CLIENTS | PEOPLE | PERFORMANCE

Parkes LOGISTICS AXIS

PART C
ENVIRONMENTAL ASSESSMENT

7. Key assessment requirements

7.1 Traffic and transport

A Design Brief for Road Traffic Infrastructure for the PIT was undertaken by GHD. A summary of the key traffic assessment findings is provided in this section, and the full report is included in Appendix B.

7.1.1 Existing environment

Parkes is a rural township with a population of approximately 10,000, which is situated approximately 365km west of Sydney. It has established transport connections with a State Highway, two key national rail lines and a regional airport located in the Local Government Area in close proximity to the urban centre. The road and rail networks offer direct connections to Sydney, Brisbane, Melbourne, Adelaide and Perth making Parkes a strategically important for the transporting of freight around Australia and to overseas destinations.

Table 7.1 presents the proximity and distance of State Capitals and regional centres to Parkes.

Table 7.1 Travel distances from Parkes to major markets or ports

Direction	Regional town	Approx Distance (km)	State capital and Ports	Approx Distance (km)
North	Dubbo,	115	Brisbane	1000
South	Wagga Wagga, Griffith Forbes	290 300 30	Melbourne	720
West	Condobolin	100	Adelaide Perth	1250 3500
East	Orange	95	Sydney	365

Note – all distances are broad estimates rounded to the nearest 5km.

The proposed site for the Parkes Intermodal Terminal (PIT) is located to the west of the township of Parkes in an area recently rezoned as the Parkes Transport Hub (Hub). The 'Hub' is zoned for industrial uses and covers an area of approximately 520 hectares. The Hub is located in close proximity to both the rail and road networks that run through Parkes. The 'Hub' is situated close to two main rail lines running between Parkes - Brisbane (via Dubbo/ Muswellbrook/ Maitland), Parkes - Sydney (via Orange or Cootamundra), Parkes - Melbourne (via Cootamundra), and Parkes - Adelaide or Perth (via Broken Hill). In terms of supporting road network infrastructure the site is situated in close proximity to the Newell Highway and the Parkes western ring road.

The proposed site is situated at the junction of the Parkes – Narromine and Parkes – Broken Hill rail lines and in the western corner of 'Hub'. Parkes Shire Council envisaged that the 'Hub' is appropriate location for accommodating transport facilities of regional, state and national importance[4].

Refer to Figure 7.1 for further details of the site proximity to Parkes and the rail and road routes networks.

In terms of boundaries and proximity to Parkes, the site fronts Brolgan Road to the south and Condobolin Road (MR61) to the north, and is situated approximately 4km west of the ring road or 5.5km west of the Newell Highway (SH17) and Parkes CBD. .

The proposed site has a 2.8km frontage to the northern side of Brolgan Road located west of the existing Parkes to Narromine rail level crossing. The site also has a 650m frontage to Condobolin Road (Main Road 61), which is situated to the east of the Parkes to Narromine rail level crossing.

Existing road characteristics and hierarchy

The classification of roads along the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry.

The NSW Roads and Traffic Authority (RTA) have developed a set of road hierarchy classifications for urban situations, which have typical nominal volumes expressed in terms of average annual daily traffic (AADT) served by various classes of roads.

Table 7.2 RTA functional classifications of roads

Type of road	Traffic volume (AADT)	Peak Hour Volume (vph)
Arterial Road	>15,000	1,500 – 5,600
Sub-Arterial Road	5,000 – 20,000	500 – 2,000
Collector Road	2,000 – 10,000	250 – 1,000
Local Road	<2,000	0 – 250

These classifications can be used in this study to assess the pre and post development capacity levels along urban type roads situated in Parkes. However, it should be noted that the majority of the road sections that are likely to be impacted have rural characteristics and will not attract high urban type traffic volumes.

Brolgan Road

Brolgan Road (Shire Road 40) is a rural road that is maintained and under the control of Parkes Shire Council. The Brolgan Road route runs between Middleton Street in Parkes in the east, to Brolgan, Nelungaloo and beyond in the west. The proposed site is located approximately 4km west of the intersection with Coronation Avenue.

[4] Source - Parkes Transport Hub – Local Environmental Plan, Parkes Shire Council (March 2002)

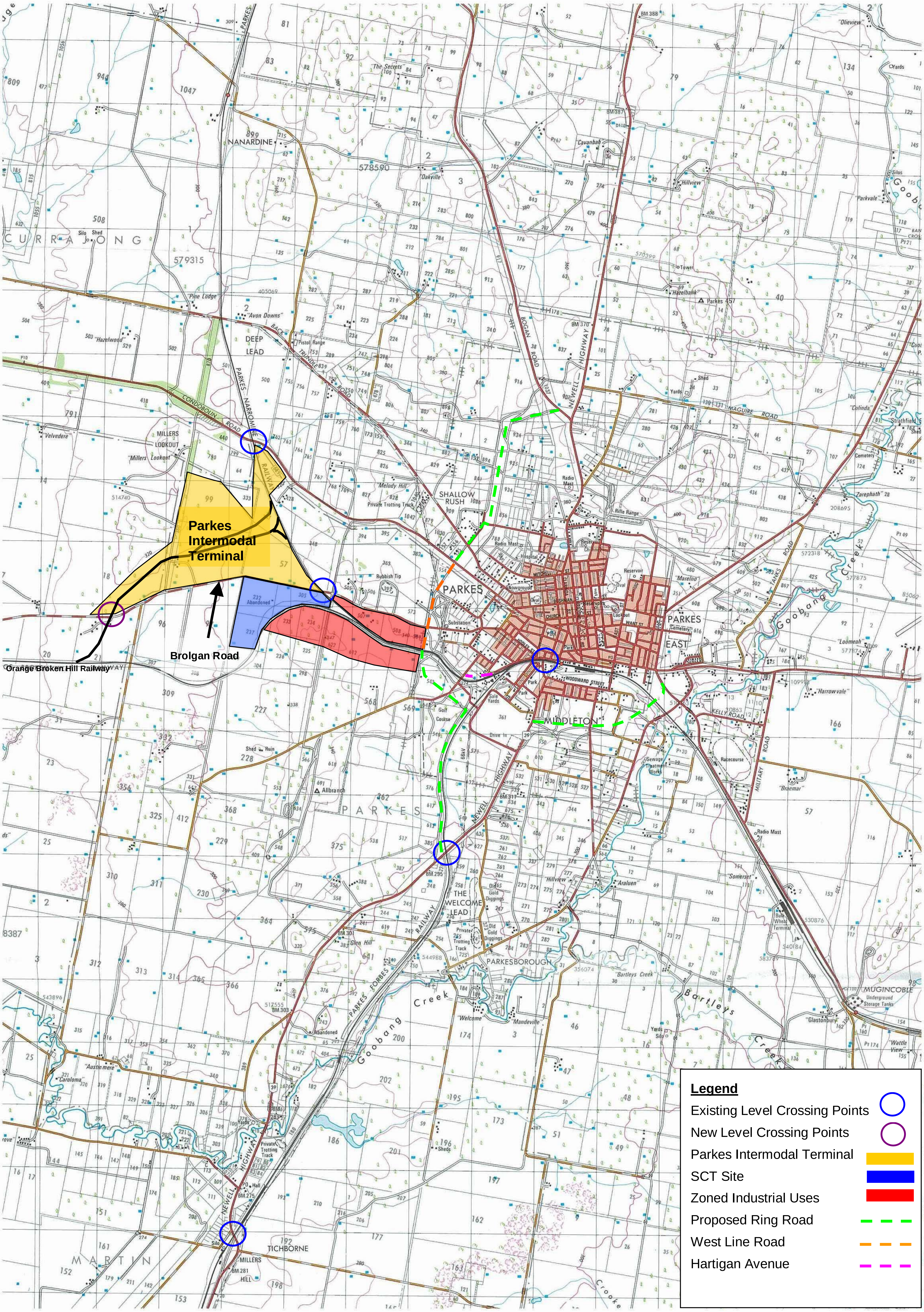


Figure 7-1 – Transport Infrastructure Surrounding the Site

Brolgan Road is a typical rural road with a single carriageway and two traffic lanes, one in each direction. The route travels through an area, which is predominantly used for grazing and crops. The sealed carriageway width is approximately 7m with a 1m sealed shoulder for the majority of its length. The signposted speed limit is 100km/h in the vicinity of the site transitioning to 80km/h near to the level crossing with the Parkes to Broken Hill rail line and 50km/h to the east of the ring road (West Lime Road). The road alignment of Brolgan Road consists of a number of base curves that can be negotiated at high speeds and moderate changes in gradient. The pavement is described as suitable for current traffic loads, however, unlikely to be capable of supporting increases in heavy vehicle traffic.

Traffic approaching from the east, currently travel over the Parkes to Broken Hill rail line at a level crossing, which is situated to the southeast of the site. This crossing is currently controlled by type F flashing lights and is known to have some restricted sightlines.

Brolgan Road is planned to become a key road link that will serve the development of the 'Hub'

Brolgan Road is also understood to be influenced by seasonal traffic flows that are associated with agricultural uses and storage facilities situated near to the west of Parkes. These uses generate higher than average traffic volumes and would be expected to consist of heavy vehicles that are transporting goods to markets.

Condobolin Road

Condobolin Road is a State Road (known as MR 61) and falls under the control and maintenance of the Roads and Traffic Authority (RTA). The road is a designated B Double route, which permits road train movements under certain weather, time and period operating restrictions to travel west of Parkes. The alignment of the route runs predominantly east-west between Parkes and the township of Condobolin.

Condobolin Road is a typical rural road with a sealed carriageway width of approximately 8.5m, two 3.25m wide traffic lanes, 1m wide sealed shoulders and appropriate linemarking. The signposted speed limit is 100km/h in all rural areas transitioning to 80km/h then 50km/h in Dalton Street.

Parkes Ring Road System

The long-term aim of Council is to protect the amenity of Parkes residents from traffic growth and facilitate the transporting of freight. The development of the Parkes ring road system will address these objectives and is planned to divert heavy vehicle traffic from the Newell Highway and east-west road routes running through existing residential and commercial areas of Parkes.

[5] Source - Parkes Transport Hub – Local Environmental Study, Page 13, Parkes Shire Council (March 2002 & September 2003)

Table 7.3 Staged Development of Ring Road

Stage	Section	Link by colour – Appendix C	Timeframe
1	Hartigan Ave to Brolgan Rd	Dark Blue	Completed
2	Short St/ Clarinda St intersection	Red	Completed
3	Bogan Street	Yellow	Ongoing
4	Brolgan- Condobolin Rd Link (West Lime Rd)	Green	Completed
5	Blaxland St – Saleyards Rd – SH17 link	Brown	By Demand
6	Condobolin Rd – SH17 link (Northern)	Orange	By Demand
7	Rail overbridge and West Lime – Saleyard link road	Pink	By Demand
8	SH17 – MR61E (Southern)	Purple	By Demand

Source - Parkes Transport Hub – Local Environmental Study, Parkes Shire Council (March 2002)

Note – refer to **Appendix B** for a reference to the road link colours mentioned above.

Table 7.3 indicates that the Hartigan Avenue and West Lime Road is already completed and provides a connection between the Newell Highway at Forbes Street and Condobolin Road.

The future development of the Northern and Southern sections of the Ring Road will provide significant benefit to the township of Parkes, in that it would improve amenity through the redistribution of existing heavy vehicle traffic movement to more suitably road links. The recent completion of the central Western Section of the ring road will assist in minimising the impact on residential amenity from both existing and future road freight movement through Parkes that could be generated by existing industrial uses, growth in the Goobang Junction Industrial Area and development of the Parkes Transport Hub.

Western Ring Road (completed section)

The western ring road currently consists of Hartigan Avenue and West Lime Road.

West Lime Road section is understood to have recently constructed and opened to traffic by Parkes Shire Council. The route runs north-south, providing access from Condobolin Road to Hartigan Avenue for traffic wanting to travel to the Goobang Junction Industrial Area and the Parkes Transport Hub. This road section of the future ring road system together with Hartigan Avenue has recently been identified in the RTA Classification Review for potential reclassification as a State Road.

The carriageway width is in the order of 10m including a 1m wide sealed shoulder. The completed western ring road section is a designated B Double route, which could in the future potentially accommodate road train movements under certain weather, time and period operating restrictions. The speed limit along the western ring road is 80km/h.

Hartigan Avenue

Hartigan Avenue has recently been extended and upgraded by Parkes Shire Council to become the designated truck route between the Newell Highway and the Goobang Junction Industrial Estate or the Parkes Transport Hub. The works were completed in early 2005 and aimed to provide a continuous route between the Forbes Street level crossing and West Lime Road. The route follows the existing Orange - Broken Hill rail alignment and was aimed at reducing impacts on residential amenity from additional heavy vehicle movement generated by the proposed FCL Intermodal Terminal.

The Hartigan Avenue route fronts residential properties in the east, the rail corridor to the south, land zoned for industrial uses in the west and open space situated to the north. The design of the route is intended to limit access between Forbes Street level crossing and West Lime Road to the collector road system, this being Blaxland Street, Best Street and Hooley Street. Under section 8.2 of the 'Review of Environmental Factors – Access Road for the Goobang Junction Industrial Area' prepared by Parkes Shire Council and through further discussions with Council, it has been identified that the intended upgrade of Hartigan Avenue was for it to act as an arterial road for movement between the Newell Highway and industrial land uses situated to the west.

Hartigan Avenue together with West Lime Road form part of the future Western Ring Road (Newell Highway Bypass) and as a result are constructed to a heavy vehicle standard suitable for B Double access. The road is appropriately linemarked and has a 9 metre sealed carriageway with two 3.5m wide traffic lanes and 1m shoulders. The road is signposted at 50km/h along urban sections of the route.

Proposed Saleyards Road Ring Road Connection (Interim Option)

Blaxland Street crosses a level crossing situated on the Orange – Broken Hill rail line near to the intersection with Hartigan Avenue. This access point offers an alternative road connection via Saleyards Road and Ackroyd Street to the Newell Highway and avoids the level crossing on the Newell Highway to the south of Hartigan Avenue.

This interim ring road route requires traffic to travel over two level crossings, the first crosses the Orange – Broken Hill railway near to the intersection with Hartigan Avenue and the second is situated on Saleyards Road and crosses the Parkes – Forbes Railway near to the intersection with Ackroyd Street.

The key movement at the Hartigan Avenue with Blaxland Street intersection is known to be the movement along Hartigan Avenue, however, the priority at the intersection is currently given to Blaxland Street and is to compensate for the lack of storage space between Hartigan Avenue and level crossing.

[6]Upgrade requirements for the intersection of Hartigan Avenue and Blaxland Street, Baker Saran Pty Ltd (August 2004), Parkes Shire Council website, Traffic Committee Agenda, February 2005.

The Blaxland Street level crossing is understood from the 'Baker Saran Pty Ltd - Road Safety Audit' report[7] to be situated close to Hartigan Avenue and consists of approach warning signs, flashing lights and boom gates. The audit report was included Council's traffic committee meeting minutes dated February 2005. The minutes from this meeting indicate that the Council Committee recommended that priority at the intersection be changed from Blaxland Street to Hartigan Avenue and that the intersection be widened with turning lanes to provide adequate storage for road train movement.

It was also noted in discussions with Council that the section of Saleyards Road between Blaxland Street and Ackroyd Street is narrow and currently not of a suitable standard for B Double type vehicles. It was also noted that a review of the Saleyards Road level crossing maybe required as part of introducing this connection as part of the proposed Parkes Ring Road.

Newell Highway

The Newell Highway is known as SH 17 and is under the control and maintenance of the RTA. The route is one of NSW's longest highway stretches, which starts at the Victorian border near Tocumwal and runs north to Goondiwindi on the Queensland border. The highway passes through rich agricultural lands in the Riverina and Hay Plains, crop growing country around West Wyalong and vast sheep, cattle and crop plains near Moree.

The Newell Highway is a typical high quality rural highway with a single traffic lane in each direction and a speed limit of 110km/h in rural areas with a transitioning through to 80km/h and then 50km/h through Parkes. Overtaking opportunities are provided along the route and the typical sealed carriageway width is in the order of 10m including shoulders with generally good pavement conditions. All level crossing points along the Newell Highway are designed to accommodate daily traffic volumes in excess of 2,000 vehicles and B double type vehicles.

On entry to Parkes CBD, both heavy vehicles and through traffic are encouraged to travel along Bogan Street and the recently opened western section of the Ring Road between Condobolin Road and Hartigan Avenue via Brolgan Road.

Existing road performance

A criteria for evaluationg the operational performance of mid block rural road sections is provided in the AustRoads – Guide to Traffic Engineering Practice: Part 2 – Roadway Capacity, section 3.4

The Level of Service (LOS) is a qualitative measure describing the operational conditions within a traffic stream taking into consideration the perception of motorists and/or passengers and is typically based on typical volume/capacity (V/C) ratio. The characteristic conditions for each level of service can be graded on several measures from level of service A (good) to level of service F (unsatisfactory are shown in **Table**

[7] Upgrade requirements for the intersection of Hartigan Avenue and Blaxland Street, Baker Saran Pty Ltd (August 2004), Parkes Shire Council website, Traffic Committee Agenda, February 2005.

7.4. There are six LOS categories (A to F), with LOS A representing the best operating conditions and LOS F the worst.

Table 7.4 Operating Conditions with LOS and V/C Comparisons

Level of Service	Description	Volume to Capacity Ratio (V/C)
A	Free flow conditions with drivers unaffected by other movements in traffic stream	<0.65
B	Stable flow with drivers having reasonable freedom	0.65 to 0.75
C	Stable flow, but drivers somewhat restricted	0.75 to 0.85
D	Approaching stable flow limits with drivers significantly restricted	0.85 to 0.95
E	Unstable flow, traffic at or close to capacity with drivers severely restricted	0.95 to 1.0
F	Forced flow, over capacity limits	> 1.0

Rural Road Performance Criteria

The performance guideline used in this assessment for rural roads is taken from the traffic volume design ratio of between 10% and 12% for peak hour traffic against average daily traffic with road conditions being typically flat terrain.

The performance criteria presented in the table below will be used to evaluate traffic conditions on all rural road approaches into Parkes which includes: the Newell Highway, Condobolin Road, Brolgan Road, Wellington Road, Orange Road and Eugowra Road.

Table 7.5 Level of Service Criteria for Two Lane Two-Way Rural Roads

Level of Service	Description	Maximum AADT
A	Free flow with low volumes with little or no delay	2,400
B	Stable flow with minimum delays and spare capacity	4,800
C	Stable conditions with spare capacity	7,900
D	Close to the limit of stable flow, operating near capacity	13,500
E	At capacity with high	22,900

Level of Service	Description	Maximum AADT
	delays for motorists	
F	Forced flow capacity exceeded unsatisfactory operating conditions	>22,900

Source: Austroads (Table 3.9): assuming two lane two-way road, level terrain, K factor = 0.10 and 60/40 directional split

Urban Road Performance Criteria

The performance criteria presented in the table below will be used to evaluate traffic conditions on the urban road sections within Parkes likely to be impacted by the proposed development. Roads that are urban in character and are evaluated as part of this assessment include Hartigan Avenue, Bogan Street and Dalton Street. All three of these roads are classified under the capacity thresholds for roads as '*urban undivided highways with interrupted flows*'.

Typical mid-block capacities for various lane configurations for urban roads are listed in Table 7.6.

Table 7.6 Level of Service Capacity Thresholds for Roads

Road Type	Capacity per Lane (veh/hr)	Max V/C for Los D	Max Service Flow Rate per lane for LoS D
Urban Divided/Undivided Highways with Clearways and signal coordination	1,600	0.90	1,440
Urban Divided/Undivided Highways with Interrupted Flow	1,000	0.90	900
Residential Streets	700	0.90	630

The information above indicates that each traffic lane along urban road sections through Parkes can cater for traffic levels of up to 900 vehicles per hour. The performance guideline used in this assessment for urban roads is based on the peak hour representing approximately 10% of the overall average daily traffic volume and a traffic directional split of 60/40.

Study Area Road Network Performance Assessment

Table 7.7 presents the performance levels of relevant road routes through the Local Government Area of Parkes using traffic volumes provided by the RTA, Council and the LOS criteria set in **Tables 7.4.**

Table 7.7 Performance Level of Key Approach Routes to Parkes (2005)

Rural/ Urban	Road Name	Count Location	Performance Level (LOS)	Traffic Volumes (AADT or ADT)
Rural	Brolgan Road	East of the site and west of the level crossing	A	188
Rural	Condobolin Road	At level crossing, west of Parkes	A	1036
Rural	Newell Highway – north	Parkes, 3.2km north of Court St	B	5337
Rural	Newell Highway – south	At Forbes/Parkes boundary	B	5620
Rural	Orange Road	Parkes, at Billabong Ck bridge	A	2031
Rural	Wellington Road	Parkes, 8km north of SH17, Newell Hwy	A	408
Rural	Eugowra Road	At Forbes/Parkes boundary	A	488
Urban	Hartigan Avenue	West of Forest Street	A	450
Urban	Bogan Street	North of Hartigan Avenue	A	5427
Urban	**Dalton Street**	West of Bogan Street	A	1943

Sources – AADT volumes for state roads have been taken from RTA Western Region traffic data. ADT volumes for Brolgan Road, Hartigan Street, Bogan Street and Dalton Street have been obtained from Parkes Shire Council supplied information.

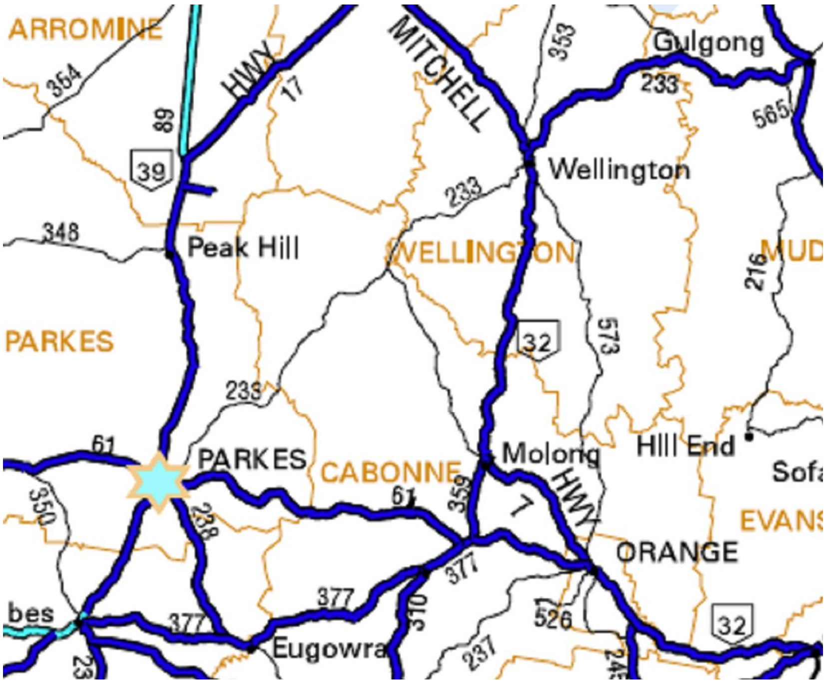
Note - Traffic volumes and performance levels have been factored up for 2005 traffic levels and include estimated per annum (pa) growth rates for background light traffic and a 3.6% pa increase in road freight.

Generally, a road with an operating performance (Level of Service) of A or B is desirable and a road section with an operating performance of Level of Service C is viewed to be acceptable. Using this evaluation criteria, it appears that currently both urban and rural road sections that could potentially be impacted by traffic generated from the proposed development operate satisfactorily.

Haulage Routes

Access routes in NSW for B Double trucks up to 25m in length and road trains up to 36.5m in length can be obtained from RTA's website (RTA, 2006). Information for the Parkes area is contained in the country towns and Hunter Valley sections and is presented in Figure 7-2 and Figure 7-3

Figure 7-2 Designated B Double and road train routes in the Region



Source - RTA website – www.rta.nsw.gov.au

Notes

- red bold lines represent roads that are designated B double routes (up to 25m).
- yellow bold lines represent roads that are designated road train routes (up to 36.5m).

