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ECONOMIC IMPACT AND PORT ASSET PACKAGING STUDY

PHASE 1 — TRANSACTION STRATEGY REPORT (MILESTONE 5)
VOLUME 2 OF 2 – INFORMATION PACKAGES

Originally Produced in December 2003

This publication was produced for review by the United States Agency for International Development.

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MARKETS
GROUP

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VOLUME 2 OF 2 – INFORMATION PACKAGES

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Under contract to:
Emerging Markets Group, Ltd.
(f/k/a Deloitte Touche Tohmatsu Emerging Markets, Ltd.)

Submitted to:
USAID

Contract No.:
PCE-I-00-97-00016-00
SEGIR Privatization IQC
Delivery Order #809

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This Volume provides basic information packages by terminal for Packages 2 through 11. As explained in our ***Transaction Strategy Report*** (Milestone 5, Section 3 of Volume 1), we propose that concessioning of these terminals proceed in four waves, labeled B to E below (DCT has already been designated by the Government of South Africa as package 1, the sole element of the first wave).

Sequence	Package	Terminal
B	2	Cape Town Container Terminal
B	3	Port Elizabeth and CoegaNgqura Container Terminals
C	4	Port Elizabeth and Coega Bulk and Multi-Purpose Terminals
C	5	Richards Bay Bulk
C	6	Saldanha Bay Bulk
D	7	Richards Bay Multi-Purpose Terminal
D	8	Cape Town Multi-Purpose Terminal
D	9	Saldanha Bay Multi-Purpose Terminal
E	10	East London Terminals
E	11	Durban Car Terminal
E	12	East London Car Terminal
E	13	Maydon Wharf & Point Terminals (whenever possible)

These information packages are based on extended field visits to each port by a three-man team, conducted between November 2002 and January 2003. Draft *Operational and Facilities Reports* were circulated to NPA and SAPO for comment between May and August 2003. Consolidated comments were received from NPA in September 2003 and are fully reflected in the present volume. SAPO provided detailed comments on our ***Draft Concession Strategy,*** but to date no comments have been provided on these Information packages.

Note that for the moment the information relating to Package 12 (East London Car Terminal) has been included in Package 10 (East London Terminals). No information package has been prepared for Package 13 (Durban Multi-purpose terminals) pending completion of the move from Pier 1 to the new Point terminal and rationalization of the Maydon Wharf, where there are many operators, with only a small share of operations directly controlled by SAPO.

As soon as the restructuring process is ready to move beyond DCT it will be necessary to update the information included in this volume.

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1 Introduction

1.1 Task

This report includes the review of the Cape Town Container Terminal and forms part of the required Base Information Packages.

1.2 Objectives

The objectives of this report are to identify:

- Limits of the terminal;
- Condition of built facilities;
- Operational Issues;
- Environmental Issues;
- Proximity to Urban developments and impacts of future development plans;
- Physical limits to expansion of the terminal.

1.3 Itinerary

The Study Team met with representatives of Portnet (South Africa Port Operations) and National Ports Authority (NPA) in Cape Town from December 2-5, 2002..

2 Physical Limits of the Cape Town Container Terminal

2.1 General

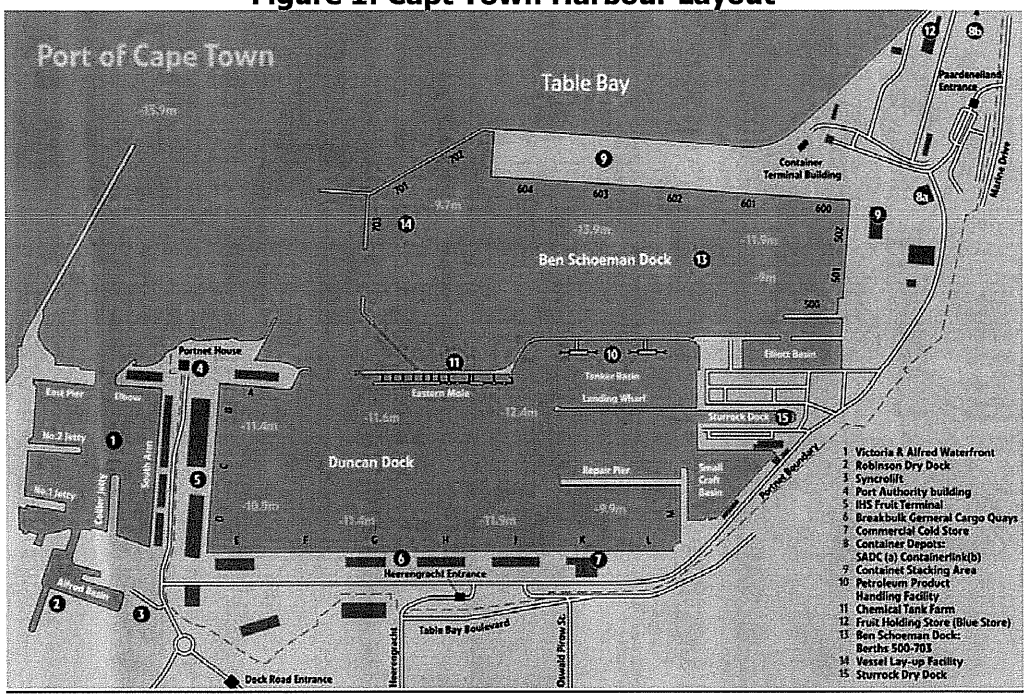
The port of Cape Town is situated 120 nautical miles north-west of Cape Agulhas, the most southerly point in Africa. The port consists of the BEN SCHOEMAN DOCK 1800 x 500 m, the DUNCAN DOCK 1800 x 600 m, the ALFRED BASIN 300 x 100 m and the tourist harbour area known as the VICTORIA & ALFRED WATERFRONT 500 x 500 m. On the southern and eastern side the port is enclosed by the city of Cape Town. The port has easy access from open sea and the depth at the entrance channel is 15.9 m – CD.

Cape Town harbour is operated on a common user basis and ships are handled on a first-come-first-served basis. Special quays are provided for the handling of specific commodities such as containers and bulk or unitised cargo. The port is world renowned for its deciduous fruit, perishable and frozen product exports and liquid bulk, as well as ship repair. The fishing industry at the Port of Cape Town is of major proportion.

During 2001 the Port of Cape Town handled 7,300,000 metric tons of cargo.

A lay-out of the harbour and its different terminals and facilities is given on Figure 1.

Figure 1: Capt Town Harbour Layout



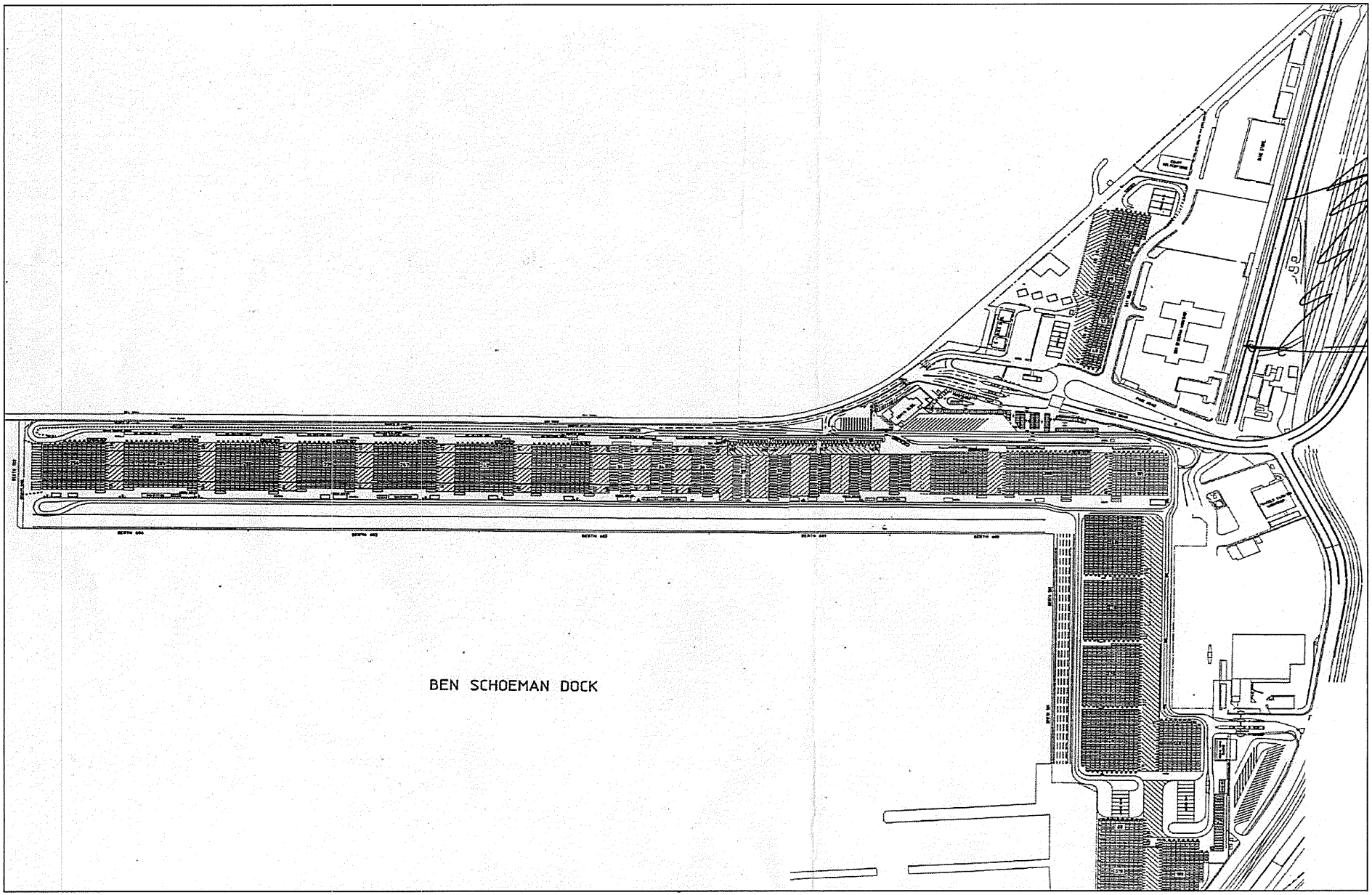
2.2 Location and Layout of Container Terminal

The container terminal is situated along the northern border of the port as can be seen on the lay-out. The Ben Schoeman Dock offers sufficient water area to manoeuvre the container vessels with a turning circle available opposite berth 604. The land connection of the Container Terminal by road is realized via Paardeneiland entrance to reach the Marine Drive.

This road which gives access to the N_1, N_2 and N_7 is frequently congested, mainly by private commuter traffic at peak times. However the container handling operation is not yet affected by this congestion. The rail connection is good as is the case in the whole of South Africa. The Rail Service Centre is independently operated; only 8 % of the containers are transported by rail. The size of the container handling area with a width of 170 m/100 m rectangular behind the berth offers an excellent operability.

Figure 2 gives a clear impression of the lay-out of Cape Town Container Terminal.

Figure 2



The container terminal has two coastal container berths (501 and 502) and five deep sea container berths (600, 601, 602, and 604). Berths 501 and 502 with a length of 183 m each and a depth of 10.7 m – CD. Berth 600, with a length of 200 m, waterdepth 10.7 m, berth 601 with a length of 236 m, waterdepth 12,8 m, berths 602, 603 and 604 each with a length of 305 m and a waterdepth of 14.00 m. Berth 600 is merely used as a lay-up berth and berth 501 and 502 for coastal container handling.

The stacking area of the container terminal provides 4,442 TEU ground slots plus 447 x 12 m reefer points (approximately 1,000 TEU) . In the near future the number of reefer points will be even bigger (app. 1,000 TEU). The empty containers are stored at the north-east side of the Terminal. This storage area shall be enlarged in the future.

The administration building (Terminal building) is perfectly located near the entrance gate and outside the fence of the actual terminal. This building offers a clear view on the container handling operations.

The Container Terminal has a throughput capacity of 535,000 TEU per annum (2002). The average stacking height is only two containers due to the fact that about 10 % of the time operations are stopped as a result of very high wind velocities. West gales that can occur particularly in the winter can result also in heavy range action (seiches) along the berths.

3 Condition of Built Facilities

3.1 Berth Structures

The quay walls of all berths located at the Container Terminal are of similar construction. The quay wall was built in 1977 and consists of concrete blocks directly supported on the rocks or with a granular sub-base on the sub-soil.

The quay top elevation is 3.66 m above LWOST. It should be noted that extreme low-water is 22 cm's below LWOST being CD.

During the short visual survey no significant deformation or damages have been observed on the quay structure. Bollards are placed 20 m c.o.c. on the deep sea quay and 15 m c.o.c. along the coastal quay. Bollards are of the "Butterfly" type with a capacity of 80 tons. For bow- and stern line bollards have been installed with 150 tons capacity.

All roller type fenders and Vredestein fenders are replaced by "earth-mover type fenders" with a diameter of 3.0 m. This rather simple type fender effectively absorbs the berthing energy. Each quay wall carries a large service tunnel, built according to South African standards, inside the concrete coping.

Covers at the quay surface that close the connections to this service tunnel should be made of stainless steel. Iron cover are rapidly rusting away.

Crane rail gauge throughout the terminal is 20 m.

3.2 Pavement, Roads, Drainage

At the deep sea and coastal quay the pavement directly behind the mass concrete capping beam (coping), between the crane rails, consists of 160 mm thick precast reinforced concrete plates of 2 x 2 meters. Many of these plates have settled and edges are broken off, requiring continuous repair. Settlement is most likely caused by leakage of sand through joints between the concrete blocks and poorly constructed drainage pipes.

Figure 3

The area in between the crane rails is used by bath-tub trailers to transport the containers. A 160 mm concrete slab foundation is apparently not sufficient for this type of operation. It is recommended to investigate and subsequently prevent sand leakages and install a up to date foundation layer.

The pavement behind the landside crane foundation consists of heavy duty concrete paving which in general is in good condition. This paving consists of 375 mm thick in situ concrete. There are no rail tracks along the quay sides as the rail service centre is located separately at the north-east corner of the port.

The surface drainage is collected in heavy slot drains running parallel to the quay front from where it is discharged into the harbour basin. The design of this drainage system looks good. It could be that poor execution of the discharge pipelines would cause the earlier mentioned sand leakage.

3.3 Buildings

Port Administration Building.

This building, recently partly renovated, looks in very good condition and is located at a perfect site close to the entrance of the Container Terminal. Hauler, trailer and container workshop, situated outside the Terminal Building in reasonable condition. Note: repair work is leased out by the Terminal to private enterprise.

Refrigeration Building

This so called "Blue Store" could stack 5 high reefer containers. Building is scheduled to be abandoned in 2004. Straddle carrier workshop situated inside the Terminal building looks in reasonable condition.

Workshop 17

This is a very large building and appears to be n a reasonable condition. The repair facilities are already partly demolished as shall be the case with the diesel pump stations in order to make space to stack empties.

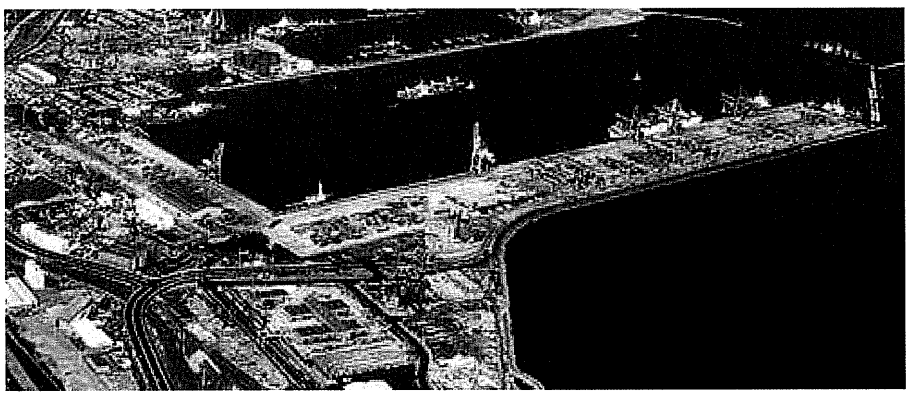
Substations

There are six substations, of which four are placed parallel to the deep-sea quay at a distance of approximately 50 m. The position of these substations may be a hindrance to container handling.

4 Operational Issues

The Cape Town Container terminal is located on the outer mole to the Ben Schoeman Dock and is thus limited to berths operating on the south side of the terminal area. The berthing facilities consist of five continuous berths, 600 to 604 (two cross berths at the eastern end of the dock, 501 and 502. are used for ship repair).

Figure 4: Overview of Cape Town Container Terminal



Cranage and equipment on the quay-side consists of 4 panamax and 2 post panamax gantry cranes. On the dock, operations are limited by the available quay space and stacking areas. Containers are landed directly on to "bath-tub" trailers, which are designed to avoid the necessity for twist locks and other securing devices during movement. The trailers are then hauled to the designated stacking area, where the boxes are lifted by straddle carrier and placed in the stack.

Figure 5: "Bath-tub" trailer

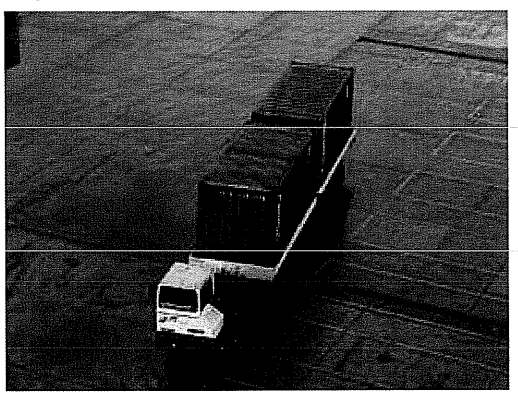
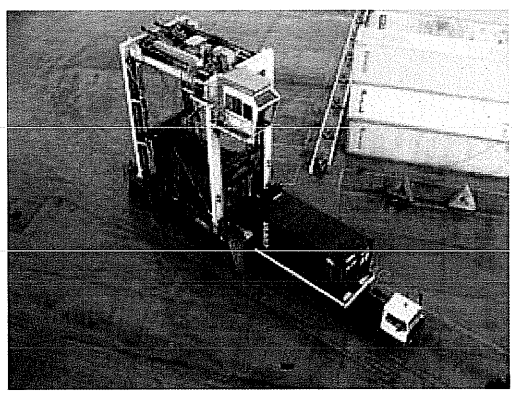


Figure 6: Transfer using Straddle carrier



Containers are stacked no more than two high due to the frequent occurrence of high winds, which have at times moved containers in the stack.

Transfer from the stack to road transport is again by straddle carrier, with carrier vehicles being given access to transfer areas in sections along the length of the cargo area. The liberalisation of road transport has meant that an increasing number of containers are moved by road, with average turnaround times for vehicles being brought down 25 minutes

Figure 7: General view along the breakwater / pier

Containers are also transferred to onward rail transport by rail mounted gantry cranes in the rail yards. Sets of 50 wagons are shunted into position by Spoornet locomotives and at set times during the day the loaded wagons are removed to the external sorting and train compilation yards at Belcon in the suburb of Belleville, from where they can be transferred anywhere in the country on the Spoornet main lines. The average turnaround times for train sets is reported to be about 2 hours.

According to SAPO statistics and reports the container terminal currently has the following mobile equipment available for use:

- 23 Noell Straddle carriers of 35 tonne capacity (to be increased to 27 by December 2003);
- 1 Heavy Fork Lift Trucks of 25 tonne capacity;
- 49 Hauling units;
- 68 "Bath-Tub" type internal port trailers;
- empty container stackers

The regular manpower listing shows a permanent staffing of 568 staff in all categories.

During the period April 2002 to March 2003 the container terminal had a throughput of 506,592 TEU, including 193,799 landed, 186,823 shipped, and 125970 transhipped. Empties

represented 21% of throughut. There has been a progressive increase in the proportion of 12m units, with current share approximately 35 % of the total boxes.

The terminal has introduced the COSMOS system for operational control and tracking, which since 2002 has been backed up by the computerised billing system, Corebis. These two developments have resulted in improvements to performance on the terminal and to increased customer satisfaction in the marketing field.

In common with all container terminals in South Africa, container operational performance differs considerably depending on whether the ship is cellular, or non-cellular and on the proportion of deck moves.

Reported rates show that non-cellular vessels are able to be worked at an average of 14 moves per gross crane hour, while cellular vessels are able to achieve between 20-25 moves per gross crane hour. Rates such as these are broadly competitive in the world market for this size of port.

In line with the demand for cold storage during the fruit season, the terminal has a large cold store, named the "blue store" due to its colour, in which up to 500 porthole type containers can be kept cool while awaiting shipment. Changes in reefer ship technology may require changes to be made in this store, but that will be a market-led response to the opening up of the South African fruit market, the increasing number of varieties of fruit and the demands of the shippers for integral type containers. As with other containerised traffic, the share of 12 m (40 foot) reefers is increasing, and parcel size is increasing.

5 Environmental Issues

Container terminal operations in the port of Cape Town are affected by the following environmental conditions and constraints:

- Lack of space
- Increasing amount of congestion on the roads leading to the terminal from the main motorway system
- Threats of incursion into available space by other services in the port
- The exposed position and high winds
- Expansion proposals and changes in cargo technology

5.1 Lack of space:

The Cape Town container terminal operates on one side of a North-Westerly running quay and storage area, with 5 contiguous berths of total length 1,371 metres, plus 2 cross berths of total length 366 metres. Berths 604, 603 and 602 have nominal length of 305m and depth alongside of 14.5m. The inner berths 601, and 602 have a combined length of 456 metres with depths decreasing to 10.7 metres.

The Ben Schoeman Dock

The Ben Schoeman Dock is entered through an entrance of only approximately 180m wide and has an internal turning circle for ships of maximum diameter 500 metres. The approach to the inner berths has normally to be stern first with the effective navigable width reducing gradually to about 360 metres. The effect of ships berthed on the outer container berths and the close berthing of vessels on berths 600 and 502 reduce the effective useful berthing length in the far north eastern corner. Berths 604, 603 and 602 are normally used for the larger vessels with the smaller and shallower vessels berthed on 601, 602 and 502, with 501 frequently referred to as the "coastal" berth.

The quay and stacking area

The quay and operational area has an approximate width of some 170 m, but with the access road and the effective back-reach areas of the quay cranes the overall storage width is reduced to approximately 100 metres or 50% of the nominal berthing length. This results in the total number of available ground slots, including the areas behind the cross and coastal berths, for the storage of containers being limited to 4,500. The orientation of the quay is in line with the strongest of the local winds, which are reported to be from the north-west and in the reverse direction as a katabatic wind from the south east. Container stacking in the terminal is thus constrained to 2 high.

Operational methodologies and the orientation of the stacking areas result in containers being landed directly on to port trailers and hauled to the stacking areas for lifting off by straddle carriers. The straddle carrier units then lift the containers from the stack to delivering vehicles, or for transport to the rail yard for rail transit. The result is that considerable additional space is required for the movement of vehicles, which is further complicated by the movement of non-port vehicles from private hauliers and transporters.

5.2 Road and Rail connections

The port entrance is situated close to Marine Drive which then leads to the primary motorway network serving the city, local areas and the extensive hinterland. The N1 leads towards Gauteng and Johannesburg, the N7 leads to the north and Namibia, while the N2 acts as the coastal connector to the east and Port Elizabeth.

Roads

As usual in a city port environment, road congestion causes concern, particularly during peak traffic periods. This is partially overcome by the increase of container movements at night, which is resisted by affected residential areas. However in the context of Cape Town access to the main road network is relatively easy and road freight can exit the city areas quickly.

Rail

Rail transport is provided by Spoornet, with its railhead in the port and its depot, Belcon, in the suburb area of Bellville. Rail support in the port is closely coordinated, with wagon sets consisting of 50 wagons capable of carrying 100 TEU's. To avoid conflict between rail and road traffic, particularly where rail tracks cross the road system, Spoornet have specific four-hour time slots for container trains to depart the port.

5.3 Threats on available space

The port boundary lies just beyond the main internal road which links the container terminal to the other parts of the port. This effectively limits the space available for stacking and development. However the Ben Schoeman Dock is also the entrance dock for small Marina in the Elliott Basin with its associated small craft workshops and established facilities.

The south side of Elliott Basin links to the Sturrock Dock complex in Duncan Dock and the area associated with ship repair. There has been discussion of the extension of the facilities in this area by the construction of addition ship lift facilities, which may impinge on the container stacking areas behind berth 501.

Further proposals have been made for the eventual relocation of the fruit export facility from berths D to B in the Duncan basin to a new purpose built fruit terminal based on berth 501 and its associated stacking areas and road/rail connections.

5.4 Wind

The port of Cape Town is subject to periods of strong winds, in excess of 80km/hour particularly during October to February. At such times the container cranes have to be closed down and clamped, resulting in loss of available crane working time of 8 to 10 days per year.

The design of the container quay and the outer protection to Ben Schoeman Dock has taken

the strength and direction of these strong winds into account and vessels are berthed, usually with head to the north-west, so that mooring stresses are reduced.

The original part of the port close to the Victoria and Alfred Basins is relatively protected but the eastern end of the dock system is exposed to the strong north-westerly gales and to the south easterly wind, the "Cape Doctor", sweeping in over the Cape Flats. To reduce the effect of wind various proposals have been made, including the partial filling of the eastern end of the basin off berths 501 and 502.. Research by CSIR has identified several designs, including a perforated concrete wall, tubular sectioned deflectors and the latest proposal which is for a combined reefer container stacking facility in a steel framework which could have the combined effect of providing shelter to the port working area plus increased reefer storage capacity.

5.5 Expansion proposals

The primary environmental limits to container operations in the port of Cape Town are the lack of space and the wind, which reduces stacking and operational capabilities. The port has proposed that the container quay be extended by some 300 metres to the north-east by infilling the relatively shallow areas of the bay. This expansion could produce at least four deepwater berths and working / stacking areas of up to 54 hectares. Alternative designs could produce either a completely filled area with exposed berths, or a new basin protected by a new outer wall and associated working areas.

Expansion of trade in the Cape Town area is linked with fruit and the need to provide adequate cold storage and facilities for the containerisation of parcels of cargo, particularly with the increasing involvement of smaller groups of specialised exporters. The current "Blue Store" linked to the container yard has capacity for 500 TEU of porthole type containers. It is likely that this will have to change due to the probable change from porthole types which effectively are kept at one standard temperature, to individual integral reefer containers where the temperature of each container can be set and monitored to optimal carriage levels.

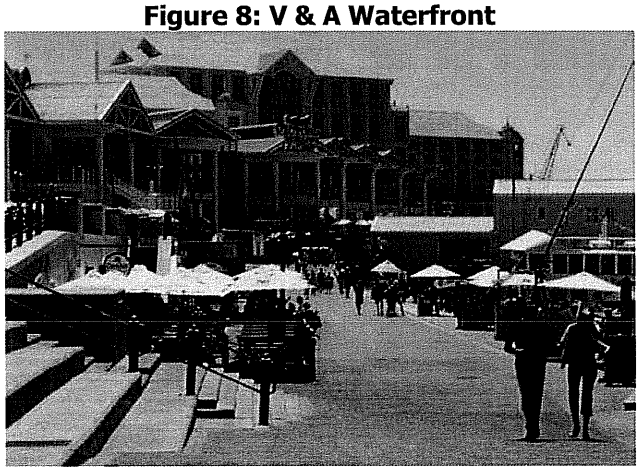
6 Proximity to Urban Developments and Impact of Future Development Plans

6.1 Proximity to Urban developments

On the southern and eastern side the Port of Cape Town is enclosed by the City of Cape Town, while at the west side the Victoria and Alfred basins partly are transformed in a successful tourist attraction. The Victoria and Alfred Waterfront (see figure 4) provides a very good example of the transformation of an old harbour area into a very popular tourist attraction. The Victoria and Alfred Waterfront has successfully merged leisure activities catering for tourists with a working port facility.

According to the Municipality of Cape Town, it is essential for a port and its city to interact as the port is the city's window to the rest of the world. This may be the case for the Victoria and Alfred Waterfront, although proposals to expand the Container Terminal have met some opposition from environmental lobbyists during the EIA process.

Figure 8: V & A Waterfront



6.2 Future development of Cape Town Container Terminal

The plans of NPA to expand the Container Terminal include the following:

- Extend the north east side of the deepwater quay in first instance to create more storage capacity secondly to provide additional berthing place at the extended side. The protective seawall should therefore be shifted northwards. **Comment**: As the rectangular area behind the quay now becomes a width of approximately 500 m it is questionable if this is not too wide for optimal operation. Extending berth 604 by creating berth 605 and removing the present activities at this area would give an additional deep-sea berth and a safe terminal, as it is unlikely that in this new situation the Terminal should still be hampered by intrusion from the point.

- Shift the quay-line from the coastal quay parallel in north-westerly direction to provide an increased water depth (no rock bottom), creating one additional deep-sea berth.
- Relocate the present city road (marine drive) behind the area of the Salt River Power Station, which area had recently been taken over by the NPA.
  The area of the former Power Station then forms part of the Port and a second access to the Container Terminal could be provided to separate incoming and outgoing traffic.
- In the far future a large new breakwater will be required to protect a new harbour dock. At the north-east side of the Terminal a long new quay could then be built existing of four deep sea berths to nearly double the container handling capacity.

Apart from the above mentioned long term development plans, the plans of the National Port Authority for the short turn development are:

- Create at the north-east corner of the existing port a large area to handle and stack empty containers. This will require removing the tire-repair facilities, the diesel-pump stations and there are even plans to break down the large building of Ben Schoeman Workshop.
- Create a large reefer stack parallel on the existing railway track so alongside the Rail Service Centre.
  We have recommended trying to obtain the area at the west side of the Container Terminal as part of the Terminal itself. The dirt road connecting this area to the mainland should than also become part of the Terminal. It would mean a safe terminal, enclosed only by deep water and difficult to enter by unwanted persons.

7 Physical Limits to Expansion of the Terminal

7.1 Physical limits Waterside

There are no physical limits on the waterside. Extending the Port of Cape Town northwards by building a new breakwater gives no physical problems.

Opposition is coming from the Municipality, local residents and the Greens of course, to create a new harbour basin and as such offering the Container Terminal to extend her berths to the north side, shall cost a lot of money and plans shall have to be studied carefully.

The periodically occurring gale force winds are already a problem and shall create more problems for harbour basins located further offshore. At the moment container handling is stopped if wind forces are in excess of 80 km/hour.

7.2 Physical limits landside

Rail connections are adequate to cope with the increased number of containers to be handled in the future. It is envisaged that the growth of container handling will mainly come from transhipment of containers. Rail and road transport would grow in line with the growth of the national production growth. Nevertheless, road transport faces congestion already, so the situation will only become worse in the future. At the Container Terminal itself the situation will improve if the proposed separate entrances for ingoing and outgoing traffic become effective.

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Annexure A: Port of Port Elizabeth, Long Term Development Framework Plan

1 Introduction

1.1 Objectives

The objectives of this report are to identify:

- The general physical limits of the terminal;
- The basic condition of built facilities;
- Operational Issues;
- Environmental Issues;
- The proximity to Urban developments and impacts of future development plans;
- The physical limits to expansion of the terminal.

1.2 Itinerary

During December 2002 discussions took place with representatives of Portnet (South Africa Port Operations) and the National Ports Authority (NPA). These initial visits were reinforced by further visits and discussions during January 2003.

2 Physical Limits of the Port Elizabeth Container Terminal

2.1 General

Port Elizabeth is located midway between the Ports of Durban (384 nautical miles north-east) and Capetown (423 nautical miles west). The Port of Port Elizabeth being at the centre of the country's motor vehicle manufacturing industry handles large volumes of containerised components and Bulk and Breakbulk commodities for this industry.

The Port of Port Elizabeth is the fifth largest port in Southern Africa, with a total throughput in 2000of 7,500,000 metric tonnes, made up of 5.6 million tonnes of imports and exports and approximately 1.0 million tonnes of coastwise and transhipment cargo. In 2001 the volume of imports and exports had dropped to around 4.15 million tonnes.

The lay-out of the Port of Port Elizabeth is given on figure 1. The Container Terminal comprises the largest part of the Port. The oil tank farm is located at the southern border of the Port as is the Manganese ore stockpile and loading area. The fishing industry is concentrated on the west side of the Port. The general cargo handling and the Outspan Citrus Terminal are located at the centre of the Port.

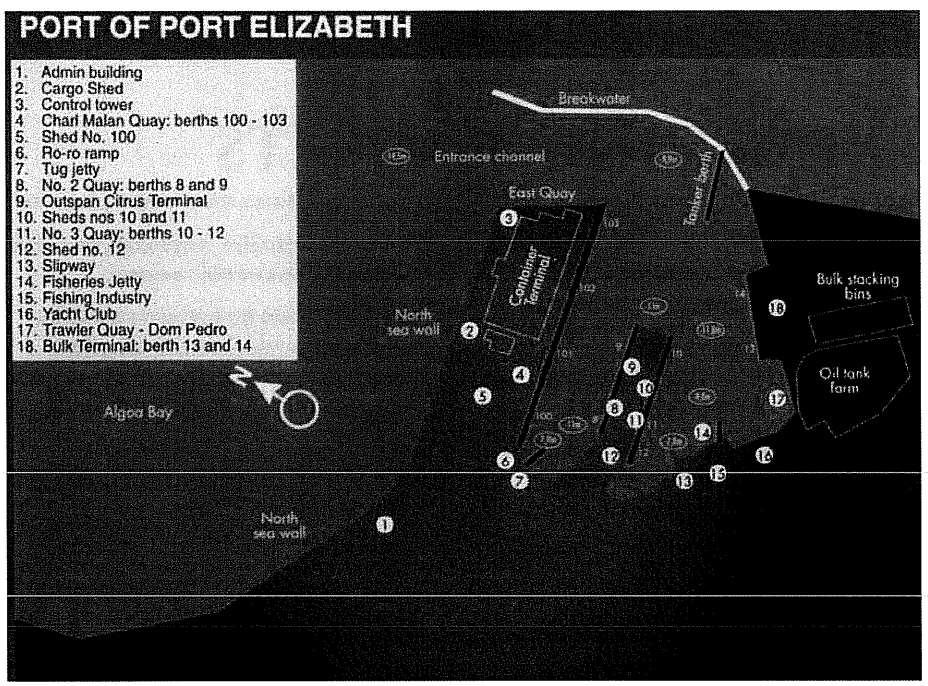


figure 1

2.2 Location of Container Terminal

The Terminal is situated at the Charl Malen Quay and includes berths 100, 101, 102 and 103. The harbour basin opposite berths 103 and 102 offers sufficient water area to manoeuvre container vessels. The entrance channel has a depth of 14.50 metres below CD and a width of 310 metres.

The rail connection of the Port Elizabeth Container Terminal is excellent, with two rail tracks running along the whole length of the terminal at the back of the stacking area.

The road connection with the South African highway system is rather poor, as all container traffic has to pass the city of Port Elizabeth. Port Elizabeth is known as the "fifteen minute city" but the passage of loaded trucks through the city creates a bottle-neck situation.

The lay-out and size of the Container Terminal as can be seen on the aerial view of figure 2 offers operational potentials.

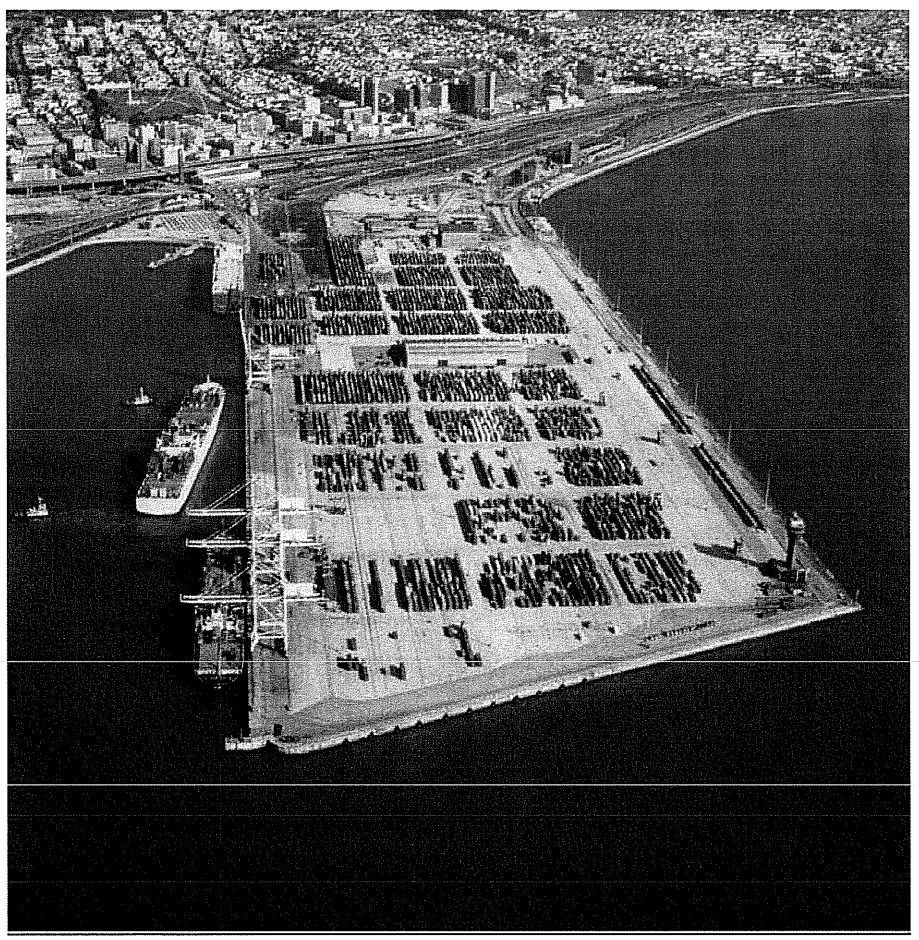


figure 2

2.3 General information on the Terminal

The Port Elizabeth Container Terminal has a quay length of 635 m comprising berths 102 and 103 with a maximum water depth of 12.20 m minus CD. Berth 100 and 101 are basically used as general cargo berth and occasionally used for handling containers. Total storage area: 35 ha.

