 4 (refer to **Figure 2-1**).
SITA Grand Avenue, entrance via former Patrick Port Services at 239 Grand Avenue Lot 101 DP 809340	Waste management – resource recovery and treatment facility.	Currently leasing a section of Shell-owned land to the north-east of the Project Area (refer to **Figure 2-1**). Adjacent to the Project Area, occupying approximately 20,730 m^2.
Site formerly leased to Patrick Port Services 39 Grand Avenue, Camellia Lot 101 DP 809340	Shell is currently negotiating to lease this site to another third party.	The previous Patrick Port Services operations occupied approximately 36,620 m^2 to the north of the Project Area.
Air Liquide Gate 4 Durham Street, Camellia Lot 101 DP 809340 and Lot 2 DP 24288	Gas supply.	Air Liquide operates on two small sections of Shell-owned land adjacent to the north-east of the Project Area.
Parramatta Terminal Gate 4 Durham Street, Camellia Lot 1 DP 109739	Fuel distribution via road fuel gantry under joint operation between Shell and BP.	The Parramatta Terminal is situated adjacent to the Project Area. It provides for the road distribution of finished petroleum products that have been received, stored and undergone dosing at the Clyde Terminal.

Property Details	Business Activities	Proximity to the Project Area
Jemena Gate 4 Durham Street, Camellia Lot 1 DP 109739	Energy and water supply.	Jemena leases a small section of Shell-owned land adjacent to the Parramatta Terminal operations.
BOC Gases Gate 4 Durham Street, Camellia Lot 2 DP 224288	Gas supply.	BOC Gases leases a small portion of land adjacent to the LyondellBasell's operations alongside the north-eastern section of the Project Area.
Autonexus Car Tech Services Australia Corner of Colquhoun and Unwin Streets, Rosehill Lot 100 DP 1168951	Car storage facility.	Adjacent to the south-western boundary of the Project Area. A small portion of land leased to Autonexus would be included within the Project Area to enable the demolition of redundant infrastructure at the Clyde Terminal.
A B Mauri Camellia Pty Limited 35 Grand Avenue, Camellia	Bakery ingredients manufacturing.	Approximately 400 m north of the Project Area. This land is not owned by Shell.
Australian Pharmaceutical Industries 15 Grand Avenue, Camellia, and 10 Colquhoun Street, Rosehill	Support office.	Within 100 m of the western section of the Project Area (for the Colquhoun Street operations). This land is not owned by Shell.
Australian Red Cross Blood Service 15 Grand Avenue, Camellia	Support office.	Approximately 500 m north of the Project Area. This land is not owned by Shell.
Boral Plasterboard 3 Thackeray Street, Camellia	Building products.	Approximately 100 m north of the Project Area. This land is not owned by Shell.
Crusher Rentals 14 Thackeray Street, Camellia	Crushing services.	Approximately 500 m to the north of the Project Area. This land is not owned by Shell.
CSR Roofing Sales and Manufacturing Head Office 10 Grand Avenue, Camellia	Building products.	Approximately 350 m to the west of the Project Area. This land is not owned by Shell.
EarthPower Technologies 35 Grand Avenue, Camellia	Recycling/energy production facility.	Approximately 400 m to the north of the Project Area. This land is not owned by Shell.
Fosters Group Devon Street, Rosehill	Distribution services.	Approximately 50 m to the north of the Project Area. This land is not owned by Shell.
Concrete Recyclers Pty Ltd 14 Thackeray Street	Recycling facility.	Approximately 300 m to the north of the Project Area. This land is not owned by Shell.

Property Details	Business Activities	Proximity to the Project Area
James Hardie Building Products Devon Street	Building products.	Directly adjacent and to the west of the Project Area. This land is not owned by Shell.
KLF Holdings 11 Grand Avenue, Camellia	Recycling.	Directly adjacent and to the north-east of the Project Area. This land is not owned by Shell.
Veolia Environmental Services 37 Grand Avenue Lot 5 DP 549358	Waste facility.	Approximately 500 m north of the Project Area. This land is not owned by Shell.
CHEP 2b Unwin Street, Rosehill	Equipment pooling system service centre.	Within 50 m of the Project Area. This land is not owned by Shell.
Hymix Concrete 14 Grand Avenue, Camellia Lot 100 DP 809340	Concrete supply services.	Approximately 300 m north-east of the Project Area.
Northline Freight Distribution 5 to 7 Shirley Street, Rosehill	Product transport facility.	Approximately 50 m to the west of the Project Area. This land is not owned by Shell.
Emoleum Road Servicea Lot 5 DP 549358	Asphalt and Bitumen paving	Approximately 150 m north of the Project Area.



G:\Projects\602 Projects\60236231\FIGURES\EIS - Clyde\60236231 F2-1 Clyde Terminal and Parramatta Terminal Existing Infrastructure 14 11 2013 TO Rev H

AECOM

CLYDE TERMINAL AND PARRAMATTA TERMINAL EXISTING INFRASTRUCTURE

Clyde Terminal Conversion Project
Environmental Impact Statement

FIGURE 2-1

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2.3 Land Use Context

2.3.1 Clyde Terminal

The Project Area has historically been owned and operated by the Commonwealth Oil Corporation. In 1913, the land was transferred to John Fell & Co, a shale oil company. Shell became the owner of the property in 1928 (CH2M HILL, 2007). For further information about the historical operation of the Project Area, refer to **Section 3.1**). Shell continues to own the land occupied by the Clyde Terminal and several adjoining lots which are leased out for other industrial uses (refer to **Table 2-2**).

There are 113 tanks currently at the Clyde Terminal. Of these tanks, 67 have been used since 2011 and 46 have not been in use for some time. The majority of these tanks are now considered redundant. The Clyde Terminal also provides for the bulk supply of Jet fuel via a direct pipeline to Sydney Airport, and for fuel supply via the Hunter and Silverwater pipelines.

The site is fenced for security along the western border where the Project area abuts Durham Street and Devon Street. Grand Avenue borders the Project Area to the north.

Riparian vegetation largely planted by Shell during the 1980s and 1990s as part of rehabilitation activities, runs along the south-eastern boundary of the Project Area (refer to **Figure 1-5**).The Clyde Terminal area is generally flat as a result of extensive capping and filling over the last 100 years, and ranges from 2 to 5 m Australian Height Datum (AHD) in elevation (ERM, 2010).

2.3.2 Other Surrounding Land Uses

The Parramatta Terminal is situated next to Clyde Terminal within the northern section of the Project Area, and is bounded by Durham Street to the west and Grand Avenue to the north. Access is via the main gate 4 on Durham Street which is operational every day of the year and also serves the Clyde Terminal. A small portion of land surrounded by the Parramatta Terminal is currently leased to Jemena.

Shell constructed the Parramatta Terminal in 1964, which subsequently replaced the former Clyde Refinery as Shell's primary road distribution centre within NSW. All marketing distribution functions, with the exception of bitumen and bulk solvents, were transferred from the Clyde Refinery across to the new Parramatta Terminal.

Despite having been constructed in 1964, the Parramatta Terminal remains the major point of Shell's road transport distribution within NSW. The Parramatta Terminal is comprised of a main fuels road gantry that has seven bays, with a total throughput of around 2.7 billion litres per annum. There is also a rail siding traversing the site that previously allowed for fuel train distribution, but this has since been decommissioned. Shell and BP jointly operate the road gantry area. The site also comprises:

- A lubricating oil tankfarm which stores finished bulk lubes that are supplied from Shell's Pinkenba Terminal in Brisbane;
- A packed lubes warehouse; and
- Shell's Direct Sales Team offices.

Parramatta Terminal currently employs approximately 40 staff and is operational 24 hours a day, seven days a week (Shell, 2012f).

The site of the Parramatta Terminal contains some trees, non-native grasses and landscape vegetation, but no remnant native vegetation. As with the Clyde Terminal, the topography of Parramatta Terminal is largely flat due to capping and filling operations that have occurred over the past century.

Industrial land users in the vicinity of the Project Area are outlined in **Table 2-2**. Other land uses in proximity to the Project Area include:

- Rail;
- Local roads;
- Parks and recreational areas;
- Rosehill Gardens Racecourse;
- Sydney Speedway; and

- Sydney Helicopters at the Rosehill Heliport.

There is a railway corridor located to the north of the Project Area and a decommissioned rail siding that leads from this railway corridor into the Parramatta Terminal. This spur line previously serviced the Parramatta Terminal but has not been used for some time.

The Clyde Terminal is bordered by Durham Street, Devon Street and Grand Avenue. Parramatta Terminal is bounded by Durham Street to the west and Grand Avenue to the north. All of these roads are within the responsibility of Parramatta City Council (refer to **Figure 2-1**). There are numerous other roads in the vicinity of the Clyde Terminal. However traffic movements associated with Clyde Terminal and the Parramatta Terminal tend to be along Grand Avenue and Durham Road.

Two recreational areas are located in the vicinity of the Project Area: Eric Primrose Reserve and Silverwater Park. Eric Primrose Reserve is located on the opposite side of the Parramatta River, approximately 200 m to the north-east of the Project Area along a strip of land bordering the northern bank of Parramatta River. Silverwater Park is located across the Duck River, approximately 200 m to the east of the Project Area.

The nearest residential areas are Rydalmere, approximately 900 m north-east, Silverwater 1.4 km south-east from the Project Area across the Parramatta River, Rosehill, approximately 1.7 km to the west of the Project Area, and 650 m to the south of the Project Area.

The Rosehill Gardens Racecourse is located on James Ruse Drive in Rosehill, approximately 250 m north-west of the Project Area. It is a world class thoroughbred horse racing course that also incorporates public and private function spaces at its grand pavilion and exhibition hall. It is under the management of the Australian Turf Club.

Sydney Speedway (formerly known as the Granville Speedway and the Parramatta City Raceway) is located at 21 Wentworth Street, Granville, approximately 550 m south-west of the Project Area. The site has been used as a raceway since 1977.

Sydney Helicopters operate at the Rosehill Heliport, located at 25 Wentworth Street, Granville, approximately 420 m south-west of the Project Area. The site is used as the base for commercial helicopter flights operated by Sydney Helicopters.

2.4 Strategic Land Use Planning

Development within the Sydney region is guided by the *Metropolitan Plan for Sydney 2036* (Department of Planning NSW, 2010), which outlines the strategic direction for the region and aims to enhance liveability, strengthen economic competitiveness, ensure fairness, protect the environment and improve governance. The *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (SREP 2005) aims to recognise, protect, enhance and maintain the catchments, foreshores, waterways and islands of Sydney Harbour, while ensuring a prosperous working harbour and an effective public transport corridor. The Project is aligned with several objectives of the abovementioned plans, as it improves the safety and efficiency of the Clyde Terminal.

3.0 Site History

3.1 Historical Operation of the Former Clyde Refinery

The Project Area was originally included as part of an 850-acre land grant by the Crown to John Macarthur on 8 October 1816 as an addition to Macarthur's existing Elizabeth Farm. John Macarthur and his wife Elizabeth were successful farmers, and eventually became the largest landholders in NSW. Following the death of the Macarthur's son Edward in 1872, the land continued to be administered by trustees until being sold in 1881. Elizabeth Farm was purchased in 1881 by Septimus Alfred Stephen after which it was subdivided and sold, with the final portion being sold in 1884 (Young & Burnett, 1979). In 1908, a parcel of 140 acres of land including the current Project Area was transferred to the Commonwealth Oil Corporation. The land on which the refinery was established comprised flat, unfenced scrublands and mangrove swamps at the confluence of Parramatta and Duck Rivers.

John Fell, a Scottish immigrant, established his shale-oil refinery company John Fell & Co Pty Ltd and opened the first refinery at Gore Bay in 1903. The Gore Bay Terminal was adjacent to the British Imperial Oil's Gore Bay terminal facilities that opened in 1901. By 1910, John Fell & Co Pty Ltd was buying the supplies of Tarakan crude oil from British Imperial Oil, a subsidiary of the Shell Transport & Trading Co. For several years, John Fell & Co was its largest Australian customer (Stanley et al, 2009). After some successful market growth and increasing demand for refined oil, Fell further expanded his company's operations. In 1918, he established another shale oil refinery on 60 acres of land at Clyde which had been owned and operated by the Commonwealth Oil Corporation as a refinery.

Facing fierce and increasing competition, falling international prices, and reductions in Government import taxes, John Fell & Co was increasingly under pressure to keep its business profitable. In 1918, Fell offered the company's assets to Shell; however Shell did not accept the offer as it was not considering moving its operations into refining at the time. However by 1922, Fell's refining operations were suspended and in 1924 his unsuccessful Newnes shale oil mine was closed. In order to maintain operations at Clyde, Fell began purchasing Crude Oil from Shell (Stanley et al, 2009).

Shell eventually took over as owner and operator of the Clyde Refinery on 1 January 1928 (CH2M HILL, 2007). Shell purchased an additional seven acres of land on 30 July 1928 and a further 150 acres in June 1930. The first stage of expansion of the refinery ran from 1929 to 1939, with the purchase and construction of new equipment and buildings.

In 1931, following the decision of the Commonwealth Government to impose a four pence per gallon excise duty on refined gasoline, the Clyde Refinery was temporarily closed. This also enabled the Dubbs furnace to be rebuilt and other general maintenance to be conducted. The special boiling unit was constructed in 1934; the same year in which the refinery ceased production of Shell Imperial, introducing in its place imported Super Shell Motor Spirit. Upon the recommendation of Mr J.W Ernste, the capacity of the refinery was increased and a modern distillation unit was erected to eliminate the need for re-distilling gasoline. In September 1938, a new topping plant/crude distillation unit was brought on line and the old Dubbs unit was subsequently shut down on 8 October 1938. This first period of expansion concluded in 1939 with the construction of the drum and tin filling shed.

Following the outbreak of World War II, and in particular Japan's entry into the war in 1941, Crude Oil supplies were cut to the Clyde Refinery and efforts were redirected to supplying and supporting the requirements of the Australian armed forces. With the exception of the No. 1 and 2 boiler stills, the Clyde Refinery was closed on 30 January 1942, and was adapted to become an essential wartime industrial facility. For the duration of the war, the primary function of the refinery was as a storage terminal and drum filling area. Following the resolution of the conflict in 1945, crude oil was once again available and refining operations at the site recommenced.

The refinery was reopened on 21 March 1946 by the then Premier of NSW, Mr W.J. McKell, and underwent its second phase of development and expansion, with the construction of the bitumen plant and neutralised lubricated oil production facilities, which were officially opened in 1948. The expansion culminated with the commissioning of the LVI lubricating oil plant and the official opening of new laboratories at the site in May 1953.

From 1958 to 1959, the Clyde Refinery underwent its third major expansion and development. This involved the erection of a platformer, significant modernisation and extension of existing ancillary facilities, and the erection of double-storey administration buildings onsite. Another major expansion phase followed almost immediately, from 1960 to 1963. Major additions to the refinery during this expansion phase included the catalytic cracking complex, high vacuum unit, ethylene and epikote plants, and the construction of two pipelines.

Prior to 1962, Shell's Gore Bay Terminal received a variety of Crude Oils and finished petroleum products, and was itself used as a distribution facility for finished petroleum products. In 1962, the Gore Bay – Clyde pipeline was commissioned and the Gore Bay Terminal became a predominately Crude Oil import facility to support the refining operations at the former Clyde Refinery (refer to **Figure 2-1**).

In the period 1966 to 1968, the Clyde Terminal underwent another major overhaul and expansion, including the erection of a splitter treater, the introduction of the No. 2 crude distiller, No. 7 steam boiler, turbo generator 1, and the chemical and hydrocarbon solvents plant, as well as extensions and additions to existing ancillary facilities.

The expansion and development of Clyde continued with an additional 35 acres of land purchased from Mobil in 1970. Also that year, a new polypropylene plant was erected for Shell Chemical. In 1972, the processing capabilities of the Clyde Refinery experienced further significant development, with the addition of platformer 2 and turbo-generator 2. Between 1974 and 1975, a water recovery treatment and re-use system was installed for refinery process cooling. This enabled the Clyde Refinery to be operationally isolated from the previous Parramatta River and Duck River systems.

Following the conclusion of the major phases of expansion and development of the Clyde Refinery in the mid-1970s, only minor additions and modifications were made. In the mid-1980s the Butane de-asphalting plant and oil interceptor were demolished. The site that these elements had occupied was redeveloped, with the central control room constructed at that location in 1988. In 1991, a new propylene unit and platformer unit were commissioned and in 1994 the mounded LPG storage facility was built (Shell, 1993). However in 1999 with Shell, and the oil industry generally, increasingly challenged by a combination of tight economics and environmental concerns, the Clyde Refinery once again found itself facing the prospect of closure. In late 1999, the announcement was made that the closure of the refinery at some point in time after 2006 was a real possibility. The refinery continued to operate, along with six other Australian refineries, in the early years of the twenty-first century. In November 2008, the Clyde Refinery was temporarily closed down for maintenance works, and did not resume operations until July the following year.

In 2011, Shell publically announced its decision to cease refining at the Clyde Refinery prior to mid-2013. In June 2012, Shell confirmed that from late 2012, the Clyde Refinery would cease processing crude oils.

Under the most recent refining operations that were undertaken at the Project Area until 2012, more than four million tonnes of Crude Oil, feedstock and finished petroleum products including Diesel, Fuel Oil, Gasoline and Jet fuel were imported through the Gore Bay Terminal by tanker ship. In 2008, when the former Clyde Refinery was shut down for urgent repairs and maintenance, finished petroleum products were imported through the Gore Bay Terminal where they were directly transferred from ship to the Clyde Terminal via pipeline. Partly processed petroleum products were also occasionally pumped from the Clyde Terminal back to the Gore Bay Terminal for export by ship to other refineries.

Significant amounts of waste were generated during refining operations. This included processing catalysts, heavy residue sludge, and processing by-products. Where possible, product interface volumes were reprocessed but many waste streams had to be transported from the Clyde refinery by accredited waste contractors and disposed of as prescribed waste.

The fuel and other chemical products that were received, stored and processed at the Clyde Refinery before refining operations ceased in 2012 included:

- Crude Oil;
- Residue;
- Condensate;
- Gasoline (Unleaded Petroleum);
- Jet fuel;
- Automotive Gas Oil (AGO) otherwise known as Diesel;
- Intermediates;
- Hydrofluoric acid;
- Catalyst materials;
- Caustic (sodium hydroxide);

- Hydrochloric acid;
- Butane; and
- LPG.

3.1.1 Historical Relationship between the Clyde Refinery and the Gore Bay Terminal Operations

When the Clyde Terminal was operating as a refinery, finished petroleum products were transferred directly from tanker ship at the Gore Bay Terminal to product storage tanks at the Clyde refinery via the 19 km underground pipeline.

During refining operations, the majority of Diesel product received at the Gore Bay Terminal by tanker ship was transferred to the Clyde refinery via the connecting pipeline. Diesel was then transferred to Crude Oil tanks at the Clyde Refinery, where the product was then processed into clean finished products. Small quantities of Diesel would remain in product storage tanks at the Gore bay Terminal for marine use.

Crude oils were temporarily stored at the Gore Bay Terminal and subsequently pumped to the Clyde Refinery where they were refined into finished products, for distribution. Refinery by-products, including Bitumen, LPG and Fuel Oil Blending Component would be stored at the Clyde Refinery for up to about five days. Fuel Oil Blending Component was then sent to Gore Bay via the pipeline for fuel oil blending activities, and LPG was used on-site at the Clyde Refinery for power generation, or supplied to service stations via the on site LPG gantry. Bitumen was transported to customers by road from the Clyde Refinery.

The relationship between the Clyde Refinery and Gore Bay Terminal during historical refining operations is illustrated in **Plate 1** below.

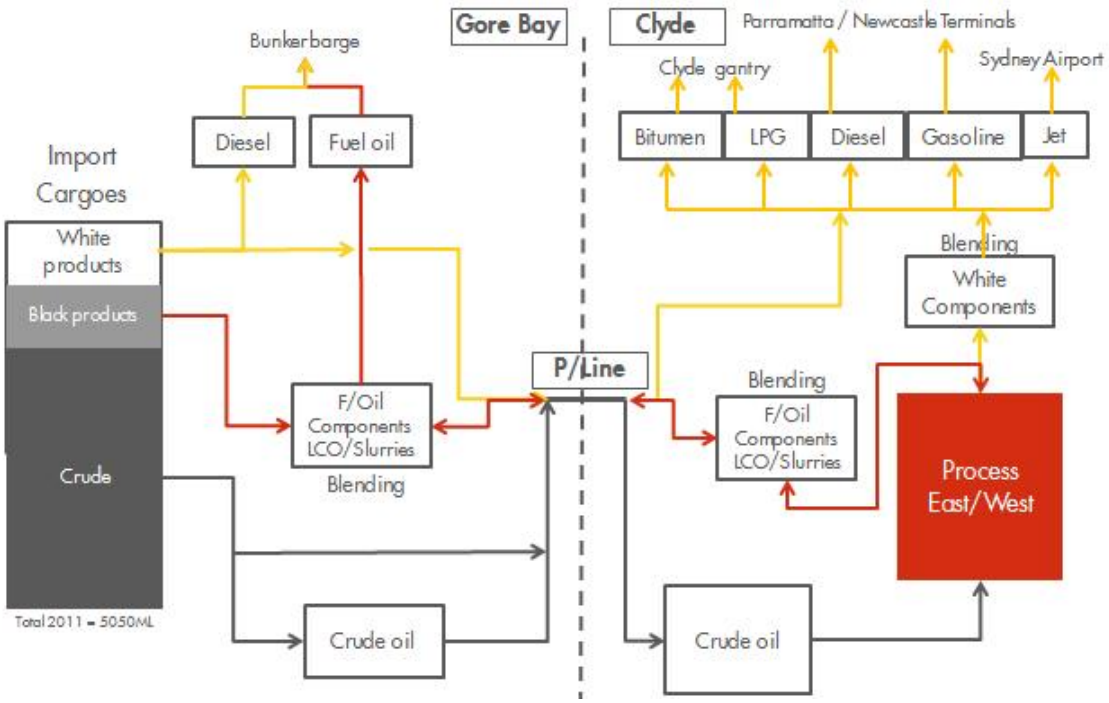


Plate 1 Relationship between the historical Clyde Refinery and the Gore Bay Terminal

Before refining operations ceased at the former Clyde Refinery in 2012, petroleum products received at the Gore Bay Terminal were handled in one of the following ways:

- Fuel Oil and Diesel were stored at the Gore Bay Terminal for supply to customers in Sydney Harbour;
- The majority of Crude Oil and feedstocks were immediately transferred to the Clyde Refinery via pipeline, and stored at the Clyde Refinery prior to being refined into finished petroleum products;

- Some Crude Oil and feedstocks were temporarily stored at the Gore Bay Terminal and subsequently transferred to the Clyde Refinery when pipeline capacity allowed; and
- Gasoline, Jet fuel and Diesel were transferred immediately to the Clyde Refinery via pipeline for storage prior to distribution.

3.2 Current Operations at the Clyde Terminal

Since the cessation of refining operations in late 2012, the site has been known as the Clyde Terminal, and is used for the receipt, storage and distribution of finished petroleum products. Product dosing and product sampling (which is worked back into products) is also undertaken. The decommissioning and decontamination of redundant refining infrastructure has commenced as these activities did not require development consent. Following the procurement of all necessary approvals, the demolition and construction works would commence at the Project Area.

Once the conversion activities are complete, the Clyde Terminal would continue to operate as a finished petroleum products import, storage and distribution terminal. It would also continue to comprise a range of infrastructure and facilities required for the purposes of operating a liquid fuel depot, including but not limited to:

- Tankfarms and associated valving and pipework;
- Control rooms;
- Pumping stations;
- Gantries;
- Administration facilities;
- Warehouses;
- Workshops;
- Electrical sub-stations and associated infrastructure;
- Water supply and treatment facilities;
- Waste handling facilities;
- Directional signage;
- Fire fighting infrastructure;
- Boat shed, a boat launching ramp and jetty; and
- Other infrastructure required to operate a finished petroleum products terminal.

The Clyde Terminal currently receives finished petroleum products from the Gore Bay Terminal. These would continue to be distributed by pipeline from the Clyde Terminal to the adjacent Parramatta Terminal road gantry, to Sydney Airport, to Silverwater terminal and to Newcastle via existing infrastructure. Butane would be transported to the Clyde Terminal via truck. The retention of facilities at the Project Area is crucial in supplying these distribution chains, and ensuring the distribution of fuels within regional NSW and metropolitan Sydney.

Since refining activities ceased, only the following finished petroleum products are stored at the Clyde Terminal:

- Gasoline (Unleaded 91, 95 and 98);
- Diesel (AGO);
- Jet fuel;
- LPG; and
- Butane.

In addition to these products, the Project Area continues to store small quantities of chemicals and oils that are used for cleaning, site maintenance, and as lubricants for operating equipment.

Clyde Terminal currently has a total petroleum products storage capacity of 638 ML and a Butane gas storage capacity of 10,851 m^3. During current operations, the total throughput of the Clyde Terminal is approximately 4,400 ML per annum, a reduction from the total throughput of 5,050 ML during 2011. There is sufficient capacity within the proposed terminal storage and the upstream supply infrastructure to be able to continue to meet the expected market growth in the future.

Butane and anti-static additives are injected into products via inline injection to ensure that the products meet the required specifications and are fit for their intended use. These products are store in existing storage tanks at Clyde Terminal and are injected into the receipt pipeline as product is entering the storage tanks or is recirculated between tanks. These processes are part of the normal operation of storing fuels to ensure they meet the Australian specifications.

The amount of product supplied from the Clyde Terminal is dependent on market demand and supply logistics, and would be expected to respond to generic market growth. While the demand for Gasoline is predicted to remain largely unchanged, Diesel and Jet Fuel are expected to experience a growth in demand. The increased demand in Jet Fuel to Sydney Airport would be supplied by the existing pipeline network and would not result in an increase in traffic movements. An increase in the supply of Diesel would require three additional truck movements per day to and from the Parramatta Road Terminal, giving rise to a 1.2 percent increase in traffic per annum. Although an increase in the demand for Diesel would result in a small increase in traffic movements, there would be a net reduction in vehicle movements compared to what was required while refining activities were still being undertaken.

The Clyde Terminal maintains a river spill control station including boat launching facilities and jetty. This facility is maintained to deploy critical spill control and recovery activities in the unlikely event that a spill occurs.

The Clyde Terminal and Gore Bay Terminal both currently operate 24 hours a day, seven days a week. Products are imported through the Gore Bay Terminal and transferred to the Clyde Terminal via the 19 km underground pipeline. The existing infrastructure at the Clyde Terminal is shown in **Figure 2-1**. This infrastructure is well maintained, and would be used for operation for the next 40 years. It is only currently used to approximately 50 percent of its theoretical throughput. All tanks are connected to the Gore Bay – Clyde pipeline via an interconnecting manifold system. The product is then directed to the relevant tank where it is tested and batched for distribution. The tanks are also connected to the distribution pipelines via another interconnecting manifold system allowing the relevant product to be directed to an individual or multiple pipelines simultaneously.

The current terminal configuration does not generate the same waste streams as there are no refining operations, however, as assets are decommissioned, the waste generated by cleaning has to be disposed of. Some product is being trucked to Shell's Geelong refinery to be reprocessed, other waste streams are being disposed of as prescribed waste through accredited waste contractors so these assets can be demolished and removed following consent.

3.2.1 Existing relationship between Clyde Terminal and Gore Bay Terminal Operations

Currently, finished petroleum products are transferred directly from tanker ship at the Gore Bay Terminal to the Clyde Terminal via the existing pipeline. Small amounts of Diesel and finished Fuel Oil is unloaded from tanker ship to storage tanks at the Gore Bay Terminal. As finished Fuel Oil is imported, no refining is undertaken at the Gore Bay Terminal. Finished products are stored at the Clyde Terminal for about five days prior to being distributed to Sydney Airport, the Parramatta Road Terminal, Silverwater Terminal and Newcastle pipelines. Products are no longer routinely transferred from the Clyde Terminal to the Gore Bay Terminal. The current relationship between the Clyde Terminal and Gore Bay terminal is illustrated in **Plate 2** below.

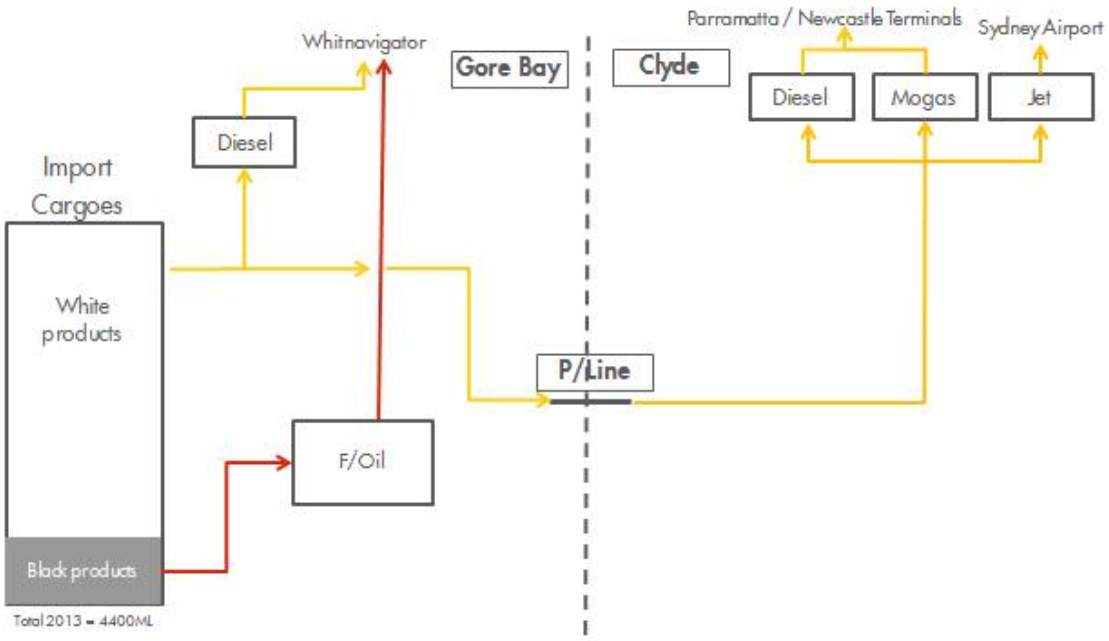


Plate 2 Current relationship between the Clyde Terminal and Gore Bay Terminal

4.0 Project Need

Relevant DGRs: The EIS must include a detailed description of the development, including the need for the proposed development.