Figure 7-2 indicates that the township of Parkes has good access to the regional road network with the following roads designated as having the ability to accommodate B Double vehicles:

- SH17 - Newell Highway south of Parkes;
- SH17 - Newell Highway north of Parkes;
- MR61 – Condobolin Road west of Parkes;
- MR61 – Orange Road East of Parkes; and
- MR 238 – Eugowra Road south east of Parkes.

RTA mapping also indicates that the road network to the west of Forbes and to the north of Peak Hill is able to accommodate road trains up to 36.5m in length.

Legend

Source: Copyright Universal Publishers Pty Ltd

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- CBD
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses

GHD CLIENTS PEOPLE PERFORMANCE

Parkes Intermodal Terminal

Approved Truck Routes Through Parkes

job no 21-13701-08
file ref 2113701-08_LTN_02.cdr

scale as shown date 24 May 2006

Figure 7-3

Figure 7-3 provides an understanding of B double routes through the township of Parkes. These routes have recently changed as a result of opening western sections of the Parkes ring road system.

It is noted from the review of Council's Traffic Committee Meeting Minutes[8] that authorisation has been granted by the committee for the use of road trains along roads situated in Parkes. This authorisation for the operation of road trains along public roads is usually restricted to selected road routes, to a haulage operator, a set time period and days of operation. The method for obtaining approval for the use of road trains is provided in RTA's '*Route Assessment Guidelines for Restricted Access Vehicle'* and should be used if a section or a number of sections of the state or local road network is required to be opened for restricted vehicle access.

7.1.2 Impact assessment

Construction

The PIT would be built over a series of staged construction periods, as new elements are periodically required to allow throughput to be increased or the market dictates that other associated services and facilities are required to contain and improve service operations.

The majority of the built structures to be erected on the site would involve assembling prefabricated elements. Once the footings have been established, prefabricated beams and support structures would be transported to the site and erected prior to cladding being fixed in place. Utilising prefabricated components would not only minimise the length of the construction period and the required number of construction vehicles, it would also reduce the potential for conflict between construction and operational activities. This approach would enable normal intermodal terminal and warehouse operations to continue whilst construction is in progress. The mixing of construction and normal operations has been successfully achieved on other similar large scale industrial sites and is not expected to create conflicts. Traffic management measures can be adopted and the site layout is appropriate for progressive development and the area available.

Civil works are expected to include minor excavation and filling on parts of the site to provide a suitable building platform for the construction of foundations. Earthworks would be required to allow for the construction of new rail tracks, sidings, hardstand areas.

The construction of all new Initial Stage elements is expected to occur before 2010.

The construction of the Initial Stage facility and then the staged upgrading of the site's operating areas to deliver the Ultimate Stage developments would generate small increases in external traffic. The majority of these additional traffic movements would

[8] Parkes Shire Council website - http://www.parkes.nsw.gov.au

be as a consequence of delivering plant, track and machinery or construction staff shift movements.

All construction activities would not be undertaken concurrently, and there would not be a defined period of intense construction traffic movement.

Parking for construction equipment and staff vehicles would be accommodated on-site during the construction period and in the Initial Stage it would be situated in locations that are clearly separated from normal operating areas. The proposed location of this parking area should minimise conflict between construction and Initial Stage operating traffic.

The following construction traffic impacts are envisaged:

» External construction traffic movement is unlikely to conflict with peak hour road or Initial Stage operating periods and can be managed;

» The majority of traffic generated during the staged construction periods would be internal movement at the time of excavating material to provide a suitable building platform for the structures and hardstand areas; and

» The assessment of the throughput of 530,000 TEU per annum is the worst-case evaluation of external road network impacts for both construction and intermodal terminal operations. This is because the traffic movements during the construction periods are likely to be lower than those experienced during operation of the PIT at a throughput of 530,000 TEU per annum.

Operation

The intermodal transport terminal is a multi modal facility, which will operate under the following conditions:

» Provide an operation that targets existing and estimated growth in road rail freight movement along key transport corridors that travel through Parkes. This will lead to traffic being redistributed along the local road network and minimal changes to predicted traffic levels along the regional road network;

» Provide an operation that targets repackaging of goods and the storage of bulk goods that can be stored for long periods of time;

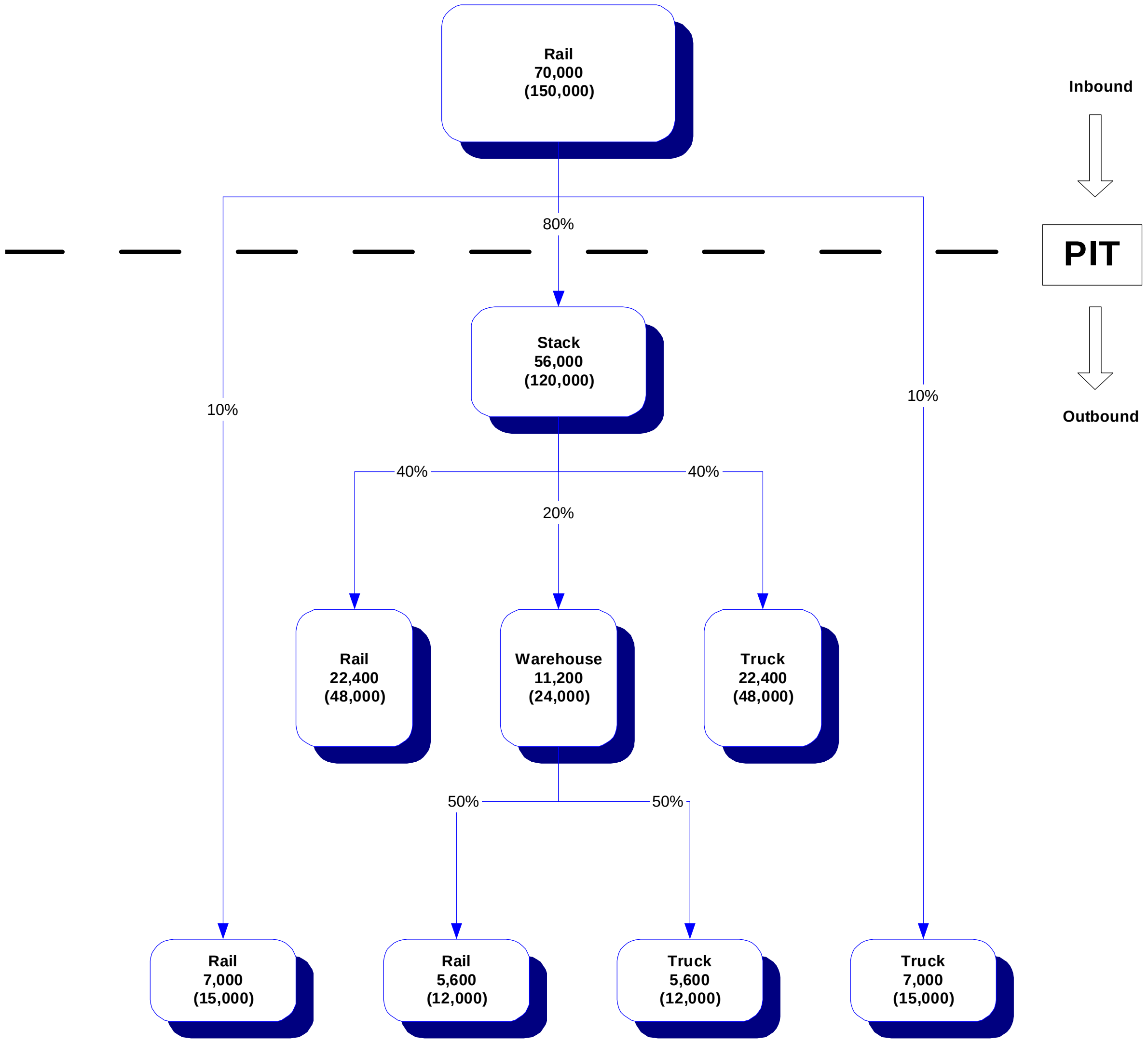
» Will have a limited market catchment that is focussed on statewide and nationwide freight distribution, thus its market limitations are not associated with the size of its area as used to calculate trip generation under the RTA Guideline;

» Aims to carry a large proportion of freight by rail, which will not impact on the external road network and not account for in the RTA Guideline; and

» Is demonstrated to generate some level of internal movement that will also not impact on the external road network and not account for in the RTA Guideline.

Figure 7-4 and 7-5 describe the annual containerised PIT throughput by truck and rail.

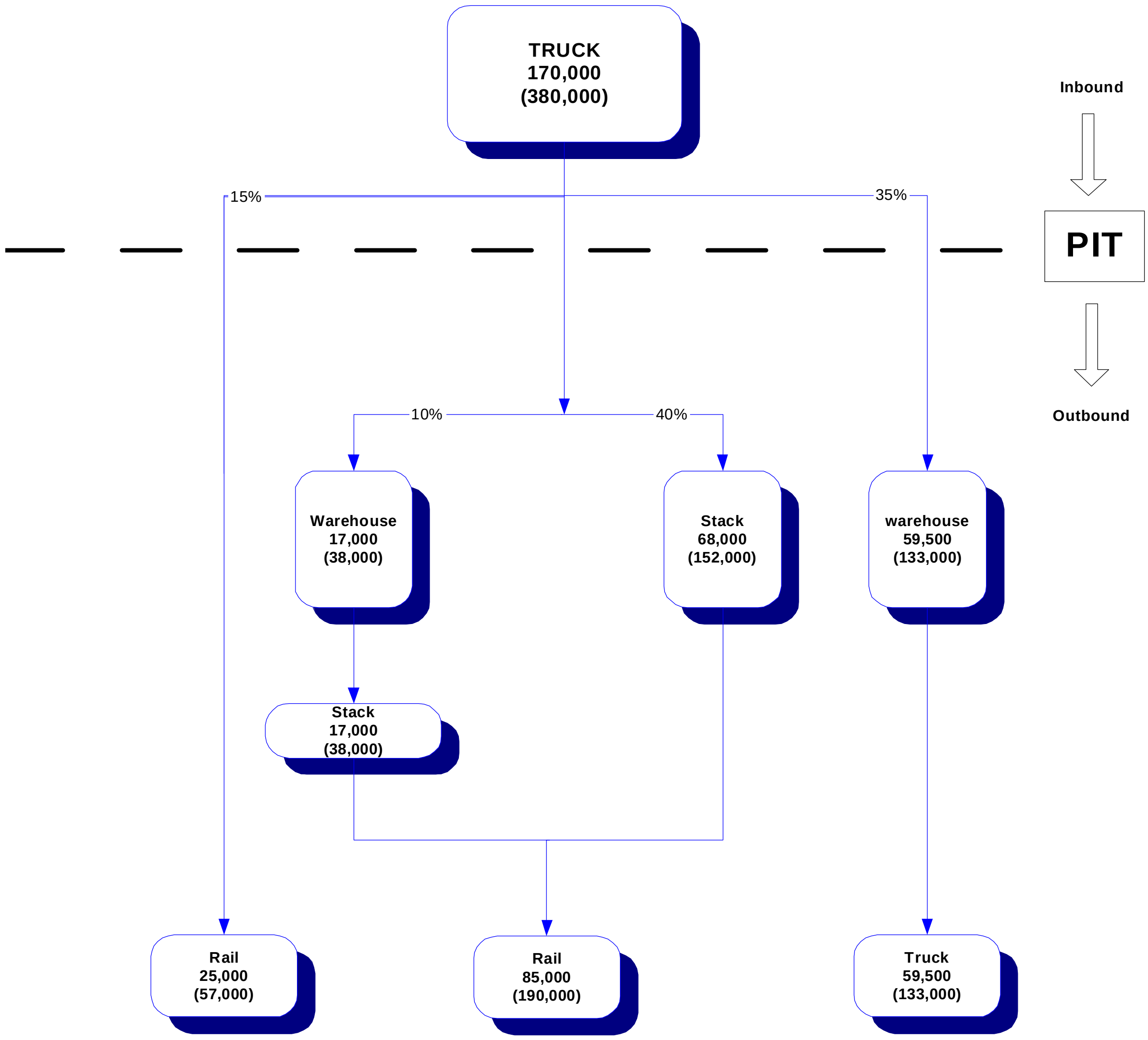
Figure 7-4 : Annual Containerised PIT Throughput by Inbound Rail Freight Movement in TEUs



LEGEND

70,000 TEUs: Initial Stage
150,000 TEUs: Ultimate Stage
PIT: Parkes Intermodal Terminal

Figure 7-5 : Annual Containerised PIT Throughput by Inbound Truck Movement in TEUs



LEGEND

170,000 TEUs: Initial Stage
380,000 TEUs: Ultimate Stage
PIT: Parkes Intermodal Terminal

It is understood that the worst case estimate for truck traffic visiting the Intermodal Terminal can only be based on the set throughput target (i.e. 240,000 TEU in the initial stage and 530,000 TEU in the ultimate stage) for capturing freight. Thus, the traffic generation potential of the proposed Intermodal Terminal has been estimated based on the maximum road freight throughput target plus staff and delivery movements.

Traffic generation

Intermodal Terminal

The heavy vehicle traffic generation for the proposed intermodal terminal is shown in **Table 7.8.** In addition to traffic generation for heavy vehicles the site will generate light vehicle movements, which have been estimated to consist of both staff and deliveries movements. The following provides an understanding of likely generation from these activities:

» Initial stage: Assumes 2 shifts of 20 staff travelling to the site during the shift changeover period, which equals 40 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 120 two-way vehicle trips per day plus 6 daily light vehicle delivery movements.

» Ultimate stage: Assumes 2 shifts of 50 staff travelling to the site during the shift changeover period, which equals 100 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 300 two-way vehicle trips per day plus 20 daily light vehicle delivery movements.

It is currently not known if the shift changeover periods will impact on the proposed development, however, for the purpose of this assessment and in order to understand the worst case scenario, the shift changeover period is assumed to occur during the AM and PM peak on the external road network.

Based on the above, the following adjusted rates are presented in the table below.

Table7.8 Daily and Peak Hour Two Way Vehicle Trips (Intermodal Terminal)

	Initial Development				**Ultimate Development**			
Period	**Daily**		**Peak Hour**		**Daily**		**Peak Hour**	
Vehicle Type	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**
Staff		120		40		300		100
Deliveries		6		0		20		0
Internal movements	200		20		440		44	
External Movements associated with PIT	472		47		1,110		110	
Total per Vehicle Class	672	126	67	40	1,550	320	154	100
Combined Total	***798***		***107***		***1,870***		***254***	

	Initial Development				Ultimate Development			
Period	**Daily**		**Peak Hour**		**Daily**		**Peak Hour**	
Vehicle Type	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**
After discounting internal movements		***598***		***87***		***1,430***		***210***

Note

» LV represents light vehicles and HV represents heavy vehicles.

» Peak hour heavy vehicle traffic has been estimated to represent 10% of daily heavy vehicle traffic generated by this use.

» Internal movement for the intermodal terminal has been calculated from the following:

– Initial stage = 125,400 TEUs being transferred between land uses with an assumption that rail to stack and vice versa is undertaken by on-site cranes & the average carrying capacity of each truck is 2 TEUs.

– Ultimate stage = 274,000 TEUs being transferred between land uses with an assumption that rail to tack and vice versa is undertaken by on-site cranes & the average carrying capacity of each truck is 2 TEUs

Warehousing

In order to understand the likely operations of warehouse facilities located on site it is important to be aware of its proposed purpose. Based on this approach, it is expected that a large proportion of the on-site warehousing will act as storage facilities for the Intermodal Terminal. As a result, the warehousing has a relationship with the intermodal terminal which indicates that approximately 20% of its total demand will be made from internal movements (i.e. TEU movements from rail and stack areas). This internal movement will not impact on the external road network and is not a typical characteristic for warehouse operations. It can therefore be assumed that the average traffic generation rates provided in the *RTA Guideline* for warehousing will not provide a true representation on expected traffic movement for warehousing situated within the proposed development. The facility is also expected to offer the market a low cost option for long-term storage of bulk goods.

Based on the operating characteristics for this type of facility, it is reasonable to assume that the average traffic generation rate for warehousing could be discounted due to internal vehicle movements associated with other PIT uses, and other factors such as:

» Being attractive to bulk transfers by rail,

» Targeting large trucks carrying higher TEU loads;

» Offering the market a facility for long term storage,

- Having good connectivity with the rail system, which increase its ability to capture more goods being transported by rail;
- Having only a small local market catchment;
- The target market being limited to state and nationwide freight movement; and
- Requiring only a small workforce due to the provision of new heavy loading technology to handle the movement of goods.

The heavy vehicle traffic generation for warehousing is based on the above assumptions and shown in **Table 7.9.**

Apart from the transport of freight by heavy vehicles the site will generate other vehicle movements, which have been estimated to consist of staff (assumed to be all light vehicles) movements. The following provides an understanding of likely generation from this activity:

- Initial stage: Assumes 2 shifts of 30 staff travelling to the site during the shift changeover period, which equals 60 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 180 two-way vehicle trips per day. The overall parking requirement will be based on 67 parking spaces, as specified in the '*RTA guideline'*.
- Ultimate stage: Assumes 2 shifts of 80 staff travelling to the site during the shift changeover period, which equals 160 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 480 two-way vehicle trips per day. The overall parking requirement will be based on 167 parking spaces, as specified in the '*RTA guideline'*.

A similar assumption has been applied for staff working at the proposed warehousing to that shown for the intermodal terminal with the worst case scenario being adopted, which assumes the shift changeover period occurs during the AM and PM peak on the external road network.

Table 7.9 presents traffic generation rates for the proposed warehousing areas that will be situated within the proposed development.

Table7-9 Daily and Peak Hour Two Way Vehicle Trips (Warehousing)

	Initial Development				**Ultimate Development**			
Period	**Daily**		**Peak Hour**		**Daily**		**Peak Hour**	
Vehicle Type	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**
Staff		180		60		480		160
Internal movements	45		5		115		12	
External Movements associated with PIT	215		22		465		47	

	Initial Development				Ultimate Development			
Period	**Daily**		**Peak Hour**		**Daily**		**Peak Hour**	
Vehicle Type	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**
External Movements not associated with PIT	30		3		68		7	
Total per Vehicle Class	290	180	30	60	648	480	66	160
Combined Total	***470***		***90***		***1,128***		***226***	
Discounted from associated PIT traffic	***210***		***63***		***548***		***167***	

Note

- LV represents light vehicles and HV represents heavy vehicles.
- Peak hour heavy vehicle traffic has been estimated to represent 10% of daily heavy vehicle traffic generated by this use.
- The 68 truck movements that are not associated with the PIT have been estimated to be able to carry approximately 45,000 TEU per annum. This throughput calculation is based on each truck in the future carrying 2.18 TEU per trip. It has also been assumed due to future efficiency improvements in the road freight industry from the planning and scheduling of container freight movements both inbound and outbound movements being fully utilised and the warehousing would be operational 312 days a year.

Offices

The assumed traffic generation rates for office uses situated in the proposed development are as follows:

- Initial stage: Assumes 20 staff travelling to the site during the peak commuter period along the external road network. The total traffic generation from offices uses situated within the proposed development is expected to be approximately 40 two-way vehicle trips per day plus 4 daily light vehicle delivery movements. The overall parking requirement will be based on 25 parking spaces, as specified in the '*RTA guideline*'.
- Ultimate stage: Assumes 80 staff travelling to the site during the peak commuter period along the external road network. The total traffic generation from offices uses situated within the proposed development is expected to be approximately 160 two-way vehicle trips per day plus 10 daily light vehicle delivery movements. The overall parking requirement will be based on 100 parking spaces, as specified in the '*RTA guideline*'.

PIT Traffic Generation

The combined daily and peak hour traffic generation predicted for all the above uses situated within the proposed development is as follows:

Table7.10 Total Traffic Generation from the Proposed PIT

Traffic Generators	Initial Stage		Ultimate Stage	
	Peak Hour	Daily	Peak Hour	Daily
Intermodal Terminal Throughput (HV)	48	472	111	1110
Additional Warehouse Movements (HV)	3	30	7	68
Workers and deliveries (LV)	120	350	340	970
Total	***171***	***852***	***458***	***2148***

Impact on the Regional Road Network

The following section provides an understanding of the likely distribution of traffic and the resulting impact on both local and regional roads from traffic travelling to the proposed development.

The current distribution of heavy vehicle traffic has been evaluated and is shown in **Table 7.11.**

Table7.11 Daily Truck Movements Through Parkes

Road link	Total Daily HV Traffic (2005)	Proportion of HV Traffic through Parkes
SH17 Newell Hwy (N)	888	33%
SH17 Newell Hwy (S)	1510	56%
MR 61 (W) Condobolin Rd	82	3%
MR 61 (E) Orange Rd	111	4%
MR 233 Wellington Rd – NE	41	2%
MR 238 Eugowra Rd – SE	53	2%
Total	2685	100%

Source: Traffic Volume Data for Western Region, RTA 2002.

Note - Values used for HV movement along the Newell Highway south have been adjusted.

It is clear from the above table that the Newell Highway is key route for road freight travelling through Parkes and represents 89% of all road freight movement along rural sections of the Parkes regional road network.

The following assessment is based on both light and heavy vehicle traffic, which is anticipated to be generated by land uses situated within the proposed development. The estimated vehicle distribution resulting from the operation of proposed development is assumed to be as follows:

Table 7.12 Assumed Traffic Distribution from PIT for Different Vehicle Types

Roads	Light Vehicles	Heavy Vehicle
Brolgan Road	100%	100%
MR 61 (W) Condobolin Rd	5%	3%
SH17 Newell Hwy (N)	10%	33%
SH17 Newell Hwy (S)	10%	56%
MR 61 (E) Orange Rd	5%	4%
MR 233 Wellington Rd – NE	0%	2%
MR 238 Eugowra Rd – SE	0%	2%
Hartigan Avenue	25%	97%
Bogan Street	40%	33%
Dalton Street	70%	0%

It has been assumed that the majority of workers associated with the proposed development will live within or around Parkes LGA and that 100% will use Brolgan Road to travel to the site. It is expected that the majority of this traffic will then travel to Dalton Road and Bogan Street before accessing the local road network.

Similar to the assumption applied for light vehicle movements, heavy vehicles will access the external road network via Brolgan Road, however due to current road network vehicle restrictions and the location of some sensitive land uses, it has been assumed that all traffic travelling to the Newell Highway and beyond will use Hartigan Avenue. This will result in 97% of the expected heavy vehicle movement traveling to and from the site using the Hartigan Avenue route and only 3% using the West Lime Road and Condobolin Road route.

Table 7.13 presents an estimation of future daily total traffic and truck movements along all road routes likely to be impacted by the proposed development. The estimated traffic volumes through Parkes have been calculated for both 2010 (Initial PIT Stage) and 2020 (Ultimate PIT Stage) by applying annual traffic growth rates used for the traffic study.