The stacking area of 5403 TEU ground slots allows an average stacking height of 2 containers (as a result of local wind conditions).

The number of reefer plug points amounts to 222.

Two general-purpose cargo sheds, no. 100 and 101, provide a total under cover storage. Part of the container handling area is fenced off in order to stock motor vehicles. This creates disturbance to container handling operations involving longer hauling distances for equipment.

There is no area to stack empty containers near the Terminal, There is an balance between the numbers of in and outgoing containers.

At the north-eastern corner of the Terminal the Port Control Tower is situated, while the Terminal Administration Building is located near the entrance gate to the Terminal and outside the fence.

The Port Elizabeth Container Terminal has a capacity of 375,000 TEU per year.
In 2000 the total through-put comprised 242,718 TEU while the year 2001 saw only 156,883 TEU.

3 Basic Condition of Built Facilities

3.1 Berth structure

The quay wall structure of the Port Elizabeth Container Terminal was built in 1977 and consists of concrete blocks supported with an intermediate granular sub-base on the sub-soil. The quay's top elevation is + 5.20 above CD. At the location of the Container Terminal the original capping-beam has been partly removed and replaced by a new beam to support the container handling cranes. To accommodate the landside rail a piled rail beam had been installed providing a rail span of 20 metres.

Figure 3 shows a photograph of the container quay.

figure 3

No significant deformation or damages have been observed on the quay structure during the short visual survey. Bollards of the 'slope-back' type are placed along the entire quay at 20 m intervals and a capacity of 80 tons. At approximately 25 m inshore 4 storm bollards each of 150 tons capacity are placed. The fendering of berth 103 consist of double type "earth-mover type fenders" with a diameter of 3.00 m as clearly can be seen on figure 3.

Berth 100 and 101 are provided with single "earth-mover type fenders" while berth 102 still has circular tubular rubber fenders. It is recommended also on this berth 102 to install double type of "earth-mover type fenders", as the performance of these fenders is better for the coping or capping beam.

It is also recommended to replace the iron covers of the service-tunnel by stainless steel covers. The service tunnel is situated inside the coping/capping beam with at regular intervals, connections to the quay surface.

3.2 Pavement, roads and drainage

The pavement behind the quay wall under the cranes consists of concrete slabs. These slabs are 2.0 x 2.0 m with a thickness of 210 mm. Along the whole length of the quay settlements of the plates could be observed and at some places severe damage was visible.

Initially the area in between the crane rails was used for intermediate transport of containers (tractor + bathtub trailer). Presently the containers are loaded/unloaded at the back reach of the crane and transported to the stacking area by means of straddle-carriers (see figure 4). The area in between the crane rails is now used to store the hatch-covers of the moored vessels. The point loads of these hatch covers cause damage to the concrete slabs.

Figure 4

Settlement of the concrete slabs is caused by sand leakages through the quay wall.

The pavement behind the landside crane rail consists of heavy duty concrete paving which in general is in good condition

The concrete paving has a thickness of 375 mm founded on a 150 mm layer of cement stabilised sand. At berths 100 and 101 there is an area paved with small concrete blocks and generally not in good condition. However concrete block pavements on a correctly designed foundation layer can serve very well to stack containers as is the case in several ports in Europe.

Surface drainage is collected in heavy slot drains running parallel to the quay front from where it is discharged into the harbour basin. The gradient of the stocking area is 1:80. A lot of debris is gathered inside the heavy slot drains (e.g.. tins, scrap metal, plastic, etc.). It is therefore recommended to clean the drains regularly, the same applies for the gullies on either side of the crane rails.

3.3 <u>Buildings</u> (see figure 1, lay out)

- Port Administration Office.
  This office is in good condition and situated just outside the fence near the entrance gate to the Container Terminal.
- Port Control Tower.
  Building in good condition. From the top of the building it is possible to get a superb view of the entire harbour of Port Elizabeth.
- Shed inside fence of Container Terminal
  This is a rather new building with an inner surface of 7,500 m^2 and a storage capacity of 43,5000 m^3.
- Straddle carrier workshop looks in reasonable good condition.

Figure 5

At present two substation buildings are placed parallel with the quay line at the paved area. These buildings limit the onshore container handling. The substation building is connected to an amenity building.

- It might be worthwhile to investigate if this combined building cannot be replaced by a much smaller building

- Stacking control towers. These buildings placed in between the stacking area and the rail service centre (see figure 2 aerial view of Container Terminal) do not comply with the latest regulations with regard to safety and environment (exhaust gas from road-trucks can freely flow into the building).

3.4 Dredging

Due to the littoral drift along the coast there is resulting sediment movement in northerly direction. Some of these sediments are settling in the approach channel. This approach channel initially was dredged wider to trap some of the sediments. Also due west of the breakwater a sand trap was dredged to collect the transported sediments. Regular dredging is required to empty this artificial sand trap.

There are also plans to 'by-pass' the sand by means of a permanent pump station at the west-side of the Port and discharging the sediments via a pipeline at the north side.

In the middle section of the breakwater wave action passes through the rubble mound structure. This part apparently consists of large stones only as also sand is passing through this section.

This sand has formed a sandbank at the inner side of the breakwater which can be clearly seen at low water.

This bank is situated outside the approach channel and turning area for the vessels.

In the past maintenance dredging was in the order of 100,000 m^3 to 200,000 m^3 per annum. However it is expected that maintenance dredging will increase to about 500,000 m^3/year.

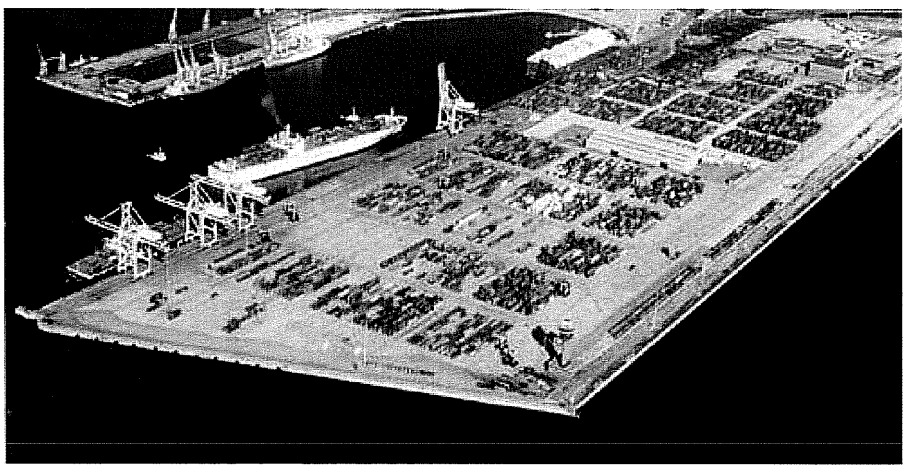
This is approximately the same amount to be pumped yearly by the 'sand-by pass' structure in case this plan should become reality.

4 Operational Issues

For a container ship operating at 17 knots represents a day's run from Durban or Cape Town. This offers a convenient intermediate port of call, providing there are no berthing or operational delays. The port lies on the western side of Algoa bay and has serviced the needs of the growing agricultural and industrial areas of the Eastern cape and beyond.

The last major developments in the port were a) the construction of the bulk cargo berths in the early 1960's and b) the widening and extension of the Charl Malan quay between 1975 and 1983 to form the existing container berths and storage, as illustrated below.

Figure 6: Charl Malan quay and the Container Terminal



The container terminal operates with two dedicated berths, 103 and 102, with an additional berth 101 available for smaller geared vessels. The total quay length available is some 635 metres with a maximum depth of water alongside of 12.2 metres. The terminal working and stacking area amounts to 29 hectares and a total of 4,770 ground slots are available for storage. There are 212 reefer points available with 96 ground slots.

Stacking is normally 2 high and is configured for full straddle carrier operations. According to operational calculations using the UNCTAD formulae the theoretical berth capacity with four gantry cranes is about 315,600 TEU's per annum. The stacking capacity is calculated to be 322,000 per annum allowing for an average dwell period of 5 days.

According to SAPO statistics the ratio of 12 metre containers has gradually increased over the years until it currently stands at about 55%. This can be attributed to the high utilisation of 12m containers by the motor trade for the import of car parts and c.k.d.'s.

Figure 7: The container yard, Port Elizabeth

Quayside operations is with four gantry cranes with the portal space used for hatch covers and for temporary re-stows and repositioning if required.

The landing and pick up of containers is from the back-reach of the cranes, which allows free movement of straddle carriers without having to cross the crane rails. Operating rates for the cranes is reported to be about 16 containers per crane working hour. The average ship works between 250 and 300 container units per call and with two cranes this means that a discharge/load could be completed in approximately 10 hours.

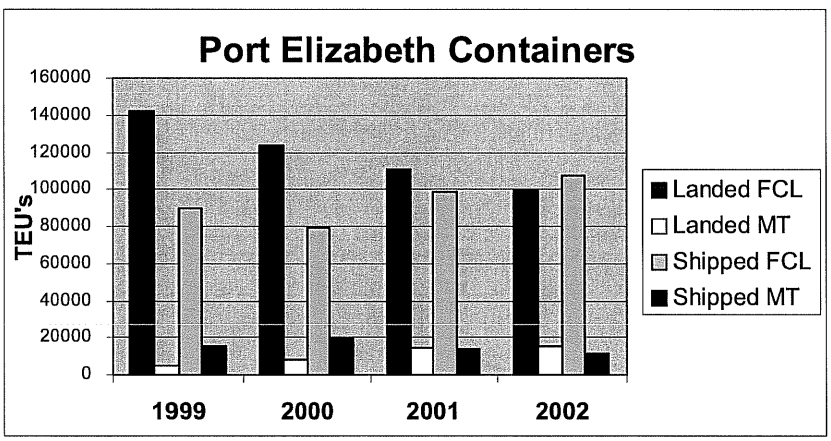
Berth occupancy on the two main berths has averaged between 50 % and 60% over the last five years, but during the first part of 2002, up to November 2002, the average rate had increased to more than 75 % .

Delivery of containers to and from the port is by rail and road, and with the liberalisation of the road freight industry a larger proportion of containers are moved by road. The rail terminal is at the back of the container yard and has been upgraded to accommodate train sets of 50 wagons, allowing movement of 100 TEU's. Cargo declarations indicate that well over 90% of all containers landed or shipped through the port are classified as "general" with only minor percentages of Hazardous and Reefer units.

Figure 8: Gantry cranes with Straddle carriers

The throughput of containers in Port Elizabeth averages about 15,000 units per month, equivalent to about 22,000 TEU's, with, a steady decline in imports balanced by increases in exports.

Figure 9: Extracts from SAPO statistics



5 Environmental Issues

The port of Port Elizabeth is a long established port that has developed and expanded in over a century of use. Its location on the western side of Algoa Bay provided some shelter from the predominant westerly winds and a convenient access to the hinterland of the Eastern Cape.

The port has three sections:

- The Charl Malan Quay with the container terminal
- No 2 Quay with fruit and Break-Bulk cargo
- The southern berths with the Manganese ore terminal and the tanker berth

There are also significant areas set aside for local; fishermen and leisure activities.

The main environmental factors which affect the port apply to all sections and will be discussed on a port-wide basis:

- Wind and swells in the entrance
- Siltation of the entrance due to littoral drift
- Dust contamination from the ore stacks and scrap iron
- Ground and water contamination
- Oil contamination risks from tanker operations
- Lack of segregation for hazardous cargoes or spills
- Pressure on port land for residential, commercial or leisure use
- The development of Coega or Ngqura port

5.1 Wind and swells

The port is well protected by the land and the city of Port Elizabeth from westerly winds. During the summer months the port experiences periods of strong and persistent easterlies which build up a large swell and heavy sea conditions in Algoa Bay and in particular at the entrance to the port. The south breakwater does afford some protection but vessels in their final approach are heading south, at broad angle to the swells and manoeuvring can be affected.

5.2 Siltation

The south coast is subject to a general eastward coastal drift current which carries considerable volumes of fine sand. The South breakwater was constructed to divert that drift and to allow the build up of sand, in the form of a land trap, to form Kings Beach.

This land trap, or beach accretion, is virtually full and the problem of sand drift along the breakwater and around the head into the entrance channel is becoming more

serious. There is also some leakage of sand through the breakwater structure and the build up of sand in the main part of the entrance channel.

The advantage of the land trap has been the growth of the sandy beach, Kings Beach, just outside the town, which has attracted plans from developers of leisure and waterfront activities.

5.3 Dust contamination

There are two main sources of dust and airborne contamination from the port and both of these are most noticeable during periods of on-shore winds. These include the manganese ore stockpile and the scrap steel stockpile.

5.4 Tanker operations and Oil cargoes

The tanker berth is at the root of the South Breakwater and services the oil tank farm which is located inland and beside the manganese ore silos. It is reported that the lease for the tank farm area, which has been in operation since 1939, is due to expire in 2014 and that it will not be renewed. This has been as a result of the conflict between the siting of an oil tank facility close to residential and commercial areas, the fears of incidents and the potential alternative development of a leisure and entertainment complex in conjunction with the Kings Beach and Casino proposals. The future of the oil berths and the tank farms are linked to the development of the new port at Coega.

5.5 Hazardous cargoes

The development of modern trade has resulted in an increase in the movement and transport of cargoes, which can cause risk of damage either to personnel or to the natural environment. Such cargoes have to be contained, segregated and facilities provided for the collection and safe handling of any spills, or effects of fire and explosions.

The port of Port Elizabeth is not well equipped to deal with such cargoes and cargo run-off and materials do find their way into the harbour and the natural water table. The port drainage system is in need of rehabilitation and formalised arrangements made for the segregation and handling of hazardous cargoes. The development of the port of Coega and the transfer of such cargoes to that port would help to ease the problem in Port Elizabeth.

5.6 Residential, commercial and leisure use.

The port is closely bounded at the rear or city side by the rail tracks of Spoornet and the main coastal highway through the town. Development inland from the port is therefore stopped.

Port activities, in particular the movement of trains and trucks and the activities in the scrap and ore terminals, create conflict with local residents and with non port connected businesses. In common with many older coastal communities the area of Port Elizabeth has a need to diversify its economic base and tourism and the leisure industry is seen as one potential. The requirements of this industry are clean beaches, clean air and easy transport linked to good weather and the provision of support facilities such as hotels, golf courses and other indoor type activities.

The port and in particular the southern part around the Kings Beach area, including the manganese terminal and the tank farm are central to development plans proposed by entrepreneurs and the local municipality.

5.7 Commercial and sport fishing

South African coastal waters offer the commercial and the sports fisherman an opportunity to earn a living and to enjoy sport and leisure activities. Currently the back part of the port, between No 3 quay and the Manganese berths is used for this purpose, with small piers and slipways to service the needs of the craft. Development in this area has been haphazard with many small areas leased to operators who have constructed storage sheds and industrial buildings without much apparent building control. The result is that the area is congested and presents a poor image of the port.

5.8 Coega or Ngqura port

The development of a new port at the mouth of the Coega river to the north of Port Elizabeth will have a major impact on operations and development within the port of Port Elizabeth. The original concept was for the development of a pure industrial port linked to a major development zone with tax and trade concessions to attract industry to the area.

This concept remains, with the addition of a dedicated container terminal.

The most immediate considerations for Port Elizabeth are the possibilities for the relocation of the manganese terminal, the tank farm and berths and scrap steel to the new port, plus the competition for container operations. Such moves could trigger major rethinking of the whole strategic plan for Port Elizabeth and result in a solution to the identified environmental problems and a sea change in the utility profile of the port.

The construction at Coega of a purpose built and equipped container terminal with international management, will have a major impact on container operations in Port Elizabeth.

6 Proximity to Urban Developments and Impacts of Future Development Plans

6.1 Proximity to Urban developments

The present harbour area of the Port of Port Elizabeth is fully enclosed by the city of Port Elizabeth.

It is clear that new expansion can only be realised towards the north side of the Port, through reclamation of areas from the sea. However there is a strong opposition from the municipality of the city of Port Elizabeth. The municipality has for many years wanted to expand the tourist attractions of Port Elizabeth e.g.. leisure areas, yacht harbour, beaches, etc.

With the start of the development of the new port of Ngqura (Coega) it shall be clear that this will have a major impact on the existing port operations and as such on the ambition of the municipality of the city of Port Elizabeth.

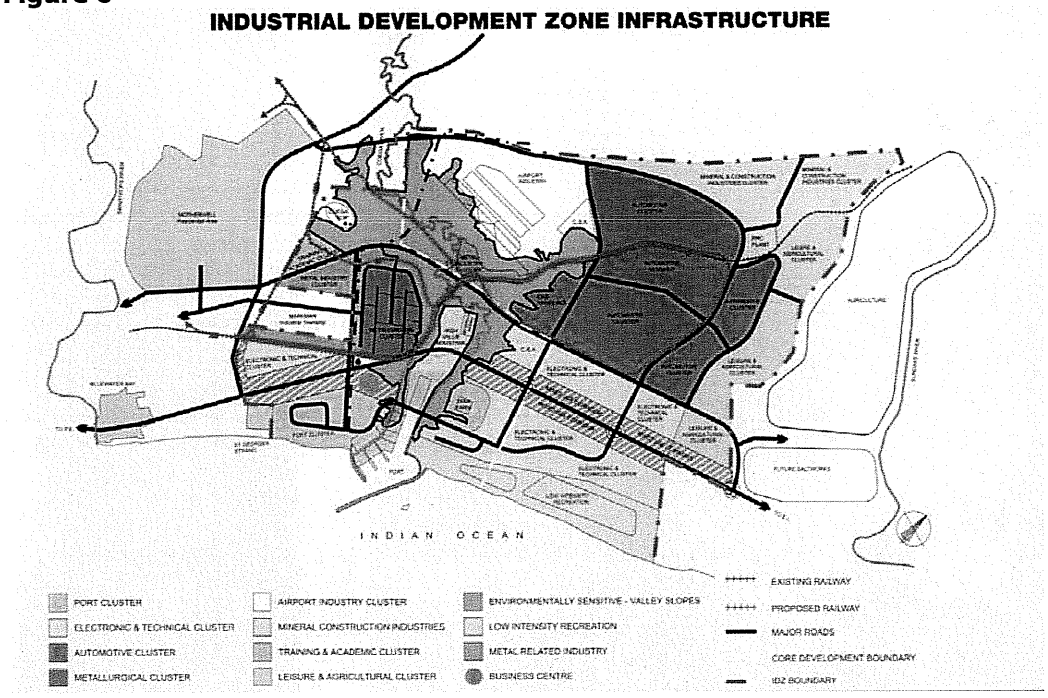
The Port of Port Elizabeth (NPA) has proposed a long term development framework plan (see annexure A). This plan covers the possible development of port infrastructure in the Port over the next 20 years.

In all likelihood the Manganese Ore Installation and the Oil Tank Farm will close down and the operations will be relocated to Coega. This will present a golden opportunity to redevelop the area. Drawing no. 1V8066-SCEN2 shows one of the possibilities. The Port of Port Elizabeth remains the same in size but only clean cargo is now handled in the port as the general cargo is mainly restricted to the handling of motor vehicles. The Fishing Industry, being an area of growth, is now using a considerable larger area.

Also the wishes of the municipality of Port Elizabeth now can be fulfilled: a relatively clean harbour connected with the existing beach development by an area for mixed uses: residential, leisure, commercial, small craft, fishing.

The development of a new deep water port at Coega is intended to stimulate the economy in the Eastern Cape, which would result in a huge spin off for the existing port. Furthermore the intention to privatise port operations as quickly as possible will also result in greater demand for more independent terminals to be established , and contrary to what is stated above, it would become necessary to develop additional sites for new terminals. The proposed development of the Port of Coega is shown on figure 6.

Figure 6



6.2 Future development of Port Elizabeth Container Terminal

Comparison of the existing land use in 2001 (drawing IV.8066-0100) with the possible future development scenario 2 (drawing IV.8066-SCEN2) shows that the area for container handling has been decreased by approximately 50%.

As far as the container handling is concerned this is in contradiction with the idea that the new port of Coega is intended to stimulate the development in the existing port.

This depends on two scenarios, either the container handling is moved to the port of Coega or the general cargo (mainly motor vehicles).

The proposed Port of the Port of Coega development is shown on figure 7 on the next page.

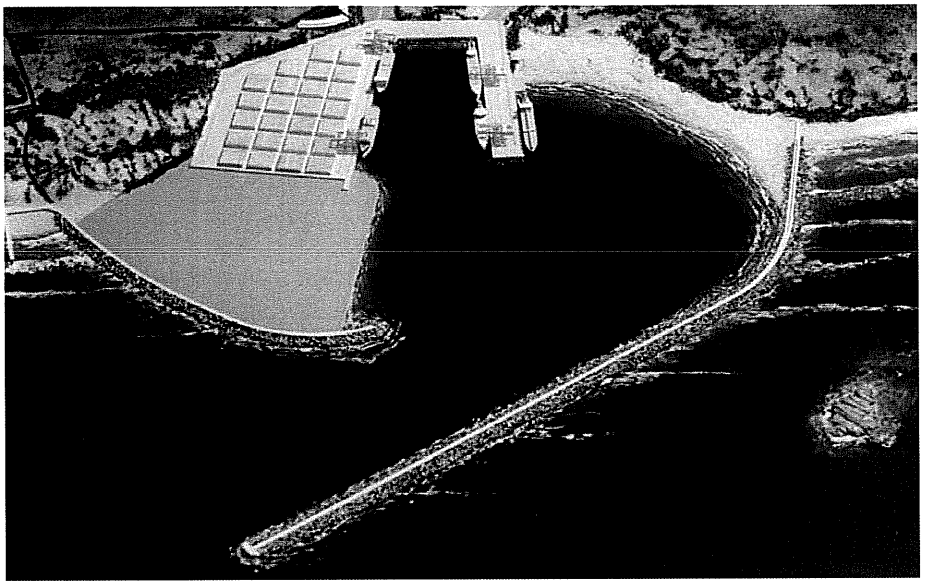


Figure 7

Moving the complete container handling to Coega means:

- A modern up to date container terminal could be developed able to receive the largest class of container vessels.
- Short distances to industries within the Coega Development Area for containerised goods.
- Possibility to establish an independent terminal area within the greater container handling area.
- Better access to roads and railways.

The aerial photograph of the maquette of the proposed Port of Coega shows the first phase of the container terminal with a possible extension seawards. The land extending 400 metres back from the quay will be retained for container handling in the future.

The tender documents for the quay wall show a concrete block type of quay to be built "in the dry" with an eventual water depth of 18.00 m - CD.

Quay level 5,04 m + CD, concrete coping with standard service tunnel.

This means that the quay wall, which construction started only a few months ago, is able to accommodate the newest generation of container vessels. Initially two berths will be built.

6.3 Physical Limits to Expansion of the Terminal

Transport from and out of the Port area should be thoroughly analysed as far as the roads are concerned. There are only two entrances to the port area i.e. Jetty Street and Green Street (see also drawing 1V8066-0100).

Jetty street entrance is in fact not suitable for cargo, so only Green Street remains. To reach the main highway all cargo vehicles first have to follow the fly-over crossing the railway and the main highway and subsequently have to pass through city traffic over a distance of approximately 200 m in order to reach the turn off towards the main highway.

A direct connection from the main highway sloping down towards the harbour area may be considered.

Aesthetically this is not a nice solution but specifically in this part of the city it cannot do any harm as the existing road way already divides the port from the town by an elevated section.

Annexure A:

Port of Port Elizabeth
Long Term Development Framework Plan

ANNEXURE A

PORT OF PORT ELIZABETH

LONG TERM DEVELOPMENT FRAMEWORK PLAN

1. INTRODUCTION

1.1 BACKGROUND

Over the past 10 to 15 years, a number of attempts have been made to prepare a Long Term Development Framework Plan. The outcome of these attempts was an acceptance that the port had ample spare capacity, and as a consequence of this, no detailed descriptive report was prepared, but merely a plan was drawn indicating the various zones for development and the possibilities for future expansion.

At the beginning of 2000, a project team was established in head office, to review all the ports development framework plans with the purpose of getting a fresh perspective into the development and content of all port framework plans. The project team visited the port in February 2000 and later produced a report which identified the gaps requiring attention.

This Long Term Development Framework Plan is the outcome of these initiatives.

During the year 2000, Portnet has made significant changes to its organisational structure and the long awaited divisionalisation into a Port Authority Division (PAD) and a Port Operations Division (POD) was finally implemented. These two divisions now function completely independently from each other.

This report deals only with the long term development plans for the Port Authority Division. Naturally, the projections of growth anticipated by the Port Operations Division, as reflected in the individual chapters of the various terminal operations, has been taken into consideration, but only so far as it dictates the future expansion of the port infrastructure.

1.2 PURPOSE OF A LONG TERM DEVELOPMENT FRAMEWORK PLAN

The commercial ports in South Africa have a major role to play in boosting the economic development of the country. The only way which South Africa can survive economically is if we expand our foreign trade with the rest of the world. South Africa is rich in natural resources and the economy has developed around the export of raw materials and agricultural products. These, due to the large volumes and bulky nature of the commodities, have to pass through the ports. Likewise, the vast majority of our imports pass through the ports.

The ports therefore have a major role to play in minimizing the transportation costs and creating opportunities for growth, employment and re-distribution. Transformation remains critical to the agenda, and the African Renaissance inspires a clear social directive.

The challenge facing the port planners is one of uncertainty as to the long term infrastructural requirements. The cost of port infrastructure provision is high, and lead times are long. It is therefore absolutely essential to have a Long Term Development Framework Plan which can identify the influences on the developmental requirements of the port, and record the assumptions used in forecasting the anticipated growth in the economy. Once this is in place, the actual growth in the economy can be monitored and measured against the assumptions and forecasts, which will enable the port planners to provide for the required expansion of port infrastructure timeously and cost effectively.

A Long Term Development Framework Plan must not be seen as cast in stone and once

approved be implemented to the letter. Rather, it must be reviewed regularly and adjusted according to the forces in the market place. The plan must therefore be flexible, and incrementally implementable.

1.3 MULTI-DISCIPLINARY TEAM

In an environment where the demands for improved service quality and efficiency are constantly increasing, the planning and development of a port framework plan requires an increasingly broad and integrated approach in recognising, understanding and responding to these demands. Nowadays, port activities extend far beyond the loading and unloading of cargo. Over the years, ports have developed into centres for transhipment, industrial development, distribution, trade and transport, manufacturing, fishing, tourism and recreation etc. It therefore follows that this dynamic and complex nature in which ports function, requires a diverse and multi-skilled team of individuals to look at the overall planning of the port for the long term.

Developments in industry, distribution, land use, traffic and transport, the environmental implications of all these activities, and the consequences for employment and added value, need to be thoroughly investigated and form part of the integrated port development framework. The most effective way of achieving this was through the formation of a multi-disciplinary team, tasked with producing a comprehensive framework plan that addresses and responds to the immediate and future needs of all port users.

The multi-disciplinary task team comprised the following:

S Chait	-	Port Engineer - Convenor
G du Plessis	-	Chief Engineering Technician
B J Vosloo	-	Senior Engineering Technician (Drawing Office)
S Tandon	-	Port Captain
T Mayosi	-	Technical Manager
E Hill	-	Container Manager
O Borchards	-	MPT Manager
M Mondi	-	Environmental Manager
J Barnard	-	Property Manager
M Naidoo	-	Legal Advisor
YD Gajjar	-	Marketing Manager

2. HISTORICAL BACKGROUND

It is useful to review how the port has developed since the first settlers landed in Port Elizabeth in 1820. The historical development is depicted in Diagrams 1 to 8 and is broken down into various phases of development, each one extending over a number of years.

In 1820, the first British Settlers landed in Algoa Bay and started the development of the city which came to be known as Port Elizabeth. Of course, in the early years after 1820, there was no port development, and ships used to lie at anchor in the bay, and all cargo and passengers were ferried to and fro by lighters. It wasn't until 1839 that construction commenced on the first timber landing jetty, which was completed in 1841. It took a further 15 years before the first breakwater was commenced in 1856, which was only completed in 1866. However, this soon become silted up in 1867 (Diagram 1).

The next phase of development started in 1869 with the replacement of the first timber jetty, followed by a further replacement of the second timber jetty in 1880/81 by the cast iron North Jetty. This was followed soon after by a similarly constructed South Jetty built between 1883/84. A further cast iron structure, the Dom Pedro Jetty, was built during 1898 to 1902 (Diagrams 2 & 3).

There wasn't any further development until 1922 when the present Breakwater was commenced as an extension of the Dom Pedro Jetty. This was built as a slice blockwork construction with rock protection and was completed in 1933. The 1930's saw some massive expansion of the port infrastructure with the construction of the original Charl Malan Quay between 1930 to 1935, No 2 Quay between 1932 to 1936 and the Tanker Berth between 1936 to 1938 (Diagram 4).

This infrastructure sufficed until 1953 when the Tanker Berth was extended. Also during this phase of development No 2 Quay was widened between 1956 to *1959,* to include No 3 Quay and the Bulk Cargo Quay was built between 1959 to 1963 (Diagram *5).*

The latest phase of development was the lengthening of the Breakwater between 1975 to 1978 to allow for the development of container facilities by the widening of Charl Malan Quay between 1975 to 1983. The new tug jetty was constructed in 1989 (Diagram 6).

In the late 1980's the Burggraaf Committee Report was finalised in which the main conclusion reached was that an area of land and water had been identified as being unsuitable for commercial port operations and it was recommended that the land be utilised for a waterfront development for the promotion of the tourist industry, and also to provide a back-up area for development of the growing fishing industry.

This area was expanded to incorporate under utilized land adjacent to the port, belonging to Spoornet and Propnet. The total area under consideration consisted of 194 ha, a far cry from the 11 ha identified in the Burggraaf Report. A specialist group of Architects and Town Planners were appointed as consultants to prepare a development framework plan for the whole area, and the GAPS Report on the Bay Waterfront Project was finally completed in 1992.

In 1993 a developer was selected to carry out the Bay Waterfront Development, but this project never got off the ground, and was finally aborted in November 1999. In the interim period, a proposal to built a casino complex on the land presently occupied by the oil tank farm and manganese ore dumps was also mooted but never came to fruition. During this whole period of more than 10 years all development within the area in question had been stifled.

3. SCENARIO PLANNING

Any process of long term planning will always be burdened by the uncertainty which the future holds. One can always look at past history and do a statistical projection of the future growth, but this would be purely a mechanistic forecast, and not take account of external changes. Many external changes would have a major impact on the economy of the region and these impacts need to be taken into consideration. One way of achieving this is to create various scenarios and then investigate the possible outcomes if they should occur.

The main uncertainties which faced the task team at the beginning of 2000 were the following:

the new port at Coega
a new deep water container terminal at Coega
the Casino licence bid
the Divisionalisation process within Portnet
the National Ports Policy

The various scenarios considered under each of the above-mentioned, are dealt with hereunder.

3.1 THE NEW PORT AT COEGA

As a result of a number of approaches being made for various industrial developments within the existing port it soon become apparent that the spare capacity within the port was nowhere near sufficient to accommodate the proposed developments. In addition, the area surrounding the port had been built up to such an extent that there was no suitable land near to ~the port, which could be developed into the proposed Industrial Development Zone, that was mooted as a spin off of the proposed industrial developments within the port. In order for these proposals to be considered seriously, the idea of a port at the Coega river mouth, was rekindled.

The original idea of the port at Coega was that it should be an industrial port only, with an Industrial Development Zone (IDZ) adjacent to it. The raw materials would be imported through Coega, be processed in the IDZ, and the finished products then exported through the existing Port of Port Elizabeth. Thus, the two ports would be complimentary to each other. The Coega port would also have created the opportunity for the manganese exports and the oil tank farm, both situated in the existing port, to be relocated to the Coega Port. This in turn would have freed up land and quay space in the existing port for redevelopment into "clean" cargo activities.

During Portnet's planning and design stages for the Coega port, the Coega Development Corporation (CDC) selected a partner for the development and P & 0 Nedlloyd were selected. They now insist on a container terminal being provided at Coega, which has necessitated a whole new design and layout, notwithstanding the fact that they are still busy with a feasibility study for the container terminal.

At this point in time there are still no clients who have committed themselves, in writing, to the Coega port, and therefore there is great uncertainty whether —

(i) the new port at Coega will be built and
(ii) if it does go ahead, in the foreseeable future, whether a new deep water container terminal will be established.

For the purposes of this Long Term Development Framework Plan it has been assumed that the new port at Coega will go ahead in the short term and that the container terminal will be develop.

3.2 THE CASINO LICENCE BID

The promulgation of the new Gambling Laws resulted in the demise of the Bay Waterfront Project mentioned previously, but also created a demand for land within the port area for the development of a casino and entertainment complex. Certain developers envisaged such a complex on the site presently occupied by the manganese ore terminal and the oil tank farm and were given the rights to lease the land for a casino development. These rights were subsequently amended to grant them an option to develop the sites even without being granted a casino licence, and that option has now been exercised. The extent of the land which they require for development, and whether the land can in fact be leased or sold to the developer, is still being negotiated.

Naturally, the prospective developer can only be granted access to the sites once the present activities are relocated, and this can only happen if and when the new port at Coega goes ahead. Other uses for the sites also need to be considered such as the redevelopment for commercial harbour operations. The existing berth is -12,2 metres deep, and a further two berths can be built within the protection of the existing port and its breakwater. This would be by far the cheapest way to create additional capacity, should it be required.

The legal ramification of the Memorandum of Understanding between the prospective developer and Transnet must still be addressed, but for the purpose of this Long Term Development Plan it is assumed that Portnet will retain a 400 m wide back of berth area for redevelopment of commercial harbour operations.

3.3 THE DIVISIONALISATION PROCESS

Portnet officially split into two separate divisions on 1 July 2000, namely a Port Authority Division (PAD) and a Port Operations Division (POD). Although the split has led to some consternation amongst certain staff, the split has been achieved without any major impact on the port, and certainly has not led to any requirements for additional port infrastructure.

3.4 THE NATIONAL PORTS POLICY

This policy is still in the discussion stage, but it is not envisaged that the new policy will have any significant impact on this long term development framework plan.

4. Traffic

The use of past statistics and statistical forecast models is vital in preparing any framework plan. It is important to project when the existing spare capacity in the port is likely to become fully utilised, so that timeous planning for the provision of additional capacity in the form of basic infrastructure can be undertaken.

Each terminal operator has worked in conjunction .with the marketing department to project cargo throughput for the next 20 years. These statistics have been used as the basis for determining any future infrastructure requirements.

The following growth trends have been extracted from the statistics over the past five years:

4.1 CONTAINERS

Container imports in TEU's	19% per year
Container exports in TEU's	9% per year
Container transhipments in TEU's	10% per year
Containers total	13% per year

It would appear however that the volumes are levelling off or may even decline over the next few years.

The total number of TEU's handled at present at the two container berths is approximately 250 000 TEU's per year.

4.2 MANGANESE ORE

Manganese Ore exports have been fairly consistent at approximately *1,5* million tons per year with slight increases in 1995/96 and 1997/98. However, the projections are that exports will only increase very slightly over the next 20 years.

4.3 FRUIT EXPORTS

Although indications from the fruit industry projected a growth of 3 to *5%* per year, the statistics show a different story.
Fruit exports dropped from 390 000 tons in 1995/96 to between 360 000 to 370 000 over the period 1996/97 to 1999/2000. The forecast for 2000/01 is back to 390 000 tons for the year.

4.4 BREAKBULK

The statistics for breakbulk cargoes are too erratic to predict any patterns. Main commodities handled, excluding fruit and scrap metal, are wheat, motor vehicles, machinery, and timber logs.

5. CONTAINERS

5.1 INTRODUCTION

At present there is only one container terminal operation in the port which is situated on the Charl Malan Quay. The original Charl Malan Quay was built in the early 1930's as a general cargo handling quay but with the shift to containerisation in South Africa in the late 1960's it was decided to convert the Charl Malan Quay into a container terminal. This work was carried out between 1975 to 1983.

The construction work required the old quay to be widened from 180 metres to 400 metres. The breakwater was also extended at that time, to provide protection for the extended width of the quay. A new approach channel was also required as a result of the breakwater extension and the dredged sand was pumped ashore to provide the fill for the extended width of the quay.

The first container berth was officially opened on 1 July 1977 although construction work on the other berths, as well as the backup facilities, still continued afterwards.

In 1997/98 the stacking area was extended by an additional ± 60 000 m^2 of concrete paving.

5.2 STATUS QUO

The Container Terminal presently forms the major core operation in the Port of Port Elizabeth. In terms of tonnages handled per annum, containers have shown a steady increase in relation to bulk and breakbulk and presently accounts for almost 66% of the total tonnages handled.

Ever since its inception, the major business of the container terminal has always been the motor industry with respect to the import of various components, and more recently with the export of fully built up motor cars, as well as components such as engines and catalytic converters. Other commodities handled include fruit, hides and skins, wool etc.

The original terminal covered a total area of 23,1 ha with 3 904 ground slots. This was increased in 1997/98 by the provision of an additional + 60 000 m^2 with an extra 1152 ground slots giving a total of 5 056 ground slots available. This was later reduced to 4 770 ground slots with the implementation of COSMOS.

There are presently 2 Berths with 4 Container Wharf Cranes available.

Historically there has always been a large imbalance between imported and exported volumes which has necessitated a large number of empty containers having to be exported.

The major commodities imported have always been for the motor industry. By far the largest volumes have been CKD's followed by machinery, chemicals, rubber and textiles.

The major commodities exported over the past few years have also been linked to the motor industry. Fully built up vehicles have contributed the largest number of containers.

It is obvious, therefore, that the container terminal is largely dependent on the motor industry which is centred around the Port ElizabethlUitenhage metropole.

Port Elizabeth is at a disadvantage compared to Durban, as a result of the significant differences in the rail distances from the two ports to Gauteng which happens to be the economic hub of the country. Although Port Elizabeth is favourably situated with respect to Europe and the Americas, the extra rail costs impact very severely on the amount of traffic handled for Gauteng. Over the past few years, the rail tariffs were equalised which resulted

in Port Elizabeth gaining some extra cargo but now that the equalisation of rail tariffs has ceased, that extra business has been lost.

Over the past number of years there has been a considerable increase in the number of 40 ft containers, as a result of the motor car export program. The ratio at present is 55% of all containers handled are 40 ft.

