Chapter 7:

Impact on Traffic and Transportation

Impact on Traffic and Transportation

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7. IMPACT ON TRAFFIC AND TRANSPORTATION

This chapter is based on the specialist study prepared by Mr Roy Bowman of Stewart Scott International, Port Elizabeth (Bowman, 2006).

7.1 Introduction: Approach and Methodology

A spreadsheet-based model was developed to determine the number of passenger and heavy vehicles that would be added to existing traffic flows as a result of the proposed project. This enabled the effect of the project on the capacity of the existing and planned road network to be assessed. A conventional four-step process was used, namely trip generation (calculating the number of trips generated by the project), trip distribution (connecting each trip with an origin and destination), modal split (allocating each trip to a particular mode of transport or vehicle type) and trip assignment (assigning each vehicle trip to a particular route). The assessment focused on the morning peak hour traffic associated with the project (during construction and operations) and used the assumption that the afternoon peak hour is of approximately the same magnitude, but in the opposite direction. In order to assess impacts on traffic conditions, vehicle traffic flow was compared to the existing road and intersection capacity as determined by the Highway Capacity Manual (Transportation Research Board, 2000).

The cumulative traffic impact of Phase 1 (the construction of the container handling facilities for the existing two berths, for which a ROD has already been issued) and Phase 2 (the construction of an additional two berths and expansion of the container handling facilities and administrative craft basin) has been assessed in this study because the two phases overlap and because there has not previously been a traffic impact assessment of Phase 1 on its own. The reasoning is that if the total impact of Phases 1 and 2 together is acceptable, then the impact of Phase 2, which is the subject of the current EIA scoping, will be acceptable. This presents a **precautionary approach** to this assessment.

The assessment includes the potential impact that abnormally loaded vehicles may have on traffic conditions. An abnormal load is defined as a material object which, due to its dimensions and/or mass, cannot be transported on a vehicle or vehicles without exceeding the limitations of either dimension or mass contained in the National Road Traffic Regulations (Department of Transport, 1999).

The assessment of the impact on the road infrastructure focussed on heavy vehicles since private motor vehicles and light delivery vehicles have a negligible effect on road pavement life. The impact of the proposed development on the road structure was determined using the South African Mechanistic Design Method (Department of Transport, 1996).

7.2 Identification of sources of impact from the proposed project

An over-arching description of the proposed project is provided in Chapter 2. This section provides additional project information specific to the traffic and transportation impact assessment.

7.2.1 Construction

During the envisaged 18 month construction period for Phase 2 of the container terminal development, traffic impacts will occur as a result of the transportation of personnel, construction materials and equipment to the site; and personnel and spoil material away from the site. This may include the transport of abnormal loads, namely cranes, from the Port Elizabeth harbour, if these are not able to be shipped directly to the site in the Port of Ngqura.

Approximately 960 workers will be working at the construction site during the peak Phase 2 construction period, with an average of 600 – 700 workers over the whole period. The majority of these construction workers (70%) will be recruited from the NMMM area and will be transported to the site from designated pick up points by bus in terms of the Coega IDZ Labour Agreement. Workers with special skills who are seconded from outside the area of the Nelson Mandela Metropolitan Municipality (NMMM) to the project by the contractor (25%) will be accommodated in the Coega construction village situated near the intersection of Addo Road (MR 450) and the N2 freeway, or in the adjacent Wells Estate housing area. The other 5% will be management and administrative staff who will be accommodated in Port Elizabeth.

Materials required for construction of the quay walls and container handling area will consist of cement and aggregate for the production of concrete, and core and armour rock for the breakwater at the administration craft basin. The quantities of the construction material and the envisaged sources from which they will be transported are shown in Table 7.1.

Table 7.1: Quantities of construction materials for the project

Material	***Quay Wall and Container Terminal***	***Administrative Craft Basin***	***Source of Material***
Cement (tons)	95 000	10 000	Port Elizabeth
Coarse aggregate (tons)	300 000	30 000	Coega Kop quarry
Concrete (m^3)	210 000	20 000	Mixed on site
Core and Armour Rock (m^3)	-	15 000 90 000	Stockpiles on site Commercial quarry

Reference: CPHMG (A McKay) October 2006

The material that is removed by dredging to obtain the required depths for the berths at the container terminal and the administrative craft basin, is envisaged to be disposed of at the offshore disposal site used for the original port construction, with the necessary permits to be obtained from Marine and Coastal Management.

There will be a cumulative traffic impact due to the overlap of the Phase 1 construction of the land-based facilities for the existing two container terminals (D100 and D101) and the Phase 2 construction. The Phase 1 construction is expected to employ a similar number of personnel to Phase 2 and requires the production of 170 000 m^3 of concrete.

7.2.2 Operations

Traffic Impacts during the operational phase will stem from the transportation of personnel to and from the container terminal and the administrative craft basin, as well as the import and export of containers.

The nature of the container terminal operations (i.e. four container berths) will require approximately 960 persons divided into 3 shifts of 320 persons, when the terminal reaches its designed operating capacity of 1 250 000 TEUs per annum, which is envisaged to be attained by the year 2015 (at earliest). The prognosis is that 36% of these containers will be transported by road, 24% will be transported by rail, and 40% will be transhipped in the port. Transhipping refers to the shipment of containers to the terminal and then back onto another ship without leaving the boundary of the terminal.

It is estimated that the other port operations, including the administrative craft basin, will require in the region of 160 persons per day.

7.3 Applicable policies, legislation, standards and guidelines

The National Road Traffic Regulations (1999) promulgated under Section 75 of the National Road Traffic Act (Act No. 93 of 1996) regulate the conveyance of abnormal loads and dangerous goods on public roads.