Table 7.13 Estimated Daily Traffic Movement Without PIT (Two-Way)

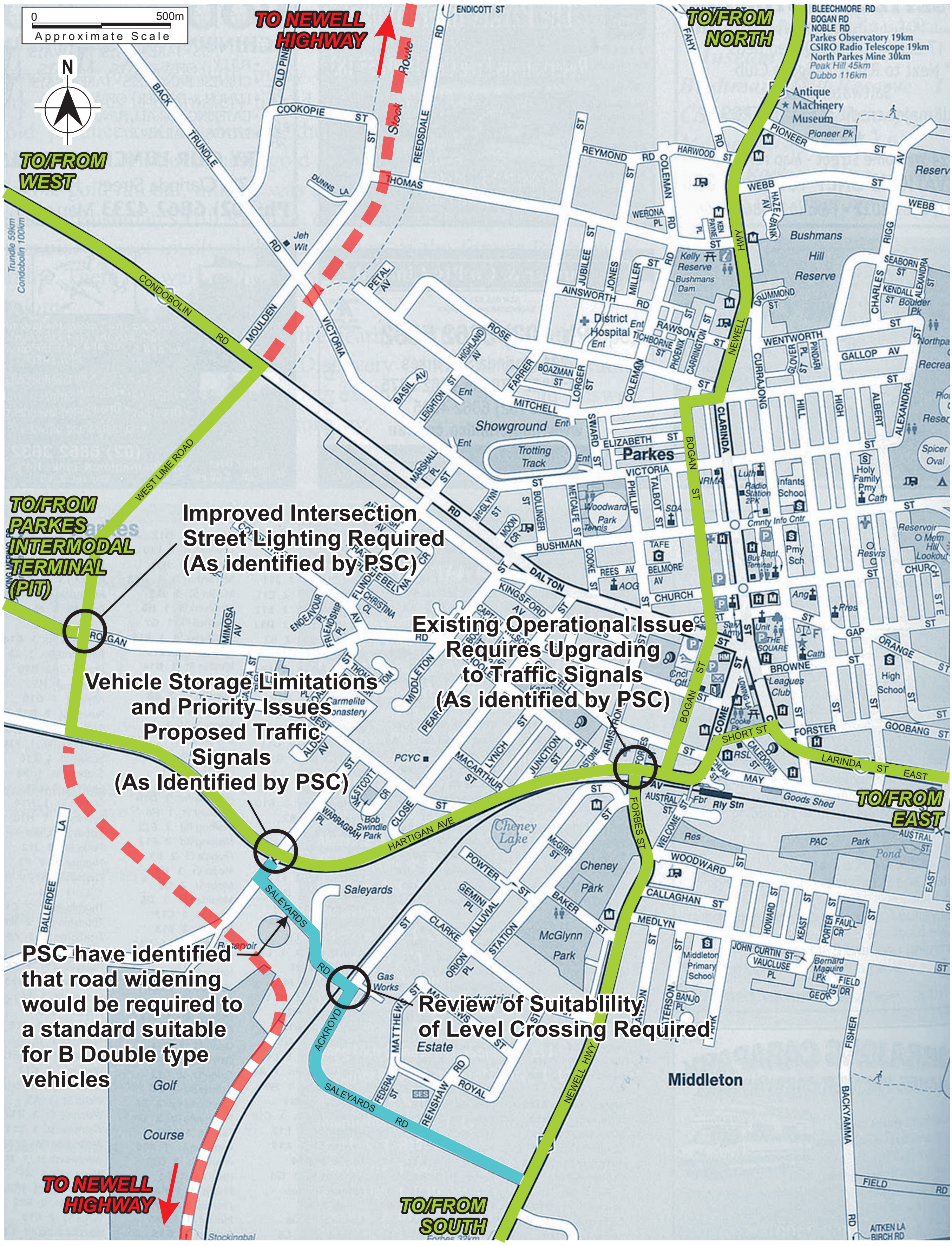
Year	2010			2020		
Road link	**Total**	**HV**	**HV%**	**Total**	**HV**	**HV%**
Brolgan Road	200	4	2%	227	5	2%

MR 61 (W) Condobolin Rd	1064	97	9%	1138	127	11%
SH17 Newell Hwy (N)	5685	1048	18%	6597	1367	21%
SH17 Newell Hwy (S)	5914	782	13%	6684	2325	35%
MR 61 (E) Orange Rd	2099	131	6%	2276	171	8%
MR 233 Wellington Rd – NE	417	49	12%	441	64	15%
MR 238 Eugowra Rd – SE	500	62	12%	529	81	15%
Hartigan Avenue	690	140	20%	762	155	20%
Bogan Street	5789	984	17%	6587	1252	19%
Dalton Street	1992	100	5%	2094	105	5%

Source: Traffic Volume Data for Western Region, RTA 2002 for all sites situated along regional roads and PSC traffic data for roads situated within Parkes.

It is clear from the above table that the Newell Highway including Bogan Street is predicted to continue to be the key route for road freight traffic travelling through the Parkes LGA.

Designated B Double and Road Train Routes that are proposed to be utilised by heavy vehicle traffic travelling to and from the proposed development are shown in



Source: Copyright Universal Publishers Pty Ltd

Legend

- Proposed Truck Routes to PIT
- Proposed Ring Road
- Interim Truck Route (Option)

GHD CLIENTS PEOPLE PERFORMANCE

Parkes Intermodal Terminal

Proposed Truck Routes to the Parkes Intermodal Terminal

scale as shown | date 24 May 2006

job no 21-13701-08
file ref 2113701-08_LTN_01.cdr

Figure 7-6

10 Bond Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Future Traffic Levels with PIT

Table 7.14 and **Table 7.15** provide an understanding of future traffic volumes along the road network with and without the development of the proposed development.

Table7.14 PIT Future Road Freight Capture - Two Way Movement 2010

Year	**Without PIT**			**High Capture**		
Road link	**Total**	**HV**	**HV%**	**Total**	**HV**	**HV%**
Brolgan Road	200	4	2%	1052	506	48%
MR 61 (W) Condobolin Rd	1064	97	9%	1087	102	9%
SH17 Newell Hwy (N)	5685	1048	18%	5775	1103	19%
SH17 Newell Hwy (S)	5914	782	13%	6043	876	14%
MR 61 (E) Orange Rd	2099	131	6%	2123	138	6%
MR 233 Wellington Rd – NE	417	49	12%	420	52	12%
MR 238 Eugowra Rd – SE	500	62	12%	503	65	13%
Hartigan Avenue	690	140	20%	1264	627	50%
Bogan Street	5789	984	17%	5984	1039	17%
Dalton Street	1992	100	5%	2237	100	4%

Table7.15 PIT Future Road Freight Capture - Two Way Movement 2020

Year	Without PIT			High Capture		
Road link	**Total**	**HV**	**HV%**	**Total**	**HV**	**HV%**
Brolgan Road	227	5	2%	2375	1183	50%
MR 61 (W) Condobolin Rd	1138	127	11%	1198	139	12%
SH17 Newell Hwy (N)	6597	1367	21%	6824	1497	22%
SH17 Newell Hwy (S)	6684	2325	35%	7001	2545	36%
MR 61 (E) Orange Rd	2276	171	8%	2340	187	8%
MR 233 Wellington Rd – NE	441	64	15%	449	72	16%
MR 238 Eugowra Rd – SE	529	81	15%	537	89	17%
Hartigan Avenue	762	155	20%	2147	1298	60%
Bogan Street	6587	1252	19%	7105	1382	19%
Dalton Street	2094	105	5%	2773	105	4%

Both tables indicates the following in terms of expected impacts resulting from the full development of the site:

» Significant growth in heavy vehicle traffic along both Brolgan Road and Hartigan Avenue; and

» Small percentage increases in heavy vehicle traffic above that expected by 2010 and 2020 along Bogan Street and the northern and southern section of the Newell Highway.

It is apparent from the information contained in that section that the majority of growth in truck movement will occur along the Newell Highway and that this will occur with or without the proposed development. It is also noted that the proposed development of the site is likely to lead to increased heavy vehicle traffic levels along Hartigan Avenue and Brolgan Road.

Impact on Traffic Network Operations

Table 7.16 presents current and future road performance levels along Brolgan Road, urban freight routes through Parkes and approaching regional haulage routes to Parkes without the development of the PIT.

Table7.16 Future Performance of Road Freight Routes Without PIT Traffic

Road Type	Road Name	Count Station	2005		2010		2020	
			AADT/ ADT	LoS	AADT/ ADT	LoS	AADT/ ADT	Lo S
Rural	Brolgan Road	East of the site and west of the level crossing	188	A	200	A	227	A

Road Type	Road Name	Count Station	2005		2010		2020	
			AADT/ ADT	LoS	AADT/ ADT	LoS	AADT/ ADT	LoS
Rural	Condobolin Road	At level crossing, west of Parkes	1036	A	1064	A	1138	A
Rural	Newell Highway (N)	Parkes, 3.2km north of Court St	5337	B	5685	B	6597	B
Rural	Newell Highway (S)	At Forbes/Parkes boundary	5620	B	5914	B	6684	B
Rural	Orange Rd	Parkes, at Billabong Ck bridge	2031	A	2099	A	2276	A
Rural	Wellington Rd	Parkes, 8km north of SH17, Newell Hwy	408	A	417	A	441	A
Rural	Eugowra Rd	At Forbes/Parkes boundary	488	A	500	A	529	A
Urban	Hartigan Avenue	West of Forest Street	450	A	690	A	762	A
Urban	Bogan Street	North of Hartigan Avenue	5427	A	5789	A	6587	A
Urban	Dalton Street	West of Bogan Street	1943	A	1992	A	2094	A

Notes

Future predicted traffic levels are based on an annual growth of 3.6% applied to road freight and the average annual growth factor has been applied to all light vehicle traffic on each haulage route.

It is noted from the findings presented in the above table that all current road freight routes perform satisfactorily under 2010 and 2020 traffic condition without the proposed development.

The increase in traffic assumes that the haulage routes identified in Figure 7-6 will be impacted by trucks travelling to the proposed development. An assessment of road performance has been completed for the worst-case 'with proposed development scenario' and is shown in **Table 7.17.**

Table7.17 Future Performance of Road Freight Routes With PIT Traffic

Rural/ Urban	Road Name	Count Station	2010		2020	
			ADT/AADT	LoS	ADT/AADT	LoS
Rural	Brolgan Road	East of the site and west of the level crossing	1052	A	2375	A
Rural	Condobolin Road	At level crossing, west of Parkes	1087	A	1198	A
Rural	Newell Highway – north	Parkes, 3.2km north of Court St	5775	B	6824	B

Rural/ Urban	Road Name	Count Station	2010		2020	
			ADT/AADT	LoS	ADT/AADT	LoS
Rural	Newell Highway – south	At Forbes/Parkes boundary	6043	B	7001	B
Rural	Orange Road	Parkes, at Billabong Ck bridge	2123	A	2340	A
Rural	Wellington Road	Parkes, 8km north of SH17, Newell Hwy	420	A	449	A
Rural	Eugowra Road	At Forbes/Parkes boundary	503	A	537	A
Urban	Hartigan Avenue	West of Forest Street	1264	A	2147	A
Urban	Bogan Street	North of Hartigan Avenue	5984	A	7105	A
Urban	Dalton Street	West of Bogan Street	2237	A	2773	A

It is apparent from the above assessment that all identified road freight routes will operate with a satisfactory level of service in the future with or without the development.

Train frequency and time delay at level crossings

The following level crossings situated around the site would be impacted by general growth in rail and road movement generated by the site:

- The existing level crossing situated along Brolgan Road to the east of the site;
- A new level crossing to be situated along Brolgan Road to the west of the site; and
- The existing level crossing situated along Condobolin Road to the west of the site access.

The following presents a worst case scenario for train movements and resulting delays to traffic at level crossings with and without the implementation of the PIT:

During the Initial Stage the impacts would be as follows:

- The existing Brolgan Road level crossing to the east of the site is expected to cater for approximately four train movements potentially travelling at 115km/hr and two train movements potentially travelling at between 20km/hr - 50km/hr. The total delay to traffic per day would be approximately 20 minutes with the proposal and approximately 10 minutes without. The longest delay to traffic would be approximately seven minutes and caused by a 1,800m long train travelling from the PIT.
- The existing Condobolin Road level crossing to the west of the site is expected to cater for approximately four train movements potentially travelling at 115km/hr and one train movement potentially travelling at between 20km/hr - 50km/hr. The total

delay to traffic per day would be approximately 13 minutes with the proposal and approximately 10 minutes without. The longest delay to traffic would be approximately seven minutes and caused by a 1,800m long train travelling from the PIT.

» The new Brolgan Road level crossing to the west of the site is expected to cater for approximately 1 train movement potentially travelling at 40km/hr and one train movement potentially travelling at 10km/hr. The total delay to traffic per day would be approximately 16 minutes and the longest delay to traffic would be approximately 12 minutes and caused by a 1,800m long train travelling into the PIT.

During the Ultimate Stage the impacts would be as follows:

» The existing Brolgan Road level crossing to the east of the site is expected to cater for approximately 10 train movements potentially travelling at 115km/hr and four train movements potentially travelling at between 20km/hr - 50km/hr with the inland rail line built through Parkes. The total delay to traffic per day would be approximately 45 minutes with the proposal and approximately 25 minutes without. The longest delay to traffic would be unchanged at approximately seven minutes and caused by a 1800m long train travelling from the PIT.

» The existing Condobolin Road level crossing to the west of the site is expected to cater for approximately 10 train movements potentially travelling at 115km/hr and two train movements potentially travelling at between 20km/hr - 50km/hr with the inland rail line built through Parkes. The total delay to traffic per day would be approximately 35 minutes with the proposal and approximately 25 minutes without. The longest delay to traffic would be unchanged at approximately seven minutes and caused by a 1,800m long train travelling from the PIT.

» The new Brolgan Road level crossing to the west of the site is expected to cater for approximately two train movements potentially travelling at 40km/hr and two train movements potentially travelling at 10km/hr. The total delay to traffic per day would be approximately 33 minutes and the longest delay to traffic would be approximately 12 minutes and caused by a 1,800m long train travelling into the PIT.

7.1.3 Recommended mitigation and management measures

The following infrastructure upgrades are likely to be required as a result of developing the Initial and Ultimate Stages of the Parkes Intermodal Terminal and other similar traffic movement to industrial uses associated with Parkes Transport Hub and Goobang Junction Industrial Area:

» To manage construction traffic an on-site traffic management plan should be prepared as part of the Construction Environmental Management Plan;

» Upgrade of existing level crossings situated along Brolgan Road to the east of the proposed development and along Condobolin Road to the west of the proposed development to incorporate road design specification to accommodate B double and road trains, advanced warning signs and flashing lights;

- Intersections that should be evaluated and are deemed to be directly impacted by container movement generated or redistributed to the PIT are as follows:
  - Brolgan Road with the West lime Road (Western Section of the Parkes Ring Road);
  - Condobolin Road with West Lime Road;
  - Newell Highway (Forbes Street) and Hartigan Avenue; and
  - Hartigan Avenue with Blaxland Street.
- Develop a new level crossing point situated along Brolgan Road to the west of the proposed development to incorporate advanced warning signs, boom gates and flashing lights;
- Upgrade Brolgan Road between the western section of the Parkes ring road system to the proposed western most site access point to incorporate road design specification to accommodate B double and road trains. It is understood that it would be desirable to provide two 3.5m wide traffic lanes with a shoulder width of 2.0m and 1.0m of this being sealed;
- Provide appropriate high quality intersections along Brolgan Road, which provide multiple opportunities to gain direct and efficient access to the internal warehouse service road and the PIT access points. These intersections should be designed to accommodate frequent movement with a worst-case vehicle design standard being a B double and road train type vehicle. Based on the guidelines specified in the Austroads Part 5: 'Intersections at Grade' it would be desirable to provide types 'AUR' and 'CH' intersection layouts for access points along Brolgan Road to the PIT.
- Provide appropriate high quality intersection along Condobolin Road. The intersection should be designed to accommodate B double and road train type vehicle. Based on the guidelines specified in the *Austroads Part 5: 'Intersections at Grade'* it would be desirable to provide types 'AUR' or 'CH' intersection layout.
- All of the above except the new access point onto to Condobolin Road should be undertaken in the initial stage of site development with the Condobolin Road provided in the Ultimate Stage.

The study identifies that the analysis is based on a preliminary level of information and a series of assumption, which will only be confirmed once an operator for the facility is identified. The proposed operator will have the understanding of the resulting traffic impacts produced from each stage of the proposed development. These impacts should be identified and addressed with the submission of Development Applications for each facility proposed to be located in the Parkes Intermodal Terminal. The supporting detailed traffic impact statement will as part of this exercise address issues associated with the following:

- Proposed truck routes at each stage of the development;
- Intersection upgrades at each stage of the development; and
- Level crossings at each stage of the development.

7.2 Noise

A Noise Assessment for the PIT was undertaken by GHD. The key noise assessment findings have been provided in this section, and the full report is included in Appendix C.

The noise assessment is based on the NSW DEC publications Environmental Noise Control Manual Chapter 171 Construction site noise (ENCM), Environmental Criteria for Road Traffic Noise (ECRTN), and Industrial Noise Policy (INP).

The noise assessment involved the following methodology:

» Environmental noise monitoring of the most potentially affected and representative noise-sensitive locations;

» Establishment of operational noise and construction goals in accordance with the ENCM, ECRTN, and INP;

» Prediction of future noise levels and comparison to the noise goals; and

» Where required, investigation of possible noise control measures to reduce predicted noise impacts.

7.2.1 Existing environment

Monitoring was undertaken between 25 August 2005 and 2 September 2005 at the following locations:

» **Location 1** (also known as Parkes 1): Keith Residence, Brolgan Road, south west of the subject site.

» **Location 2** (also known as Parkes 2): Clifton Residence, off Condobolin Road, north of the subject site.

Following the completion of long term monitoring at the two nominated locations, it was understood Parkes Shire Council had approved a development application for the construction and occupation of a third residence within close proximity to the terminal site. Background noise monitoring was not undertaken at this location (as the rating background level is anticipated to be similar to that at the two original noise monitoring locations), however the location of the proposed residence was included in noise modelling.

The anticipated third residence adjacent to the site is known as Parkes 3.

A map of noise monitoring locations is included in Appendix C. It is acknowledged that the Keith resident would be relocating during operation of the proposed terminal, however the exact location of the new residence was not yet confirmed.

Unfavourable data due to adverse weather conditions was eliminated from the assessment.

Error! Reference source not found. and **Error! Reference source not found.** provide a graphical summary of the long term noise monitoring conducted at Parkes 1 and Parkes 2.

Figure 7-7 Results of noise monitoring - Parkes 1

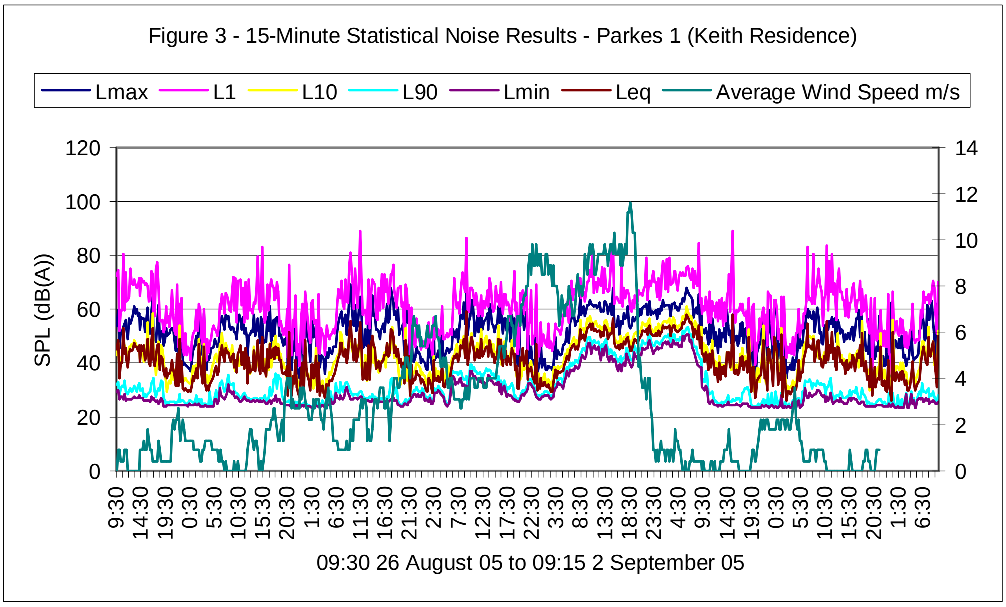
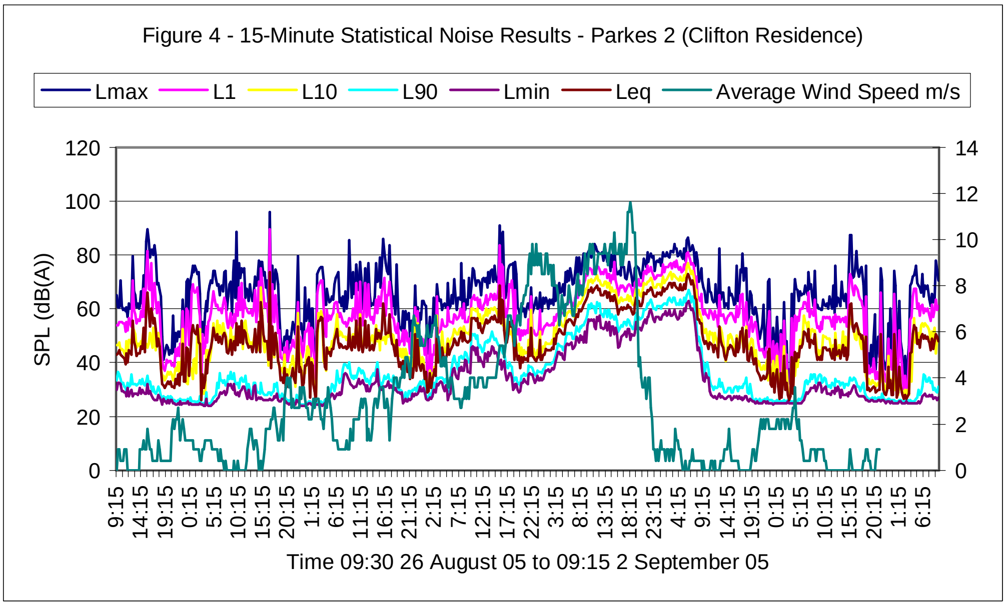


Figure 7-8 Results of noise monitoring - Parkes 2



Long term noise monitoring indicates a noise environment typical of a rural or suburban environment.

Calculated background L_{A90} day, evening, and night, $L_{Aeq(15hr)}$, $L_{Aeq(9hr)}$, $L_{Aeq(24hr)}$, $L_{Amaxeq(15hr)}$, $L_{Amaxeq(9hr)}$, and $L_{A10(18hr)}$ for the monitoring period are provided in the following tables.

Table 7.18 Noise monitoring results* – background L_{A90} noise levels at Brolgan Road

	Brolgan Road (Parkes 1)	Condobolin Road (Parkes 2)
Day: 7am – 6pm	26.8	30.7
Evening: 6pm – 10pm	24.9	25.9
Night: 10pm – 7am	24.3	25.3

* RBL – rating background level

Table 7.19 Average noise monitoring results (excluding data influenced by wind speed)

	Brolgan Road (Parkes 1)	Condobolin Road (Parkes 2)
$L_{Aeq(15hr)}$ 7am – 10pm	45.1	53.0
$L_{Aeq(9hr)}$ 10pm – 7am	40.2	48.7
$L_{Aeq(18hr)}$ 6am – 10pm	44.8	50.0
$L_{Aeq(24hr)}$ 12am – 12am	43.9	51.6

Environmental noise criteria

Construction noise criteria

Criteria for the construction phase applied to the assessment were sourced from Section 171 of the DEC's Environmental Noise Control Manual. The criteria was established using the measured background noise levels and applying a conversion factor based on the expected construction period. Construction noise criteria, based on Table 7.18 and Table 7.19 are shown in Table 7.20.

Table 7.20 Construction noise criteria

Construction Period	Level Restrictions	Parkes 1 L_{A10}	Parkes 2 L_{A10}	Parkes 3 L_{A10}
Less than 4 weeks	Background + 20 dB	55	55	55
Less than 26 weeks	Background + 10 dB	45	45	45
More than 26 weeks	Background + 5 dB	40	40	40

Normal construction hours are 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday. Construction activity outside those hours is not preferred but can usually occur provided the normal operational noise criteria are met and construction noise is not substantially audible or intrusive inside a dwelling.

Operational noise criteria

The INP provides guidance on the assessment of operational noise impacts. The guidelines include both intrusive and amenity criteria that are designed to protect receivers from noise significantly louder than the background level and to limit the total noise level from all sources near a receiver.

Intrusive noise limits set by the INP control the relative audibility of operational noise compared to the background level. Amenity criteria limit the total level of extraneous noise. Both sets of criteria are calculated and the lowest of the two in each time period normally apply. Intrusive criteria are simply 5 decibels above the measured (or adopted) background level with a minimum of 35 dB(A).

Amenity criteria are determined based on the overall acoustic characteristics of the receiver area and the existing level of noise excluding other noises that are uncharacteristic of the usual noise environment. Nearest residents to the proposed terminal are considered to live in a 'rural' area as it is an area that is defined by an acoustic environment that is dominated by natural sounds, having little or not traffic. The INP specifies that a suburban area may be located in either a rural, rural-residential, environmental protection zone or scenic protection zone, as defined by an LEP or other planning instrument.

The project specific noise levels are provided in Table 7.21.