5.3 OPTIMUM CAPACITIES

The optimum capacities have been calculated using the empirical formulas published by UNCTAD.

At present there are a total of 4 770 ground slots available (excluding 96 reefer ground slots). The stacking pattern is 1,5 containers high i.e. alternate rows in a stack have 1 and 2 containers high respectively. This allows any container in the stack to be reached by lifting a maximum of three over two.

According to the UNCTAD formulas, the optimum throughput capacities are as follows:

Stack Capacity	C_s = 322 000 TEU's per annum
Berth (Quay) Capacity	C_q =315 600 TEU's per annum

These capacities could be increased as follows:

Stack Capacity	C_s = 402 500 TEU's per annum, if the dwell time was reduced from *5* days to 4 days
Berth (Quay) Capacity	C_q = 352 800 TEU's per annum, if the handling rate was increased from 16 to 18 containers per crane hour

5.4 TERMINAL EFFICIENCIES

The current (2002) handling rate is reported to be 16,1 containers per crane per hour. This is the gross handling rate and includes all delays. As a result of the high proportion of 40 ft containers (55%) this is equivalent to a handling rate of 26 TEU's per crane per hour. The aim is to increase the handling rate to 18 containers per crane hour or 28 TEU's per crane hour.

Due to the spare capacity in the stacks, the dwell time has been allowed to average out at 5 days. If it become necessary as a result of space constraints, the average dwell time could be reduced to 4 days.

The terminal is currently handling approximately 250 000 TEU's per annum with an average of 480 ships calling per year. The average number of containers handled per vessel is 300 to 350 or 465 to 540 TEU's.
In comparison with the optimum capacities there is spare capacity of 38% in the stacks and 30% at the berths.

5.5 PROJECTIONS

Projected throughputs have been drawn up for the next 20 years in conjunction with the Head Office Marketing department. Although it is unclear what impact the development of the Coega Port will have on container throughputs, an optimistic approach was adopted and it was assumed that very little cargo would be lost to Coega. Even so, the projections over the next 20 years do not exceed 280 000 TEU's.

It would therefore seem as if there is enough spare capacity to cater for the next 20 years

and beyond.

5.6 SHORT, MEDIUM AND LONG-TERM PLANS

As a result of the spare capacity which will cater for the next 20 years at least, there are no plans to develop any additional infrastructure in the time frames being considered.

6. BULK

6.1 INTRODUCTION

The need for a Bulk Cargo export facility for South Africa become apparent after the Second World War and the focus turned to Port Elizabeth. A number of widely varying schemes were considered and evaluated, including the construction of a causeway to St Croix Island, in Algoa Bay and the provision of a loading berth on the island. Eventually it was decided to build a bulk handling facility on the southern side of the port, as an extension of the Dom Pedro Quay and adjacent to Kings Beach. Construction work commenced in 1957 and was completed in 1963. Operations started in April 1963. Export cargoes are railed from the Northern Cape mines around Sishen and Hotazel. This also meant that the main line had to be upgraded and electrified.

Initially only iron ore was exported, but once Saldanha Bay Port was built in the 1970's, the facility in Port Elizabeth was switched to handle Manganese Ore only. The facility was originally designed to handle 3 million tons of ore per annum. During 1968/69 the storage bins were increased from 290 000 tons to 380 000 tons storage capacity.

6.2 STATUS QUO

Ore trains arriving from the Northern Cape mines are split up and staged in the arrivals yard from where the trucks are passed through a tippler and the ore is transported by conveyor belts to the storage bins. Four concrete lined storage bins are available with a storage capacity of 380 000 tons. Up to 40 different grades of ore have been stored in the past, but more recently it has been limited to approximately 20 different grades.
The ore is placed in the bins by two mechanical stackers. When ready for export, the ore is again recovered from the stacks by means of three mechanical reclaimers and transported to the quayside by means of conveyor belts. A shipping gallery, running the length of the ship, transfers the ore to two shipping gantries which deposit the ore into the hold of the ship.

6.3 STATISTICS AND PROJECTIONS

Over the past 10 years (199 1/92 to 2000/01), manganese exports have ranged from a low of 1,180 million tons in 1994/95 to a high of 1,967 million tons in 1998/99, with the average being 1,500 million tons per annum. World markets appear to have stabilised and the projections for the next 20 years show a slow but steady increase to 1,700 million tons per annum.

6.4 TERMINAL EFFICIENCIES

Although the terminal equipment was originally designed for a capacity of 3,000 million tons per annum, it is nearly 40 years old, and cannot be expected to operate as efficiently as it did when new. A concerted effort by the terminal operator to increase the productivity has borne fruit and the loading rate has shown a steady increase from 750 tons per gross working hour in 1998/99 to the present 810 tons per gross working hour in 2000/01.

Parcel sizes range from 25 000 to 35 000 tons with the average being 29 000 tons. The average number of vessels calling is approximately 60 per annum which equates to an average berth occupancy of 34%.

6.5 ENVIRONMENTAL ISSUES

The nature of the product is dirty and dusty, and many complaints have been received from the general public over the years. An investigation was carried out by the CSIR a number of years ago which concluded that although the manganese ore creates a dust nuisance, there was no evidence of it being toxic. Portnet had therefore given an undertaking that the

manganese ore terminal would not continue to operate, in its present location, indefinitely, but at some time in the future would be relocated.

The proposed construction of the new port at Coega offers the ideal opportunity to shut down the existing manganese ore terminal and provide a more modern terminal at Coega. This needs to be vigorously investigated.

When the existing terminal shuts down it will be necessary to rehabilitate the existing ground before the site can be developed for any other activity.

6.6 SHORT, MEDIUM AND LONG TERM PLANS

In the short term it is envisaged that the terminal will continue to operate at the same levels as at present.

In the medium term it is envisaged that the new port at Coega will be operational and new modern bulk handling terminal/s will be established there. The existing terminal will therefore be shut down and dismantled.

In the long term there will be no bulk handling terminal in the existing port.

7. BREAK-BULK

7.1 INTRODUCTION

Break-bulk is handled in two separate areas, namely Charl Malan Quay (Berths 100, 101) and No 2/3 Quays (Berth 8, 9 and 10, 11).

Main commodities handled are:

Fruit - originating from Langkloof and Sundays River Valleys and exported to Europe (90%) and Japan (10%).

Scrap steel - originating in Bloemfontein, Iscor and local areas and exported to Japan.

Wheat - imported from USA (50%) Argentina (3 0%) and Australia (20%) and destined for local consumption in Port Elizabeth, Uitenhage and Aliwal North.

Timber logs - originating along the Garden Route and exported to Europe, Japan and America.

Vehicles - fully built-up Audis and Jettas are imported from Germany for local distribution throughout South Africa.

General - very small volumes of timber, steel coils, machinery and other commodities from various origins and to various destinations.

7.2 FRUIT

7.2.1 Status Quo

Fruit exports contributes 33% of the total income of the Multi Purpose Terminals (MPT) and constitutes the core operation of Break-bulk. A total of 230 000 tons per annum is exported through a privately leased pre-cooling store serving Berths 9 and 10. Only one exporter has established pre-cooling facilities in the port, and this could prejudice other role players.

7.2.2 Statistics and Projections

The maximum throughput capacity is 720 000 tons per annum. The season however, only lasts approximately 7 months.

Over the past 10 years, (1990/91 to 2000/01), fruit exports have fluctuated from a low of 246 700 tons in 1991/92 to a high of 392 300 tons in 1995/96. Current projections for 2001/02 are 350 000 tons with a small but steady growth of 2% per annum to approximately 500 000 tons per annum by the year 2019/20.

The average number of ships calling is 13 per month over the 7 month season, with an average berth occupancy of 40%

7.2.3 Short, medium and long term plans

In the short to medium term there is sufficient berth capacity to handle the volumes. One needs to consider the expectations of other stakeholders however, and the demand for alternative pre-cooling facilities could become more urgent.

In the long term the opportunity would present itself to consider the development of other fruit terminals if some of the present activities in the port were relocated to Coega.

7.3 SCRAP METAL

7.3.1 Status Quo

There are two main clients exporting scrap metal which amounts to 85 000 tons per annum. Scrap metal is stockpiled on a designated site between the Port Administration Building and the Jetty Street Bridge and is conveyed in bins by trailer/tractor to the quayside where the bins are hoisted by ships derricks.

An additional site much closer to the quayside has recently been developed with the provision of a rail siding. This will greatly speed up the handling rates.

This is the second largest operation of MPT and contributes 11% of their total income. The exports are handled at the Charl Malan Quay at Berths No. 100 and 101.

7.3.2 Statistics and Projections

Throughput has fluctuated wildly in the past 10 years with current volumes amounting to 85 000 tons per annum. It is anticipated that another client will begin exporting shortly and that throughput will increase to 165 000 in the year 200 1/02. These volumes will be maintained for the next three years whereafter this commodity will slowly decrease to approximately 22 000 tons per annum by the year 2019/20.

The average number of ships calling has been 6 per annum, but this will increase to 10 per annum for the next 3 years, before falling away to only 1 shipment per year.

7.3.3 Short, medium and long term plans

In the short term the scrap metal will continue to be handled at Berths 100 and 101. Berth occupancy is low enough not to require any additional infrastructure.
In the medium to long term, consideration should be given to moving this activity to Coega, but the volumes will reduce to such an extent that it may not be viable to handle it at Coega.

7.3.4 Environmental Issues

This product does cause an environmental concern with contamination of the soil in the stacking area, and consideration needs to be given to relocating the activity to Coega.

7.4 OTHER COMMODITIES

7.4.1 Status Quo

The other remaining commodities such as wheat, motor cars, timber, steel coils, machinery etc. constitutes such a small percentage of MPT activities (10%) that they can all be considered together. Total throughput for the present year amounts to 140 000 tons.

Various berths are used for the commodities as follows:

Timber logs	exports	- Berth 100/101
Vehicles	imports	- Ro/Ro Ramp
Wheat	imports	- Berths 10/11
Timber	imports	- Berth 8
Machinery	imports	- Berth 8
Other		- Berth 8

7.4.2 Statistics and Projections

The present throughput of 140 000 tons per annum is projected to grow to 144 000 tons by

the year 2003/2004, but then will fall off to 122 000 tons by the year 2019/20.

7.4.3 Short, medium and long term plans

There is sufficient capacity to cater for these commodities for the next 20 years and there are therefore no plans to develop additional infrastructure.

8 PORT AUTHORITY

8.1 DREDGING

One of the primary responsibilities of the Port Authority is to ensure that the promulgated depths in the harbour are maintained at all times. This obviously includes the entrance channel, which if allowed to silt up, would result in the whole port having to shut down, as no vessels would be able to enter or leave. The ports on the eastern seaboard of South Africa have to contend with the phenomenon of littoral drift. Due to the angle of attack of the waves as they reach the shore, sand is eroded from the beaches and moved along the coast in a northerly direction. Since the commencement of construction of the breakwater in 1922, a barrier was placed in the direct line of travel of the littoral drift of sand, and it was therefore deposited behind the breakwater. This led to the creation of Kings Beach, as the breakwater formed a manmade storage reservoir which forced the sand to settle and collect behind the breakwater. This has continued for about 75 years until the sand has now virtually filled up the storage space behind the breakwater, and is now passing around the breakwater and landing up in the entrance channel.

As a result of the sand moving around the breakwater it has become necessary to dredge the entrance channel on an annual basis, at great cost to the port.

A proposal to provide a fixed sand bypass scheme, at the root of the breakwater, has been submitted for approval by the Transnet Board. If approved it would be built in the short term

9. LAND USE PLANS

The freeze on all leases as a result of the Bay Waterfront Project resulted in a substantial area of land lying dormant for a number of years. This together with other less desirable areas of land is shown on Annexure ...

The development of sites for the fishing industry will result in the vacant land along Soldiers Road being taken up in the short term. It is not envisaged that the other smaller sites will be in demand and will probably remain vacant.

The possibility of acquiring the strip of land between the Baakens River and Kings Beach, which is presently owned by Spoornet, has already been discussed with Spoornet and appears to be a distinct possibility, should the demand for lease sites for the fishing industry, exceed the available land being developed at present.

In terms of the projections of the various terminals, there is no envisaged real growth in cargo over the next 20 years, and consequently no additional land will be required by the existing terminals.

As mentioned above, a group of developers have exercised their option to lease the land occupied by the manganese ore terminal and the oil tank farm, for the establishment of a commercial development aimed at the tourism and recreational industry. The proposed development is designed around a marina with a water access through the existing Dom Pedro Quay.

The question that now needs to be considered is whether PAD can afford to allow such a commercial development on prime harbour land, or whether it should retain the land for possible future expansion of harbour operations. On the one hand, all cargo projections indicate a negative or very insignificant growth over the next 20 years, with the possibility of even more cargo being lost to Coega. However, on the other hand the whole purpose of Coega is intended to have a very significant impact on the economic recovery of the region. This will no doubt result in a bigger demand for port facilities. Furthermore, with Portnet's committed aim to privatise port operations as quickly as possible, the prospect, of many more terminal operators requiring port facilities, is very real.

The opportunity exists at the manganese ore terminal to extend the existing Berth No 13 by two additional deep water berths (-12,2 CD) with the required backup areas. It is considered that this is such a golden opportunity to redevelop the sites for "clean" cargoes, as and when the need arises, that it would be a fatal mistake to forgo the opportunity, by allowing the land to be leased/sold for the proposed commercial development.

The alternative to the development of the above-mentioned three berths for port operations, would be to extend the harbour northwards of the Charl Malan Quay, at very much higher cost. No cost estimates have been done but the cost to extend the three berths inside the port would only entail the construction of two additional quays, and a minimal amount of dredging. However, the cost of providing the same facilities by extending the harbour northwards, would entail the additional costs of extending the breakwater, the dredging of a new approach channel, the dredging of new basins, the reclamation of land etc. These cost would amount to many hundreds of millions of rand.
Portnet's core business is the provision of port infrastructure for cargo working and port operations and no matter how inviting the offer is for land to be developed for commercial purposes, it is considered that whatever land we have, should be retained for the possible future needs of port operations.

10. OTHER INDUSTRIES

10.1 FISHING INDUSTRY

In terms of the Burggraaf Committee Report published in 1988 the need for additional facilities for the fishing industry was identified. Since then there has been a concerted effort by the local fishermen for the quotas to be re-allocated more to the locals rather than the big international companies. There is also a huge increase in the number of smaller companies operating out of Port Elizabeth.

The campaign for a larger share of the quotas has been very successful and the anticipation is that in five years the fishing industry would grow as follows:

Hake	522% growth
Lobster	213% growth
Pilchard	269% growth
Maasbanker	new species
Average	560% growth

The existing leases of land and buildings amounts to 23 000 m^2 but already there are 16 new applications for leases requiring a further minimum area of 28 000 m^2. The Bay Waterfront Project resulted in a freeze on all leases in the area until it was eventually cancelled in November 1999. This paved the way for alternative use of the land which was then earmarked for the development of facilities for the fishing industry.

At present PAD is busy with a project to provide basic services to the area so that the sites can then be leased to the fishing industry. This will be achieved in the short term.

A further need of the fishing industry, which was identified, is the provision of additional berthing space. Whilst the demand is not immediate; we have identified a potential for providing an additional 500 metres of jetties with an additional 1000 metres of berthing space.

This would be provided as the demand materialises, which is expected in the medium to long term.

10.2 OIL INDUSTRY

The Oil Industry has been leasing the sites where the tank farm is situated since 1939. Originally the leases were for 25 years but these were renewed in 1964 and again in 1989. However, in 1989 the industry was advised that the leases would not be renewed again, and consequently they will terminate in 2014. This decision was taken after persistent outcries, from the general public as well as politicians and others, about the potential hazard posed by the close proximity of the tanks to built up residential areas, as well as the impact on any proposals for tourist and recreational developments.
The Burggraaf Committee Report published in 1988 also identified the negative impact of the tank farm on any potential developments, and recommended that its relocation should be investigated.

At the time of the decision not to renew the leases after 2014, there was no definite plan of where the industry would relocate to. However, the subsequent proposals for an industrial port at Coega, provided the ideal opportunity for relocation.

Although the oil industry could delay the move to 2014, it is considered that they would opt to move sooner, rather than later, to gain the advantage of the best sites available. This would probably result in the relocation of the tank farm and tanker berth being implemented in the medium term.

10.3 TOURISM

During the process of bidding for casino licences, the area occupied by the manganese ore terminal and oil tank farm was offered to one of the bidders on a long term lease, on the understanding that these two sites would be vacated when Coega is built.

The company was not successful in their bid for a casino licence, but nevertheless is still extremely anxious to proceed with a commercial development to cater for the tourism and recreation industries. In terms of their agreement with Transnet, they have been given the right to lease the land, which option they have exercised.

11. ENVIRONMENT

11.1 GENERAL ISSUES

1. The environmental issues in this port originate from the issues mentioned below, which could be addressed in future at an early stage such as that of planning and construction. Many issues are a direct result of poor environmental consideration during decision making:

    * The land use in the port is ad hoc hence you find facilities next to each other with incompatible activities; e.g. Dom Pedro Jetty is used for both ice and bunker facilities which is unacceptable;

    * Allocation of buildings and construction of structures within the port are needs driven and do not follow any particular pattern;

    * Some buildings were constructed with asbestos sheets and these have started weathering thereby posing a threat to both employees and the public at large. The disposal costs for asbestos are extremely high and should therefore weigh the immediate saving we make in buying a cheaper material versus the risk and disposal costs;

    * The drainage system in the entire port is flawed and must be addressed with future modifications and amendments. There is currently no way of isolating the potentially contaminated runoff from clean storm-water and runoff

    * In addition to what the port policy says, serious consideration of natural resource depletion and energy consumption is required. This could be addressed in future by adopting ECO-Efficiency principles, more especially when constructing buildings.

2. A Strategic Environmental Assessment (SEA) for the port must be conducted and provide decision-makers with sound environmental basis. The SEA should address hydrodynamics in Algoa Bay and cover the effects of dredged spoils dump, storm-water outlets and the industrial pipelines on the port activities and future developments. The SEA will reveal opportunities that exist based on what the environment can offer.

3. We should consider an integrated approach of SEA and the Port Development Framework, which will cover the entire region and attempt to quantify the impact of Coega on the existing port. This combination has a potential to produce a more informative document.

4. Development of Environmental Management Systems (EMS) for facilities in the port should be prioritised for new developments before they deteriorate to the level of other facilities in the port and also developed EMS's for existing facilities.

11.3 CONTAINER TERMINAL

1. In the event of a major spill or disaster, this area cannot be isolated from the broader environment nor can we contain the spilled product within the affected area because of the lack of channels or trenches to control the spill. Same applies with workshops.

1. The drainage system is not ideal.

11.4 BULK TERMINAL

1. Drainage: rain that falls onto the area could be contaminated and wash away into the broader catchment area;

2. Dust: Main challenge in this terminal.

3. Aesthetics: the land use adjacent to this area is more tourism oriented and definitely not compatible with the activities of this terminal.
4. Rehabilitation: Future developments should address rehabilitation from the onset to ensure that the end state of the area in question is known, acceptable and complies with the envisaged land use.

11.5 BREAKBULK

1. Problematic products or commodities should in future be handled on sites that are properly designed and have at least minimum environmental controls to ensure environmental protection. For example, scrap handling in ports: depending on where the source is and what the scrap is contaminated with, it may have serious threats to human health, natural systems and the biophysical environment.
   In this port pedestrians coming of the pedestrian bridge are exposed to all kinds of hazards ranging from:

   * Shanting that takes place while employees are crossing over to the office;
   * The possible effect that may originate from the scrap itself;
   * Possible groundwater contamination from rainwater that falls onto scrap and percolates down, bearing in mind that we operate on reclaimed land;
   * It makes more environmental sense to relocate the scrap to an area with hard surface and closer to the loading berth.

11.6 FISHING INDUSTRY

1. The general fishing community requires basic facilities that will indirectly reduce the environmental impact resulting from their current way of operation. There is definitely a need to set aside an area for this industry as an attempt to facilitate order;

2. Mariculture has a potential to impact negatively on the port environmental in the sense that the organic material that gets generated in the process may when settled at the bottom of the sea, increase the probability for contaminants to settle. This will depend on a number of factors that may prove otherwise when assessed.

3. The port environmental policy will have to be adhered to in any future development, including all other relevant government legislation as well as the Portnet's Corporate Policy should it be developed.

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1 Introduction

1.1 Task

This report includes the civil engineering review of the Port Elizabeth Multipurpose Terminal and forms part of the required Base Information Packages.

1.2 Objectives

The objectives of this status quo report are to identify:

- The general physical limits of the terminal;
- The basic condition of built facilities;
- The proximity to Urban developments and impacts of future development plans;
- The physical limits to expansion of the terminal.

1.3 Itinerary

During the period January 2003, from 16 till 23, discussions took place with representatives of SAPO (South African Port Operations) and NPA (National Ports Authority).

2 Physical Limits of the Elizabeth Multipurpose Terminal

2.1 General

The Port of Port Elizabeth is situated in Algoa Bay on the south-eastern coast of Africa, midway between the Ports of Durban (384 nautical miles north-east) and Capetown (423 nautical miles west).

The Port of Port Elizabeth being at the centre of the country's motor vehicle manufacturing industry handles large volumes of containerised components and Bulk and Break bulk commodities for this industry.

The Port of Port Elizabeth is the fifth largest port in Southern Africa with a throughput of 6,500,000 metric ton in 2000 and 4,150,000 in 2001.

The total tonnage handled (import + export) in 2000 comprised 7,500,000 (coastwise + transhipment).

The lay-out of the Port of Port Elizabeth is given in figure 1 as shown on this lay-out the Container Terminal comprises the largest part of the Port. The oil tank farm is located at the southern border of the Port as is the manganese ore stockpile and loading area.

The Multipurpose Terminal is concentrated at the centre of the harbour and the fishing industry due south of it.

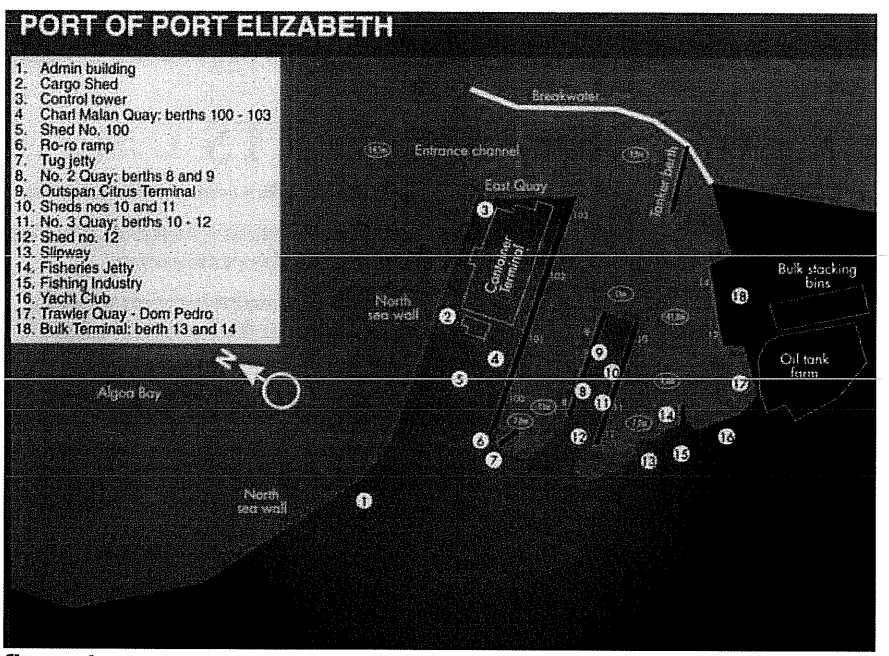


figure 1

2.2 Location of Multi Purpose Terminal

Initially the Multipurpose Terminal made use of quays no. 2 (berth 8 and 9) and no. 3 (berth 10, 11 and 12) as from January 1st 2003. Berth no. 9 and also 50 % of berth no. 8 are used by the Fruit Terminal (50 % Capespan) who operates as a hundred percent private company.

Berth no. 10 and no. 11 are used as waiting berths during the peak period of the fruit season.

At other times the berths are used by fishing vessels.

At berth no. 12 a water depth of 7.00 m is available. This berth is occupied permanently by a fish-factory ship.

Figure no. 2 shows an aerial photograph of the multipurpose terminal with berth no.'s 8 and 9 in the front. The wharf cranes (7) at berths 10 and 11 which are shown on figure 2 have been scrapped and no replacement has taken place.

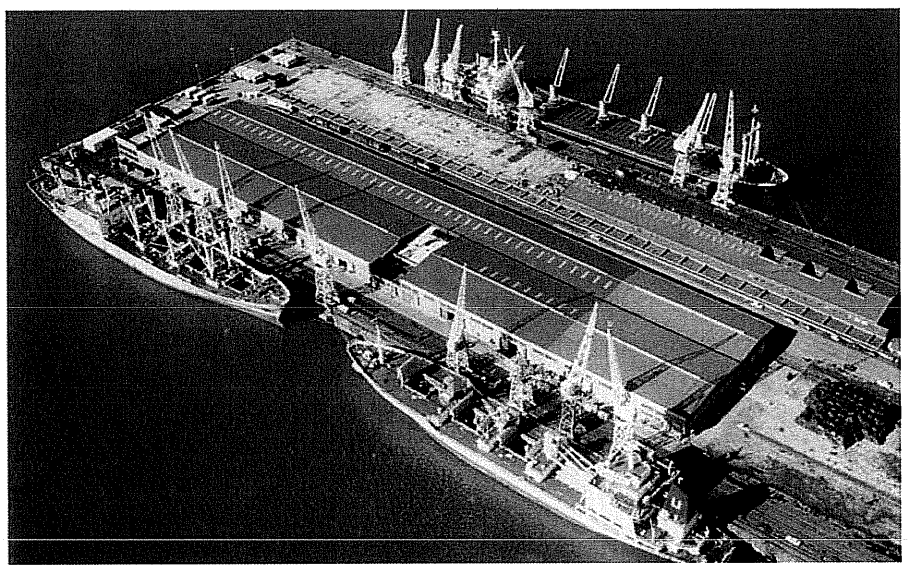


figure 2

The entrance towards the Multipurpose Terminal is good and opposite quays no.'s 2 and 3 sufficient water area is available for safe manoeuvring of vessels.

The rail connection of the Multipurpose Terminal is good with rail tracks along the whole length of the quays.

Road connection with the South African Highway system is rather poor as all road-traffic has to pass the city of Port Elizabeth first.

2.3 General information on the Terminal

The Multipurpose Terminal consists of:

Berth 8 and 9
total length 519 m depth – 11.00 m CD

Berth 10 and 11
total length 396 m depth – 10.00 m CD

Berth 12
total length 122 m depth – 6.00 m CD

Berth 100
total length 133 m depth – 11.00 m CD

Berth 101
total length 290 m depth – 11.00 m CD

figure 3

For break bulk (cars) berth no. 100 and no. 101 are used on quay no. 1.

Although the Port Elizabeth car terminal is the smallest car terminal operated by SAPO the current increase of imported cars made it necessary also to utilize berth no. 101.

This berth 101 as such no longer belongs to the Container Terminal. The financial year 2001-2002 saw handling of 13,140 vehicles.

A unique feature of the car terminals is that there is a de-waxing and washing facility where imported cars can be de-waxed, washed and distributed to the dealer ship from the terminal. Expansion plans are in place to increase the current capacity from 17,000 m^2 to 63,000 m^2. Already 6,000 m^2 under cover storage is available.

Figure 4 shows part of the car terminal at berth 101.

figure 4

The commodities handled by the Port Elizabeth Multipurpose Terminal are:

- CITRUS and DECIDUOUS fruit (export) (season April – November) - 2001–2002 ~300,000 ton
- timber, scrap steel, others (export) - 2002-2003 forecast ~100,000 ton
- timber, fresh fish, wheat, steel rails, sugar, machinery, maize, abnormal machinery + others ~ 250,000 ton
- break bulk (RoRo and vehicles) - 2002-2003 forecast 160,000 ton.

So, as the citrus and deciduous fruit is handled by a private company, the Multipurpose Terminal (SAPO) only handles some 510,000 tonnes yearly of which 160,000 tonnes are vehicles.

All the wharf cranes (7) on quay no. 3 are scrapped. At Quay no. 2 only one crane is available at present. The others are being rehabilitated by SAPO, with the intention of ensuring availability of 4 cranes for fruit and other break bulk cargo.

Now left with only two wharf cranes it will take over 14 days to discharge a 4,000 dwt vessel. This in fact is not acceptable.

3 Condition of Built Facilities

3.1 Berth structure

Quay no. 1, berth 100 (length 133 m) and berth 101 (length 290 m) was built as a gravity type structure consisting of 15 tons pre-cast concrete blocks. Top of the quay 5,18 m + CD.

Dredged elevation 11,00 m – CD.

At berth 101 the original capping beam has been partly removed and replaced by a new beam to support the container handling cranes.

The tunnel in the mass concrete capping accommodates the service utilities such as water and electricity.

No significant deformation or damages have been observed on the quay structure during the short visual survey.

Bollards of the 'slope-back' type are placed along both berths at 20 m intervals and a capacity of 80 tons.

Both berths are provided with single 'earth-mover tyre' fenders offering a good protection of the quay sides.

It is recommended to replace the iron covers of the service tunnel by stainless steel covers.

Quay no. 2, berth no.'s 8 and 9 (total length 519 m) was built during the period 1932 – 1936 as a gravity type structure and renovated during the period 1959 – 1963. Top of the quay at 5.18 m + CD and dredged elevation 11.00 m – CD. The quay structure does not show any major damages and/or displacements. Bollards are placed 18 m c.o.c. very close to the edge of the quay. Fenders are single 'earth-mover tyre' type diameter 3.00 m. The capping beam needs to be upholstered. There is one train rail under the crane available and two train rails at the landside of the crane.

Quay no. 3, berth 10 and 11 (total length 396 m) was built as a gravity type structure during the period 1959-1963. Top of the quay at 5.18 m + CD with a dredged elevation of ~10.00 m CD.

The adjacent basin is only dredged at 9.00 m - CD.

Although during the short physical inspection no major damages and/or displacements were observed it looks as if the quay has had no maintenance over the past 25 years.

The total length of the quay needs to be refurbished as covers are missing (open pits) or broken and the concrete of the capping beam is crushed at several places.

Bollards at 18 m c.o.c. are of the old-fashioned vertical type very close to the edge of the quay. Fenders are ok.: 'earth-mover tyre' type with 3 m diameter. As there initially were

three train rails of which one was positioned under the crane it seems that nowadays only one rail track is in use. All seven cranes on this quay have been scraped. Berth no. 12 is permanently in use to moor a fish factory vessel.

Fishing boats (total length 122 m) come alongside this vessel to unload their catch.

3.2 Pavement, roads and drainage

At berths 100 and 101 the pavement between the crane and train rails consists of asphalt concrete. Part of the pavement was renewed at the time of the visit in order to obtain a smooth surface to handle the imported vehicles. At the landside the pavement consists of concrete bricks on a cement stabilised subsoil. Part of this surface is not in a good condition. At quay no. 2 a new concrete paved storage area and storage facilities were installed in 1999 and are in use by the fruit company (berth no. 9 and part of berth no. 8).

At quay no. 3 the pavement looks to have had no maintenance within the past 25 years: rail track are sometimes 5 cm higher than the existing pavement; many open pits, many damaged surfaces and a lot of rubbish spread around.

The surface drainage was blocked by dirt at several places, but no pronounced settlements were observed at the outlets towards the harbour.

3.3 Buildings

Along berth no. 9 the private Fruit Company owns a renewed /rebuilt storage cooling facility. This is a good looking well maintained building with a surface area of approximately 18000 m^2 (see figures 2 and 5).

Opposite berths 10 and 11 a approximately 7,000 m^2 warehouse is positioned and in a deplorable state. The building has a cellar underneath the whole length of the building formerly in use as a cooling facility.

Nowadays only a small part of this cellar, with its bottom under the water level, is used to store fishing nets. This storage facility should be completely removed or restored in case dedicated cargo is available.

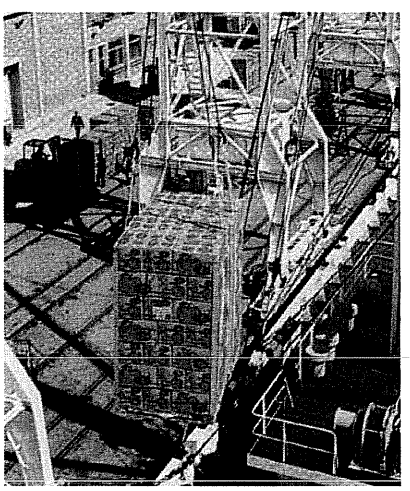


figure 5

The smaller structure, opposite berth 12 is also in a bad condition.

Part of this shed is nowadays used for maintenance of the forklifts, etc.

Opposite berth 101 at quay no. 1 and under cover shed for storage of cars is available with a surface area of approximately 6,000 m^2.

This is a good looking shed only a few years old.

3.4 Dredging

Due to the littoral drift along the coast there is resulting sediment movement in northerly direction. Some of these sediments are settling in the approach channel. This approach channel initially was dredged wider to trap some of the sediments. It was understood that nowadays that due west of the breakwater a sand trap was dredged to collect the transported sediments. Regular dredging is required to empty this artificial sand trap.

There are also plans to 'by-pass' the sand by means of a permanent pump station at the west-side of the Port and discharging the sediments via a pipeline at the north side.

In the middle section of the breakwater one can see waves passing through the rubble mound structure. This part apparently consists of large stones only as also sand is passing through this section. This sand has formed a sandbank at the inner side of the breakwater as can be clearly seen at low water.

This bank is situated outside the approach channel and turning area for the vessels.

In the past maintenance dredging was in the order of 100,000 m^3 to 200,000 m^3 per annum. However it is expected that maintenance dredging will increase to about 500,000 m^3/year. This is approximately the same amount to be pumped yearly by the 'sand-by pass' structure in case this plan should become reality.

4 Operational Issues

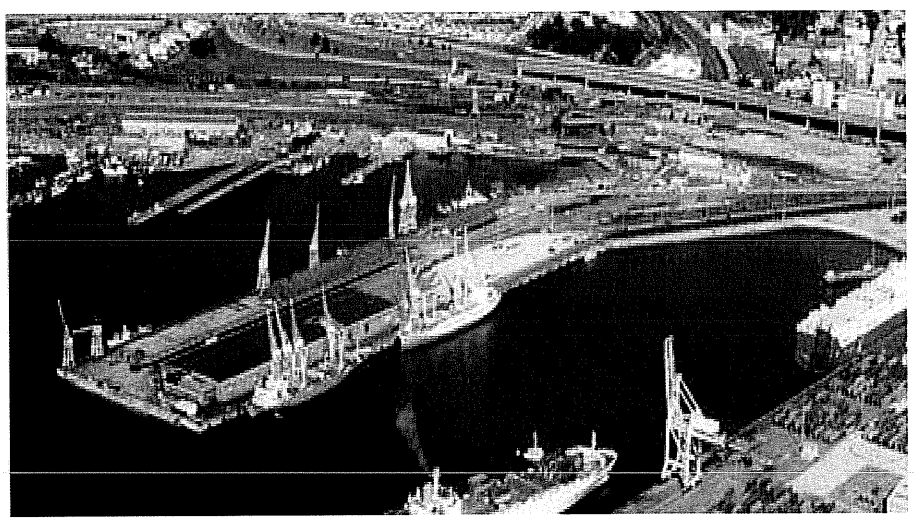
4.1 Operational characteristics

Under the management function of the Multi Purpose terminal in Port Elizabeth are three distinct types of operation;

- Ro-Ro and car operations on berth 100 Charl Malan Quay
- General cargo and breakbulk operations on berths 8, 10, & 11
- Bulk mineral ore, manganese, on berths 13 & 14.

In addition to these operations, the port also includes a private fruit terminal operated by *Fresh Produce Terminals* (formerly *Outspan International*) on berth 9 on No 2 quay, and the Oil Tanker berth at the root of the South breakwater which is linked directly to the oil tank farm and operated by the concessionaire.

Figure 6: Port Elizabeth Multi Purpose berths, 8, 9, 10, 11 plus Ro-Ro 100



4.2 Ro-Ro and Break-Bulk operations berth 100, Chari Malan Quay

Berth 100 lies at the inner end of No 1 quay on the south side of the Charl Malan Quay and has a small Ro-Ro ramp suitable for stern ramped vessels. However developments in the motor car trade, mostly the importation of fully built up Audi and Jetta cars from Europe, which are shipped in large pure car carriers with side and angled stern ramps has rendered this ramp almost redundant.

Berth 100 has a nominal length of only 133 metres and depth alongside of 10.9 metres. The inner end of the berth configuration is restricted by the tug jetty and the space required for the berthing and manoeuvring of the port's three tugs. When necessary, due to the length of ships and for operational reasons the MPT has the use of berth 101 in the container terminal which can provide an additional 290 metres of berthing space..

A washing and de-waxing facility has been established in the rear of berth 100 which provides an added value service to the car industry.

The continued growth of the car trade and the demands of importers for a totally clean environment has resulted in the virtual dedication of this berth solely for car movements, and the break bulk cargo, including timber and scrap steel, previously shipped using this berth has been moved to berths 8 and 11 .

Figure 7: Imported cars parked on open space behind the tug jetty

The operation of Ro-Ro cargo is performed by SAPO with hauling units and roll trailers and for the car trade with trained and specially equipped teams of drivers and checkers.