During the construction phase, there is the possibility that abnormal loads, namely cranes, whose dimensions and/or mass may exceed the limitations contained in the National Road Traffic Regulations, will need to be transported from the Port Elizabeth harbour to the Port of Ngqura by road, unless these cranes are transported directly to the Port of Ngqura by ship or barge.

In the event of the transport of abnormal loads by road being necessary, the affected road authorities must be contacted beforehand, namely SANRAL for permission to use the N2 and the Nelson Mandela Bay Municipality, such that a suitable route can be selected between the Port Elizabeth harbour and the N2, and traffic control arrangements made. If the height of the abnormal load exceeds 5,0 metres, a route must be selected between the Port Elizabeth harbour

and the Port of Ngqura which avoids passing under any bridges. This will involve travelling over the Settlers Freeway on Green Street, north along Govan Mbeki Avenue to Boswell Street to gain access to Settlers Freeway north of the overhead bridges, then via Burman Road and Grahamstown Road to get access onto the N2 at John Tallant Road.

During the operation phase, there is the possibility that dangerous goods may be shipped by container through the Port of Ngqura and require conveyance by road.

The National Road Traffic Act (1996) seeks to ensure that unintentional incidents are prevented and managed in a responsible way, and it makes persons accountable for their actions. Some of the requirements in the legislation include:

- ***Registration of operators:*** All dangerous goods operators who are operating vehicles whose gross vehicle mass is in excess of 3500 kilograms are required to register with the Department of Transport as dangerous goods operators.
- ***Driving licence:*** A special category D professional driving licence will be required.
- ***Signage on vehicles:*** All operators transporting dangerous goods will be required to identify their vehicles accordingly. This will include an orange diamond in front of the vehicle, placards on the sides and rear of the vehicle;
- ***Documentation:*** The driver of the vehicle will be required to carry at least 3 different documents, including a route plan, a transport emergency card and a document known as the dangerous goods declaration. The dangerous goods declaration will contain details of the consignor, consignee, the operator, the correct name of the product and the hazards associated with the chemical. The operator is also required to inform the emergency services situated along the routes which he will travel, what will be transported and the quantities so that appropriate measures will be taken to deal with an emergency;
- ***Responsibility of consignors and consignees:*** The legislation requires operators, consignors and consignees to take responsibility for their actions within each phase of the transport process. Each Party will be required by law to sign an operational agreement confirming the responsibility attached to them. In this way the responsible person could be held accountable in the event of an incident arising out of negligence.

7.4 Scenarios considered in the impact assessment

The assessment of impacts associated with traffic and transportation of personnel and materials related to the construction and operation of the container terminal and administration craft basin is based on the **worst-case scenario** in which:

1) **Peak-period traffic volumes** are assessed against the capacity of the existing road infrastructure assuming that planned upgrades of Addo Road and Dibanisa Road have not been completed by the end of the construction period (December 2008).

2) The construction of Phase 1 of the container terminal (i.e. land-based activities) will **overlap** with the peak construction period for Phase 2, resulting in a cumulative traffic impact from the transportation of personnel and materials associated with both phases.

For the assessment of impacts on road infrastructure, the assessment was based on a scenario in which trucks are assumed not to be overloaded, apart from the possibility of the transport of cranes from the Port Elizabeth harbour, which are treated as abnormal loads (see previous section).

7.5 Impact assessment and mitigation

This section presents the impacts and mitigation measures, which are assessed according to the standard methodology presented in Chapter 4. The issues discussed below are summarized in Table 7.3, with significance ratings given both with and without the possible mitigation measures.

7.5.1 Impact on traffic conditions

Construction Phase

The construction activities of Phase 1 and Phase 2 are expected to overlap from August 2007 to April 2008, according to information obtained from Transnet's design consultants CPHMG (Alistair McKay, CPHMG, pers. comm.). The cumulative traffic impacts are expected to peak from November 2007 to February 2008. The calculation of the traffic generated by each phase is contained in Appendix G.

It is estimated that approximately 110 private car trips (100 in and 10 out), 50 bus trips (28 in and 22 out) and 40 heavy vehicle trips (30 in and 10 out) will be generated during a typical morning peak hour (06:30 – 07:30) during the peak construction phase (based on 2 000 construction workers employed on Phase 1 and Phase 2). The other daily vehicle movements (max. 60 per day) shown in Appendix G for delivery of equipment, etc, are expected to occur after the above morning peak hour.

Impact of abnormal loads

If the ship-to-shore cranes for the initial phase of commissioning the container terminal cannot be brought by ship to the site, they will be brought by road transport from Port Elizabeth harbour.

The abnormal loads probably will be transported to the site via the N2 Highway and Neptune Road, provided that the loaded height does not exceed 5.0 m. Although the number of trips would be low (6 ship-to-shore cranes are required initially) the speed and size of the vehicles could have an impact on traffic patterns along these roads. However, the approximately 22 km of dual carriageway highway between Port Elizabeth Harbour and the Port of Ngqura has more than one lane per direction and therefore other vehicles will be able to pass the abnormal loads. The **significance** of the **negative impact** due to abnormal loads during construction is consequently regarded as **low,** provided that the loaded height does not exceed 5.0 m.

If the loaded height is higher than 5.0 m a route will have to be selected which avoids passing under bridges, which have a height restriction of 5.1 m. This route will involve travelling on

municipal streets (Govan Mbeki Avenue, Burman Road and Grahamstown Road) through the built-up commercial and industrial areas of Nelson Mandela Bay, which will be disruptive to normal traffic activity on these streets. The **significance** of the **negative impact** due to abnormal loads travelling on these roads is thus regarded as **medium**.