Table 7.21 Project specific noise levels

	Parkes 1			**Parkes 2**		
Criterion	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
A: Rating Background Level	27* $L_{A90(day)}$	25* $L_{A90(evening)}$	24* $L_{A90(night)}$	30 $L_{A90(day)}$	26* $L_{A90(evening)}$	25* $L_{A90(night)}$
B: Intrusiveness Criteria (A + 5dB)	35 $L_{Aeq(day)}$	35 $L_{Aeq(evening)}$	35 $L_{Aeq(night)}$	35 $L_{Aeq(day)}$	35 $L_{Aeq(evening)}$	35 $L_{Aeq(night)}$
C: Rural Amenity Criteria (Table 2.1 INP)	50 $L_{Aeq(day)}$	45 $L_{Aeq(evening)}$	40 $L_{Aeq(night)}$	50 $L_{Aeq(day)}$	45 $L_{Aeq(evening)}$	40 $L_{Aeq(night)}$
D: Amenity Criteria: (INP Table 2.2 Adjusted)	50 $L_{Aeq(day)}$	45 $L_{Aeq(evening)}$	40 $L_{Aeq(night)}$	50 $L_{Aeq(day)}$	45 $L_{Aeq(evening)}$	40 $L_{Aeq(night)}$
E: Project	35	35	35	35	35	35

	Parkes 1			Parkes 2		
Criterion	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Specific Noise Level (Pg 21 INP)	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(night)}$	$L_{Aeq(15min)}$	$L_{Aeq(evening)}$	$L_{Aeq(night)}$

* Note – The INP states that where the rating background level is found to be less than 30 dB(A), then it is set at 30 dB(A), therefore these values have been adjusted to 30dB for further calculations.

Road traffic noise criteria

Road traffic noise criteria are sourced from the DEC's Environmental Criteria for Road Traffic Noise. (ECRTN). The ECRTN contains a number of criteria applied to residential receivers near roads, depending on the situation and the road classification.

Road classifications and relevant criteria can be seen in Table 7.22.

Table 7.22 ECRTN road traffic noise criteria L_{Aeq}

	Day	Night	Road Classification
Brolgan Road	$L_{Aeq(1hr)}$ 55	$L_{Aeq(1hr)}$ 50	Local Road
Condobolin Road	$L_{Aeq(1hr)}$ 60	$L_{Aeq(1hr)}$ 55	Collector
Newell Highway (north)	$L_{Aeq(15hr)}$ 60	$L_{Aeq(9hr)}$ 55	Arterial Road
Newell Highway (south)	$L_{Aeq(15hr)}$ 60	$L_{Aeq(9hr)}$ 55	Arterial Road
Orange Road	$L_{Aeq(15hr)}$ 60	$L_{Aeq(9hr)}$ 55	Sub-arterial Road
Wellington Road	$L_{Aeq(1hr)}$ 60	$L_{Aeq(1hr)}$ 55	Collector
Eugowra Road	$L_{Aeq(1hr)}$ 60	$L_{Aeq(1hr)}$ 55	Collector

Rail noise criteria

The NSW DEC publication Environmental Noise Control Manual (ENCM) Chapter 163 provides guidance for rail traffic noise. The noise criteria are set for residential receivers and are specified as 24hr L_{Aeq} and as a maximum pass-by level.

The project specific noise levels are provided in Table 7.23.

Table 7.23 Operational project specific noise levels

Planning Levels	Maximum Levels
$L_{Aeq, 24hr}$ = 55 dB(A)	$L_{Aeq, 24hr}$ = 60 dB(A)
L_{Amax} = 80 dB(A)	L_{Amax} = 85 dB(A)

Sleep disturbance criteria

The NSW DEC publication ENCM, Chapter 19 provides consideration for sleep arousal levels. It states that noise control should be applied with the general intent to protect people from sleep arousal. The purpose of sleep arousal guidelines is to address short high level noise likely to cause awakening during night time period 10 pm to 7 am and 8 am on Sundays and Public Holidays. To achieve this, the L1 level of any specific noise source should not exceed the background noise level (L_{90}) by more than 15 dB(A) when measured outside the bedroom window.

7.2.2 Impact assessment

Construction noise assessment

Initial Stage construction activities at the site are expected to occur in stages over a 5-year period (ie. more than 26 weeks), and the site is expected to be fully operational by the year 2020, the construction noise criterion should be considered as being Background + 5 dB(A). As a consequence, in a worst case configuration, noise levels have the potential to exceed project specific noise levels during construction. However, it is highly unlikely that all of the machinery would be operating at full power at the same time for an extended period.

Received noise produced by anticipated activities, during the construction of the upgraded facility is shown in Table 7.24 for a variety of distances to a typical receiver, with no noise barriers or acoustic shielding in place and with each plant item operating at full power. The sound power levels shown are maximum levels produced when machinery is operated under full load.

Table 7.24 Predicted plant item noise levels, dB(A) L_{10}

Plant Activity SWL dB(A)	160 m	320 m	640 m	1280 m
Crane 110	58	52	46	40
Backhoe 108	56	50	44	38
Compressor 100	48	42	36	30
Concrete Pump 109	57	51	45	39
Dump Truck 108	56	50	44	38
Water Tanker 109	57	51	45	39
Compactor 110	58	52	46	40
Concrete Saw 118	66	60	54	48
Paver 113	61	55	49	43
Rock Breaker 118	66	60	54	48

Operational noise assessment

Acoustic modelling was undertaken using Computer Aided Noise Abatement (CadnaA) to predict the effects of industrial noise generated by the PIT.

CadnaA is a computer program for the calculation, assessment and prognosis of noise exposure. CadnaA calculates environmental noise propagation according to ISO 9613.

According to the road traffic assessment, the current throughput likely to use the PIT was a net number of approximately 12 trucks per hour through the terminal, or 1 truck every 5 minutes.

An assessment of rail freight movements predicted that an average of 8 trains would arrive into the terminal every day.

The model took into account the sound power levels of the primary noise sources to be used at the facility, which were sourced from GHD's internal database, based on a rail facility located at Hornsby that undertakes similar engineering maintenance to the proposed rail siding. Estimated power levels for primary noise generating equipment at the PIT are provided in Table 7.25.

Table 7.25 Estimated sound power levels for primary noise generating equipment SWL dB(A)

Item	SWL dB(A)
Shunting Tractor	110.6
Forklift – Fantuzzi FDC 450 G4*	96.0
KONE 15-Tonne Crane during Operation	97.0
Overhead Crane 20-Tonne during Operation	81.7
Train Approaching Facility (approximately 20 km/h)	75.9

* – Sound power level provided by client

CadnaA noise prediction software considers topography, weather conditions, site sources and the location of the receiver areas to predicted received noise levels from the proposed terminal facility. The location of the noise sources within the site was done with reference to site layout plans.

The above scenarios were modelled under four differing meteorological conditions as follows:

» Scenario 1 – calm weather conditions, with no wind;

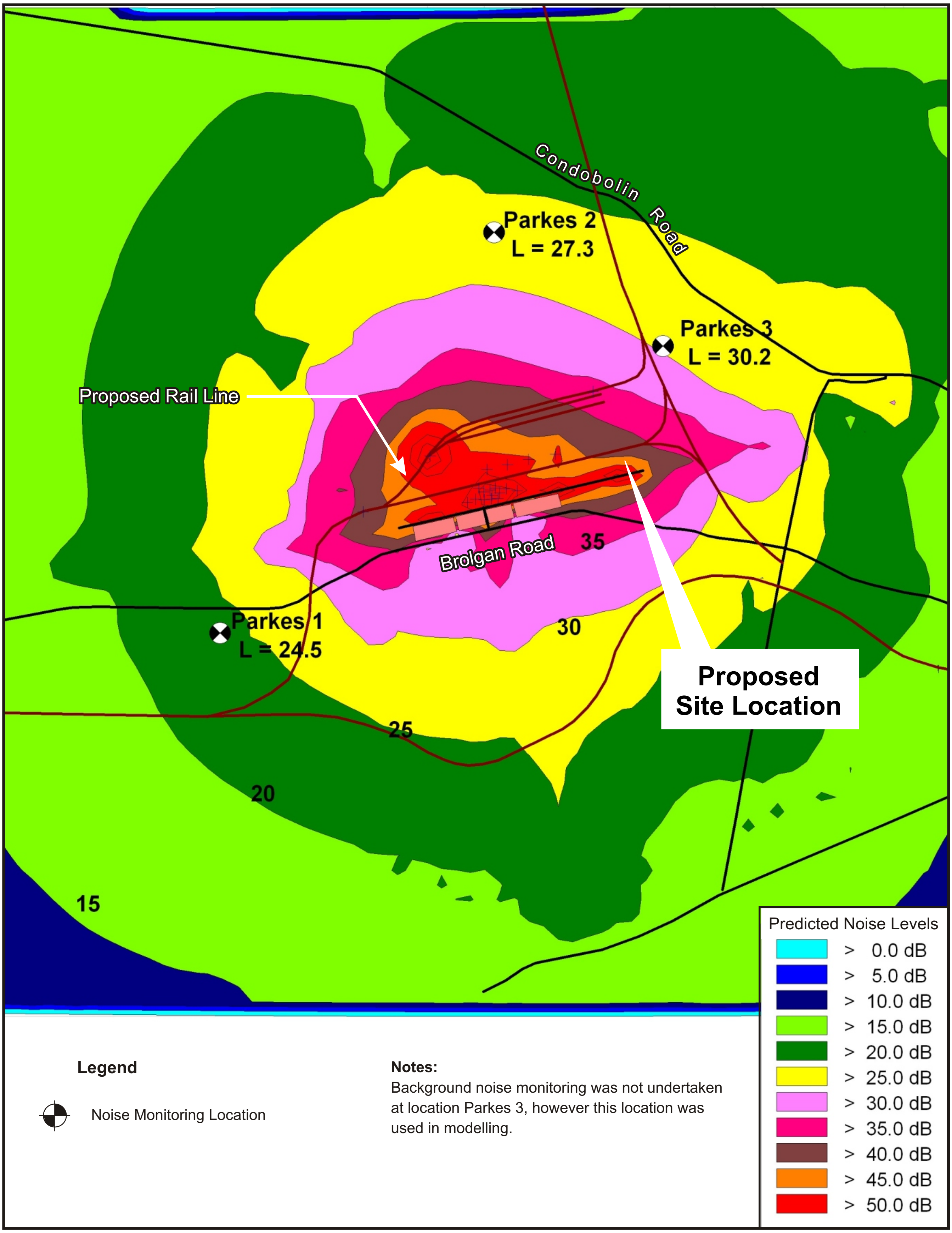
» Scenario 2 – Class F9 CONCAWE[10] weather conditions, wind speed 2 m/s towards north west, noise monitoring location Parkes 2 under worst case conditions during the evening period;

[9] The default inversion parameter Class F has been used based on the area classified as a non-arid area.

[10] Weather category system

- Scenario 3 – Class F CONCAWE weather conditions, wind speed 2 m/s towards south west, noise monitoring location Parkes 1 under worst case conditions during the evening period; and
- Scenario 4 – Class F CONCAWE weather conditions, wind speed 2 m/s towards north east, proposed residential dwelling under worst case conditions during the evening period.

Results of the noise modeling, provided in **Error! Reference source not found.**, **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.**, are based on a worst-case scenario with all plant items operating at their maximum levels including wind direction toward both the residences and calm weather conditions.



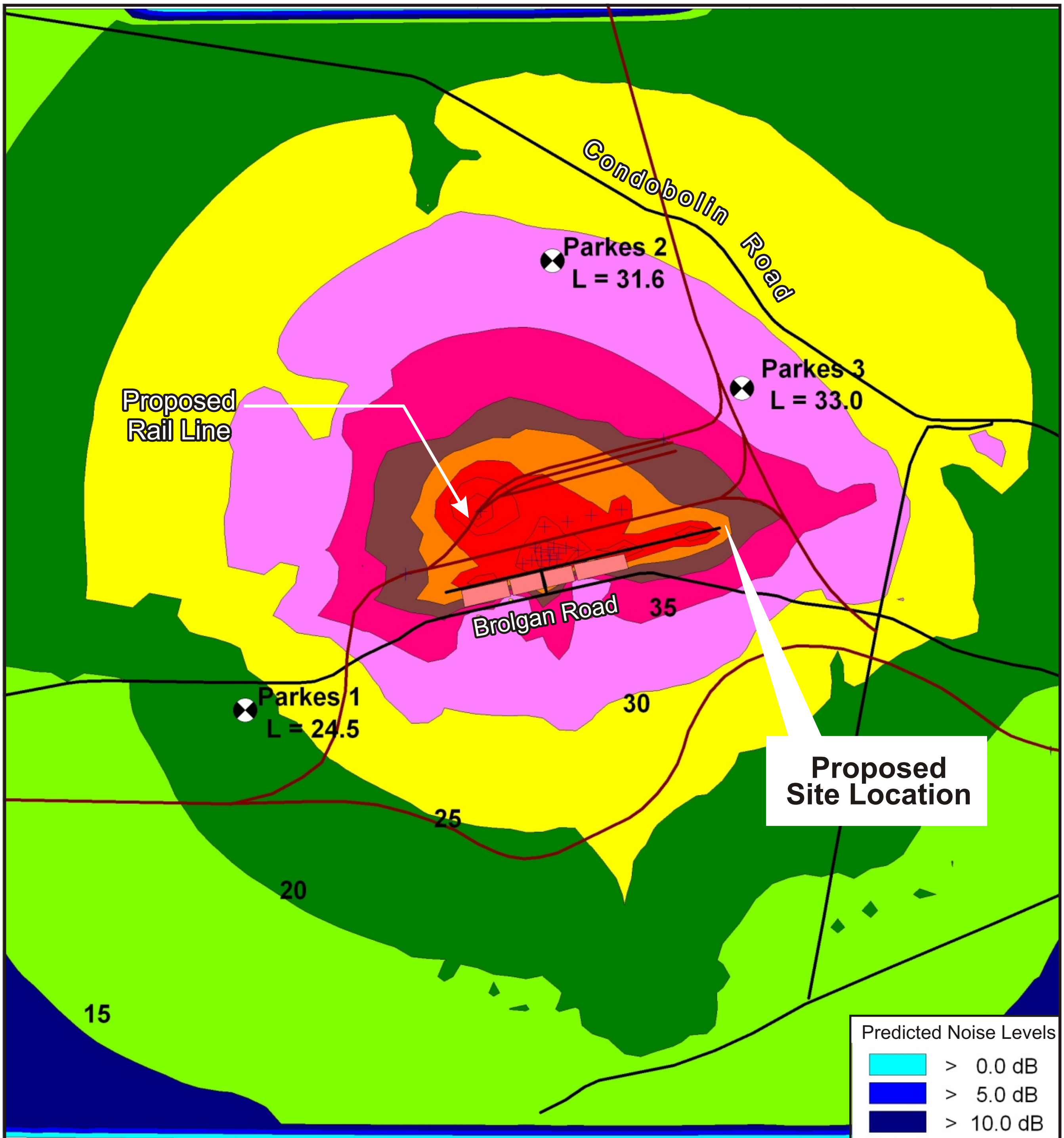
Notes:
Background noise monitoring was not undertaken at location Parkes 3, however this location was used in modelling.

Date: 2 February 2006

Predicted Noise Levels - Scenario 1

File Name: 2212447_LTN_02.cdr

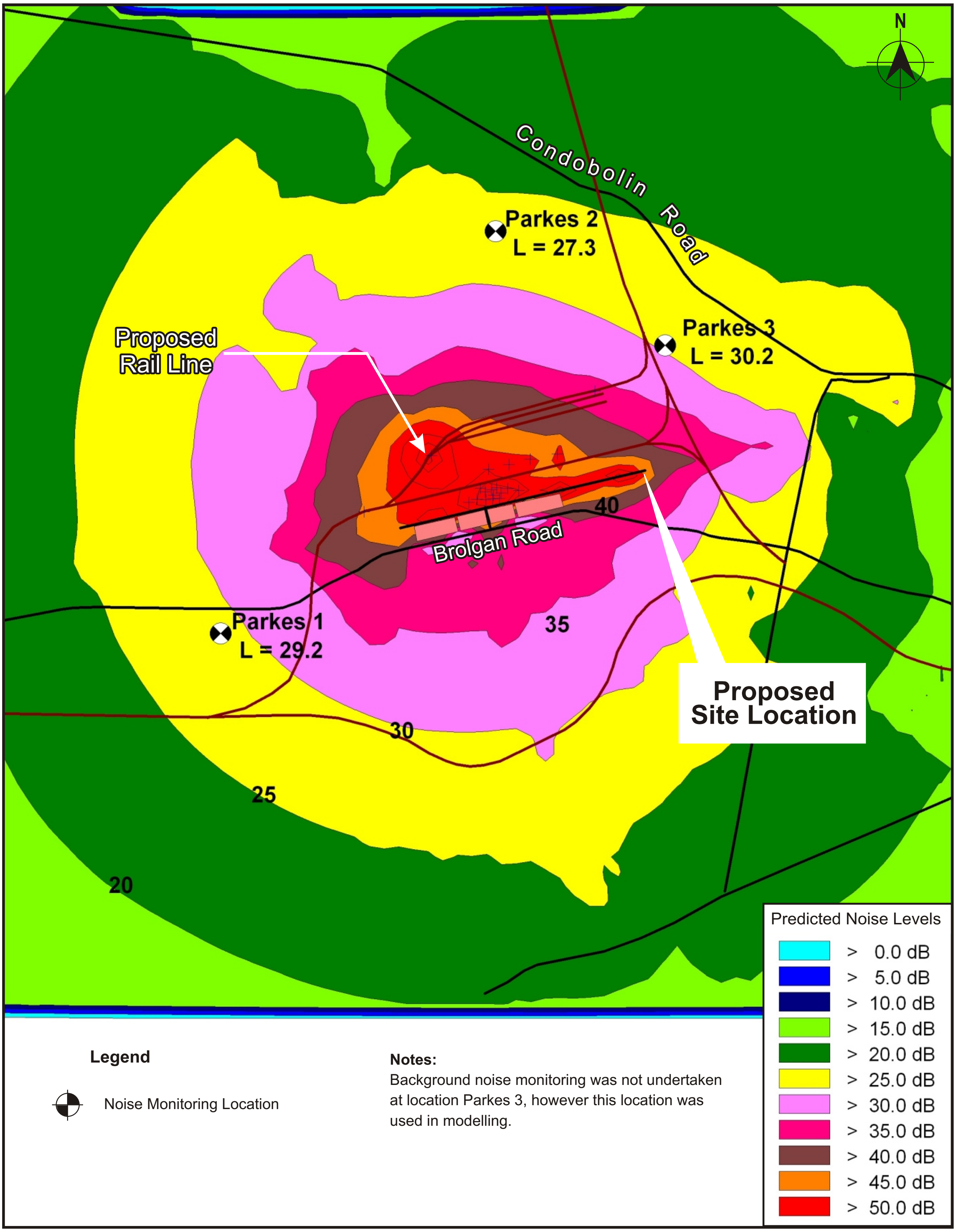
Figure 7-9



Legend

Noise Monitoring Location

Notes:
Background noise monitoring was not undertaken at location Parkes 3, however this location was used in modelling.



Notes:
Background noise monitoring was not undertaken at location Parkes 3, however this location was used in modelling.

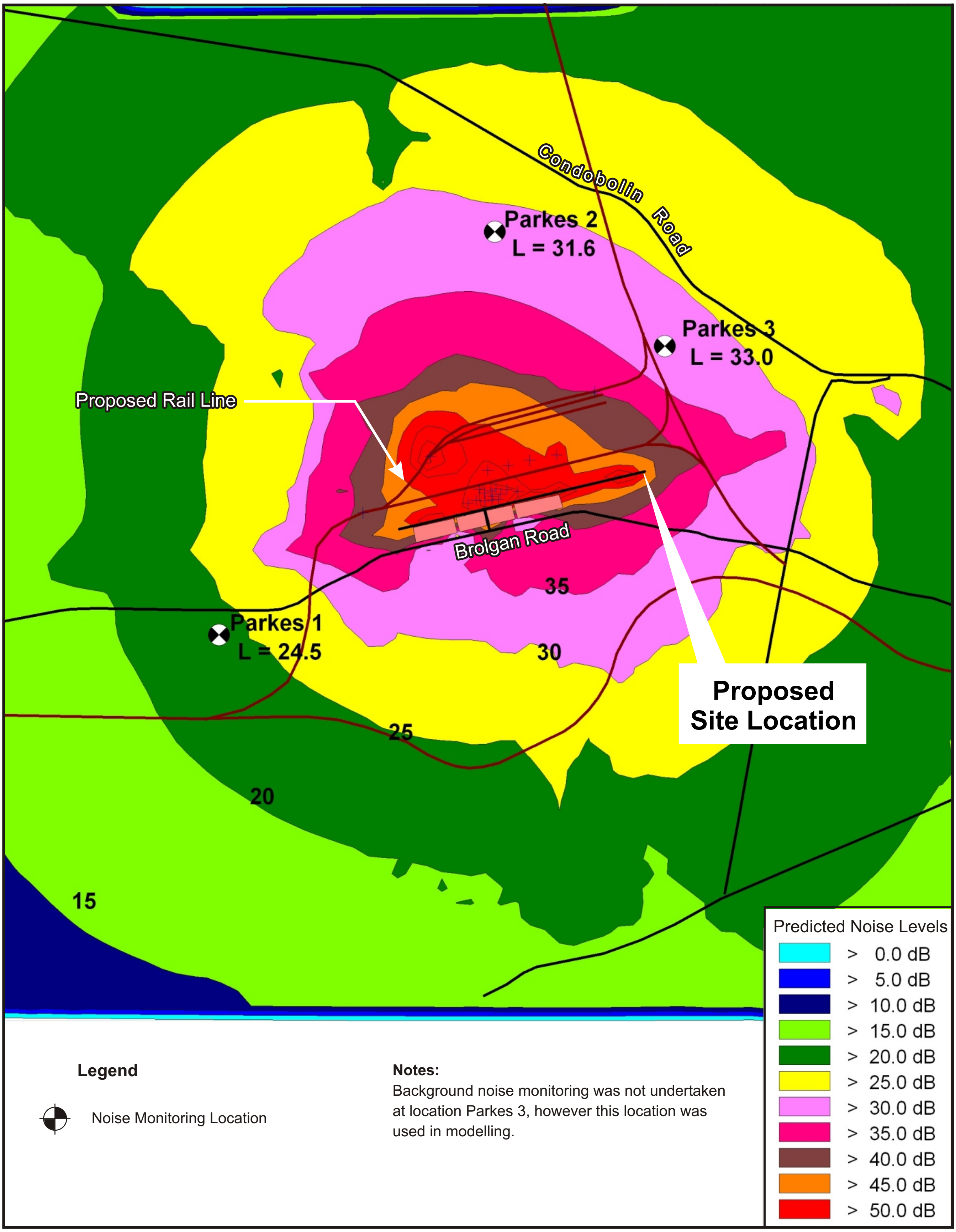
Date: 2 February 2006

Predicted Noise Levels - Scenario 3

File Name: 2212447_LTN_04.cdr

Acoustic Assessment - Proposed Intermodal Terminal, Parkes

Figure 7-11



Date: 2 February 2006

Predicted Noise Levels - Scenario 4

File Name: 2212447_LTN_05.cdr

Acoustic Assessment - Proposed Intermodal Terminal, Parkes

Figure 7-12

Modelled sound pressure levels at the residential receiver locations for the four different scenarios are summarised in Table 7.26.

Table 7.26 Modelled receiver sound pressure levels dB (A)

	Scenario 1 dB(A)	**Scenario 2 dB(A)**	**Scenario 3 dB(A)**	**Scenario 4 dB(A)**
Parkes 1	24.5	24.5	29.2	24.5
Parkes 2	27.3	31.6	27.3	31.6
Parkes 3	30.2	33.0	30.2	33.0
Project Specific Noise Goals (Day)	**35**	**35**	**35**	**35**
Project Specific Noise Goals (Evening)	**35**	**35**	**35**	**35**

Project specific noise levels for monitoring locations were based on the intrusive noise criteria. Modelled results, as shown in Figure 7-9 to Figure 7-12 suggest that project specific noise goals can be met at all three nearby residences under the four meteorological conditions as specified.

Road traffic noise assessment

An operational traffic noise assessment was undertaken using the Calculation of Road Traffic Noise (CoRTN)[11] algorithm, which is implemented in CadnaA to determine the traffic noise generated from the PIT traffic.