4.3 The break bulk terminal, berths 8, 9, 10 and 11

The break bulk terminal on quays 2 and 3 forms the core of the Port Elizabeth Multi Purpose Terminal and consists of the following facilities;

	Berths		Cranes		Storage	
	Length (m)	Design Depth (m)	No.	Lift Capac. Tonne	Shed	Floor Area
No. 2 Quay						

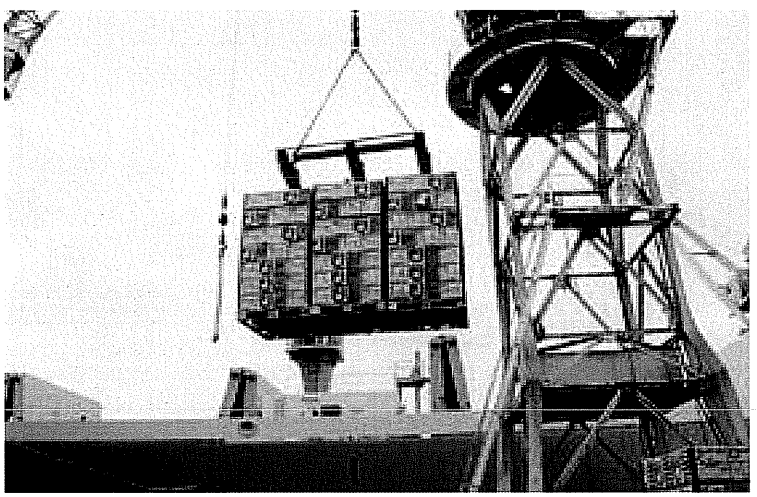
Berth 8 & 9	519	10,9	8	4		
No. 3 Quay Berth 10 & 11	396	9,9	1 8	15 4	No. 10 & 11	8.651 m²
Berth 12	122	6,9	Fishing vessels		No. 12	1.686 m²

Berth 8 is used for general cargo and, during the heavy fruit season as the clearing and parking area for trucks and operations related to vessels berthed at the Outspan cooling facility on berth 9.

The pre-cooling facility of *Fresh Produce Terminals* on berth 9 has overall dimensions of 300m by 60m. The full undercover storage area is 17,500m^2 with storage capacity for 6,000 pallets in the cooling chambers and a further 2,400 pallets stored under cover, but in ambient temperature conditions.

SAPO staff are involved only in the movement of pallets of fruit from the shed to the ship and in the driving of the 4 tonne portal cranes. Private stevedoring firms contracted by the shipper carry out stevedoring operations on the ships.

Figure 8: Pallets of fruit lifted by SAPO portal crane



Berths 10 and 11 on No 3 quay have a combined length of 396 metres and depth alongside of 9.9 metres and are used for general cargo operations, which includes timber and grains. Operations are normally by ship's gear, with the SAPO staff involved only in the handling of cargo on the dock.

4.4 Scrap steel.

The handling of this commodity has in the past contributed about 11% of the gross income to the MPT, even though the operational involvement is only in the movement of bins of scrap from the stockyard to the ship's side.

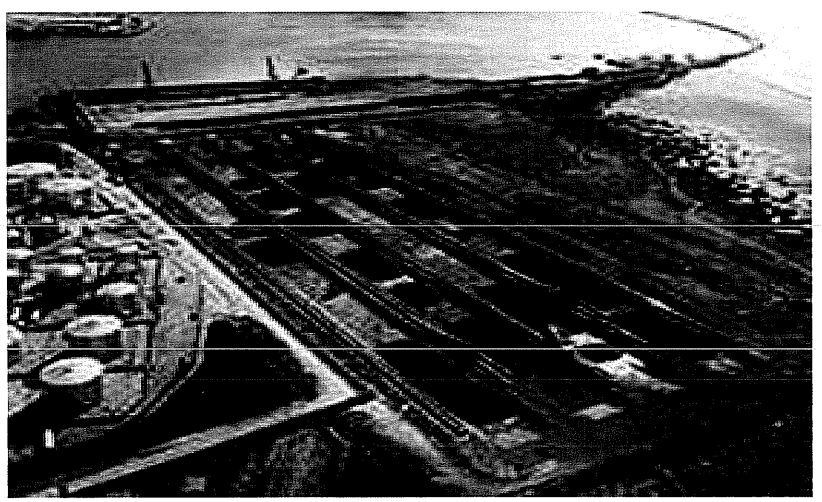
Scrap steel is currently stored on open land between the port administration building and the Jetty Street bridge and is delivered into the port by rail. Wagons are unloaded by back-actors to await shipment. For delivery to the ship the material is loaded into skips which are then transported on trailers to the ship for lifting on board by ship's gear. The volumes of scrap shipped each year vary considerably from 60,000 tonnes to 120,000 tonnes, with average parcel sizes of less than 10,000 tonnes.

The increase in car shipments using berth 100 and the conflict between this type of cargo, in terms of rusty dust and shards of metal on the ground, has meant that scrap has been transferred to available berths on quays 2 and 3 with consequential longer transit distances and potential for more contamination of road surfaces.

4.5 The dry bulk terminal.

The dry bulk terminal is located on the extension of the old Dom Pedro pier on berths 13 and 14 with depths alongside of 12.2 metres. The terminal operates as a self contained export centre for manganese ore.

Figure 9: Overview of the Manganese ore terminal



The terminal was originally brought into operation in 1963 for the export of iron ore, but in 1976 the port in Saldanha Bay was opened with a shorter rail linkage and iron

ore exports were transferred to Saldanha. In principal the terminal can handle any kind of dry bulk commodity (except foodstuff and grains).

The design capacity of the terminal was for 3.5mln ton p.a. of iron ore. During the early years the terminal handled these amount of manganese ore, however since the mid 1980s, the volumes of manganese ore for export declined to an all time low of 1.1m tonnes. Current manganese ore exports runs at about 1.5 million tonnes per annum.

South African manganese ore is of high quality but the production processes in the manufacture of steel are changing. The new mini-mills and electric arc furnace developments are expected to reduce the global demand for manganese ore. Furthermore manganese ore is increasingly converted into Ferro alloys and exported as the more valued Ferro alloy products. It is possible that in the future the export of manganese ore may be superseded the export of Ferro Alloys and/or the whole process will be transferred to the new port and industrial complex at Coega.

Manganese ore is sourced from four mines near Hotazel by two main mining companies:

- Associated Manganese Ore (Assomang) and
- SA Manganese Corp. (Samancor).

The mining areas are connected to the port by a single railway track of 1100km. Spoornet operates the rail and manganese ore is the single commodity over most of the length. Each train load consists of a string of 100 wagons each with a maximum tare load of 63tonnes. Normal loading is at 96% i.e. about 61tonnes per wagon. Approximately 30,500 tonnes is discharged in a five working day week. The ore is discharged from the rail wagons by two tipplers, of about 63 tonnes each, capable of discharging 18 wagons an hour. Two wagons can be tippled at a time.

From the tipplers the ore is transferred by belt to two stacker units which each serve two of the four bins.

The open stock bins have length 300 metres and are 20 metres wide and each have a nominal capacity of 100,000 tonnes.

Manganese ore is normally stored in up to 14 different grades, and is recovered for delivery to the ship loaders by three reclaimers. The material is then transferred by belt to the two ship loaders, which have a rated loading capacity of 750 tonnes per hour. Average ship loads amount to 20,000 tonnes and may consist of several grades, each of which has to be loaded and segregated to avoid cross contamination.

Rail operations are performed five days a week with a single day time shift, while ship operations are performed 24 hours a day with two shifts.

Figure 10: Different grades of manganese ore in one of the bins

5 Environmental Issues

The port of Port Elizabeth is a long established port that has developed and expanded in over a century of use. Its location on the western side of Algoa Bay provided some shelter from the predominant westerly winds and a convenient access to the hinterland of the Eastern Cape.

The port has essentially three sections:

- The Charl Malan Quay with the container terminal
- No 2 Quay with fruit and Break-Bulk cargo
- The southern berths with the Manganese ore terminal and the tanker berth

There are also significant areas set aside for local; fishermen and leisure activities.

The main environmental factors which affect the port apply to all sections and will be discussed on a port-wide basis:

- Wind and swells in the entrance
- Siltation of the entrance due to littoral drift
- Dust contamination from the ore stacks and scrap iron
- Ground and water contamination
- Oil contamination risks from tanker operations
- Lack of segregation for hazardous cargoes or spills
- Pressure on port land for residential, commercial or leisure use
- The development of Coega or Ngqura port

1.1 Wind and swells

The port is well protected by the land and the city of Port Elizabeth from westerly winds, but during the summer months the port experiences periods of strong and persistent easterlies which build up a large swell and heavy sea conditions in Algoa Bay and in particular at the entrance to the port. The south breakwater does afford some protection but vessels in their final approach are heading south, at broad angle to the swells and manoeuvring can be affected.

1.2 Siltation

The south coast is subject to a general eastward coastal drift current which carries considerable volumes of fine sand. The South breakwater was constructed to divert that drift and to allow the build up of sand, in the form of a land trap, to form Kings Beach.

This land trap, or beach accretion, is virtually full and the problem of sand drift along the breakwater and around the head into the entrance channel is becoming more serious. There is also some leakage of sand through the breakwater structure and the build up of sand in the main part of the entrance channel.

The advantage of the land trap has been the growth of the sandy beach, Kings Beach, just outside the town, which has attracted plans from developers of leisure and waterfront activities.

1.3 Dust contamination

There are two main sources of dust and airborne contamination from the port and both of these are most noticeable during periods of on-shore winds.

Manganese ores

The open silos for the stockpiling of manganese ores awaiting shipment are located to the south of the port behind Kings Beach and form an open area capable of holding some 380, 000 tonnes, ranged in four large concrete silos. The annual throughput of manganese ore through the port amounts to about 1,500,000 tonnes in shipments of up to 30, 000 tonnes. This volume of storage and shipments mean that during an average year the port is host to about sixty ships loading ore at the berths and the stockpile has to be recharged on a daily basin with train loads of ore delivered from the Sishen and Northern Cape mines.

Handling of rail delivered ore is by tippler and transfer by conveyor belts to the stacker units. Export of ore is via reclaimer units to conveyor belts and thence to the loading chutes into the ship.

All of these stages create, dust, noise and congestion where the ore trains cross roads through residential areas. The terminal has been in constant operation since 1963 and the resulting contamination of the land and the sub surface water table would require considerable clean-up operations if the area was to be returned to alternative use.

The manganese terminal occupies a valuable area of land with water frontage giving alongside draughts of 12.2metres which could be used for clean port developments, such as containers, or for leisure activities in conjunction with the beach area and the development of a yachting marina.

Scrap

The export of scrap steel is a common factor in most ports around the world, and scrap forms a valuable input into the production of new steel. However the trade is subject to quality control and the vagaries of the international steel market and thus stockpiles may linger for considerable periods while awaiting a suitable sale/shipment, or the material may have to be cut or shredded to suitable form to meet the demands of purchasers.

Scrap is brought into the port by road trucks and by rail and is offloaded using backactors at the scrap storage area to the north of the port, beyond the port administration building. The result is that scrap steel is stockpiled is convenient areas, where it rusts and is then moved to the loading area by skip and trailer, all of which result in more dust, more noise and contamination of the ground through scrap residues and shards. Rusty dust blown on the wind into residential areas is a source of constant complaint as it causes staining to paintwork, and cars in particular, and creates an adverse image of the port among the population.

1.4 Tanker operations and Oil cargoes

The tanker berth is at the root of the South Breakwater and services the oil tank farm, which is located inland and beside the manganese ore silos. It is reported that the lease for the tank farm area, in operation since 1939, is due to expire in 2014 and that it will not be renewed. This has been as a result of the conflict between the siting of an oil tank facility close to residential and commercial areas, the fears of incidents and the potential alternative development of a leisure and entertainment complex in conjunction with the Kings Beach and Casino proposals.

The future of the oil berths and the tank farms are thus linked to the development of the new port at Coega.

1.5 Hazardous cargoes

The development of modern trade has resulted in an increase in the movement and transport of cargoes that can cause risk of damage either to personnel or to the natural environment. Such cargoes have to be contained, segregated and facilities provided for the collection and safe handling of any spills, or effects of fire and explosions.

The port of Port Elizabeth is not well equipped to deal with such cargoes and cargo run-off and materials do find their way into the harbour and the natural water table.

The port drainage system is in need of rehabilitation and formalised arrangements made for the segregation and handling of hazardous cargoes.

The development of the port of Coega and the transfer of such cargoes to that port would help to ease the problem in Port Elizabeth.

1.6 Residential, commercial and leisure use.

The port is closely bounded at the rear or city side by the rail tracks of Spoornet and the main coastal highway through the town. Development inland from the port is therefore stopped.

Port activities, in particular the movement of trains and trucks and the activities in the scrap and ore terminals, create conflict with local residents and with non port connected businesses. In common with many older coastal communities the area of Port Elizabeth has a need to diversify its economic base and tourism and the leisure industry is seen as one potential. The requirements of this industry are clean beaches, clean air and easy transport linked to good weather and the provision of support facilities such as hotels, golf courses and other indoor type activities.

The port and in particular the southern part around the Kings Beach area, including the manganese terminal and the tank farm are central to development plans proposed by entrepreneurs and the local municipality.

Commercial and sport fishing

South African coastal waters offer the commercial and the sports fisherman an opportunity to earn a living and to enjoy sport and leisure activities. Currently the back part of the port, between No 3 quay and the Manganese berths is used for this purpose, with small piers and slipways to service the needs of the craft. Development in this area has been haphazard with many small areas leased to operators who have constructed storage sheds and industrial buildings without much apparent building control. The result is that the area is congested and presents a poor image of the port.

1.7 Coega or Ngqura port

The development of a new port at the mouth of the Coega river to the north of Port Elizabeth will have a major impact on operations and development within the port of Port Elizabeth. The original concept was for the development of a pure industrial port linked to a major development zone with tax and trade concessions to attract industry to the area. This concept remains, with the addition of a dedicated container terminal.

The construction of a purpose built and equipped container terminal, with international management, will have a major impact on container operations in Port Elizabeth.

The most immediate considerations for Port Elizabeth are the possibilities for the relocation of the manganese terminal, the tank farm and berths and scrap steel to the new port, plus the competition for container operations. Such moves could trigger major rethinking of the whole strategic plan for Port Elizabeth and result in a solution to the identified environmental problems and a sea change in the utility profile of the port.

6 Proximity to Urban Developments and Impacts of Future Development Plans

6.1 Proximity to Urban developments

The present harbour area of the Port of Port Elizabeth is at the landside fully enclosed by the city of Port Elizabeth. It is clear that new expansions can only be realised towards the north side of the Port, which means by reclaiming areas from the sea. However there is a strong opposition from the municipality of the city of Port Elizabeth.

The municipality for many years already wants to extend the tourist attractions of Port Elizabeth a.o. leisure areas, yacht harbour, beaches, etc.

With the start of the development of the new port of Ngqura (Coega) it will be clear that this will have a major impact on the existing port operations and as such on the ambition of the municipality of the city of Port Elizabeth.
In all likelihood the Manganese Ore Installation and the Oil Tank Farm will close down and the operations will be relocated to Coega. This will present a golden opportunity to redevelop the area. Drawing no. 1V8066-SCEN2 shows one of the possibilities. The Port of Port Elizabeth remains the same in size but only clean cargo is now handled in the port as the general cargo is mainly restricted to the handling of motor vehicles. The Fishing Industry, being an area of growth, will occupy a considerably larger area.

Also the wishes of the municipality of Port Elizabeth now can be fulfilled: a relatively clean harbour connected with the existing beach development by an area for mixed uses: residential, leisure, commercial, small craft, fishing.

The development of a new deep-water port at Coega is intended to stimulate the economy in the Eastern Cape, which would result in a huge spin off for the existing port. Furthermore the intention to privatise port operations as quickly as possible will also result in greater demand for more independent terminals to be established.

The proposed development of the Port of Coega is shown on figure 11 on the next page.

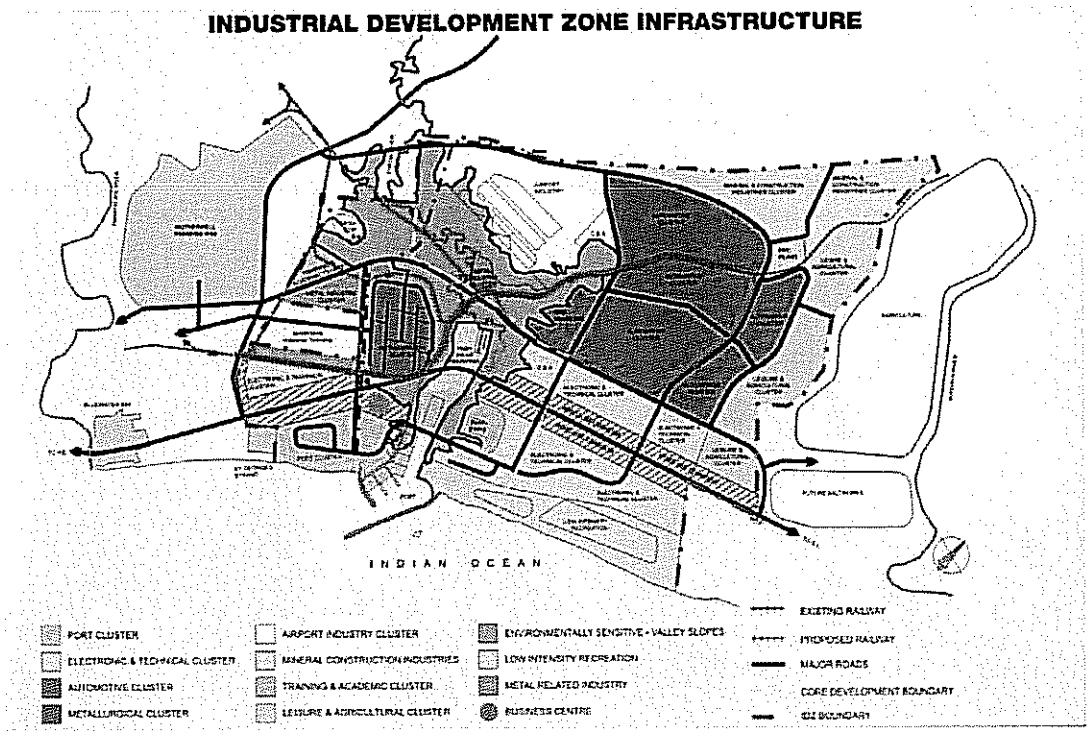


Figure 11

6.2 Future development of Port Elizabeth Container Terminal

As can be observed by comparing the existing land use in 2001 (drawing IV.8066-0100) with the possible future development scenario 2 (drawing IV.8066-SCEN2) the area for break bulk (cars) has substantially increased. So handling of mainly motor vehicles, being a clean cargo, shall be extended in the future and by doing so the Container Terminal area will become smaller at the same time.

Although the Port of Port Elizabeth Container Terminal has an excellent infrastructure, with the development of the Port of Coega it would be wise to move the whole terminal to Coega. Contrary to what is indicated on the drawing of future scenario 2 today already 50 % of berth no. 9 is 'leased' to the private Fruit Company. This leaves little area to operate the Multipurpose Terminal.

One of the important commodities is scrap metal. The port has a concession to handle approximately 90,000 ton/year in the future.

SAPO is now facing two problems as far as scrap metal is concerned.

- The fruit terminal does not want to have stockpiles of scrap metal at berth no. 8, as the dust could interfere with the fruit handling.
- The car terminal does not want any handling of scrap metal at berth no. 100 as the dust could also cause damage of the cars.

As a solution, the scrap metal stockpiles shall be located at the area between the NPA building and the shunting yard (indicated as vacant on drawing IV.8066-0100). Work is in progress on the foundation of the concrete floor of this scrap metal stockpile together with the required environmental measures.

7 Physical Limits to Expansion of the Terminal

Expansion of the area to be used by the Multipurpose Terminal as shown on Figure 6 provides sufficient space to cope with the future developments of the next 20 years.

If the Container Terminal is moved to Coega the freed-up area could then be used by the Multipurpose Terminal. So in fact the physical limits are the existing boundaries of the present Container Terminal. This will give sufficient area as the growth of the Multipurpose Terminal at Port Elizabeth, restricted to clean general cargo.

As far as the transport by road to and from the Port of Port Elizabeth is concerned the present physical limits are the two entrances to the Port i.e. Jetty Street and Green Street (see drawing IV.8066-0100)

Jetty street entrance is in fact not suitable for cargo, so only Green Street remains. To reach the main highway all cargo vehicles first have to follow the fly-over crossing the railway and the main highway and subsequently have to pass through city traffic over a distance of approximately 200 m in order to reach the turn off towards the main highway.

A direct connection from the main highway sloping down towards the harbour area may be considered. Aesthetically this is not a nice solution but specifically in this part of the city it cannot do any harm as the main highway already exists at a level approximately 10 m above street level.

Transport to and from the Port of Port Elizabeth by rail is good and would not cause any physical limits for the Multipurpose Terminal. The railway line that transports timber and logs logs to the Port is very old fashioned but it is a dedicated line.

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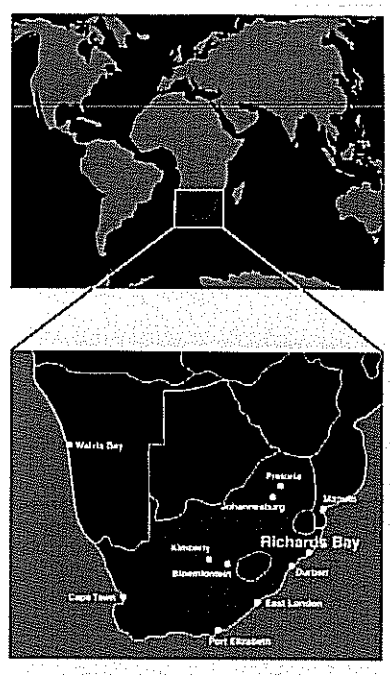
1 Physical Facilities

1.1 General information



The construction of the port at Richards Bay was sanctioned by the South African parliament in 1972 and by 1976 the first phase of the planned harbour was officially opened for business. Since its opening the facilities have been expanded to service the demands of trade, diversifying from its original function as an export port for coal to a major multi service port handling in excess of 90 million tonnes of cargo per year.

The port has the largest surface area of any South African port with a total land and water surface area of 3,600 hectares. Development potential still exists and the port management have formulated extensive plans for the future expansion of the port and the further use of the existing land and water areas.

The port of Richards Bay and its associated hinterland has been designated as one eight Spatial Development Initiatives (SDI's) which are designed to attract new investment into the port and the region. These initiatives are planned to encourage private sector investment and the development of specialised Industrial development Zones (IDZ's). Resulting directly from these initiatives the previously separate municipalities of Empangeni, Esikhawini, Nselini, Ngwelezane, KwaDlangezwa, Vulindlela and Richards Bay have been incorporated into the City of uMhlathuze, effective from August 2001.

1.2 The port of Richards Bay

Name of Port	Richards Bay
Location	Indian Ocean coast of Kwazulu-Natal Latitude 28° 48' S Longitude 32° 02' E
Nearest port	Maputo 465 km to the North in Mozambique Durban 160 km to the South
Conurbations	Port city of Richards Bay and uMhlathuze Johannesburg / Pretoria approx. 560 kms
Connections	N2 coastal highway North and South R66/68/33 inland Rail links for freight and passengers Airport, regular service to Johannesburg
Telephone	Port Manager 035 905 3203 - (Hlubi Mzamo)

Fax. 035 905 3199

1.3 Overview of Port Terminals

The port of Richards Bay has six (6) cargo handling terminals, of which four are operated by the private sector, or the concerned industry and two are operated by South African Port Operations (SAPO).

1.3.1 The Dry Bulk terminal

Operated by SAPO, primarily for the import and export of specialised ores, minerals and woodchips.

Name of Terminal	Dry Bulk Terminal
Operator	South African Port Operations (SAPO)
Contacts	PO Box 1793, Richards Bay 3900, South Africa Telephone 035 905 3215 Facsimile 035 905 3216 Email bhell@iafrica.com
Location	In the north west part of the port
Trade	Import and Export of a wide variety of dry bulk ores, minerals and woodchips
Limits of Terminal	Occupying approximately 60.2 hectares of land to the rear of berths 701 to 703, running back to the main internal port road and to the northern port boundary.
Berths	The Terminal has 3 nominal berths for Imports and 5 berths for Exports.

Import Berths	609	Length 300m	Depth 14.5m	Draft 14.0 m
	701	Length 300m	Depth 14.5m	Draft 14.0 m
	702	Length 240m	Depth 19.0m	Draft 17.5 m
Export Berths	703	Length 240m	Depth 19.0m	Draft 17.5 m
	704	Length 240m	Depth 19.0m	Draft 17.5 m
	705	Length 280m	Depth 19.0m	Draft 17.5 m
	801	Length 260m	Depth 19.0m	Draft 17.5 m
	804	Length 260m	Depth 19.0m	Draft 17.5 m

Storage	Sheds and specialised silos are available.
Equipment	4 general purpose loaders, design rates of 2500 tonnes/hr 2 pneumatic woodchip loaders, design rates 750 and 1000 tph 3 grab unloaders, design rate 500 tonnes per hour 1 grab unloader, design rate 250 tonnes per hour 2 Mobile Harbour cranes, SWL 30 tonnes 2 pnuematic unloaders, design rates 600 tph and 500 tph.
Linkages	Rail connections to hinterland and port based industries
Impact on city	Minimal, due to distance from any buildings, dust emissions are kept to a minimum
Potential for expansion	The Dry Bulk Terminal is bounded on both sides by the two elements of the Multi Purpose Terminals. To the rear the terminal reaches the port boundary resulting in considerable movement of cargo from its stored position to and from the ship.

1.3.2 The Multi-Purpose terminal

Operated by SAPO, handling a wide variety of break-bulk cargoes, including heavy lifts and other abnormal loads.

Name of terminal	Multi Purpose Terminal (MPT)
Operator	South African Port Operations (SAPO)
Location	North Western part of the port
Trade	Minor bulks and quasi bulks such as Ferro Alloys, Steel, Pig and Scrap iron, Granite, Aluminium, Paper, Forest Products, Containers and General.
Limits of Terminal	The Multi Purpose Terminal is in two separate sections, "A" and "B".
Section "A"	Located at berths 606, 607. 608 is limited to the area behind the berths. To the west, the terminal is limited by the extension of the dredged basin and empty port land towards Urania road.
Section "B"	Located at berths 704, 705, 706, 707, and 708, including berth 801 of the finger pier when not being used by the DBT, is limited by the port road system which has resulted in a Eastwards extension of the storage areas for Ferro Alloys and for Logs.
Berths	606 Length 220m Depth 14.5m Draft 13.5 m 607 Length 220m Depth 14.5m Draft 13.5 m 608 Length 204m Depth 14.5m Draft 13.5 m Note: Berths 608 and 609 are also used for export by FOSKOR

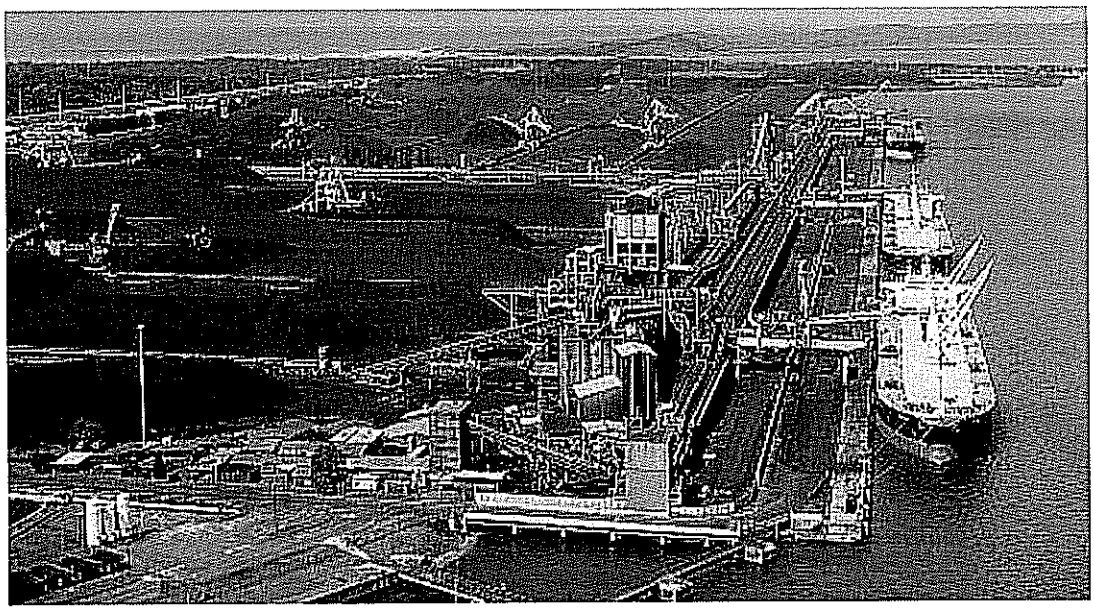
704	Length 240m	Depth	19.0m	Draft	17.5 m
705	Length 280m	Depth	19.0m	Draft	17.5 m

Note berths 704 and 705 are also used by the Bulk Terminal

706	Length 200m	Depth	14.7m	Draft	13.5 m
707	Length 200m	Depth	14.7m	Draft	13.5 m
708	Length 200m	Depth	14.7m	Draft	13.5 m

1.3.3 The Coal terminal

Operated by the Richards Bay Coal terminal Company as an export facility for bulk coal

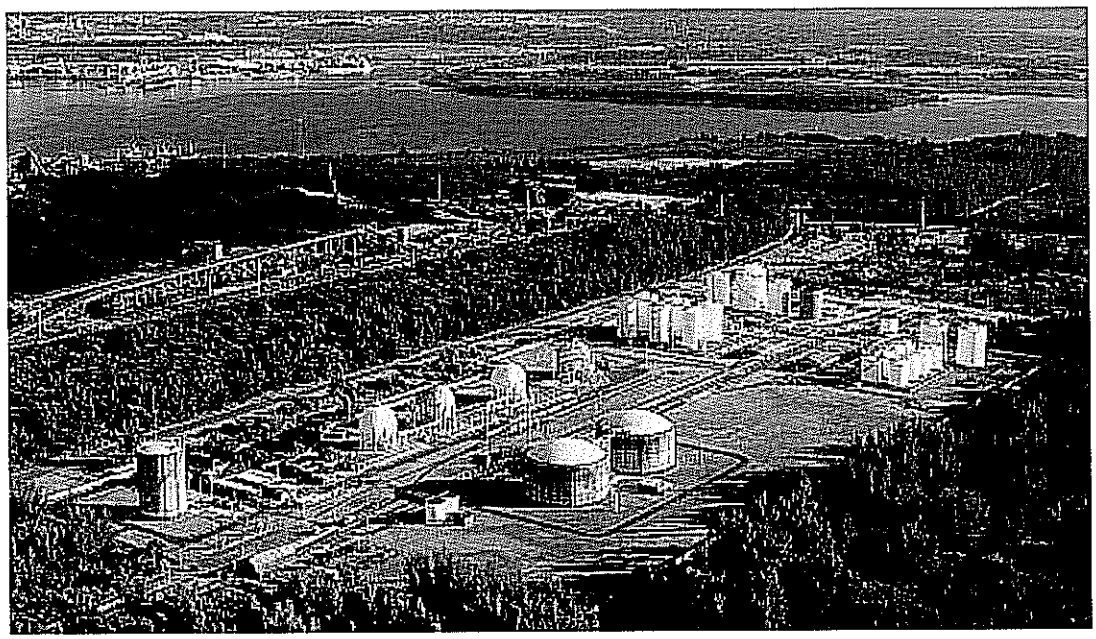


Name of Terminal	Richards Bay Coal Terminal
Operator	Richards Bay Coal Terminal Company Limited
Location	South-East part of harbour, South Dunes
Trade	Export of Coal, approx. 72 million tonnes/annum
Limits of terminal	The terminal has a total land area of 254,114 Hectares in a rectangular area, approximately 2,350m x 108m, immediately behind 1,584 metres of deepwater export quays.
Berths	The terminal has five (5) export berths

301	Length 350m	Depth 19.0m	Draft 17.5m
302	Length 350m	Depth 19.0m	Draft 17.5m
303	Length 350m	Depth 19.0m	Draft 17.5m
304	Length 350m	Depth 19.0m	Draft 17.5m
305	Length 184m	Depth 19.0m	Draft 17.5m

1.3.4 Island View Storage

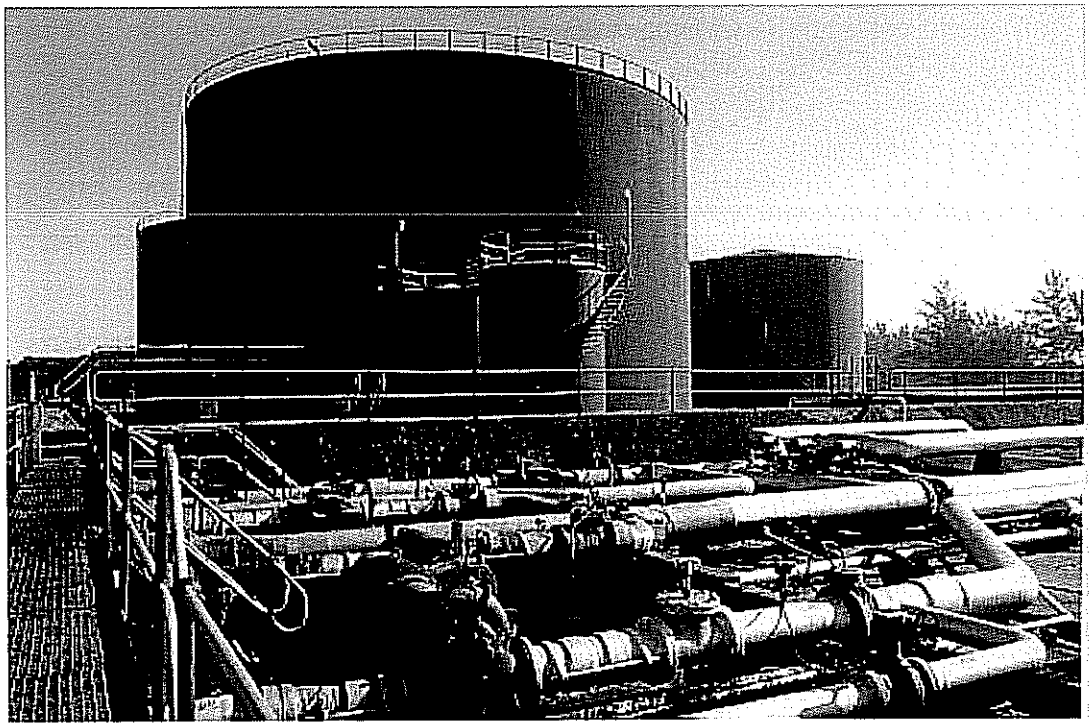
Operated by Richards Bay Bulk Storage, handling bulk liquid commodities



Name of Terminal	Island View Storage
Operator	**Richards Bay Bulk Storage (Pty) Ltd** and **Island View Storage (Ltd)**
Location	South Eastern part of the harbour, South Dunes
Trade	Liquid chemicals in bulk. Propylene, Butadiene, Ammonia, Hexane, Octene, Acetone and Detergent Alchohol
Limits of Terminal	The tank terminal area is approximately 100 hectares, bounded by Dune road and the wooded areas of the South Dunes. The tank storage area is linked by pipelines to berth 209
Berth	The terminal is linked to berth 209. 209 Length 300m Depth 14.0 m Draft 12.5m

1.3.5 The Bunker terminal

Operated by Joint Bunker Services handling bunker fuels for shipping, delivered via two bunker barges operating inside the port area.



Name of Terminal	Richards Bay Bunker Terminal
Operator	**Joint Bunker Services**
Location	In South Dunes area, close to Richards bay Coal terminal and Island View Storage.
Trade	Supply of Bunker fuels to shipping, by pipeline and/or barge.
Limits of terminal	Tank farm with three large storage tanks for primary fuels, plus smaller tanks for specialist fuels and lubricants. Located between Dorothea road and a natural heritage site.
Berths	Main operation from berth 209, but pipeline bunker points are available on berths 301 and 302 (RBCT)

1.3.6 The Sasol Agri terminal

Operated by Sasol- Agri over berths 608 and 609 as a specialised facility

Name of Terminal	Sasol Agri
Operator	**Sasol**
Location	Area behind berths 608 and 609
Trade	Export of Phosphoric Acid
Lease period	Unknown
Limits of Terminal	Terminal area of 1.309 hectares, with rail reception facilities and four storage tanks with capacity 11,000 tonnes.
Berths	Non dedicated berths 608 and 609. 608 Length 204m Depth 14.5m Draft 13.5m 609 Length 300m Depth 14.5m Draft 14.0m

2 Operating Issues

In many countries the port of Richards Bay would be classified as an Industrial Port, as it is dominated by import and export flows of industrial class materials destined for a small and stable number of customers. However a pure industrial port would normally be owned and operated by the primary industrial complex and be devoted to the servicing of their needs. In the case of Richards Bay the number of major industrial units is large, and growing, and SAPO does have a significant operational influence in the Bay View and Umhlatuzi range of berths.

The major industrial products handled in the port of Richards Bay include:

- Export of steam coal through the Richards Bay Coal terminal.
- Imports/exports of bulk chemicals in liquid form, through Island View Storage
- Aluminium ingots, through Strang Rennies Metal terminals and the Multi Purpose Terminal operated by SAPO
- Phosphoric Acid from Sasol Agri through berths 608/609 in Umhlatuzi and the berths operated by SAPO
- Ferro Alloys through the Multi Purpose terminal operated by SAPO
- Forest Products, logs and woodchips through the SAPO terminals
- Other industrial products serving a range of port based industries and using the SAPO terminals.