Impact on road sections

The existing peak hour traffic and generated peak hour traffic during construction is shown in Figures 7.1 and 7.2.

Peak hour traffic generated during construction, when added to the current traffic volumes, will not exceed the vehicle-carrying capacity of the road sections. The road that will experience the highest traffic increase is Neptune Road, east of the N2, but this road currently carries only a small amount of existing construction traffic. The additional traffic from Phase 1 and Phase 2 will only utilise 4% of its capacity. The additional peak hour traffic on the N2 will only use 3% of its capacity. The **significance** of this **negative impact** is therefore **low**.

Impact on intersections

Apart from the road sections, the intersections usually act as bottlenecks in the network that can also experience capacity problems. Based on the traffic volumes, the most critical intersection will be the intersection of Dibanisa Road (MR 435) and Addo Road (MR 450) through which all the buses from Port Elizabeth and Uitenhage will travel to get to Neptune Road, before proceeding to the construction site in the port. This intersection was recently upgraded to signal control by the NMMM (June 2006). A volume/capacity analysis has been undertaken at this intersection before and during construction, using the SIDRA computer software, which is based on the HCM method. The results of this analysis are shown in Appendix G.

The 40 additional buses passing through this intersection in the morning peak hour will increase the volume/capacity ratio of this signalised intersection from 0.83 to 0.91 and the average vehicle delay from 31 seconds to 35 seconds. The **significance** of this **negative impact** is therefore **low**.