4.1 Project Objectives

The objective of the Project is to convert the Clyde Terminal, which now contains redundant infrastructure previously used to refine Crude Oil, into a more efficient finished petroleum products terminal capable of supporting the growth of the NSW economy through the efficient storage and distribution of finished petroleum products. Additionally, the Project aims to improve the efficiency and timeliness of Jet fuel supply to Sydney Airport by providing capacity through Shell's Jet fuel pipeline. This would be achieved by installing larger pumps at the Clyde end of the pipeline, larger filters to debottleneck the pipeline and to install improved filtration at the Clyde Terminal. This would allow the product to be received, tested, batched and transferred to Sydney Airport in a more efficient manner than is possible with the existing configuration. This will support growth in Jet fuel demand, and maintain a robust supply to this important source of revenue for the NSW economy.

The converted Clyde Terminal would have enhanced environmental performance and improved safety systems compared to both the former Clyde Refinery and the currently operating Clyde Terminal.

4.2 Background to Cessation of Refining

In 2011, Shell announced its decision to cease refining at the Clyde Refinery prior to mid-2013 and to convert the Clyde and Gore Bay Terminal facilities into an integrated and competitive product import terminal. The rationale for the decision to cease refining and move to a different business model for the continued supply of liquid fuels into NSW and therefore the subsequent need for the Project is further outlined in **Section 4.2.1** to **Section 4.2.3**. Effectively, the business case to support the decision was that:

- There is growing excess refining capacity in the Asia-Pacific region;
- The former Clyde Refinery was a small scale refinery in comparison to its regional competition and would not have generated enough revenue to justify further investment; and
- Shell can access an adequate supply of Australian-grade products from the Asia-Pacific marketplace.

4.2.1 Regional Competition

Crude Oil and petroleum markets are typically regional and increasingly global (Australian Institute of Petroleum, 2012). Australian refineries operate predominantly in the Asia-Pacific regional market – a region dominated by the recent rise of large-scale 'mega-refineries' in Asia. Between 2000 and 2010, the majority of the world's growth in refining capacity occurred in the Asia-Pacific region. This growth in refining capacity was in the order of seven million barrels per day (BPD), an increase equivalent to 74 percent of global refining capacity. In the same period, China alone accounted for approximately 51 percent of the global growth in refining capacity (Australian Competition and Consumer Commission (ACCC), 2011). To give some perspective on the scale of these new "mega-refineries", the world's largest refinery, Jamnagar in India (owned by Reliance Industries), has a production capacity of 1.24 million BPD - more than Australia's entire current daily fuel demand (Hydrocarbon Asia, 2012) of 0.94 million BPD (Vivoda, 2012). In comparison, the former Clyde Refinery's production capacity was 79,000 BPD.

The scale and efficiency with which foreign refineries are able to produce high quality Australian-grade products is directly impacting on the ability for Australian refineries to compete given their relatively small scale, and in the case of the former Clyde Refinery, an inability to generate enough revenue to justify further investment in the Refinery. Australian refineries combined now account for less than one percent of the global refining capacity (Hydrocarbon Asia, 2012; ACCC, 2011) with the total combined operational capacity of the then seven Australian refineries (which included the former Clyde Refinery) was 757,000 BPD (Energy Information Administration, 2011); a production capacity which, for some time, has been unable to meet the total current domestic demand. The disparity between production capacities of Asian and Australian oil refineries is shown in **Figure 4-1**.

Shell's Gore Bay Terminal and former Clyde Refinery had been operational for over 80 years (Herbert, 2011), and despite significant investment and upgrades, these refineries continued to exist in a commercial environment very different from that which they were originally designed to service. Significant and ongoing investments were also required to maintain and upgrade refinery equipment to meet evolving environmental standards in Australia, compared to newer and more efficiently designed refineries recently built in Asia which are able to produce a wide range of high quality products generally out of cheaper Crude Oil and feedstocks. As such, the ongoing operation of the former Clyde Refinery supported by the Gore Bay Terminal was no longer regionally competitive, and a different business model was proposed which included the cessation of refining operations and conversion of the two facilities into an integrated, efficient and competitive product import terminal.

The refining industry in Australia has been challenged with financial results over the past three financial years. For instance, between 2010 and 2011, refining sector profits were below the average profits attained in 2002 to 2003 (ACCC, 2011). The refining industry, like other manufacturing industries in Australia, is also vulnerable to the high Australian dollar with refining margins being in American dollars and costs in Australian dollars. Compared to other manufacturing and production industries such as beverages, construction materials, chemicals, building and food products, refining has the lowest average rate of return on product sales; an additional factor leading to the financial vulnerability of the domestic refining sector of the economy.

4.2.2 Continuing Deregulation

From 1984 to 1998, the Australian refining industry operated under a government-regulated pricing surveillance regime, whereby wholesale prices were established and endorsed by the Prices Surveillance Authority and subsequently by the Australian Competition and Consumer Commission (ACCC, 2011). In 1998, this structure was discontinued in favour of a deregulated market (Roarty, 1999).

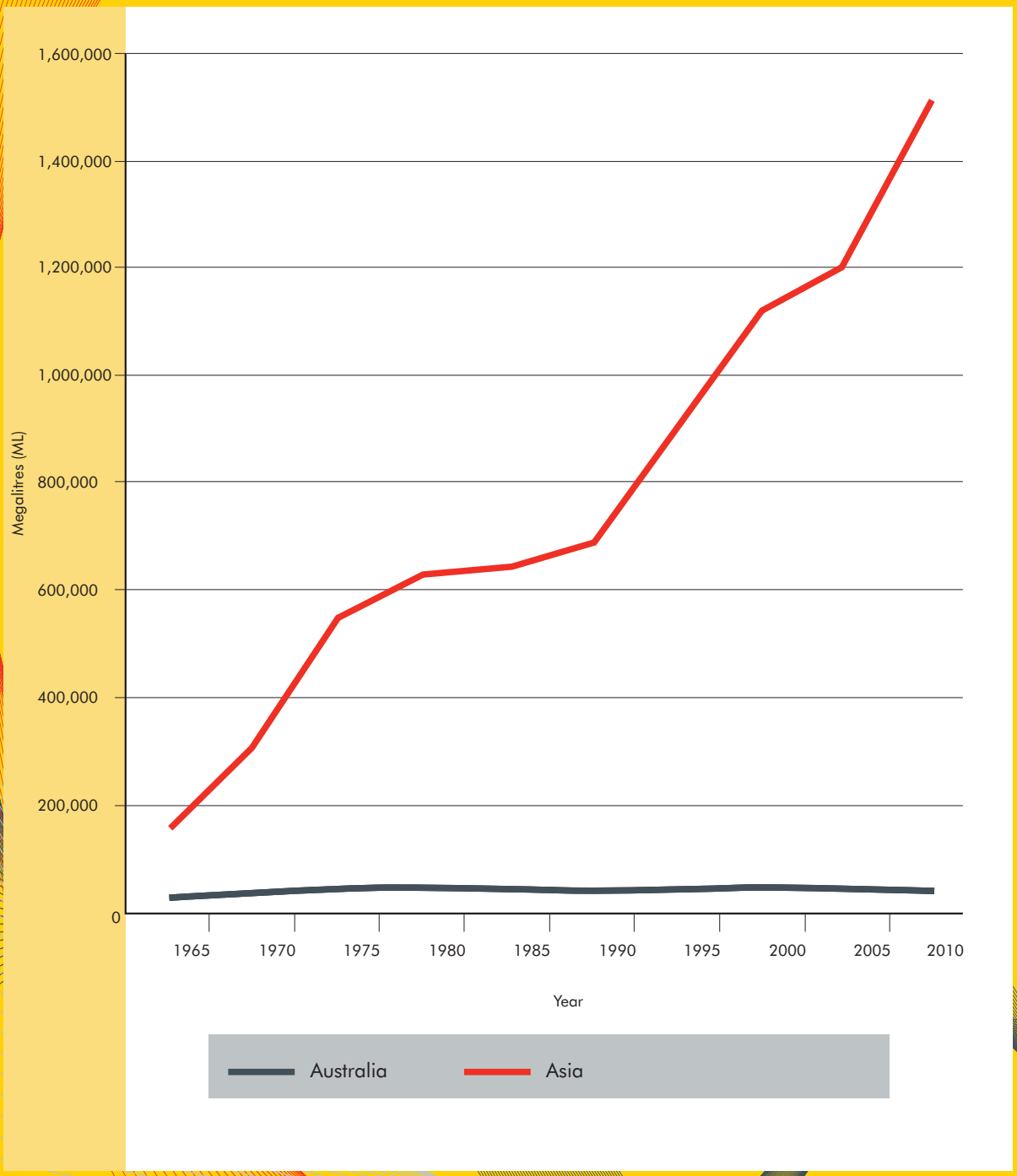
Competition in the petroleum wholesale and retail markets has also been encouraged with the introduction of the *Trade Practices (Industry Codes – Oil code) Regulations 2006* (also known as the Oil Code) on 1 March 2007, which encouraged better access for oil importers (Minister for Resources and Energy, 2009). As a result, domestic wholesale prices for refined petroleum products are strongly linked to international markets and market movements, with retailers setting the retail price according to their local competition.

Owing to the changes in the refining industry, access to open markets, and a change in demand for different products (including more Diesel and premium fuels), Australia now imports around 40 percent of its refined petroleum products (Energy Information Administration, 2011), a figure which is expected to increase as further transition happens in the refining industry and with the emergence of more independent importers (ACCC, 2011).

4.2.3 Crude Oil Importation

Cost-effective supply of Crude Oil is another issue leading to Australian refineries being disadvantaged, as the majority of Crude Oils are imported at a significant cost. This is both due to the decline in Australian Crude Oil production (which many of Australian refineries were designed for) and Australia's geographic location as well as global trends of rising Crude Oil prices. Although Australia does produce Crude Oil (approximately 22 million tonnes in 2010 to 2011 (ACCC, 2011)) from fields in the North West Shelf of Western Australia and Victoria's Bass Strait, the majority of this product is exported for a premium price due to its light, sweet characteristic, and sulfur content of less than 0.5 percent (Australian Institute of Petroleum, 2012). Australian refineries are better suited to heavier Crude Oils, with Crude Oil imports equating to approximately 33 million tonnes in 2010 to 2011 (ACCC, 2011).

The combination of all of these factors has led to the decision by Shell to cease refining at the Clyde Terminal and to service the NSW market under a different business model. The alternate business model chosen for the continued supply of approximately 40 percent of the fuel requirements of NSW is the importation of refined petroleum products through the Gore Bay Terminal, transfer by pipeline to the Clyde Terminal for storage, and transport to market via the Parramatta Terminal or the pipelines to Sydney Airport and Newcastle.



G:\Projects\602 Projects\60236231\FIGURES\EIS - Clyde\60236231 F4-1 Asian and Australian Oil Refining Capacities 22 02 2013 TO Rev A

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ASIAN AND AUSTRALIAN OIL REFINING CAPACITIES 1965 - 2010

Clyde Terminal Conversion Project
Environmental Impact Statement

Data Source: Australian Competition and Consumer Commission (2011)

FIGURE 4-1

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5.0 Alternatives Considered

5.1 Decision Making Process

There were several factors that were impacting on the refining industry in Australia and these created the need for Shell to consider a new business model for its activities within the NSW market. Shell determined that further re-investment into Shell's former Clyde Refinery to make the facility more competitive was not economically justifiable. Shell concluded that conversion of the former Clyde Refinery into an efficient terminal facility, as well as modifications to its existing Gore Bay Terminal (subject to a separate development application), were necessary for it to import finished petroleum products for distribution throughout the NSW market. It was this decision making process that resulted in the cessation of refining activities at the former Shell Clyde Refinery, and the need to convert the current Clyde Terminal to create a more efficient and competitive finished petroleum products import and storage facility.

In weighing up these alternatives, Shell took a holistic approach, considering the cumulative operations of Shell's Clyde Terminal, Gore Bay Terminal and Parramatta Terminal operating alongside one another, as well as the operation of other liquid fuels infrastructure currently within the NSW market. The Gore Bay Terminal Modification Project is subject to a separate development application and is not considered part of the current Project.

The Clyde Terminal is one of a few key fuel supply operations servicing the NSW economy and is located adjacent to the major distribution terminal (i.e. Shell's Parramatta Terminal) at Rosehill in Western Sydney. There are multiple companies whose operations rely on fuel supplies from the Parramatta Terminal which, as Sydney has grown, is now located in a strategic position in relation to the Sydney Metropolitan area. Shell's Clyde and Parramatta Terminals function to distribute finished petroleum products throughout the Sydney Metropolitan area and Western Sydney, as well as into other key regional locations throughout NSW. The Project would also retain a critical, dedicated Jet fuel supply pipeline into Sydney Airport. This pipeline infrastructure is required to meet current and future Jet fuel demand that is not otherwise easily met in the longer term. Overall, the Project is critical to enable Shell's Clyde Terminal and associated infrastructure to support the current and future growth of the NSW economy. The Project is therefore critical in supporting the current and future growth of the NSW economy in an efficient and effective manner.

5.2 Key Alternatives Considered

The converted Clyde Terminal would allow Shell to maintain an efficient and robust supply chain for finished petroleum products supporting future growth in the liquid fuels demand in the NSW market. The Clyde Terminal is Shell's only terminal in the Sydney metropolitan region. Shell has a small terminal at Newcastle that is currently supplied with product from Clyde via the existing pipeline. The direct import of Diesel to a third party terminal at Newcastle on behalf of Shell for the mining industry has reduced the supply requirements from the Clyde Terminal by approximately 400 million litres per year. This terminal does not have the ability to import or store other products. Gasoline and some Diesel will still require transfer by pipeline from Clyde to Newcastle in order to maintain supply to the Newcastle market without increasing heavy vehicle movements between the Sydney metropolitan region and Newcastle. However, Diesel would be imported by Shell via tanker ship directly into Newcastle, where it would be stored at and distributed from the third party terminal rather than Shell sending as much Diesel to Newcastle through the pipeline. Shell would continue to distribute these products from the Clyde Terminal to the retail, mining, manufacturing and aviation industries within the Sydney metropolitan and regional NSW areas which are not efficientlyserviced by the Newcastle terminals. Shell's converted Clyde Terminal is vital to the continued growth of the NSW and national economy and, as noted in the *Energy White Paper 2012: Australia's Energy Transformation* (Department of Energy, Resources and Tourism, 2012), there would be a continued need for terminal infrastructure to support these economies. The Clyde Terminal is located within an industrial area in the geographic heart of the Sydney metropolitan area. This optimizes the distribution of finished petroleum fuels minimizing the hazard profile and environmental effects when compared to the location of other bulk fuel terminals in the Sydney metropolitan area.

The key alternatives considered by Shell included:

- Maintaining the current Shell import requirement through a smaller footprint (i.e. fewer tanks) at the Clyde Terminal and the Gore Bay Terminal;
- Commissioning an alternative terminal facility at a new location;
- The use of an existing third party distribution terminal to service the west of Sydney;

- The use of an existing third party receiving terminal to replace Shell's Gore Bay Terminal; and
- Do nothing.

Each of these alternatives is discussed in the following sections.

5.2.1 Smaller Footprint

The possibility of downsizing operations at both the Clyde and Gore Bay Terminals was considered as an alternative to the current Project. This would have involved a reduction in the number of storage tanks in operation at the sites and would have therefore resulted in a smaller project footprint. The main benefit of this alternative is that it would have required a smaller amount of working capital and capital investment by Shell. However, key disadvantages identified in relation to this alternative included:

- Decreasing the storage capacity at the Gore Bay Terminal would have increased the time ships are at the berth at the Gore Bay Terminal whilst product is transferred directly from the ship to the Clyde Terminal via the underground pipeline. Maintaining storage capacity at Gore Bay Terminal allows ships to discharge Jet fuel and Diesel cargoes into the Gore Bay Terminal storage tanks whilst simultaneously transferring products directly via the bidirectional underground pipeline to the Clyde Terminal. Increased berthing time would also result in increased noise and air emissions in the local community;
- Liquid fuel supply security would have suffered compared to the current Project. Without undertaking the proposed works and continuing the operation of select storage tanks at the Gore Bay terminal, the pipeline would be idle whilst ships were not occupying the berth (i.e. if all storage tanks were removed from the Gore Bay Terminal). This would have been a lost opportunity for the continued transfer of finished petroleum products from the Gore Bay Terminal to the Clyde Terminal, potentially resulting in decreased supply security to the NSW market;
- Market growth can be expected to generate growth in Diesel and Jet fuel demand of approximately four percent per annum. Without adequate storage at the Gore Bay Terminal to allow the discharge of Diesel or Jet fuel into the Gore Bay storage tanks, while simultaneously transferring products from ship to the Clyde Terminal via the existing pipeline, this growth in demand would be unable to be serviced effectively. Alternatively, ships would be required to be at berth for longer periods while the volumes are being discharged directly to the Clyde Terminal via the pipeline;
- Shell's ability to transfer the total product demand to the Clyde Terminal would have been compromised, given required ship berthing times, necessitating the use of other less efficient storage options. This would have resulted in significant additional trucks along already congested roads to and from Port Botany to be able to deliver fuel products, as the Clyde Terminal supplies significant volumes of product within the Sydney metropolitan area and predominately to the Western Sydney and NSW regional fuel markets. Each additional trip from Port Botany would be expected to add approximately 70 km to the return trip and 80 minutes of additional road time and exposure for these vehicles;
- Jet fuel supply to Sydney Airport would be placed at risk of disruption because the current pipeline arrangements from Botany to the Airport are unable to transfer the total volumes required. This would also place the Airport at risk from a lack of supply contingency in the event that the pipeline from Botany had to be shut down for any reason when compared to the current dual pipeline supply routes into Sydney Airport; and
- Shell's continued use of third party terminals in Botany was discounted as an alternative to the proposed project as fuel distribution is largely to the west of the Sydney metropolitan region. The use of a third party terminal at Botany would increasing traffic congestion which would have adverse environmental, economic and safety outcomes in comparison with the proposed project. Jet fuel volumes at Sydney Airport continue to increase in demand and the existing pipeline that runs from Botany to Sydney Airport is becoming increasingly congested, leaving Sydney Airport and the NSW economy potentially exposed to jet fuel shortages. This pipeline has incurred a number of unplanned shutdowns which has resulted in Sydney Airport supply being maintained only by the Clyde terminal and connecting pipeline augmenting the stored volume at the airport until the Botany pipeline was able to be restarted. Sydney Airport is normally supplied simultaneously by both pipelines as neither has the capacity to maintain total supply individually. This redundancy is essential to be able to maintain supply to Sydney Airport. Further, the improved efficiency of the operation of the Clyde Terminal would subsequently improve supply to Sydney Airport.

On balance, the alternative of downsizing operations at both the Gore Bay Terminal and the Clyde Terminal was not considered economically viable due to decreased efficiencies and the inability to support the growing liquid fuels demand within the NSW market. This option is also considered to deliver unfavourable air quality outcomes, arising from increased road congestion as well as safety implications of a growth in heavy vehicle movements.

5.2.2 Alternative Terminal Facility

Shell also considered the possibility of commissioning an alternative terminal facility in the Sydney region to replace its existing terminal facilities. The Botany Bay area in particular was considered as a potential location for a new facility as shipping could utilise Sydney Port Corporation's second Bulk Liquid Berth.

The primary benefits of this alternative were that Shell would have been able to capitalise on the latest technologies and improvements in terminal design and processes. However, there were several significant drawbacks associated with this approach, including:

- The potential location considered for an alternative facility was not suitable from a storage perspective as insufficient free space exists to be able to provide the product storage volumes and hence, security of supply that is required and provided with the existing and proposed Gore Bay Terminal and Clyde Terminal supply chain;
- The potential new location considered was not suitably located to provide a point from which road distribution could efficiently and readily occur. This alternative, including provision of additional pipeline infrastructure, was cost-prohibitive when compared to the use of existing infrastructure and could not be justified;
- The potential new location considered did not have adequate truck loading infrastructure required to undertake the current distribution task and involved significantly increased levels of cross urban road transportation of fuel products to be delivered to the western regions of Sydney and beyond into regional NSW locations. This option would add to the existing traffic congestion surrounding Port Botany by adding 70 km to each of approximately 56,250 return trips per annum for road tankers or an additional 67,500 hours of driving time to fulfil the distribution task from Port Botany. This alternative was therefore cost-prohibitive and considered unsustainable from a distribution and road-user perspective when compared to using the existing infrastructure proposed by the Project;
- Shell already utilises some storage at Port Botany for supply by truck to regional airports and by pipeline for supply of Jet fuel to Sydney Airport. The economics of these distribution options are poor when compared with the distribution economics of the Project so that moving more of the distribution task to these locations was not viable;
- Establishing a new terminal to replace the Gore Bay Terminal and Clyde Terminal would have also required a new pipeline for Jet fuel transfer to Sydney Airport to replace the current direct pipeline from the Clyde Terminal. This would have resulted in additional costs that could not be economically justified; and
- The time investment in converting operations to a new location would have been significant, spanning years from initial project conception to purchasing appropriate land, obtaining approvals, constructing and commissioning new assets and decommissioning the current facilities.

This proposed alternative was found to offer insufficient economic benefit to be considered a viable option. It was also considered inferior in terms of environmental outcomes, and would have also decreased short term supply continuity in comparison to other alternatives.

5.2.3 Use of Existing Third Party Distribution Terminal

A third alternative considered was the use of an existing terminal, the Silverwater Terminal (refer to Figure 1-2 for location relative to the Clyde Terminal), to service the western area of Sydney. Silverwater Terminal is located in the suburb of Silverwater, which lies in proximity to Shell's existing Clyde and Parramatta Terminals (approximately 300 m south-east). Ownership of this Silverwater Terminal lies with the Sydney Metropolitan Pipeline, and its operations consist of a 40/60 joint venture partnership between Mobil Oil Australia and Caltex Australia, with primary operations overseen by Mobil. The main activities conducted at the Silverwater Terminal are storage and distribution of Gasoline and Diesel to Sydney metropolitan and regional NSW markets. Finished petroleum products are received via pipeline from Caltex's Kurnell Refinery and also occasionally from the Clyde Terminal and the Vopak Terminal at Port Botany. Operations are conducted at Silverwater Terminal 24 hours a day, seven days a week, and it has bulk fuel storage capacity of approximately 42 million litres (ExxonMobil, 2003).

The main benefit in pursuing this project alternative would be the relative small start-up costs. However there were several critical constraints to this proposal, including:

- The Silverwater Terminal currently has insufficient storage space to service the throughput required by Shell and other parties using the Shell facilities;
- The Silverwater Terminal is located in an area where there is no available land that could be used to further expand infrastructure;
- The current pipeline supply infrastructure available into Silverwater would be insufficient to supply the additional volumes required to cater for the increased market demand. The Gore Bay Terminal pipeline to the Clyde Terminal would still be required, along with an extension to this pipeline into Silverwater;
- This option would require retention of all Gore Bay Terminal storage, and would create the need to store products, including Gasoline (which is not part of the Gore Bay Terminal modification project), for longer periods at Gore Bay Terminal due to the limited storage capacity available at Silverwater;
- Without complete control over the Silverwater Terminal ownership, management, cost and operations, Shell would be exposed to the risk of retaining the ability to use this infrastructure. This could have significant impacts on the NSW fuel market, as supply could essentially be cut off if parties could not agree on a suitable resolution; and
- Distribution costs would also be at risk of increasing significantly as Shell would be charged a rate out of its control for the use of the Sydney Metropolitan Pipeline owned by other parties. The precedence for this concern has been seen with supply from Port Botany to Sydney Airport, resulting in a significant loss of market share and profitability, and reduced supply security for the Sydney market.

Ultimately it was determined that the use of the existing Silverwater Terminal did not have sufficient capacity or project certainty in order to create an economically viable option for Shell.

5.2.4 Use of Existing Third Party Receiving Terminal

Shell also considered the possibility of commissioning the expansion of an existing third party terminal facility in the Sydney region to replace its existing Clyde Terminal facilities. The Botany Bay area in particular was considered as a potential location for such a new facility as shipping could potentially utilise Sydney Port Corporation's second Bulk Liquid Berth due for completion in mid-2013. The primary benefits of this alternative were that Shell would have been able to capitalise on the latest technologies and improvements in terminal design and processes. However, there were several significant drawbacks associated with this approach, including:

- The potential new locations considered were not suitable from a storage perspective as insufficient storage capacity exists to be able to provide the product volumes and hence, security of supply that is required and provided with the existing and proposed Clyde Terminal supply chain;
- The potential new locations considered had insufficient pipeline infrastructure needed to transfer the required petroleum products to the Clyde Terminal or an alternative distribution facility. This alternative was therefore cost-prohibitive when compared to existing infrastructure and could not be justified against the road transport alternative;
- The potential new locations considered did not have adequate truck loading infrastructure required to undertake the current distribution task and would involve a significant increase in levels of road transportation of fuel products to be delivered to the western regions of Sydney and beyond into regional NSW locations. This option would add to the existing traffic congestion surrounding Port Botany by adding 70 km to each of the approximate 56,250 return trips per annum for road tankers or an additional 67,500 hours of driving time to fulfil the distribution task from Port Botany. This alternative was therefore cost-prohibitive and unsustainable from a distribution and road-user perspective when compared to using the existing infrastructure proposed by the Project;
- Shell utilized some storage at Port Botany for distribution of finished petroleum products by truck and for some pipeline supply of Jet fuel to Sydney Airport until the end of 2013. The economics of these distribution options are poor when compared with the distribution economics of the Project so that moving more of, or even retaining the current, distribution task to these locations was not viable. The contracts in place are planned to cease at the end of 2013;
- Without complete control over the third party terminal ownership, management and operations, the risk exists whereby Shell might lose the ability to use this infrastructure. This could have significant impacts on

the NSW fuel market, as supply could essentially be cut off if parties could not agree on a suitable resolution;

- Establishing a new terminal to replace the Clyde Terminal would have also required a new pipeline for Jet fuel transfer to Sydney Airport to replace the current direct pipeline from Shell's Clyde Terminal as the current pipeline from Botany to the Airport is unable to supply the total Sydney Airport demand and would leave a supply vulnerability for the airlines, the airport, the public and the NSW economy. This would have resulted in additional costs that could not be economically justified; and
- The time investment in converting operations to a new location would have been significant, spanning years from initial project conception to purchasing appropriate land, obtaining approvals, constructing and commissioning new assets and decommissioning the current facilities.

Overall this proposed alternative was found to offer insufficient economic benefit to be considered a viable option. It was also considered inferior in terms of environmental outcomes, and would have also decreased short term supply continuity in comparison to other alternatives.

5.2.5 Do Nothing Approach

The Clyde Terminal is a critical piece of infrastructure providing an advantageous storage and distribution location for fuel supply to and beyond the growing urban area west of the Sydney metropolitan area and into regional NSW. In the event that Shell did not propose to convert the Clyde Terminal and modify the Gore Bay Terminal, Shell's operations would be confined to its existing storage, resulting in an inefficient supply chain for finished petroleum products.

This would be an inefficient arrangement, bearing significant additional costs and being unable to support the anticipated NSW finished petroleum product market growth. On many occasions the Clyde Terminal and associated distribution systems would be susceptible to shipping delays, potentially leaving the current market short of fuel and being unable to support growth within NSW. The Australian Institute of Petroleum predicts that growth in demand for fuel will continue in Australia – predominately for Diesel and Jet fuel – and that this would be largely met by imports in the future, further strengthening the price relationship with Asian fuel prices. It is therefore imperative for Shell to act now in order to remain competitive in the Australian fuel market (refer to **Section 4.2**) and to ensure sufficient capacity is available in the supply chain to meet current and future fuel demand.

The do nothing approach also ignores the economic realities of Shell maintaining an efficient and viable long term storage and distribution centre in the west of Sydney from which to supply the Sydney metropolitan area and into NSW. The current supply chain is inefficient and costly and cannot adequately support the NSW economic growth forecasts. Continuing these operations unchanged is not a viable financial option. As Shell supplies around 40 percent of Sydney's and NSW total fuel needs, and a significant proportion to the NSW market generally, jeopardising the future of these facilities can be expected to threaten the security of the local fuel market and limit growth of Sydney Airport.

5.3 Conclusion

The Project would enhance the viability of infrastructure required to facilitate the efficient import of finished petroleum products. Without the continued operation of the Clyde, Parramatta and Gore Bay Terminals, liquid fuel supply security would be hindered.

The current Project also involves no additional environmental footprint as it is located on an already developed and operating site, and capitalises on existing infrastructure and land assets owned by Shell. It also avoids many of the other issues that could be expected to arise from the alternative options outlined above.

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6.0 Project Description

6.1 Proposed Works

The key components of the Clyde Terminal Conversion Project 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; and
- Conversion of part of the existing Clyde Terminal assets to more efficiently receive, 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:

- Geodesic 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;
- Installation of new inlet manifold systems and remote valves with segregated product distribution piping to respective tanks;
- Reduction of the gas storage capacity of the Clyde Terminal from 10,851 m^3 to 1,550 m^3 to accommodate the continued receipt (by road tanker) and storage of Butane. Butane would continue to be dosed with winter grades of Gasoline;
- Upgrades to the electrical supply, control and safeguarding systems, including the replacement of substations;
- Increased automation of terminal systems;
- Installation of equipment to provide improved product quality segregation;
- Revised drainage and water treatment to suit reduced operations;
- Fixed fire system works, including:
    - Remote operation of foam and fire water to tanks and compounds as required;
    - Installation of two new firewater tanks in the current carpark area, West of tankfarm E1, as part of the upgrading of current tanks;
    - Installation and relocation of fire water pumps;
    - Installation of a new town mains water supply from street mains as make up water to replace the current source of water located in the proposed demolition zone;
    - Installation of a new fire and gas system to receive signals from existing fire detection systems such as the tank rim seal fire detection, and to activate the existing fire protection systems such as firewater deluge and foam system and the alert systems onsite; and
    - Installation of rim seal fire detection on all necessary operational tanks based on assessed risks and regulatory requirements.
- Revised pumping and piping works including:
    - Installation of a new import manifold to the pipeline approximately 100 m west of the existing manifold. This would include a sampling facility which would be drained to the slops tank. The new import/export manifold would include new tie-ins to the other pipelines at the Clyde Terminal;

- New distribution pipework to and from operational tanks, including the reuse of existing piping wherever possible;
- Installation of new pumps and valves wherever existing equipment is identified as unsuitable for the required service;
- Relocation of pipeline pigging facilities; and
- Installation of pig launcher and new piping connection.

- 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 as follows:

- Grading works would be undertaken surrounding Tankfarms B, B1, E1, E2 and K, and also surrounding Tanks 32 and 52 (which are to be demolished) to improve tankfarm drainage and general site drainage (refer to Figure 6-2). Excavations required as part of these works would be undertaken to an estimated depth of between 0.6 metres below ground surface (mbgs) and 1 mbgs; and
- Excavations to 300 mm to lay load-spreading concrete slabs for the new substations.