The port area is divided into three major complexes;

- the bulk coal and chemical berths at Die Duine which are operated by the Richards Bay Coal Terminal and Island View Storage, respectiely, plus the bunker fuel operations of the Richards Bay Bunker Terminal.
- the area of Tuzi Gazi and Naval Island which comprises the tug and small vessel berths, plus a marina and associated leisure facilities. Berths in this area are sometimes used as lay-by berths for vessels undergoing minor repairs.
- the berth complex of Umhlatuzi and Bay View which are the primary berths operated by the South African Port Operations company (SAPO)

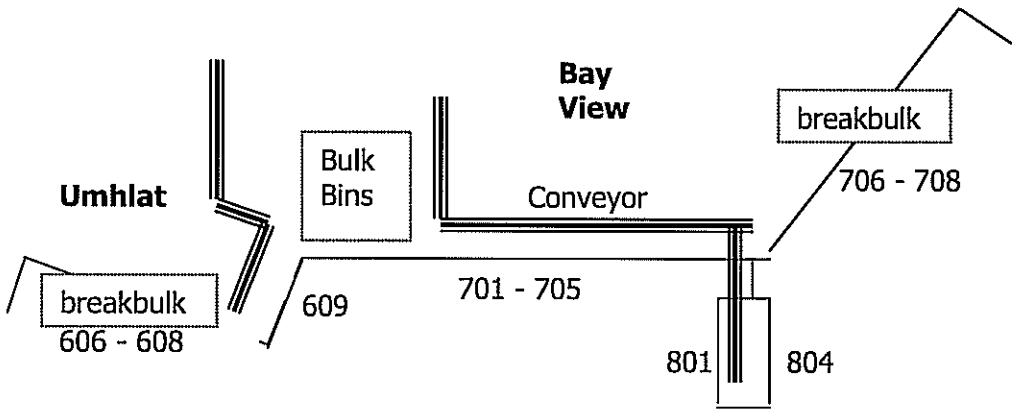
The port was built to export 3 mtpa of steam coal. The dry bulk terminal followed later.

SAPO Operations

The berths operated by SAPO lie in a complex group of four sets of continuous berths plus a finger jetty which in all comprise some 14 nominated berths of total length 3,364 metres. The general configuration of the berths is shown in the sketch.

The port of Richards Bay was primarily designed to service the requirements of large scale industries which were attracted to the area by the promise of the port facilities, plus the Special Development Status granted to the area. Initial cargo volumes were thus expected to be mainly bulk products which could be handled efficiently by conveyor belt systems with remote stacking and delivery to the ship in bulk. Thus the bulk cargo berths are serviced by high level conveyor belt systems which could restrict development to the rear of the berths, but do permit access to the berths under the system, with limited height restrictions.

General configuration of the SAPO berths



The Dry Bulk Terminal (DBT) is operated by SAPO as a separate business unit and has a total land area of 59.6 hectares with an estimated throughput capacity of up to 18 million tonnes of bulk materials per annum. The berth system consists of the contiguous berths 609 and 701 to 705 to MPT and the relatively new berths on the finger jetty 801 and 804. The jetty could be extended in the future, with the new berths to be numbered 802 and 803.

The Dry Bulk Terminal is primarily a conveyor belt type of operation being linked to associated industries in the rear of the port by a 40 km conveyor belt system managed through a central computer.

The main commodities handled through the Dry Bulk Terminal include dry bulk mineral ores, woodchips, coking coal and fertilizers, all primarily handled by conveyor belt systems.

Berth 609 is a preferential berth for alumina imports but is also used for the export of Phosphoric acid from the FOSKOR plant, which is delivered to the berth by fixed pipeline and then by temporary pipelines for the ship connections. Berth 608 is the primary berth for phosphoric acid.

Berths 609, 701 and 702 are nominally designated as import berths. Quay equipment associated with these berths includes 4 grab unloaders with combined capacity of about 5,750 tonnes per hour. Berths 702 to 705 are designed for export of bulk commodities and are serviced by a high level conveyor belt system from the storage areas close to the industries and further back into the port industrial areas.

The berths have standard loaders and pneumatic unloaders linked to the conveyor systems capable of 10,000 tonnes per hour loading of bulk materials, and about 1,100 tonnes per hour of suction of granular and light materials.

Berths 801 and 804 on the finger jetty were designed for the loading of woodchips and other bulk materials and have a pneumatic woodchip loader of 1,750 tonnes per hour designed rate, plus a general purpose loader rated at 3,000 tonnes per hour. The finger jetty is planned to be able to be extended to create two more berths, which will be numbered 802 and 803, so completing the configuration.

3 Environmental Issues

Port and industrial development in the Richards Bay area has been ongoing for the last 26 years and in that time a large and complex industrial area has been injected into a "green field" site. Great care has been taken by the port, industrial developers and the local council to segregate industrial areas from residential and recreational areas.

Each individual industry in the port area has an environmental protection plan and the port management in particular concentrate their efforts in ensuring that water quality in the harbour is maintained and that the quay and related storage areas are maintained in as clean a condition as possible.

The port of Richards Bay has for the majority of its existence been under constructional and operational development. Its current total land area available is listed at 2,157 hectares surrounding the water area of 1,443 hectares. Within that land and water area it is estimated that approximately 40 % of the land area is developed, with the developed land backing on to a total of 6,363 metres of berths, subdivided into three major terminal sections, plus a small craft harbour.

"Die Duine"	Bulk Liquids and Coal	6 berths	1,884 metres
"Umhlatuzi"	General and Bulk	4 berths	944 metres
"Bay View"	General and Bulk	10 berths	2,420 metres
Small Craft	Harbour craft / Dredger	6 berths	1,115 metres

The port was dredged out of an existing estuary,, with the Umhltuzi river being diverted and canalised. A wall was constructed across the estuary for road and rail access to the Die duine area. This allowed one portion to be a sanctuary and the other the harbour.

The port is thus surrounded by a considerable area of primative and recovered land and vegetation, which provides immediate subdivision and protection of the industrialised areas from the growing urban developments. For example the bulk coal berths of the Richards Bay Coal Terminal at Die Duine, are approximately 3 km distant from either the berths of the Multi Purpose Terminals in Umhlatuzi or the Small Craft Harbour and commercial developments of Newark. The residential and commercial centre of Richards Bay lies a further 3 kilometres to the north.

3.1 SAPO Environmental Policy

SAPO has developed an environmental policy as part of the Environmental Management System (EMS) which is to ISO 14001 standards.

This policy is geared to serve the operational needs of the various terminals and port operating sectors and to assist port operating companies in environmental management while ensuring that the natural environment is minimally impacted and that the individual terminals comply fully with all legal and moral requirements for environmental protection.

Environmental Impacts

Within the context of a commercial and industrial seaport the following have to be considered: environmental impact, the parties affected and the environmental conditions at present and in the future.

Each of these factors and impacts change with time and with the intensity of activity and South African Environmental legislation is well advanced in giving guidance to industries and local authorities.

Environmental Factors	Affected parties	Time scale
Visual impact Noise pollution Waste pollution Smell and dust Traffic Drainage	Animals Birds Vegetation Insects Benthnic organisms People	Construction/Developme nt The present situation Future developments

Construction and development stage

During the primary construction phases the immediate impact was created by the construction of access roads and the dredging of the lagoon associated with the construction of the quay walls, and extensive filling in of mud flats, reed beds etc.

The lagoon and flood plain were virtually virgin land and the impact on the natural environment was severe. Water quality in the river, the lagoon and near to the newly dredged harbour entrance was disturbed with considerable raising of silt. For the human population the impact was not so severe, as the original township of Richards Bay was relatively distant from the site and the benefits of employment were enjoyed.

Since that initial construction phase development has continued at a slower pace with the construction of primary industries and other associated sites. The regional and town councils have taken account of the impact of industrial development on the natural environment and have co-operated with the port and the industries in the production of a sustainable programme for the environment. The result is that currently the water quality in the harbour appears to be good and the surrounding marsh lands appear to be healthy with reported sightings of the indigenous flora and fauna. Part of the harbour area has been developed as a tourist and recreational zone which indicates the desire to share and protect the natural resources of the area for the benefit of the population.

3.2 The present situation

The port of Richards Bay is essentially divided into three port operational areas. The area of Die Duine and the port complex of Umhlatuzi and Bay View.

Die Duine

The Die Duine area includes the coal export facility operated by The Richards Bay Coal Terminal Company Limited, the Island View Storage operated by Richards Bay Storage (Pty) Ltd and the Richards Bay Bunker Terminal operated by Joint Bunker Services. Each of these operations is self contained and uses pipelines or bulk rail for the movement of materials.

The Richards Bay Coal Terminal covers an area of some 254 hectares and has open storage for 6.7 million tonnes of coal. Delivery of bulk coal to the storage yards is by train and transfer to the ship loaders is via large conveyor belts.

The bulk coal terminal could cause pollution dust, but the company have mechanical and operational procedures which reduce dust. Prevailing winds are from either the NNE or SW, with wind speed exceeding 18 m/s (40 mph or Gale force) for less than 10 % of the time. From observations at the harbour entrance and in the area of Newark, some 3 km north of the export facility, no dust contamination was apparent.

The Island View Storage covers an area of 50 hectares and contains 30 storage tanks of varying capacities containing many noxious and polluting commodities, such as Propylene, Ammonia, Octene and Detergent Alcohol with a total of some 152,000 m^3. Transportation is via pipelines from the storage tanks to berth 209 immediately north of the main coal berths The company appear to have excellent control and no reports of contamination were received.

The Richards Bay Bunker Terminal, also operates a bunker fuel storage farm and uses berthf 209 in common with Island View Storage for the import of fuel. Commodities include Bunker Fuels and products. Delivery of bunker oils to ships is either by fixed pipeline connections to berths 301 and 302 in the coal terminal, or, by bunker barge to other areas of the port.

Unused or non industrialised areas of Die Duine amounting to at least another 500 hectares are heavily wooded with natural growth associated with swamp land and uncontaminated habitats. Bird and animal life flourish in the area which was evidenced by sightings of many varieties of birds and monkeys.

Umhlatuzi and Bay View

This section of the port lies on the northern shore and is thus closest to urban developments of the city, but is also segregated from residential and retail areas by wide strips of natural and managed grassland and other vegetation.

The prime causes of any industrial pollution are the major units of the Billton Smelters, RBCT, the FOSKOR plant, the Mondi plant the woodchip facility, and the fertiliser plant. However each of these industrial complexes has its own controls and appears to operate in close co-operation with the local and municipal councils.

The port operational area consists of three sections of berths, operated by SAPO as the Multi Purpose Terminal and the Dry Bulk Terminal.

The Dry Bulk Terminal

This terminal area is operated by SAPO and consists of berths 609, 701 and 702 for imports and berths 703, 704, 705, 801 and 802 nominated for exports. Berth 705 is to be handed over to MPT.

The total land area of the DBT is 59.6 hectares and is essentially a conveyor belt operation with over 40 km of conveyor belts managed through a central control room.

The terminal therefore operates as a typical bulk terminal, although operating with multiple commodities, and main contamination come from spillages and losses from the conveyor belt systems. However these are well monitored and controlled with co-operation from the receiving industries in the cleaning up and removal of waste products.

Berths 608 and 609 are used regularly by FOSKOR for the export of Phosphoric Acid which is delivered to specialist tankers by pipelines and connections on the berths.

3.3 Future developments

The main feature of development in the port area is the fact that the whole area is in the flood plain and alluvial basin of the Umhlatuzi river and thus some areas may be unsuitable for constructional use due to land instability and the associated cost of preparing foundations. The second factor is the pristine natural environment and the establishment of sanctuary and protected areas for wildlife.

In the Die Duine area development of the coal export berths in Icubhu are planned, with extension to the south by a further berth (306). This extension would then result in a total of six coal berths, which it is anticipated would be sufficient to service the demands of the international export trade. Once again, the operators of the industrial facilities in the area of Die Duine are major players in the South African industrial arena and have well defined expansion and environmental plans.

Expansion of port facilities in the Umhlatuzi and Bay View areas is planned, but is limited by the geotechnical conditions of the subsoils which have been investigated thoroughly. A large section through the harbour basin, from Mzingazi in the north to Kabeljou in the south, has been found to have soft and non supporting soils and will probably not be suitable for industrial development.

Further major expansion has been pre-planned to take the port area further up the river valley of the Umhlatuzi river towards the main N2 motorway, bypassing the Billton smelter and creating an extensive area of docks and basins to service specialised industrial developments. A draft plan of this proposed extension area is shown in the Draft Framework Development Plan prepared by Richards Bay port management.

4 Planning proposals 2003

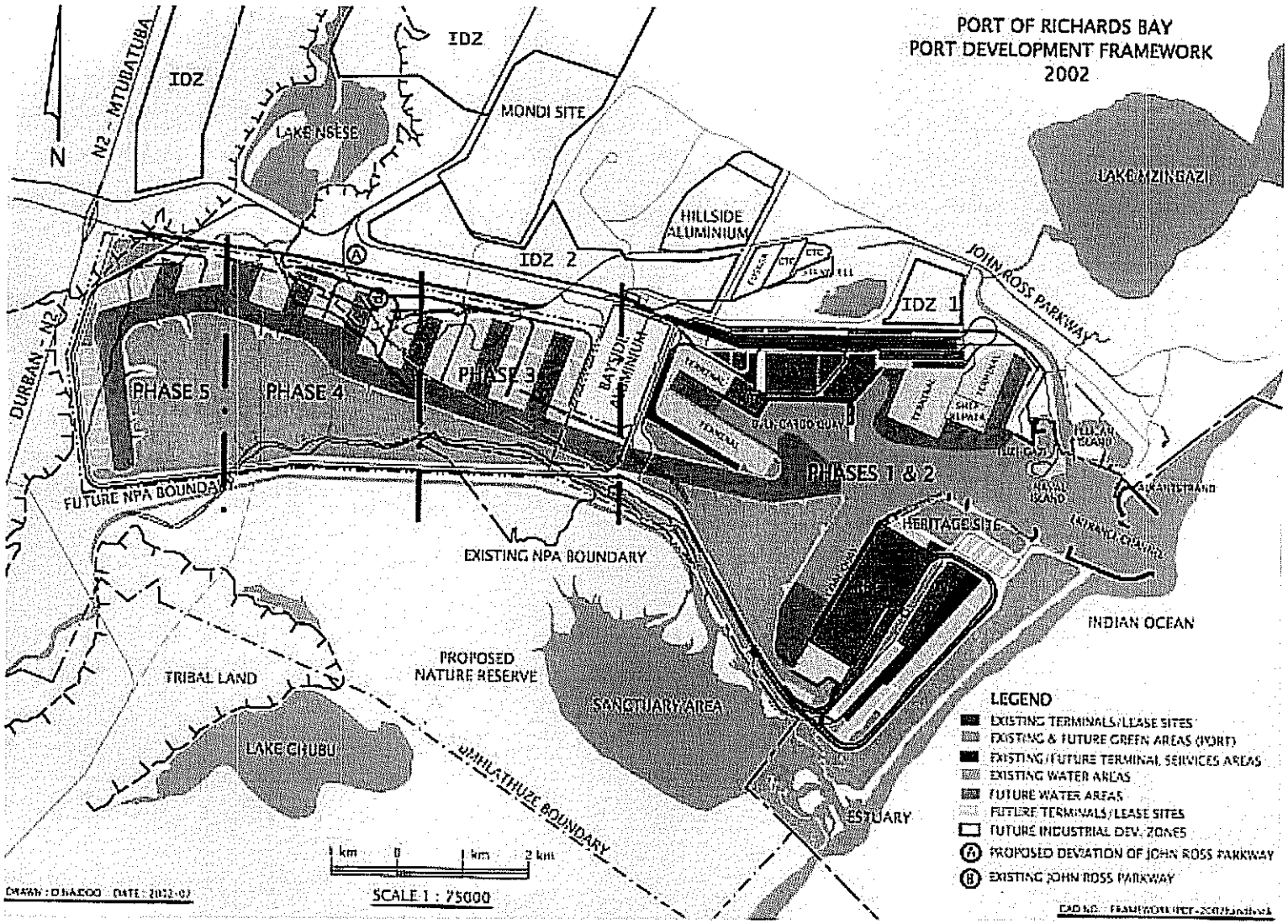
The National Port Authority is the landlord and is responsible to the Government for the development of the port infrastructure has made tentative plans for the future expansion of the port of Richards Bay, sufficient to be able to offer exporters and importers facilities for the foreseeable future.

The Planning and Development Department of NPA has created a Port Development Framework that takes into account national planning objectives, geotechnical and environmental considerations and the technical changes in world shipping and transportation. Details may change as developments occur, but essentially the port can more than double its capacity by expanding up the Mhlatuze River floodplains.

The following planning developments are envisaged:

- Development of an additional coal export facility, particularly for smaller exporters;
- Additional berths for Breakbulk/Multi Purpose vessels;
- Additional bulk liquid and bunker vessel berths;
- The development of a modern ship repair facility;
- A specialised terminal for passengers, or fruit;
- A specialised container handling facility.

Further developments outside the port boundary but having a major impact on port utilisation are the creation of Industrial Development Zones. These are intended to be purpose built and secure industrial estates, linked to the port and containing a customs controlled duty-free area. The intention is to provide services tailored for export oriented industries through the development of industrial clusters based on major "anchor" tenants.


PORT OF RICHARDS BAY
PORT DEVELOPMENT FRAMEWORK
2002
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N2 - MTUBATUBA
IDZ
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LAKE NSESE
MONDI SITE
HILLSIDE ALUMINIUM
IDZ 2
IDZ 1
LAKE MZINGAZI
JOHN ROSS PARKWAY
DURBAN - N2
PHASE 5
PHASE 4
PHASE 3
BAYSIDE ALUMINIUM
PHASES 1 & 2
FUTURE NPA BOUNDARY
EXISTING NPA BOUNDARY
HERITAGE SITE
INDIAN OCEAN
PROPOSED NATURE RESERVE
TRIBAL LAND
SANCTUARY AREA
LAKE CHUBU
UMHLATHUZE BOUNDARY
ESTUARY
LEGEND
EXISTING TERMINALS/LEASE SITES
EXISTING & FUTURE GREEN AREAS (PORT)
EXISTING/FUTURE TERMINAL SERVICES AREAS
EXISTING WATER AREAS
FUTURE WATER AREAS
FUTURE TERMINALS/LEASE SITES
FUTURE INDUSTRIAL DEV. ZONES
PROPOSED DEVIATION OF JOHN ROSS PARKWAY
EXISTING JOHN ROSS PARKWAY
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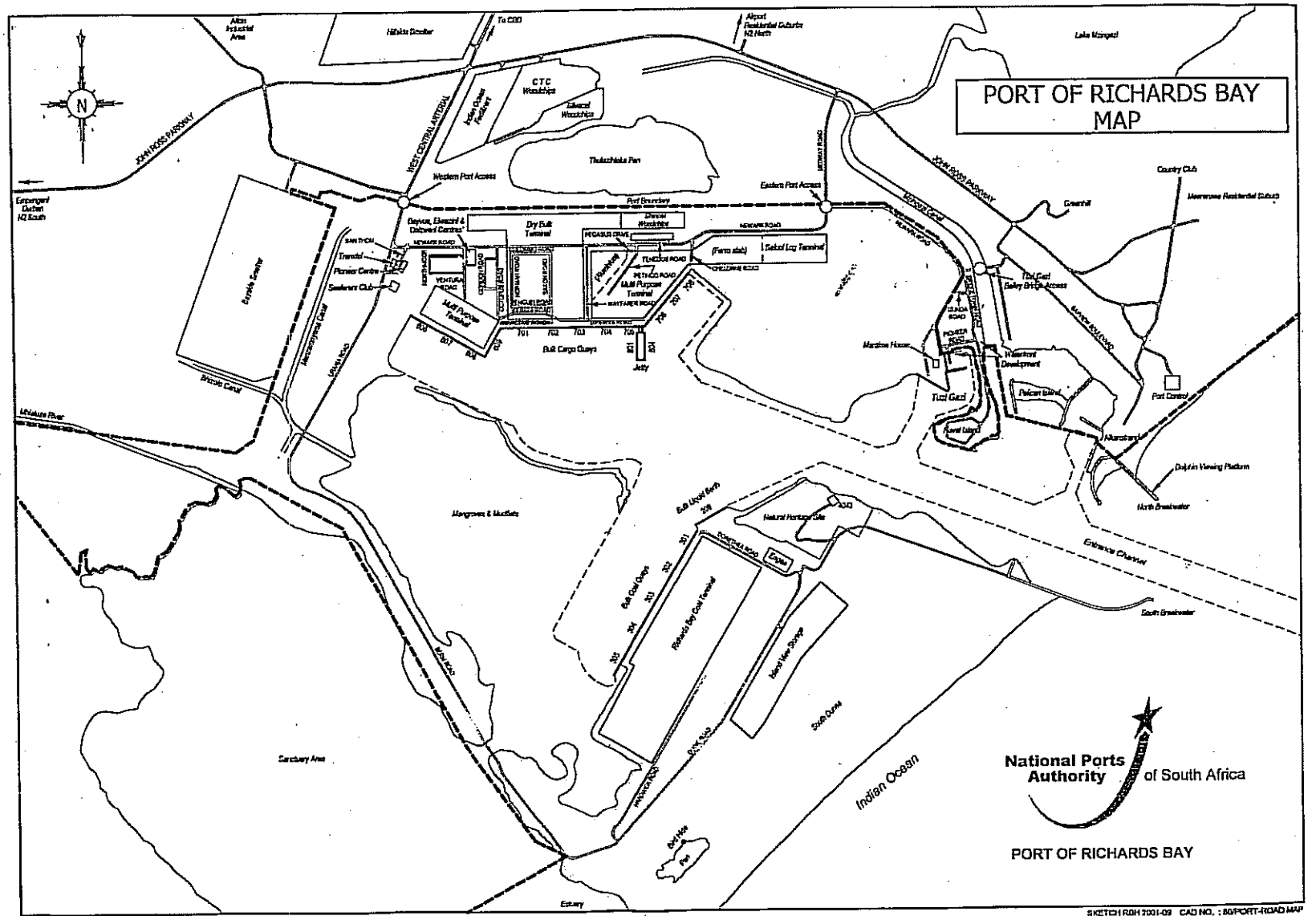

DRAWN : D.NADOO DATE : 2001-10-16

SKETCH RDH 2001-09 CAD NO. : 80/PORT-ROAD MAP

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1 Introduction

The port of Saldanha in Saldanha Bay was developed in the late 1970's as an export terminal for iron ore mined in the area some 860 km northwards, near to Sishen. The bay was chosen as it offered a relatively well-protected and natural deep water for the large bulk vessels expected to use the facilities.

The terminal facilities are operated by South African Port Operations (SAPO), which in conjunction with the Spoornet-operated OREX line form a virtually seamless operation as the Iron Ore Export Channel from the mines, via the rail link to the port stockpiles and hence via conveyor belt systems to the ship loaders.

The mines and transport

Iron ore is mined by two companies (Iscor and Assomang) and is normally delivered in up to seven specified grades. From the mines the ore is loaded on to Spoornet rail wagons and made up into train sets consisting of 200 wagons. The loaded trains proceed along the 861 km of single line track to the port of Saldanha.

The track is provided with passing loops for returning sets and the entire rail operation is controlled by Spoornet. Annual movement of iron ore along the rail link is about 25 million tonnes, which represents almost the maximum capacity of the single track line.

The trains are split at the port into 100 wagon sets and delivered to the Tippler unit, for discharge via belts and stackers into the main stockpile. It is reported that the average time required to clear a 100-wagon string is about 72 minutes giving a stacking rate of about 8,000 tonnes per hour.

2 Terminal Facilities

The Iron Ore Terminal consists of a jetty structure some 630 metres in length at the seaward end of a 3 km long filled causeway, or mole. The jetty is served by a single conveyor belt system which runs from the stacker/reclaimers in the stock yard, along the causeway and out to the ship loaders. The jetty is constructed on caisson structures with a reinforced concrete capping plate which supports the loading facilities.

At the seaward end of the iron ore jetty is an extended jetty for tanker operations. This bulk oil terminal is separated from the IOT by a chain link fence and gate.

The jetty has two berths, one each side, where vessels are moored head out to sea, against large pneumatic "Yokohama" type fenders. These are of 3.3 metres diameter and are designed to cope with the ranging of vessels along the quay during times of swell action in the bay.

The channels on both sides of the projecting ore and oil jetties are dredged to a depth of 23 metres below Chart datum, which with a rise of tide at springs of about 1.74 metres gives a maximum available depth of 24.74 metres. Port regulations restrict the maximum draught of vessels to 20.5 metres, and with permission from the Harbour Master vessels may sail with draught of up to 21.5 metres.

As vessels are berthed head to sea the port has a large turning circle just off the end of the jetty. This has a diameter of 580 metres and has a draught availability of 23.2 metres.

Delivery of iron ore to the loading chutes is by high capacity conveyor belt systems about 7 km long, with transfer points, which is able to maintain a flow of some 8,000 tonnes of material per hour. The terminal operates 24 hours per day and in a normal year will deliver some 25 million tonnes of iron ore for export. Currently one ship at a time is loaded, which normally takes between 12 and 18 hours

The nominal capacity of the iron ore stock-yard is 3.5 million tonnes and occupies an area of about 13 hectares. The terminal is geared to handle large volumes of single grades of ore, but can separate the piles of up to seven different grades. Due to the requirement for physical separation of different grades, the normal tonnage in the stock yards is about 2.5 million tonnes, which with the average delivery for export of parcels of 120,000 tonnes is sufficient for about 20 ships. This provides a degree of capacity cover in case there is any delay at the mines or breakdown in the rail linkage.

Direct loading of ships from the tippler station is also possible, bypassing the stack and increasing the flexibility of the system.

3 Physical Condition

The jetty was constructed over 25 years ago and is now showing signs of its age. *National Ports Authority* and *SAPO* are in discussions over the possibilities for expansion, rehabilitation or even relocation, but this will have to depend on the global demand for the grades of iron ore available from Sishen and on the projected capacity of the vessels used to transport the material for export.

The concrete capping slab is worn and there are no special arrangements made for drainage of rainwater. Concrete curbs do prevent waste iron ore dust from being washed into the sea and there is a constant requirement for cleaning gangs to collect dropped iron ore at the transfer stations and from beneath the ship loaders.

4 Operational Issues

The Iron Ore Terminal at the port of Saldanha is operated as a complete unit, with all functions controlled from the Central Control Room (CCR).

Soon after the terminal and the port were constructed, *National Ports Authority* obtained the concession to manage and operate the terminal, as part of the Iron Ore Export Channel. The terminal is open 24 hours a day and for 365 days in the year. Operational staff work three eight-hour shifts during weekdays and two twelve-hour shifts at the weekends.

Figure 1: Minimum staffing requirements IOT

	Day time	Admin	Supervisors/ Team leaders	Operators	Asst. Operators	Asst. Gen. Duties	Total
Management							
Terminal Mgr	1						1
Operations Mgr	1						1
Admin staff	2						2
Total Day work	4						4
Operations							
CCR		2					2
Tippler				1	1	1	3
Stacker Reclaimers (2)				2	2		4
Sampling Plant				1	1		2
Conveyor 113						1	1
Conveyor 114						1	1
Point J						1	1
Ship Loaders (2)				2	2	1	5
Supervisors/ Team leaders			2				2
Back-up staff per shift				1	1	1	3
Total (1 shift)		2	2	7	7	6	24
For 3 shifts		6	6	21	21	18	72

Figure 1 shows the approximate minimum numbers of management and staff required to operate the export terminal and the stack yards on the basis of standard conditions for the delivery of iron ore to the tippler and then either to the stackyard or direct to the ship loaders.

To provide cover for leave, sickness and general absenteeism and to allow for on and off site training the terminal operates with additional staff which are normally available for each shift, particularly to cover the key operating staff in the tippler, the stacker reclaimers and the ship loader. This acts as a supplement, in addition to the operating back-up provided in emergency by the assistant operators.

The terminal is able to carry out the following functions at any one time:-

- Operate the tippler and deliver material to the stackyard
- Operate a reclaimer and deliver material to the ship loader

or

- Operate the tippler and deliver material directly to the ship loader

plus;

- Handle steel pellets for delivery to Saldanha steel

The Central Control Room is the key element in the terminal operations. All functions are computer controlled. The control room is normally manned by an operations planner and a senior administrator. The operations planner controls all communications and manages the ship loading operation, while the administrator manages the discharge of trains, the operation of the tippler and the stacking/reclaiming operations.

The majority of the terminal staff are in permanent employment, due to the necessity to maintain high levels of operational safety, the extent of the training required to handle the specialist equipment, and the need for staff to be aware of the environmental implications of an accident. The terminal normally employs local casual labour to provide basic cleaning and collection duties under the belts and the transfer points.

Maintenance of the terminal equipment is performed through the Mechanical Engineering workshop in the port, which in effect acts as a sub-contractor for the various operational units.

5 Environmental Issues

The handling of large volumes of iron ore in any part of the world leads to the release of dust which enters the atmosphere and is carried along by winds for up to 5 kilometres from the source. The typical wind direction in the Saldanha area is from the South East during the summer and from the North West during the winter. The summer time is normally the period for the strongest winds, which when linked with high temperatures and dry conditions increases the likelihood of dust emissions and the deposition in the downwind localities.

The iron ore stockyard is located close eastwards of the root of the causeway and blown dust is known to have affected the Mussel breeding beds in the bay. CSIR have performed a vegetation analysis for the Saldanha-Vredenberg area and have found that iron ore dust has contaminated plants and vegetation within 2 kilometres of the source.

The prime sources of dust are:

- The tippler and rail transfer units
- The stock piles in the 13 ha stockyard
- Operation of the stacker/reclaiming units in the stockyard
- Dropped dust from the conveyor belt transfer stations
- Dust emissions from the ship loading operation.

SAPO and the management of the IOT are well aware of the environmental problems associated with handling dusty bulk minerals and have an Environmental management Plan in operation. This includes the suppression of dust at the transfer points and the operation of filter systems.

6 Plans for the Future

Plans are in hand for an expansion of the facilities by the installation of a third stacker/reclaimer in the stockyard, an increase in the size of the stackyard and a second tandem tippler. To increase the ship-side facilities, a second belt system can be installed below the exiting system. This would permit the simultaneous operation of the two ship loaders and allow the loading of two vessels at the same time.

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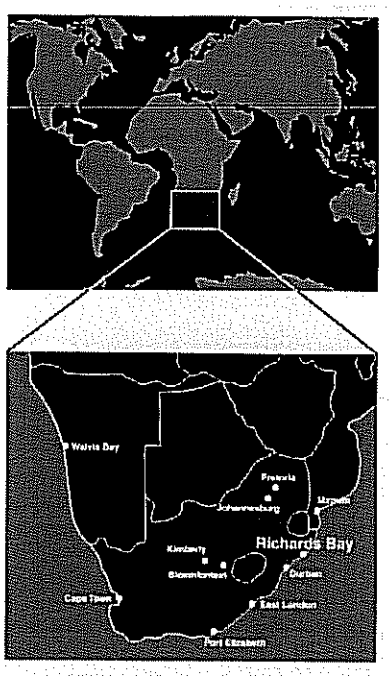
1 Physical Facilities

1.1 General information



The construction of the port at Richards Bay was sanctioned by the South African parliament in 1972 and by 1976 the first phase of the planned harbour was officially opened for business. Since its opening the facilities have been expanded to service the demands of trade, diversifying from its original function as an export port for coal to a major multi service port handling in excess of 90 million tonnes of cargo per year.

The port has the largest surface area of any South African port with a total land and water surface area of 3,600 hectares. Development potential still exists and the port management have formulated extensive plans for the future expansion of the port and the further use of the existing land and water areas.

The port of Richards Bay and its associated hinterland has been designated as one eight Spatial Development Initiatives (SDI's) which are designed to attract new investment into the port and the region. These initiatives are planned to encourage private sector investment and the development of specialised Industrial development Zones (IDZ's). Resulting directly from these initiatives the previously separate municipalities of Empangeni, Esikhawini, Nselini, Ngwelezane, KwaDlangezwa, Vulindlela and Richards Bay were incorporated into the City of uMhlathuze, effective from August 2001.

1.2 The Port of Richards Bay

Name of Port	Richards Bay
Location	Indian Ocean coast of Kwazulu-Natal Latitude 28° 48' S Longitude 32° 02' E
Nearest port	Maputo 465 km to the North in Mozambique Durban 160 km to the South
Conurbations	Port city of Richards Bay and uMhlathuze Johannesburg / Pretoria approx. 560 kms
Connections	N2 coastal highway North and South, R66/68/33 inland Rail links for freight and passengers Airport, regular service to Johannesburg
Telephone	Port Manager 035 905 3203 - (Hlubi Mzamo) Fax. 035 905 3199

1.3 Overview of Port Terminals

The port of Richards Bay has six (6) cargo handling terminals, of which four are operated by the private sector or the concerned industry and two are operated by South African Port Operations (SAPO).

1.3.1 The Multi-Purpose terminal

Operated by SAPO, handling a wide variety of break-bulk cargoes, including heavy lifts and other abnormal loads.

Name of terminal	Multi Purpose Terminal (MPT)
Operator	South African Port Operations (SAPO)
Contacts	PO Box 1794, Richards Bay 3900, South Africa Telephone 035 905 3209 Facsimile 035 905 3161 Email justice@portnet.co.za
Location	North Western part of the port
Trade	Minor bulks and quasi bulks such as Ferro Alloys, Steel, Pig and Scrap iron, Granite, Aluminium, Paper, Forest Products, Containers and General.
Lease period	Not leased, operated by SAPO as a public service terminal
Limits of Terminal	The Multi Purpose Terminal is in two separate sections, "A" and "B".
Section "A"	Located at berths 606, 607. 608 is limited to the area behind the berths. To the west the terminal is limited by the extension of the dredged basin and empty port land towards Urania road.

Section "B"	Located at berths 704, 705, 706, 707, and 708, and including berth 801 of the finger pier, when not being used by the DBT.
Berths	606 Length 220m Depth 14.5m Draft 13.5 m 607 Length 220m Depth 14.5m Draft 13.5 m 608 Length 204m Depth 14.5m Draft 13.5 m Note: Berths 608 and 609 are also used for export by FOSKOR 704 Length 240m Depth 19.0m Draft 17.5 m 705 Length 280m Depth 19.0m Draft 17.5 m Note berths 704 and 705 are also used by the Bulk Terminal 706 Length 200m Depth 14.7m Draft 13.5 m 707 Length 200m Depth 14.7m Draft 13.5 m 708 Length 200m Depth 14.7m Draft 13.5 m
Storage	The terminal has two 10,000 m^2 warehouses, including a canopy between providing an additional 8,000 m^2 of covered storage for sensitive cargo. There is also a storage shed of 4,500 m^2. Open yard storage extends to 330,000 m^2 Dedicated storage bins for Ferro Alloys of 75,000 m^2, on concrete bases, and Dedicated log area on open ground of 55,000 m^2 , which is leased to the woodchip company
Equipment	Cargo is moved from the storage areas to the quay by tractors and trailers, often using large skips of about 12 m^3 which are lifted up into the ship and tipped into the holds. The equipment in the storage areas consist of ;

Rail mounted gantries	2
Pay-loaders	14
Pulp clamps	13
Reach Stackers	2
Forklifts	23
Haulers	25
Tractors	60
T railers	97
Nissan truck	2
Brush sweeper	2
Dumpy trailers	9

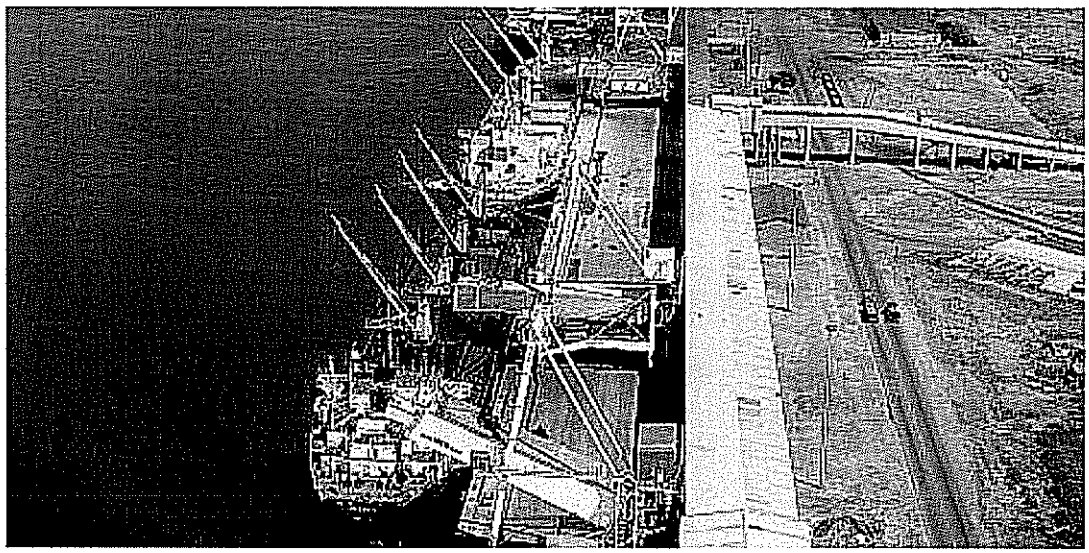
At the berth the principal equipment consists of three mobile cranes, with many ships using their own gear.

Linkages	Materials arrive at the port by rail wagon and by truck and are unloaded for storage and pre-loading assembly.
Impact on city	Minimal due to distance from the urban area.

Potential for expansion	The terminal has approximately 70,000 m^2 of open ground which has been earmarked for expansion. Further expansion, depending on the development of trade, could take place to the East of the current area, linked to the construction of new berths and storage areas. It is estimated that the further expansion could provide seven new berths each of 250m

1.3.2 The Dry Bulk terminal

Operated by SAPO, primarily for the import and export of specialised ores, minerals and woodchips.