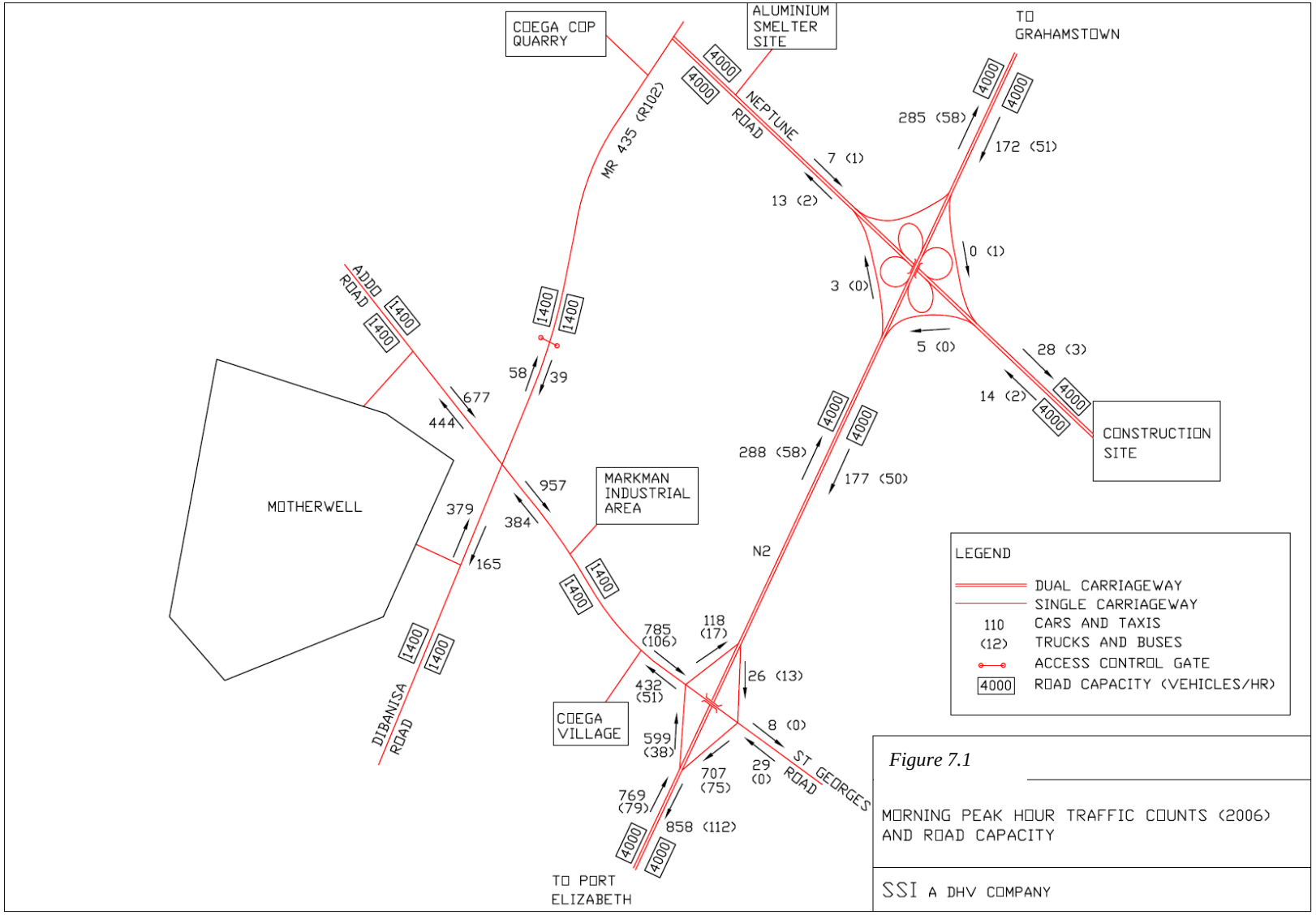

Figure 7.1

MORNING PEAK HOUR TRAFFIC COUNTS (2006) AND ROAD CAPACITY

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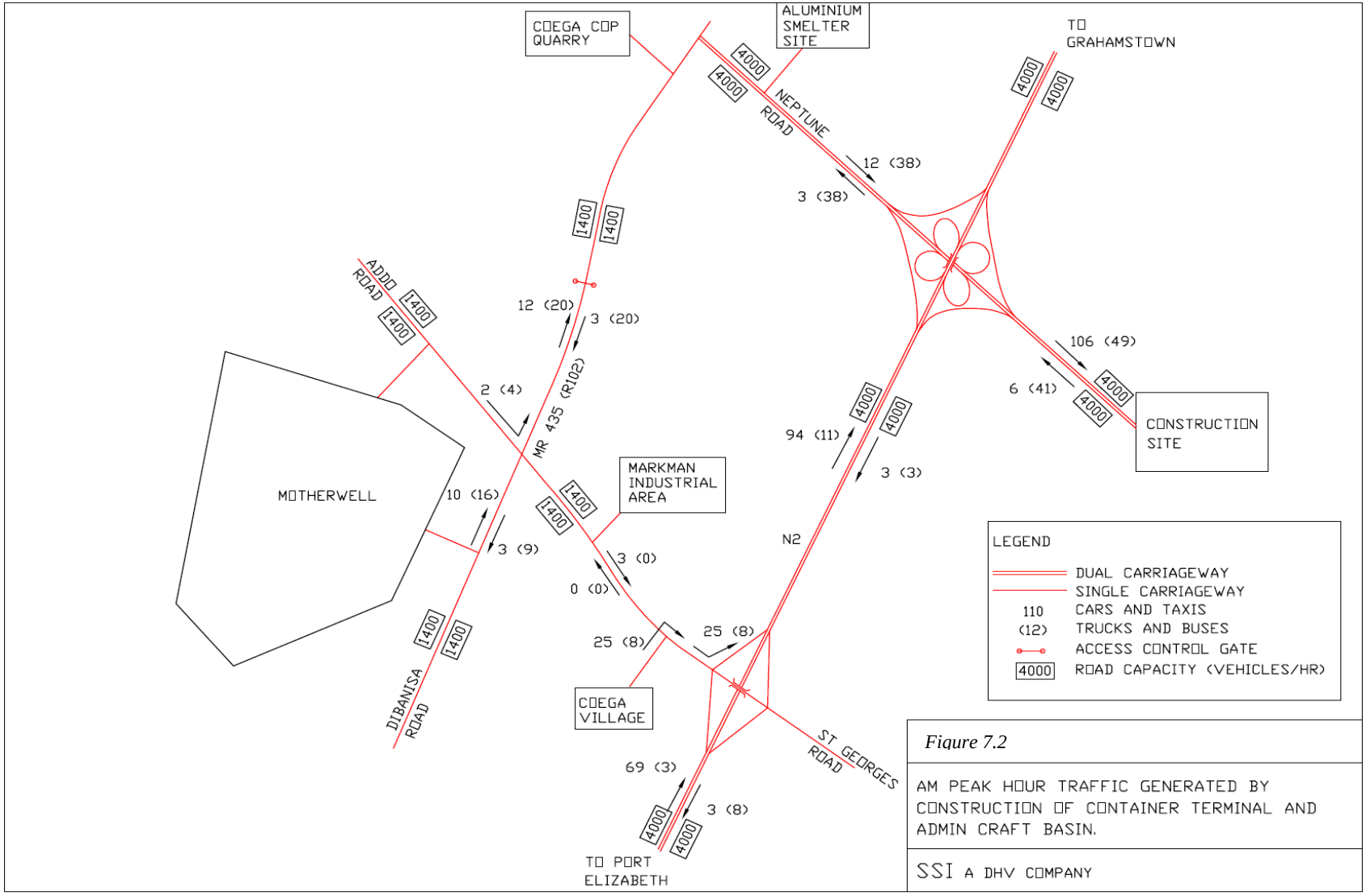

Figure 7.2

AM PEAK HOUR TRAFFIC GENERATED BY CONSTRUCTION OF CONTAINER TERMINAL AND ADMIN CRAFT BASIN.

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Operations Phase

The container terminal will operate 24 hours per day, 7 days a week and will employ a total of approximately 960 persons in three shifts at full operation (by 2015, at earliest). The shift having the most significant impact on other road traffic will be the 06:00 – 14:00 shift, when 320 departing workers from the shift ending at 06:00 coincide with 160 day staff arriving for the other port operations.

The 320 departing workers and 160 arriving workers during the peak hour 06:00 – 07:00 are estimated to generate 110 vehicles leaving the port (100 cars and 10 minibuses) and 55 vehicles entering the port (50 cars and 5 minibuses). This is based on the assumption that 50% of the workers will use cars at an average occupancy of 1.6 persons per vehicle and 50% of the workers will use minibuses at an average occupancy of 16 persons per minibus. These are the worker numbers for full operation of the container terminal in 2015. For the first stage of operation of the container terminal commencing in 2009, it is assumed that half of the above worker numbers will be required, which will thus generate half of the above road traffic. The distribution of the worker traffic on the N2, Addo Road and Dibanisa Road is assumed to be proportional to the existing peak hour traffic counts.

During the first stage of operation commencing in 2009 the container terminal is designed to have the capacity to handle 550 000 TEU per annum which will be increased in stages to a designed operating capacity of 1 250 000 TEU per annum in 2015, according to CPHMG, Transnet's engineering consultants.