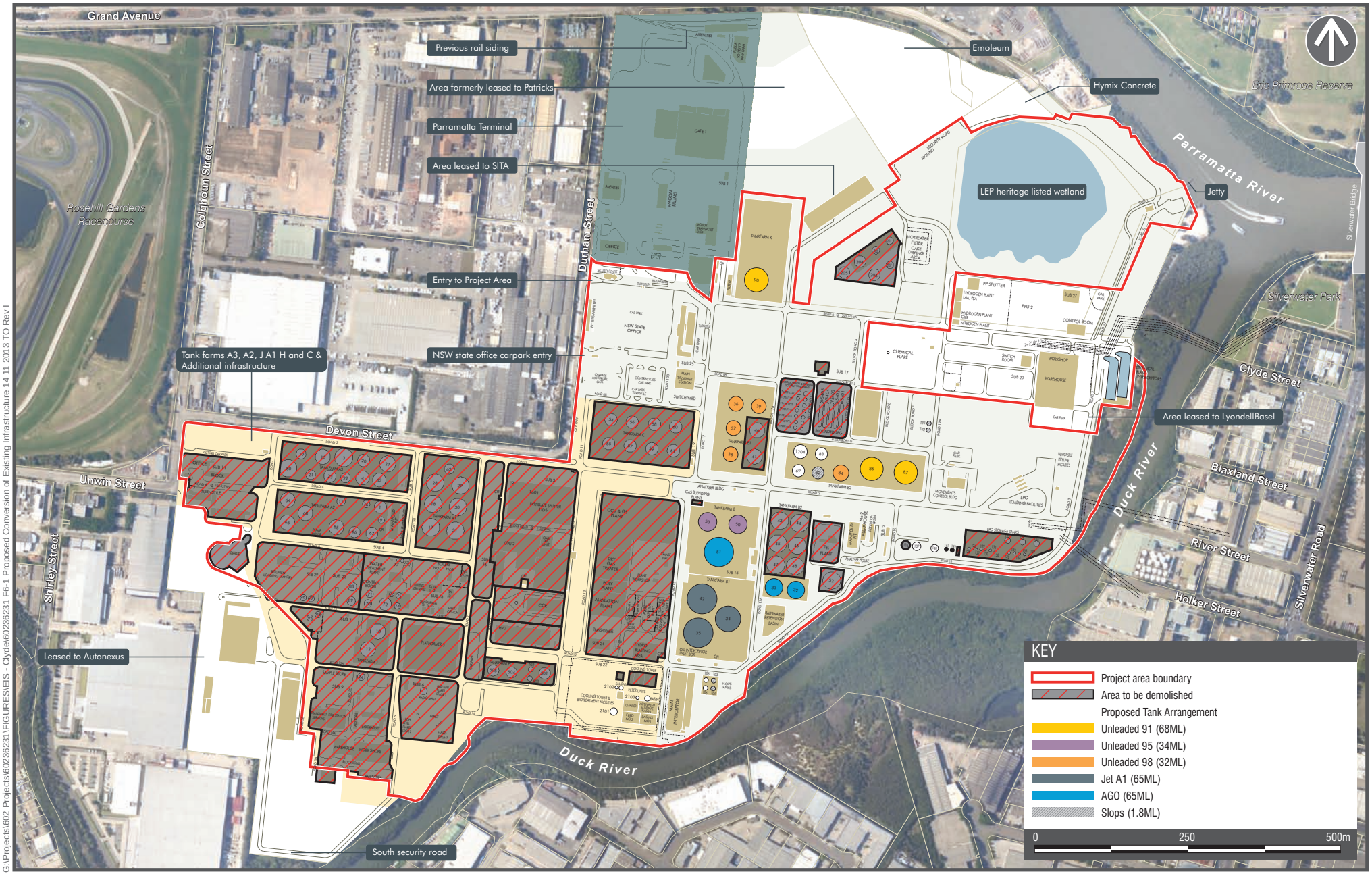
Conversion activities would generally upgrade the eastern section of the Clyde Terminal to contain the finished petroleum product tanks required for continuing Clyde and Parramatta Terminal operations. This area currently contains Crude Oil tanks, intermediate product tanks and finished petroleum product tanks formerly used in the refining operations at the Project Area (refer to **Figure 6-1**). Some of these Crude Oil and intermediate product tanks would be converted for use in storing finished petroleum products, replacing finished petroleum product tanks currently located in the western section of the Project Area to suit the requirements of the converted Clyde Terminal.

Decommissioning and decontamination of the remaining tanks and associated infrastructure in the eastern section of the Project Area (refer to **Figure 6-1**) has commenced. The western section of the Clyde Terminal mainly contains Crude Oil processing dosing facilities which are required for product specification improvement activities, Crude Oil intermediate product tanks, finished petroleum product tanks and associated infrastructure. Following the cessation of refining, these assets and processing units are no longer needed. Once all necessary approvals are obtained, this infrastructure would be demolished. It is expected that the demolition works would be completed within five to 10 years after development consent is granted. Some of the existing assets within this area would continue to be used for a period of time while conversion works occur in the eastern area of the Project Area to accommodate the ongoing Clyde Terminal operations.

Figure 6-1 shows the infrastructure in the western section of the Project Area that would be demolished as part of the Project.

Three new electrical substations would also be constructed as part of the proposed Project (refer to **Section 6.1.3**).

Details of these activities are provided in the **Section 6.1.1** to **Section 6.1.10**.



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PROPOSED CONVERSION OF EXISTING INFRASTRUCTURE

Clyde Terminal Conversion Project
Environmental Impact Statement

FIGURE 6-1

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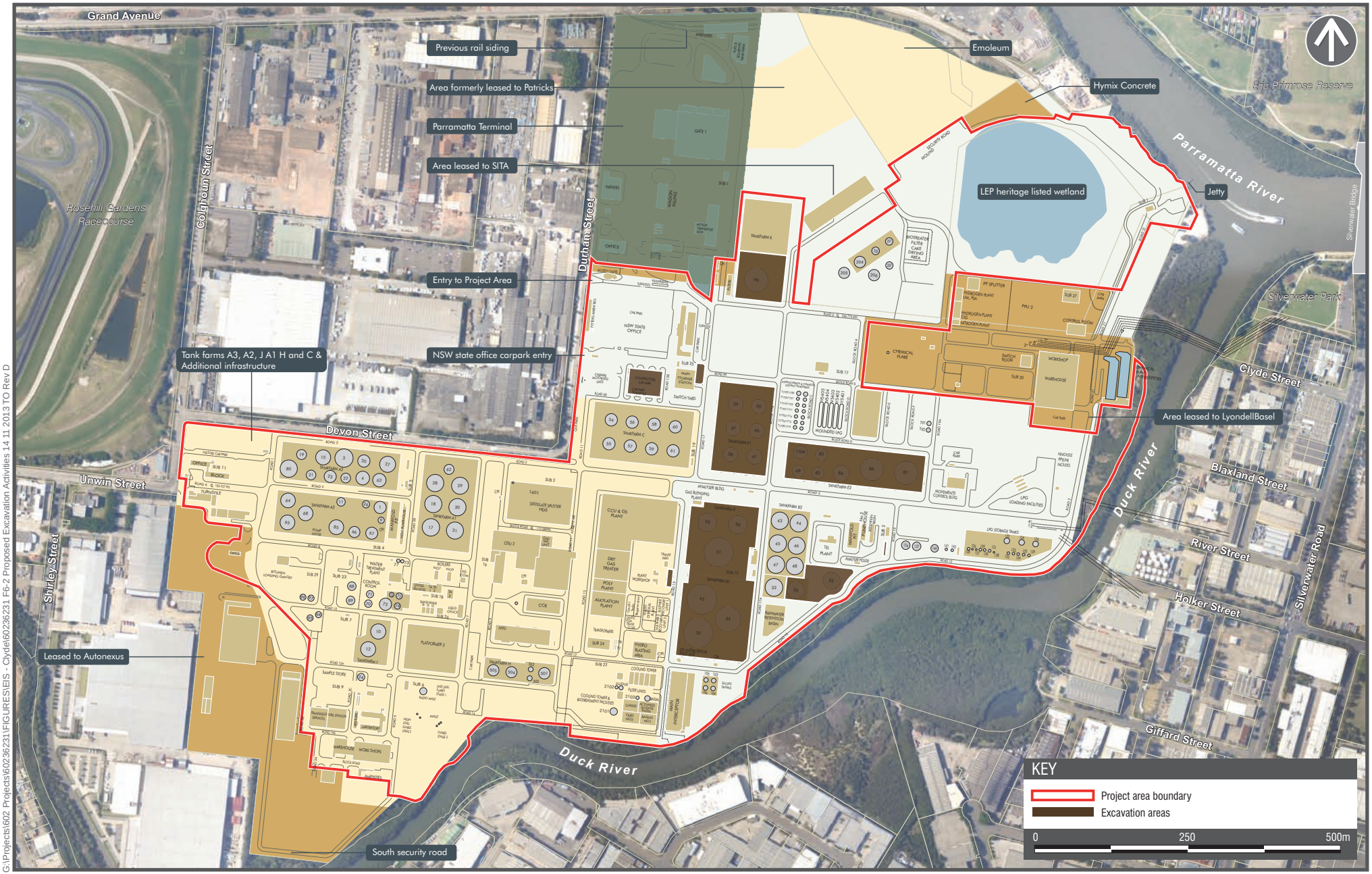

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PROPOSED EXCAVATION, PROFILING AND GRADING ACTIVITIES

Clyde Terminal Conversion Project
Environmental Impact Statement

FIGURE 6-2

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6.1.1 Demolition Works

Assets and processing units that are no longer required would be demolished and removed as part of the Project. The decommissioning and decontamination of these assets has commenced, and once all necessary approvals are obtained, this infrastructure would be demolished and removed as shown in **Figure 6-1**.

It should be noted that the scope of the demolition activities is for demolition to ground level only which may include some removal of existing foundations below the surface. Any further excavation works associated with remediation activities required at the Project Area would be the subject of a future development application separate from the current Project. Demolition activities which would be undertaken as part of the Project would comprise the following activities:

- Isolation and management of identified hazardous materials such as asbestos;
- Demolition to collapse structures to a level that allows the use of heavy machinery to cut the process equipment and piping for scrap recovery;
- Demolition using explosive techniques for a limited number of stacks at the Project Area (currently this is anticipated to be used for three stacks, but the number would be confirmed as part of the detailed demolition methodology);
- Civil works to remove some existing foundations below grade while other areas would be removed to grade; and
- Repair of drainage systems.

The demolition of redundant infrastructure at the Clyde Terminal is proposed to be undertaken in two phases.

The first phase of demolition is anticipated to commence within six months of the grant of development consent and be completed within two to three years. It would include demolition of the following infrastructure:

- Main processing area's Crude Distillation Unit and Catalytic Cracking Unit;
- Platformer 3 unit;
- Tankfarms A1 and H; and
- Bitumen loading gantry.

The second phase of demolition is anticipated to commence within 12 months of the grant of development consent and would be completed within five to 10 years. It would include demolition of the following infrastructure:

- Utilities plant;
- Redundant tankage and bund walls not required for the Clyde Terminal;
- Biotreater;
- LPG area; and
- Various associated buildings.

Figure 6-3 provides an indication of how these demolition activities are likely to be staged, however, this would be confirmed once the demolition and construction contractors are selected.

The methods employed for demolition activities would abide by the following methodology:

- For high level and interconnecting piping:
    - Selectively cut utilising oxy-acetylene; and
    - Bring to grade via crane;
- For columns, vessels, exchanger structures:
    - Collapse to a level enabling excavators to complete works with mechanical shears; and
    - Cut components up for scrap and transport the material offsite as work progresses.

- For furnaces and Boilers:
    - Demolish using mechanised equipment or deconstruct the furnaces or boilers to manage potential hazardous materials such as asbestos or mineral fibres.
- For stacks:
    - Decontaminate stacks containing asbestos seals or mineral fibres and then demolish either by dismantling the stacks in sections to grade by crane or by controlled explosion. A limited number of the stacks are planned to be brought to grade through the use of controlled explosion (this is currently anticipated for three stacks, but the number would be confirmed as part of the detailed demolition methodology). Appropriate asbestos management procedures would be put in place for asbestos removal (refer to **Section 20.3**).
- For storage tanks:
    - Mechanised demolition using equipment such as excavators equipped with hydraulic shears.
- For buildings:
    - Mechanised demolition.

All of the existing infrastructure in the western area of the Project Area would be removed (refer to **Figure 6-1**).

6.1.2 Tank Works

The western section of the Clyde Terminal mainly contains Crude Oil processing and dosing facilities which are required for product specification improvement activities, Crude Oil intermediate product tanks, finished petroleum product tanks and associated infrastructure. The eastern area of the Clyde Terminal currently contains Crude Oil tanks, intermediate product tanks and finished petroleum product tanks (refer to **Figure 6-1**). The Project would entail the change of the eastern section of the Clyde Terminal to contain the finished petroleum product tanks required for continued Clyde and Parramatta Terminal operations.

The majority of the Clyde Terminal's 36 currently operating tanks are divided into separate clusters of tanks, or tankfarms. Various other redundant tanks are located in other tankfarms in the western section of the Project Area and there are several tanks that are separate from an established tankfarm. The key operational tankfarms are: Tankfarms A1, A2, A3, B, B1, B2, C, E1, E2, H, J and K. All tankfarms comprise either External Floating Roof (EFR) tanks, Fixed Roof/Internal Floating Roof tanks (IFR) or a mixture of both. For a detailed description of the nature of these EFR and Fixed Roof tanks, refer to **Section 15.1**.

There has been a significant reduction in the number of tanks required for the current Clyde Terminal operations compared to the previous refining operations. The Project would reduce the number of fuel storage tanks at the Clyde Terminal from 113 to 16. At the completion of the conversion works, the tanks at the Project Area would include:

- Sixteen storage tanks for fuels, consisting of Unleaded grades 91, 95 and 98, Diesel (AGO), and Jet (A1) as shown in **Table 6-1**;
- Two existing butane spheres;
- Five existing slops tanks 82, 91, 92, 103 and 104;
- Two newly commissioned slops tanks to support two relatively smaller tanks. These slops tanks would be small (with 2,000L and 1,000L capacity, respectively); and
- Three new firewater tanks in the current contractor carpark to replace the two existing firewater tanks, which are to be demolished.

The capacity of storage for petroleum fuels at the Clyde Terminal would be significantly reduced following the conversion, from 638 ML to 264 ML for fuels, and from 10,851 m^3 to 1,550 m^3 for gas storage (Butane would continue to be used for dosing with Gasoline).

Table 6-1 shows the types of key tanks in each tankfarm that would be retained following the conversion works, their dimensions, the product they currently store and the finished petroleum product they are anticipated to store following the conversion.

Table 6-1 Proposed Future Use of Storage Tanks at the Clyde Terminal

Tankfarm	Tank Number[1]	Tank Type[1]	Height (m)	Previous Refinery Product	Finished Petroleum Product[1]
B	50	EFR	22.0	Crude	Unleaded 95
	51	EFR	22.0	Crude	Diesel (AGO)
	53	EFR	22.0	Crude	Unleaded 95
B1	34	Fixed/IFR[2]	12.8	Crude	Jet (A1)
	35	Fixed/IFR[2]	18.3	Crude	Jet (A1)
	42	Fixed/IFR[2]	18.3	Crude	Jet (A1)
B2	32	Fixed/IFR	16.0	F.O/Long Residue	Diesel (AGO)
	33	Fixed/IFR	16.0	F.O/Long Residue	Diesel (AGO)
E1	36	EFR	16.5	C.C. Gasoline	Unleaded 98
	37	EFR	16.5	C.C. Gasoline	Unleaded 98
	38	EFR	16.5	C.C. Gasoline	Unleaded 98
	39	EFR	16.5	Platformate	Unleaded 98
E2	84	Fixed/IFR	22.0	Gasoline	Unleaded 98
	86	EFR	22.0	Premium Gasoline	Unleaded 91
	87	EFR	22.0	Premium Gasoline	Unleaded 91
K	90	EFR	22	Unleaded Petrol	Unleaded 91

Note:

[1]These tank configurations and product allocations may change over time as required to meet market demand, and that this information therefore only represents an indicative proposed use of the Clyde Terminal tankfarms.

[2] It is proposed to install fixed roof geodesic domes on tanks containing Jet fuel.

Tanks which are to remain operational following the conversion works would be inspected prior to the conversion to ensure that they are in an appropriate condition to be used for continued operation as part of the Clyde Terminal. Following inspection, tanks to be retained would be repaired (e.g. painting, replacement of fittings, etc.) or converted as necessary before re-entering service to suit the proposed re-allocation of product to these tanks. It is proposed to convert Jet fuel tanks at the Project Area into IFR roof tanks with the addition of a new cone roof or geodesic dome.

Tanks which previously stored Crude Oil at the Clyde Terminal have already been emptied of product, except one tank which has been used to collect all remaining oily sludges from the previous Crude Oil storage tanks. Once this waste has been disposed of, all Class 3 (flammable liquid) and Packing Group I products (products that have a flashpoint less than 23°C and an initial boiling point not greater than 35°C) will have been removed from the Clyde Terminal.

As discussed in **Section 6.1**, decommissioning and decontamination of some of the surplus tanks that are no longer required at the converted Clyde Terminal has commenced, to prepare tankfarms for conversion or demolition as required. **Plate 3** and **Plate 4** show a selection of these tanks that are to be retained or demolished.

Plate 3 Tanks 53, 51, 42 and 35 to be Retained

Following the receipt of the necessary development approvals and by the completion of the conversion works, redundant infrastructure would ultimately be demolished and removed. Some of the existing assets in the western section of the Project Area would continue to be used for a period of time while conversion works occur.

Plate 4 Tanks 55, 57, 59 and 61 to be demolished

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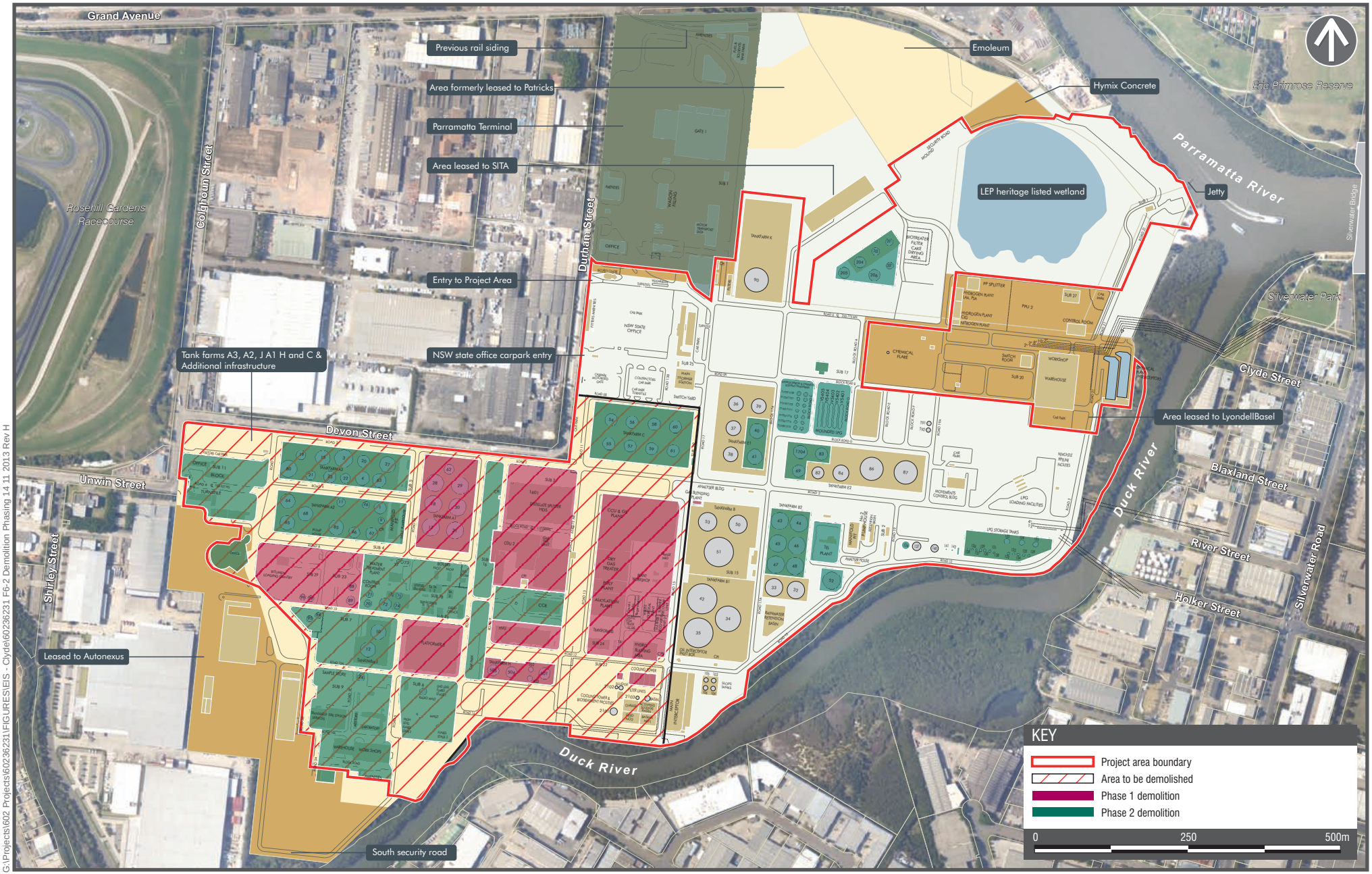

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DEMOLITION PHASING

Clyde Terminal Conversion Project
Environmental Impact Statement t

FIGURE 6-3

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6.1.3 Electrical and Instrumentation Works

The Project would involve upgrades to several electrical and instrumentation systems including upgrades to:

- Tank instrumentation and tank control systems to enable additional remote and automated control. Specifically, water tanks, pumps and fixed foam delivery would all become remotely operated;
- Inlet manifold systems and remote valves with segregated product distribution piping to respective tanks;
- Pumping and gantry supply piping systems;
- Site electrical systems, including the replacement of existing electrical distribution substations within the current footprint and the replacement of a number of switchboards;
- Fire protection and suppression systems, including the installation of a fixed fire system to replace the existing mobile fire service; and
- Safety shutdown systems.

Operation of the converted Clyde Terminal would be controlled from the Old Movements Control Room building.

6.1.4 Tank Overfill Prevention

Tank overfill would continue to be prevented through a combination of:

- An automatic tank level gauging system with multiple level alarms including: target fill level; high level alarm with time for appropriate operator action at each point and before the next level; an alarm point; and manual dips to prove the accuracy of the tank level gauging system;
- A final independent high-high alarm system that provides an alarm independent from the other alarms and tank level gauging system. This system provides for sufficient response time before overfill is anticipated to occur; and
- Operational readiness planning with procedural support.

In the highly unlikely event that there is a product overflow from a storage tank, product would be captured in the tank bunds. Following the removal of product from the tank bund, an incident specific clean-up plan would be developed which would include the recovery of as much product as possible when safe to do so, for future use or safe disposal.

The Project would involve the following improvements to bunding and spill management:

- Motorised valves would be installed on tanks to allow quicker closing and remote operation; and
- An upgraded oily water release system is also proposed to be installed for improved wastewater treatment within the Project Area, with further improvements in bund drains and drain valves as required.

Upgrades to the bund infrastructure would also be undertaken as required to ensure containment integrity.

Slops management at the converted Clyde Terminal (excluding interface slops) would be dealt with as follows:

- Slops resulting from the samples would be directed to 1 m^3 capacity self-contained potable Intermediate Bunk Container-style tanks before being pumped to the larger slops tanks;
- Product returned from retail sites, from the Hunter export pipeline pump pit and from Gore Bay Terminal pipeline pigging operations would continue to be pumped into the larger site slops tanks;
- Oily water entering the interceptor system would be recovered and pumped to the slops tanks;
- Two of the identified slops tanks would act as oil and water separation vessels with the water being returned to the interceptor system and the oil directed to the larger slops tanks; and
- The majority of slops created through normal operations would be re-used with only minimal volumes being sent offsite as prescribed waste. It is expected that less than two percent of slops generated from terminal operations would be sent offsite as prescribed waste in the final terminal operation.

6.1.5 Bunding and Spill Management

Existing tank bund walls would be inspected prior to the conversion works commencing to identify any necessary improvements to, or replacement of, existing bunds. Such improvements are part of ongoing operational practices already undertaken at the Clyde Terminal and are not necessarily specific to the current Project. However, where such improvements are undertaken as part of the proposed project activities, they are likely to include:

- Replacement of the existing bund walls; and/or
- Injection of concrete into the existing bund walls to strengthen the structure or repair identified faults.

Current systems in place to prevent overfill and spill incidents include:

- Log checklists carried out every shift by operators to ensure that equipment such as valves are in the correct position;
- Flow rate indicators fitted at the interceptors (water catchment area) to detect any unusual water flow rates which could indicate that the valves are in the incorrect position;
- Gas detectors installed to initiate an alarm when trigger levels are exceeded; and
- Clean up procedures in place should a spill occur within a bund.

6.1.6 Drainage and Surface Water Management

The Project would involve the following surface water and industrial water management at the Project Area (refer to **Section 13.1.2**):

- The seven existing Corrugated Plate Interceptors (CPIs) (refer to **Figure 13-1**) would continue to be used to treat Continuously Oily Contaminated (COC) water;
- The existing main interceptor would continue to be used to treat surface water;
- An additional phenol treatment facility would be constructed to aid in phenol removal from waste water; and
- The existing stormwater drainage system in the north-eastern section of the Project Area would continue to be used throughout the Project.

The catchment areas proposed for continued use would undergo minimal changes to their existing treatment facilities to ensure that wastewater continues to be effectively managed at the Project Area. Each catchment area currently in use has a combination of drainage classification as follows:

- Clean drain lines (both aboveground and underground) for clean stormwater is currently and would continue to be directly discharged to the river;
- COC water is currently and would continue to be captured via tank drainage; and
- Accidentally Oily Contaminated (AOC) water is currently and would continue to be captured by open drains or underground drains, and then directed towards retention basins or the main interceptor header box (Shell, 2012a).

Drainage arrangements would be upgraded where required as part of the Project to minimise both COC and AOC waters. In particular, each bulk storage tank would be fitted with a quick flush tank to ensure tank bottoms and sumps are kept water-free particularly after transfer from Gore Bay. Any water found in sumps would be diverted into the corresponding CPI via pneumatic pumps. Clean and dry product would be returned to the tank from the quick flush tank via a sealed system and a separate pneumatic pump set (Shell, 2012a).

For further details about the potential impacts of these upgrades, refer to **Section 13.1.2**.

6.1.7 Ancillary Works

The Project would involve other minor conversion works to site infrastructure to facilitate safe and efficient operations, including lighting, safety shutdown systems, improved product quality segregation, control room facilities and amenities.

6.1.8 Sewerage

Existing sewerage infrastructure would continue to be used. It is expected that the amount of sewerage generated would decrease significantly due to personnel numbers decreasing and improved wastewater facilities (refer to **Table 20-2**). Staff numbers have already reduced at the Project Area since the cessation of refining activities in late 2012. Details regarding waste management are provided in **Section 20.0**.

6.1.9 Natural Gas

Natural gas is currently used at the Clyde Terminal as a partial power source with electricity and self-manufactured gases and steam. Natural gas demand has reduced significantly following the cessation of refinery operations. The need for natural gas fired equipment would not be substantially reduced beyond current levels in the final Clyde Terminal configuration[1].

6.1.10 Gore Bay – Clyde Pipeline

Products that are imported via the Gore Bay Terminal are transferred to the Clyde Terminal via the 19 km underground pipeline (refer to **Figure 1-2**). The pipeline is designed to allow transfer of a variety of petroleum products and has been in service since 1962. The pipeline can also transfer product from the Clyde Terminal to the Gore Bay Terminal. The pipeline would continue to be used to transfer petroleum products between the Terminals. Shell does not intend to modify the existing pipeline, or to construct any additional pipelines as part of the current Project. Operation of the Clyde Terminal following conversion works is reliant on the continued transfer of finished petroleum products received by ship at the Gore Bay Terminal through this pipeline. Operation of the pipeline is not subject to this EIS.

6.2 Demolition and Construction Programs

Decontamination and decommissioning activities commenced at the Project Area in late 2012. Once all necessary approvals are obtained, further conversion works will be undertaken and surplus infrastructure would be demolished and removed.

Demolition would be completed in two phases over a period of five to 10 years. The first phase of demolition activities are anticipated to commence within six to 12 months of the receipt of development consent, and would be completed within two to three years. The second phase of demolition works would commence within 12 months of the grant of development consent and completed within five to 10 years. Construction activities are due to begin after the granting of development consent and would take approximately three years to complete. Demolition and construction activities would therefore occur concurrently for the first two to three years of the demolition and construction program, in addition to the ongoing operations of the Clyde Terminal.

Figure 6-3 shows the proposed demolition phasing of the Project according to the timeframe indicated in **Section 6.1.1**, subject to approvals. The first phase of demolition is anticipated to commence within six months of the granting of development consent. The second phase of demolition is anticipated to commence within 12 months of the granting of development consent. The conversion of the Clyde Terminal is expected to be completed within five to 10 years after the grant of development consent. During the demolition and construction periods, the fundamental operation of the Clyde Terminal is not expected to change significantly from the existing operations (refer to **Section 3.2**).

6.2.1 Demolition and Construction Personnel

Approximately 91 staff and 133 contractors would be required during the project works. Approximately 50 of the employed staff would undertake operations roles, whilst approximately 41 would be employed to oversee various aspects of the Project. Approximately 30 contractors would be required for demolition works, and about 70 for the construction works. The concurrent operation of the Clyde Terminal would also require approximately 33 operations contractors. Once the project works have been completed, the Clyde Terminal would require approximately 35 employees and 23 contractors.

Expected workforce numbers throughout the Project are provided in **Table 6-2**. It is important to note that these numbers indicate Shell's anticipated staff and contractor requirements, and are subject to further consultation. The numbers provided in **Table 6-2** do not reflect the total number of personnel that would be onsite at any one

[1] Natural gas usage attributable to Shell's operations within the Camellia Industrial Estate, is, however, anticipated to reduce significantly in the coming months due to reduced natural gas requirements of third party tenants leasing Shell-owned land adjacent to the Clyde Terminal.

time as the operational workforce operates on a shift roster and would therefore not all be onsite at the one time (e.g. there are five shifts, however, only two of them are located at the Clyde Terminal in a given day).

The staff and contractor workforce at the Project Area would fluctuate throughout the Project, depending on the type and extent of activities being undertaken at any one time.

Table 6-2 Clyde Terminal Current and Future Workforce Numbers

Phase	Employees	Contractors	Total
Current Operations	50 (including Clyde Modification Project Team)	33	83
Demolition / Construction (including concurrent operational personnel)	91	133	224
Operation upon completion of the Project	35	23	58

6.2.2 Construction Workforce Recruitment

The conversion works would be undertaken by various contractors in addition to Shell's current Clyde Terminal workforce depending on the particular phase of the Project. A Shell management team comprising experienced engineering and operational staff would be retained as part of the workforce to manage the works during the Project. A CEMP would be prepared for the construction works, and an overarching OEMP would be prepared for the ongoing operation of the converted Clyde Terminal (refer to **Sections 8.0** and **28.0**).