Operational traffic movements are primarily attributed to freight transport and delivery vehicles. The haulage routes identified were:

» Brolgan Road;
» Condobolin Road;
» Newell Highway – north;
» Newell Highway – south;
» Orange Road;
» Bogan Street;
» Dalton Street; and
» Hartigan Avenue.

The ECRTN criterion states that if the noise limits are already exceeded then the traffic noise arising form the development should not lead to an increase in existing noise levels of more than 2dB. An initial road traffic noise assessment was undertaken to

[11] CoRTN algorithim is published by the UK Department of Transport, 1998.

assess whether the predicted traffic as a result of haulage routes associated with the proposed terminal would lead to an increase of 2 dB or more on any of the roads.

Based on modelled results and data provided, traffic emissions should not increase by more than 2 dB on any of the haulage routes except Brolgan Road and Hartigan Avenue as a result of the proposed predicted traffic due to haulage routes.

Brolgan Road and Hartigan Avenue emission levels are predicted to increase, due to the large percentage increase in predicted traffic associated with the haulage routes, in particular, the increase in percentage of heavy vehicular movement (up to 300% increase in heavy vehicle traffic). Therefore, further assessment and modelling needs to be undertaken to determine whether ECRTN criteria are exceeded.

According to the ECRTN, both Brolgan Road and Hartigan Avenue are classified as local roads with a road traffic noise criteria of 55 $L_{eqmax(1hr)}$ day and 50 $L_{eq(1hr)max}$ night at potential noise sensitive receivers. The CoRTN algorithm implemented in CadnaA is used to calculate the respective $L_{eq(1hr)}$ levels and is depicted on contour plots to graphically represent the land areas that exceed the criteria levels.

Parkes Shire Council recorded existing hourly traffic data, including vehicle class, on Brolgan Road for Friday, 9 December 2005 to Friday, 16 December 2005, which is used in this assessment. According to this data the existing day $L_{eq(1hr)max}$ is expected to occur during the afternoon peak-hour between 5 pm – 6 pm with a weekday average of 16 vehicles with approximately 10% HV. The existing Night $L_{eq(1hr)max}$ is expected to occur during the late evening period between 10 pm – 11 pm with a weekday average of 4.4 vehicles with approximately 32% HV.

The corresponding predicted hourly traffic resulting from the haulage routes associated with the proposed terminal on Brolgan Road are as follows:

» 2010 peak-hour PIT traffic – 48 hvph12 (two-way);

» 2010 24 hour average PIT traffic – 20 hvph (two-way);

» 2020 peak-hour PIT traffic – 110 hvph (two-way); and

» 2020 24 hour average PIT traffic – 46 hvph (two-way).

Since no hourly traffic data was available for any of the other roads the following assumptions have been made:

» For the Leq1hr(max) Day, the afternoon peak hour is assumed to be 10% of the AADT; and

» For the Leq1hr(max) Night, the evening period is assumed to be the 24 hour AADT average.

The CoRTN algorithm calculates the $L_{10(1hr)}$ therefore the following general conversion factor was used for converting between road traffic noise descriptors:

$L_{eq(1hr)} = L_{10(1hr)} - 3$ dB[13].

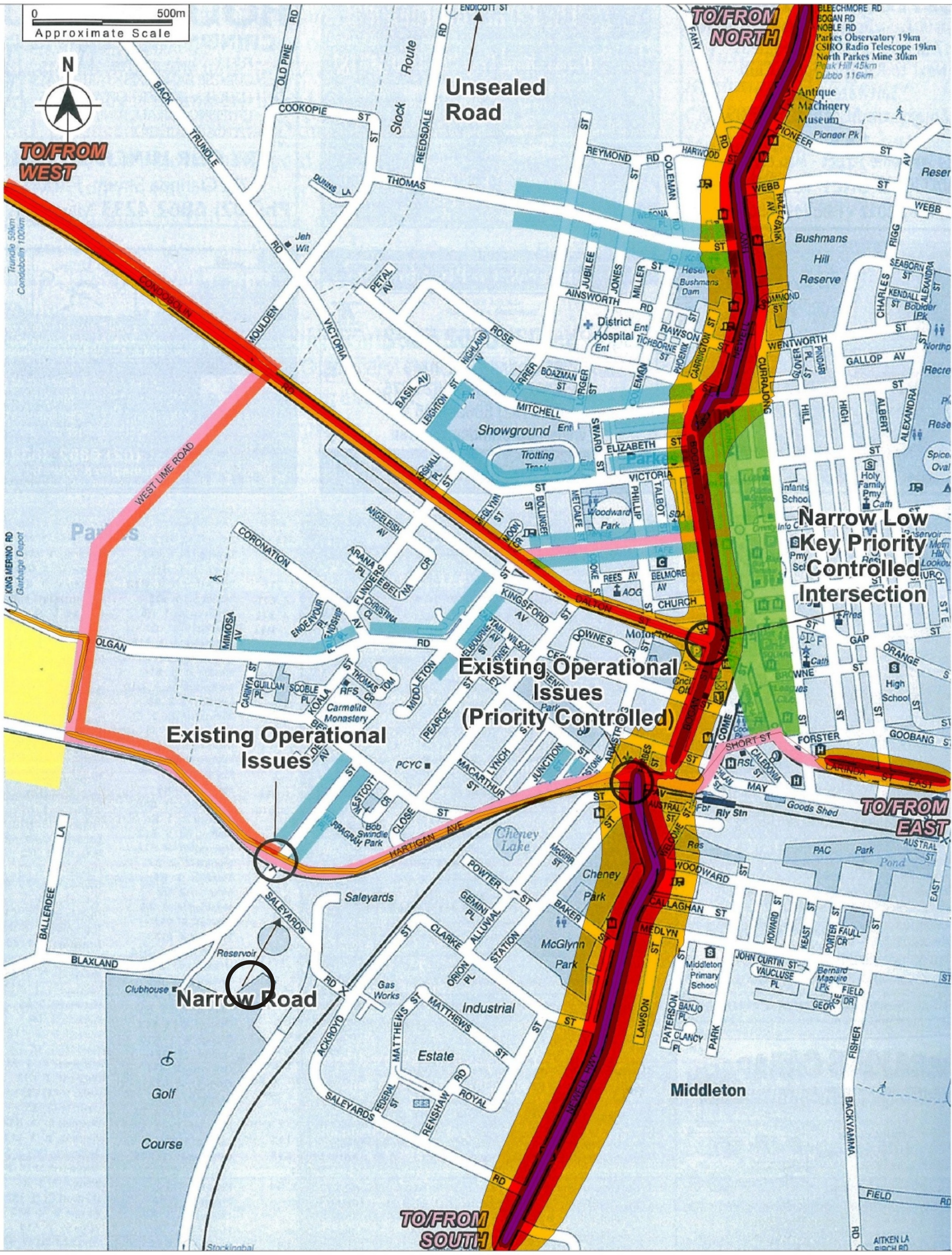
[12] Note – hvph = heavy vehicles per hour

[13] This relationship was originally derived based on short term noise measurements and is also used as a formula for converting between L_{Aeq} and L_{A10} (*Burgess, 1978*)

The following scenarios were modelled:

- Existing traffic noise level (2005) – Day $L_{eq(1hr)max;}$
- Existing traffic noise level (2005) – Night $L_{eq(1hr)max;}$
- Predicted traffic noise levels associated with the proposed terminal (2010) – Day $L_{eq(1hr)max;}$
- Predicted traffic noise levels associated with the proposed terminal (2010) – Night $L_{eq(1hr)max;}$
- Predicted traffic noise levels associated with the proposed terminal (2020) – Day $L_{eq(1hr)max;}$ and
- Predicted traffic noise levels associated with the proposed terminal (2020) – Night $L_{eq(1hr)max.}$

The modelled scenarios are presented in Figure 7-13 to Figure 7-18 below as contour plots to graphically represent the land areas that exceed the criteria levels.



Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal Acoustic Assessment

Figure 7-13 - Existing traffic noise level (2005) Day Leq(1hr)max

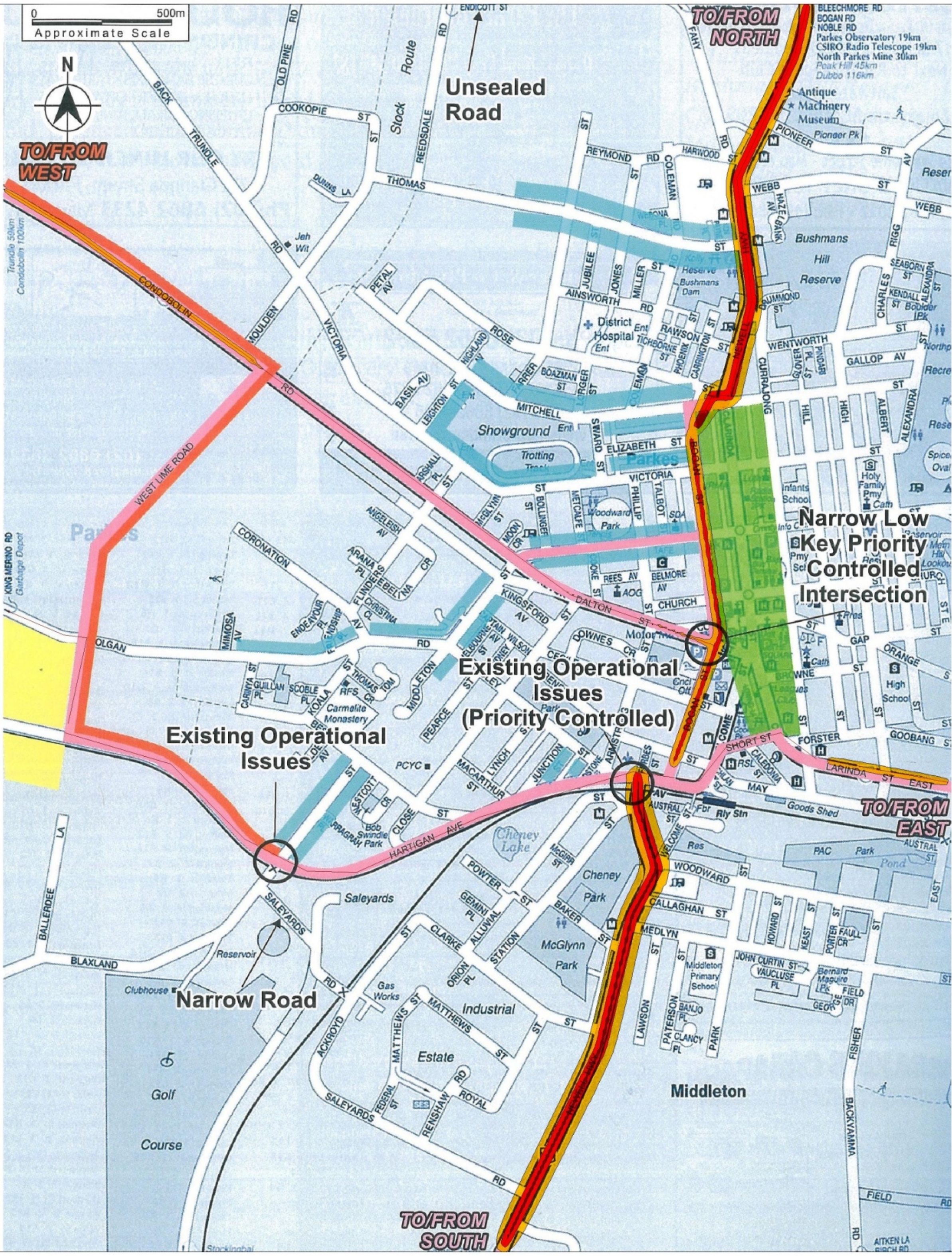
31 May 2006
JN 22 12447

CLIENTS | PEOPLE | PERFORMANCE

Source: Copyright Universal Publishers Pty Ltd

Legend

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses
- CBD



Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal Acoustic Assessment

Figure 7-14 - Existing traffic noise level (2005) Night Leq(1hr)max

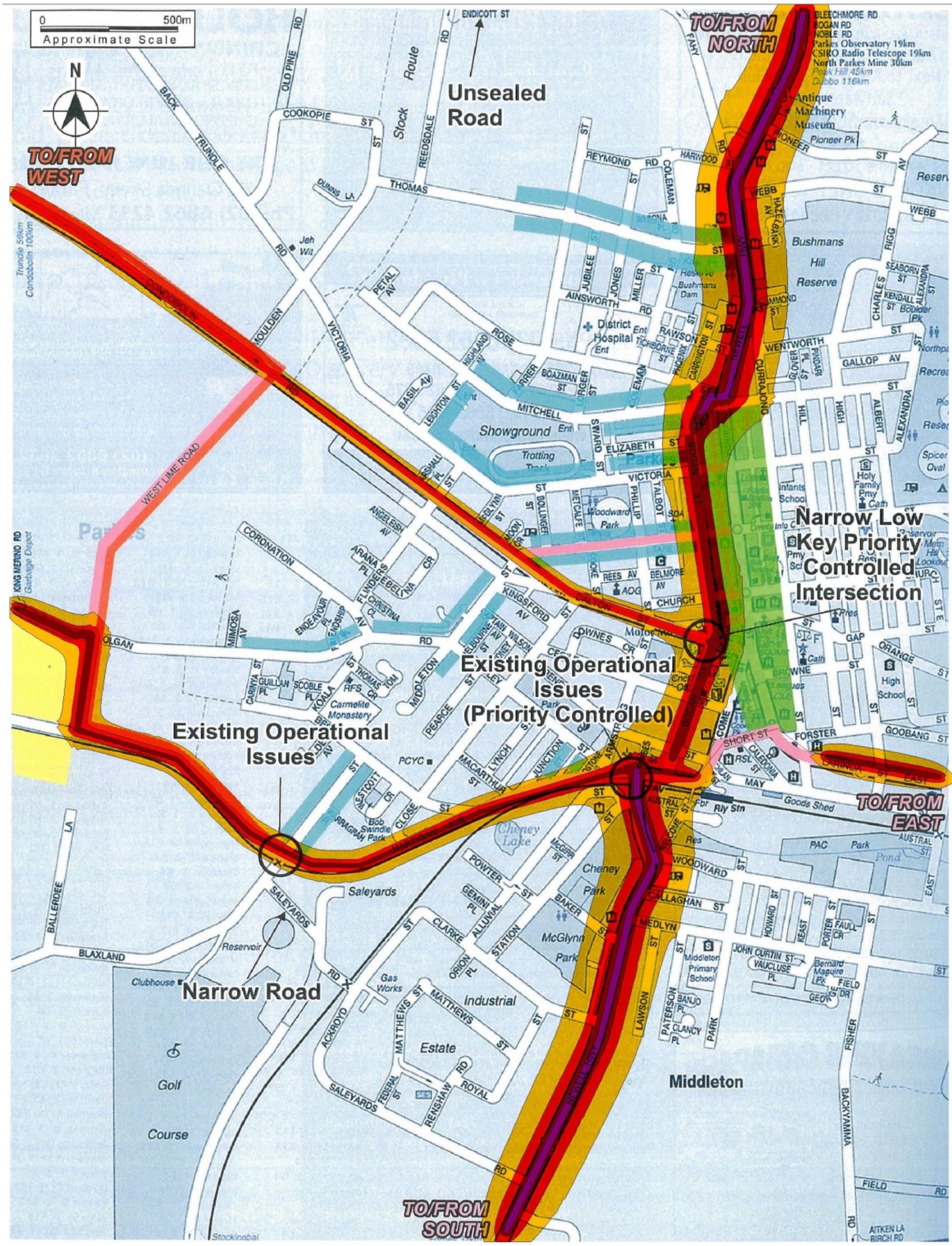
31 May 2006
JN 22 12447

GHD
CLIENTS | PEOPLE | PERFORMANCE

***Source:** Copyright Universal Publishers Pty Ltd*

Legend

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses
- CBD



Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal Acoustic Assessment

Figure 7-15 - Predicted traffic noise levels (2010) Day Leq(1hr)max

31 May 2006
JN 22 12447

CLIENTS | PEOPLE | PERFORMANCE

Source: Copyright Universal Publishers Pty Ltd

Legend

- Approved B Double Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Approved Road Train Truck Routes
- Industrial Uses
- CBD

Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal Acoustic Assessment

Figure 7-16 - Predicted traffic noise levels (2010) Night Leq(1hr)max

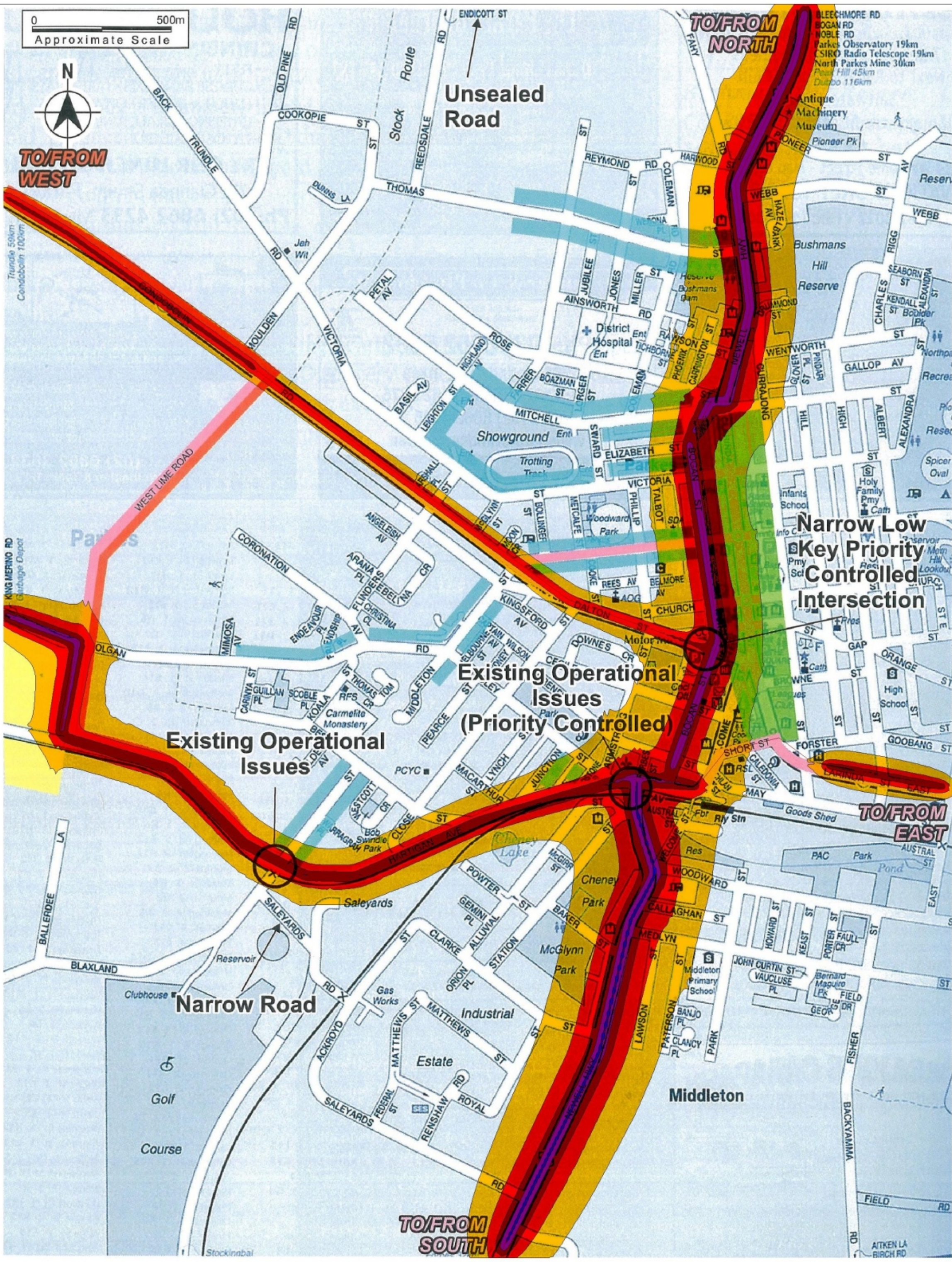
31 May 2006
JN 22 12447

GHD
CLIENTS | PEOPLE | PERFORMANCE

Source: *Copyright Universal Publishers Pty Ltd*

Legend

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses
- CBD



Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal Acoustic Assessment

Figure 7-17- Predicted Traffic Noise Levels (2020) Day Leq(1hr)max

31 May 2006
JN - 22 12447

GHD CLIENTS | PEOPLE | PERFORMANCE

***Source:** Copyright Universal Publishers Pty Ltd*

Legend

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses
- CBD

Sound Pressure Level dB(A)

- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Parkes Intermodal Terminal
Acoustic Assessment

Figure 7-18 - Predicted Traffic Noise Levels (2020) Night Leq(1hr)max

31 May 2006
JN - 22 12447

CLIENTS | PEOPLE | PERFORMANCE

Source: Copyright Universal Publishers Pty Ltd

Legend

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses
- CBD

The modelled scenarios are presented as contour plots to graphically represent the land areas that exceed the criteria levels. Sensitive land use areas (residential, recreational and educational dwellings) were documented in GHD's traffic assessment report and identified on the following road traffic noise figures (identified by blue shading).

The predicted traffic noise levels indicate that areas exceeding the ECRTN criteria along Brolgan Road and Hartigan Avenue are unlikely to overlap any noise sensitive locations that have been specified or provided.

Therefore based on the information provided it is unlikely that traffic noise levels due to the predicted haulage routes associated with the proposed terminal will exceed the noise guidelines at the nearest potentially sensitive receptors.

Rail noise assessment

The current NSW DEC recommended guideline for rail traffic noise is an $L_{eq(24hr)}$ of 55 dB(A) and an $L_{eq(max)}$ of 80. The existing rail traffic is 3 single stack trains per day from the west rail line. Rail traffic for the proposed terminal at the Ultimate Stage is 8 double stack trains (inbound and outbound movements) in total per day distributed evenly from the North, South East and West rail lines (which over a 24 hour period equates to less than 1 train per hour). Calculations were performed using the Calculation of Rail Noise (CRN[14]) algorithm using the predicted increase in train movements.

Results indicated there would be no noticeable increase in the $L_{eq(24hr)}$ levels and that the predicted rail noise would remain below the NSW DEC recommended guidelines.

Sleep disturbance assessment

The INP states that the L1 level of any specific noise source should not exceed the background noise level (L_{90}) by more than 15 dB(A) when measured outside the bedroom window.

The adjusted operational noise levels are provided in Table 7.27.

Table 7.27 Sleep disturbance noise levels

	Scenario 1 dB(A)	**Scenario 2 dB(A)**	**Scenario 3 dB(A)**	**Scenario 4 dB(A)**
Parkes 1	23.7	21.8	27.8	24.5
Parkes 2	26.6	30.1	24.9	31.6
Parkes 3	30.2	33	30.2	33
Project Specific Noise Goals (Background Level)	35	35	35	35
Sleep Disturbance	**50**	**50**	**50**	**50**

[14] The CRN algorithim is published by the UK Department of Transport, 1995.

	Scenario 1 dB(A)	Scenario 2 dB(A)	Scenario 3 dB(A)	Scenario 4 dB(A)
Level (Background +15 dB)				

Noise modelling suggests that sleep disturbance criteria can be met at all three monitoring locations during operation of the PIT.

7.2.3 Mitigation measures

To minimise noise emissions during construction, the following management and mitigation measures are available to ameliorate likely noise impacts:

- All combustion engine plant, such as generators, compressors and welders should be checked to ensure they produce minimal noise with particular attention to residential grade exhaust silencers;
- Vehicles would be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes would be eliminated, where practicable;
- Where practical, all vehicular movements to and from the construction site must be made only during normal working hours;
- Where practical, machines should be operated at low speed or power and would be switched off when not being used rather than left idling for prolonged periods;
- Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made; and
- Where practical, impact wrenches should be used sparingly with hand tools or quiet hydraulic torque units preferred.

With regard to potential traffic noise, by keeping vehicles serviced, fitted with mufflers, eliminating exhaust brake usage and posted speed limits, noise due to trucking activity associated with the operation and construction of the terminal can be significantly mitigated.

As modelled results suggest, operational noise is not expected to exceed project specific noise goals, hence no engineered acoustic mitigation measures are required. However, best practice noise management as described, but not limited to the above, should be implemented to control operational noise.