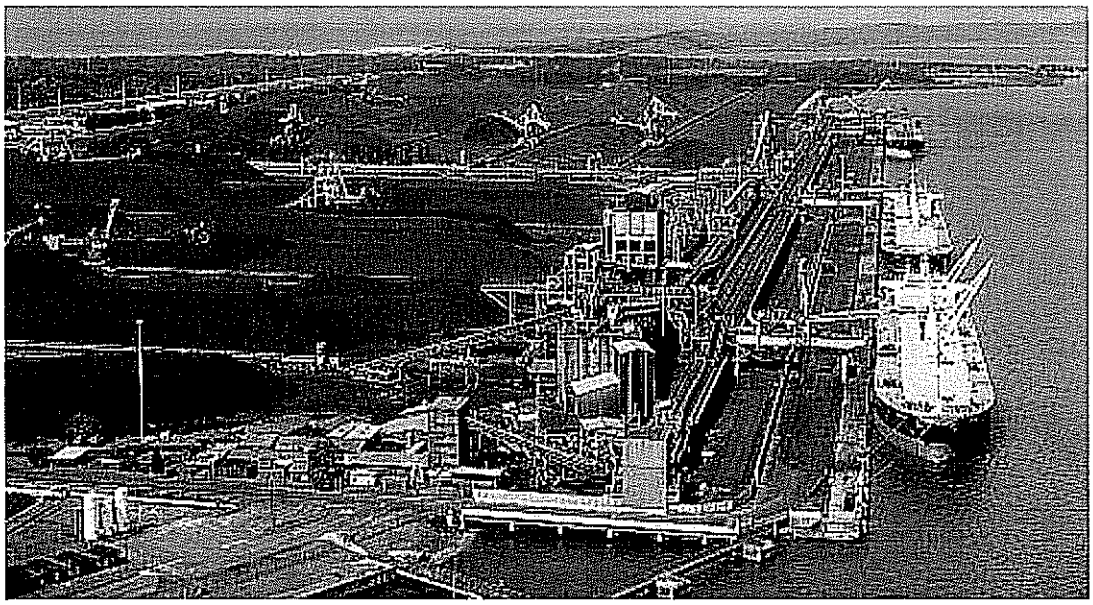


Name of Terminal	Dry Bulk Terminal
Operator	South African Port Operations (SAPO)
Location	In the north west part of the port
Trade	Import and Export of a wide variety of dry bulk ores, minerals and woodchips
Limits of Terminal	Occupying approximately 60.2 hectares of land to the rear of berths 701 to 703, running back to the main internal port road and to the northern port boundary.
Berths	The Terminal has 3 nominal berths for Imports and 5 berths for Exports.
Import Berths	609 Length 300m Depth 14.5m Draft 14.0 m 701 Length 300m Depth 14.5m Draft 14.0 m 702 Length 240m Depth 19.0m Draft 17.5 m

Export Berths	703	Length	240m	Depth	19.0m	Draft	17.5 m
	704	Length	240m	Depth	19.0m	Draft	17.5 m
	705	Length	280m	Depth	19.0m	Draft	17.5 m
	801	Length	260m	Depth	19.0m	Draft	17.5 m
	804	Length	260m	Depth	19.0m	Draft	17.5 m

1.3.3 The Coal terminal

Operated by the Richards Bay Coal terminal Company as an export facility for bulk coal

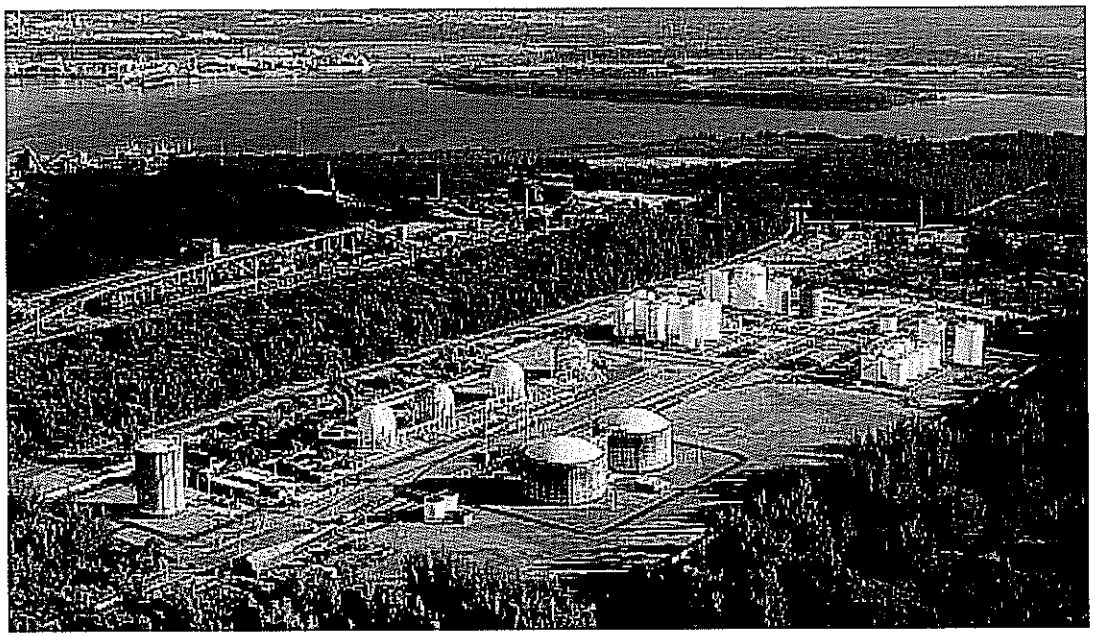


Name of Terminal	Richards Bay Coal Terminal
Operator	Richards Bay Coal Terminal Company Limited
Location	South-East part of harbour, South Dunes
Trade	Export of Coal, approx. 72 million tonnes/annum
Limits of terminal	The terminal has a total land area of 254,114 Hectares in a rectangular area, approximately 2,350m x 108m, immediately behind 1,584 metres of deepwater export quays.
Berths	The terminal has five (5) export berths

301	Length 350m	Depth 19.0m	Draft 17.5m
302	Length 350m	Depth 19.0m	Draft 17.5m
303	Length 350m	Depth 19.0m	Draft 17.5m
304	Length 350m	Depth 19.0m	Draft 17.5m
305	Length 184m	Depth 19.0m	Draft 17.5m

1.3.4 Island View Storage

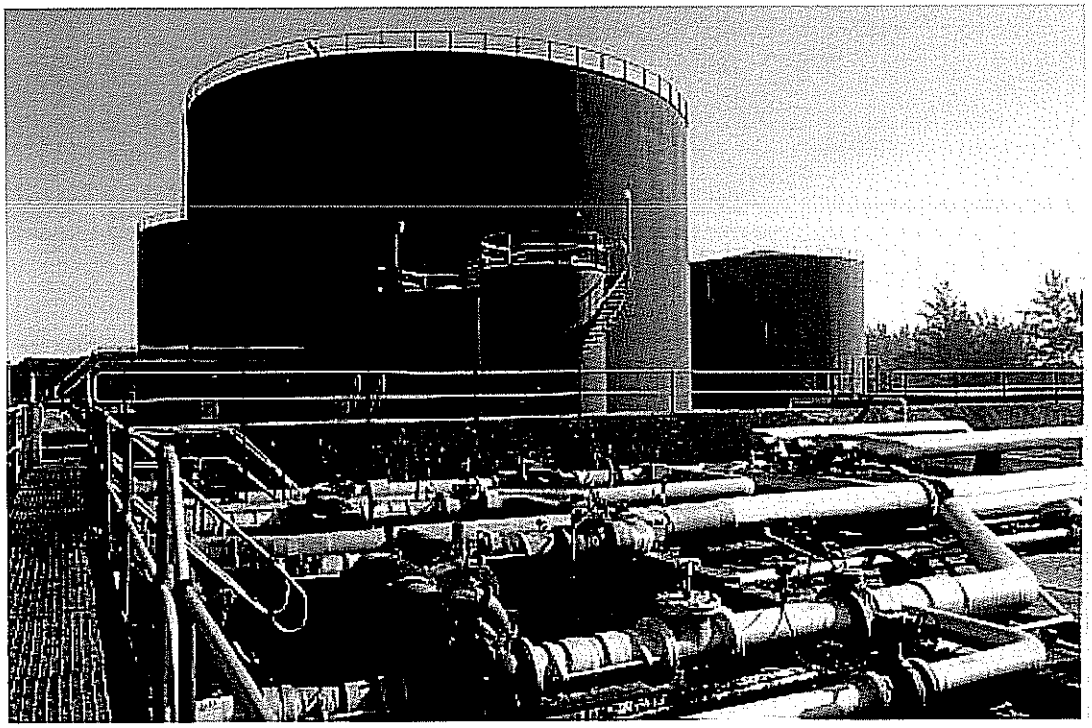
Operated by Richards Bay Bulk Storage, handling bulk liquid commodities



Name of Terminal	Island View Storage
Operator	**Richards Bay Bulk Storage (Pty) Ltd** and **Island View Storage (Ltd)**
Location	South Eastern part of the harbour, South Dunes
Trade	Liquid chemicals in bulk. Propylene, Butadiene, Ammonia, Hexane, Octene, Acetone and Detergent Alchohol
Limits of Terminal	The tank terminal area is approximately 100 hectares, bounded by Dune road and the wooded areas of the South Dunes. The tank storage area is linked by pipelines to berth 209
Berth	The terminal is linked to berth 209. 209 Length 300m Depth 14.0 m Draft 12.5m

1.3.5 The Bunker terminal

Operated by Joint Bunker Services handling bunker fuels for shipping, delivered via two bunker barges operating inside the port area.



Name of Terminal	Richards Bay Bunker Terminal
Operator	**Joint Bunker Services**
Location	In South Dunes area, close to Richards bay Coal terminal and Island View Storage.
Trade	Supply of Bunker fuels to shipping, by pipeline and/or barge.
Limits of terminal	Tank farm with three large storage tanks for primary fuels, plus smaller tanks for specialist fuels and lubricants. Located between Dorothea road and a natural heritage site.
Berths	Main operation from berth 209, but pipeline bunker points are available on berths 301 and 302 (RBCT)

1.3.6 The Sasol Agri terminal

Operated by Sasol- Agri over berths 608 and 609 as a specialised facility

Name of Terminal	Sasol Agri
Operator	**Foskor**
Location	Area behind berths 608 and 609
Trade	Export of Phosphoric Acid
Lease period	Unknown
Limits of Terminal	Terminal area of 1.309 hectares, with rail reception facilities and four storage tanks with capacity 11,000 tonnes.
Berths	Non dedicated berths 608 and 609. 608 Length 204m Depth 14.5m Draft 13.5m 609 Length 300m Depth 14.5m Draft 14.0m

2 Operating Issues

In many countries the port of Richards Bay would be classified as an Industrial Port, as it is dominated by import and export flows of industrial class materials destined for a small and stable number of customers. However a pure industrial port would normally be owned and operated by the primary industrial complex and be devoted to the servicing of their needs. In the case of Richards Bay the number of major industrial units is large, and growing, and the South African Port Operations company do have a significant operational influence in the Bay View and Umhlatuzi range of berths. es

The major industrial products handled in the port of Richards Bay include:

- Export of steam coal through the Richards Bay Coal terminal.
- Imports/exports of bulk chemicals in liquid form, through Island View Storage
- Aluminium ingots, through Strang Rennies Metal terminals and the Multi Purpose Terminal operated by SAPO
- Phosphoric Acid from Sasol Agri through berths 608/609 in Umhlatuzi and the berths operated by SAPO
- Ferro Alloys through the Multi Purpose terminal operated by SAPO
- Forest Products, logs and woodchips through the SAPO terminals
- Other industrial products serving a range of port based industries and using the SAPO terminals.

The port area is divided into three major complexes;

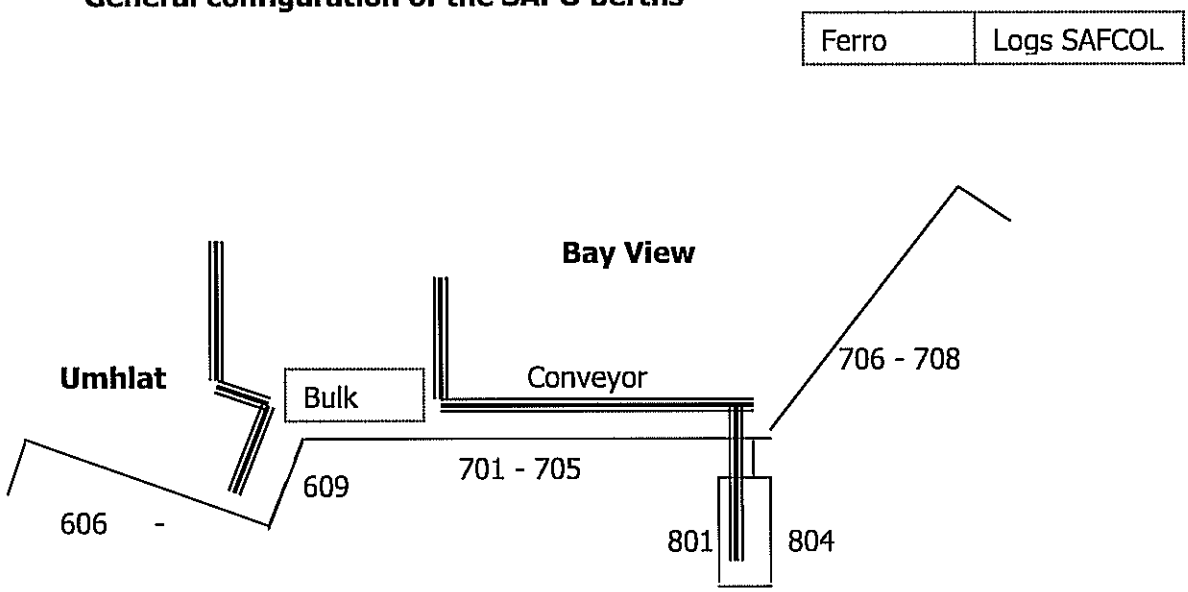
- the bulk coal and chemical berths at Die Duine, which are operated by the Richards Bay Coal Termina and Island View Storage, respectively, plus the bunker fuel operations of the Richards Bay Bunker Terminal.
- the area of Tuzi Gazi and Naval Island which comprises the tug and small vessel berths, plus a marina and associated leisure facilities. Berths in this area are sometimes used as lay-by berths for vessels undergoing minor repairs.
- the berth complex of Umhlatuzi and Bay View which are the primary berths operated by the South African Port Operations company (SAPO)

SAPO Operations

The berths operated by SAPO lie in a complex group of four sets of continuous berths plus a finger jetty which in all comprise some 14 nominated berths of total length 3,364 metres. The general configuration of the berths is shown in the sketch.

The port was built to export 3 mtpa of steam coal. The dry bulk terminal followed later.

General configuration of the SAPO berths



Berths 801 and 804 on the finger jetty were designed for the loading of woodchips and other bulk materials and have pneumatic woodchip loaders of 1,750 tonnes per hour designed rate, plus a general purpose loader rated at 3,000 tonnes per hour. The finger jetty is planned to be extended to create two more berths which will be numbered 802 and 803, so completing the configuration.

The **Multi Purpose Terminal (MPT)** has a total area of some 44.5 hectares and nominally includes the 3 berths 606 to 608 in Umhlatuzi and the 4 berths 705 to 708 in Bay View. These berths have open quay frontage and are essentially used for the handling of all non-conveyor belt cargoes. Cargo is transported to and from the berth by road trailer either direct to a storage area behind the berth or to purpose built stacking areas or horizontal silos at areas separated from the berth by about a kilometre or more. Thus there is considerable road traffic with truck and trailer combinations or for the logs and ferro alloys tractor and trailer or bulk skips.

The berth complex has considerable storage areas which includes 2 large warehouses of 10,000 m^2 which are joined by a covering canopy providing another 8,000 m^2 of protected storage. This is augmented by a further closed shed of some 4,500 m^2.

Open storage amounts to 330,000 m^2 with a specialised Ferro handling facility fitted with horizontal segregated bins or silos of 75,000 m^2 giving a storage capacity of at least 100,000 tonnes of specialised grades of Ferro alloys and minerals.

A log terminal or stacking area of 55,000 m^2 is located at a distance of some 1.2 kilometres from the berths and is serviced by the log and forest product company SAFCOL with the berth handling of loading and discharging performed by SAPO.

Equipment on the quays includes 3 large mobile cranes, 2 rail gantry cranes and 2 reach stackers plus a wide range of tractors and haulers with trailers, dump trucks and bulk skips.

The majority of ship work is performed by ship's gear with SAPO employed stevedores and dock workers handling the labour on the ship and on the quay landing zones. Container cargo is worked either with ship's gear or by the mobile cranes and on-dock handling by the reach stackers and tractor trailer units.

Contacts: Multi Purpose Terminal Manager Tel 035 905 3209
Email : justicel@portnet.co.za / dalenel@portnet.co.za

3 Environmental Issues

Port and industrial development in the Richards Bay area has been ongoing for the last 26 years and in that time a large and complex industrial area has been injected into a "green field" site. Great care has been taken by the port, industrial developers and the local council to segregate industrial areas from residential and recreational areas.

Each individual industry in the port area has an environmental protection plan and the port management in particular concentrate their efforts in ensuring that water quality in the harbour is maintained and that the quay and related storage areas are maintained in as clean a condition as possible.

The port of Richards Bay has for the majority of its existence been under constructional and operational development. Its current total land area available is listed at 2,157 hectares surrounding the water area of 1,443 hectares. Within that land and water area it is estimated that approximately 40 % of the land area is developed, with the developed land backing on to a total of 6,363 metres of berths, subdivided into three major terminal sections, plus a small craft harbour.

"Die Duine"	Bulk Liquids and Coal	6 berths	1,884 metres
"Umhlatuzi"	General and Bulk	4 berths	944 metres
"Bay View"	General and Bulk	10 berths	2,420 metres
Small Craft	Harbour craft / Dredger	6 berths	1,115 metres

The port was dredged out of an existing estuary with the Umhlatuzi river being diverted and canalised. A wall was constructed across the estuary for road and rail access to the Die Duine area. This allowed separation of the sanctuary and the harbour.

The port is thus surrounded by a considerable area of primative and recovered land and vegetation, which provides immediate subdivision and protection of the industrialised areas from the growing urban developments. For example the bulk coal berths of the Richards Bay Coal Terminal at Die Duine, are approximately 3 km distant from either the berths of the Multi Purpose Terminals in Umhlatuzi or the Small Craft Harbour and commercial developments of Newark. The residential and commercial centre of Richards Bay lies a further 3 kilometres to the north.

3.1 SAPO Environmental Policy

SAPO (South African Port Operations) has developed an environmental policy as part of the Environmental Management System (EMS) which is to ISO 14001 standards.

This policy is geared to serve the operational needs of the various terminals and port operating sectors and to assist port operating companies in environmental management while ensuring that the natural environment is minimally impacted and that the individual terminals comply fully with all legal and moral requirements for environmental protection.

Environmental Impacts

Within the context of a commercial and industrial seaport the following have to be considered: environmental impact, the parties affected and the environmental conditions at present and in the future.

Each of these factors and impacts change with time and with the intensity of activity and South African Environmental legislation is well advanced in giving guidance to industries and local authorities.

Environmental Factors	Affected parties	Time scale
Visual impact	Animals	Construction/Developme
Noise pollution	Birds	nt
Waste pollution	Vegetation	
Smell and dust	Insects	The present situation
Traffic	Benthnic organisms	
Drainage	People	Future developments

Construction and Development Stage

During the primary construction phases the immediate impact was created by the construction of access roads and the dredging of the lagoon associated with the construction of the quay walls and extensive filling in of mud flats and reed beds etc.

The lagoon and flood plain were virtually virgin land and the impact on the natural environment was severe. Water quality in the river, the lagoon and near to the newly dredged harbour entrance was disturbed with considerable raising of silt and the associated effect of industrial waste products. For the human population the impact was not so severe, as the original township of Richards Bay was relatively distant from the site and the benefits of employment were enjoyed.

Since that initial construction phase development has continued at a slower pace with the construction of primary industries and other associated sites. The regional and town councils have taken account of the impact of industrial development on the natural environment and have co-operated with the port and the industries in the production of a sustainable programme for the environment. The result is that currently the water quality in the harbour appears to be good and the surrounding marsh lands appear to be healthy with reported sightings of the indigenous flora and fauna. Part of the harbour area has been developed as a tourist and recreational zone which indicates the desire to share and protect the natural resources of the area for the benefit of the population.

3.2 The present situation

The port of Richards Bay is essentially divided into three port operational areas. The area of Die Duine and the port complex of Umhlatuzi and Bay View.

Die Duine

The Die Duine area includes the coal export facility operated by The Richards Bay Coal Terminal Company Limited, the Island View Storage operated by Richards Bay Storage (Pty)

Ltd and the Richards Bay Bunker Terminal operated by Joint Bunker Services. Each of these operations is self contained and uses pipelines or bulk rail for the movement of materials.

The Richards Bay Coal Terminal covers an area of some 254 hectares and has open storage for 6.7 million tonnes of coal. Delivery of bulk coal to the storage yards is by train and transfer to the ship loaders is via large conveyor belts. The bulk coal terminal could generate pollution dust, but the company has mechanical and operational procedures which reduce dust. Prevailing winds are from either the NNE or SW, with wind speed exceeding 18 m/s (40 mph or Gale force) for less than 10 % of the time. From observation at the harbour entrance and in the area of Newark, some 3 km north of the export facility, no dust contamination was apparent.

The Island View Storage covers an area of 50 hectares and contains 30 storage tanks of varying capacities containing many noxious and polluting commodities, such as Propylene, Ammonia, Octene and Detergent Alcohol with a total of some 152,000 m^3. Transportation is via pipelines from the storage tanks to berth 209 immediately north of the main coal berths The company appear to have excellent control and no reports of contamination were received.

The Richards Bay Bunker Terminal also operates a tank storage farm and uses berth 209 in common with Island View Storage for the import of fuel. Commodities include Bunker Fuels and products. Delivery of bunker oils to ships is either by fixed pipeline connections to berths 301 and 302 in the coal terminal, or, by bunker barge to other areas of the port.

Unused or non industrialised areas of Die Duine amounting to at least another 500 hectares are heavily wooded with natural growth associated with swamp land and uncontaminated habitats. Bird and animal life flourish in the area which was evidenced by sightings of many varieties of birds and monkeys.

Umhlatuzi and Bay View

This section of the port lies on the northern shore and is thus closest to urban developments of the city, but is also segregated from residential and retail areas by wide strips of natural and managed grassland and other vegetation.

The prime causes of industrial pollution are the major units of the Billton Smelters, RBCT, the Foskor plant, the Mondi plant, the woodchip facility, and the fertiliser plant. However each of these industrial complexes has its own controls and appears to operate in close co-operation with the local and municipal councils.

The port operational area consists of three sections of berths, operated by SAPO as the Multi Purpose Terminal and the Dry Bulk Terminal.

The Dry Bulk Terminal

This terminal area is operated by SAPO and consists of berths 609, 701 and 702 for imports and berths 703, 704, 705, 801 and 802 nominated for exports. Berth 705 is to be handed over to MPT.

The total land area of the DBT is 59.6 hectares and is essentially a conveyor belt operation with over 40 km of conveyor belts managed through a central control room.

The terminal therefore operates as a typical bulk terminal, although operating with multiple commodities, and main contamination come from spillages and losses from the conveyor belt systems. However these are well monitored and controlled with co-operation from the receiving industries in the cleaning up and removal of waste products.

Berths 608 and 609 are used regularly by Foskor for the export of Phosphoric Acid which is delivered to specialist tankers by pipelines and connections on the berths.

3.3 Future developments

The main feature of development in the port area is the fact that the whole area is in the flood plain and alluvial basin of the Umhlatuzi river and thus some areas may be unsuitable for constructional use due to land instability and the associated cost of preparing foundations. The second factor is the insistence pristine natural environment and the establishment of sanctuary and protected areas for wildlife.

In the Die Duine area development of the coal export berths in Icubhu is planned, with extension to the south by a further berth (306). This extension would then result in a total of six (7) coal berths, which it is anticipated would be sufficient to service the demands of the international export trade. Once again, the operators of the industrial facilities in the area of Die Duine are major players in the South African industrial arena and have well defined expansion and environmental plans.

Expansion of port facilities in the Umhlatuzi and Bay View areas is planned, but is limited by the geotechnical conditions of the subsoils which have been investigated thoroughly. A large section through the harbour basin, from Mzingazi in the north to Kabeljou in the south, has been found to have soft and non-supporting soils and will probably not be suitable for industrial development.

Further major expansion has been pre-planned to take the port area further up the river valley of the Umhlatuzi river towards the main N2 motorway, bypassing the Billiton smelter and creating an extensive area of docks and basins to service specialised industrial developments. A draft plan of this proposed extension area is shown in the Draft Framework Development Plan prepared by Richards Bay port management.

4 Planning proposals 2003

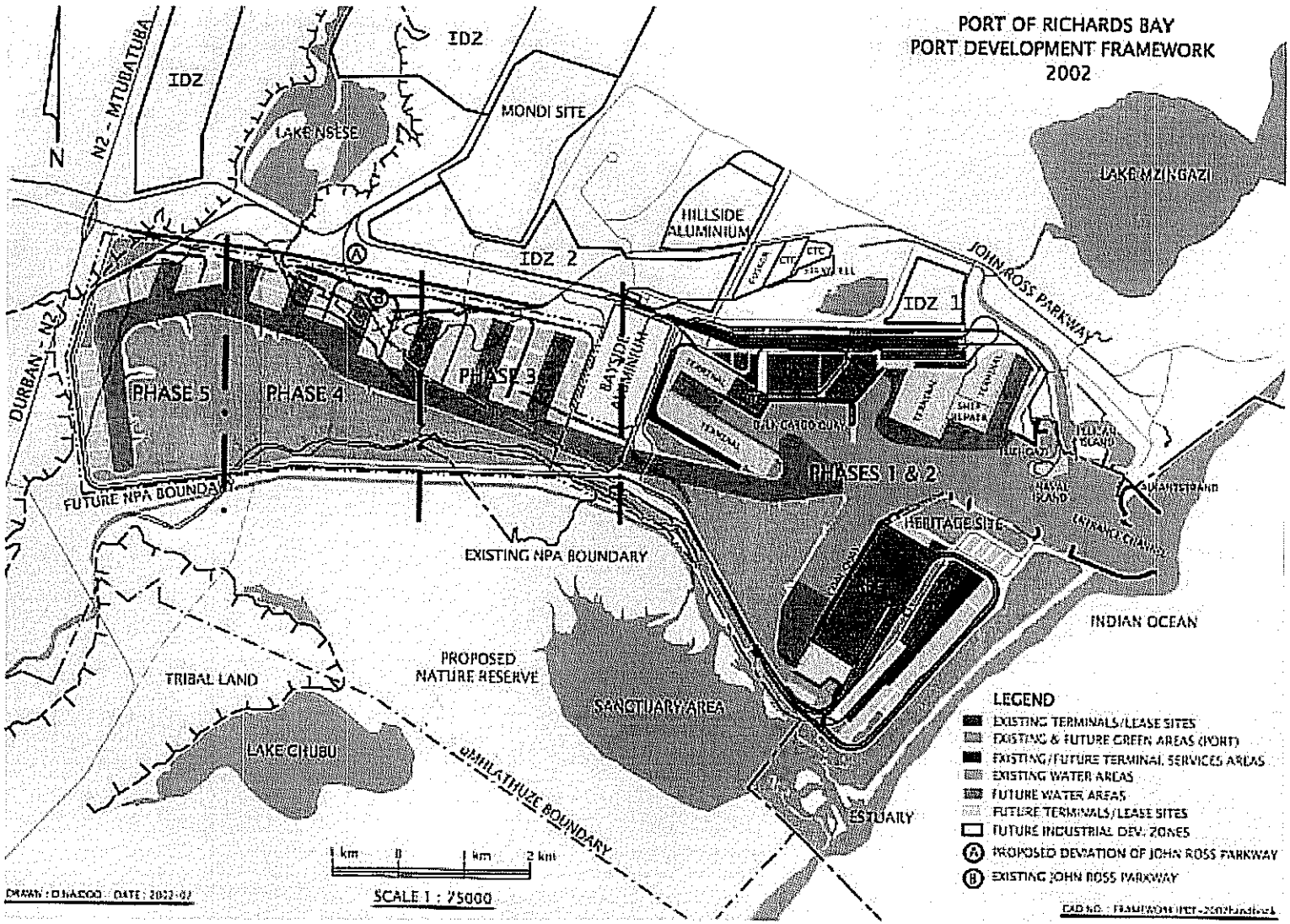
The National Port Authority is the landlord and is responsible to the Government for the development of the port infrastructure has made tentative plans for the future expansion of the port of Richards Bay, sufficient to be able to offer exporters and importers facilities for the foreseeable future.

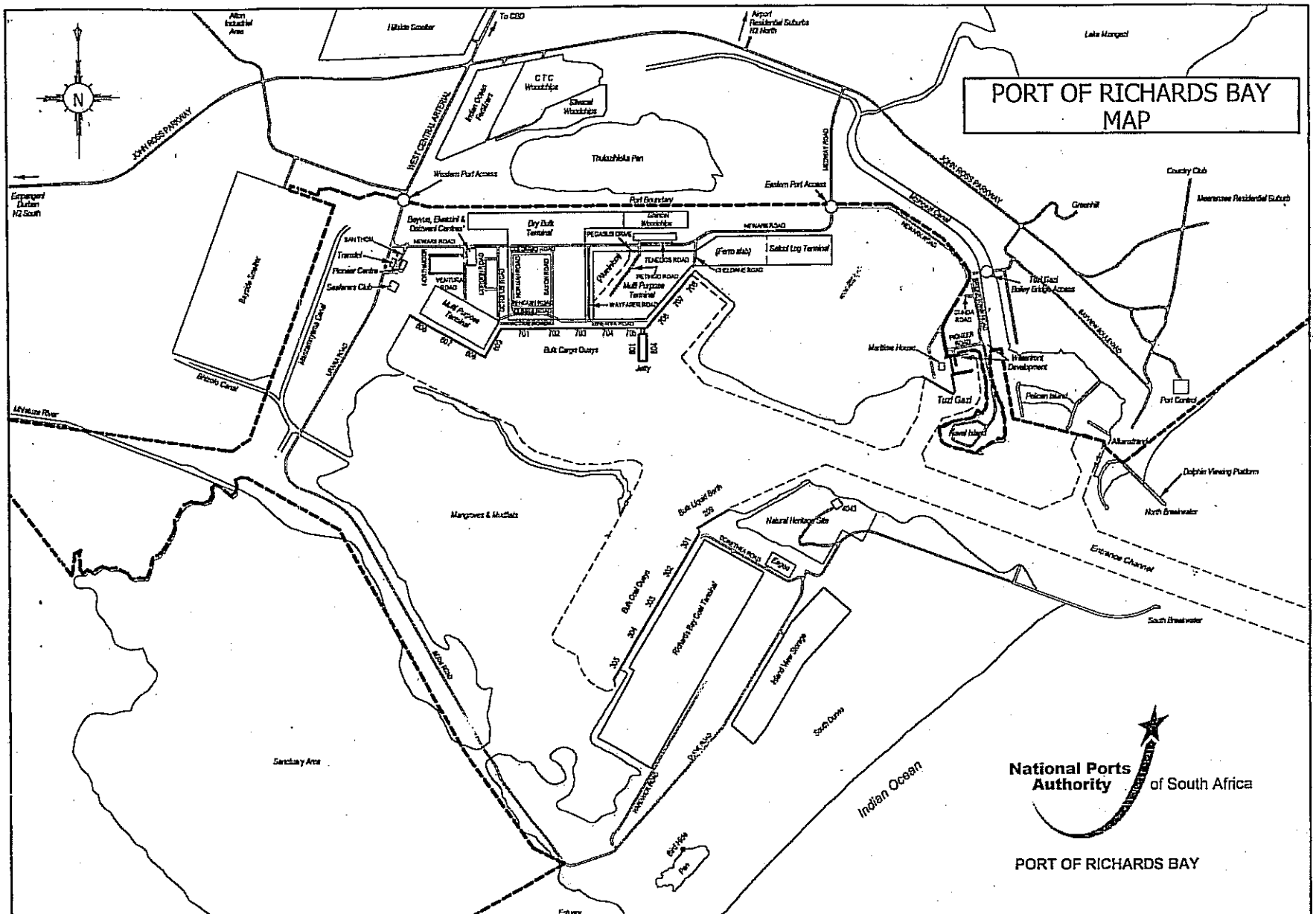
The Planning and Development Department of NPA has created a Port Development Framework, which takes into account national planning objectives, geotechnical and environmental considerations and the technical changes in world shipping and transportation. Details may change as developments occur, but essentially the port can more than double its capacity with its existing boundaries and by expanding up the Mhlatuze River floodplains.

The following planning developments are envisaged:

- Development of an additional coal export facility, particularly for smaller exporters
- Additional berths for Breakbulk/multi Purpose vessels
- Additional bulk liquid and bunker vessel berths
- The development of a modern ship repair facility
- A specialised terminal for passengers, or fruit
- A specialised container handling facility

Further developments outside the port boundary but having a major impact on port utilisation are the creation of Industrial Development Zones. These are intended to be purpose built and secure industrial estates, linked to the port and containing a customs controlled duty-free area. The intention is to provide services tailored for export-oriented industries, through the development of industrial clusters based on major "anchor" tenants.


PORT OF RICHARDS BAY
PORT DEVELOPMENT FRAMEWORK
2002
N
N2 - MTUBATUBA
IDZ
IDZ
MONDI SITE
LAKE NSESE
LAKE MZINGAZI
HILLSIDE ALUMINIUM
IDZ 2
IDZ 1
JOHN ROSS PARKWAY
DURBAN - N2
PHASE 5
PHASE 4
PHASE 3
BAYSIDE ALUMINIUM
PHASES 1 & 2
FUTURE NPA BOUNDARY
EXISTING NPA BOUNDARY
HERITAGE SITE
INDIAN OCEAN
PROPOSED NATURE RESERVE
TRIBAL LAND
SANCTUARY AREA
LAKE CHUBU
UMHLATHUZE BOUNDARY
ESTUARY
1 km 0 1 km 2 km
SCALE 1 : 75000
LEGEND
EXISTING TERMINALS/LEASE SITES
EXISTING & FUTURE GREEN AREAS (PORT)
EXISTING/FUTURE TERMINAL SERVICES AREAS
EXISTING WATER AREAS
FUTURE WATER AREAS
FUTURE TERMINALS/LEASE SITES
FUTURE INDUSTRIAL DEV. ZONES
PROPOSED DEVIATION OF JOHN ROSS PARKWAY
EXISTING JOHN ROSS PARKWAY



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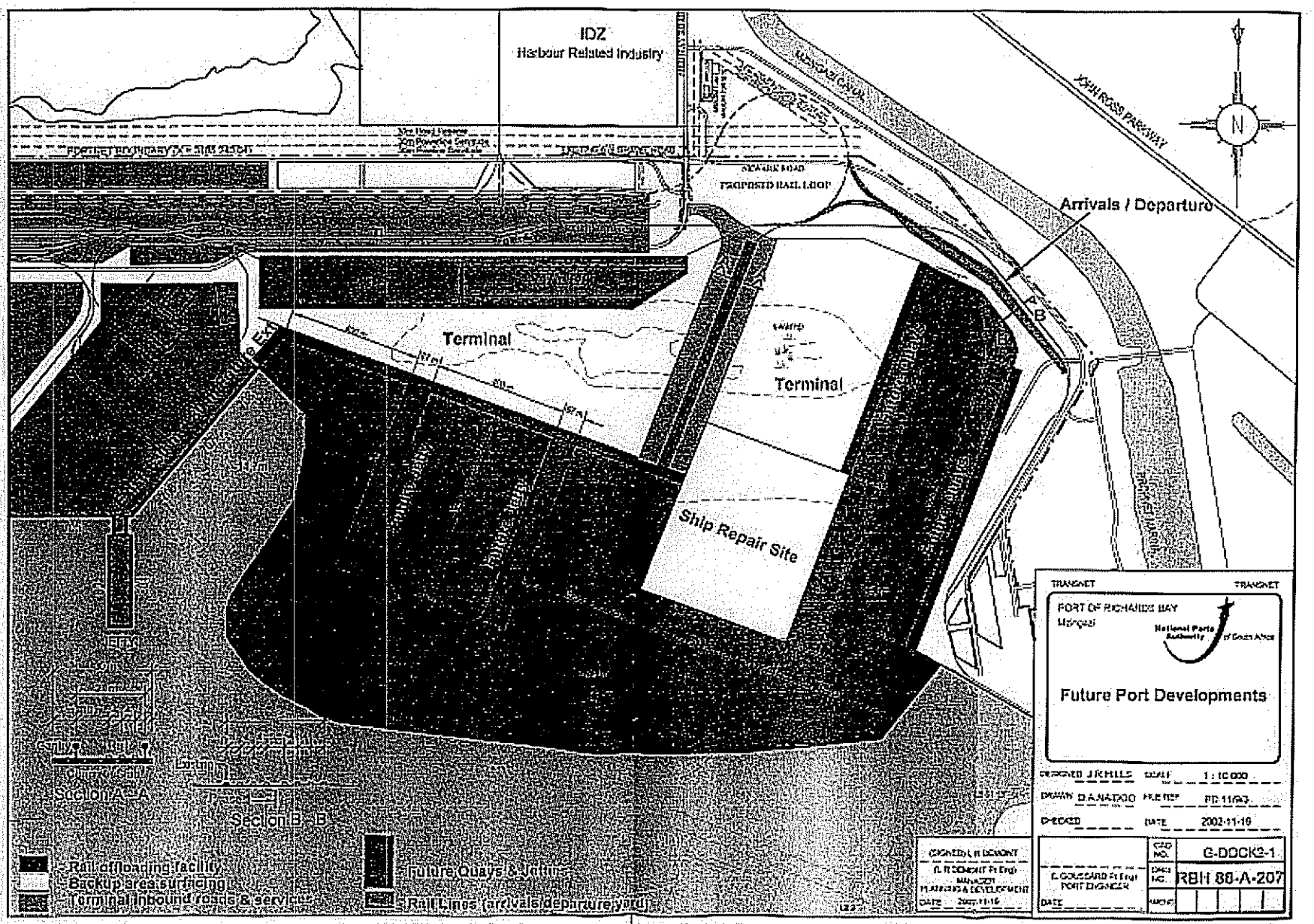
SKETCH RBH 2001-09 CAD NO. : 80/PORT-ROAD MAP


IDZ
Harbour Related Industry
JOHN ROSS PARKWAY
PROPOSED RAIL LOOP
Arrivals / Departure
Terminal
Terminal
Ship Repair Site
Section A - A
Section B - B
Rail offloading facility
Backup area surfacing
Terminal inbound roads & services
Future Quays & Jetties
Rail Lines (arrivals/departure yard)
TRANSNET
FORT OF RICHARDS BAY
Future Port Developments
G-DOCK2-1
RBH 88-A-207

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1 Introduction

1.1 Task

This report includes the facilities and operational review of the Cape Town Multipurpose Terminal and forms part of the required Base Information Packages.

1.2 Objectives

The objectives of this status quo report are to identify:

- Physical limits of the terminal;
- Basic condition of built facilities;
- Operational Issues;
- Environmental Issues;
- Proximity to Urban developments and impacts of future development plans;
- Physical limits to expansion of the terminal.