The successful demolition and construction contractors would also be required to provide a detailed waste management plan and tracking system that incorporates available recycling options. The safety criteria for the demolition and construction contractors would include the provision of safety management plans in line with current codes of practice and Shell Policy and standards.

The decommissioning and decontamination activities have been resourced from the former Clyde Refinery labour contingent of employees and contractors where possible. Shell would endeavour to appoint demolition and construction contractors with access to their own direct labour force. It is anticipated that the workforce would come almost entirely from within the Sydney metropolitan region, and where necessary, from the broader NSW regions, as is common practice. It is assumed that the majority of the workforce would commute to the Project Area daily by private vehicle or public transport.

6.2.3 Road Access

Road access to the Clyde Terminal is well established. Project-related traffic movements would be largely along 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. The Clyde Terminal can also be accessed from Parramatta Road via Wentworth Street, Kay Street and Unwin Street. The use of this route enables access to the Project Area without using James Ruse Drive or Grand Avenue.

It is not anticipated that any changes to access or local roads would be required to accommodate demolition and construction works, or the ongoing operation of the converted Clyde Terminal.

6.2.4 Construction Vehicles and Equipment

Demolition and construction vehicles and equipment would be mobilised to and from the Project Area at various times throughout the demolition and construction period. Vehicles and equipment would remain onsite for the entire period that they are required, except for the use of large cranes which would be used intermittently. The final timing and required equipment would be determined by the construction contractor as part of the detailed design. It is anticipated that the following plant and equipment would be required during the demolition works:

- Blasting equipment;
- Excavator equipped with mechanical shears;
- Trucks;
- Cranes; and
- Cutting Torch.

Construction equipment is anticipated to include:

- Pneumatic wrench;
- Trucks;
- Cranes; and
- Air Compressors.

Demolition and construction activities would be undertaken from 7am to 6pm, Mondays to Fridays, and 8am to 1pm on Saturdays. The converted Clyde Terminal would operate 24 hours a day, seven days a week. The demolition and construction works would require approximately 169 light vehicle trips per day to the Clyde Terminal to accommodate the additional workforce (refer to **Section11.2**). Demolition activities would see the addition of 16 heavy vehicles in each direction per day during demolition works to transport waste materials. Construction activities would require approximately one heavy vehicle trip per day to deliver construction materials and initially to mobilise construction plant and equipment. This is in addition to the approximate 257 heavy vehicles that currently access the Project Area and its adjoining Parramatta Terminal each day (250 per day accessing the Parramatta Terminal and seven per day accessing the Clyde Terminal), including fuel tankers, waste transport trucks, as well as other delivery and courier vehicles (refer to **Section 11.2**).The heavy vehicles entering the Clyde Terminal are expected to comprise 3-4 movements per day for Butane delivery and 2-7 for general and equipment deliveries as well as for waste removal.

It is not expected that the removal of assets from the site will involve oversized loads, however, if this is required, approvals from the necessary authorities will be arranged before these movements take place and a traffic management plan developed.

6.3 Future Operations

Once the conversion activities are complete, the Clyde Terminal would continue to operate as a finished petroleum products import, storage, product dosing, and distribution terminal. The Clyde Terminal would continue to comprise a range of infrastructure and facilities required for the purposes of operating a liquid fuel depot, including, but not limited to, tankfarms and associated valving and pipework, control rooms, pumping stations, gantries, administration facilities, warehouses, workshops, electrical sub-stations and associated infrastructure, water supply and treatment facilities, waste handling facilities, directional signage, fire fighting infrastructure, boat shed, a boat launching ramp and jetty, and other infrastructure required to operate a finished petroleum products terminal.

Vehicular traffic to and from the Clyde Terminal has reduced significantly since the cessation of refining in late 2012. This would increase marginally during the demolition and construction activities before reducing further once the conversion works are complete. Light vehicle traffic would be reduced compared to current operations. Once the works are completed, the number of light vehicle trips would be approximately 32 per day, which is approximately 20 percent fewer than the current number. Heavy vehicle movements are not predicted to differ significantly from the current operations (refer to **Section 11.2**).

Based on current demands for petroleum products, the throughput at the Clyde Terminal site is about 4,400ML per annum. It is expected that the throughput will increase over time in response to future demand, with market growth currently forecast at about 4 percent per annum. The current operation of Shell's infrastructure at Clyde, including the inward supply chain has the capacity to respond to this predicted growth for about 15 years. As technology improves, the life of the existing pipeline could also be extended. Further, the turnover of products stored in tanks at the Clyde Terminal is able to match the demand.

In the final terminal configuration, low volumes of waste would be generated as the efficiencies and asset changes allow greater control over product interfaces, improved tank water draining facilities are provided, redundant assets are removed and the terminal only receives only finished petroleum products. Expectations when comparing the prior refinery operations to other Shell terminal operations, the waste streams generated by the final terminal would be expected to be less than five percent of the waste generated by the refinery. This will continue to be treated as prescribed waste.

6.3.1 Future Relationship between the Clyde Terminal and Gore Bay Terminal Operations

Following completion of the Project, Gasoline would be transferred directly from tanker ship at the Gore Bay Terminal to the Clyde Terminal via the existing pipeline. Diesel and Jet Fuel received from tanker ship would be stored in tanks at the Gore Bay Terminal and subsequently transferred to the Clyde Terminal for distribution, or directly transferred from tanker ship to the Clyde Terminal via the existing pipeline. Gasoline, Diesel and Jet Fuel would be stored at the Clyde Terminal for between five and 10 days prior to distribution across Shell's pipeline network to the Parramatta Terminal, Silverwater Terminal, Sydney Airport and to Newcastle (refer to **Plate 5** below).

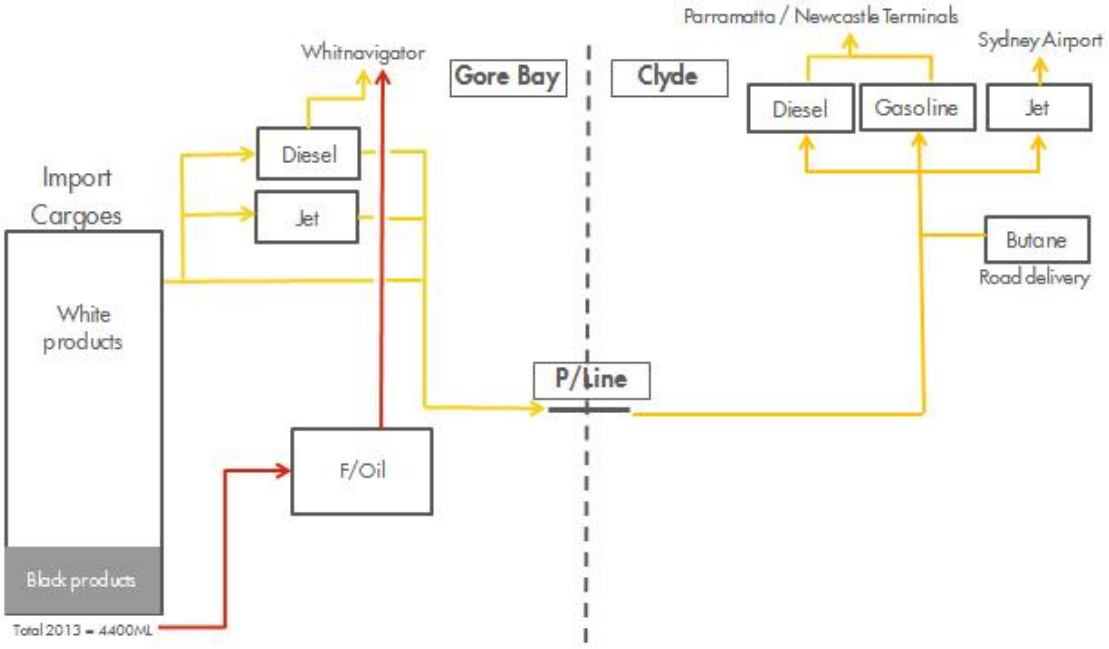

Plate 5 Proposed relationship between the Clyde Terminal and Gore Bay Terminal

6.4 Operational Workforce and Hours of Operation

As per current operations, operation of the converted Clyde Terminal would be undertaken 24 hours a day, seven days a week. It is expected that during operation of the converted Clyde Terminal there would be around 35 staff and 23 contractors with varying work patterns, including a mixture of 24/7 continuous shift rosters and standard Monday to Friday day hours. Employees would include tankfarm operators, movements controllers, administration, maintenance and engineering.

6.5 Environmental Management and Monitoring

6.5.1 Demolition and Construction

The conversion works at the Clyde Terminal would be undertaken in accordance with the site CEMP to manage actual and potential environmental impacts. The mitigation measures proposed in this EIS, and summarised in **Section 27.0**, including several issue-specific management plans, form part of the proposed Project works and would be implemented to avoid, minimise and mitigate potential impacts of these activities.

As the main overseer of the conversion activities, Shell would be ultimately responsible to ensure that it or its contractors organise and manage the following:

- Obtaining and ensuring the currency of all relevant licences, registrations and work permits required for the:
    - Demolition and construction works; and
    - Any oversized loads.
- Arranging for the necessary approvals and disposal of any contaminated demolition or construction waste at an appropriately licensed facility. The demolition and construction contractors would also be involved in obtaining these licences and approvals; and
- The provision of appropriate training to site personnel for the management and handling of hazardous materials.

For more details of these licences and approvals, refer to **Section 8.3**.

6.5.2 Operation

All operational activities would be planned and executed with regards to operational safety and environmental considerations, including monitoring and control activities. Prior to the commencement of operation of the converted Clyde Terminal, all site personnel would complete a training course in Safety and Risk Assessment in accordance with Shell's Health, Safety, Security and Environment Management Systems (HSSE-MS) standards. The site's Safety Management Plan and the OEMP would also be updated to align with the converted operation of the Clyde Terminal (refer to **Section 27.0**). These plans would be developed in conjunction with and communicated to relevant government and emergency services agencies.

6.6 Quality Assurance and Quality Control

6.6.1 Quality Management System

To ensure all conversion works undertaken at the Clyde Terminal are completed in accordance with applicable standards and regulations, Shell Global internal and Australian Standards would be applied during the Project with regard to design and engineering. The principal Australian Standard is *AS 1940-2004: The storage and handling of flammable and combustible liquids*, and there are approximately 55 other Australian Standards that would apply to the Project, in addition to four International Standards and 14 Industry Standards.

Since late 2010, significant work has gone into the design of the proposed converted Clyde Terminal with a number of workshops between consultant engineering organisations, Shell project personnel and Terminal Operations personnel to review and challenge the design from a number of perspectives, namely:

- Functionality and efficiency;
- Health and Safety;
- Environmental performance;
- Social and economic impacts; and
- Product quality.

These workshops have resulted in a design for the proposed converted Clyde Terminal that would ensure a safe, efficient and effective Clyde Terminal to deliver long-term economic benefits to Shell and the NSW economy.

Plans are in progress for construction safety and environmental controls during the demolition and construction works and would be finalised once the respective contractors are in place and development consents are granted.

To ensure quality procedures are followed during this Project, a specific Quality Management System would be implemented. This would include preparation of a Quality Assurance/Quality Control Plan (QA/QC Plan) that would establish the framework for the planning, implementation and assessment of quality management onsite. The QA/QC Plan would include:

- Policies, objectives and plans for Quality Assurance and Quality Control;
- Identification of the appropriate site authority at the Clyde Terminal;
- Identification of specific roles and responsibilities of employees at all levels;

- Quality management, procedures and practices to be undertaken onsite; and
- Measures to support the implementation of other onsite health, safety and environment policies.

6.6.2 Roles and Responsibilities

The Clyde Terminal Manager would be responsible for administration and implementation of the Quality Management System. The Clyde Terminal Controllers would act as 'champions' for the Quality Management System and would report to the Operations Manager. These Controllers would be responsible for the planning and implementation of the QA/QC Plan.

A specific project team within Shell has been established to undertake the conversion Project. This team is staffed by specialists from a range of fields to ensure the final design is functional, efficient, safe and environmentally sound while meeting the required statutory requirements and industry standards.

This team meets regularly with the Terminal Operations staff to ensure the design is effective and functions, and that management of plant and equipment handover between the teams is robust to prevent quality, safety and environmental incidents.

For more information about the roles and responsibilities of these Shell staff during the Project, refer to **Sections 8.2.2** and **8.2.3**.

6.6.3 Control of Non-Conformance and Corrective Action

Any non-conformance with the Quality Management System would be reported to the Operations Manager. The Clyde Terminal Controller would assist the Operations Manager in the control of non-conformances and the appropriate corrective action as set out in the QA/QC Plan.

6.6.4 Documentation and Communication Procedure

The Quality Management System would include a system to ensure that operational documents including drawings, specifications, reports and procedures are kept up-to-date as per current revisions and are communicated and distributed to staff.

Existing quality control documents and procedures would be updated and reviewed on a regular basis.

6.7 Additional Future Uses of the Project Area

There is the potential for sections of the Project Area to contain contamination which is unable to be assessed at this point in time, due to the presence of refinery assets. Following the removal of assets in the western and north-eastern sections of the Project Area, further investigations will be conducted. Preferred final uses of land within the western and north-eastern sections of the Project Area are therefore the subject of ongoing assessment (refer to **Section 14.2.1** for more detail). If required, remediation and development for future use of this area would be the subject of a separate assessment and approval (the Clyde Remediation and Redevelopment Application) in accordance with legislative requirements. If required, the findings of such an investigation would be used to develop a remediation plan in consultation with the EPA.

7.0 Environmental Planning Considerations

Relevant DGRs: The EIS must consider all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments.

7.1 Permissibility

The Project is located on land zoned as IN3 Heavy Industrial under LEP 2011. Under this zone, development for the purposes of a liquid fuel depot is permissible with development consent. Demolition of any building or works lying within the LGA is also permissible with development consent under LEP 2011.

7.2 Assessment Process

Under clause 8 of the SRD SEPP, the Project is declared to be SSD because it is permissible with development consent and is a type of development listed in Schedule 1 of the SRD SEPP. The Project meets two of these classifications under Schedule 1 of the SRD SEPP as it is:

- Development that would be classified as a MHF within the meaning of Chapter 9 of the Work Health and safety Regulation 2011 (WH&S Regulation) (clause 10(3), Schedule 1 of SRD SEPP); and
- Development that has a capital investment value of in excess of $30 million for the purpose of a liquid fuel depot (clause 10(2), Schedule 1 of SRD SEPP).

The Project would therefore be assessed and determined as SSD by either the PAC or potentially a senior executive of DP&I, by virtue of the Minister for Planning and Infrastructure delegating his consent authority role for SSD applications (with the exception of those whereby the proponent is a public authority), effective from 1 October 2011.

7.2.1 Continuing Use Rights

Shell's Clyde Terminal currently operates under a combination of continuing use rights (section 109(1) EP&A Act), and various development consents that have been granted to Shell by Parramatta City Council and the Minister for Planning and Infrastructure.

Shell began operating the former Clyde Refinery after it purchased the land in 1928. Refinery operations had already been conducted on the land prior to this date. These operations therefore commenced before the need to obtain development consent under the EP&A Act. Although various development consents have been obtained from Parramatta City Council and the Minister since then, these development consents, neither individually nor in combination, completely replaced the continuing use rights Shell exercises over the Clyde Terminal. The current SSD application therefore seeks development consent to replace all of these previous Council and Ministerial consents, as well as the continuing use rights that currently exist, with a modern planning approval which would authorise and regulate future operations at the Clyde Terminal.

For Shell to be able to rely on continuing use rights at the Clyde Terminal, it must show that the activities that are currently being undertaken, and which would be undertaken during the Project are permissible under LEP 2011. None of the operations that Shell are currently undertaking or are proposing to undertake at the Clyde Terminal during the Project can be classified as prohibited under LEP 2011.

LEP 2011 lists the types of development that are prohibited on land zoned IN3 Heavy Industrial. All other development that is not prohibited is stated to be permissible with development consent. The Clyde Terminal has been used, and will continue to be used, for the purposes of a heavy industrial storage establishment, which is defined under LEP 2011 as:

a building or place used for the storage of goods, materials, plant or machinery for commercial purposes and that requires separation from other development because of the nature of the processes involved, or the goods, materials, plant or machinery stored, and includes any of the following:

(a) a hazardous storage establishment,

(b) a liquid fuel depot,

(c) an offensive storage establishment.

Liquid fuel depot is further defined in LEP 2011 as “premises used for the bulk storage of petrol, oil, petroleum or other inflammable liquid for wholesale distribution and at which no retail trade is conducted.” The Clyde Terminal is properly characterised as a heavy industrial storage establishment for the purposes of a liquid fuel depot.

The activities currently undertaken at the Clyde Terminal, and those which would be carried out during the Project, are permissible with development consent under LEP 2011.

A list of development consents applicable to the Project Area are provided in **Table 7-1**.

Table 7-1 Development Consents Applicable to the Project Area

DA	Year DA was approved	Details of DA
DA/205/2013	2013	Construction of a new concrete slab and fire water storage tank. (Submitted: 15/04/2013).
CC/147/2013	2013	Construction of a new concrete slab and water tank at industrial premises. (Submitted: 15/04/2013).
DA/65/2012	2012	Construction of a building for use as a dangerous good store for an existing plastic production plant. The development is defined as a "Nominated Integrated Development" as an activity approval is required under the Water Management Act 2000. (Submitted: 06/02/2012).
DA/90/2012	2012	Construction of Replacement Vapour Recovery Unit (VPU) at the Shell Refinery, Clyde. (Submitted: 15/02/2012).
DA/925/2010	2010	Installation of an automated crude dehydrator to replace existing manual system. (Submitted: 17/11/2010).
DA/87/2009	2009	Refurbishment of administration precinct, within the Shell refinery complex. (Submitted: 19/02/2009).
DA/103/2008	2008	Alterations and additions to the existing Basell Polypropylene Plant within the Shell Refinery complex including the provision of a water cooling tower. (Submitted: 18/02/2008).
TA/306/2008	2008	Removal 1 Tree (Submitted: 05/05/2008).
TA/364/2008	2008	Removal of 2-4 Trees (Submitted: 29/05/2008).
DA/695/2008	2008	Construction of a workshop within Shell's Clyde Refinery. (Submitted: 23/09/2008).
DA/912/2008	2008	Alterations and additions to the Shell Employee Credit Union Building within the Shell Refinery Complex, including the placement of a pre-fabricated portable office building on the site with an associated walkway. (Submitted: 27/11/2008).
CC/722/2008	2008	A pre-fabricated portable office with a linkway connection to an existing brick veneer office. (Submitted: 27/11/2008).
DA/07/0067	2008	Hydrodesulphurisation unit upgrade of existing unit and associated infrastructure to reduce sulphur content in Diesel (HDS2).
DA/06/0013	2008	Upgrade to fluidised catalytic cracking unit .
DA/26/2007	2007	To install 4 underground storage tanks in the existing Shell Clyde Refinery. (Submitted: 16/01/2007).
DA/96/2007	2007	Storage and distribution of motor vehicles, and for the premises to be used for the registration of and/or wholesale of motor vehicles. No public access to the site is permitted. (Submitted: 12/02/2007).
DA/163/2007	2007	Alterations and additions to a wholesale car distribution yard including the installation of portable building, tree removal, landscaping and removal of a portion of the hail netting. (Submitted: 05/03/2007).
DA/184/2007	2007	Alterations and additions to a wholesale car distribution yard including the installation of a fuel dispensing facility. (Submitted: 13/03/2007).
DA/296/2007	2007	Installation of four 110kL underground storage tanks for the storage of neat ethanol. (Submitted: 20/04/2007).
DA/397/2007	2007	Installation of one 30kl underground storage tank for storage of petroleum slops within the Shell Refinery complex. (Submitted: 25/05/2007).
DA/769/2007	2007	Demolition and alterations and additions to old lift and stairwell (Submitted 17/09/2007).
DA/769/2007	2007	Demolition and alterations and additions to old lift and stairwell (Submitted: 17/09/2007).
DA/975/2007	2007	Construction of two new awnings and provision of additional waste types at the existing resource recovery facility. (Submitted: 12/11/2007).

DA	Year DA was approved	Details of DA
DA/163/2007/A	2007	Section 96(1a) modification to approved alterations and additions to a wholesale car distribution yard. Modifications include: 1. Addition to an existing office; and 2. Modification and replacement of an existing carport structure. (Submitted: 13/12/2011).
TA/849/2006	2006	Pruning of 42 Tree/s (Submitted: 28/09/2006).
DA/1022/2006	2006	Construction of two metal cat walks within the Shell refinery site. (Submitted: 10/11/2006)
CC/752/2006	2006	Construction 2 metal catwalks (Submitted: 10/11/2006).
TA/277/2005	2005	Removal of 5 trees (Submitted: 03/03/2005).
TA/597/2005	2005	Removal of 41 trees (Submitted: 31/05/2005).
DA/222/2006	2005	Construction of a 26,000m3 unleaded petrol storage tank (known as Tank No. 93) within Tank Farm K in the Shell Clyde Refinery. (Submitted: 24/03/2006)
TA/399/2006	2005	Removal of 1 Tree (Submitted: 16/05/2006).
DA/967/2004	2004	Use of part of an existing building as a cafe. (Submitted: 03/08/2004)
DA/1023/2004	2004	Reduction in height of existing above ground storage tank No 28 within the Shell Refinery complex. (Submitted: 13/08/2004)
CC/595/2004	2004	Reduction in height of storage tanks (Submitted: 24/09/2004).
DA-140-6-2004i	2004	Benzene reduction unit – Mogas improvement .
TA/388/2003	2003	Removal of 37 trees Various species In decline & inappropriate location (Submitted: 25/02/2003).
DA/764/2003	2003	Minor alterations to existing amenities/office building (Submitted: 14/04/2003).
CC/206/2003	2003	Minor alterations to existing amenities/office building (Submitted: 14/04/2003).
DA/2145/2003	2003	To erect and operate a waste transfer reprocessing and resource recovery facility. (Submitted: 02/12/2003)
DA/2145/2003/A	2003	Amended application to rotate the footprint of the office building, increase the length of the storage building by 18 metres and reconfigure the footprint of the waste processing building. (Submitted: 03/11/2004)
	2002	Establishment of proposed landfarm area.
DA/868/2001	2001	Alterations to the existing amenities building (Submitted: 15/05/2001).
CC/363/2001	2001	Alterations to the amenities building (Submitted: 15/05/2001).
DA/2384/2001	2001	to construct land farming facility (oily sludge) ancill to existing refinery (Submitted: 11/12/2001).
	2001	Gasoline tankage construction.
DA/249/09/01	2001	Upgrade to Hydrodesulphurising unit (HDS1).
DA/284/1999	1999	Use part of the site for car storage, including. erection of nail netting, etc. (Submitted: 03/03/1999).
CC/228/1999	1999	alterations to existing refinery plant (Submitted: 03/03/1999).
DA/1612/1999	1999	Erection of silos for the transfer, storage & distribution of polypropylene (Submitted: 20/10/1999).
DA/1661/1999	1999	Erect a prefabricated housing module to be used as a display & admin. office, part of shell (Submitted: 27/10/1999).
DA/176/1997	1997	Erect a vapour storage tank and associated pipework. (Submitted: 07/04/1997)
DA/378/1997	1997	The erection of a twin pylon sign. (Submitted: 07/07/1997)
DA/28/1996	1996	additions to the side of the existing control room (Submitted: 09/01/1996).
DA/405/1996	1996	an industrial storage shed (Submitted: 05/07/1996).
DA/7/1995	1995	Refurbishing of the existing office building, with a minor atrium extension (Submitted: 05/01/1995).
DA/112/1993	1993	To construct a new rail tank car loading facility and extend the railtracks. (Submitted: 03/03/1993)

DA	Year DA was approved	Details of DA
DA/172/1993	1993	Construction of a selective hydrogenation unit (Butane/Butlene Treater) (Submitted: 24/03/1993).
	1993	Laboratory upgrade.
	1993	Polypropylene solids handling upgrade.
DA/4233/1992	1992	Monomer Recovery Project (Submitted 21/02/1992).
DA/5819/1992	1992	Request for modification of council's consent for the erection of a bulk store and admin building (Submitted: 16/03/1992).
DA/11078/1992	1992	Construction of a new gatehouse fire tender parking area and associated new concrete roadworks (Submitted: 29/05/1992).
DA/14244/1992	1992	Installation of one additional cell to the water cooling tower (Submitted: 08/07/1992).
DA/26534/1991	1991	Bitumen loading gantry (Submitted: 11/07/1991).
DA/42517/1991	1991	One analyser house (Submitted: 23/12/1991).
NA	1991	Hydrogen purification plant.
NA	1991	Bitumen substation installation.
NA	1991	Provision of drainage connection to river.
NA	1990	Prefabricated analyzer house installation.
NA	1990	Platformer 3 motor upgrade.
NA	1990	Refinery drainage upgrade.
NA	1990	Alkylation operator amenities building.
NA	1989	Poly II construction.
NA	1989	Alkylation plant change room.
NA	1988	Construction of catalytic reformer and gas turbine co-generation units.
NA	1988	Canteen awning.
NA	1987	Construction of new control centre.
NA	1987	Hydrocarbon gas absorption unit.
NA	1986	Installation of second desalter unit.
NA	1986	Interceptor drainage improvements.
NA	1986	Catalytic cracking unit auxilliary control room extension.
NA	1986	Administration building gatehouse and entrance Colquhoun St.
NA	1986	Polypropylene blend bunkers.
NA	1986	Main office building extension.
NA	1986	Establishment of a solid waste drying facility.
NA	1985	LPG recovery facility.
NA	1985	TA3 building.
NA	1985	CPU 5600 LPG recovery system.
NA	1985	Fire bin work area.
NA	1985	Turbo alternator No.3.
NA	1985	Catalytic reformer and gas turbine co-generation.

DA	Year DA was approved	Details of DA
NA	1984	Construction of Platformer II Texas tower.
NA	1984	Construction of oil storage tanks for interceptor skimming.
NA	1984	Improved heat recovery system.
NA	1984	Excess stabliization biomass drying area.
NA	1984	Storage and mooring facilities and skimmer boat Clyde wharf works.
NA	1984	Oil boom, work boat and oil skimming at wharf.
NA	1982	Construction of Crude Distillation Unit Column C304.
NA	1982	Construction of oil storage tank 12.
NA	1982	Consruction of oil storage tank 90.
NA	1981	Construction of polypropylene unit warehouse awning.
NA	1981	Berthing facilities upgrade.
NA	1981	Construction of new distillation column.
NA	1981	Mesityl oxide storage tank.
NA	1981	Construction of awning at loading/unloadingarea for PPU warehouse.
NA	1980	Installation of mounded LPG bullets.
NA	1980	Construction of oil storage tanks 88 and 89.
NA	1980	Construction of main transformer substation no.2.
NA	1980	Construction of field office.
NA	1980	Construction of Rosehill Service Station.
NA	1980	Repairs and upgrades to Parramatta River wharf.
NA	1980	Construction of 2 tanks for batching hexylene glycol.
NA	1980	Construction of 1 solvent tank.
NA	1980	Field office, drawing office, training centre construction.
NA	1980	Construction of 2 new water tanks.
NA	1980	Construction of tanks 737 A/B.
NA	1979	Construction of Boiler no.9.
NA	1979	Crude Distillation Unit control room extension.
NA	1979	Ethylene plant modifications.
NA	1979	Construction of LPG storage facilities.
NA	1979	Conversion of existing office, workshop/amenities, provision of additional car parking and extension of loading platform.
NA	1978	Install Crude Distillation Unit heat recovery plant.
NA	1978	Installation of building No.3 for quality testing instrumentation.
NA	1978	Installation of building No.2 for quality testing instrumentation.
NA	1978	Operators amenities building extension project.
NA	1978	Polypropylene storage silos.

DA	Year DA was approved	Details of DA
NA	1978	Installation of radio antenna on main administration building.
NA	1977	Installation of a sulphur reduction unit.
NA	1977	Modify and extend the Crude Distillation Unit control centre.
NA	1977	Extension to substation V.
NA	1977	Extension to substation No.6.
NA	1977	Construction of oil storage tanks 86 and 87.
NA	1977	Installation of building No.1 for quality testing instrumentation.
NA	1977	Construction of butane storage spheres.
NA	1977	Construction of 4 buildings for testing instruments and amenities.
NA	1977	Construction of heat recovery unit.
NA	1977	Construction of Cataylitic Cracking Unit and Alkylation complex.
NA	1976	Additional sour water stripper.
NA	1976	Construction of substation No.23.
NA	1976	Catalytic Cracking Unit control room extension.
NA	1976	Catalytic Cracking Unit Colum C404 installation.
NA	1976	Installation of an additional bathroom facility in the training centre.
NA	1976	Construction of gas oil storage.
NA	1976	Construction of epikote storage tanks.
NA	1976	BDA project office.
NA	1976	Flare area modifications.
NA	1976	Polypropylene rain shelter.
NA	1976	Sour water stripping unit and sulphur recovery unit.
NA	1976	Chemical solvents plant.
NA	1976	CCU control room and substation no.5.
NA	1976	Construction of Sulphur Recovery Unit.
NA	1976	Construction of electrical substation.
NA	1975	Epikote plant extention.
NA	1975	BDA rebuild.
NA	1975	Construction of tankfarm H and tanks.
NA	1975	Construction of gas oil storage.
NA	1975	Bus shelter and bike storage.
NA	1975	Installation of substation No. 24.
NA	1975	Building of gatehouse and change rooms.
NA	1975	Construction of fire training grounss.
NA	1975	Tank 505 oil storage tank.
NA	1975	Butane de-asphalting unit.

DA	Year DA was approved	Details of DA
NA	1975	Construction of 600t Butane storage vessel.
NA	1975	Primary crude distillation unit expansion.
NA	1974	Construction of Movements Control Room.
NA	1974	Construction of oil storage tank 4.
NA	1974	Polypropylene loading facilities.
NA	1973	Laboratory bottle loading platform.
NA	1972	Main refinery entrance modifications.
NA	1971	Polypropylene Unit upgrade project.
NA	1971	Lawn locker.
NA	1971	Construction of fire station extension.
NA	1971	Shelter for Siebe Gorman trolley.
NA	1970	Constructionof contractor amenities building.
NA	1970	Construction of oil storage tanks 93, 85, 84.
NA	1970	Power station installation.
NA	1970	Construction of oil storage tanks 84, 85 & 93.
NA	1969	Polypropylene Unit plant.
NA	1969	CO boiler.
NA	1968	Installation of interceptor adjacent to Duck River.
NA	1968	Construction of oil storage tank 33.
NA	1968	Construction of laboratory and office extention for No.2 pumphouse.
NA	1968	Refinery drainage system modifications.
NA	1967	Installation of hydrocarbon solvents unit and chemical solvents unit.
NA	1967	Construction of chemical and hydrocarbon solvents plant.
NA	1967	Refinery extension for capacity increase.
NA	1966	Extension to sewer system.
NA	1966	Construction of new hydrotreater and boiler.
NA	1966	Construction of 2 concrete chimney stacks.
NA	1966	Construction of CDU and NDT stacks.
NA	1966	Construction of control room and switchrooms.
NA	1966	Installation of cool water pump.
NA	1966	Construction of heat exchanger.
NA	1966	Construction of polypropylene storage sphere.
NA	1966	Construction of polypropylene bullets V134/135.
NA	1966	Construction of oil storage tanks 50 & 51.
NA	1966	Construction of boiler no.7.
NA	1966	Construction of polypropylene treater and splitter units.