7.3 Water quality

A Water Management Assessment for the PIT was undertaken by GHD. A summary of the key water quality assessment findings is provided in this section, and the full report is included in Appendix D.

7.3.1 Existing environment

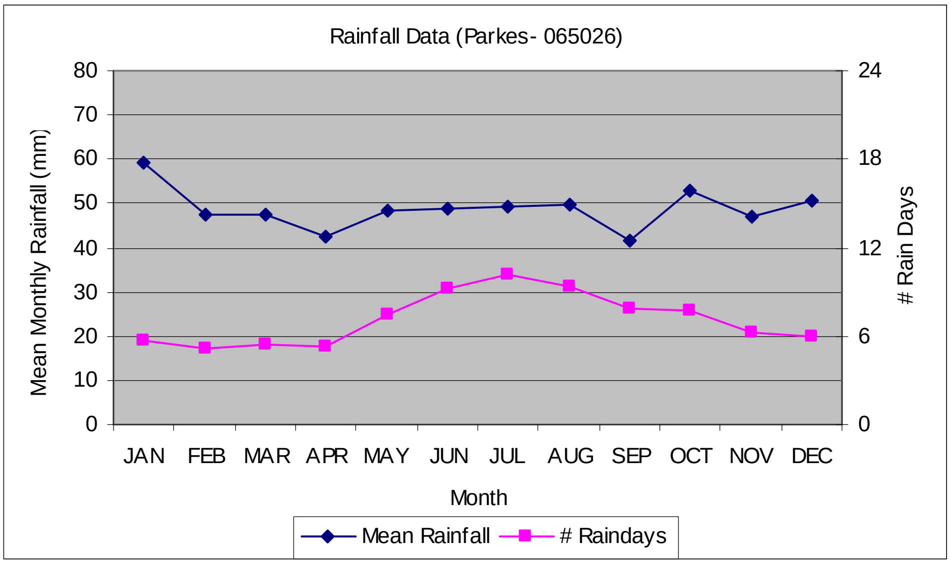
The catchment is predominantly cleared rural farming and grazing land. The Parkes Transport Hub LES describes the area as "Rural landscape, undulating agricultural country with timbered galleries along old stock routes, road reserves, ridges and waterways that are remnants of the original vegetation communities of the locality."

The terrain of the land to be developed is predominantly open and flat to undulating, naturally draining southwest to Goobang Creek. Included on the site are hills up to 320 metres Australian Height Datum (AHD), with most of the site at approximately 300 metres AHD.

Stormwater runoff from the existing site flows in a south-westerly direction and discharges into a number of small farm dams. These dams discharge into Goobang Creek, west of Parkes.

The Parkes weather station (065026) records a mean annual rainfall of 585 mm. Figure 7-19 shows the mean monthly rainfall to be generally constant throughout the year at approximately 50 mm. A slight increase in rainfall is observed in January. The number of rain days increases in the winter months compared with the summer months.

Figure 7-19 Seasonal rainfall distributions at Parkes



With respect to groundwater, the *Parkes Transport Hub Environmental Audit* (Parkes Shire Council, 2003), found:

- Groundwater across the site at depths greater than 40 m;
- Shallower groundwater resources (<8m depth) could be found in unconsolidated material;
- Lack of data precludes assessment of groundwater levels;
- A general southerly flow direction; and

- Recharge via infiltration of rainfall and slope runoff, overflows from Goobang Creek.

With respect to salinity the Parkes Transport Hub Environmental Audit (Parkes Shire Council, 2003) found there to be no dryland salinity scalds at the site; and although dryland salinity is not a major issue at Parkes, the township does suffer from occurrences of urban salinity, foundation corrosion and pipe decay, potentially due to perched water tables, leakages and clayey soil profiles.

7.3.2 Impact assessment

Development results in increased impermeable surfaces, which affect the hydrological cycle. This 'hardening' of the surfaces results in reduced infiltration of rainfall to the soil and more rainfall becoming runoff. The potential impacts are discussed below.

Water balance impacts

The increase in impervious area due to the proposed development could result in impacts to the water balance including:

- Reduced rainfall infiltration to the soil resulting in decreased groundwater recharge;
- Increased stormwater runoff volumes, which could impact downstream sensitive habitats in terms of flushing regimes (frequency, volume and rate), water quality, and wetting cycles;
- Development and infrastructure on the site could lead to increased recharge due to removal of vegetation, over-irrigation, and structural leakages;
- Site compaction, fill, landform reshaping and underground structures could impact groundwater flow; and
- Potential salinity impacts.

Stormwater pollution

There are potentially a number of causes leading to pollution of stormwater discharging from the site. They include:

- Increased runoff volume during regular rainfall events would more readily entrain and mobilise pollutants (particularly first flush) and increase pollutant loads to the receiving environment;
- The type of development and associated activities may introduce differing pollutant profiles, for example, vehicular traffic could increase hydrocarbon introduction. The movement of vehicles, particularly during dry periods, could result in dust, and disturbed surfaces could provide a source of sediment, substantially contributing to the total suspended solids. In general, typical pollutants include litter, sediment, suspended solids, nutrients, hydrocarbons and toxicants;
- Accidental spills on unbunded areas of the site could discharge to the site stormwater system and the receiving environment. In addition this could lead to groundwater contamination;
- The generation of wind borne sediment/material by any of the operational activities could be deposited in to the stormwater system;

- Contamination from wastes streams from the site entering the drainage system and groundwater; and
- Contamination from storage facilities (for example stockpiles, machinery storage and chemical), and covered/uncovered works areas which may include fuel, oil, grease, coolant, chemicals, solvents and/or cleaning agents.

Stormwater peak flows and flood risk

The following potential impacts may arise:

- On-site stormwater runoff peak flow rates and volumes would be increased due to the increased impermeable surfaces. During moderate rainfall events the resultant discharges can be highly erosive to stream bed banks and the receiving environment, thereby causing downstream degradation;
- Increased peaks would raise on-site and off-site flood risk if not adequately managed. This could raise the flood risk (to life and property), compromise downstream infrastructure capacity and impact downstream environments leading to increased erosion and sedimentation; and
- Flood risk at the site could also be impacted by local drainage channels that bisect or are located in close proximity to the site, and that convey runoff from larger upstream catchment areas either through or past the site. Increased local flood levels could impact directly on the site leading to risks to life and property and associated damages.

Construction phase impacts

During the construction phase, clearing and earthmoving activities have the potential to impact on surface water quality in the vicinity of the site, especially during high rainfall events. The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods;
- Work areas that have not been stabilised, and clearing of land in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Bulk earthworks and construction of pavements;
- Washing of construction machinery;
- Works within drainage paths, including depressions;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals; and
- Maintenance of plant and equipment.

7.3.3 Recommended mitigation and management measures

A number of measures would be implemented to effectively manage and mitigate the identified potential impacts. These are described below.

Water balance

Measures proposed include the following:

- Provision of stormwater retention strategies. These can be provided in the form of bio-retention swales and extended detention water bodies and wetlands. Swales may need to be lined to prevent percolation to groundwater. Infiltration-based management on the site is generally not favoured due to potential groundwater contamination impacts and the risk of urban salinity;
- In general, water reuse on site is dependant upon the source water quality and finding a suitable use with effective yet minimal water treatment measures. There is an optimum storage volume that would maximise the water supply while minimising the number of overflows from the storage facility. Rainwater harvesting for re-use would be sourced from roofed areas. Roof water would require adequate first flush treatments and can be directed to a single or a number of holding tanks for re-use as process water, toilet flushing or irrigation of landscaped areas. On-ground stormwater would be directed to onsite storage facilities and re-used as process water and for landscape irrigation, after suitable treatment; and
- Management and monitoring of onsite activities and infrastructure would be essential in managing the water balance, to prevent excess recharge, and potentially resulting in salinity impacts.

Stormwater pollution

Stormwater quality and pollution would be effectively managed and mitigated by providing a number of strategies, which typically comprise both structural and procedural mitigation measures, which aim at “source control”:

- Structural measures (for example first flush basins and drains) would have a direct, measurable effect on water quality while, procedural measures (for example improved housekeeping/maintenance) would play an important role in mitigation and would reduce the pollutant load on the structural mitigation measures. This would manage water quality and reduce the maintenance requirements for the structural measures. Key opportunities identified for the site include:
  - Opportunities for diverting “clean” stormwater, preventing contact with contaminated runoff;
  - Reduction in the sediment load by source controls, particularly from fuel storage or other high-risk contamination areas. This would be achieved through housekeeping, maintenance, treatment of surfaces, and diversion and treatment of stormwater runoff using first flush basins and other treatment strategies;
  - Prevention of stormwater runoff contact with contaminated areas through the construction of diversion drains and bunds as appropriate;
  - Separation of wastewater and stormwater streams across the site;
  - Separation of roof water from primarily the warehouse and storage buildings and surface stormwater runoff, if appropriate;
  - Provision of structural mitigation measures such as Gross Pollutant Traps (GPTs) and Oil and Water Separation Devices; and

- Maximising vegetated overland flow paths for stormwater runoff, by using lined swales, buffer strips and bio-retention swales.

» All contamination areas, for example fuel storage and treatment areas must be bunded to contain overflows or accidental discharges. A plan would need to be developed to manage disposal of contaminated runoff from within the bunds, potentially for re-use or as a licensed discharge;

» All contaminated hardstand areas should be directed to first flush basins. This captured runoff should be re-used on site, or discharged to the stormwater system or the sewer if of suitable quality; and

» Site maintenance would be the key to managing stormwater pollution. This may require frequent sweeping and regular house keeping practices. Regular maintenance of stormwater infrastructure, particularly water quality strategies, would be essential.

Stormwater peak flows and flood risk

On-site detention in the form of basins and storage areas would be used to effectively mitigate the increase in peak flows. In addition, stormwater quantity management would be achieved by:

» A general site grading towards the west;

» Kerbs and gutters on internal roads collecting runoff and discharges, after treatment and reuse, via an internal stormwater pipe network and conveying these to a detention basin;

» Adopting flood planning levels, which ensure that floor areas are located above any flood levels on account of on-site and local flood peaks; and

» Providing a flood evacuation plan/strategy for the site.

Construction phases impacts

Construction phase impacts can be managed by implementation of a Construction Phase Soil and Water Management Plan detailing stormwater management strategies in accordance with the former Landcom's document entitled "*Soil and Construction, Managing Urban Stormwater*" (Landcom, 2004). These would include:

» General site practices and responsibilities;

» Material management practices;

» Stockpile practises;

» Topsoil practices; and

» Erosion control practices (earth sediment basins, straw bales, sediment fences, turbidity barriers, stabilised site accesses, diversions and catch drains).

Stormwater management strategy

Figure 7-20 outlines the concept Stormwater Management Plan for the site.

FIGURE 7-20 : CONCEPT STORMWATER MANAGEMENT PLAN

PRELIMINARY

CLIENTS | PEOPLE | PERFORMANCE
GHD Pty Ltd ABN 008 488 373
10 Bond Street, Sydney NSW 2000 Australia
T 61 2 9239 7100 F 61 2 9239 7199
E sydmail@ghd.com.au W www.ghd.com.au

Scale 1-5000	DO NOT SCALE	Client	TERMINALS AUSTRALIA PTY LTD
Drawn CT	Designed CC	Project	PARKES INTERMODAL TERMINAL
Drafting Check CC	Design Check KT	Title	CONCEPT LAYOUT PLAN CONCEPT STORMWATER DRAINAGE
Approved D ROBERTS		Original Size A0	Drawing No: 21-13701-R020D(Fig.7-20) Rev: A
Date 18/01/06			

Designated site discharge point

The designated site discharge point would be located at the south-western point of the site upstream of the culverts under Brolgan Road and downstream of the on-site basin, OSD 1.

Warehouses along Brolgan Rd and Intermodal Terminal container storage area (Initial Stage)

The proposed warehouse developments along Brolgan Road and the Intermodal container storage area would drain to the internal access road located between these two facilities.

- The internal access road would grade towards the west. A 1 in 20 year ARI sub-surface stormwater system would be provided along the access road, which would drain to the on-site basin, OSD 1. Surcharge pits would be provided and discharges in excess of the 20-year ARI event would be routed overland in the roadway;
- The PIT container storage area would be provided with pits capable of capturing the 100-year ARI event, to prevent inundation of this hardstand area. These would connect to the sub-surface system along the internal access road;
- Each warehouse facility would be provided with internal stormwater management which would comprise:
  - An internal stormwater system of sub-surface pipes and pits;
  - Rainwater tanks from roof areas, which would overflow to internal sub-surface systems. Rainwater would be re-used for toilet flushing, vehicle washing and irrigation (with due consideration to increased salinity risk);
  - Bunding and first flush facilities, capturing the first 15 mm of rainfall on potentially contaminated hardstand areas. These would discharge to stormwater, sewer or licensed contractors depending on water quality and treatment achieved;
  - Inlet pit devices to capture sediment and litter; and
  - GPT's and oil-water separation devices.
- Detention would be provided in the on-site basin, OSD 1.

Intermodal Terminal container storage area (Ultimate Stage) and containerised fuel storage area

These two areas would drain to the internal access road located between these two facilities.

- The internal access road would grade towards the west. A 1 in 20 year ARI sub-surface stormwater system would be provided along the access road, which would drain to a swale drain and the on-site basin, OSD 1. Surcharge pits would be provided and discharges in excess of the 20-year ARI event would be routed overland in the roadway;
- The PIT container storage area would be provided with pits capable of capturing the 100-year ARI event, to prevent inundation of this hardstand area. These would connect to the sub-surface system along the internal access road;

- Containerised fuel storage area would be provided with internal stormwater management which would comprise:
  - An internal stormwater system of sub-surface pipes and pits;
  - Rainwater tanks from roof areas, which would overflow to internal sub-surface systems. Rainwater would be re-used for toilet flushing, vehicle washing and irrigation (with due consideration to increased salinity risk);
  - Bunding and first flush facilities, capturing the first 15 mm of rainfall on potentially contaminated hardstand areas. These would discharge to stormwater, sewer or licensed contractors depending on water quality and treatment achieved;
  - Inlet pit devices to capture sediment and litter;
  - GPT's and oil-water separation devices.
- Detention would be provided in the on-site basin, OSD 1.

Heavy engineering facility

This facility shall be drained to a sub-surface stormwater system located in the access road, which discharges at the western end into a swale drain. The internal stormwater management of the Heavy Engineering Facility would comprise:

- An internal stormwater system of sub-surface pipes and pits;
- Rainwater tanks from roof areas, which would overflow to internal sub-surface systems. Rainwater would be re-used for toilet flushing, vehicle washing and irrigation (with due consideration to increased salinity risk);
- Bunding and first flush facilities, capturing the first 15 mm of rainfall on potentially contaminated hardstand areas. These would discharge to stormwater, sewer or licensed contractors depending on water quality and treatment achieved;
- Inlet pit devices to capture sediment and litter;
- GPT's and oil-water separation devices.

Detention would be provided in the on-site basin, OSD 1.

Rail tracks and sidings

All rail tracks and sidings would drain to open channel 'cess' drains and sub-surface systems. These would generally drain in a south-westerly direction to OSD 1. "Lobster-pot" inlet pits would drain ballast areas and connect to sub-surface drainage in collecting runoff from the formation. All extreme events would be routed overland to OSD 1.

Culverts would be provided at track crossings over drainage lines.

On-site detention

Estimate of on-site detention requirements

Initial hydrology analysis was undertaken and calculations determining the existing runoff from the site were undertaken using the Rational Method in accordance with Australian Rainfall and Runoff (Institute of Engineers in Australia, 2000).

Discussions with Parkes Shire Council staff highlighted the need for the post development drainage discharge to be limited to the pre-development drainage discharge. This is a standard condition for development within the Parkes Shire Council area and is further highlighted by the fact that the discharge point from the site shall be onto adjoining properties.

Based on this requirement and an assumed post development impervious area for the development, the on-site detention storage requirement for the 100-year ARI event would be 230 m^3/ha.

Proposed on-site detention strategy

OSD 1 basin would be located on the northern side of Brolgan Road. The purpose of this basin is to control site discharge and to limit the peak flow of water in the stormwater drainage structure crossing beneath Brolgan Road. The proximity of the rail line and area reserved for future warehousing development may limit the size of this basin.

A second basin located in-line from OSD 1 and the drainage line leading to Goobang Creek, OSD 2, would be constructed on the southern side of Brolgan Road. The proponent has an agreement with the existing Landowner to expand an existing dam in the southeast corner of this neighbouring lot. The purpose of this basin is to supplement site detention storage and to limit the peak flow of water in the stormwater drainage structure crossing beneath the Sydney-Adelaide-Perth rail line.

It is proposed that:

» Basin OSD 1 be maximised in order to contain and manage stormwater on-site in preference to off-site in OSD 2. It may be that OSD 2 is not required, however if the site discharge is of suitable quality OSD 2 could be used as a balancing storage for potential re-use;

» That the OSD basins be provided with pre-treatment in the form of GPT's and inlet sediment traps;

» That the basins be provided with staged outlets (low level and flood) to manage discharges, offsetting potential evaporation losses and to emulate existing hydrological cycles; and

» Provide water quality treatment by including a wetland zone, a detention zone, together with an extended detention zone. The wetland zone could be located in the base of the basin.

Based on the proposed development areas the following on-site detention would be required:

» Initial Stage (20 ha): 4600 m^3; and

» Ultimate Stage (additional 32 ha): additional 7360 m^3.

These volumes should easily be accommodated in the locations of OSD 1 and OSD 2.

Recommended monitoring program

Monitoring should be undertaken to ensure that stormwater management measures are working effectively. An indicative monitoring program is outlined in Section 9.3.2.

7.4 Land use safety

GHD-Qest conducted a preliminary risk screening for the PIT. A summary of the findings is provided in this section, and the full report is included in Appendix E.

Methodology

The methodology for the preliminary risk screening is presented in the Department of Planning document entitled “Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines” (1997). The preliminary risk screening concentrates on the transportation and storage of specific dangerous goods classes that have the potential for significant off-site effects. The steps involved in a preliminary risk screening are as follows:

- Collate Information: The proponent should provide a full list of hazardous materials stored on-site, the method of storage, storage location, maximum inventory and shortest separation distance to site boundary. Additionally, the average number of weekly and annual road movements of hazardous material to and from the site, as well as the typical quantities in each load should be provided;
- Identify the Types of Hazard Presented by a Hazardous Material: This involves the identification of the hazardous material *class* (and subsidiary classes) for each hazardous material stored on-site. Classes and subsidiary classes are obtained from the Dangerous Goods Code (DGC) or material safety data sheets (MSDS) and illustrate the types of hazard to be considered;
- Group and Total by Class, Activity and Location: When several hazardous materials of the same class are stored in the same general site location but in differing storage forms, total the bulk quantity and then separately total the quantity stored in each form;
- Compare with Screening Threshold: Provided in the Department of Planning’s abovementioned document are various tables and figures indicating the screening threshold pertaining to each class of hazardous material. If a screening threshold is not exceeded it is assumed that the hazardous material is unlikely to pose a significant off-site risk; and
- Transportation Issue Consideration: If a proposed development generates traffic movements (entering and leaving the site) of significant quantities of hazardous material, the development may be considered potentially hazardous. Provided in the Department of Planning’s abovementioned document are transportation screening thresholds relating to the various classes of hazardous materials. The thresholds are based on a minimum quantity per load (below which the vehicle movement should be ignored) and a vehicle movement frequency.

If any one screening threshold is exceeded then the proposed development is considered “potentially hazardous” under SEPP 33 and a preliminary hazard analysis (PHA) is required to be submitted with the development application. If any transport screening thresholds are exceeded then the proposal is considered potentially hazardous with respect to transport and a route evaluation study is required.

7.4.1 Impact assessment

Dangerous goods storage screening

The proposed inventories and locations of hazardous materials to be stored and utilised in the proposed development are listed in Table 7.28. The locations are shown in Figure 6-1. It must be noted however, that the inventories presented for hazardous material stored in the containerised fuel storage facility are indicative of a total hazardous material storage inventory of 1,000m^3 (which equates to approximately 1 million litres).

Table 7.28 Hazardous material description, inventory and location

Material	Inventory (m3)	Location
Unleaded Petrol (ULP)	150	Containerised fuel storage facility
Leaded Petrol (LP)	150	Containerised fuel storage facility
Diesel	700	Containerised fuel storage facility
Diesel	100	Train refuelling facility
Diesel	100	Terminal plant refuelling facility

The hazardous material class relating to the materials listed above are presented below. A class 3PGII classification indicates the material is a flammable liquid with a flash point of less than 23ºC. A class C1 classification indicates a combustible material with a flash point of 150ºC or less.

Table 7.29 Hazardous material class and Sub-Class

Material	Class/Sub-Class
Diesel	C1
ULP	3PGII
LP	3PGII

The containerised fuel centre would be used to store both class C1 (diesel) and class 3PGII (ULP & LP) hazardous materials. Under SEPP 33 if a class C1 material is stored with other flammable materials then it should be considered a class 3PGIII hazardous material. Additionally, SEPP 33 advises that if more than one subsidiary class of a given class is stored in the same general area then the total (class) quantity should be considered to be of the more hazardous subsidiary class present. Hence the total inventory of material stored at the containerised fuel centre is considered to be class 3PGII hazardous material. Given the separation distance of approximately 400m from the proposed containerised fuel facility to the site boundary, correlated with the approximate 1,000m^3 storage volume anticipated results in a screening value were well below the specified storage screening threshold. Hence this storage facility is considered unlikely to present a significant off-site risk.

Diesel is classified as a class C1 material. As it is the only flammable material within the respective storage areas, it is not considered to be potentially hazardous.

Based on the dangerous goods storage screening process conducted and illustrated above it is believed that none of the proposed hazardous material storage situations at the Parkes PIT exceed the storage screening threshold specified under SEPP 33. Hence, it is assumed that these storage situations are unlikely to pose a significant off-site risk.

Dangerous goods transport screening

The Department of Planning document entitled "*Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines*" (1997). The DoP's Applying SEPP 33 specifies the transport screening threshold for class 3PGII materials transported in quantities greater than 3 tonnes (which equates to approximately 3,000L[15]) as greater than 750 cumulative annual movements and not exceeding peak weekly movements of 45. It is proposed that the majority of the fuel stored in the containerised fuel storage facility would be diesel. With the classification of diesel as a class C1 material it is not subject to transportation screening thresholds under SEPP 33. ULP and LP are classified as class 3PGII hazardous materials and as such are subject to transport screening thresholds. It is envisaged that truck movements of ULP and LP would not exceed 750 movements per annum or maximum peak weekly movements of 45.

Therefore, it is concluded that the proposed total annual and peak weekly movements of class 3PGII hazardous materials would not exceed the transport screening thresholds specified under SEPP 33. Hence, the PIT is not considered to be potentially hazardous with respect to transportation.

Level of risk assessment

In accordance with SEPP 33, if any of the screening thresholds are exceeded then the proposed development should be considered potentially hazardous and a PHA is required to be submitted with the development application.

Based on the above assessment, the proposed development does not exceed the storage threshold or transport threshold for Class 3PGII hazardous materials and hence is not considered as potentially hazardous. Therefore, a PHA is not required for the anticipated substance volumes for the containerised fuel storage facility or the permanent on-site fuel storage tanks proposed for the PIT.

7.4.2 Recommended mitigation and management measures

Requirements for compliance with Australian Standard 1940

The PIT presents two separate and distinctly different hazardous material storage scenarios for the purpose of compliance with *Australia Standard 1940 – The Storage and Handling of Flammable and Combustible Liquids* (2004). The first is that of permanent on-site storage of combustible liquids in tanks with fuel being provided for site operations and train refuelling operations. The second scenario is transit storage of flammable and combustible liquids at the containerised fuel storage facility.

[15] Material with a specific gravity of 0.9.

For the purposes of this investigation, a protected place is defined as per AS 1940 Clause 1.4.55 as;

» A dwelling, residential building, place of worship, public building, school or college, hospital, theatre, and any building or open area in which persons are accustomed to assemble whether it is within or outside the property boundary of the installation.