1.3 Itinerary

During the period from 2 till 5 December 2002 and 15 till 22 January 2003 several discussions took place with representatives of SAPO(South Africa Port Operations) and the National Ports Authority (NPA).

2 Physical Limits of the Cape Town Container Terminal

2.1 General

The port of Cape Town is situated 120 nautical miles north-west of Cape Agulhas, the most southerly point in Africa.

The port consists of:

- the BEN SCHOEMAN DOCK 1800 x 500 m,
- the DUNCAN DOCK 1800 x 600 m,
- the ALFRED BASIN 300 x 100 m and
- the VICTORIA & ALFRED WATERFRONT the tourist harbour area 500 x 500 m.

On the southern and eastern side the port is enclosed by the city of Cape Town. The port has easy access from open sea and the depth at the entrance channel is 15.9 m – CD.

Cape Town harbour is operated on a common user basis and ships are handled on a first-come-first-served basis. Special quays are provided for the handling of specific commodities such as ore, containers and bulk or unitised cargo. The port is world renowned for its deciduous fruit, perishable and frozen product exports. The fishing industry based at the Port of Cape Town is of major proportion.

During 2001 the Port of Cape Town handled 7,300,000 metric tons of cargo.
A lay-out of the harbour and its different terminals and facilities is given on figure 1.

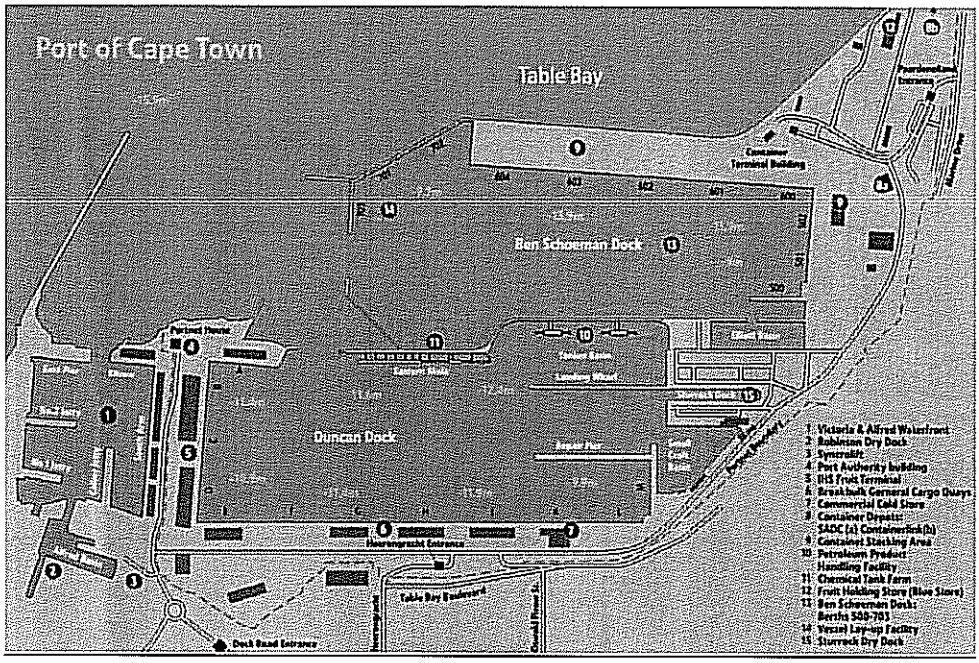


Figure 1

2.2 Location of the Multipurpose Terminal

The Multipurpose Terminal is situated along the western side of Duncan Dock comprising berths E, F, G, H, J, K and L (see figure 2on the following page).

A-Berth has been zoned for the offshore oil industry and is currently occupied by an ocean going cable-laying vessel. Berths B, C and D are leased to the Fresh Produce Terminals.

The total area of the present Multipurpose Terminal comprises 227,603 m^2 of which 32,000 m^2 is Shed area.(14%). On the waterside the Duncan Dock offers sufficient water area to safely manoeuvre the in- and outgoing vessels. The water area of the Duncan Dock measures 1800 x 600 m with an entrance 180 m wide.

On the landside, the future development of Victoria & Albert Waterfront's Clocktower Precinct will cause major effects on the Multi Purpose Terminal, as the public traffic will increase.

Access via the South Arm circle to the Multipurpose Terminal area is already compromised due to the increased amount of public traffic and general congestion in peak tourist season. This will become worse in the future. The second entrance to the Multipurpose Terminal at the Duncan Road could cause problems due to increased traffic. Traffic problems occur specifically during the peak period of the fruit season.

2.3 General information of the Terminal

The Multipurpose Terminal of Cape Town is split into two sub-terminals.

Terminal 1 (combi terminal) mainly handles: containers, fruit, fish, granite, timber, steel, copper and general cargo.
Terminal 2 (bulk terminal) mainly handles: cement, fish, scrap steel, bentonite, barley, grains/wheat, maize, soya/oats.
The multipurpose Terminal presently handles a range of about 60 commodities.

During the financial year 2000/2001 the following tonnages were handled:

Fruit	235,000 t	Barley	210,000 t
Containers	540,000 t	Cement	85,000 t
Maize	146.000 t	Fertilizer	145,000 t
Soya	252,000 t	Copper	30,000 t
Timber	61,000 t	Fish	157,000 t
		Steel (+ scrap)	204,000 t

The combi terminal is the latest development. The storage shed at berth F has been demolished and an additional area parallel to Duncan Road, at the back of the berths, has been provided with a heavy duty concrete surface.

The lay-out of the slots, as can be seen on figure 3 on the next page, is based on a straddle carrier operation. In total 1068 ground slots and 106 reefer ground slots are made available. During the financial year 2000/2001 a total of 30,700 TEU were handled, while for 2002/3003 already 45,000 TEU are expected.

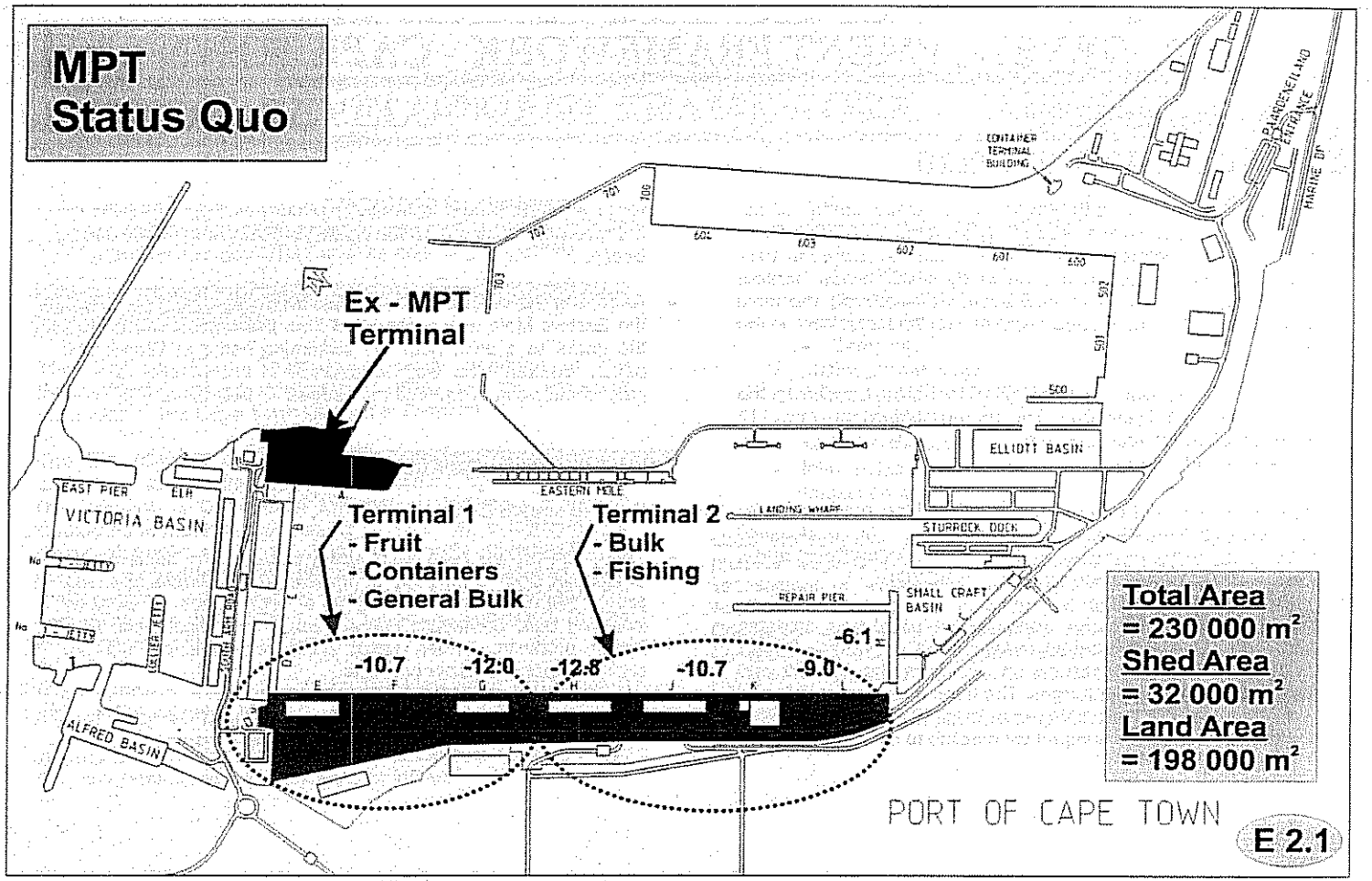

MPT
Status Quo
Ex - MPT
Terminal
Terminal 1
- Fruit
- Containers
- General Bulk
Terminal 2
- Bulk
- Fishing
-10.7
-12.0
-12.8
-10.7
-9.0
-6.1
Total Area
= 230 000 m²
Shed Area
= 32 000 m²
Land Area
= 198 000 m²
PORT OF CAPE TOWN
E 2.1
ELLIOTT BASIN
EASTERN MOLE
LANDING WHARF
STURROCK DOCK
REPAIR PIER
SMALL CRAFT BASIN
EAST PIER
VICTORIA BASIN
JETTY
ALFRED BASIN
CONTAINER TERMINAL BUILDING
PLANTATION LAND ENTRANCE
MARINE DR

Figure 2

A mobile 100T Gotttwald multipurpoise crane is available. Normal handling of the commodities occurs with old fashioned 4 tonne wharf cranes in combination with ships gear. It is projected that in the near future all cargo handling will be by ship's gear and the old wharf cranes will be demolished.

Two railway tracks are available along the entire quayside (berths E to L).

3 Condition of Built Facilities

3.1 Berth Structures

The construction of the Duncan Dock was completed in 1945.

The quay walls of all berths E through L consist of prefabricated solid concrete blocks supported either directly on the rock bottom or on a granular sub-base on the sub-soil.

On the top of the concrete blocks a concrete reinforced capping beam is made provided with a service tunnel. The top elevation of this capping beam is + 4.27 m CD. The elevation of the toe of the concrete blocks is –11.89 m CD.

Berth lengths and draughts are as follows:

Berth	Length	Depth	
E	225.6 m	9.1 m	Fruit/general/passengers
F	249.9 m	12.2 m	Terminal 1 – Combi Terminal
G	249.9 m	12.2 m	Terminal 1 – Combi Terminal
H	318.5 m	12.8 m	Terminal 2 - Bulk
J	249.9 m	10.7 m	Terminal 2 - Bulk
K	249.9 m	10.7 m	Terminal 2 – Bulk/Fish
L	246.3 m	10.7 m	Foreign Fish

During the short visual inspection no significant deformation or damages have been observed on the quay structure itself.

Bollards are placed at centres of 22 m along the entire quay (E through L).

Bollards are of the "Butterfly" type with a capacity of 50 tons and are located at the far front of the quay wall edge (see figure 4).

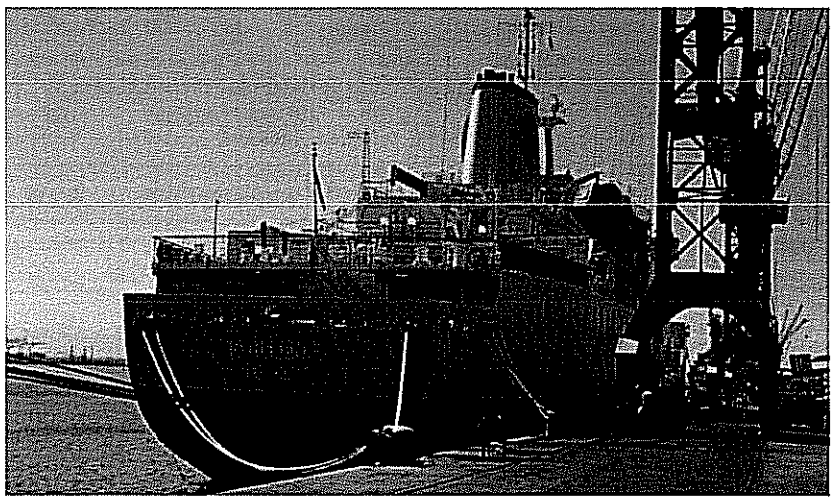


Figure 4

The fendering system consists of "earth-mover tyre" fenders with a diameter of 3 m hung at 22 m centres and fixed to the quay wall by means of chains.

The seaside crane rail for the wharf cranes is supported on the concrete capping beam. The centre of this rail is at a distance of 2.44 m from the edge of the quay. The crane track is 4.877 m wide and the landside rail is supported by concrete piles (crs 1.83 m for the 15 ton crane and 3.66 m for the 4 ton crane).

Special structures are provided where the Table Bay Powerstation inlet- and discharge duct are located as well as for the Buitengracht storm/sewer discharge.

Several ladders along the quay are missing or broken.

Covers at the capping beam surface that provide access to the service tunnel are missing at some places, or broken with damaged surrounds. This type of cover should be made of stainless steel.

Urgent repairs are necessary, as the open pits are a danger for people and equipment.

3.2 Pavement, roads, drainage

The pavement behind the quay wall consists of asphalt concrete. The pavement is at many locations in poor condition and needs urgent rehabilitation.

Settlement along the whole length behind the concrete capping beam was observed. The rails of the two railway tracks that run on the quay at distances of 4.000 m and 7.96 m from the landside crane rail, are at some places much higher than the surrounding pavement.

The protective steel plates at the railtrack-switches on the quay form a real hazard for the traffic and could cause severe wear and tear of the tyres of mobile equipment.

The pavement of the new area of the Combi Terminal consists of heavy duty concrete with a thickness of 37.5 cm on a 15 cm crushed stone layer.

The drainage along the whole length of the quay (E through L) consists of a surface drainage from the seaside of the building to the edge of the quay with a slope of 1:60 straight into the harbour basin (note: nowadays this is environmentally not acceptable). The remaining paved area is provided with open "gullies" collecting the surface water, which is by means of underground pipelines discharged directly into the harbour.

These "gullies" have a hollow round form and due to their depth they are also a concern for crossing equipment.

As many parts of these "gullies" are filled with debris and sand their functionality during rainfall may be doubtful.

The newly paved Combi Terminal is provided with concrete slot drain units covered with heavy duty grating.

Figure 5 shows the activities on the quay at J berth.

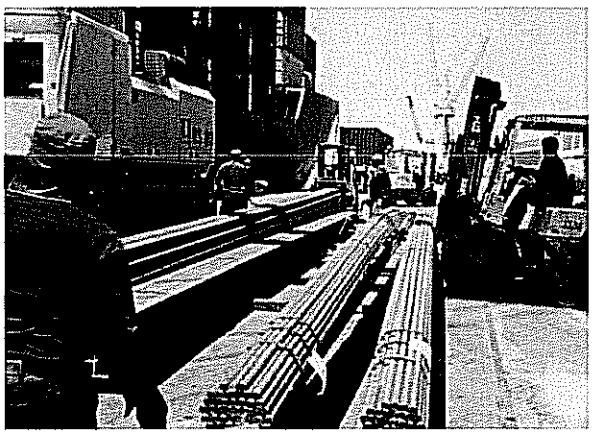


Figure 5

3.3 Buildings

Drawing A5-2076 Sh (Annexure A) gives an oversight of the different buildings leased to the Multipurpose Terminal.

At berth E the storage shed A4 has a ground area of 13,036 m^2 and is partly used for storage (tractors etc.) and partly as offices. The building was constructed in 1940 and should be demolished to provide more manoeuvring space on the quay.

At berth F the storage shed has already been demolished to create space for the Combi Terminal.

At berth G the cargo shed C has a ground area of 5,700 m^2. This shed dates from 1959 and is not in a good condition, in particular the height of the entrances are too small.

At berth H the cargo shed D has ground area of 6,894 m^2. The building was constructed in 1967 and is in a reasonable condition. The disadvantages of this shed are the small entrance doors and the floor which consists of different levels which were designed to serve a specific sack-loading method. The floor should be levelled and renovated in order to make proper use of the shed.

At berth J the cargo shed E with a ground surface of 6,685 m^2 was built in 1970. Apart from the doors the shed is in good condition.

At berth K the Commercial Cold Store for fish is located, with a capacity of 10,000 ton of which 2,000 ton capacity at – 60° C and 8,000 ton cold store at – 30° C.
On drawing TBH-106-A5-2076-Sh2 (Annexure B) details are given with regard to substations, offices, mess and ablution, oil store, workshops, etc.

3.4 Dredging

Maintenance dredging in the Port of Cape Town is very minor. In 1998, after a period of 20 years, some maintenance dredging was carried out in the approach channel.

As far as the Multipurpose Terminal is concerned, some minor sedimentation occurs due to the discharging of surface drainage, in particular by the Buitengracht Stormwater, which discharges into the Duncan Dock basin between berths F and G.

This minor sedimentation is normally removed by grab dredging.

Note: During the short visual survey "milky and smelly" clouds of sewer sediments were observed at the discharge end of the Buitengracht Stormwater Sewer. According to NPA personnel this was most probably an illegal discharge and measures were taken immediately.

4 Operational Issues

The Multi Purpose Terminal in the port of Cape Town is currently limited to the length of berths from E to L in the southern side of Duncan Dock.

Operationally and for marketing purposes the terminal is subdivided into two units:

- Terminal One, the **Combi Terminal**, which is planned to handle Containers, Fruit, General cargo, Timber and Steel
- Terminal Two, the **Bulk Terminal**, which is geared to handle bulk Grains, Cement, Fish and Scrap steel

During the financial year 2000/2001 the following tonnages were recorded:

Terminal One	Tonnes 2000/01	Budget 2002/03
Containers	540,000	
Fruit	235,000	246,000
Timber	61,000	50,000
Copper	30,000	40,000

Terminal Two	Tonnes 2000/01	Budget 2002/03
Maize	146,000	200,000
Soya	252,000	220,000
Barley	210,000	160,000
Cement	85,000	180,000
Fertilizers	145,000	90,000
Fish	157,000	65,000
Steel, incl Scrap	204,000	170,000

Source: SAPO statistics

The port design is linear, with an apron of approximately 20 metres width, followed by cargo sheds and a back berth area to the port boundary.

4.1 Rail Operations

This section of the port is essentially geared to rail operations with two sets of tracks running the length of the quays on the apron. A further set of tracks lies immediately behind the cargo sheds and further sets of tracks lead along the port boundary to the container platform at the rear of berth F. These longitudinal rail tracks are joined by crossing links, permitting transfer and passing of wagon sets.

This whole rail network dominates operations on the quays and the placement of wagon sets determines operational functions at the individual berths. Rail wagons are brought into the port by Spoornet locomotives and moved during cargo operations by SAPO tractors and pusher units.

The main, in-port roadway runs along the line of the quays behind the cargo sheds.

Cranes

The berths were originally fitted for the operation of portal cranes, but these have mostly been removed and in January 2003 only four remained operational. It is planned that these remaining cranes will be taken out of service and either sold or scrapped, and all ship operations will then revert to the use of ship's gear or the 100T Gottwald multipurpose crane.

Cargo sheds in the Multi Purpose Terminal

Berth	Shed	Area m^2	Date	Condition
E	A	13,036	1940	Used for long term storage/offices, poor condition
F				
G	C	5,700		Shed demolished, now open space
H	D	6,894	1959	Poor condition with small entrance doors
J	E	6,685		Reasonable condition, doors small, floor uneven
K			1967	Shed in good condition
L			1970	The Duncan Cold Store, 10,000 tonnes frozen products
				Open quay area

4.2 Operational Methods.

Normal working is of two shifts of nominal eight hours from 0600 to 2200 Monday to Friday and 0900 to 1700 on Saturdays. It is reported that overtime and night operations are available on request.

Delivery of cargo is mostly by direct means either to rail wagons or to road transport. This reduces storage in the port and is designed to reduce congestion. To this effect the cargo sheds, listed above, are not fully utilised, and consideration could be given to demolition or rehabilitation with improved access doors and clear level floor areas. The rear of the sheds is designed for transverse loading of rail wagons and thus the floor of the sheds slopes upwards towards the rear.

SAPO operations on the berths includes basic stevedoring services plus the handling of cargo on the dock and in cargo sheds. For these purposes the following equipment is reported to be available;

Other port equipment listed in the terminals 2002.

Equipment type	No.
Fantuzzi 45 Tonne FLT	1
Fantuzzi Reach Stacker	4
Fantuzzi 18 Tonne FLT	2

Equipment type	No.
Tjerberg / Mafi Haulers	8
Bell Tractors	23
Bathtub trailers (12m)	6

Fantuzzi 13 Tonne FLT	2
Fantuzzi 10 Tonne FLT	2
TCM 5 Tonne FLT	24
TCM 4 Tonne FLT	4
Yale 3 Tonne FLT	7
Paper clamps TCM	2

Multi-purpose trailers	6
(12m)	5
Skeletal trailer (12m)	3
Drawbar trailer (6m)	1
Street and berth sweeper	

Note: The condition and physical existence of the listed equipment has not been verified, but is taken from port documentation.

5 Environmental Issues

The Multi Purpose Terminal in the port of Cape Town occupies the South and West parts of Duncan Dock and comprises the second major terminal operation in the port for SAPO.

The primary environmental factors, which affect the operation and future development of the terminal, can be considered to be both internal and external:

- Increasing conflict between port operations and harbourside development
- History of berth allocation, resulting in split operations
- Changes in cargo patterns
- Wind, weather and sea conditions

5.1 Conflict between the city and the port

The port city of Cape Town generates considerable benefits from port operations, but the potentials for increasing revenue from tourism and non port commercial activities means that the prime land bounding the port is being taken for development, such as hotels, shopping malls and other leisure oriented activities. The rear of the port operational area is bounded by the high level expressway which effectively limits any possibility of the port expanding backwards into the city area.

Developments of the Roggebaai Canal Precinct (RCP) area for tourism and the new hotel and exhibition/convention centre complex are now completed, with the next demands being for additional space for parking and for improved road access. This will be linked with demands for the curtailment of noisy and dirty port operations, initially at night, but eventually during the daytime as well.

The constraints on port generated truck and rail traffic are already being felt with the Fresh Produce Terminals considering a major shift from their present location on berths B, C, and D to a new location closer to the container terminal and the existing rail head.

The port operational area currently consists of the berths E to L in Duncan Dock, the existing cargo sheds and a working and storage area along the length of the port averaging no more than 150 metres in depth. Within this linear area the SAPO have allocated port operations to groups of cargo, with an attempt to provide some form of internal specialisation. The result of the linear configuration is that traffic has to pass internally along the port, either to the available road gates, or, on rail wagons along the length of the port to join the Spoornet rail network at Bellville.

Development of a new rail station for the "Blue Train" close behind the Combi terminal storage areas would create conflict and also result in the loss of land and possibly difficulties in the timing of commercial rail connections and passenger rail over the same tracks. However NPA has now decided that no more NPA land will be transferred to the "Blue Train".

5.2 Berth allocation

The Multi Purpose Terminal is ranged around the inner and western sections of Duncan Dock and consists of berth A, which has been leased to an offshore operator, berths B, C, and D, which are leased to and operated by Fresh Produce Terminals, and the berths E, F, G, H, J, K and L, which together form a continuous line of quay some 1790 metres in length.

Of these contiguous berths K and L are operated by the Commercial Cold Storage for the landing and export of frozen fish, and berth L is used alternatively as a berth for scrap iron, or in conjunction with the ship repair activities in the basin. Thus the main berths operated by SAPO are those from E to J. (1294 metres)

Cruise facilities

The port of Cape Town, as one of the first ports of call for long distance cruise vessels has no dedicated cruise or passenger facilities. In the past berth A was used for this purpose, but currently passenger operations are limited to berths F and G with the primary customer being the liner service to and from the UK and the Atlantic Islands serviced by the RMS St Helena. The cruise trade is largely seasonal, November to April, but during this time some 20 cruise vessels and about 10,000 passengers use the facilities of the port. 70% of cruise ships are handled at the V&A, with the overflow diverted to the commercial port. Cruise liners of up to 200 metres in length, being able to berth at Pier 2 in the Victoria basin which gives passengers direct access to the shops and waterfront facilities of the Victoria and Alfred complex.

Victoria and Alfred complex

The shopping and tourist area of the Victoria and Alfred complex is currently centred around the western side of the Victoria basin and the Alfred Basin with the sheds and berths on the South Arm still maintaining their traditional role as the base for the local fishing industry. Initial road access to the Victoria and Alfred complex, the Victoria basin and to the berths A to E is shared with a new road surface and roundabouts constructed to facilitate transport for tourists and shoppers. Development of the facilities in the V & A is continuing apace, with new shops, hotels and residential accommodation being constructed. It could well be imagined that entrepreneurs will view the existing port related and fishing facilities as ripe for development, with a change of emphasis from commercial to tourist geared operations. Such developments could cause considerable pressure on the Port Authority to release land on the South Arm and to allow commercial development of land surrounding NPA House, and even berth A.

Fruit

The sheds and berths of the *Fresh Produce Terminals are* insufficient to cater for their needs during the peak fruit exporting season. Regular demand is made for the use of berth E, which has on dock connections to berth D and has available space for the marshalling of lorries and wagons and the loading of specialised reefer ships. Berth E, operated by SAPO in competition with FPT, is generally reserved for the fruit trade, but is also used for general cargo operations. However it is limited in its capabilities, due to the old shed structures and the access which has to be either under the shed, or via open space at berth F.

Bulk Products

Berths H and J are the major cargo operating berths in the Multi Purpose Terminal and are used for the import of grain, which is unloaded by grab into sets of rail wagons, or directly into road transport, as required. Movement of rail wagons, either by tractor shunters, or by rail locomotives, causes disruption to traffic flows on the dock roads

5.3 Changes in cargo patterns

The port of Cape Town is an import and export service centre for the region and has to respond to the changing demands of trade. In the recent past this has resulted in the virtual demise of the timber trade, the bulk cement or clinker import and the export of scrap iron. The stable trade factors in the port are containers, fruit, and grain, plus the import and export of frozen fish.

The Multi Purpose Terminal has attempted to meet these demands by providing facilities for bulk and general, cargo plus storage space for the handling of containers, as direct trade from multi-purpose or combi ships, Containers are mostly handled at berth F which has open space behind and a purpose designed area for the storage of containers and transfer to road and rail wagons.

5.3.1 Natural environmental factors

Wind

The berths and operating areas of the Multi Purpose Terminal are relatively well sheltered from the worst effects of either the north west or the south east (Cape Doctor) winds. The berths further to the east, notably berth L are subject to wind resulting in the blowing of dust, including rust, which can cause staining of facades and vehicles in the city area. This difficulty can also apply to the discharge of bulk grains and cement and operations are usually suspended during periods of strong winds.

Tides and sea conditions

The berths in the Duncan basin have general depths alongside of between 10.7metres and 12.2 metres, siltation is minimal and the range of tide at springs is about 1.5 metres. The berths are well protected from the effects of swell and conditions for shipping are considered to be safe.

6 Proximity to Urban Development and Impacts on Future Development Plans

6.1 Proximity to Urban Developments

On the southern and eastern side the Port of Cape Town is enclosed by the City of Cape Town, while at the west side the Victoria and Alfred basins partly are transformed into a successful tourist attraction.

The Victoria and Alfred Waterfront (see figure 6) provides a good example of the transformation of an old harbour area into a very popular tourist attraction. The Victoria and Alfred Waterfront has successfully merged leisure activities catering for tourists with a working port facility.

Figure 6

According to the Municipality of Cape Town, it is essential for a port and its city to interact as the port is the city's window to the rest of the world. But the future development of V&A Waterfront's Clock Tower Precinct will have a major effect on the Multipurpose Terminal due to the increasing public traffic.

The NPA Development Framework Cape Town, provides a clear and complete report of the future development of the Port.

The development of the Roggebaai Canal Precinct (RCP) has led to loss of stacking space within the Multipurpose Combi Terminal. The RCP will also bring commercial/retail industry adjacent to the Multipurpose Combi Terminal leading to incompatible operations situated next to each other. In essence the proposed canal is not the problem but rather the related infrastructure that will be developed alongside it i.e. offices, shops, retail business, loft apartments, etc. These developments will be on the doorstep of the existing Combi Terminal where break-bulk and container cargo is handled.

Multipurpose Terminal's equipment used to handle these cargos is in the form of road haulers, trailers, forklifts, straddle carriers, etc. The Multipurpose Terminal's operations by nature are of a heavy industry kind i.e. high noise levels, night shift working, etc.

There certainly will be operational restrictions placed on the Multipurpose Terminal's operations due to complaints.

The proposed "Blue Train" station, adjacent to the Combi Terminal will also give a potential clash of operations.

The Multipurpose Terminal's environment is dangerous with regard to the continued deployment of Cruise Liner Vessels near berth E and not conductive to the on/off-loading of luxury cruise liner passengers.

Development of a Convention Centre combined with adequately sized exhibition centre/space relatively close by generates conflicting operations with the Multipurpose Terminal.

It should be clear that due to increasing needs for land area and tourist infrastructure the Multipurpose Terminal is coming under threat.

6.2 Future development of Cape Town Multipurpose Terminal

The NPA Development Framework of Cape Town offers a very clear picture of the short-, medium- and long term development of the Cape Town Multipurpose Terminal.
The main aspects are the following:

Short term:
(0-7 years)

- A berth to be used by offshore, already done
- Increasing fishing industry to berths K and L
- Optimise combi + fruit terminal (already in operation)
- Remove non-essential services to the Port Industrial Park

Note: This Port Industrial Park is located south of the Marine Drive near the Salt River Powerstation, inland from berths 501 and 502.

Medium term:
(7-15 years)

- Deepen K and L berths to –13.0 m CD
- Move Fruit Terminal to berths 501, 502 and 600
- Move Fishing industry to berths B, C and D
- Move Timber and Steel to L berth
- Construct New Cruise Liner Terminal north of A berth

Long term:
(15-20 years)

- Make the entire back up area of the Combi Terminal available for Multipurpose Terminal operations
- Potential growth of Multipurpose Terminal cargo to A berth
- Development of dolphin berths to facilitate growth in cargo.

The medium term development is shown on figure 7 on the following page.

By shifting the whole fruit handling operation to berths 501, 502 and 600 traffic congestion near the Victoria & Albert Waterfront will be less as the fruit-trucks during their season no longer pass the South Arm circle to get access to the Fruit Terminal.

The fishing industry that replaces the fruit industry at berth B, C and D does need much less road traffic for their operations.

Also the fishing industry and more specifically the fishing vessels are more appropriate to "border" the waterfront development.

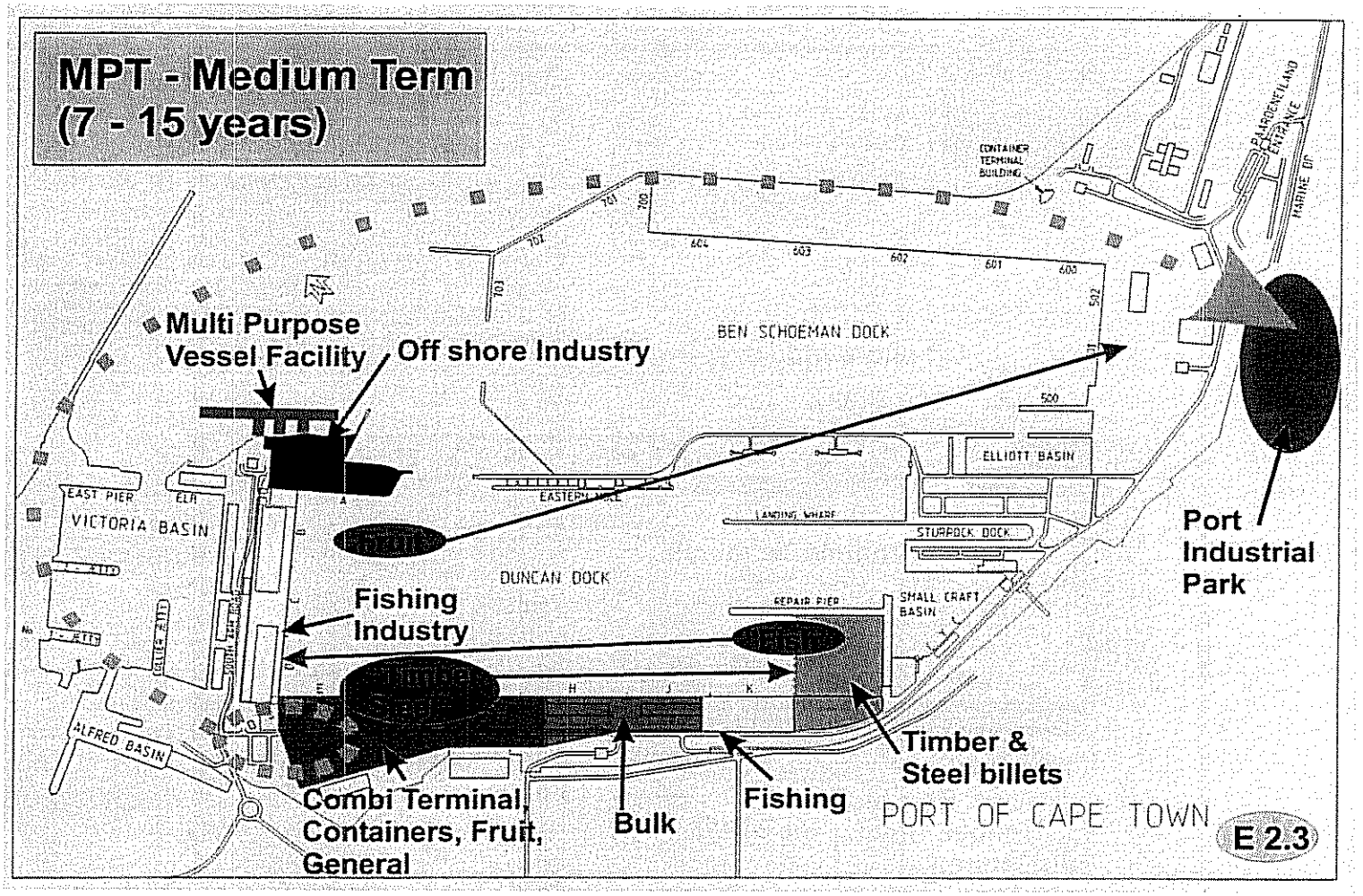

MPT - Medium Term
(7 - 15 years)
Multi Purpose
Vessel Facility
Off shore Industry
Port
Industrial
Park
Fishing
Industry
Timber &
Steel billets
Combi Terminal,
Containers, Fruit,
General
Bulk
Fishing
BEN SCHOEMAN DOCK
ELLIOTT BASIN
EASTERN MOLE
STURROCK DOCK
DUNCAN DOCK
REPAIR PIER
SMALL CRAFT
BASIN
EAST PIER
VICTORIA BASIN
ALFRED BASIN
CONTAINER
TERMINAL
BUILDING
PARDENELAND
ENTRANCE
MARINE DR
PORT OF CAPE TOWN
E 2.3

Figure 7

The development of a multi-user Terminal north of berth A could probably better be combined with a new waterfront development at the land area of berth A than with offshore industry.

So in the long term:

Combi Terminal, Fruit, General	- Berths E, F, G
Bulk Terminal	- Berths H.J.
Unitised Cargo	- Berths K, L (at –13.00 m CD)

7 Physical Limits to Expansion of the Terminal

7.1 Physical Limits Waterside

The size of the Duncan Dock determines the physical boundaries of Cape Town's Multipurpose Terminal.

On the waterside, no expansion is possible. Only in case the Port of Cape Town in the very long term (> 20 years) shall extend westwards by building a new breakwater, large areas become available to locate a new Multipurpose Terminal.