DA	Year DA was approved	Details of DA
NA	1966	Construction of chimney stack.
NA	1966	Construction of CDU, Hydrotreater, Tail gas treater, polypropylene/propane splitter, 7 oil storage tanks and utilities.
NA	1965	Modifications to roadway 9 and 12.
NA	1962	HVU Control room.
NA	1962	Construction of ethylene plant, control room, tea room, wet weather and field stores.
NA	1962	Construction of catalyst store building.
NA	1962	Addition to the Catalytic Cracking Unit control room.
NA	1961	Construction of LPG storage.
NA	1961	Crude oil storage tanks.
NA	1961	Waiting room and pay office construction.
NA	1960	Major extension to the Clyde Refinery.
NA	1958	Solvents tank fire water and foam lines.
NA	1957	Construction of oil storage tank 34.
NA	1957	Construction of vacuum bitumen plant.
NA	1957	Renovation and modifications to solvents plant.
NA	1957	Construction of column 5501.
NA	1956	Construction of 3 monocrete residences.
NA	1952	Construction of amenities building.
NA	1951	Construction of laboratory.
NA	1949	Construction of workshop.
NA	1949	Construction of lubricating oil refinery processing units and storage tanks.
NA	1949	Construction of various refinery buildings.

7.3 Environmental Planning Instruments

The following environmental planning instruments include provisions relating to issues that would or may be relevant to the environmental impact assessment of the Project and the relevant provisions have been considered in the EIS:

- LEP 2011;
- SRD SEPP;
- *State Environmental Planning Policy No.33 – Hazardous and Offensive Development* (SEPP 33);
- *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55); and
- SREP 2005, a deemed SEPP.

The following State Environment Planning Policies were considered to be potentially relevant to the Project. After further consideration, it was determined that these SEPPs do not relate to the Project:

- *State Environmental Planning Policy No. 71 - Coastal Protection*. The Project does not fall within the NSW Coastal zone, and this SEPP is therefore not relevant;

- *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides that development for the purpose of a pipeline may be carried out by any person without consent if that pipeline is subject to a licence under the *Pipelines Act 1967* or under the *Gas Supply Act 1996*. However, the pipeline connecting the Gore Bay Terminal with Clyde Terminal would not be subject to development as part of the Project. Clause 104 of the Infrastructure SEPP also provides that traffic generating development triggers further requirements for consultation with the RMS in relation to traffic numbers and site access. However the Project does not involve the development of a new premises, nor does it involve the enlargement or extension of an existing premises. Furthermore, traffic movements as a result of the Project are anticipated to represent an overall decrease compared to the traffic currently generated by the Clyde Terminal (refer to **Section 11.2**). As such, Infrastructure SEPP does not require further consideration; and
- The *Sydney Regional Environmental Plan No. 28 – Parramatta* (Parramatta Plan 28), a deemed SEPP. Clause 1.9 of LEP 2011 provides that the Parramatta Plan 28 does not apply to land within the Parramatta LGA that is already dealt with by LEP 2011. As a result, Parramatta Plan 28 does not apply to the Project Area.

7.3.1 Parramatta Local Environmental Plan 2011

The Project is situated on land within the Parramatta LGA which falls under LEP 2011.

Heavy Industrial Zoning

LEP 2011 provides that a consent authority must have regard to the relevant land use objectives when determining a development within the IN3 Heavy Industrial zone. A consideration of these land use objectives is provided in **Table 7-2**.

Table 7-2 Land Use Objectives of Zone IN3 Heavy Industrial under LEP 2011

Objective	Consideration
To provide suitable areas for those industries that need to be separated from other land uses.	The converted Clyde Terminal would retain the status of a MHF consistent with that of the former Clyde Refinery. It is appropriate for these operations to continue to take place within the Camellia Industrial Estate where they are separated from other more sensitive land uses, such as public recreation and residential uses.
To encourage employment opportunities.	Whilst the Project ultimately results in a small decrease in the number of Shell employees in Sydney, it ensures the financial viability of the Clyde Terminal, and thus supports ongoing employment for a number of existing staff. This is preferable to Shell not undertaking the Project and allowing the Clyde Terminal and associated Gore Bay Terminal (subject to a separate development application) to further decrease in profitability, which would lead to closure of both sites. This would result in a complete loss of employment at these sites.
To minimise any adverse effects of heavy industry on other land uses.	The Project would reduce the overall hazard profile of the Project Area, thus minimising the risk of potential adverse impacts to other land uses in the area.
To support and protect industrial land for industrial uses.	The Project capitalises on the current infrastructure situated in the Project Area, and therefore maintains the industrial use of this land. Surplus land would be made available in the western and north-eastern portions of the Project Area as a result of the Project. Whilst Shell cannot commit to a future use for this land, it is anticipated that this land would be suitable for some sort of industrial use in the coming years (refer to **Section 14.2**).
To allow a wide range of industrial and heavy industrial uses serving the Greater Metropolitan Area of Sydney and beyond.	The Project would ensure that the Clyde Terminal continues the vital service of supplying fuel products within Sydney and to the wider NSW region.

Objective	Consideration
To ensure that opportunities are not lost for realising potential foreshore access on land that is contaminated and currently not suitable for public access.	The Project maintains the viable use of foreshore land that has the potential to be contaminated and might therefore be unsuitable for public use, and which in any event remains unavailable for public use.

An analysis of how the Project is compatible with further strategic planning objectives that relate to the Project Area is provided in **Section 14.2**.

Riparian Land and Waterways Zoning

Clause 6.5 of LEP 2011 provides that, before determining a development application for development on land that is zoned Riparian Land and Waterways, a consent authority must consider any adverse impacts of the proposed development on riparian land and waterways.

As outlined in **Section 2.3.1**, the southern and eastern boundary of the Project Area runs along a strip of land adjacent to Duck River which is classified as Riparian Land and Waterways under LEP 2011. This land contains mangroves and other riparian vegetation that was largely planted by Shell as part of a rehabilitation program during the 1980s and 1990s. Whilst this land is within the Project Area, it falls outside of the actual footprint of project works. LEP 2011 further identifies this strip of land as a heritage listed wetland.

There is another remnant wetland classified as a heritage item under LEP 2011 that lies within the north-eastern portion of the Project Area, but which would also fall outside the project footprint due for conversion works (refer to **Figure 6-3** for an indication of proposed demolition locations). This wetland is designed to receive clean waste water from the Project Area. Furthermore, part of the Project Area is affected by the 1:100 year flood event as outlined in the *City of Parramatta Local Floodplain Risk Management Policy* (Parramatta City Council, 2006a) (refer to **Section 13.1.3**). As a result, LEP 2011 provides that development consent must not be granted for the Project unless the consent authority is satisfied that the development is not likely to cause destruction of riparian vegetation (Clause 6.3(d)). **Sections 17.2.4** and **16.3** of this EIS have concluded that the Project would not impact on this riparian vegetation.

Further information about the compatibility of the Project with these objectives is provided in **Section 14.2**.

Heritage Zoning

Clause 5.10(2) of LEP 2011 provides that consent is required for development that involves demolishing, moving, altering, disturbing or excavating heritage items, or erecting a building on land or subdividing land where a heritage item or heritage conservation area is located. While the Project Area contains LEP 2011 Heritage listed wetlands, and is adjacent to several items zoned for heritage protection under LEP 2011 (refer to **Section 2.3.1**), the Project is unlikely to involve any of the abovementioned activities in relation to these listed heritage items. However, as detailed in **Section 18.0** and **Appendix E**, the Project would impact items of heritage significance that are not identified in LEP 2011, and an appropriate level of assessment of these impacts has been undertaken.

7.3.2 State Environmental Planning Policy (State and Regional Development) 2011

The SRD SEPP identifies development that can be classified as SSD, or State significant infrastructure, and confers certain powers on joint regional planning panels to determine development applications. As outlined in **Section 7.2**, the Project is classified as SSD.

7.3.3 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

State Environmental Planning Policy No.33 – Hazardous and Offensive Development (SEPP 33) requires a consent authority to consider whether a development may constitute a hazardous or offensive industry. SEPP 33 defines potentially hazardous industry as:

"development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

(a) to human health, life or property, or

(b) to the biophysical environment, and includes a hazardous industry and a hazardous storage establishment."

Potentially offensive industry is defined under SEPP 33 as follows:

"development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment."

The Project would be defined as a potentially hazardous industry and potentially offensive industry. A Preliminary Hazard Analysis (PHA) has therefore been prepared to accompany the development application, and has concluded that the proposed Project does not present a significant risk to surrounding land uses and meets the requirements of SEPP 33 in terms of risk management (refer to **Section 19.0**). The PHA and assessments presented in this EIS demonstrate that Project would not constitute hazardous industry or offensive industry.

7.3.4 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No.55 – Remediation of Land (SEPP 55) provides that a consent authority may not consent to a development unless it has considered whether the land is contaminated, and if so, whether remediation is required to make the land suitable for the purposes of the development. If remediation is so required, the consent authority must be satisfied that the land would be remediated before that land is used for the identified purpose.

As outlined in **Section 7.5.3**, the EPA issued Shell with a Preliminary Investigation Order under the *Contaminated Land Management Act 1997* in 2011. Shell thereafter commissioned an Environmental Conditions Summary report (ERM, 2012) to consider potential contamination sources at the Project Area (refer to **Section 17.0** for more details). The Environmental Conditions Summary Report has not identified any pressing matters of contamination that would prevent the Project from taking place (ERM, 2012). **Section 17.2.5** also outlines how the Environmental Conditions Summary Report has considered the potential for human health and ecological risk impacts to result from activities at the Project Area, given its historical contamination. These risks are considered minimal. It is also acknowledged that the Project does not actually involve a change of use of the land at the Project Area, as the converted Clyde Terminal would continue to receive, store, undertake product dosing activities and distribute finished petroleum products, albeit with greater efficiency.

The DGR's issued by the DP&I (refer to **Appendix A** of **Volume 2** of this EIS) have not required any further detailed investigation into contamination in the Project Area to date. Shell continues its dialogue with the EPA on these matters as per the requirements of the *Contaminated Land Management Act 1997* (refer to **Section 7.5.3**).

7.3.5 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Under the SREP 2005 a deemed SEPP, the Clyde Terminal is located on land adjacent to the Parramatta River which is zoned as W1 Maritime Waters and W2 Environment Protection. The Clyde Terminal is also located on land adjacent to the Duck River, which is zoned as W2 Environment Protection.

The objectives of the W1 Maritime Waters zone are:

a) to give preference to and protect waters required for the effective and efficient movement of commercial shipping, public water transport and maritime industrial operations generally,

b) to allow development only where it is demonstrated that it is compatible with, and will not adversely affect the effective and efficient movement of, commercial shipping, public water transport and maritime industry operations,

c) to promote equitable use of the waterway, including use by passive recreation craft.

The objectives of the W2 Environment Protection zone are:

a) to protect the natural and cultural values of waters in this zone,

b) to prevent damage or the possibility of longer term detrimental impacts to the natural and cultural values of waters in this zone and adjoining foreshores,

c) to give preference to enhancing and rehabilitating the natural and cultural values of waters in this zone and adjoining foreshores,

d) to provide for the long-term management of the natural and cultural values of waters in this zone and adjoining foreshores.

The Project would:

- Not alter the effectiveness and efficiency of commercial shipping movements, public water transport and maritime industrial operations in the harbour and river;
- Not promote unequal use of the waters in the harbour and river;
- Be compatible with commercial shipping, public water transport and maritime industry operations; and
- Be compatible with the objectives of the W2 Environment Protection zone. The Project would not detrimentally affect the natural and cultural values of water in this zone.

The Clyde Terminal will continue to maintain a river spill control station, including boat launching facilities, jetty and boat shed. These are maintained to deploy critical spill control and recovery services in the unlikely event that a spill occurs.

Ultimately the Project would align with the zoning objectives under the SREP 2005.

7.4 NSW Environmental Approvals

Under sections 89J and 89K of the EP&A Act, other NSW environmental approvals would not be required for the Project (section 89J), or would be required to be issued consistent with the development consent for the proposed development (section 89K). Each of these separate approvals is considered in **Table 7-3**. Other environmental approvals may be required in addition to those referred to under section 89J and 89K of the EP&A Act.

Notwithstanding, where separate environmental approval processes have been integrated into the assessment regime under the EP&A Act, the EIS for the Project considers and addresses the same issues that would have otherwise been required to be assessed for the separate environmental approval.

Table 7-3 Relevant Environmental Approvals

Approval	Relevant to the Project?	Comment
Approvals not required under section 89J		
Concurrence under Part 3 of the *Coastal Protection Act 1979*.	Not relevant	The Project would not be located within the coastal zone.
A permit under section 201 of the *Fisheries Management Act 1994*.	Not relevant	The Project would not involve dredging or reclamation works.
A permit under section 205 of the *Fisheries Management Act 1994*.	Not relevant	The Project would not harm marine vegetation.
A permit under section 219 of the *Fisheries Management Act 1994*.	Not relevant	The Project would not result in the blockage of fish passage.
An approval under Part 4, of an excavation permit under section 139, of the *Heritage Act 1977*.	Potentially relevant	The Project would not impact a place, building, work, relic, moveable object, precinct, or land that is subject to an interim heritage order or that is listed on the State Heritage Register. An excavation permit may be required if there is reasonable cause to suspect that the disturbance or excavation is likely to result in a relic being discovered. As demonstrated in **Section 18.2**, this is not considered necessary for the Project.

Approval	Relevant to the Project?	Comment
An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*.	Potentially relevant	The Project Area is identified as having Aboriginal association. Due to the highly disturbed nature of the Project Area, however, it is considered unlikely that any Aboriginal objects would be uncovered or disturbed during the Project. Therefore it is considered extremely unlikely that the Project would result in impacts to Aboriginal heritage objects, places, land or persons (refer to **Section 21.2**).
An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (of under any Act repealed by that Act) to clear native vegetation of State protected land.	Not relevant	The Project Area contains both remnant and regenerated native vegetation, including native species that are both indigenous and non-indigenous to the area, and weeds and other non-native species. Existing landscaping and peripheral trees and large shrubs would not be removed as part of the Project. It is possible that occasional trees or shrubs may however be impacted due to their proximity to buildings and structures that are to be demolished. However any such clearing or root damage to retained vegetation would only be minimal and does not include significant flora species. As regrowth protected under the *Native Vegetation Act 2003* would not be impacted, no approvals are likely to be required under the Act.
A bushfire safety authority under section 100B of the *Rural Fires Act 1997*.	Not relevant	The Project is not located in a bushfire prone area.

Approval	Relevant to the Project?	Comment
A water use approval (section 89), a water management work approval (section 90) or an activity approval (other than an aquifer interference approval) (section 91) of the *Water Management Act 2000*.	Relevant	The Project Area falls under the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011* (WSP 2011). Therefore, the provisions of the WM Act apply to the Project Area, and the provisions of the *Water Act 1912* do not apply to the Project Area. Section 91A of the WM Act provides that it is an offence to use water from a water source governed by the WM Act without holding a relevant water use approval. Shell has commissioned geotechnical investigations of the areas that are likely to be excavated as part of the Project. These investigations found that the Project is highly unlikely to involve the interception of groundwater at the Project Area, although any stormwater entering excavated areas would still require removal. In any event, the EP&A Act does not provide any exemptions for SSD applications in relation to aquifer interference approvals. Notwithstanding, NOW has advised that the need for an aquifer interference has not commenced at this time. In the highly unlikely event that the Project does intercept groundwater, and depending on the timing of commencement of the need for an aquifer interference approval, Shell would liaise with NOW regarding the issue of an appropriate approval(s) to allow dewatering to occur. This is further discussed in **Section 17.2**. Section 91E of the WM Act provides that a controlled activity approval is ordinarily required if works are to be undertaken on, in or under 'waterfront land' (generally defined as land lying within 40 m of a water body). It is likely that the Project would include works that are undertaken within 40 m of the Parramatta and Duck Rivers lying on the Project Area boundary. A controlled activity approval would therefore ordinarily be required under section 91.
Approvals required to be issued consistently under section 89K		
An aquaculture permit under section 144 of the *Fisheries Management Act 1994*.	Not relevant	The Project would not involve aquaculture.
An approval under section 15 of the *Mine Subsidence Compensation Act 1961*.	Not relevant	The Project would not be located within a mine subsidence district.
A mining lease under the *Mining Act 1992*.	Not relevant	The Project does not involve mining.
A production lease under the *Petroleum (Onshore) Act 1991*.	Not relevant	The Project would involve the receipt, storage, product dosing and distribution of fuel products including finished petroleum products. However the Project would not involve petroleum production.
An Environment Protection Licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) (for any of the purposes referred to in section 43	Relevant	Clyde Terminal currently operates under Environment Protection Licence (EPL) No. 570 due to the following scheduled activities taking place: - Petroleum products and fuel production; - Petroleum products storage; and - Non-thermal treatment of hazardous and other waste. Shell has undertaken consultation with the EPA to vary the terms of

Approval	Relevant to the Project?	Comment
of that Act).		EPL No. 570 for consistency with the revised operations at the Project Area. These amendments came into place on 29 October 2012, and the Project Area is no longer licensed for petroleum products and fuel production. Significant amendments have also been made to the air quality monitoring regime as part of existing EPL No. 570 to take account of the change in operations. Water quality monitoring requirements would remain the same under the amended EPL No. 570, and the EPL conditions relating to waste would also be largely unchanged.
Consent under section 138 of the *Roads Act 1993*.	Not relevant	The proposed works would not: - Erect a structure or carry out a work in, on or over a public road; - Dig up or disturb the surface of a public road; - Remove or interfere with a structure, work or tree on a public road; - Pump water into a public road from any land adjoining the road; or - Connect a public or private road to a classified road.
A licence under the *Pipelines Act 1967*.	Not relevant	The Project would involve maintenance and replacement of sections of site specific pipework on the Project Area. However, the actual 19 km pipeline that connects Gore Bay Terminal with Clyde Terminal and runs beneath Sydney Harbour would not be subject to development as part of the Project.

7.5 Other NSW Legislative Requirements

7.5.1 Work Health and Safety Act 2011 (WH&S Act) and Regulation 2011 (WH&S Regulation)

The *Work Health and Safety Act 2011* (WH&S Act) and the *WH&S Regulation 2011* provide for a nationally consistent approach to health and safety throughout NSW workplaces that is in line with the Commonwealth *Work Health and Safety Act 2011* and *Work Health and Safety Regulations 2011*. A key principle of the WH&S Act is that workers and others are entitled to the highest level of protection against workplace hazards and risks that is reasonably practicable to provide.

Chapter 9 of the WH&S Regulation outlines the requirements relating to MHF's in NSW. The former Clyde Refinery met the definition of a MHF. The currently operating Clyde Terminal retains this status, and the Clyde Terminal would keep this status once the conversion works are complete. Schedule 15 substances are and will continue to be present in amounts exceeding the baseline threshold set out in Table 15.2 to that Schedule. Following conversion, the Clyde Terminal would have the capacity to store approximately 200ML or 150,000 tonnes of flammable materials (Gasoline and Jet fuel). Consultation with WorkCover has been undertaken (refer to **Section 9.3.3**) and will continue during the development of a revised MHF licence submission.

Chapter 8 of the WH&S Regulation sets out the procedures for dealing with asbestos in the workplace, as well as the process of licensing certain personnel as official asbestos removalists. The demolition works at the Clyde Terminal are expected to yield a certain amount of asbestos waste, or waste materials containing asbestos. Shell would undertake to abide by these regulations for dealing with asbestos waste as outlined in **Section 20.0**.

7.5.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) aims to conserve biological diversity; promote ecologically sustainable development; prevent species extinction; protect critical habitats and evolutionary development process; provide for impact assessment of actions affecting threatened species, populations and ecological communities; and encourage the conservation of threatened species, populations and ecological communities. The Act specifically identifies endangered, critically endangered and vulnerable species, populations and ecological communities within NSW.

The EP&A Act provides that a consent authority may not grant consent for a development on critical habitat, or where the development is likely to significantly affect a threatened species, population, or ecological community or its habitat unless the consent authority has consulted with the Minister for Environment under the TSC Act.

As part of the Ecological Assessment prepared for this EIS, an assessment of significance (seven-part test) pursuant to the TSC Act was conducted for the Green and Golden Bell Frog (GGBF) (*Litoria aurea*) which is listed as an endangered species under the TSC Act. Assessments of significance (seven-part tests) were also prepared for the Grey-headed Flying Fox (*Pteropus poliocephalus*) which is listed as endangered and for several species of microbats (Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), Southern Myotis (*Myotis macropus*), and the Greater Broad-nosed Bat (*Scoeanax rueppellii*)) which are listed as vulnerable under the TSC Act (refer to **Appendix D** of **Volume 2** of this EIS). The Ecological Assessment and these seven-part tests concluded that, whilst the Project would impact on the GGBF at the Project Area by removing some habitat features that the frogs are known to utilise and by relocating affected individuals to the remnant wetland in the north-east of the Project Area, these impacts would not be significant. This is due to the fact that the key GGBF habitat at the Project Area is the remnant wetland, and this area would not be impacted by the project works. The seven-part tests also concluded that the Project would not significantly impact on the Grey-headed Flying Fox or microbats (refer to **Section 16.3** for more details).

The Project Area does not constitute critical habitat as defined in the TSC Act. Given that the Project would not significantly affect threatened species, populations, or ecological communities or habitats as defined in the TSC Act, consultation with the Minister for Environment would not be triggered.

7.5.3 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) establishes a process for investigating and remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment. Where land is identified as potentially contaminated, consultation with the EPA should be undertaken.

Shell currently has in place a *Soil and Groundwater Management Plan Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (Shell, 2010) and a *Groundwater Sampling and Analysis Plan*: *Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (ERM, 2010) to manage these issues.

Shell had previously advised the EPA in July 2011 that it planned to cease refinery operations. The EPA replied to Shell on 12 October 2011 detailing its expectations and requiring that an investigation and remediation program be developed (i.e. a Preliminary Investigation Order). In November 2011, Shell initiated additional investigations of soil and groundwater contamination in the areas of the Clyde Terminal that had not been previously characterised. An Environmental Conditions Summary Report was prepared and provided to the EPA. The report provides:

- A summary of potential contamination sources related to the Project Area, as well as all available information about soil, water and sediment contamination relating to the Project Area;
- An identification of data gaps relating to the identification and management of contamination at the Project Area, and a proposed investigation plan to fill the data gaps, including:
    - The nature and extent of dissolved phase Contaminants of Concern throughout various sections of the Project Area; and
    - The characterisation of potential contaminant sources in various sections of the Project Area.
- A Conceptual Site Model (ERM, 2012) that separates Shell's operations into four sections to identify current site conditions, data gaps and potential risks to identified receivers.

The results of this Environmental Conditions Summary Report are detailed further in **Section 17.1**. The information collected during closure of the data gaps will be supplied to the EPA either annually within the Annual Progress Report, or within standalone reports if requested. The Conceptual Site Model 2012 would also be used during the conversion activities and once the Clyde Terminal has been converted, to manage contamination at the Project Area.

For the western and north-eastern sections of the Project Area that are likely to become surplus following the conversion works, the presence of infrastructure and operations limits accessibility for the purposes of undertaking complete site contamination characterisation. The need for additional investigation of this section of the Project Area would be determined following the demolition works. The requirement for additional site assessment would also give consideration to potential future land uses which are yet to be conclusively established (refer to **Section 14.2.1**). No potential change in land use or redevelopment of this land is proposed until such time as appropriate site assessments have been conducted.

7.5.4 Environmentally Hazardous Chemicals Act 1985

The *Environmentally Hazardous Chemicals Act 1985* (EHC Act) provides the EPA with the power to regulate the use of certain chemicals and chemical wastes in NSW by issuing Chemical Control Orders (CCOs). A CCO has been made by the EPA under the EHC Act to control the use of Polychlorinated Biphenyl (PCB) wastes, which would include the management of such materials at the Clyde Terminal. Condition L7 of Shell's EPL No. 570 provides that Shell must comply with the CCO in relation to material wastes containing PCBs. This CCO outlines controls on the generation, processing, storing, conveying and disposal of PCB materials or wastes. Any PCB wastes generated as part of the Project would be required to be managed according to this CCO and EPL No. 570.

7.5.5 Protection of the Environment Operations (Waste) Regulation 2005

The *Protection of the Environment Operations (Waste) Regulation 2005* (POEO Waste Regulation) sets out provisions for tracking certain wastes as they are transported throughout NSW and interstate. The following wastes are anticipated to arise from the Project (as outlined in **Section 20.0**) and are identified under Schedule 1 of the POEO Waste Regulation as being required to be tracked when transported offsite and disposed of:

- Waste oil/water, hydrocarbons/water mixtures or emulsions;
- Waste tarry residues arising from refining, distillation, and any pyrolytic treatment; and
- Waste substances and articles containing or contaminated with PCBs, polychlorinated naphthalenes and polychlorinated terphenyls.

These waste tracking requirements relate to record keeping that must be undertaken by consigners, transporters and receivers when these types of wastes are transported. Furthermore, if the following wastes resulting from the Project are planned for transport across the NSW border, they will also fall under these tracking requirements:

- Asbestos;
- Containers and drums that are contaminated with residues of the wastes mentioned above;
- Grease trap waste; and
- Soils contaminated with a substance or waste mentioned above.

Regardless of whether it can be classified as a trackable waste under the POEO Waste Regulation (this would depend on whether it is being transported interstate or not), asbestos waste is required to be securely packaged, be in a sealed container, be wetted down, or be covered in a leak-proof vehicle for transportation offsite (clause 42).

Shell and its demolition and construction contractors would ensure that the transport of these wastes offsite for further processing and disposal conforms with these waste tracking requirements, and to the specific requirements for the transport of asbestos wastes.

7.5.6 Radiation Control Regulation 2003

As outlined in **Section 20.0**, the decommissioning and decontamination activities of the Project are expected to yield a small amount of redundant equipment containing radioactive isotopes. Clause 23 of the *Radiation Control Regulation 2003* provides that a person must not dispose of a radioactive substance or a radiation apparatus without the consent of the Chairperson of the EPA. Shell would ensure that the necessary approval is obtained before such waste is disposed of offsite.

7.5.7 Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008

The *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008* (UPSS Regulation) relates to the underground storage of petroleum, but does not relate to petroleum storage that is classified as a scheduled activity under the POEO Act, or where petroleum storage occurs wholly above ground (regardless of where the associated piping infrastructure lies). As outlined in **Table 7-3**, the current and proposed operations at the Clyde Terminal will constitute scheduled activities and thus scheduled premises under the POEO Act. As such, the UPSS Regulation does not apply to the Project.

7.6 Commonwealth Environmental Legislation

7.6.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for Environment, Heritage and Water where an action has or would have a significant impacts on a matter of National Environmental Significance (NES).

A search of the EPBC Protected Matters database was conducted on 14 September 2012 and is included as **Appendix A** of **Appendix D**. This search covered the Project Area and a 10 km zone surrounding the Project Area in order to identify any potential matters of NES that may trigger the need for a referral of the action to the Commonwealth Department of the Environment (formerly the Department of Sustainability, Environment, Water, Population and Communities (SEWPAC)). The results of the database search are presented in **Table 7-4**.

The Ecological Assessment summarised in **Section 16.0** and provided as **Appendix D** of **Volume 2** of this EIS has determined that the Project is not anticipated to have a significant impact on any ecological matters under the EPBC Act, TSC Act or FM Act. The mitigation measures recommended in **Section 16.4** have been developed to reduce and manage the potential impacts of the Project to the extent reasonably practicable.

At the time of writing this EIS, a referral has been submitted to the Commonwealth Department of the Environment in relation to the potential for impacts on the GGBF, which is listed as vulnerable under the EPBC Act. The purpose of the referral is to determine whether the Project will need formal assessment and approval under the EPBC Act in relation to the potential for impacts to GGBF. Provided the mitigation measures in **Section 16.4** are in place, it is not anticipated that the Project would result in significant impacts to the GGBF.

Table 7-4 Matters of National Environmental Significance

Matters of NES	Matters Within the Vicinity of the Project Area
World Heritage Properties	There are no World Heritage Properties within the Project Area. There are two World Heritage Properties that lie approximately 3 km west of the Project Area, namely the Parramatta Park and the Old Government House and Domain. The Project would not impact on World Heritage Properties.
National Heritage Places	The Old Government House and Domain World Heritage Property are also listed as a National Heritage Property. The Parramatta Female Factory Precinct is another National Heritage Place that is located approximately 4 km north-west of the Project Area. The Project would not impact on National Heritage Places.
Wetlands of International Importance	There are no wetlands of international importance located within 10 km of the Project Area. The Project would not impact on wetlands of International Importance.
Commonwealth Listed Threatened Species and Ecological Communities	**Threatened Ecological Communities** Four Commonwealth listed threatened ecological communities were identified within 10 km of the Project Area. **Threatened Flora** Twenty-one flora species listed as threatened under the EPBC Act are recorded as being known or likely to occur within 10 km of the Project Area. **Threatened Terrestrial Fauna** Twenty-one threatened terrestrial fauna species (including birds, frogs, mammals and reptiles) are listed as threatened under the EPBC Act and likely or known to occur within 10 km of the Project Area.

Matters of NES	Matters Within the Vicinity of the Project Area
	Threatened Marine Fauna Nine marine fauna species that have been listed as threatened under the EPBC Act as known or likely to occur within 10 km of the Project Area. The Project would not pose significant impacts to the Commonwealth listed threatened species or ecological communities listed in **Appendix A** of **Appendix D**. The Project has the potential to impact the threatened species GGBF, but with the proposed mitigation measures in place these impacts would not be significant. This is further discussed in **Appendix D** of **Volume 2** of this EIS and **Section 16.0**. The Ecological Assessment prepared as part of this EIS has concluded that, with the proposed mitigation measures in place, the Project would not significantly impact on any threatened ecological communities, flora or fauna.
Commonwealth Listed Migratory Species	Twenty-four additional listed threatened migratory species (i.e. species that were not captured under the Listed Threatened Species search) have either been recorded, or their potential habitat has been recorded, in the vicinity of the Project Area. The Project would not pose significant impact to Commonwealth listed migratory species. This is further discussed in **Appendix D** of **Volume 2** of this EIS and **Section 16.0**.
Nuclear Action	The Project would not result in any nuclear action, nor would any nuclear activity need to be undertaken as defined in the EPBC Act.
Commonwealth Marine Areas	There are no Commonwealth Marine Areas either in the vicinity of the Project Area. The Project would not impact on Commonwealth Marine Areas.