Permanent on-site storage tanks

To ascertain whether the permanent on-site storage tanks comply with AS 1940, the permanent on-site storage tanks are defined as follows:

» A permanent on-site tank storing class C1 dangerous goods (diesel);

» Indicative dimensions of 2m height by 8.5m diameter, capable of storing approximately 100,000L; and

» The tank is contained within a dedicated bund with no other flammable or combustible material stored within this bund.

Separation Distances

Separation distances for above ground tanks storing flammable or combustible material are specified in Section 5.7 of AS 1940. AS 1940 Clause 5.7.2 indicates that separation distances to security fences and on-site protected places are specified in AS 1940 Table 5.3.

» Separation distance to on-site protected places > 7.5m; and

» Separation distance to security fences > 7.5m.

AS 1940 Clause 5.7.2 indicates that separation distances to protected places beyond the site boundary are specified in AS 1940 Table 5.4 as:

» Separation distances to protected places beyond the site boundary > 7.5m.

Bunding Requirements

The bunding requirement for above ground tanks storing flammable or combustible material specified in Section 5.8 of AS 1940. AS 1940 Clause 5.8.1 states:

» Provision shall be made to contain any leakage or spillage from the tank storage facility and to prevent it from contaminating the surrounding soil or entering any watercourse or water drainage system.

The required capacity of the bund is specified by AS 1940 Clause 5.8.2 as:

» The net capacity of the bund shall be the volume of the largest tank plus the output of any firewater over a 20 minute period (in this case this equates to approximately 100,600L).

Fire Protection Requirements

The required fire protection for this storage scenario is defined in AS 1940 Clause 11.12.4 which specifies that class C1 liquids require:

» A hose reel and foam making equipment capable of supplying 27L/min of foam solution at a minimum pressure of 220 kPa for 30 min; and

- Two powder type fire extinguishers compliant with AS/NZS 1841.5.

Transit storage scenario

AS 1940 Clause 1.4.70 defines transit storage as 'the storage of flammable or combustible liquids for at least 12 hours and less than 5 days, where such liquids are intended for further transport to another location.'

AS 1940 Clause 3.9.2 specifies that 'areas used for transit storage of flammable or combustible liquids shall be deemed to be separate areas if apart from each other and from any other storage areas, building or amenities by at least 15m.'

AS 1940 Clause 3.9.3 states:

- The aggregate quantity of flammable and combustible liquids held in each transit storage area shall not exceed 200 tonnes (which equates to approximately 220,000L[16]);
- Freight or tank containers containing flammable or combustible liquids in a transit storage area shall not be stacked more than two containers high and two containers deep; and
- Where stacked two containers deep, be provided with access for inspection to both sides of each stack (minimum inspection width approximately 800mm).

Separation Distances

AS 1940 Clause 3.9.4 specifies transit storage areas shall be separated from protected places, on-site protected places and public streets by the distances given in AS 1940 Table 4.1 and shall be separated from site boundaries by the distances given in AS 1940 Table 4.2. Separation distances shall be measured from the edge of the transit storage area and be of the following minimum distances:

- Separation distance to accumulations of combustible material (i.e. timber, plastics etc.) > 5m;
- Separation distance to protected places, on-site protected places and public streets > 17m; and
- Separation distance to site boundaries > 3m.

Bunding Requirements

AS 1940 Clause 3.9.3 specifies that each transit storage area shall be provided with spillage catchment facilities with a volume at least 100% the capacity of the largest tank or freight container. However, in order to facilitate the management of emergencies it is recommended that the catchment facilities be 10% greater than the capacity specified above. Hence, the catchment facilities should be 110% of the capacity of the largest tank.

[16] Material with a specific gravity of 0.9.

Fire Protection Requirements

AS 1940 Clause 11.8.6 states that fire protection requirements for transit storage areas are as per the requirements of AS 1940 Table 11.3 and specifies that for transit storage areas storing between 10m^3 and 100m^3 of flammable liquid (which equates to between 10,000L and 100,000L) are required to have:

- Four powder-type extinguishers compliant with AS/NZS 1841.5;
- Two foam-type extinguishers compliant with AS/NZS 1841.4; and
- A hose reel and foam making equipment capable of supplying 27L/min of foam solution at a minimum pressure of 220 kPa for 30 minutes and capable of reaching all parts of the storage areas.

8. Management of other environmental issues

8.1 Overview

The preceding chapter addresses the key potential environmental impacts associated with the PIT. In addition to the key potential impacts, there are a range of other issues that have been considered in order to develop an appropriate environmental management framework for the construction and operation of the PIT.

These issues include:

» Management of non-Indigenous heritage resources;

» Management of Indigenous heritage resources;

» Flora, fauna and bushfire;

» Management of soils;

» Visibility of the PIT and the potential for visual impacts;

» Climate;

» Air quality;

» Socio-economic impacts; and

» Waste management.

This chapter considers the nature of the above issues and describes the management initiatives proposed to ensure the potential for environmental impacts is minimised during construction and operation. The proposed management measures form the basis for the draft Statement of Commitments (refer to Chapter 9).

8.2 Non-Indigenous heritage

B cubed sustainability (BCS) undertook a non-Indigenous Heritage Assessment for the PIT in November 2005. A full copy of the report is included in Appendix F.

8.2.1 Impact assessment

The key features on the site are the remains of a late Nineteenth Century farm complex, comprising the original farmhouse of Pisè (rammed earth) construction, numerous timber outbuildings and another farmhouse, severely damaged by fire.

The PIT would result in the demolition of the farm complex.

None of these items discussed above are included on any statutory or non-statutory heritage registers. They have also been excluded from the current review of the Parkes Heritage Study which is being finalised by Parkes Shire Council.

Therefore, on the basis of information obtained during the site visit and subsequent research, it is concluded that whilst the non-Indigenous heritage items identified within the study area reflect the former use of the part of the site, they do not meet the criteria required to be considered as having heritage significance.

It is also noted, that whilst the study area is picturesque and is typical of the agricultural landscape in the Parkes Shire, it does not exhibit any particular or individual aspects to which heritage significance can be attributed.

Therefore, it is concluded that there would be minor non-Indigenous heritage impacts resulting from the PIT.

8.2.2 Recommended management measures

Despite there being no listed heritage items at the site, the following general mitigation measures would be implemented:

- A photographic record of the farm complex and its key components (farm house, ancillary buildings, landscape elements etc) would be taken before and during the proposed works (not required to be of archival standard). Copies of these recordings would be forwarded to the NSW Heritage office and to Parkes Shire Council; and
- That an exception notification be lodged with the NSW Heritage Office seeking exception under Section 139(4a) of the NSW Heritage Act, and that acceptance of that notification be received prior to the commencement of construction taking place. Consultation with the NSW Heritage office has concluded that the lodgement of this report as the supporting documentation for an Exception Notification under exception 139(4a) is acceptable.

8.3 Indigenous heritage

B cubed sustainability (BCS) undertook an Indigenous Heritage Assessment for the PIT in November 2005. A full copy of the report is included in Appendix F.

8.3.1 Impact assessment

During field work undertaken by John Robinson in 2002, eight scar trees were recorded within the local area. However, in applying the above criteria, it was determined that only two of these trees qualified. A further one tree was identified during the 2004 survey undertaken by Jillian Comber. The location of the trees however, is not within the study area for the PIT.

A review of the Aboriginal Heritage Information Management System (AHIMS) administered by the NPWS Division of DEC also indicated that there are no Aboriginal objects or Aboriginal places recorded in or near the study area.

On the basis of previous studies and fieldwork undertaken as part of this report, there are no Indigenous archaeological sites within the study area. The Peak Hill Local Aboriginal Land Council (LALC) did not raise any concerns regarding the subject site.

Therefore the PIT would not impact on any Aboriginal objects or Aboriginal places. Consequently, no action is required with regard to the NPW Act.

8.3.2 Recommended management measures

Despite there being no Indigenous heritage impacts on the study area, the following is recommended:

- Should any Indigenous artefacts be unearthed during construction, works within the immediate vicinity of the find would temporarily cease and move to another area of the site (allowing for a curtilage of at least 50 metres), and DEC would be contacted, and permission sought from the relevant Aboriginal organisations to collect the items.

8.4 Flora, fauna and bushfire

An Ecological and Bushfire Assessment was undertaken by GHD in December 2005. A summary of the findings are discussed below. A full copy of the report has been provided in Appendix G. The impact assessment has been based on the proposal at its Ultimate Stage as this would provide for a worse case assessment.

8.4.1 Impact assessment

8.4.2 Flora

The only vegetated areas at the site occurred in the north western corner and the small parcel of land in the north east. The small parcel of land in the north east of the site (Lot 98 & 99 DP 750179) supported White Box with a highly disturbed understorey and very little ground cover. The majority of the soil across the remainder of the site has been sown with crops and therefore does not contain any native groundcover. However, native trees such as White Cypress are scattered across these areas. A row of Yellow Box occurs along the western boundary and Yellow Box and White Box trees were scattered throughout the disturbed and sown areas.

Endangered ecological communities

The north western corner of the site supported a remnant of open woodland vegetation characteristic of the endangered ecological community White Box Yellow Box Blakely's Red Gum Woodland. This community is listed under the NSW TSC Act. The community is also potentially characteristic of a disturbed remnant of the Commonwealth EPBC Act listed Grassy White Box Woodland. Although named differently under State and Commonwealth legislation, these communities have similar characteristics. White Box and Yellow Box were present at the site and are key diagnostic species for these communities. The understorey was largely absent and the ground cover appeared to support a mixture of native and exotic species. However, the drought conditions and heavy grazing made species identification difficult. This community would not be directly impacted by the proposal and indirect impacts would be mitigated. Therefore further consideration of this community was not deemed necessary.

Threatened flora

A number of threatened flora species have been recorded within the locality and are listed in Table 1 of the Ecological and Bushfire Assessment (Appendix G), together with their conservation status and an assessment of the likelihood of them occurring at the site. Given that the site was highly disturbed and in most areas the soil had been sown with crops, it is unlikely that any of these species would occur.

8.4.3 Fauna

The site supports limited habitat for fauna as the majority has been cleared of vegetation and only scattered tree cover remains. However, the woodland area on the north western part of the site is likely to provide potential nesting and foraging habitat for a variety of bird species. No habitat for ground-dwelling or arboreal mammals was recorded at the site as it does not support an understorey and the woodland area was sparse. However, the few hollow-bearing trees scattered across the site may provide habitat for some species of bats and birds. Two dams were present at the site and these have the potential to provide habitat for common frog species.

A small rocky area south of the woodland along the western boundary of the site may provide potential habitat for some reptiles such as skinks.

The site does not form part of any recognisable fauna corridors throughout the locality. The woodland in the north western part of the site is likely to provide some connectivity in the form of stepping-stones for mobile species such as bats and birds throughout the locality. No corridors would be isolated or fragmented as a consequence of the proposal.

Threatened fauna

A number of threatened fauna have been recorded within the locality (DEC 2005 & Birds Australia 2005, Figure 4 and Figure 5 in Appendix G) and some have the potential to occur at the site. The woodland in the north western corner may provide foraging habitat for a number of threatened birds including the Grey Falcon (*Falco hypoleucos*) which has been recorded north of the site along Condobolin Road (Birds Australia 2005). Table 2 in Appendix G lists those species recorded within a 20 km radius of the site, their conservation status and outlines the likelihood that they could occur at the site. Given that the woodland at the site would not be removed as part of the PIT and some areas of pasture would also remain, it is considered unlikely that the removal of a small number of scattered trees have a significant impact on any of these species.

Assessment of potential impacts for threatened species and endangered ecological communities has been undertaken for the following threatened species as these species have the potential to nest at the site due to the presence of a small number of mature and hollow-bearing trees and stags:

» Grey Falcon; and

» Superb Parrot.

In accordance with the DEC *Draft Guidelines for Threatened Species Assessment* (July 2005, the assessment of potential impacts of the PIT on threatened species are set out in Annex A of Appendix G. In line with the assessment of potential impacts under Part 3 of the EP&A Act, it is considered that the PIT would be unlikely to have a significant impact on this species.

Assessment under the EPBC Act

The Superb Parrot is listed as vulnerable under the EPBC Act. However, in line with the findings of the assessment of potential impacts under Part 3A of the EP&A Act, it is considered that the PIT would be unlikely to have a significant impact on this species. Therefore, a Referral to the Department of Environment and Heritage (DEH) is not required, as the PIT is unlikely to constitute a controlled action.

8.4.4 Bushfire assessment

As discussed in Section 3.5, the PIT does not require referral to the NSW Rural Fire Service under the EP&A Act or the Rural Fires Act as neither residential nor rural residential development are proposed for the study area.

Vegetation groups are classified in accordance with the likely flammability of each vegetation type and are based on factors such as likely fuel loads, vegetation composition and presence of sclerophyllous species. Vegetation communities are assigned to three categories with Group 1 presenting the greatest fire hazard and Group 3 the least. Two vegetation classes were present at the site, Open Woodland (Group 3) and Grassland (Pasture) (Group 3).

Vegetation types (eg. woodland or forest) present different levels of fire hazard. The level of fire hazard also varies with slope and aspect. Slope and aspect are unlikely to significantly affect fire behaviour at the site due to the vegetation type.

The slope of the site was generally flat and was less than 5°. Given the vegetation classes at the site the slope is not considered a major factor influencing fire behaviour.

Asset Protection Zones act as a buffer between the development and the hazard and are the principal protection mechanism. APZs reduce the vulnerability to fires through construction and maintenance of asset protection areas (PlanningNSW 2001).

Road and fire trails may form part of the APZ and therefore reduce the need for further vegetation clearance. A fire trail would provide:

» Easier access for firefighters allowing more efficient use of fire fighting resources;

» A safe retreat for fire fighters; and

» A clear control line from which to conduct back-burning operations if necessary.

8.4.5 Recommended management measures

Flora and fauna

In order to prevent and mitigate potential indirect impacts of the PIT on the endangered ecological community and potential habitat for flora and fauna at the site the following management measures would be implemented:

» Clear definition of development area boundary to prevent construction works breaching the site boundaries and potentially impacting adjacent vegetation;

» Installation of sediment detention basins, or similar, to prevent untreated runoff entering adjacent areas;

- Placement of stockpiles away from the woodland at the site;
- Placement of soil that may contain seeds of exotic species away from the woodland where they could be spread during wind or rainfall events;
- Where possible avoid the removal of mature and hollow-bearing trees at the site;
- Removal of stock from the remaining woodland at the site to allow natural regeneration; and
- Initial and continual treatment of weeds within the woodland and potential rehabilitation.

Bushfire

Although the PIT is not required to comply with *Planning for Bushfire Protection (PBP)* (Planning NSW), 2001, it is recommended that the principles of this document be applied to the PIT where appropriate in order to reduce the threat at the site and on adjacent lands and property.

Asset Protection Zones

- Based on the vegetation class present at the site an Asset Protection Zone of 20 m is recommended. Road and fire trails may form part of the APZ and therefore reduce the need for further vegetation clearance.
- A fire trail would be incorporated into the APZ and would include the following attributes:
  - located within a minimum 6 m wide reserve (4 m wide trail and 1 m wide cleared area each side of the trail);
  - constructed in accordance with design criteria outlined in Section 5.2.2 of PBP;
  - be trafficable by firefighting vehicles under all weather conditions;
  - appropriate drainage and erosion controls;
  - not traverse any wetlands or other land potentially subject to periodic inundation;
  - should link to Brolgan Road;
  - be maintained in a serviceable and accessible condition at all times; and
  - have passing bays at regular intervals of 200 m.
- Any vegetation within the APZ, which in this case is likely to be grasses, would be managed through regular mowing.

Site Access

- Access to the site would be established and maintained and include a perimeter fire trail. This is a managed fire trail surrounding the buildings and incorporated within the 20 m APZ measured from the edge of the building. If Brolgan Road is within 20 m of a building and meets the bushfire standards, then construction of a perimeter access trail on this side of the building is not required.
- This would include the following attributes:

- a minimum trafficable width of 4 m with an additional 1m wide strip on each side of the road kept clear of bushes and long grass;
  - the road should have a passing bay about every 200 m where possible, which should be 20 m long by 3 m wide, making a minimum trafficable width of 7 m at the passing bay;
  - the capacity of the road should be sufficient to carry fully loaded firefighting vehicles (approximately 28 tonnes or 9 tonnes per axle);
  - a minimum vertical clearance of 6 m to any overhanging obstructions, including tree branches;
  - curves should have a minimum inner radius of 6 m and be minimal in number to allow for rapid access and escape;
  - the minimum distance between inner and outer curves should be 6 m;
  - roads would provide sufficient width to allow firefighting vehicle crews to work with firefighting equipment around the vehicle.
- If possible two access roads to the site are recommended along paths that are unlikely to be cut simultaneously by fire and therefore ensure there is at least one safe evacuation point.

Water supply

- Appropriate watering points would be provided along the perimeter trail from a series of fire hydrants. These hydrants would meet the requirements of Australian Standard 2419–*Fire Hydrant Installation* and be delivered by a ring main system.

8.5 Soils

This section of the report identifies the subsurface ground conditions of the site referencing preliminary studies undertaken by Parkes Shire Council for the Parkes Transport Hub Local Environmental Study (September 2003), and more recent assessments undertaken by GHD for Terminals Australia. The more recent assessment was undertaken to better understand the soil properties and the engineering requirements due to subsurface materials.

The study area for the recent assessment was chosen due to its intended use as a borrow pit and on-site detention dam for the proposed development. This assessment involved additional test pits and boreholes at the proposed location in the southeast corner of Lot 200 DP 627302.

8.5.1 Impact assessment

The findings from the LES geotechnical investigations stated that the site 'has few soil landscape limitations to industrial land use'[17] with the limitations identified as expansive soils and dispersive soil. For expansive soils however, the findings suggest that there need not be any restrictions on buildings or roads for an industrial development with the

[17] Preliminary Geotechnical Investigation of Parkes Transport Hub Development – Envirowest Consulting Pty Ltd (August 2003).

occurrence of expansive soils indicating the soils have high shrink-swell potential. The findings suggest that to mitigate this for an industrial development, the footings of buildings would require additional stabilisation. For dispersive soil, the findings suggest that earthworks would require erosion control plans to prevent off-site movement of soil, which is a common erosion mitigation requirement during construction.

The recent samples were tested in the laboratory for liquid limit and linear shrinkage testing and soaked California Bearing Ratio (CBR) tests. Table 8.1 below presents a summary of the findings.

Table 8.1 Geotechnical assessment: laboratory test results

Test Method	Range
Liquid Limit	33.5% - 60.5%
Plasticity Limit	12.5% - 22%
Plasticity Index	21% - 45%
Maximum Dry Density	1,530 – 1,880 kg/m^3
Optimum Moisture Content (OMC)	14.6% - 25.5%
4-day soaked California Bearing Ratio (CBR)	4% - 12%

The clay soils in the upper 3.0m are generally moderately reactive clays and gravely clays in a moist and stiff condition. Below 3.0m, the clays and gravely clays are considered more reactive and less stable under adverse moisture conditions due to increased liquid limit, plastic limit, optimum moisture content, and reduced maximum dry density and 4-day soaked CBR.

8.5.2 Recommended management measures

It is recommended, that more extensive geotechnical investigations be undertaken at the exact location of the proposed infrastructure during the detail design phase.

8.6 Visual amenity

Assessment of visual impacts is made according to the two stages of development: Initial Stage and Ultimate Stage. The concept design for the proposed facility has attempted to minimise visual impact by the following features:

- Positioning of the development site between hills to the north, east and south-east and the ridgeline running north-east/south west;
- Location of the container storage to the north and warehousing to the south to enable the ridgeline and warehouses to filter views of the terminal and loading areas;
- Planting along the eastern, north and western end of the proposed terminals;

- The proposed external lighting has been designed to limit obtrusive light onto abutting properties in accordance with AS4282 – Control of the Obtrusive Effects of Outdoor Lighting;
- Artificial sky glow from external lighting would be minimised by utilising environmentally friendly cut-off floodlights that limit the upward light and provide good glare control;
- The occupants of the dwelling at the south-west of the site would be relocated and the existing dwelling made redundant.

Artists' impressions of the proposed terminal are shown from Figure 6-3 to Figure 6-7.

8.6.1 Impact assessment

Potential visual issues are considered in Table 8.2.

Table 8.2 Potential visual impacts

Potential Visual Receiver	Number of viewers	Comment
Initial Stage		
Brolgan Road	Moderate	Brolgan Road runs the length of the southern edge of the site. This positioning affords the most notable view lines into the site. The terminal storage would run parallel to Brolgan Road with the administration building defining its length. Potential views of the PIT to the east and west along Brolgan Road would be limited by the distance from the site and the crest of the hill south-east of the site.
Condobolin Road	Low-moderate	The plantation of trees along the eastern boundary of the site would filter the terminal container storage development from Condobolin Road.
Parkes-Narromine rail line	Moderate	The development rests in close proximity to the Parkes-Narromine rail line. However, its prominence would be mitigated by the proposed plantings along the eastern boundary of the site. The hill to the south would also obstruct views of the development when travelling north from Parkes.
Sydney–Adelaide–Perth rail line	Moderate	The Sydney-Adelaide-Perth line runs along the length of the PIT approximately 500 metres to the south of the site at its nearest point. The distance between the rail line and the PIT would also limit view lines into the site.
Residential dwelling to east	Low	The dwelling is in close proximity to the proposed eastern edge of the terminal and the existing Parkes-Narromine rail line. Proposed plantings would filter the development, however, the prominence of the

Potential Visual Receiver	Number of viewers	Comment
		development would still be apparent due to movement, proximity and nature of the development (as indicated in Figure 8-2).
Residential dwelling to south	Low	Views to Brolgan Road in the north and proposed railway line to the east and south would be unimpaired. To the north-east the proposed development would be filtered by proposed plantings along the rail line and western end of the siding (as indicated in Figure 8-3). This residence would be relocated during the operation of the PIT.
Night time viewer	High	The lighting for the terminal would contribute to night glare and increased prominence of the site at night. However, the specification of lights is intended to reduce the visual impact of the terminal at night.
Ultimate Stage		
Brolgan Road	Moderate	As for Initial Stage. Visual impact of the terminal and container storage would be filtered at the Ultimate Stage by the placement of warehouses along Brolgan Road and the tree plantings along the property boundary and along the length of the southern terminal (as indicated in Figure 8-1).
Condobolin Road	Low-moderate	As for Initial Stage.
Parkes-Narromine rail line	Moderate	As for Initial Stage.
Sydney–Adelaide–Perth rail line	Moderate	The terminals, sidings and container storage would be filtered by the positioning of the warehousing along Brolgan Road and the proposed plantings across the boundary and along the length of the terminal.
Residential dwelling to east	Low	As for Initial Stage.
Residential dwelling to south	Low	As for Initial Stage.
Night time viewer	High	The lighting for the terminal would contribute to night glare and increased prominence of the site at night. However, the specification of lights is intended to reduce the visual impact of the terminal at night (as indicated in Figure 8-4).