The design consultants estimate that 50% of the containers will be handled during the 8 hour shift 06:00 – 14:00 with the other 50% spread over the remaining 16 hours per day. The calculation of the number of trucks conveying containers in and out of the port during the peak hours is shown in Table 7.2 based on Transnet's modal split assumptions and an assumption of 1.5 TEU per truck.

Table 7.2: Calculation of Peak Hour Road Traffic Conveying Containers

Year	*TEU p.a.*	*Landed 60% TEU*	*Local Road 35% TEU*	*Hinterland Road 40% of 65% TEU*	*Total Road TEU p.a.*	*TEU/day 365 p.a.*	*Trucks/hour 0,5/8 hr/1,5 TEU*
2010	550 000	330 000	115 500	85 800	201 300	552	23
2015	1 250 000	750 000	262 500	195 000	457 500	1 253	52

The distribution of the peak hour trucks from the port is assumed to be proportional to the local and hinterland TEU split, with local deliveries west on the N2 and hinterland deliveries east on the N2.

The peak hour road traffic generated by staff and containers during the operational phase in 2010 and 2015 is shown in Figures 7.3 and 7.4. The majority of traffic generated by the development during a typical morning peak hour will approach the site from the N2 highway from

Port Elizabeth. This traffic generated by operations will only take up 2% of the road capacity in 2010 and 4% of the capacity in 2015. These volumes are small and will not cause a noticeable impact on the level of service. The **significance** of the **negative impact** is therefore assessed to be **low**.

Mitigation

The following mitigation measures to limit the impact of additional traffic generated during the ***construction phase*** should be considered:

(1) The delivery of cranes and gantries for the container terminal should, if possible, be done by ship or barge directly to the site in the Port of Ngqura rather than by road from the Port Elizabeth harbour. This will avoid the need for transporting **abnormal loads** on the roads. If the cranes and gantries have to be transported by road, the height of the loaded vehicle should, if possible, be limited to 5.0 m from the road surface to enable the loads to pass under bridges on the Settlers Freeway (M4) and N2 highway. This will minimize the impact on local roads, which would have to be used to avoid bridges **if the abnormal loads are higher than 5.0 m**.

*Note: The following two mitigation actions are provided, although the predicted impacts are of **low** significance before mitigation.*

(2) The use of **public transport** (buses and minibus taxis) should be encouraged. The CDC has already entered into a contract with the Algoa Bus Company to transport locally employed workers from designated pick-up points in the NMMM area to the IDZ. Skilled workers accommodated in the Wells Estate Village should also have a bus or minibus service provided for them so that they do not have to use private cars. The provision of a reliable public transport service by the contracted bus operator to convey workers from the metropolitan area to the Port during construction and operation must be monitored by the CDC as the contracting authority, to ensure that the service is punctual and not overcrowded. This will mitigate the need for workers to seek to use other modes of transport like cars and taxis, which are less efficient in the use of road space per passenger carried, resulting in greater peak hour traffic congestion.

(3) Deliveries of **cement** from commercial suppliers in Port Elizabeth should be done by using truck and trailer vehicles (carrying 30 - 35 tons) rather than smaller vehicles (carrying 15 - 20 tons) to limit the number of truck trips required for cement deliveries from Port Elizabeth.

The following mitigation measures to limit the impact of additional road traffic generated during the ***operations phase*** should be considered:

Note: The following three mitigation actions are provided, although the predicted impacts

*are of **low** significance before mitigation.*

(1) The use of **public transport** (buses and/or minibus taxis) should be encouraged. This can be done by means of an effective public transport system and subsidized public transport fares for all workers. The CDC is in the process of preparing a Public Transport Plan for a contracted bus service to operate on a daily scheduled basis throughout the IDZ, linking to the NMMM scheduled service at the Motherwell central modal interchange.

(2) A greater proportion of containers destined for the hinterland should be transported by **rail** rather than by road, particularly in the first phase of operation (2009 to 2015) when there is spare capacity on the rail line. Transnet's consultants have estimated that 60% of the hinterland containers will be transported on rail, whereas the CDC Container Study undertaken in 2000 indicated that Spoornet was already transporting 76% of the containers from the existing Port Elizabeth harbour by rail and envisaged being able to increase this to 80%. If a greater proportion of containers destined for the hinterland can be transported by rail rather than by road, it will mitigate the accelerated degradation of the road pavement structure and the increased number of road accidents that will result from increased heavy vehicle traffic. This appears to be possible in the early stages of operation of the container terminal when there is sufficient capacity on the rail line between the Port and the Coega station for Spoornet to convey a proportion greater than 60% of the hinterland containers, particularly in view of the fact that Spoornet has been conveying about 75% of the containers out of the existing Port Elizabeth harbour by rail (CDC, 2000).

(3) **Appropriate heavy vehicles** should be selected in consultation with vehicle manufactures to ensure that they can safely maintain the legal speed limit when loaded. Elements such as the power output of the vehicle, the terrain, the noise specification contained in the noise specialist study, the average trip distances of the vehicles and braking requirements should be taken into account.