7.6.2 National Greenhouse and Energy Reporting Act 2007

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) came into effect in September 2007 and introduced a single national reporting framework for the reporting and dissemination of information about Greenhouse Gas (GHG) emissions, GHG projects, and energy use and production by corporations. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or GHG emissions meet specified thresholds. Shell would continue to report its emissions under the NGER Act after the conversion works are complete, as the fully operational Clyde Terminal would continue contributing to the overall emissions generated by Shell within Australia (as Shell's overall domestic emissions are anticipated to continue above the 25 kilotonne reportable threshold under section 13(1)(d)(i) of the NGER Act).

For a detailed analysis of GHGs that would be emitted from the converted Clyde Terminal, refer to **Section 23.0**.

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8.0 Environmental Management Framework

8.1 Environmental Policy Statement

In managing its Clyde Terminal, Shell maintains a Commitment and Policy on Health, Security, Safety and the Environment (HSSE) and Social Performance (SP). The Policy aims to ensure that every Shell company:

- Has a systematic approach to HSSE and SP management designed to ensure compliance with the law and to achieve continuous performance improvement;
- Sets targets for improvement and measures, appraises and reports performance;
- Requires contractors to manage HSSE and SP in line with this policy;
- Engages effectively with neighbours and impacted communities; and
- Includes HSSE and SP performance in the appraisal of staff and rewards accordingly (Shell, 2009).

8.2 HSSE Management System

The Clyde Terminal operates under the Shell Australia HSSE Management System (MS), which is consistent with the Shell Group HSSE and SP Control Framework Manuals, and in particular the HSSE MS Requirements and the Shell General Business Principles with specific reference to Principle 5 which states:

"Shell companies have a systematic approach to health, safety, security and environmental management in order to achieve continuous performance improvement. To this end, Shell companies manage these matters as critical business activities, set standards and targets for improvement, and measure, appraise and report performance externally. We continually look for ways to reduce the environmental impact of our operations, products and services."

The MS has been designed to ensure Shell's operations are compliant with relevant legislative requirements, and to assist in achieving continuous improvements in performance. The MS also provides a framework for the management of all aspects of the Project, including:

- Leadership and commitment;
- Policy and objectives;
- Organisation, responsibilities, resources, standards and documents;
- Risk management;
- Planning and procedures;
- Implementation monitoring and reporting;
- Assurance; and
- Management review.

The Clyde Terminal HSSE MS has been reviewed and updated since the cessation of refining operations to reflect the current risks present onsite. This document would be further reviewed throughout the Project to accurately reflect the health and safety risks present at the Project Area and to ensure the controls applicable to those risks are recorded, adequate and complied with. The HSSE MS is the document used to describe the management system in place for the Clyde Terminal against which all reviews and audits are conducted. Risks associated with the Clyde Terminal operations have already reduced when compared to the previous refining operations and would reduce further once the Clyde Terminal conversion is complete. A new MHF submission would be developed at key stages throughout the conversion to recognise the changed risks and the controls as part of the licencing system.

8.2.1 Standards and Manuals

Shell's Control Framework sets out the HSSE requirements globally across all Shell businesses. Within this sits the HSSE and Social Performance Management System (HSSE & SP MS), including applicable audit and assurance processes. Manuals that operate under the HSSE framework relate to issues surrounding:

- Health;
- Personal safety;
- Process safety;
- Security;
- Environment;
- Contractors;
- Projects;
- Transport;
- Product stewardship; and
- Social performance.

8.2.2 Environmental Management System Roles and Responsibilities

Implementation of Shell's HSSE and SP MS is distributed across several different personnel positions at the Clyde Terminal. Since the commencement of the current operations post cessation of refining, the responsibility for implementing the HSSE and SP MS is distributed across key personnel positions as follows:

- Terminal Operations Manager: Responsible for the operation and maintenance of both the Gore Bay and Clyde Terminals. This role includes overall accountability for HSSE performance;
- Clyde Terminal Operations Manager: Accountable for the safe and efficient operations and the availability of on-grade finished product. The role has a particular focus on achieving the aims of Goal Zero, compliance with the Life Saving Rules (refer to **Section 8.2.4**), and ensuring that the Project Area is operated in accordance with all HSSE and Operational standards and procedures;
- Clyde Terminal Duty Manager: Role filled by one of the senior managers on rotation and provides a point of contact for the Terminal Controller in the event of an operational or health, safety or environmental issue which requires escalation and support of senior management. This position is filled and available for contact 24 hours per day to support the Terminal Controller;
- Clyde Terminal Controller: Responsible for safe and efficient management of the day to day operational activities at the Clyde Terminal, product quality and storage arrangements. The role has specific accountability for the health, safety and environmental attributes of the Clyde Terminal within each shift, the performance of the assets and the allocation of labour to the various tasks. The Terminal Controller is the first point of contact for all operational matters;
- Emergency Services Officer and Safety Lead: Provides support to operations at the Clyde Terminal. This includes ensuring HSSE and SP systems are relevant and maintained, competence development plans and legislative requirements are complied with, safety initiatives are developed and implemented, assets are maintained appropriately and emergency response capabilities are appropriate, maintained and exercised. This role also has the primary responsibility for liaison with external emergency response agencies, to ensure emergency exercises are conducted and learnings implemented, and for ensuring integration of HSSE activities with staff;
- Training Co-ordinator: Accountable for the overall learning and development approach for the Clyde Terminal, including planning and implementation of the ongoing technical and HSSE training, and development of employees and/or third party contractors at both the Gore Bay Terminal and the Clyde Terminal;
- Conversion Project Manager: Responsible for the project design, demolition and construction activities at both Gore Bay and Clyde Terminals. This role includes overall accountability for HSSE performance;
- Conversion Project HSSE Lead: Responsible for accurate recording and assessment of the health and safety risks and controls, review of the project design to ensure all relevant controls are incorporated and that the Project is undertaken in a manner that complies with the controls required;
- Conversion Project Field Safety HSSE Leads: Responsible for compliance of project staff and contractors with the required health and safety management; auditing of the controls for adequacy and compliance and incident investigation in the event that any incident occurs;

- Conversion Contractor Project Manager: Responsible and accountable for implementation of health and safety risk management across the demolition and construction workforces and alignment with Shell's HSSE systems; and
- Conversion Project staff: Responsible for undertaking compliance checks according to the schedule set for the Project and to ensure that all workgroups comply with the risk controls required by Shell.

8.2.3 Environmental Management and Monitoring Plans

Construction Environment Management

A CEMP for the Project would be prepared and implemented prior to the commencement of construction. The CEMP would include all relevant mitigation measures identified in **Section 27.0** in addition to several supplementary plans focused towards specific demolition and construction activities. The CEMP would be developed in accordance with the Shell Commitment and Policy on HSSE & SP.

Operational Environment Management

All operational activities would be planned and executed with regards to operational safety and environmental considerations, including monitoring and control activities. Prior to the commencement of operation of the converted Clyde Terminal, all site personnel would complete a training course in Safety and Risk Assessment in accordance with Shell's HSSE-MS standards. Site Safety and the existing Operational OEMP would also be updated to align with the converted operation of the Clyde Terminal.

The Clyde Refinery HSSE MS is being updated to account for the changes in assets, operations and risks during the Project, and to include operational mitigation measures identified in **Table 27-1** in **Section 27.0**. This process involves a series of workshops and consultations with the site Work Health and Safety Committee and key operational and specialist staff to ensure that all relevant hazards, controls and operating procedures are in place prior to the demolition and construction works commencing.

All operational activities would be planned and executed in accordance with the OEMP and the overarching HSSE MS. The Clyde Refinery HSSE MS would be progressively updated throughout the Project to reflect any changes to risks at relevant stages of the Project. A final Clyde Terminal HSSE MS would be in place prior to the commencement of operation of the converted Clyde Terminal. Several sub-plans currently operating under the Clyde Refinery HSSE MS as outlined below would also be revised prior to each activity and the commencement of operation of the converted Clyde Terminal, including the site-specific:

- *Soil and Groundwater Management Plan Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (Shell, 2010) (SGMP 2010). The SGMP 2010 was prepared to ensure the implementation of long-term management measures for soil and groundwater issues and to reduce the potential for offsite migration of potentially contaminated groundwater. This SGMP 2010 and its management approach are further discussed in **Section 17.0**. The SGMP 2010 would be revised as part of the Project;
- *Clyde Terminal Conversion Project: Clyde Waste Water Management System* (Shell, 2012a). This plan has been specifically prepared for the Project. It would require revision once the Clyde Terminal has been converted;
- *Groundwater Sampling and Analysis Plan*: *Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (ERM, 2010) (GWSAP). The GSWAP forms the basis of routine reporting of site conditions. It would require revision as part of the Project;
- *Waste Management Procedure: Shell Clyde Refinery (Australia) Pty Ltd* (Shell, 2013) (WMP 2013). This plan provides for the management of wastes produced, received and processed at the Clyde Terminal;
- *Clyde Emergency Response Plan* (ERP) (Shell, 2012). This plan was provided as part of Shell's submission to WorkCover regarding the Project Area's continued status as a MHF. The purpose of this ERP is to ensure that measures are in place to provide for the safety of all staff and the environment in an emergency situation. The ERP would need to be revised to take into account the decreased risks of operating on the Project Area once the conversion has been completed. As per clause 557 of WH&S Regulation, this ERP would continue to address all health and safety consequences of a major incident occurring, and would include all matters specified in Schedule 16 to the WH&S Regulation. The ERP would also provide for the testing of emergency procedures. Once detailed engineering drawings for the Project are finalised, Shell would undertake consultation with Fire and Rescue NSW and Parramatta City Council in developing an updated version of the ERP to take account of amended operations and reduced infrastructure at the Clyde

Terminal. A copy of the Plan would be maintained at the Project Area, and a copy would also be provided to Fire and Rescue NSW. The ERP would be developed according to the requirements identified in the:

- Hazard and Operability Study;
- Fire Safety Study;
- Construction Safety Study;
- Safety Management System; and
- Final Hazard Analysis.

- *Pollution Incident Response Management Plans – Clyde Refinery* (Shell, 2012b) (PIRMP 2012). The PIRMP 2012 fulfils Shell's obligation under Part 5.7A of the POEO Act. It is due for review and replacement in 2015, but would be reviewed and amended prior to that as required by the changed operations at the Project Area. As required by law, the PIRMP 2012 would continue to be maintained at the Project Area for the life of the Project.

Additional plans that would be prepared as part of the Project would include:

- An Erosion and Sediment Control Plan including an Acid Sulfate Soils Management Plan;
- A GGBF sub-plan; and
- A Construction Traffic Management Plan.

In addition to the mitigation measures outlined in **Table 27-1**, all site-specific management plans, including the CEMP and OEMP, would need to account for the implications of relevant legislative requirements such as:

- Providing adequate procedures for dealing with specific streams of waste under the POEO Waste Regulation including tracking requirements, and specifically in relation to asbestos waste in accordance with the WH&S Regulation;
- Continuing Shell's obligations under the CLM Act in dialogue with the EPA as outlined in **Section 7.5.3**;
- Ensuring the Project complies with the CCO in Relation to Materials and Wastes Containing PCBs, as specified in EPL No. 570. Shell has removed all PCB-containing materials with concentrations greater than 50 mg/kg from the Project Area, other than from existing electrical transformers. Transformers and lower concentrations of PCBs remaining at the Project Area would be managed according to the CCO;
- The disposal of a small amount of waste in the form of radioactive substances as per the requirements of the *Radiation Control Regulation 2003* and the *Waste Classification Guidelines Part 3: Waste Containing Radioactive Material* (Department of Environment and Climate Change, 2008e); and
- Continued reporting obligations under the NGER Act.

Further detail on the legislative requirements of the Project has been provided in **Section 7.0**.

8.2.4 Occupational Health and Safety

The Shell HSSE and SP MS are supported by a set of mandatory manuals covering various topics. Those specific to Occupational Health and Safety (OH&S) include the Health, Personal Safety, Process Safety, Security and Contractors HSSE Management Manuals. The Clyde Refinery HSEE MS also complies with *AS 4801:2001 Occupational health and safety management systems – Specifications with guidance for use*, and *National Standard for Control of Major Hazard Facilities*. In addition to the Project Area's ERP and the HSSE MS manuals, the following objectives are also implemented on all Shell sites:

- Exposure monitoring for specific activities where exposure to hazardous substances is possible, to ensure appropriate controls and personal protective equipment are in place to protect personnel from harm, and to monitor the conditions and health of personnel performing these activities;
- Goal Zero – which aims to operate with no fatalities and no significant incidents;
- Life Saving Rules – specific mandatory rules across 12 activities known to have the potential for fatality or significant injury to project personnel safety;
- HSSE Golden Rules – three rules that provide a framework for safe behaviour;
- Take Five – five actions to observe, assess and manage hazards in day to day activities;

- Permit to Work and Management of Change – processes established to specifically review and control changes occurring in the Project Area as well as work activities generally; and
- Barrier Thinking – process that helps identify hazards and controls for each task before commenced.

8.3 Approvals and Licences

As the main overseer of the conversion activities that would largely be undertaken by contractor personnel, Shell would be responsible for ensuring that it or its contractors have:

- Obtained current relevant licences, registrations and work permits required for the:
  - Demolition and construction workforces;
  - Plant, equipment and machinery; and
  - Any oversized loads;
- Arranged for the necessary approvals and for disposal of contaminated demolition or construction waste at an appropriately licensed facility. The demolition and construction contractors would also be involved in obtaining these licences and approvals; and
- Provided appropriate training to site personnel for the management and handling of hazardous materials.

8.3.1 Environment Protection Licence

Operation of the Clyde Terminal is a scheduled activity under the POEO Act and currently holds EPL No. 570 for the following scheduled activities:

- Petroleum products storage where more than 100,000 kilolitres are stored; and
- Non-thermal treatment of hazardous and other waste.

In particular, EPL No. 570 identifies the environmental conditions and limits that the Project Area must comply with in relation to:

- Licensed discharge and monitoring points, including volumetric, load and concentration limits, specifically in relation to emissions to air and water;
- Load limits for certain pollutants released into the atmosphere;
- The receipt, storage and disposal of waste, including conditions for the receipt of waste from the Gore Bay Terminal;
- Operating and maintenance conditions;
- The need for an ERP;
- Monitoring and recording conditions including sampling methods;
- Complaints management;
- Reporting conditions; and
- Requirements for reporting on soil and groundwater monitoring and investigations.

Shell obtained an initial amendment for EPL No. 570 in preparation for the conversion of the Clyde Terminal. Shell submitted a request that the desludging of Buffer Basin No. 1 be postponed until the anticipated decommissioning of the biotreater after the Clyde Refinery had ceased operations. The EPA agreed to this request, and a condition was added to the biotreater pollution reduction plan allowing for the desludging of biotreater buffer basin no. 1 after the final shutdown of the biotreater (EPL No. 570 Licence Notice 1507399, dated 19 July 2012). Shell will decommission and demolish the biotreater as part of the proposed Project once there is no longer a requirement for this unit, and after ensuring that water discharged from the Project Area can continue to comply with the parameters specified in EPL No. 570.

Since this initial EPL amendment was obtained, Shell has undertaken further consultation with the EPA to vary the terms of its EPL No. 570 for consistency with the revised operations at the Project Area. These amendments came into place on 29 October 2012. For instance, the Project Area is no longer licensed for petroleum products and fuel production. Significant amendments have also been made to the air quality monitoring regime as part of

existing EPL No. 570 to take account of revised operations. Water quality monitoring requirements would remain the same under the amended EPL No. 570, and the EPL conditions relating to waste disposal would also be largely unchanged although the quantities of wastes would reduce significantly.

8.3.2 Other Environmental Approvals

Under sections 89J and 89K of the EP&A Act, several other NSW environmental approvals would not be required for the Project, or would be required to be issued consistently with the development consent for the Project by the consent authority as the Project is classified as SSD. However, as these separate environmental approval processes are integrated into the assessment regime under the EP&A Act, this EIS is nevertheless required to consider and address the same issues that would have otherwise been required to be assessed for the separate environmental approval (refer to **Section 7.4**).

At the time of writing this assessment, a referral has been submitted to the Commonwealth Department of the Environment in relation to the potential for impacts to the GGBF, which is listed as vulnerable under the EPBC Act. The purpose of the referral is to determine whether the Project will need formal assessment and approval under the EPBC Act. Provided the mitigation measures in **Section 16.4** are in place, it is not anticipated that the Project would result in significant impacts to the GGBF.

There is some limited residual potential (albeit highly unlikely) for the Project to require an aquifer interference approval under the *Water Management Act 2000* (WM Act) and unit shares in the WSP 2011 for the interception and dewatering of groundwater at the Project Area, however this is considered highly unlikely. In the event that this is required, Shell would consult with NOW regarding the issue of an aquifer interference permit and unit shares in the WSP 2011 to allow dewatering to occur (refer to **Table 7-3** and **Section 17.2** for more detail).

In relation to these integrated environmental approvals, Shell commits to undertaking the proposed mitigation measures outlined in **Table 27-1** in **Section 27.0**.

8.3.3 Major Hazard Facility

The Clyde Terminal would be required to maintain its licensed status as a MHF under Part 9.7 of the WH&S Regulation (refer to **Section 7.5.1**). The former Clyde Refinery was originally registered as a MHF under clause 175R of the previous *Occupational Health and Safety Regulation 2001*, which has since been repealed and replaced by the WH&S Regulation. Under the provisions of the WH&S Regulation, the Clyde Terminal is automatically deemed to be a licensed MHF under the new WH&S Regulation, and is deemed to have had its licence issued under the WH&S Regulation on the date of its registration as a MHF under the previous OH&S Regulation.

Under the transitional provisions, Shell is exempt from the requirement to provide a Safety Report to WorkCover NSW under clause 560 of the WH&S Regulation, and is instead required to provide WorkCover NSW with a Safety Report (as per the requirements of the previous OH&S Regulation) before 1 January 2014. As outlined in **Section 9.3**, Shell has undertaken consultation with WorkCover. An updated Safety Report was prepared by Shell and provided to WorkCover in February 2012.

As an operator of a MHF, Shell would further ensure that the following obligations under Chapter 9 of the WH&S Regulation are met:

- Identify all major incidents and all major incident hazards that could occur in the course of operation of the MHF, and to prepare a corresponding safety assessment on the operation of the MHF (clauses 554 and 555);
- Implement control measures that would eliminate, so far as is reasonably practicable, the risk of a major incident occurring. If it is not reasonably possible to eliminate a risk, it should be minimised as far as is reasonably practicable (clause 556);
- Implement controls that would minimise the magnitude and severity of a major incident for persons both on and off the site, and also prepare an emergency plan for the MHF dealing with potential major incidents (clauses 556 to 557);
- Prepare and review a safety management system and suitable security arrangements for the MHF (clauses 558 to 558A); and
- Provide general information about the nature of the MHF to Parramatta City Council as well as making that information publically available (clause 572).

As part of the Project, Shell would provide WorkCover with a written notice of any change to material information that was previously provided to WorkCover NSW regarding the MHF. That written notice would be provided within 14 days after Shell becoming aware of the change, as per clause 588. As described in **Section 8.2**, Shell has a HSSE MS and several OH&S programs in place to ensure hazards can be identified and mitigated as far as reasonably practical. The Clyde ERP 2012 is also in place for the Project Area.

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9.0 Stakeholder Engagement

Relevant DGRs: During the preparation of the EIS, you must consult with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners.

In particular, you must consult with the:

- Environment Protection Authority;
- Fire and Rescue NSW;
- NSW Office of Water;
- NSW Transport (Roads and Maritime Services);
- Parramatta City Council;
- Sydney Metropolitan Catchment Management Authority;
- Sydney Ports; and
- WorkCover NSW.

The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.

9.1 Stakeholder Identification

In preparing this EIS, Shell has undertaken extensive consultation with various regulators and authorities, as well as with community liaison groups and local Aboriginal groups. Various meetings have been held between Shell, AECOM and these stakeholders, which focused on key environmental issues associated with the proposed Project.

The stakeholders that have been consulted (refer to **Section 9.3**) include:

- Shell's Clyde Terminal workforce and the Work Health and Safety Committee;
- DP&I;
- NSW OEH;
- NSW EPA;
- Parramatta City Council;
- Sydney Ports Corporation;
- RMS;
- WorkCover NSW;
- NOW;
- Fire and Rescue NSW;
- SMCMA;
- NSW Health;
- Local Aboriginal interest groups;
- Community groups; and
- Local businesses in the vicinity of the Project Area.

9.2 Director General's Requirements

An EIS Scoping Report was prepared by AECOM and submitted to the DP&I on behalf of Shell on 24 January 2012 (AECOM, 2012). The purpose of the Scoping Report was to provide the DP&I with an overview of the Project so that the DP&I could formulate DGRs for the Project. In preparing the DGRs, the DP&I referred the Scoping Report to various Government departments and agencies and sought their key issues and assessment requirements for input into the DGRs (refer to **Section 9.4**). The Scoping Report identified potential issues that may arise from the Project based on:

- Existing knowledge of the Project Area;
- Preliminary desktop investigations; and
- An understanding of the relevant statutory framework and general approvals requirements for the Project.

The DP&I subsequently issued the DGRs for this EIS on 16 March 2012. These DGRs are provided as part of **Appendix A** of **Volume 2** of this EIS. **Table 9-1** outlines these DGRs, and provides cross references to the relevant sections of this EIS that deal with each issue, as required. They are also available for viewing on the DP&I's Major Project Register webpage at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5147.

Table 9-1 Department of Planning and Infrastructure's Director General's Assessment Requirements

DP&I DGRs		Where Addressed in this EIS
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. In addition the EIS must include:	
	- Detailed description of the development, including: • Need for the proposed development; • Justification for the proposed development; • Likely staging of the development; • Likely interactions between the development and existing, approved and proposed operations in the vicinity of the site; • The nature and destinations of fuels to be received and distributed; and • Plans of all proposed building works.	 **Section 4.0** **Sections 5.3** and **29.0** **Section 6.1.1** **Section 25.0** **Table 6-1** and **Section 3.2** **NA** (refer to **Section 6.0**)
	- Detailed description of the development, including: • Consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; and • Risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment.	 **Section 7.3** **Sections 10.0** and **26.0**
	- Detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: • A description of the existing environment, using sufficient baseline data; • An assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and	**Sections 11.1**, **13.1**, **15.1**, **16.2**, **17.1** and **19.1** **Sections 11.1**, **13.1**, **15.1**, **16.2**, **17.1** and **19.1** **Sections 11.0** to **25.0**

DP&I DGRs		Where Addressed in this EIS
	• A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment.	**Sections 27.0** and **8.0** and **Table 27-1**
	- Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.	**Table 27-1**
Key Issues	The EIS must address the following specific matters:	
	Hazards and Risks – including:	
	- A summary of the results of a Preliminary Hazardous Analysis (PHA) undertaken for the proposed development. The PHA should be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis*, and in particular:	**Section 19.0**
	• Identify the hazards associated with the existing site and the proposed development, as well as any external hazards (i.e. natural hazards) to determine the potential for offsite impacts;	**Sections 19.1** and **19.2**
	• Include failure rates approximate to the plant and equipment to be used;	**Section 19.3.3**
	• Address all relevant recommendations arising from the Buncefield incident; and	**Sections 19.3.2** and **19.3.6**
	• Demonstrate that the proposed development complies with the criteria set out in *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning*; and	**Section 19.3.4**
	- Estimate the cumulative impacts from the overall site and the surrounding potentially hazardous developments in the area (existing and proposed) and demonstrate that the proposed development does not increase the cumulative risk of the area to unacceptable levels.	**Section 19.3.4**
	Contamination – including how ecological and human health risks posed by contaminants on the site would be mitigated and managed particularly as redundant tankage and other infrastructure is decommissioned, demolished and removed.	**Section 17.0**
	Soil and Water – including:	
	- An assessment of the potential soil, groundwater and surface water impacts of the development including potential impacts on the Parramatta River and Duck Rivers and their tributaries;	**Section 13.2**
	- Identification of any water licensing requirements or other approvals under the *Water Act 1912* and/or the *Water Management Act 2000*;	**Table 7-3** and **Section 13.2.1**
	- Demonstration that water for the development can be obtained from an appropriately authorised and reliable water supply in accordance with the operating rules of the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources;	**Sections 13.3** and **17.3**

DP&I DGRs		Where Addressed in this EIS
	- A detailed description of the mitigation and management controls that would be put in place to manage erosion and sediment, stormwater and acid sulfate soils (if present);	**Section 13.3**
	- Ways to reduce water supply and increase water reuse; and	**Section 13.3**
	- Potential impacts of flooding, with consideration of climate change and projected sea level rises	**Section 13.2.4**
	Heritage – including:	
	- An Aboriginal cultural heritage assessment (including both cultural and archaeological significance), which must demonstrate effective consultation with relevant Aboriginal community groups; and	**Sections 21.0 and 9.3.2**
	- A non-Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which must:	**Section 18.0**
	• Include a statement of heritage impact (including significance assessment) for any State significant or locally significant historic heritage items including the Shell Oil Refinery Wharf and the surrounding wetland areas on the banks of the Parramatta and Duck Rivers and their tributaries; and	**Section 18.2.2**
	• Outline any proposed management and mitigation measures.	**Section 23.2**
	Noise and Vibration – including all demolition, construction and operational noise and onsite and offsite road noise.	**Section 22.0**
	Air Quality and Odour – including a quantitative assessment of the air quality and odour impacts of the development on surrounding receivers.	**Section 15.0**
	Transport and Access – including:	**Section 11.0**
	- Accurate predictions of the traffic generated by the development;	**Section 20.0**
	- A detailed assessment of the potential impacts of the development on the capacity, efficiency and safety of the road network including the cumulative traffic generated by all existing and proposed developments on the Rosehill/Camellia industrial precinct;	**Sections 11.2.3 and 11.2.4**
	- Details of any upgrades to road infrastructure that would be required due to the development; and	No roads would require upgrading due to the Project.
	- Site accesses, internal roads and vehicular parking required as a result of the development.	**Section 11.2.3**

DP&I DGRs		Where Addressed in this EIS
	Greenhouse Gas – including: A quantitative analysis of the Scope 1, 2 and 3 greenhouse gas emissions of the development; A qualitative analysis of the impacts of these emissions; and Details of the measures that would be employed to improve energy efficiency.	**Sections 23.0** **Section 23.3** **Section 23.3** **Sections 23.3**
	Visual – impacts on surrounding receivers and from public areas.	**Section 24.0**
	Biodiversity – including impacts to terrestrial and aquatic ecology and ways to maintain and improve intact stands of riparian vegetation to the north-east and east of the refinery site.	**Section 16.0**
	Waste – including accurate estimates of the quantity and classification of the potential liquid and non-liquid waste streams of the development and a description of the measures that would be implemented to ensure that any waste produced is appropriately handled, processed and disposed of.	**Section 20.0**
	Social and Economic.	**Sections 12.0**
Consultation	During the preparation of the EIS, you must consult with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular, you must consult with the: - Environment Protection Authority; - Fire and Rescue NSW; - NSW Office of Water; - NSW Transport (Roads and Maritime Services); - Parramatta City Council; - Sydney Metropolitan Catchment Management Authority; - Sydney Ports; and - WorkCover NSW. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	**Sections 9.2**, **9.3** and **9.3.3**
References	The assessment of the key issues listed above must take into account relevant guidelines, policies and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of the development.	**Sections 11.0** to **24.0**

9.3 Consultation

As per the DGRs outlined above, Shell has undertaken extensive consultation with various stakeholders as detailed below.

9.3.1 Local Community and Business Consultation

Shell has consulted with the local community and local businesses throughout the environmental assessment process. This consultation has been undertaken in many forms and is summarised in **Table 9-2** below.

Table 9-2 Summary of local community and business consultation activities

Form of consultation	Details of consultation	Where addressed in the EIS
Local newspaper advertisement	Shell placed advertisements, providing a brief overview of the project in the following newspapers: - The *Parramatta Advertiser* (Thursday 27 September 2012 and Tuesday 4 October 2012). - The *Auburn Review* (Thursday 2 October 2012 and Tuesday 4 October 2012). The advertisements invited interested parties to contact Shell to express their views regarding the proposal and provided a postal address, email, telephone number and webpage for the community to use to contact Shell regarding the project.	N/A
Project information session	A public information session was held in the Camellia Industrial Estate on 26 September 2012 with Shell's business neighbours and Parramatta City Council. About 25 personnel, largely representatives of local businesses attended the meeting. Issues raised during this session related to traffic management and securing industrial land within Sydney.	**Section 11.0** and **Section 14.0**
Letterbox drop	A letter was sent by Shell to 1,200 households in the region. The mailing list was formulated in consultation with Parramatta City Council, with the aim of targeting the closest residential receivers to the Project. A response was received by a nearby business, Aldi, commenting that it had no issues with the proposed project. A nearby resident responded to the letter requesting information regarding employment opportunities at the converted terminal. The same respondent raised the point that the EIS for the current Project, as well as the EIS prepared for Shell's Gore Bay Terminal Modification Project taking place in the Lane Cove LGA should be reviewed as a whole and not as separate developments.	**Sections 4.0**, **5.0** and **25.0** of this EIS take into account some of the combined impacts of the two projects, as well as Shell's decision-making process behind both projects which involved considerations relating to both of the Terminals.
Meetings with the Community Advisory Panel	Shell held meetings with the Community Advisory Panel of 2 August 2012, 4 October 2012 and 12 December 2012. The Community Advisory Panel, comprising representatives from Auburn and Parramatta LGAs, as well as a State Government representative, the Parramatta Chamber of Commerce, one community organisation and the nearby University of Western Sydney did not raise any particular issues associated with the project.	N/A

Shell also received a request from Regional Development Australia to undertake dialogue with the food plastics industry, but Shell does not consider this relevant to the Project as the conversion and operation of the Clyde Refinery is not directly associated with this industry.

Shell has also prepared a webpage on its Australian webpage titled *Shell Clyde Refinery & Gore Bay Terminal: Conversion Project* (Shell, 2012e). This webpage is available at:

http://www.shell.com.au/home/content/aus/aboutshell/who_we_are/shell_au/operations/downstream/manufacturing/clyde/.

The webpage provides an overview of the rationale for the Project. A questions and answers sheet has also been provided with specific details about the Project, particularly in relation to potential hazards and risks.