Figure 8-1: Artist's Impression of the View From Brolgan Road (Looking West)

Environmental Assessment - Parkes Intermodal Terminal

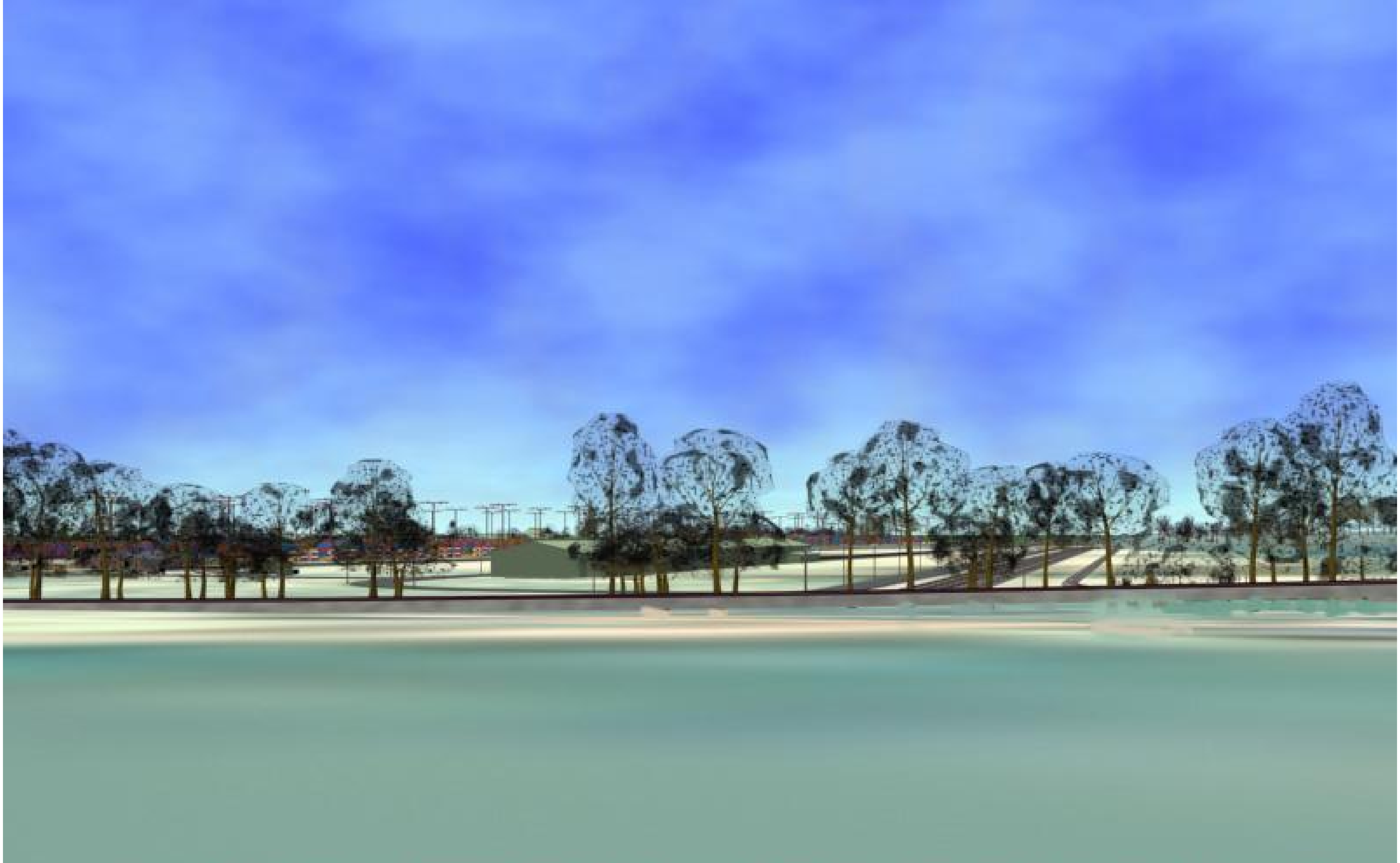


Figure 8-2: Artist's Impression of the View From The Eastern Residential Dwelling (Looking West)

Environmental Assessment - Parkes Intermodal Terminal

Figure 8-3: Artist's Impression of the View From Brolgan Road (Looking East)

Environmental Assessment - Parkes Intermodal Terminal

Figure 8-4: Artist's Impression of Night Time View

Environmental Assessment - Parkes Intermodal Terminal

8.6.2 Recommended management measures

It is recommended that the following management measures be implemented to reduce the potential for visual impacts:

- Retention of existing vegetation outside the areas required to be cleared for the development;
- Plantation proposed to screen the visual impact of the development from the inception of construction if possible;
- Appropriate choice of building materials and treatments including:
  - Minimal use of reflective elements, and use of textual cladding where practicable; and
  - Use of green/brown colour tones on the buildings (including the upper portion of built elements) to minimise the contrast with surrounding bushland.

8.7 Climate

8.7.1 Impact assessment

Construction

A potentially major cause of disruption during construction is rain. More intense rain events may lead to localised flooding and erosion, while extended construction delays may result from persistent but less intense rainfall.

Construction activities, particularly those involving earthmoving, would require close attention to dust management during periods of hot dry conditions and high winds as dust generation could potentially cause temporary stoppage of construction.

When undertaking landscaping and revegetation works, consideration needs to be given to general climatic conditions of the season. Species endemic to the Parkes Region would be more tolerant of weather conditions within the study area. Watering and general care of species needs to be adaptable to local weather conditions.

Operation

Heavy rainfall events can cause runoff and pooling of water. This can be overcome substantially in the drainage design of the site. Heavy rainfall events may also result in reduced driver visibility around entry and exit points to the site.

Being located in a rural area, bushfires are a potential risk to any development. A Bushfire Risk Assessment was undertaken for the PIT, which outlines a number of fire management measures (see Section 8.4.5).

8.7.2 Recommended management measures

The following mitigation measures are proposed to minimise any potential adverse impacts:

- Landscaping works would be undertaken when plant growth conditions are most suitable for the species selected for planting; and
- Lighting and clear, visible line-marking and signposting would be incorporated in the detailed design of exit and entry points to the site.

8.8 Air quality

8.8.1 Impact assessment

The construction and operation of the PIT would involve a number of activities which have the potential to impact on air quality. These are detailed below.

8.8.2 Construction Phase

Construction of the facility would involve some earthworks and result in dust generating activities. Dust generated by these activities has the potential to impact on nearby sensitive receptors.

Initial Stage

The construction phase of the project for the Initial Stage is expected to occur in stages over a 5-year period.

The potential sources of dust generation from the construction of the facility have been identified and classified into various operations / activities as follows:

- Earthworks would involve the stripping of vegetation and topsoil, foundation excavation, backfilling and road construction. Typical equipment to be used would include a bulldozer, grader, dump truck, excavator, water cart.
- Traffic movement on construction site would be a continuous dust source throughout the construction process.
- Any disturbed (unvegetated / unsealed) areas of the site, including temporary roads can also result in dust impacts due to wind erosion.

A number of control measures are proposed which would assist in greatly reducing dust impacts. These include dust suppression techniques (watering of exposed areas and trafficked areas) and undertaking works during favourable weather conditions (i.e. works would cease during high wind speeds or unfavourable wind directions). Furthermore, the low, local population density and location of the receptors would also ensure that the extent of impacts on sensitive receptors can be minimised.

Ultimate Stage

It is unknown how long construction activities for the Ultimate Stage would continue for, as further development would be driven by market forces. However, it can be assumed that any earthworks required as part of construction activities would have the same potential impacts as the Initial Stage and should be mitigated as appropriate. Construction of subsequent stages would be subject to separate environmental assessment.

8.8.3 Operational Phase

The impact assessment for the operational phase of the PIT has been based on an assessment of the proposed Ultimate Stage operations as this provides a worst case assessment. Impacts for the PIT's operation during the Initial Stage would be considerably less due to limited activities being undertaken on site.

Ultimate Stage

Emissions from the operational phase of the development are more varied. The facility is generally designed for the handling of non-bulk freight. This type of freight is considered to have minimal contribution to air quality impacts when compared to the potential for impacts from bulk freight (eg. coal, sand and grain in its natural state and which is not packaged). The storage and handling of bulk freight is not proposed for the PIT facility at this stage. Therefore, emissions from the freight itself are assumed to be negligible with the exception of fuel, which is identified below.

The activities associated with operation of the proposed development, which might impact on the air quality are discussed below:

- » Use of trains for movement of freight

  The Newell Highway (which passes through Parkes) currently carries over 5000 vehicles per day of which a substantial proportion are trucks (for freight). Areas west of Parkes are also large generators of freight and are rapidly adopting road-trains as the preferred freight vehicle. Typically trains result in more efficient fuel use than road vehicles. Rail freight uses about a third of the fuel required by road transport per tonne of freight hauled. Fuel / energy use is directly related to volumes of air emissions (and the emissions of parameters such as ozone, Nox, PM_{10} etc.). Hence on a regional basis, it could be assumed that for the transport of goods by rail as opposed to road, with more efficient fuel use, the net emissions to air would be reduced.

- » Emissions from trains.

  Typically goods trains (as relevant here) rely on a diesel engine and an alternator or generator to produce the electricity required to power its traction motors and produce some emissions. Again it is noted that the improved fuel efficiency of trains (as compared to road vehicles) is likely to result in a net positive regional impact on air quality although there may be some minor local impacts.

- » An increase in local vehicle emissions (at the terminal) associated with staff vehicles and vehicle loading / unloading (including trucks / road trains).

  While on a regional level, there would be an improvement in fuel efficiencies and hence air emissions, at a local level, (i.e. around the PIT itself) there would be an increase in vehicle numbers which is likely to result in a minor impact on air quality.

- Emissions from fuel storage and distribution facility.

  Fuel storage and distribution would be undertaken in specially designed containers which are either transhipped directly to road vehicle or to a hardstand area for storage. The fuel would remain in each container and be delivered to clients off site. The site would also be used to store full or empty containers before they are removed from site. In general, fuel would not be transferred between vessels (except for vehicle refuelling) and would only be transported in the enclosed containers. Hence emissions from these containers at the site are considered to be minimal.

  There would also be two above ground diesel storage containers on site. One would refuel trains and the other the various plant (forklifts etc) on site. The refuelling of vehicles with today's technology is generally an easy operation with the "*possible emissions from refuelling facilities considered negligible or none at all*" (National Pollutant Inventory, "Emission Estimation Techniques Manual for Railway Yard Operations", July 1999).

- Emissions from maintenance activities.

  Maintenance activities could include spray painting and general heavy engineering/ rollingstock maintenance. These activities would be undertaken in buildings equipped with the appropriate air quality control equipment (particularly for spray painting or fume generating works). Hence emissions from this source should be minimal.

The potential increase in emissions is likely to be minor and localised. Given the existing good air quality of the area, it is considered that a small increase in emissions is unlikely to have a significant impact.

8.8.4 Recommended management measures

Construction

A number of control measures are proposed to minimise dust emissions during construction. The effectiveness of any mitigation measures would rely on proactive management by site staff and it is the responsibility of the site manager to ensure the measures are appropriately implemented. An outline of the mitigation measures are provided as follows:

- An Air Quality Management Plan would be prepared for the construction phase of the PIT, and would be included as part of the CEMP. Any monitoring would comply with DEC guidelines for the Sampling and Analysis for Air Pollutants in NSW. Any conditions of licences or approvals, in relation to the maximum air pollutant levels, would be complied with;
- Extensive watering of disturbed and unsealed areas, particularly working and stockpile areas and when construction plant and equipment are observed to generate surface dust;
- Materials transported to and from the site would be appropriately covered to reduce dust generation in transit;

- Mud and other debris would be removed from the wheels and bodies of haulage equipment on leaving the site and before entering public roads or sealed pavements;
- No vegetation, timber or other combustible materials would be burned;
- Any stockpiles or material stores would be kept damp and/ or covered and screened by dust screens where appropriate;
- Reformed surfaces would be revegetated as soon as possible to minimise dust generation and topsoil dispersion;
- Undertaking excavation works during periods where meteorological conditions (wind, temperature) are likely to reduce potential off site air quality impacts. For example earthworks would not be undertaken during high wind speeds (>20 km/h) and directly towards any residents;
- Use of dust suppressant chemicals, if required (eg if clouds of dust are still observed from trafficked areas;
- Work activities would be reprogrammed if the mitigation measures are not adequately restricting dust generation;
- All construction plant and machinery would be fitted with emission control devices complying with Australian Design Standards;
- Plant and machinery would be turned off when not in use; and
- Local residents would be advised of hours of operation and duration of works and supplied with a contact name and number for queries regarding air quality.

Operation

This development can mitigate its greenhouse gas emissions by offsetting them. Greenhouse offsets from this site could include purchasing accredited *GreenPower* from the electricity provider. The percentage purchased ensures investment in renewable energy sources to source that percentage to feed back into the grid. This would be investigated by Terminals Australia.

In addition, the following mitigation measures would be implemented and were assumed in the assessment of impacts:

- Tree planting would be undertaken on the site, hence reducing CO2 levels in the atmosphere;
- Terminals Australia would promote government initiatives such as the Alternative Fuels Conversion Programme, that are designed to assist operators and manufacturers of heavy commercial vehicles to convert to Natural Gas or Liquefied Petroleum Gas (LPG);
- All plant and machinery (including maintenance equipment such as spray booths) would be fitted with emission control devices complying with Australian Design Standards;
- Plant, machinery and vehicles would be turned off when not in use;
- Only non- bulk freight would be received and stored at the site; and

- Fuel would be transferred in enclosed containers only and fitted with appropriate emission control devices.

8.9 Socio-economic

8.9.1 Impact assessment

The PIT has the potential to give rise to both positive and negative socio-economic impacts.

Potential positive impacts include:

- Generation of approximately 600 jobs during the construction phase/s of the project;
- Stimulation of the economy through the flow-on effect of investment related to construction activities and ongoing operation of the terminal;
- Generation of at least 600 full time jobs at the Ultimate Stage of the development; and
- Ongoing economic flow-on effects related to business travel, services and supplies.

Potential negative impacts would generally be related to traffic generation and environmental amenity.

Population Structure

The population of the Parkes LGA has remained steady over the last census periods, and is expected to remain so for the next 20 years. The existing workforce is diversifying and possesses a wide range of skills and expertise. The PIT would assist in encouraging population growth and enhancing community structure by providing employment opportunities for the local and regional workforce both in the short and long term. This would also be enhanced by stimulation of the local economy as a result of flow on economic effects for local trade, business and services.

The PIT may require expertise from outside the Parkes LGA, hence introducing a temporary workforce population to the area. The strategic location of the site also indicates that a variety of workers from other regions would be accessing the site during the operational phase (such as truck drivers). This would have the effect of a population influx of temporary workers at various times during construction and operation.

Amenity

There is potential for the proposed development to negatively impact on the amenity of the local area through increases in noise and visual prominence. Section 7.2 provides a detailed assessment of the likely impacts related to noise amenity. Impact on the visual environment have been considered in Section 8.6.

The proposed development would have minimal impact given that it is located in an agricultural area and is not located in close proximity to sensitive receivers.

Although the detailed assessments indicate that significant impacts on the local and regional amenity are unlikely, mitigation measures have been recommended to minimise the potential for negative perceptions

Access

The PIT is anticipated to generate both road and rail traffic in and around Parkes. The existing arterial roads servicing the site would be used in the short to medium term and a ring road system developed in the future as the need arises. Section 7.1 provides a detailed assessment of the likely impacts related to traffic. It is recognised that there would be no public transport access for employees working at the proposed facility. However this is the case for many remote workplaces.

Community facilities and recreation areas

As the PIT would provide employment opportunities for people in both the long and short term, there is some potential for an increase in the demand for human services and community facilities that are usually funded by the various levels of government. Although the existing workforce possesses the skills to fill many of the positions required by the PIT, it is probable that there would be a marginal population increase from people attracted by the growth in the economy. This increase is not considered to be sufficient to increase the burden on existing services or facilities to the point where significant additional investment in social infrastructure is required. No specific safeguards have therefore been proposed.

There are no recreation facilities that have been identified as being directly impacted by the PIT. However, the influx of temporary workers may have a positive impact on the provision of leisure and accommodation facilities in the area.

Public health and safety

Potential land use safety risks are considered in Section 7.4. The potential health risks to the public associated with the operation of the PIT are minimal as the general public would not have access to the facility. Implementation of correct operating and control procedures would minimise the potential health risks to site workers, who are members of the wider community.

Economics and employment

The existing use of the site for agistment acts as a relatively minor contributor to the local agriculture industry. Local farmers using the site would be required to find an alternative site for agistment as a result of the PIT.

The PIT would create employment opportunities for the population of Parkes and nearby communities during construction and in the operation of the PIT. It is anticipated that the construction works would generate approximately 600 new jobs for the existing community and bring skilled workers into the area. The influx of skilled persons into the region may also serve to transfer certain specialist skills into the local workforce and have positive long term impacts on the local skills base.

The purchase of goods and services associated with the presence of construction activities and staff would stimulate local businesses such as local accommodation and food facilities, while multiplier and flow on effects would generate additional employment on both a local and regional scale. By developing the PIT, other businesses may be encouraged to establish in Parkes thereby further increasing job opportunities as well as increasing services and amenities within the community.

Parkes Shire Council states in the rezoning application for the site that any new employment generating development located at Parkes would positively contribute to retaining a healthy cross section of people in the region, including younger people.

Employment opportunities within the local area during the construction of the facility would include:

- Construction machinery operators;
- Truck drivers;
- Site foremen and labourers;
- Crane operators;
- Building erectors;
- Concreters;
- Electrical and mechanical tradesmen and assistants; and
- Operational staff.

Employment opportunities within the local area during operation of the facility would include:

- Supervisory staff;
- Machinery and forklift operators;
- Gantry crane operators;
- Truck drivers;
- Electrical and mechanical tradesmen and assistants;
- Staff to refuel and perform mechanical repairs;
- Warehouse staff; and
- Administrative and office workers.

8.9.2 Recommended management measures

Specific mitigation measures to minimise potential impacts on the local community associated with land use, traffic and access, visual and noise are detailed in the relevant sections of this report.

A consultation and communication plan would be developed covering the local residents and wider community to ensure employment opportunities for the local community are maximised and to detail activities to be implemented in the lead up to, and during implementation of the PIT.

Consultation tools used would include:

- Ongoing liaison with the community, Council and local businesses;
- A community hotline to enable response to questions, complaints etc;

» Regular meetings with key stakeholders and the community in Parkes. This should include discussions with local businesses regarding economic and employment opportunities;

» Project newsletter/information sheets distributed to surrounding landowners, businesses and residents; and

» A project information signboard erected in the vicinity of the site providing regular updates on the progress of the PIT and appropriate contact details etc.

8.10 Waste minimisation and management

A Sustainability Report was prepared by GHD in November 2004 and outlines ways to address waste minimisation and management associated with the construction and operation of the proposal. A full copy of the report is included in Appendix H.

As with any infrastructure and development project, the proposal has the potential to generate a number of different types of waste, which would require appropriate management and disposal in accordance with relevant state legislation and government policies.

Waste management in NSW is prioritised according to the principles of a resource management hierarchy, giving consideration to the principles of Ecologically Sustainable Development (ESD). The principles embodied in the Waste Avoidance and Resource Recovery Act 2001 (WARR Act) are as follows:

Priority	Strategy	Action
1	Avoidance as top priority	Action to reduce waste generated by industry & government
2	Resource Recovery	Reuse, reprocessing, recycling and energy recovery
3	Disposal as last resort	Environmentally responsible management of disposal

8.10.1 Impact assessment

The assessment of impacts with regards to waste covers the construction and operation phases of the Initial Stage of the proposal.

Although the details for the Ultimate Stage have not been finalised, construction impacts and wastes generated are expected to be similar to the Initial Stage. Waste impacts would need to be addressed as part of the environmental assessments for the subsequent developments on site.

Construction

The location of the PIT is a greenfield site that will require substantial excavation works. The development is also likely to generate high quantities of concrete and metals such as steel. These materials are highly reusable and recyclable and implementation of "best practice" would mitigate impacts. The following is a list of waste likely to be generated as a result of the PIT:

- Construction waste including excavation materials such as rock and topsoil;
- Cleared vegetation and landscaping materials;
- Surplus materials used during site establishment such as safety fencing and barriers which may include plastics and metals, ballast sleepers, rail tracks and other construction materials;
- Wastewater including site run-off and water used to control dust;
- Domestic waste including food scraps, aluminium cans, glass bottles, plastic and paper containers and putrescible waste generated by site construction personnel;
- Ablution waste including waste from toilets and basins; and
- Waste oil and fuels.

To determine waste management options, waste would be classified according to the DEC's *Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (*1999) into the following categories.

- Inert – including virgin excavated material, vegetation, building and demolition waste, and asphalt;
- Solid – such as food waste and litter;
- Industrial – such as asbestos;
- Hazardous – such as flammable liquids; and
- Liquid – such as sewage.

The majority of waste is expected to be construction waste, which is likely to be classified as inert. Waste that could not be reused or recycled would be disposed of to locations that could legally accept those materials for storage or disposal.

Operation

Waste generated during operation of the PIT (at the Initial Stage and Ultimate Stage) would be expected to include:

- Paper / cardboard;
- Food organics;
- Oil;
- Batteries;
- Packaging waste including plastic strapping;
- Containers (aluminium cans, plastic bottles, glass, cartridges);
- Metal; and
- Wood products and off-cuts including timber pallets and sawdust.

Waste such as ballast, sleepers and tracks would also be generated during track maintenance activities.

8.10.2 Recommended management measures

Construction waste

Initial Stage

Currently, Parkes does not have a waste management facility to recover and recycle waste, therefore it is important to avoid creating waste through design and to ensure the buildings are constructed to allow for future disassembly. The design of the facilities would incorporate the following principles:

- Minimise cut and fill. If this cannot be avoided, reuse excavated material onsite;
- Include waste management clauses in contracts to ensure contractors are aware of the waste management targets and objectives of the development and their obligations;
- If possible, design for standard sizes, this avoids unnecessary offcuts and waste generation;
- Use pre-fabricated components. Usually, pre-fabricated components are delivered to site where they are assembled, saving money and reducing onsite waste;
- Specify for materials that are easily reusable and recyclable, avoiding potential future waste;
- Design for disassembly to ensure the buildings are able to be easily taken apart, thus facilitating future resource recovery;
- Look at ways of using materials that have recycled content;
- Avoid specifying and ordering potentially harmful substances and materials; and
- Arrange supplier take-back for excess or damaged material and for excess packaging.

Ultimate Stage

The abovementioned best practice measures for the Initial Stage would also be applicable for the Ultimate Stage however, subsequent developments on the site would be subject to a separate environmental assessment to address these issues.

Operational waste

Although no current waste management facilities exist in Parkes, future recovery of waste should be facilitated through the design of the PIT to allow for storage room/ areas and manoeuvrability of waste containers such as bins or skips. It is also possible that waste may be transported in freight containers via rail from the site to other locations with proper waste recovery facilities. This makes the storage areas designed in the development important. Incorporating and implementing the following guidelines in the design and operation of the development would ensure maximum recovery of waste.

Initial Stage

- The type and the volumes of waste expected to be generated by the operation of the proposed development would be calculated during the detailed design phase to ensure adequate waste storage facilities are provided on site. This would include waste generated from the office, landscaped areas, refuelling facilities and warehousing and distribution activities;

» Waste storage areas would be required on site. These would have sufficient room to store the required containers to accommodate the estimated quantity of waste and recyclables generated and to allow for manoeuvrability;

» Waste storage areas would be undercover and drained to sewer;

» Terminals Australia needs to select appropriate waste handling equipment and the design has to allow adequate space for onsite separation, storage and manoeuvring of waste prior to collection and transport;

» Adequate space would be required for the storage of containers of at least three waste streams – recovered waste (for reuse or recycling), residual waste (for disposal or Alternative Waste Technology) and hazardous waste (wastes that are toxic, corrosive, flammable, explosive or reactive);

» A separate storage area would be designed for liquid wastes (oils etc) that would be bunded and drain to grease traps. Liquid wastes from grease traps must only be removed by a licensed contractor approved by the relevant water authority or NSW DEC;

» Adequate space for bulky items would be provided;

» A separate storage and collection area for hazardous/ special wastes would be provided;

» Waste storage areas and wash down areas would have smooth, impervious floors, be graded to a silt trap and connected to the sewer;

» Wastewater (from cleaning the waste storage areas and bins) would be prevented from entering the stormwater system;

» WorkCover NSW requirements for the storage of dangerous goods would be complied with;

» Detailed design would required provisions would be made to prevent waste water, liquids, solid waste and debris from entering stormwater drains;

» The waste storage areas would be developed so as to not compromise fire safety objectives by having adequate fire protection measures in accordance with Australian Standards;

» As the site would be used for goods receival and export, waste storage areas would be designed to be separated from the goods receiver dock, particularly if more than 10 m^3 of uncompacted recyclable materials and waste is likely to be generated per day. Compaction units would be used where appropriate;

» Design of the storage area would require appropriate security access measures to prevent entry to the waste storage areas, scavenging, vandalism and illegal dumping. Measures could include fences, lockable gates, natural barriers such as ditches and embankments and surveillance systems;

- Appropriate access would be provided for servicing and for the collection of waste by a private contractor where desirable and/or necessary;
- A proper transport route to the main or communal storage area would be provided; and
- If a private contractor were employed, access to the storage areas by collection trucks would implement measures for road design to have adequate strength, clearance and geometric design for truck movements on access driveways and internal roads.

Ultimate Stage

Although future developments of the site to its Ultimate Stage would be subject to separate environmental assessment, the abovementioned mitigation measures should also be considered for each development.