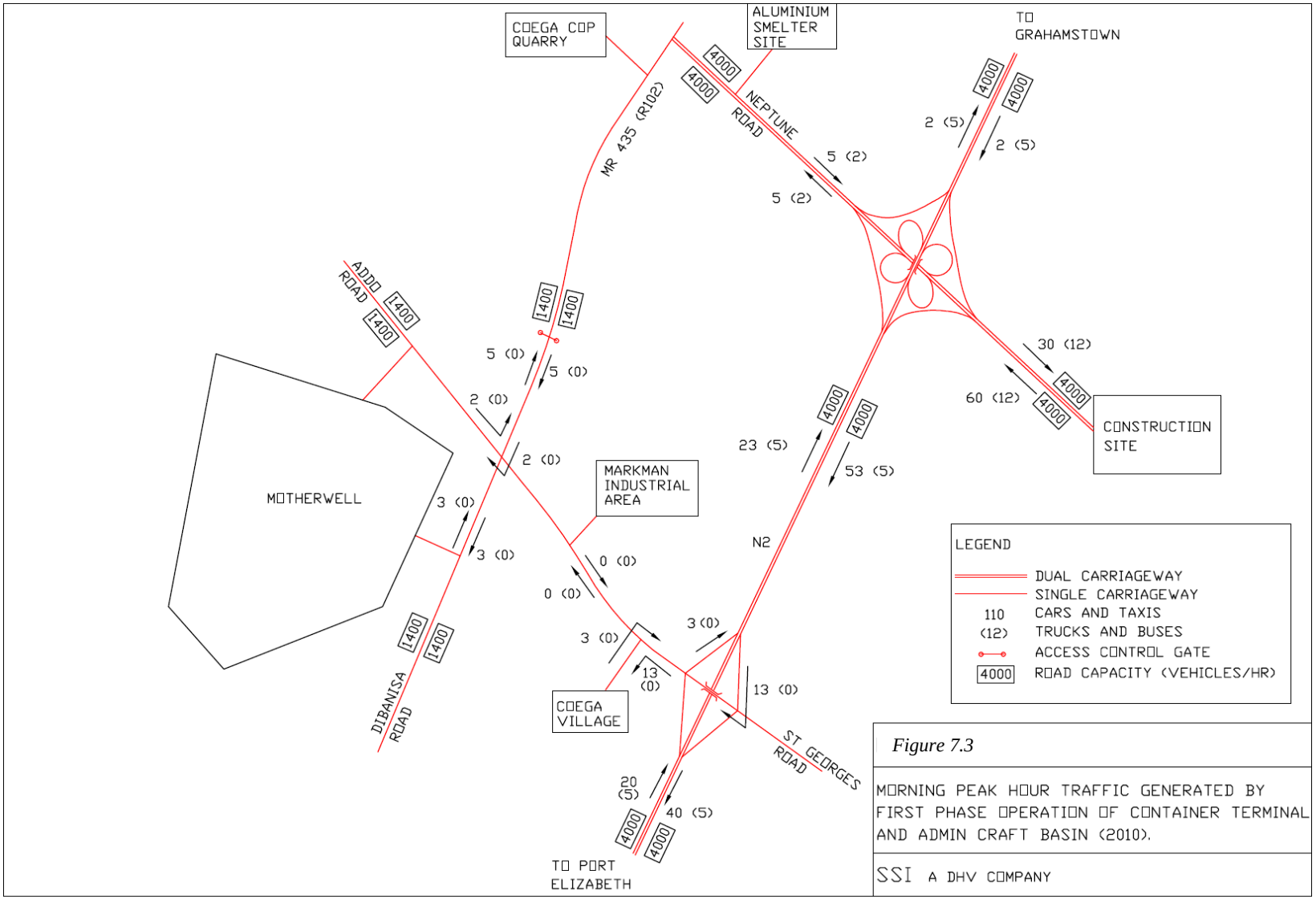

Figure 7.3

MORNING PEAK HOUR TRAFFIC GENERATED BY FIRST PHASE OPERATION OF CONTAINER TERMINAL AND ADMIN CRAFT BASIN (2010).

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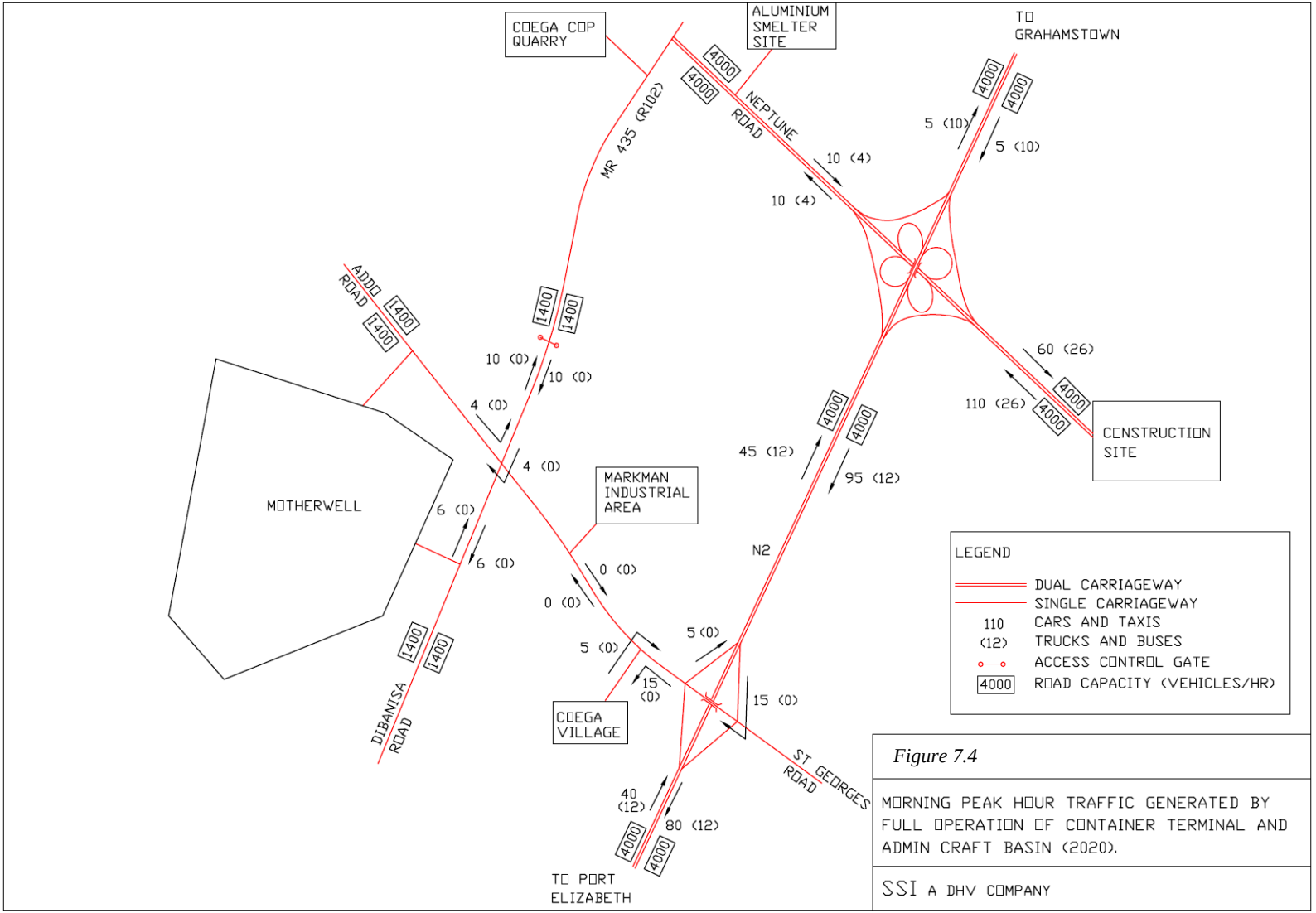