9.3.2 Aboriginal Interest Groups Consultation

Consultation was taken with local Aboriginal Interest Groups as per the *Draft Guidelines for Aboriginal Cultural Heritage Impacts Assessment and Community Consultation* (Department of Environment and Conservation, 2005c). Initially, the following organisations were contacted to assist in the identification, notification and registration of Aboriginal people who may hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and places within the Project Area:

- OEH;
- Office of the Registrar, *Aboriginal Land Rights Act 1983*;
- National Native Title Tribunal;
- NSW Native Title Services Corporation Limited;
- SMCMA;
- Parramatta City Council; and
- Deerrubin Local Aboriginal Land Council (Deerrubin LALC).

Each of the above organisations was contacted in writing on 25 July 2012. Responses were received from four organisations. These are attached as **Appendix A** of **Appendix G** as follows:

- OEH provided the names of eight relevant Aboriginal stakeholder groups that should be contacted;
- The Office of the Registrar advised that a search had been undertaken of the Register of Aboriginal Owners undertaken for the Project Area. No Registered Aboriginal Owners were found pursuant to Division 3 of the *Aboriginal Land Rights Act 1983* (NSW);
- Parramatta City Council forwarded the letter to members of its Aboriginal and Torres Strait Islander Advisory Committee, the Darug Tribal Aboriginal Corporation (DTAC) and the Dharug Custodian Aboriginal Corporation (DCAC); and
- The SMCMA forwarded the letter to its Aboriginal Advisory Committee for its information.

A notification was subsequently provided in the *Parramatta Advertiser* on 22 August 2012 (refer to **Appendix B** of **Appendix G**), requesting Aboriginal persons and organisations interested in being consulted as part of the Aboriginal Cultural Heritage Assessment to register their interest in writing to AECOM. No organisations or individuals responded to this newspaper advertisement.

On 15 August 2012 a letter inviting expressions of interests was sent to all eight of the Aboriginal stakeholder organisations and persons that were initially identified by the OEH. The closing date for expressions of interest was 30 August 2012, and seven groups registered interest by this time as follows:

- DCAC;
- DTAC;
- Darug Aboriginal Cultural Heritage Assessments (DACHA);
- Darug Land Observations (DLO);
- Darug Aboriginal Landcare Inc. (DAL);
- Yarrawalk (a division of Tocomwall Pty Ltd); and
- Deerrubin LALC.

The written expressions of interest received by AECOM from these groups are provided in **Appendix C** of **Appendix G**.

A draft assessment methodology was sent to all Registered Aboriginal Parties (RAPs) on 11 September 2012 (refer to **Appendix D** of **Appendix G**). The responses received from RAPS included:

- DCAC emphasised that the Project Area is identified as "*significant to the Darug*," and that Parramatta and surrounding areas contain numerous intact Darug sites (including many contact sites) that need further investigation;
- DACHA noted that it wished to be consulted at all times and to participate in all fieldwork, and emphasised that the Project Area should be identified as a "*very important food resource area for the Darug;"* and
- DLO noted that the Clyde Terminal is located "*on Darug Land which today is still very important*," and that it wished to participate in all fieldwork.

All RAPs were offered the opportunity to participate in an inspection of proposed impact areas within the Project Area on 2 October 2012. While all seven RAPs had registered their interest in being involved in the site inspection, only five RAPs were able to provide representatives on the day: the DACHA, DLO, DAL, Yarrawalk and DTAC organisations. During the site inspection on 2 October 2012, no areas of significant Aboriginal heritage were identified.

A draft Aboriginal heritage assessment report was circulated to all RAPs on 17 October 2012. All stakeholders were encouraged to provide a response on the content of the draft report. The closing date for comments was 31 October 2012. However, opportunity to provide comment was extended until close of business on 6 November 2012.

Written reviews on the report were provided by five of the seven RAPs for the Project and are attached as **Appendix G** of **Volume 3** of this EIS. In addition, one RAP (DTAC) provided feedback over the phone. A summary of RAP responses to the draft report is provided below in **Table 9-3**.

Table 9-3 Registered Aboriginal Party Responses to Draft Report

Organisation	Summary of Response
DTAC	DTAC is satisfied with the report and proposed management recommendations (John Reilly, DTAC Aboriginal Assessment Officer, pers. comm. 6 November 2012).
DACHA	DACHA supports the proposed management recommendations.
DCAC	DCAC has read the draft report and support its findings and recommendations. The significance of the Project Area for Aboriginal cultural heritage is low. The Project Area has had numerous land disturbances and is highly unlikely to contain intact cultural heritage.
DAL	DAL has no objections to the proposed development and supports the proposed management recommendations. The Project Area has been badly disturbed over many years and retains little to no potential for the presence of Aboriginal cultural heritage.
DLO	DLO has no concerns with the proposed management recommendations for the Project Area.
Yarrawalk	Yarrawalk has indicated that it supports the proposed management recommendations but would like to see Tocomwall field staff onsite when topsoil is being removed to recover any subsurface cultural materials. Any cultural material that is located should be returned to site once the Project has been completed. Yarrawalk also wishes to highlight the fact that the Project Area was used as a hunting / gathering and camping place.

All RAPs who provided a response to the draft report have indicated that they agree with the management recommendations detailed in **Section 21.3**. Yarrawalk has requested that Tocomwall field staff be present onsite when topsoil is being removed to recover any subsurface cultural materials. However, AECOM believes that this is unwarranted given the extent of historic land use and disturbance of the Project Area, with construction of the refinery preceded by dredging of surface waters and artificial filling and levelling. Excavation works as part of the Project are also expected to only be undertaken to depths of between 0.6 mbgs and 1 mbgs and within limited areas of the site.

9.3.3 Public Authorities and Regulatory Consultation

Consultation meetings and correspondence has taken place with the following regulators and public authorities:

- WorkCover on 11 July 2012 and 14 September 2012;
- EPA and NSW Health on 1 August 2012 and 25 September 2013;
- NOW on 19 October 2012;
- Fire and Rescue NSW on 19 October 2012 and 30 October 2012;
- Sydney Ports Corporation, Transport for NSW and RMS on 14 August 2012; and
- Parramatta City Council on 4 September 2012.

This consultation was undertaken to satisfy the DGRs issued for the Project. RMS, EPA, OEH, WorkCover, NoW and Parramatta City Council also issued key issues and assessment requirements for the Project to the DP&I for input into the DGRs. These are discussed separately in **Section 9.4**.

WorkCover

Shell met with WorkCover on two occasions (11 July 2012 and 14 September 2012) to discuss the Project. Matters discussed at these meetings that are relevant to the Project are as follows:

- Confirmation that the Project would constitute a MHF for the purposes of the WH&S Regulation;
- Licensing requirements for the converted Clyde Terminal, including MHF licensing;
- Compliance with the Australian Standard *AS1940-2004 The storage and handling of flammable and combustible liquids*;
- Risks of simultaneous operations and demolition/construction works; and
- The occupational risks posed by the Project generally.

The key points discussed during the meeting with the DP&I and NSW WorkCover regarding the PHA included:

- The PHA methodology;
- Occupational risks posed by the project;
- Compliance with the new WH&S legislation (refer to **Section 7.5.1**); and
- The changes in products that are proposed to be stored at the Clyde Terminal and the potential for that to impact on the MHF classification of the Project Area.

Meetings were also held with Parramatta City Council to discuss the risks posed by the Project to nearby residents with regards to the ongoing receipt and storage of petroleum products at the Clyde Terminal.

A PHA has been prepared and is included in **Appendix F** of **Volume 3** of this EIS and the findings are summarised in **Section 19.0**.

EPA and NSW Health

A meeting was held between Shell, the EPA and NSW Health on 1 August 2012. The topics discussed at this meeting included noise impacts and air quality issues that could result from the Project.

Following this meeting, and in subsequent consultation with these agencies, it was determined that a Human Health Risk Assessment was not required for the current Project due to the location of the nearest sensitive receivers.

The methodology for the Air Quality Impact Assessment was also developed in consultation with the EPA and NSW Health. On 25 September 2012, AECOM and Shell representatives met with EPA staff at the EPA Goulburn Street Office. The meeting was held to discuss the proposed methodology for the assessment. Further to that initial EPA meeting, there has been ongoing communication between Shell, AECOM, EPA, DP&I and NSW Health regarding the refinement of the methodology to meet each stakeholders interests. These included meetings on the following dates:

- 18 February 2013 attended by Shell, AECOM, EPA and DP&I; and
- 13 March 2013 attended by Shell, AECOM and EPA.

Shell previously advised the EPA in July 2011 that it planned to cease refinery operations. The EPA replied to Shell on 12 October 2011 detailing its expectations and requiring that an investigation and remediation program be developed (i.e. a Preliminary Investigation Order) (refer to **Sections 7.3.4** and **7.5.3**). In November 2011, Shell initiated additional investigations of soil and groundwater contamination in the areas of the Clyde Terminal that had not been previously characterised. An Environmental Conditions Summary Report (ERM, 2012) was prepared and provided to the EPA outlining potential contamination sources at the Project Area (refer to **Section 17.0** for more details). Shell continues its dialogue with the EPA on this issue.

Sydney Ports Corporation, Transport for NSW and RMS

A meeting was held between Shell, Sydney Ports Corporation, Transport for NSW and the RMS on 14 August 2012. Issues that were discussed at this meeting included the infrastructure requirements to support Shell's ongoing Sydney fuel operations, and changes to the ERP that would be prepared once the final engineering designs are completed for the Project (i.e. before demolition and construction activities take place). The requirements for this ERP are outlined in **Sections 8.2.3** and **9.3.2**).

Parramatta City Council

Consultation has been undertaken with Parramatta City Council throughout the preparation of the EIS. A briefing was provided to Parramatta City Council on 4 September 2012. Another meeting was held with Parramatta City Council on 6 December 2012 to discuss the outcomes of the Transport Impact Assessment undertaken as part of this EIS. Key issues which were discussed during this meeting related to traffic and road impacts, community and business consultation and economic drivers, as well as proper characterisation of the Project as SSD and potential future uses of the western and north-eastern portions of the Project Area. As is demonstrated in **Section 11.2**, the Project would not have a significant impact on surrounding traffic or road networks. Shell has undertaken community and business consultation as directed by the DGRs and as outlined in this **Table 9-1**. The issue of the Project being properly characterised as SSD is dealt with in **Section 7.2**.

Parramatta City Council expressed interest surrounding the future use of land that would be surplus to operation of the converted Clyde Terminal in the west and north-east of the Project Area once redundant refining infrastructure is removed. Council was interested in understanding the known and potential soil and groundwater contamination issues in the area, and how this would influence future land use decision-making. As outlined in **Section 14.2.1**, Shell is currently unable to commit to a future land use of these portions of the Project Area. However, it is anticipated that the most likely use for the surplus land at the Project Area would be for some sort of industrial use in the coming years. Shell will continue its dialogue with Parramatta City Council over this eventual land use decision. **Section 17.3.2** outlines how Shell will undertake further contamination investigations (and remediation if required) once redundant infrastructure has been demolished, to better understand the nature of suitable future land uses for the Project Area.

Parramatta City Council will also be consulted during the preparation of the ERP for the Project Area.

NSW Office of Water

Shell provided a letter to NOW on 19 October 2012 outlining the key components of the Project and inviting NOW to make further comment on the Project. At the date of preparing this EIS, no response was received from NOW.

Fire and Rescue NSW

Shell had a meeting with Fire and Rescue NSW during the initial planning for this Project on 30 October 2012. Shell also provided a letter to Fire and Rescue NSW on 19 October 2012 outlining the key components of the Project and inviting Fire and Rescue NSW to make further comment on the Project. Specifically, the letter also advised that the Project would involve the conversion of a MHF, and that Shell was therefore seeking comment from Fire and Rescue NSW in relation to the preparation of its ERP for the Project Area as per the requirements of clause 557 of the WH&S Regulation. At the date of preparing this EIS, no further response has been received from Fire and Rescue NSW. Shell would consult further with Fire and Rescue NSW at the time of amending its ERP for the converted Clyde Terminal, before demolition and construction activities commence.

CMA Consultation

Shell provided a letter to the SMCMA on 19 October 2012 outlining the key components of the Project and inviting the SMCMA to make further comment on the Project. At the date of preparing this EIS, no response has been received from SMCMA.

9.3.4 Workforce Consultation

To ensure effective consultation with Shell's workforce at both the Clyde Terminal and the Gore Bay Terminal, as a result of the cessation of refining, Shell prepared the *Clyde Interim Terminal Operations Staffing Proposal: Guide for Clyde and Gore Bay Employees* (Shell, June 2012). This proposal was made available to all Clyde Terminal and Gore Bay Terminal employees as of June 2012 (prior to the cessation of refining) to assist those employees whose roles were made redundant as a result of the cessation of refining operations.

Through this consultation process, Shell was able to redeploy around 30 staff as part of the current operations. During this period, Shell also provided change management workshops, resumé writing workshops, and a careers expo and careers road show for impacted staff and contractors.

As part of the conversion of the Clyde Refinery HSSE MS into an OEMP document, consultation was also undertaken with the Work Health and Safety Committee to ensure that all relevant hazards, controls and operating procedures are in place prior to the demolition and construction works commencing.

A number of contractors would be required during the project works. A number of currently employed staff would undertake operations roles, whilst others would be employed to oversee various aspects of the Project. Contractors would be required to assist with demolition works and the construction works. Once the project works are complete, the Clyde Terminal would require approximately 35 employees and 23 contractors (approximately 58 staff in total). These personnel numbers would be subject to further consultation. The staff and contractor workforce at the Project Area would therefore fluctuate throughout the Project, depending on the type and amount of activities being undertaken at any one time.

Operation of the converted Clyde Terminal would be undertaken 24 hours a day, seven days a week. It is expected that during operation of the converted Clyde Terminal staff and contractors would undertake varying work patterns, including a mixture of 24/7 continuous shift rosters and Monday to Friday day work roles. Shell would continue consultation with staff as the conversion works are completed, as the workforce needs of the Project Area are expected to change again.

9.4 Other Department and Agency Key Issues and Assessment Requirements

During its assessment of the initial EIS Scoping Report, DP&I also invited various other Government departments and agencies to submit key issues and assessment requirements in relation to the Project, which this EIS is also required to consider. The following Government departments and agencies provided the DP&I with key issues and assessment requirements for consideration in this EIS:

- OEH, including its former EPA arm which is now a separate Government agency, on 8 March 2012 (refer to **Table 9-4**);
- Parramatta City Council on 3 February 2012 (refer to **Table 9-5**);
- RMS on 5 March 2012 (refer to **Table 9-6**);
- WorkCover on 24 February 2012 (refer to **Table 9-7**); and
- NOW on 9 March 2012 (refer to **Table 9-8**).

These key issues and assessment requirements are provided as part of **Appendix A** of **Volume 2** to this EIS, and are outlined in the tables below. **Table 9-4** to **Table 9-8** provides cross references to the relevant sections of this EIS that deal with each issue as required.

Table 9-4 Key Issues and Assessment Requirements raised by the OEH and EPA

OEH/EPA's Key Issues and Assessment Requirements		
General Environmental Issues		
Summary of Key Information Requirements from EPA	- Potential air quality impacts on neighbouring properties; - Potential impacts of noise over the life of the development; - Water pollution implications; - Waste generation, storage and management onsite; - Biodiversity; - Contaminated sites; - Aboriginal cultural heritage; - Details of all pollution control equipment to minimise water, air and noise pollution; - Cumulative impacts on sensitive receivers from existing and proposed activities; and - Cumulative impacts of similar activities locally and regionally.	**Section 15.2** **Section 22.2** **Sections 17.2** **Section 20.0** **Section 16.0** **Section 17.0** **Section 21.0** **Sections 13.3**, **17.3** and **22.0** **Section 25.2** **Section 25.2**
Environmental Impacts of the Project	Impacts related to the following environmental issues need to be assessed, quantified and reported on: - Air issues: • Air quality; and • Greenhouse gas. - Noise and vibration. - Waste including hazardous materials and radiation: • General waste – any proposal; • Chemicals subject to Chemical Control Orders; and • Hazardous materials and radiation • Water and Soils: Acid sulfate soils; • Contaminated sites; • Soils – generally; • Water quality; • Biodiversity; • Contaminated sites; and • Aboriginal cultural heritage. • Environmental Impact Statement (EIS) should address the specific requirements outlined under each heading and assess the impacts in accordance with the relevant guidelines mentioned. The premises carries out a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and holds and Environment Protection Licence (EPL) No. 570.	**Section 15.0** **Section 23.0** **Section 22.0** **Section 20.0** **Section 20.2** **Section 20.2** **Section 20.2** **Section 17.2** **Section 17.2** **Section 17.2** **Section 17.2** **Section 13.2** **Section 16.2** **Section 17.2** **Section 21.2** As above. **Section 8.3.1**
Licensing Requirements	The premises carries out a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and holds	**Section 8.3.1**

OEH/EPA's Key Issues and Assessment Requirements		
	and Environment Protection Licence (EPL) No. 570.	
Air Issues		
General Requirements: Air Quality	The Proponent must conduct air quality impact assessments (AQIAs) for the proposed Clyde Refinery Conversion SSD-5147 in accordance with the requirements of these framework documents:	**Section 15.2.1**
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2005;	
	- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW 2005; - Assessment and Management of Odour from Stationary Sources in NSW: Technical Framework 2006;	**Section 15.2.1** **NA** (no sampling was required refer to **Section 15.1.2**)
	- Assessment and Management of Odour from Stationary Sources in NSW: Technical Notes 2006; and	**NA** (odour not quantitatively assessed – **Section 15.1.2**)
	- Protection of the Environment Operations (Clean Air) Regulation 2002.	**Section 15.2.7**
	- Key issues that air quality impact assessments for the two proposals must address are:	
	- Identify all point and fugitive sources of pollutants of concern including, but not limited to: • Principal and individual toxic air pollutants; • Odours; and • Dust.	**Section 15.1.2**
	Assess project impacts of during:	
	- All stages of proposed modification works; and	**Section 15.1.2**
	• Operational phase of the modified facility.	**Section 15.2.1**
	• Justify dispersion modelling approach, including relevance of:	
	- Activity rates and source emission profiles applies to project emissions inventory;	**Section 15.2**
	• Ambient air quality data used to establish background concentrations of project-relevant pollutants;	**Section 15.2**
	• Meteorological data used; and	**Section 15.1.2**
	• Dispersion model used.	**Section 15.1**
	• Assess the significance of pollutant ground level concentrations with respect to effects on the environment, human health, amenity and ambient air quality standards or goals of the *Protection of the Environment Operations (Clean Air) Regulation 2002* and the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2005*.	**Section 15.1**
	- Demonstrate that emissions will be minimised to the maximum extent achievable through the application of best practice process design and/or emission controls, and propose air quality management plans (AQMPs) outlining the following for principal toxic air pollutants, odour and, dust emissions:	
	- Major emission sources of pollutant;	**Section 15.1.2**
	• Monitoring and process design protocols; and	**Section 15.2.6**

OEH/EPA's Key Issues and Assessment Requirements		
	• Specifications for proposed pollution control equipment.	**Section 15.2.7**
	- Identify and describe all processes and sources of odour, dust and air toxics from all aspects of the projects that could result in air emissions. - Note that sources can be classed as either: • Point – stack or vent; or • Fugitive – e.g. excavation and construction works, wind erosion, volatilisation, loading or unloading activities, storage facilities, vehicle movements (road dust, exhausts, loss from load), and land clearing. - Sources may include, but not be limited to, emissions from: • Activities such as decommissioning, demolishing/excavation and reconfiguration. For example, emissions during demolition works for existing onsite infrastructure such as: ▪ Fluidised Catalytic Cracking Unit (FCCU); ▪ Hydrodesulphurisation (HDS) unit; ▪ Storage tanks, in particular, those in unprocessed/odorous feed services; and ▪ Various other ancillary structures. • Fuel handling during operational phase (receipt, product dosing, storage, and transfer).	**Section 15.2.1**
Detailed Requirements: Project Emissions	Provide project details essential to predicting and assessing air impacts including:	
	- Quantities and physio-chemical parameters of materials to be used, transported, produced or stored (e.g. concentration, moisture content, source areas, particle sizes etc.).	**NA** (as this relates to particulate emissions, and these impacts were qualitatively assessed)
	• Sufficient detail to identify emitted pollutant's characteristics (fuel types and compositions) and quantity (fuel throughput) during operational phase.	**Table 15-3**
	• Clear diagrams illustrating:	
	- The physical layout of the plant and pollution control equipment; and	**Figure 6-1**
	• The material and air flows through the plant and any pollution control equipment, including structures or enclosures for controlling air and odour emissions.	**NA** (as no pollution control equipment is considered necessary)
	• An outline of procedures for handling, transport, production, storage and management of solid, liquid and gaseous waste streams with potential for significant air impacts.	**Sections 20.0** and **15.3**
	- For potentially odorous emissions provide the emission rates must be reported in terms of odour units, and determined within OEH/EPA guidelines using, as appropriate, sampling and analysis techniques relevant to individual or complex odours and point or diffuse sources.	
	- The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate) relevant to each of the projects. The EA must provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data, and include the following:	**Section 15.1**

OEH/EPA's Key Issues and Assessment Requirements		
Detailed Requirements: Project Context	- Detailed description of the receiving environment, including but not limited to descriptions of: • Exact locations of sensitive receptors; • Meteorology and climate; • Topography; • Surrounding land-uses; and • Surrounding buildings that may affect plume dispersion.	**Section 15.1** **Section 15.1.2**
	- Site-specific meteorological data for the study area/project site including: • Temperature and humidity; • Wind speed and direction; • Rainfall, evaporation and cloud cover; • Atmospheric stability class; and • Mixing height (the height that emissions will be ultimately mixed in the atmosphere). • Source existing ambient air quality data and establish background concentrations of key project-relevant air pollutants at potentially affected sensitive receptor locations.	**Section 15.1** **Appendix A of Appendix C** **Section 15.1.2**
	- A perspective view of the study area such as the terrain file used in dispersion models (where appropriate).	**Figure 6-1**
	- The EIS must demonstrate that the Proponent has:	
	- Estimated resulting ground level concentrations of all pollutants based on emissions estimates emissions (by quantity (and size for particles), source and discharge point from all sources.	**Section 15.2.6**
Detailed Requirements: Assessment of Project Impacts	- Used an appropriate dispersion model to estimate ambient pollution concentrations. Discussed choice of model and parameters with the EPA where necessary (e.g. potentially significant impacts and complex terrain effects).	**Section 15.1.2**
	- Detailed how background levels and emissions from other potential sources of the key air pollutants have been cumulatively assessed at sensitive receptor locations.	**Section 15.2.7**
	- Described the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.	**Section 15.2**
	- Assessed the risk associated with potential discharges of emissions for all stages of the proposals. Assessments of risk relates to environmental harm, risk to human health and amenity.	**Section 15.2.7**
	- Demonstrated the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO Act) 1997* and the *POEO (Clean Air) Regulation (2002)*.	**Section 15.2.7**
Detailed Requirements: Management and Mitigation Measures	- The Proponent must outlined proposed air quality management and monitoring procedures during each stage of the two projects detailing: • How potentially offensive odour will be eliminated at source; • For all point and fugitive sources emitting principal toxic air pollutants, demonstrate that emissions will be minimised to the maximum extent achievable through	**Section 15.3** Note that mitigation measures have only been proposed for demolition and construction activities, as operation of the Clyde Terminal is not

OEH/EPA's Key Issues and Assessment Requirements		
	the application of best practice process design and/or emission controls for both point and fugitive emissions by specifying proposed management protocols; and, pollution control equipment and emission control techniques/practices that will be employed by the proposal.	anticipated to result in exceedances of any air quality or odour criteria (refer to **Section 15.2.7**).
Greenhouse Gas	The EIS should include a comprehensive assessment of, and report on, the project's predicted greenhouse gas emissions (tCO2e). Emissions should be reported broken down by:	
	- Direct emissions (scope 1 as defined by the Greenhouse Gas Protocol – see reference below);	**Section 23.2.1**
	• Indirect emissions from electricity (scope 2); and	**Section 23.2.2**
	• Upstream and downstream emissions (scope 3), • before and after the implementation of the project, including annual emissions for each year of the project (construction, operation and decommissioning).	**Section 23.2.3**
	The EIS should include an estimate of the greenhouse emissions intensity (per unit of production). Emissions intensity should be compared with best practice if possible.	**Section 23.2**
	- The emissions should be estimated using an appropriate methodology, in accordance with NSW, Australian and international guidelines (see below).	**Section 23.1**
	- The proponent should also evaluate and report on the feasibility of measures to reduce greenhouse gas emissions associated with the project. This could include a consideration of energy efficiency opportunities or undertaking an energy use audit for the site.	**Section 23.3**
	- <u>Guidance Material</u>	
	The Greenhouse Gas Protocol: Corporate Standard, World Council for Sustainable Business Development & World Resources Institute;	**Section 23.2**
	- *National Greenhouse Accounts (NGA) Factors*, Australian Department of Climate Change;	**Section 23.1**
	- *National Greenhouse and Energy Reporting System, Technical Guidelines*;	**Section 23.1**
	- *Australian Greenhouse Emissions Information System* (AGEIS); and	**Section 23.1**
	- *National Carbon Accounting Toolbox*.	**NA** as NCAT more relevant to changed land management.
	- *National Carbon Accounting Toolbox*.	**NA** as NCAT more relevant to changed land management.
Noise and Vibration		
In relation to noise, the following matters should be addressed (where relevant) as part of the EIS:		
General	- Construction noise associated with the proposed development	**Sections 22.1.1**, **22.2**

OEH/EPA's Key Issues and Assessment Requirements		
	should be assessed using the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009).	and **Table 22-6**
	- Vibration from all activities (including demolition, construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006).	**NA** (refer to **Section 22.1.1**)
	- If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in the *Australian and New Zealand Environmental Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).	**Sections 22.1.1** and **0**
	- Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Industrial Noise Policy* (EPA, 2000) and *Industrial Noise Policy Application Notes*.	**Sections 22.1.1**, **22.1.3**, **22.1.4**, **22.1.5** and **22.2.4**
Industry	- Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *Environmental Criteria for Road Traffic Noise* (EPA, 1999a).	**Section 22.2.2**
Road	- Noise from new or upgraded public roads should be assessed using the *Environmental Criteria for Road Traffic Noise* (EPA, 1999a).	**Section 22.2.2**
	- Noise from new or upgraded public roads should be assessed using the *Environmental Criteria for Road Traffic Noise* (EPA, 1999a).	**Section 22.2.2**
Waste, Chemicals and Hazardous Materials/Radiation		
General Waste Types – Any Proposal	The EIS should:	**Sections 20.1.1** and **20.1.2**
	- Include a detailed plan for in-situ classification of waste material, including the sampling locations and sampling regime that will be employed to classify the waste, particularly with regards to the identification of contaminated hotspots.	
	• Identify, characterise and classify all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste.	**Table 20-1** and **Table 20-2**
	• **Note:** All waste must be classified in accordance with *OEH's Waste Classification Guidelines*.	**Section 20.1.1**
	Identify, characterise and classify all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.	**Table 20-2**
	- **Note:** All waste must be classified in accordance with *OEH's Classification Guidelines*.	**Section 20.1.1**
	Include a commitment to retaining all sampling and classification results for the life of the project to demonstrate compliance with OEH's Waste Classification Guidelines.	**Section 20.3**

OEH/EPA's Key Issues and Assessment Requirements		
	- Provide details of how waste will be handled and managed onsite to minimise pollution, including:	**Section 20.3**
	• Stockpile location and management: ▪ Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste). ▪ Proposed height limits for all waste to reduce the potential for dust and odour. ▪ Procedures for minimising the movement of waste around the site and double handling.	**Section 13.3**
	- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners, etc.	
	• Erosion, sediment and leachate control including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during works. The EIS should show the location of each measure to be implemented. The Proponent should consider measure such as: ▪ Sediment traps; ▪ Diversion banks; ▪ Sediment fences; ▪ Bunds (earth, hay, mulch); ▪ Geofabric liners; and • Other control measures as appropriate.	**Section 13.3**
	- The Proponent should also provide details of: • How leachate from stockpiled waste material will be kept separate from stormwater runoff; • Treatment of leachate through a wastewater treatment plant (if applicable); and • Any proposed transport and disposal of leachate offsite.	**Section 20.3**
	- Provide details of how the waste will be handled and managed during transport to a lawful facility. If the waste possesses hazardous characteristics, the Proponent must provide details of how the waste will be treated or immobilised to render it suitable for transport and disposal.	**Section 20.3**
	- Include details of all procedures and protocols to be implemented to ensure that any waste leaving the site is transported and disposed of lawfully and does not pose a risk to human health or the environment.	**Section 20.3**
	- Include a statement demonstrating that the Proponent is aware of OEH's requirements with respect to notification and tracking of waste.	**Section 7.5.5**
	- Include a statement demonstrating that the Proponent is aware of the relevant legislative requirements for disposal of the waste, including any relevant Resource Recovery Exemptions as gazetted by OEH from time to time.	**Section 7.5.5**
	- Outline contingency plans for any event that affects operations at the site that may result in environmental harm, including: excessive stockpiling of waste, volume of leachate generated exceeds the storage capacity available onsite etc.	**Section 20.3**

OEH/EPA's Key Issues and Assessment Requirements		
	- The EIS must demonstrate how the Proponent will manage all materials and wastes containing scheduled chemical waste, dioxin and/or polychlorinated biphenyls (PCBs) in accordance with the applicable Chemical Control Order, National Management Plan or in accordance with a licence under the EHC Act.	**Sections 7.5.4** and **20.3**
Chemicals Subject to Chemical Control Orders	- Where a project involves any processing or treatment of scheduled chemicals, the proponent must provide OEH with sufficient and appropriate documentation for a technology assessment to be undertaken by the OEH, in accordance with the following: • 'National Protocol – Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes – July 1994;' and - 'National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes – July 1994.'	**NA** as Shell's waste operations at the Project Area are already managed according to EPL No. 570
	- Where a project involves any processing or treatment of scheduled chemicals, the proponent must provide OEH with sufficient and appropriate documentation for a technology assessment to be undertaken by the OEH, in accordance with the following: • 'National Protocol – Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes – July 1994;' and - 'National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes – July 1994.'	**NA** as Shell's waste operations at the Project Area are already managed according to EPL No. 570
Water and Soils		
Acid Sulfate Soils	- The potential impacts of the development of within areas of acid sulfate soils must be assessed in accordance with the relevant guidelines in the *Acid Sulphate Soils Manual* (Stone et al, 1998) and the *Acid Sulphate Soils Laboratory Methods Guidelines* (Ahern et al, 2004). - Describe mitigation and management options that will be used to prevent, control, abate or minimise potential impacts from the disturbance of acid sulfate soils associated with the project and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.	**Sections 17.2.1** and **17.3**
Water	Describe the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.	**Sections 13.1.1**, **13.1.2** and **13.2.1**
	- Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.	**Section 13.2.1**
	- Where relevant include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and	**Sections 13.2.1** and **13.2.2**