Figure 7.4

MORNING PEAK HOUR TRAFFIC GENERATED BY FULL OPERATION OF CONTAINER TERMINAL AND ADMIN CRAFT BASIN (2020).

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7.5.2 Impact on road infrastructure

Construction Phase

Since the construction phase is short compared with the lifetime of the road, the effect of construction traffic on the structural life of the road will be insignificant, provided that the roads are correctly maintained and heavy vehicles are not overloaded. Furthermore, Neptune Road which will mainly be used by heavy vehicles to transport construction materials, was specifically designed to carry heavy loads over its lifetime. The significance of the negative impact is therefore assessed to be low.

Operations Phase

During the operational phase, trucks transporting containers will mainly use Neptune Road and the N2 highway. When the container terminal reaches its designed operating capacity of 1 250 000 TEU in 2015 the typical daily movement of container trucks on Neptune Road will be 835 vehicles in and out of the Port. This is determined from the road mode split of 457 500 TEU per annum at full operation, 7 days a week and 1.5 TEU per truck.

The estimated cumulative impact of container loaded trucks over the 25 year design of life of the roads is approximately 45% of the structural capacity of Neptune Road and 32% of the structural capacity of the N2. The significance of the negative impact on the road infrastructure is therefore assessed to be medium.

Mitigation

(1) Overloading of vehicles should be avoided to limit the impact on the structural capacity and surface conditions of Neptune Road and the N2. This should be monitored by **weighing vehicles** before they leave the Port.

(2) The **rail** delivery service should be improved to encourage a larger proportion of containers destined for the hinterland to be conveyed by rail rather than by road vehicle. (Refer to more detail on this rail mitigation action in Section 7.5.1).

7.5.3 Impact on traffic safety

Construction Phase

As a result of the increase in traffic generated by the construction activities in the Port there is a potential for increased accident rates. Assuming reasonable travel distances and accumulated annual vehicle trips for light and heavy vehicles that will be generated during the construction phase, it is estimated that there will be about 3 million additional vehicle kilometres travelled per year on the road network.

The estimation of the number of casualties and fatalities associated with the increase in construction traffic is based on accident statistics maintained by the Central Statistics Service of the Department of Transport (2001) which indicates 100 casualties and 7 fatalities per 100 million

kilometre travelled per annum in RSA. Using this ratio it is estimated that the increase in construction traffic is likely to cause an additional 6 casualties and one fatality during the 2 year construction period. The **significance** of the negative impact on road safety is therefore assessed to be **low**. The risk of accidents is increased if, for example, critical intersections are not upgraded, trucks are not maintained in roadworthy condition, or dangerous driving patterns are adopted.

Operations Phase

Assuming reasonable travel distances and accumulated annual vehicle trips for light and heavy vehicles that will be generated during the operational phase, it is estimated that there will be an additional 12 million vehicle kilometres per year traveled on the road network when the container terminal becomes operational in 2009 (i.e. 550 000 TEUs per year). This is likely to cause an additional 12 casualties per year and one fatality per year at the start of the operational phase and increase at about 10% per annum as the container truck traffic volume is predicted to increase at this rate, up to 2015 when the maximum design capacity of 1 250 000 TEUs is reached. The **significance** of the negative impact on road safety is therefore assessed to be **medium**. As the container volumes increase annually, the accident rate will also increase proportionately.

Mitigation

(1) Properly **trained drivers** and **well maintained vehicles** should be used during the construction and operational phases of the development.

(2) A greater proportion of containers should be carried by **rail** in the early operational phase, when there is sufficient rail line capacity to do so. This will depend on Spoornet's supply of rail wagons and level of service provided. (Refer to more detail on this rail mitigation action in Section 7.5.1).

(3) The NMMM traffic enforcement officials should make arrangements for the **weighing and safety inspection** of heavy vehicles entering and leaving the Port. This will curb the overloading of vehicles and ensure that all vehicles are in a roadworthy condition, which will help reduce accidents caused by overloaded and/or unsafe vehicles.

7.5.4 Cumulative impacts

It must be noted that the above assessment is based on the combined impact of Phase 1 and Phase 2 on the traffic and transportation (as explained in Section 7.1). The cumulative impact of Phase 1 and Phase 2 activities is therefore already taken into consideration.

Other construction activities that may take place during the same time as the extensions to the container terminal and may cause a cumulative effect on traffic conditions, are road construction projects as part of the Coega IDZ, the aluminium smelter development and the Coega Integrated LNG-to-Power Project.

The upgrading of Addo Road (MR 450) from the N2 to Dibanisa Road (MR 435) is planned by the NMMM municipality to commence in January 2007 and continue for 2 years. The disruption to existing traffic using Addo Road is expected to be negligible because a second carriageway is to be constructed separate from the existing carriageway. Additional traffic generated by the road construction activities is not likely to be significant.

An EIA was undertaken for the proposed aluminium smelter development by CSIR in 2002 which included a specialist traffic and transportation study. This study identified significant potential impacts during the construction stage as a result of Neptune Road not being completed at the time of envisaged commencement of the smelter construction. It also identified the intersection of MR 435 and MR 450, which was stop controlled at that time, as a potential bottleneck in the road network.

These potentially significant negative impacts have been mitigated by the completion of Neptune Road and the upgrading of the intersection of MR 435 and MR 450, which is now signal controlled and has substantially more capacity than previously.

The cumulative traffic impact of the proposed Coega Integrated LNG-to-Power (CIP) project has not yet been assessed. The Draft Scoping Report for the CIP Project indicates that a traffic study will be undertaken as part of the CIP EIA process (CSIR report, October 2006, available at http://eia.csir.co.za/cip). If the peak construction period of the power plant and the integrated LNG facility overlap with the peak construction period of the container terminal in the Port, the negative impacts are likely to be significant. These impacts will be increased by the simultaneous construction of the aluminium smelter.

Table 7.3 Summarized impact assessment for container terminal extension and administration craft basin (construction and operation)

Nature of the impact	***Extent***	***Duration***	***Intensity***	***Probability***	***Significance (without mitigation)***	***Significance (with mitigation)***	***Status***	***Degree of confidence***
Reduction in level of service due to presence of abnormally loaded heavy vehicles during construction, due to disruption of normal traffic due to road closure	Regional	Short term	Medium	Highly probable	**Medium**	**Low**	Negative	Medium
Reduction in road-based level of service due to increase in traffic volumes during construction	Regional	Short term	Low	Highly probable	**Low**	**Low**	Negative	Medium
Reduction in road-based level of service due to increase in traffic during operations (staff)	Regional	Long term	Low	Highly probable	**Low**	**Low**	Negative	High
Reduction in level of service due to increased number of heavy vehicles transporting containers during operation	Regional	Long term	Low	Highly probable	**Low**	**Low**	Negative	High
Accelerated degradation of road structure due to construction traffic	Regional	Short term	Low	Highly probable	**Low**	**Low**	Negative	Medium
Accelerated degradation of road structure due to increase in operational traffic	Regional	Long term	Medium	Highly probable	**Medium**	**Low**	Negative	Medium
Increased number of road accidents due to increased traffic during construction	Regional	Short term	Low	Probable	**Low**	**Low**	Negative	Low
Increased number of road accidents due to increased traffic (operation)	Regional	Long term	Low	Probable	**Medium**	**Low**	Negative	Low

7.6 Monitoring recommendations

The actions which we consider to be necessary to ensure that the proposed mitigation measures are monitored are set out in Table 7.4 with regard to what needs to be done, by whom, to what standard and how often.

Table 7.4: Monitoring of Recommended Mitigation Actions

No.	Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
1.	Provision of reliable public transport service during construction and operation to encourage high use of buses by workers	Coega Development Corporation	CDC must check that the contracted bus service is provided as per agreement, by monitoring adherence to trip schedule	Appointed inspectors must record buses arrival and departure times at designated pick-up points and count passengers on buses	Once a week on a randomly selected day each week
2.	Cement delivery using large vehicles or truck-trailer combinations in order to reduce number of trucks on the roads	Transnet	Transnet to request contractors to arrange bulk cement deliveries in larger vehicles where possible	Transnet's construction monitoring staff to record number and size of vehicles making cement deliveries to site	Record daily and report effectiveness at weekly site meetings with contractors
3.	A greater proportion of containers to be transported by rail instead of road	Transnet	Transnet to investigate with Spoornet using more wagons in early stages of operation until rail line capacity is reached	Transnet to record supply of wagons by Spoornet and delivery time between origin and destination of selected container trains	Monitor selected trains on a daily basis and report progress with Spoornet on a monthly basis
4.	Heavy vehicle safety and overloading checks during construction and operation	NMMM Traffic Department	Traffic enforcement officials to weigh and inspect selected vehicles entering and leaving the Port	NMMM and SANRAL to organize use of vehicle weighing equipment at Port gateway	All heavy vehicles passing over weight detector. Selected vehicles to undergo safety inspection daily.

7.7 Permit requirements

If abnormal loads are to be conveyed from the Port Elizabeth harbour to the container terminal site, permission for the conveyance of these loads must be obtained from the relevant road authorities in terms of the National Road Traffic Regulations (1999). The relevant road authorities are SANRAL if the abnormal vehicles are to use the N2 and NMMM is the local road authority. The request for permission must specify the nature and size of the load, the vehicles to be used and the date proposed for the transport.