OEH/EPA's Key Issues and Assessment Requirements		
	re-use options.	
	- Details/specifications of all bunded areas to store, undertake product dosing activities and process liquids or chemicals to contain spillages.	**Sections 17.1.8** and **19.4**
	- Details/specifications of all tanker loading/unloading areas. It should be not that these areas must be designed such that they are not impacted upon by rainwater.	**Section 13.2.2**
	Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resources likely to be affected by the proposal.	**Sections 13.1**, **13.2.1** and **13.2.3**
	Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resources likely to be affected by the proposal.	**Sections 13.1**, **13.2.1** and **13.2.3**
Biodiversity		
General Requirements	The study area should include areas of remnant vegetation adjoining the site, if the proposal may cause indirect impacts to this area. Remnant vegetation in the study area includes two endangered ecological communities listed under the TSC Act (Coastal Saltmarsh and Swamp Oak Floodplain Forest), and threatened plant species (*Wilsonia backhousei* and *Acacia pubescens*). Therefore, the EIS should include a biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters included in the following sections.	**Section 16.2.2**
	- A field survey should be conducted if the site and of any adjoining areas of native vegetation that may be indirectly impacted. The survey should be undertaken and documented in accordance with relevant guidelines, including: • The *Green and Golden Bell Frog Environmental Impact Assessment Guidelines* (National Parks and Wildlife Services, 2003). • The *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians* (Department of Environment and Climate Change, 2009). • *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft* (Department of Environment and Conservation, 2004). • *Threatened species survey and assessment guideline.* • information on - www.environment.nsw.gov.au/threatenedspcies/surveyassessmentgdlns.htm.	**Section 16.1**
	The EIS should contain the following information as a minimum:	
	- Description and mapping of study area, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area.	**Sections 16.1, 16.2,** and **Figure 7** of **Appendix D**
	- Description of survey methodologies used, including timing, location and weather conditions.	**Section 16.1** and **Section 1.3** of

OEH/EPA's Key Issues and Assessment Requirements		
		Appendix D
	- Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the EIS.	**Section 1.3.3** of **Appendix D**
	- Identification of the national and state listed threatened biota known or likely to occur in the study area and their conservation status.	**Tables 5, 8, 9** and **Section 3.4** of **Appendix D**
	- Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect construction and operation impacts.	**Section 16.3**
	- Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term managed arrangements will be guaranteed. These measures should be developed in accordance with the "Management Plan for the Green and Golden Bell Frog Parramatta Key Population" (Department of Environment and Climate Change, 2008).	**Section 16.4**
	- Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 4 below).	**Sections 16.4** and **16.3.5**
	- An assessment of the significance of direct and indirect impacts of the proposal must be undertaken for threatened biodiversity known or considered likely to occur in the study area based on the presence of suitable habitat. This assessment must take into account: • The factors identified in section 5A of the EP&A Act; and • The guidance provided by the *Threatened Species Assessment Guideline – The Assessment of Significance* (Department of Environment and Climate Change, 2007).	**Section 16.3**
	- Where an offsets package is proposed by a proponent for impacts to biodiversity this package should: • Meet OEH's Principles for the use of biodiversity offsets in NSW; • Identify the conservation mechanisms to be used to ensure the long term protection and management of the offset sites. ▪ Include an appropriate Management Plan (such as vegetation or habitat) that has been developed as a key amelioration measure to ensure any proposed compensatory offsets, retained habitat enhancement features within the development footprint and/or impact mitigation measures (including proposed rehabilitation and/or monitoring programs) are appropriately managed and funded.	**Section 16.3.5**
	• With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the assessment should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.	**Section 7.6.1**
	- The proponent will have to comply with all guidelines relevant	**Section 7.5.7**

OEH/EPA's Key Issues and Assessment Requirements		
	to the decommissioning and/or removing underground petroleum storage systems (e.g. UPSS regulations).	
Contaminated Sites	An assessment of the likelihood of Aboriginal objects being located within the project should be undertaken. If it is likely that Aboriginal objects are present within the project area, consideration of potential impacts to these objects must be made in accordance with the *Draft Guideline for Aboriginal Cultural Heritage Impacts Assessment and Community Consultation* (Department of Environment and Conservation, 2005c).	**Section 21.0**
Aboriginal Cultural Heritage		

Table 9-5 Key Issues and Assessment Requirements raised by Parramatta City Council

Parramatta City Council's Key Issues and Assessment Requirements		
Parramatta City Council concurs with the DP&I's list of DGRs for the proposed development and wishes to add the following specific considerations.		
Heritage	- The site contains a heritage item under Schedule 5 of the *Parramatta Local Environmental Plan 2011*. The site is of significance because it is located on the bank of Parramatta River, and includes a portion of the river bank listed as significant wetlands. The heritage item comprises an area of remnant wetland vegetation located along the foreshore of the Parramatta and Duck Rivers and their tributaries.	**Sections 16.2** and **16.3**
Aboriginal Significance	- The site is identified as having Aboriginal Association. These are areas identified as having some significance to present day Aboriginal people through current social or historical connections. - Not only should this issue be addressed within the EIS, consideration should be given to consultation with the local Aboriginal community groups. - The relevant Aboriginal community groups are the Dharug Tribal Aboriginal Corporation and the Deerrubbin Local Aboriginal Land Council.	**Sections 21.0** and **9.3.2**
Endangered Ecological Community	- The Sydney Metropolitan Catchment Authority identifies part of the site as containing an Endangered Ecological Community being Swamp Oak Floodplain Forest. Impacts upon any ecologically endangered communities need to be addressed within the EIS.	**Section 16.2.2**
Loss of Cultural Significance	- The refinery may be considered to have cultural significance. It is an historic visual icon within the area. The loss of the refinery in terms of its cultural significance should be addressed. Consideration should be given to the photographic documentation of the site and the provision of an Arts Plan to reflect the history of the site.	**Section 18.3**
Flooding	- Part of the site is affected by 1:100 year flood event. Consideration must be given to the proposed development in regard to Council's Local Floodplain Risk Management Policy.	**Sections 13.1.3** and **13.2.4**
Council Controls to be Considered in	- The EIS should contain an assessment of the proposed development in accordance with the following Council controls: • *Parramatta Local Environmental Plan 2011*.	**Section 7.3.1** **Section 14.0** and

Parramatta City Council's Key Issues and Assessment Requirements		
the EIS	• *Parramatta Development Control Plan 2011*. • Council's Local Floodplain Risk Management Policy.	**Section 13.0**

Table 9-6 Key Issues and Assessment Requirements raised by Roads and Maritime Services

RMS Key Issues and Assessment Requirements		
Specific Issues	- 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).	**Section 11.2**
	- Details of the proposed accesses and the parking provisions associated with the development including compliance with the requirements of the relevant Australian Standards (i.e. turn paths, sight distance requirements, aisle widths, etc.).	**Section 11.2**
	- Proposed number of car parking spaces and compliance with the appropriate parking codes.	**Section 11.2.3**
	- Details of service vehicle movements (including vehicle type and likely arrival and departure times).	**Section 11.2**
	- RMS will require in due course the provision of a traffic management plan for all demolition/construction activities, detailing vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures.	**Section 11.3**

Table 9-7 Key Issues and Assessment Requirements raised by WorkCover NSW

NSW WorkCover Key Issues and Assessment Requirements		
Specific Issues	- As proposed in section 5 of the scoping report, the proponent must consult with WorkCover prior to and during the preparation of the EIS.	**Section 9.3.3**
	- Clause 4.3.6 of the report states that the Safety Report will be submitted to WorkCover in February 2012 for a new MHF Licence. In this regard, the proponent should note that with the commencement of the Work Health and Safety (WHS) legislation on 1 January 2012, the OHS legislation was repealed. Under the provisions of the WHS Regulation, the proponent must review and revise the safety related studies/reports, including those listed in clause 4.3.6 of the scoping report, when a modification to the MHF is proposed. The proponent must outline in the EIS, the procedure and the timing for compliance with the WHS Regulation.	**Sections 8.2.2** and **9.3.2**

Table 9-8 Key Issues and Assessment Requirements raised by NOW

NoW Key Issues and Assessment Requirements		
Key Issues	- The EIS for the current conversion project needs to provide adequate details to assess the impact of the project on surface water and groundwater resources. Due to the close proximity of the Clyde refinery site to the Parramatta and Duck Rivers, the presence of acid sulfate soils and contamination issues at the site, the EIS needs to assess potential impacts in surface water and address if the project is likely to intercept, use or affect groundwater.	**Sections 13.2.1**, **13.2.2** and **13.2.3**.
Surface Water and Groundwater	- The EIS for the current project needs to provide adequate details to assess the impact of the project on surface water and groundwater resources. The EIS needs to assess potential impacts on surface water and address if the project is likely to intercept, use or affect	**Sections 13.1**, **17.1**, **13.2** and **17.2.**

NoW Key Issues and Assessment Requirements		
	groundwater.	
	- The Office of Water is responsible for the management of groundwater resources. The proposal needs to demonstrate that it is consistent with NSW State groundwater policies, does not detrimentally impact on groundwater quality or the health of groundwater dependent ecosystems (GDEs).	**Sections 17.2.3**, **17.2** and **17.2.4**
	- To enable a comprehensive assessment of potential groundwater impacts associated with the proposal, the EIS needs to provide the following details:	
	• The predicted highest groundwater table at the site; Any works likely to intercept, connect with or infiltrate the groundwater sources;	**Section 17.1.6**
	• Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes;	**Section 17.2**
	• A description of the flow directions and rates and physical and chemical characteristics of the groundwater source;	**Section 17.1.6**
	• The predicted impacts of any final landform on the groundwater regime;	**Section 17.2**
	• The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts;	**Sections 17.2.3** and **17.2.4**
	• An assessment of the quality of the groundwater for the local groundwater catchment;	**Sections 17.1.6** and **17.1.7**
	• How the proposed development will not potentially diminish the current quality of groundwater, both in the short and long term;	**Section 17.2**
	• Measures for preventing groundwater pollution so that remediation is not required;	**Section 17.3**
	• Protective measures for any GDEs;	**Sections 17.1.8**, **17.3,** **13.3** and **16.4.5**
	• Proposed methods of the disposal of waste water and approval from the relevant authority; and	**Section 13.2** and **13.3**
	• The results of any models or predictive tools used.	**Sections 17.1.5** and **17.1.5**
	- Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce, manage or account for potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:	**Sections 17.1.8** and **17.3**
	• Any proposed monitoring programs, including water levels and quality data;	**Sections 17.1.8** and **17.3**
	• Reporting procedures for any monitoring program, including mechanism for transfer of information;	**Section 17.1**
	• An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of	**Section 17.2**

NoW Key Issues and Assessment Requirements		
	the proposal;	
	• Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category); and • Description of the remedial measures or contingency plans proposed; - Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.	**Sections 17.1.8** and **17.3** **Sections 17.1.8** and **17.3** **Section 17.4**
Licensing	- There may be a need for a groundwater licence and this will be decided by the Office of Water once further details are provided in the EIS.	**Table 7-3** and **Section 17.2**
Groundwater Dependent Ecosystems	- The EIS should provide details on the presence and distribution of GDEs in the vicinity of the site and: • Demonstrate that the proposed development would maintain natural patterns of groundwater flow and not disrupt groundwater levels that are critical to GDEs. • Identify any potential impacts on GDEs as a result of the proposal including: ▪ The effect of the proposal on the recharge to groundwater systems; ▪ The potential to adversely affect the water quality of the underlying groundwater systems and adjoining groundwater systems in hydraulic connections; and ▪ The effect on the function of GDEs (habitat, groundwater levels, connectivity). • Provide safeguard measures for any GDEs.	**Section 17.2.4** **Section 17.2.4** **Section 17.2.4** **Section 17.2.4** **Section 17.2.4** **Sections 17.1.8, 17.3, 13.3** and **16.4.5**
Relevant Instruments and Policies	- The EIS is required to take into account the following, as applicable: • *The Water Management Act 2000*; • *The Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* which covers the project area; • *NSW Groundwater Policy Framework Document – General*; • *NSW Groundwater Quality Protection Policy*; and • *NSW Groundwater Dependent Ecosystem Policy*.	**Section 17.2**
Relevant Legislation	- The assessment is required to take into account the requirements of the following legislation (administered by the Office) as applicable: • *Water Management Act 2000* (WMA) where a Water Sharing Plan (WSP) has commenced; and • *Water Act 1912*, where a WSP is not in place. - In particular, proposals and management plans should be consistent with the Objects (section 3) and Water Management Principles (section 5) of the WMA.	**Section 17.2** **Table 17-3**

NoW Key Issues and Assessment Requirements		
Water Sharing Plans	- Gazetted Water Sharing Plans (WSPs) prepared under the provisions of the WMA establish rules for access to, and the sharing of water between the environmental needs of the surface or groundwater source and water users. If the proposal is within a gazetted WSP area the assessment is required to demonstrate how the proposal is consistent with the relevant access and trading rules of the WSP. The site is covered by the *Greater Metropolitan Region Groundwater Sources*.	**Section 17.2**
Relevant Policies	- The assessment is required to take into account the following NSW Government policies, as applicable:	
	• *NSW Groundwater Policy Framework Document – General* (August 1997);	**Section 17.2**
	• *NSW Groundwater Quality Protection Policy* (1998);	**Section 17.2**
	• *NSW State Rivers and Estuaries Policy* (1993);	**Section 17.2**
	• *NSW Sand and Gravel Extraction Policy for Non-Tidal Rivers* (1992);	**NA**
	• *NSW Wetlands Policy* (2010);	**Section 13.1.4**
	• *Guidelines for the Assessment and Management of Groundwater Contamination* (2007);	**Section 17.1.8**
	• *Guidelines for Groundwater Protection in Australia* (1995);	**NA**
	• *MDBC Guidelines on Groundwater Flow Modelling* (2000);	**NA**
	• *Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources*;	**NA**
	• *Water Sharing Plan for the Macquarie-Cudgegong Regulated Rivers Water Source*; and	**NA**
	• *Draft Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources*.	**NA**
Guidelines	- The assessment is required to take into account the following Guidelines for Controlled Activities, as applicable:	
	• Riparian corridors (and associated Vegetation Management Plans);	**Section 13.1.4**
	• Watercourse crossings;	**NA**
	• Laying pipes and cables in watercourses;	**NA**
	• Outlet structures; and	**NA**
	• In-stream works.	**NA**
Groundwater	<u>Groundwater Source</u>	
	- The assessment is required to identify groundwater issues and potential degradation to the groundwater source and provide the following:	**Sections 17.1.6**, **17.1.7** and **17.2**
	• Details of the predicted highest groundwater table at the development site;	**Section 17.1.6**
	• Details of any works likely to intercept, connect with or result in pollutants infiltrating into the groundwater sources;	**Section 17.2**
	• Details of any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes;	**Section 17.2**

NoW Key Issues and Assessment Requirements		
	• Describe the flow directions and rates and the physical and chemical characteristics of the groundwater source;	**Section 17.1.6**
	• Details of the predicted impacts of any final landform on the groundwater regime;	**Section 17.2**
	• Details of the existing groundwater users within the area (including the environment) and include details of any potential impacts on these users;	**Sections 17.2.3** and **17.2.4**
	• Assessment of the quality of the groundwater for the local groundwater catchment;	**Sections 17.1.6** and **17.1.7**
	• Details of how the proposed development will not potentially diminish the current quality of groundwater, both in the short and long term;	**Section 17.2**
	• Quantification of impacts on groundwater GDEs	**Section 17.2.4**
	• Details on protective measures to minimise any impacts on GDEs;	**Sections 13.0, 16.0 and 17.0**
	• Details of proposed methods of the disposal of waste water and approval from the relevant authority;	**Section 13.2**
	• Assessment of the potential for saline intrusion of the groundwater and measures to prevent such intrusion into the groundwater aquifer; and	**Section 17.2**
	• Details of the results of any models or predictive tools used to predict groundwater drawdown, inflows to the site and impacts on affected water sources.	**Sections 17.1.5** and **17.1.7**
	- Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:	
	• Details of any proposed monitoring programs, including water levels and quality data;	**Sections 17.1.8** and **17.3**
	• Reporting procedures for any monitoring program including mechanism for transfer of information;	**Sections 17.1.8** and **17.3**
	• An assessment of any groundwater source/aquifer that may be sterilised as a consequence of the proposal;	**Section 17.1**
	• Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category);	**Section 17.2**
	• Description of the remedial measures or contingency plans proposed;	**Sections 17.1.8** and **17.3**
	• Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period; and	**Section 17.4**

NoW Key Issues and Assessment Requirements		
	• Any other assurances to account for the post-closure impacts such as retiring held water licences or ongoing pumping return proposals to minimise base flow losses.	**Section 17.4**
	<u>Licensing</u> - All proposed groundwater works, including bores for the purpose of investigation, extraction, dewatering, testing or monitoring must be identified in the proposal and an approval obtained from the Office of Water prior to their installation. - All predicted groundwater take must be accounted for through adequate licensing.	**Table 7-3** and **Section 17.2**
	<u>Groundwater Dependent Ecosystems (GDEs)</u> - As indicated above, any GDEs that may be affected significantly need to be clearly identified and the impacts quantified to enable proper assessment.	**Section 17.2.4**
Surface Water	<u>Watercourses/Riparian</u>	
	- The assessment is required to consider the impact of the proposal on the watercourses and associated riparian vegetation within the site and provide the following:	**Sections 13.2.1**, **13.2.3**, **13.2.5** and **17.2.4**
	• Identify the sources of surface water;	**Sections 13.2** and **17.2**
	• Details of stream order (using the Strahler System);	**Section 13.1.2**
	• Details of any proposed surface water extraction, including quantity, purpose, location of existing pumps, dams, diversions, cuttings and levees;	**Section 13.2.1**
	• Details of available surface water licences that could be purchased to account for any proposed extractions;	**NA** as not required
	• Detailed description of any proposed development or diversion works including all construction, clearing, draining, excavation and filling;	**Section 6.0**
	• An assessment of the impacts of the proposed methods of excavation, construction and material placement on the watercourse and associated vegetation;	**Sections 13.2** and **17.2**
	• A detailed description of all potential water related environmental impacts of any proposed development in terms of riparian vegetation, sediment movement, water quality and hydrologic regime;	**Sections 13.2** and **17.2**
	• A description of the design features and measures to be incorporated into any proposed development to guard against anything more than minimal long term actual and potential environmental disturbances, particularly in respect of maintaining the natural hydrological regime and sediment movement patterns and the identification of riparian buffers; and	**Sections 13.3** and **17.3**
	• Details of the impact on water quality and remedial measures proposed to address more than minimal adverse effects. **Note:** Recommended Core Riparian Zones (as applicable); • Minimum of 10 m for any intermittently flowing 1st order watercourse;	**Sections 13.3**, **17.1.8**, and **17.3**

NoW Key Issues and Assessment Requirements		
	• 20 m for any permanently flowing 1st order watercourse or any 2nd order watercourse; • 20 m-40 m (merit based assessment) for any 3rd order or greater watercourse. - Refer to NoW's *Water Guidelines for Controlled Activities* (August 2010).	
	<u>Water Management Structures/Dams</u> - If the proposal includes existing or proposed water management structures/dams, the assessment should provide information on the following: • Date of construction (for existing structure/s); • Details of the legal status/approval for existing structure/s; • Details of any proposal to change the purpose of existing structure/s; • Details if any remedial work is required to maintain the integrity of the existing structure/s; • Clarification if the structure/s is on a watercourse; • Details of the purpose, location and design specifications for the structure/s; • Size and storage capacity of the structure/s; • Calculation of the Maximum Harvestable Right Dam Capacity (MHRDC) for the site; • Details if the structure/s is affected by flood flows; • Details of any proposal for shared use, rights and entitlement of the structure/s; • Details if the proposed development/activity has the potential to bisect the structure/s. - NOW's Farm Dams Assessment Guide provide details on harvestable rights and the calculation of the MHRDC. <u>Basic Landholder Rights</u> - The WMA identifies Basic Landholder Rights (BLRs) for access to water whereby landholders over an aquifer or with river or lake frontage can access water for domestic (household) purposes or to water stock without the need for a water licence (although a works approval may still be required for a bore utilising BLR). Pipeline constructions and easements may therefore affect existing BLR users and therefore all potentially affected BLR users need to be identified and the impacts quantified. <u>Sustainable Water Supply</u> - The onus is on the proponent to assess which of the above is relevant (i.e. water licensing under a WSP) and identify the potential sources of water of an appropriate reliability and quantity to meet their water supply requirements. The water supply requirements and potential water available should be included in the EIS to enable NoW to assess the viability of the water supply required. Assurances should also be made that the proponent will enter the water market as required;	**Sections 13.1.4** and **13.2.4** **Sections 13.2** and **17.2** **NA** (refer to **Sections 13.1.2** and **13.2.1**) **NA** (refer to **Section 13.2.1**) **NA** (Project does not involve water usage for domestic or stock purposes)
	Therefore the assessment is required to address the issue of provision of a sustainable water supply for any project proposal. The assessment should include Water Management Plans detailing how a sustainable water supply can be sourced and implemented. Through the implementation of BASIX, Integrated Water Cycle Management and Water Sensitive Urban Design, and	**NA** (current potable water supply from Sydney Water to continue - refer to

NoW Key Issues and Assessment Requirements		
	proposed development should also exhibit high water use efficiency.	**Section 13.2.1**, and highly unlikely that the Project would involve groundwater interception and dewatering – refer to **Section 17.2**).

10.0 Identification of Key Assessment Issues

Relevant DGRs: The EIS must include a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment.

10.1 Approach to Identification of Key Environmental Issues

An initial screening of potential issues for consideration in the EIS was undertaken as part of the EIS Scoping Report (AECOM, 2012). As part of the EIS, the initial screening process has been re-evaluated to include additional information received regarding the key environmental and social issues associated with the Project, and to also include additional issues of concern that were identified as part of the EIS and associated consultation process.

The risk screening process has determined the likely level of assessment required to adequately and appropriately address each issue identified. The risk screening considered the significance of each potential environmental impact (through a preliminary environmental risk screening), and also the likely level of stakeholder interest in each issue. Including a stakeholder perception of potential environmental impacts is an important part of determining the level of assessment that should be applied, given that key stakeholder concerns may not necessarily align with a purely technical analysis of environmental risks.

The overall environmental assessment significance shown in **Table 10-3** was determined by selecting the highest result from both the environmental assessment screening process and the expected stakeholder interest. The overall environmental assessment score enabled the determination of the sensitivity of each issue for the Project, and whether a detailed specialist investigation or desktop analysis would be appropriate. Where a high level of stakeholder interest is expected, a potential environmental impact has been determined to be a key issue requiring a detailed assessment irrespective of the outcomes of environmental risk screening.

10.1.1 Environmental Risk Screening

The preliminary environmental risk screening for the Project was undertaken using an ordinal (comparative measurement) scale to consider the likelihood of an environmental impact occurring and the consequence of that impact should it not be mitigated. The likelihood and consequence of each impact have been combined through the significance screening matrix (refer to **Table 10-1**) to establish the likely significance of the issue for the environmental assessment of the Project.

Table 10-1 Significance Screening Matrix

Likelihood of Effect	Consequence of Unmitigated Effect		
	Minor	Moderate	Major
Improbable	Very Low	Low	Medium
Possible	Low	Medium	High
Probable	Medium	High	Very High

The allocation of risk is based upon the following considerations:

Likelihood of effect:

- Improbable: Imperceptible or short term cumulative impacts.
- Possible: Modest or medium term cumulative impacts.
- Probable: Serious or long term cumulative impacts.

Consequences of unmitigated effect:

- Minor: Minor environmental change.
- Moderate: Moderate adverse environmental change.
- Major: Important adverse environmental change.

The ranking of issues aims to prioritise the issues for assessment and does not consider the application of mitigation measures to manage the environmental effects. In all cases, appropriate and proven mitigation measures would be used to minimise potential impacts. These mitigation measures are summarised in **Section 27.2** of this EIS.

10.1.2 Review of Expected Stakeholder Interest

The expected level of stakeholder interest in each potential environmental issue identified has been considered, based on a broad review of key issues raised in previous meetings that Shell have facilitated with various Government agencies and departments, as well as community based consultation (refer to **Section 9.3.1**). Potential environmental impacts have been assigned an expected level of stakeholder interest based on the definitions presented in **Table 10-2**.

Table 10-2 Screening Levels – Expected Stakeholder Interest

Level of Interest	Definition
High level of interest	Issue raised repeatedly by stakeholders during consultation after the issuing of DGRs, or as part of feedback. Issue raised by multiple stakeholders after the issuing of DGRs.
Medium level of interest	Issue raised by stakeholders during consultation subsequent to the issuing of DGRs, or as part of feedback.
Low level of interest	Issue not raised during stakeholder consultation or feedback, apart from initial DGRs.

10.2 Screening of Environmental Assessment Significance

Outcomes of the preliminary risk screening process which determined the likely key issues of environmental significance are presented in **Table 10-3**. This screening allows for general prioritisation of environmental assessment issues based on their potential significance, and does not take into account the application of mitigation measures to minimise and manage potential impacts. Reasonable and feasible mitigation measures would be applied to the Project to minimise potential impacts. Mitigation measures developed during the assessment process are presented in detail in **Table 27-1** of this EIS.

Table 10-3 Outcomes of Screening of Environmental Assessment Significance

Issue	Unmitigated Environmental Risk Screening		
	Significance of Impacts	Stakeholder Interest	Overall Environmental Assessment Significance
Noise and Vibration			
Noise impacts on closest residential receivers during demolition and construction.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Noise impacts on closest residential receivers during operation.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Air Quality and Odour			
Air quality impacts on closest residential receivers during demolition and construction.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Air quality and odour impacts on closest residential receivers during operation.	Low Level of Significance	Low Level of Interest	Low Level of Significance

Issue	Unmitigated Environmental Risk Screening		
	Significance of Impacts	Stakeholder Interest	Overall Environmental Assessment Significance
Ecology			
Impacts on flora and fauna species and Endangered Ecological Communities (EECs) during demolition and construction.	Medium Level of Significance	Medium Level of Interest	Medium Level of Significance
Impacts on flora and fauna species and EECs during operation.	Low Level of Significance	Medium Level of Interest	Medium Level of Significance
Transport			
Road traffic impacts throughout the various phases of the Project including daily and peak movements.	Low Level of Significance	High Level of Interest	High Level of Significance
The provision of related infrastructure such as parking spaces.	Low Level of Significance	High Level of Interest	High Level of Significance
Aboriginal and Heritage			
Impacts on known or unknown sites or items of Aboriginal heritage significance.	Low Level of Significance	Low Level of Interest	Low Level of Significance
European Heritage			
Impacts on known or unknown sites or items of European heritage significance.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Greenhouse Gas Emissions			
Impacts from GHG emissions emanating from the Project Area	Low Level of Significance	Low Level of Interest	Low Level of Significance
Hazard and Risk			
Exposure of nearby industrial facilities to hazard and risk.	Low Level of Significance	Medium Level of Interest	Medium Level of Significance
Exposure of closest residential areas to hazard and risk.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Socio-Economic Effects			
Direct and indirect job creation during demolition and construction.	Medium Level of Significance	High Level of Interest	High Level of Significance
Direct and indirect job loss during ongoing operation.	Low Level of Significance	High Level of Interest	High Level of Significance
Impacts to nearby community.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Capacity of regional infrastructure and services to support workforce.	Low Level of Significance	Low Level of Interest	Low Level of Significance

Issue	Unmitigated Environmental Risk Screening		
	Significance of Impacts	Stakeholder Interest	Overall Environmental Assessment Significance
Surface Water, Process Water and Flooding			
Supply, disposal and re-use of industrial water for Clyde Terminal.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Managing quantity and quality of surface water run-off.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Potential for flooding of the Project Area.	High Level of Significance	Medium Level of Interest	High Level of Significance
Soil and Groundwater Contamination			
Potential disturbance and mobilisation of contaminated soil and groundwater during demolition and conversion.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Potential disturbance and mobilisation of ASS during demolition and construction.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Potential impacts on soil and groundwater from spills/leaks during operation.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Landscape and Visual Amenity			
Visual amenity impacts during demolition and construction.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Waste Management			
Waste generated during demolition construction.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Specialist streams of waste such as scheduled wastes, radioactive substances and asbestos wastes, and waste requiring management in accordance with CCO for the use of PCB wastes.	Medium Level of Significance	Low Level of Interest	Medium Level of Significance
Waste generated, received and processed during operations.	Low Level of Significance	Low Level of Interest	Low Level of Significance
Land Use			
Design and mitigation measures can be provided between incompatible land uses to minimise noise and amenity impacts.	Low Level of Significance	Low Level of Interest	Low Level of Significance
The scale and height of existing development is maintained and has regard to the visual dominance of the surrounding industrial and residential areas.	Low Level of Significance	Low Level of Interest	Low Level of Significance

Issue	Unmitigated Environmental Risk Screening		
	Significance of Impacts	Stakeholder Interest	Overall Environmental Assessment Significance
Provision is made for future use of surplus land.	Low Level of Significance	High Level of Interest	High Level of Significance
Provision of land to be made surplus after demolition of redundant refining infrastructure, including potential requirements for contamination investigation and remediation.	Medium Level of Significance	High Level of Significance	High Level of Significance

10.3 Identification of Key Environmental Assessment Issues

Based on the risk screening presented in **Table 10-3**, key issues of consideration for the environmental impact assessment of the Project have been identified and are summarised in **Table 10-4**.

For each of the issues considered in **Table 10-3**, an assessment of significance was made based on the dominant environmental assessment significance ranking. For example, in the case of socio-economic effects, surface water, industrial water and flooding, transport and land use, the majority of environmental significance rankings for potential impacts were rated as high. As a consequence, these issues have been determined key issues for the environmental planning assessment of the development. A similar approach was taken to identify air quality and odour, ecology, European heritage, hazard and risk and waste management to be of medium significance.

Table 10-4 Identification of Key and Other Environmental Assessment Issues

Issue	Environmental Assessment Significance	Location in the EIS
Key Issues		
Transport	High	**Section 11.0**
Socio-economic effects	High	**Section 12.0**
Surface water, industrial water and flooding	High	**Section 13.0**
Land use	High	**Section 14.0**
Other Issues		
Air quality and odour	Medium	**Section 15.0**
Ecology	Medium	**Section 16.0**
Soil and groundwater contamination	Medium	**Section 17.0**
European heritage	Medium	**Section 18.0**
Hazard and risk	Medium	**Section 19.0**
GHG emissions	Medium	**Section 23.0**
Waste management	Medium	**Section 20.0**
Aboriginal heritage	Low	**Section 21.0**
Noise and vibration	Low	**Section 22.0**
Landscape and visual amenity	Low	**Section 24.0**

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