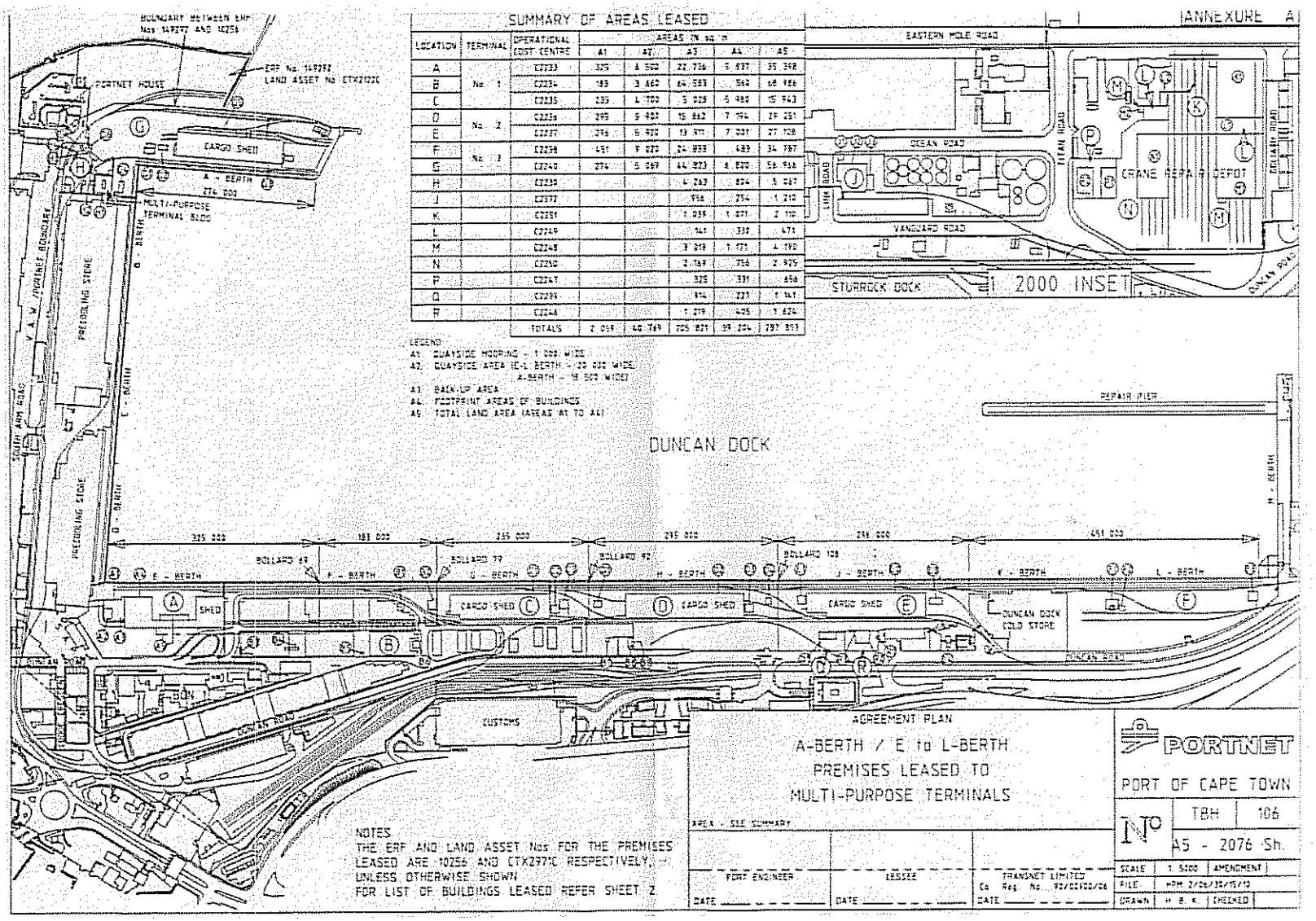
7.2 Physical limits landside

Increase of the port land area is not possible, as in fact the Multipurpose Terminal is embraced by the municipality of Cape Town.

The rail connections with the Terminal seem to be adequate to cope with the increased amount of cargo to be expected at the Terminal.

Rail and road transport are expected to grow in line with the growth of the national production. As the road transport today on the N_1, N_2 and N_7 motorways faces already congestions it will only become worse in the future.

ANNEXURE A



LOCATION	TERMINAL	OPERATIONAL COST CENTRE	AREAS IN sq m A1	A2	A3	A4	A5
A	No. 1	C2233	325	4 500	22 736	5 637	35 298
B		C2234	183	3 465	64 583	564	68 195
C		C2235	235	4 700	5 028	5 485	15 943
D	No. 2	C2236	295	9 400	15 862	7 194	29 251
E		C2237	296	9 925	13 971	7 031	27 128
F	No. 3	C2238	451	9 020	24 833	483	34 787
G		C2240	274	5 269	44 823	4 820	54 966
H		C2239			4 243	524	5 287
J		C2272			956	254	1 210
K		C2251			1 039	1 071	2 110
L		C2249			141	330	471
M		C2248			3 219	1 371	4 590
N		C2250			2 169	756	2 925
P		C2247			325	331	656
Q		C2299			914	227	1 141
R		C2246			1 219	405	1 624
		TOTALS	2 059	46 749	225 821	39 234	287 293

ANNEXURE B

LOCATION NUMBER	ASSET NUMBER	FL. AREAS IN sq. m	COST CENTRE	DESCRIPTION	LOCATION NUMBER	ASSET NUMBER	FL. AREAS IN sq. m	COST CENTRE	DESCRIPTION
A1	02XJ023C	2907,4 (174,9)	C1060	D-E GANTRY AND RAMP	G4	02EJ012C	108,1	C1060	GARAGES
A2	02YJ026C	214,7	C1082	SUB-STATION	G5	03MJ014C	392,6	C1060	LEAN-TO (A-SHED)
A3	02YJ027C	22,0	C1060	OIL STORE	G6	02AJ012C	22,6	C1060	SECURITY KIOSK
A4	02XJ022C	(3036,8 (4139,0)	C1060	E-SHED	H1	02XJ020C	1320,6 (660,3)	C1066	OFFICES
A5	03MJ005C	1436,7	C1060	LEAN-TO (E-SHED)	H2	02EJ021C	89,0	C1066	GARAGE
B1	02BH050C	112,6	C1082	SUB-STATION	H3	02ZJ040C	17,1	C1053	GARAGE
B2	02BH049C	162,0	C1061	STORE, MESS AND ABLUTION	H4	02ZJ041C	18,6	C1066	GARAGE
B3	02NH011C	36,6	C1030	OFFICE, MESS AND ABLUTION	H5	02ZJ042C	18,6	C1066	GARAGE
B4	02BH055C	27,0	C1061	WEIGHBRIDGE BUILDING	J1	02YH037C	8,6	C1082	ELECTRICAL KIOSK
B5	02ZH054C	15,1	C1061	SECURITY KIOSK	J2	02YH038C	200,6	C1069	SUB-STATION, WORKSHOP AND OFFICES
B6	02ZH070C	121,6	C1082	SUB-STATION	J3	03RH015C	45,0	C1069	CARPORT
B7	02YH059C	22,5	C1061	OIL STORE	K1	03FH001C	1071,3	C1068	PTN OF CRANE REPAIR W/SHOP & OFFICES
B8	02NH010C	25,6	C1030	OFFICE, MESS AND ABLUTION	L1	03FH001C	293,0	C1068	PTN OF CRANE REPAIR W/SHOP & OFFICES
B9	02NH009C	36,6	C1030	OFFICE	L2	02YH019C	36,6	C1069	WORKSHOP
C1	02BH048C	5699,8	C1062	G-SHED	M1	03FH001C	1159,0	C1068	PTN OF CRANE REPAIR W/SHOP & OFFICES
C2	02XH020C	258,5 (129,3)	C1062	MESS AND ABLUTION	M2	02YH018C	12,4	C1068	GAS STORE
C3	02BH047C	151,3	C1062	OFFICE, STORE AND TOILET	N1	03KH004C	755,8	C1068	SAND BLAST WORKSHOP
D1	02BH046C	116,7	C1063	OFFICE AND TOILET	P1	02XH003C	343,8 (171,9)	C1068	MESS AND ABLUTION
D2	03BH001C	6894,1	C1063	H-SHED	P2	02XH004C	309,9 (158,9)	C1068	MESS AND ABLUTION
D3	02XH021C	251,8 (125,9)	C1063	MESS AND ABLUTION	Q1	02XH008C	454,8 (227,4)	C1067	OFFICES, MESS AND ABLUTION
D4	02BH044C	57,4	C1082	SUB-STATION	R1	02YH052C	10,3	C1067	OIL STORE
E1	02XH022C	251,8 (125,9)	C1064	MESS AND ABLUTION	R2	02XH007C	625,0 (388,0)	C1067	WORKSHOP, MESS AND ABLUTION
E2	03AH001C	6685,0	C1064	J-SHED	R3	02BH043C	7,0	C1067	FUEL PUMP ATTENDANT
E3	02BH041C	140,0	C1064	OFFICES, STORE AND TOILET					
E4	02AH016C	50,0	C1064	SECURITY KIOSK					
F1	02XH027C	470,4 (235,2)	C1065	MESS AND ABLUTION					
F2	02BH039C	66,7	C1065	OFFICE, MESS AND TOILET					
F3	02YH050C	180,7	C1082	SUB-STATION					
G1	02XJ018C	357,2 (224,8)	C1060	OFFICES					
G2	02GJ004C	72,3	C1060	TOILET					
G3	02XJ019C	11041,3 (5979,2)	C1060	A-SHED					

NOTES: AREAS SHOWN ARE TOTAL FLOOR AREAS.
AREAS WITHIN BRACKETS ARE FOOTPRINT AREAS OF MULTI-STOREY BUILDINGS (INCLUDED IN TOTAL AREAS).
FOR LOCATION OF BUILDINGS LEASED REFER SHEET 1

A-BERTH / E to L-BERTH
MULTI-PURPOSE TERMINALS - LIST OF BUILDINGS LEASED

DRG No. TBH 106 A5 - 2076 Sh. 2

ANNEXURE B

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Executive Summary

The Port of Saldanha was constructed during the 1970's, to act as the deep water port for the export of iron ore from Sishen. The intention at that time was to take advantage of the worldwide demand for iron ores and the predicted increase in size of the ore carriers. The iron ore jetty and loading platform is served by large conveyor belt systems and is based on a bund created from dredged materials, plus the final deep water jetty on caisson structure.

At a later date, facilities were added for the handling of crude oil, and the Multi Purpose berths developed on the western side of the bund. Initially this consisted of one berth (201) which was constructed on concrete caissons sunk into the bay and joined by a concrete cope with service facilities for two portal cranes. These have subsequently been scrapped and are off the port's asset list. In 1997/98, due to anticipated demand for berths, the MPT was extended by 624 m and berths 202 and 203 were developed.

Export volumes are currently running at about twice the import volumes, for the 2001/02 financial year showing 1.6 million tonnes of exports and 0.72 million tonnes of Imports. Exports and indeed all cargo handled at the Multi Purpose terminal in Saldanha Bay, are essentially neo bulks, with significant volumes of lead and copper, plus specialised ore concentrates which are shipped in relatively small parcels. Steel rolls and coils from the Duferco and Iscor plants form major elements of exports and are delivered to the ship's side on trailers.

The frequent and linear transit of heavy trailers loaded with steel or skips of concentrates has caused some deformation of the quay surface, but as yet this is relatively minor.

According to the port finance office the operating and capital budget for the MPT for the year 2002/03 shows that operating expenses are estimated to be 23,752, 376 Rand (US $ 2.64 million approx.) with Capital expenditure estimated at 4,194,085 Rand (US $ 0.47 millions).

The Future for Saldanha

The port is situated in a conservation area and observes strict control over emissions and the discharge of effluent into the sea. According to cargo data released by the MPT management in 2001/02 the MPT is nearing its design capacity, at 50-60 %, so the search is on for expansion possibilities, which include:

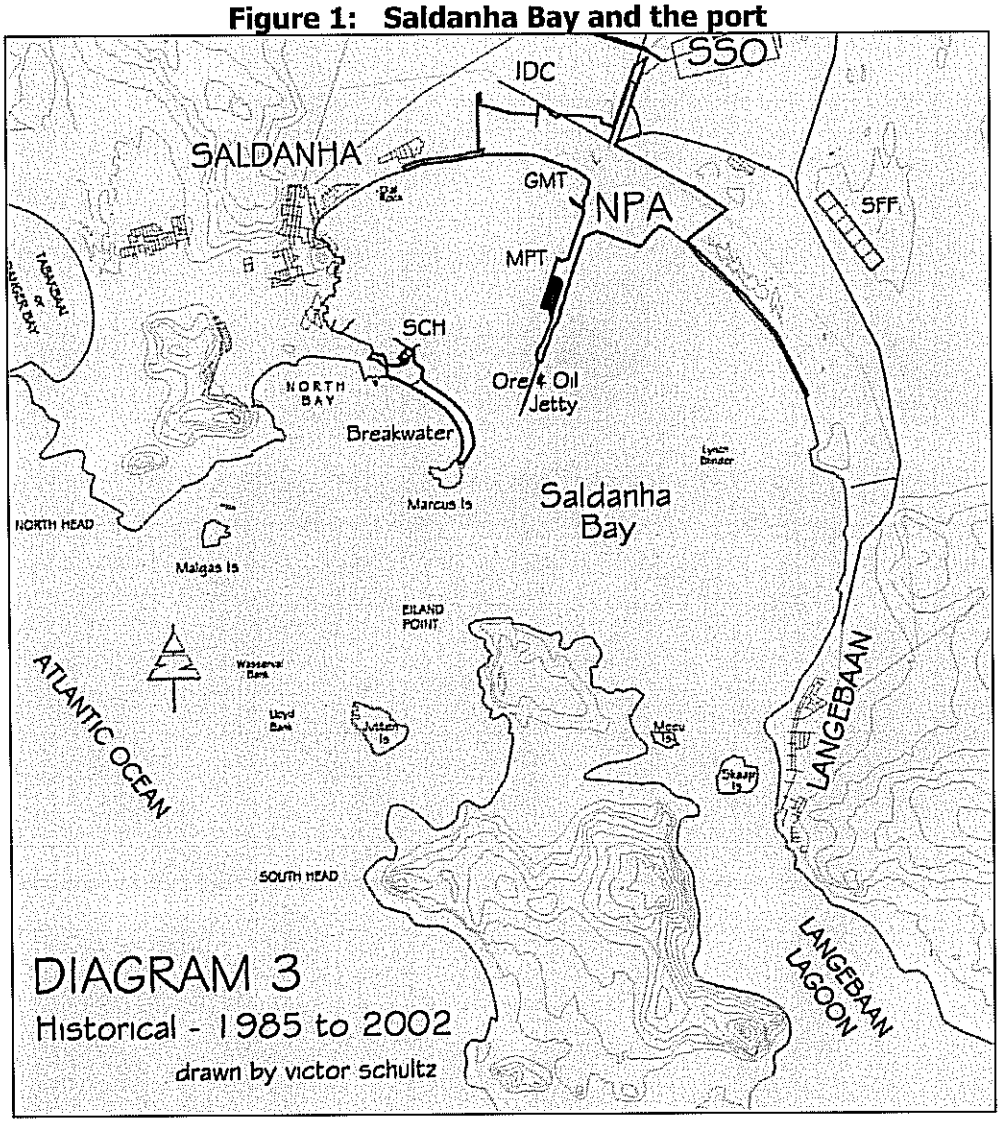
- extending the line of the current MPT to create one more berth.
- Expansion through infill of the water area towards the North West, to create more berths and associated storage space.

1 The Port of Saldanha Bay

1.1 General

The Port of Saldanha is situated on the west coast of South Africa, 60 nautical miles northwest of Cape Town. The port of Saldanha is the deepest and largest natural port in Southern Africa and is partly protected by an artificial breakwater. The port was constructed during the early 1970's originally to facilitate the export of iron ore, and is connected by means of an 860-km railway to Sishen where the iron ore mines are situated. A bulk crude oil jetty, as an extension of the ore jetty, and a break-bulk terminal were subsequently added to the facilities of the port. The port also serves base metal mines, and an adjacent heavy minerals smelter as well as the crude oil storage facility near the port.

Figure 1: Saldanha Bay and the port



Included within the port area are the SA Navy Base, SAS Saldanha, and a fishing harbour, which is administrated by the Department of the Environment. Also indicated are:

- IDC: Industrial Development Corporation Saldanha
- SSO: saldanha Steel Operations (Heavy mineral smelter)
- SFF: Strategic Fuel Fund (crude storage)
- SCH: Small Craft Harbour
- MPT: Multipurpose Terminal

1.2 Location of Multipurpose Terminal

The Terminal is situated about half way along on the west side of the 3100 m long causeway and includes berths 201, 202 and 203 with a total length of 874 m. The navigation channel towards the berths is an extension of the entrance channel towards the oil and ore jetty.

The width of the main entrance channel at its narrowest point is approximately 400 m with a depth of 23.00 m CD and 23.70 CD at the start of the main entrance channel. The maximum allowable draft of the navigation channel towards the Multipurpose Terminal is 13.50 m. There is a rail connection to the Multipurpose Terminal site, but not to the immediate quayside. However the port layout has made allowances for a possible railway connection to be constructed in the future. The road connection with the South African highway system is excellent, with direct connection to the main road network.

1.3 General information on the Terminal

The port of Saldanha Multipurpose Terminal has a quay length of 874 m comprising berths 201 (250 m), berth 202 (312 m), berth 203 (312 m). The capacity of the Multipurpose Terminal is approximately 4 million tons per annum. The total tonnage handled in the year 2001/2002 was 2,378,000 tonnes and the number of vessels 250.

The maximum permissible draught of berth 201 is 12 m, at berth 202 is 13,5 m and at berth 203 is 13,4 m. Berth 201 (250 m) was constructed in 1979-1980, originally to accommodate the export of ore concentrates (Cu, Pb and Zn). Concentrates were traditionally handled for two clients i.e. Black Mountain and Namakwa Sands.

Concentrates are trucked by road from storage to berth in 12 ton skips towed by tractors. The hauling distance is approximately 2 km. A storage shed (Cu + Pb) of 30,000 ton capacity (shed area 7200 m^2) with unloading facilities for trains is situated on the coast/beach line.

Berths 202 and 203 were constructed in 1997-1998 to accommodate, mainly, steel coils and steel pellets. Steel coils from Saldanha Steel are trucked to the quay side for direct shipment by ships gear. Duferco steel coils are stored and covered in a modern store on the Multipurpose Terminal quay side and delivered to the ship's side as required.

The following commodities are handled:

- Namakwa Sands: pig iron, titanium slag, rutile, zircon, anthracite (import)
- Black Mountain mines : lead, zinc and copper concentrates

- Saldanha Steel: steel coils, iron ore pellets (import)
- Duferco: steel coils
- Others: granite, steel scrap, pool iron, zinc

Contact details for the primary shippers are as follows:

Saldanha Steel (Pty) Ltd	Johan Fourie	022 709 4297
Namakwa Sands	Paul Henry	022 701 3045
Dufferco Steel Processing	Horacio Malfatto	022 709 7011
ISCOR Steel Limited	Thys Rossouw	012 307 4663
Black Mountain	Andre Joubert	054 983 9200
Marlin Granite	Matilda van Rooyen	012 252 9211

2 Basic Condition of MPT Facilities

2.1 Berth structures

The first part of the Saldanha Multipurpose Terminal (250 m) was built in 1979-1980 and consists of concrete caissons supported on an intermediate granular sub-base on the subsoil. On top of the sand-filled caissons a concrete coping was constructed carrying a service tunnel. The quay top elevation is + 5.10 CD. Only this initial 250 m (berth 201) is provided with crane rails, which carry the two 15t wharf cranes.

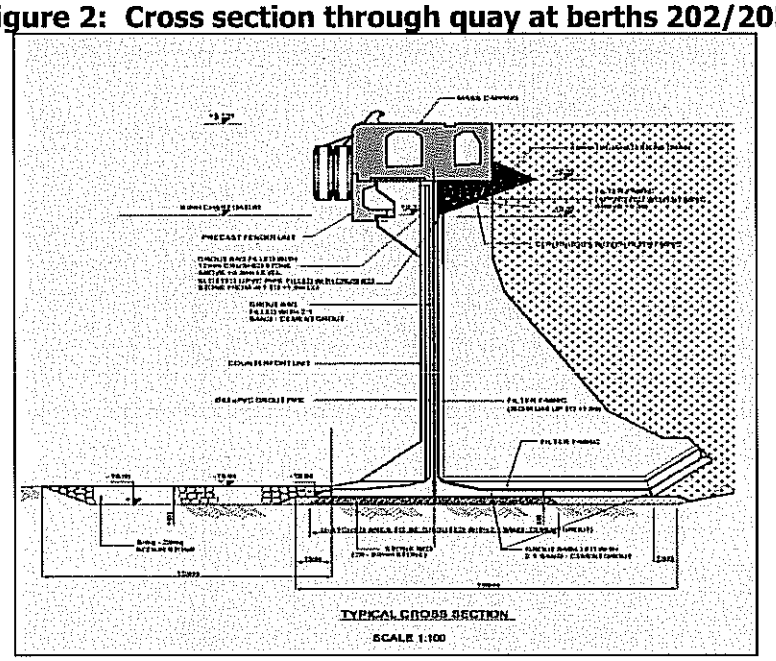
The second part of the Terminal (624 m) was built in 1997-1998 and consists of concrete counter forts with a concrete coping on top and service tunnel inside the coping. This second part (berths 202 and 203) does not carry crane rails. The water depth of berth 201 is –15.00 CD (advertised at –13.5 CD) while berths 202 and 203 have a water depth of –15.00 CD.

No deformation or damages were observed during our short visual inspection. The quay looks in a very good condition. Stainless steel ladders and stainless steel covers are in excellent condition, although some of the cast-iron covers were broken.

Bollards of the 'slope-back' type are placed along the entire quay length at about 18 m intervals and have a capacity of 80 tonnes.

The fendering of berth 201 consist of single type 'earth-mover type' fenders while berths 202 and 203 carry double type 'earth-mover type' fenders all with a diameter of 3.00 m.
This simple fender construction acts very well in absorbing the berthing energy. Berth 201 approximately 35,000 dwt ships and berths 202 and 203 approximately 60,000 dwt vessels.

Figure 2: Cross section through quay at berths 202/203



2.2 Pavement, roads, drainage

The pavement behind the quay wall of berth 201 consists of thick asphalt layer on a sub-base of gravel. Behind the quay wall of berths 202 and 203 the first 10 m also consists of asphalt, while the remaining area consists of heavy duty concrete laid in situ on a prepared sub-base.

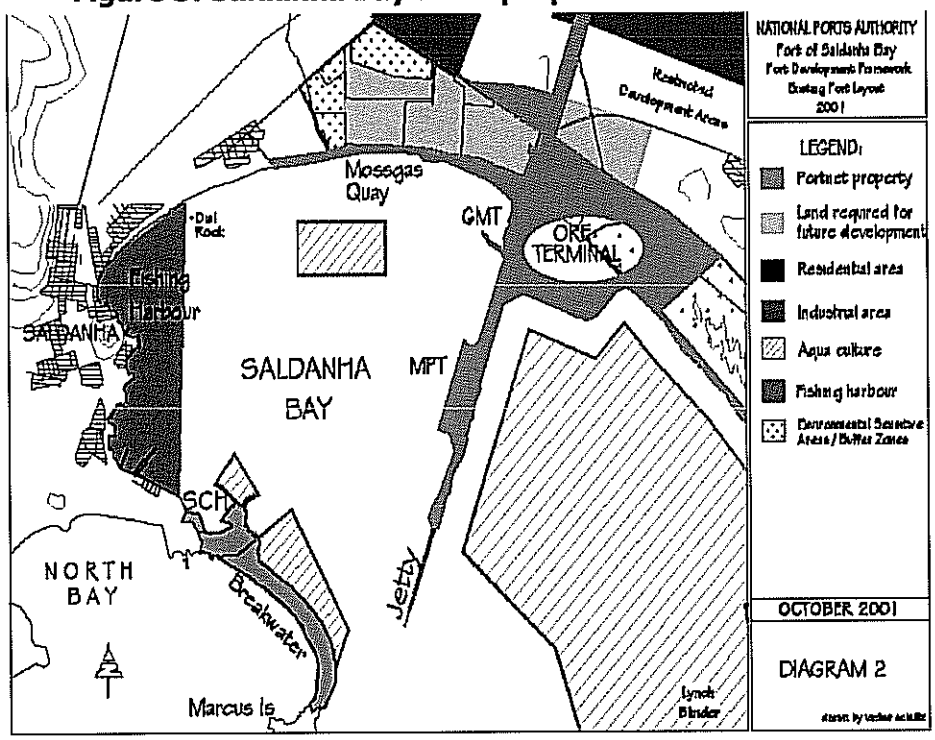
Due to the very heavy traffic on the quay, the asphalt pavement shows a settlement of a few centimetres along the length of the quay. Settlement as a result of sand leakages was not observed. The layout of the Saldanha Multipurpose Terminal (Figure 3) shows the large width of the stocking area behind the quay and the connecting roads.

Surface drainage is collected in heavy slot drains running parallel to the quay-front from where it is discharged, via a small sand-trap into the harbour. Catchment of the so-called 'first flush' is not possible. During the time of the visit the pavement areas, roads and drains looked clean and tidy and sweeping operations were in progress.

2.3 Buildings and Equipment

Apart from the storage shed for Black Mountain concentrates, there is only one storage shed on the area of the Saldanha Multipurpose Terminal itself. This storage shed is only a few years old and is in excellent condition and is purposely constructed to store Duferco's steel coils. The storage shed has an area of 8680 m^2 (62 x 140 m). This shed has a modern rail mounted gantry crane (capacity 35 ton) for direct loading/unloading of steel coils from dedicated trucks with a service road running along the whole length inside the shed.

Figure 3: Saldanha Bay Multi-purpose Terminal



The offices and administration buildings are located at the back of berth 201, leaving ample space for quay-handling operations. The buildings are well maintained and in excellent condition.

Figure 4: Equipment utilisation - Multi Purpose Terminal

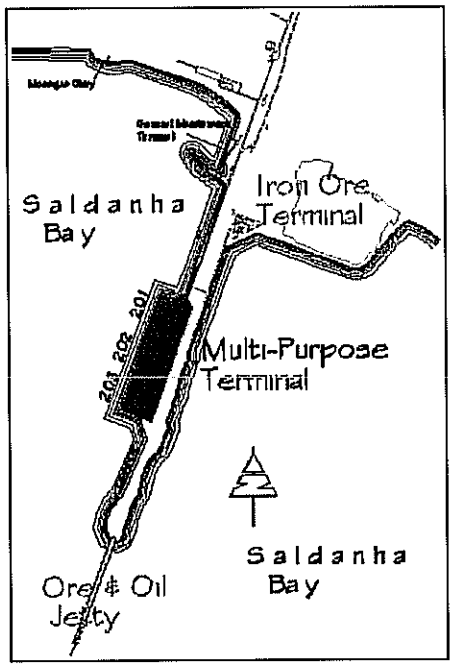
	Quantity	2000/01	2001/02	2002/03
> 20 tonne FLT	3	21 %	25 %	50%
<20 tonne FLT	2	2 %	5 %	10%
Tractors	11	23 %	41 %	53 %
Trailers	10	23 %	41 %	53 %
Front end loader	1	7 %	33 %	34 %
Wharf Cranes	2	32 %	30 %	Scrapped
Gantry Cranes	2	0 %	63 %	79 %
Hoppers	4	20 %	26 %	31 %

One of the two 15 ton wharf cranes on berth 201 was partly dismantled at the time of the visit in early 2003, while the second one appeared to be non-operational.

2.4 Dredging

The major part of the dredged material of the entrance and navigation channel consisted of calcareous material (shells and natural detritus) and only a small portion of slightly cemented sand. As the water in the bay of Saldanha is very clean, no siltation occurs. The sand movement along the bottom in the vicinity of the entrance and navigation channel is reported to be negligible. Maintenance dredging is at an absolute minimum.

Figure 5: Location of MPT



3 Operational Issues

The Multi Purpose Terminal in the port of Saldanha consists of a quay area set off to one side and about half way along the length of the main conveyor belt lines serving the iron ore loading berths at the end of the causeway. The berths are a total of 874 metres long, with three nominal berths 201, 202 and 203. The maximum draught on berth 201 is 12.0 metres and on berths 202 and 203 is 13.5 and 13.4 metres respectively.

Cargo operation on the berths is with ship's gear. The port previously had two 15 tonne wharf cranes, but these have recently been taken out of operation and are to be disposed of.

The main export commodities handled at berth 201 in the MPT in the Port of Saldanha are:

- lead and copper concentrates
- Zircon and Rutile
- Choride and Sulphate slag
- Pig iron and Steel coils

Import commodities normally handled on berths 202 and 203, consist of:

- Steel pellets
- Anthracite and Coking Coal
- Break Bulk cargo as required

Exports of bulk materials are stored either at the shippers premises, in open stacks or in a specialist shed with capacity for 30,000 tonnes of lead or copper concentrates. Material is loaded into 12 tonne skips, with two skips per trailer, and then hauled to the port and the loading quay. The skips are then lifted into the ship and the material tipped into the hold, in a manner to avoid breakage and to reduce the production of dust.

Steel coils are brought into the port from the steel mill by truck and lifted into the ship using ship's gear. The Duferco steel company utilises pre-storage facilities on the dock in an 8,680 m^2 shed, which has a 35 tonne rail mounted gantry crane to lift coils from trailers into the store.

Imports of pellets and coal are handled by grab, either direct to road transport or via port operation hoppers. Steel pellets are normally delivered to a stockpile on the land from where the steel mill collects the quantities required for production. Other imported bulk materials, such as coking coal are transported by truck directly to the receiver's premises.

4 Environmental Issues

The port of Saldanha lies some 60 nautical miles north of Cape Town, in the north eastern part of the natural coastal feature of Saldanha Bay. The port facilities consist of a 990 metre long jetty joined to the shore by a 3 kilometre causeway. Commercial operations in the port are dominated by the export of Iron Ore and the handling of crude oil. Approximately half way along the joining causeway a multi purpose terminal has been constructed to service exports of base and refined metals and specialist ores, plus other types of cargo as required.

Saldanha Bay also hosts the South African naval base of SAS Saldanha and a commercial fishing harbour. Saldanha Bay is protected by the land on most quarters, but is open to the south west. The jetty and the port complex of Saldanha are further protected against the effects of sea and swell by a man-made breakwater and causeway joining the mainland to Marcus Island.

The primary environmental constraints in the area of Saldanha Bay are:

- Wind and sea conditions, swell
- Pollution of the marine environment, by spills or ballast discharge
- Pollution of the air and land by dust
- The Mussel culture areas in the bay, close to the breakwater and main causeway
- Physical limitations to development

4.1 Wind and Sea conditions

The wind regime in this part of the South African Atlantic coast is predominantly seasonal, with Northerly winds during the winter months, May to August, and variable winds with sea breeze effect during the summer, November to February. Although the bay is protected from the north the Atlantic swells turn the point and can affect port operations significantly. Swells of 7 metres amplitude have been reported.

Pilotage operations can be adversely affected by the sea and swell conditions and large vessels may be required to use helicopter services rather than the traditional arrangement of pilot ladders and accommodation ladder.

Mooring arrangements in the port are geared to the impact of swells and the iron ore jetty has large pneumatic "Yokohama" type fenders of 3.30 metres diameter and special mooring requirements which are specified by the Harbour Master and Port Control. Vessels are normally moored head to sea and must maintain an operational crew on board, plus having engines on stand-by.

The Multi Purpose berths, which are further inside the bay, have large rubber tyre fenders to allow the use of ship's cargo gear while alongside.

Berthing and manoeuvring of tankers and large ore carriers takes place during daylight hours only, but multi-purpose and smaller vessels may enter and leave the port by day or night.

The tidal range within Saldanha Bay is reported to be 1.50 metres at springs and 0.50 metres at neaps. Tides are semi-diurnal in character, but the effect of the prevailing weather can have a considerable influence, with increased water level during on-shore winds and under low barometric pressure.

4.2 Pollution of the land and sea

Saldanha Bay is an environmentally sensitive area and strict controls are exercised on the operation of the iron ore loading facilities, the tanker berths and on the discharge of ballast water.

The original export facilities for iron ore were constructed during the 1970's and are currently under extensive refurbishment and expansion. This will include the expansion of the ore stockpiles, the installation of a new ore wagon tippler, plus the refurbishment of the conveyor belt system. Dust retention and prevention is given high operational priority and regular cleaning of the belts and quay areas takes place. Wind conditions, particularly with certain grades of ores, can cause problems, but every opportunity is taken to reduce dust from the tipplers, the stock piles and the belts and loading chutes to a minimum.

The tanker berth is fitted with 3 Chicksan hydraulic loading arms, with alarms and cut-outs in case of ship ranging movements due to swells. The port has extensive oil pollution prevention and clean up equipment. Floating oil booms are deployed around tankers and the port can deploy a range of skimmers and other equipment in case of an accidental spill.

The Multi Purpose berths have different pollution prevention problems as cargo is transported to and from the berths by 12 tonne skips which are then loaded into the ship using ship's gear. The storage of cargo, ore concentrates, steel coils and other materials is essentially in the open, so there is considerable care taken to avoid cross contamination of cargo by wind blown dust. Drainage of the quay during rain also can cause wash-out into the bay, so the berths are regularly swept and kept as clean as possible.

The shipment of lead concentrates in particular are subject to strict control of dust emissions by covering the loads and by ensuring that trucks and haulers pass through a water filled trench designed to wash off concentrate particles from wheels and chassis. Fishermen and mariculturalists fear that wind blown lead or heavy metal dust may be deposited in the mussel beds and enter the food chain.

Ballast water discharge from ships is also strictly controlled and vessels are required to arrive off the port with clean ballast water and at a draught and trim suitable for manoeuvring. Deballasting while loading is permitted, but the last elements of ballast may have to be transferred to an on-board slop tank for final discharge in the open sea. There are no slop tank facilities available in Saldanha Bay.

4.3 Mussel culture beds in the bay

Saldanha bay is an important area for the commercial exploitation of shell fish farming, particularly of the salt water Mussel. Large areas of the bay are designated as Mussel culture areas and vessels are prohibited from entry and are required to take maximum precautions to avoid any pollution of the water by discharges of oils, sanitary effluent or other waste products. The Langebaan lagoon to the south of the bay has been declared as a dedicated RAMSAR site and forms part of the West Coast National Park.

4.4 Physical limitations to development

The port of Saldanha was developed to service the export of iron ores from the Sishen mines and has since been expanded to cater for the handling of crude oil and products, plus the export of specialist mineral concentrates and general cargo.

The essential and basic facility of the causeway and the jetty exists and can only be expanded at considerable expense. Expansion and development possibilities are thus limited to increasing of stockpiles and storage areas, which will be outside of the port boundary, and operated by the industry, and to improvements and expansion of the capacities of the material handling in the port.

For iron ore, the primary product, the loading system is conveyor belt based and improvements to increase capacity could involve increasing the speed of the belt and the physical size. This may not be necessary, as loading conditions have limited the supply or material from the stockpiles and the ability of ships to receive cargo at higher rates.

For oil cargoes the product is transported by pipeline to storage tanks outside the port, again outside of the direct control of the port.

Cargo handled at the Multi Purpose berths uses road transport and 12 tonne skips. This is unlikely to change due to the value of the cargo, the requirement to avoid cross contamination and the normal small tonnages of individual parcels of concentrates.

Steel coils are transported on road trucks, either from the steel mill or to designated storage areas on the quay. At this stage major expansion of the facility will depend on world market demand for rolled steel and for the specialist concentrates used in the production of steel.

5 Proximity to Urban Developments and Impacts of future Development plans

5.1 Proximity to Urban developments

The present harbour area of the Port of Saldanha leaves ample space for new developments. The port of Saldanha presented a Port Development Framework (year 2002) in which future port scenarios based on short-, medium- and long-term plans were developed. Figure 6 shows Alternative 5 of the six alternatives for long-term port development, with a new iron-ore terminal and oil terminal and different possibilities for future terminals.

Figure 6: Redevelopment Alternative

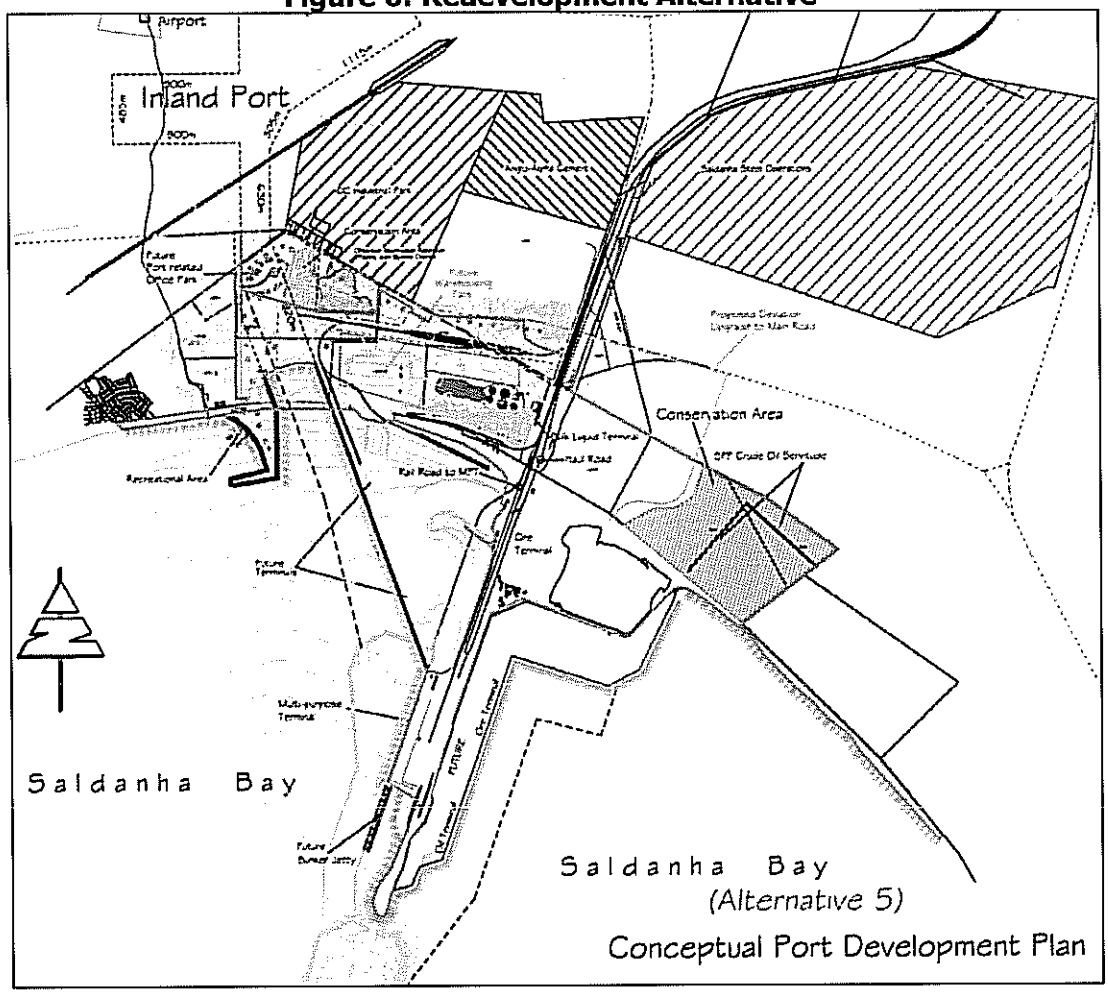
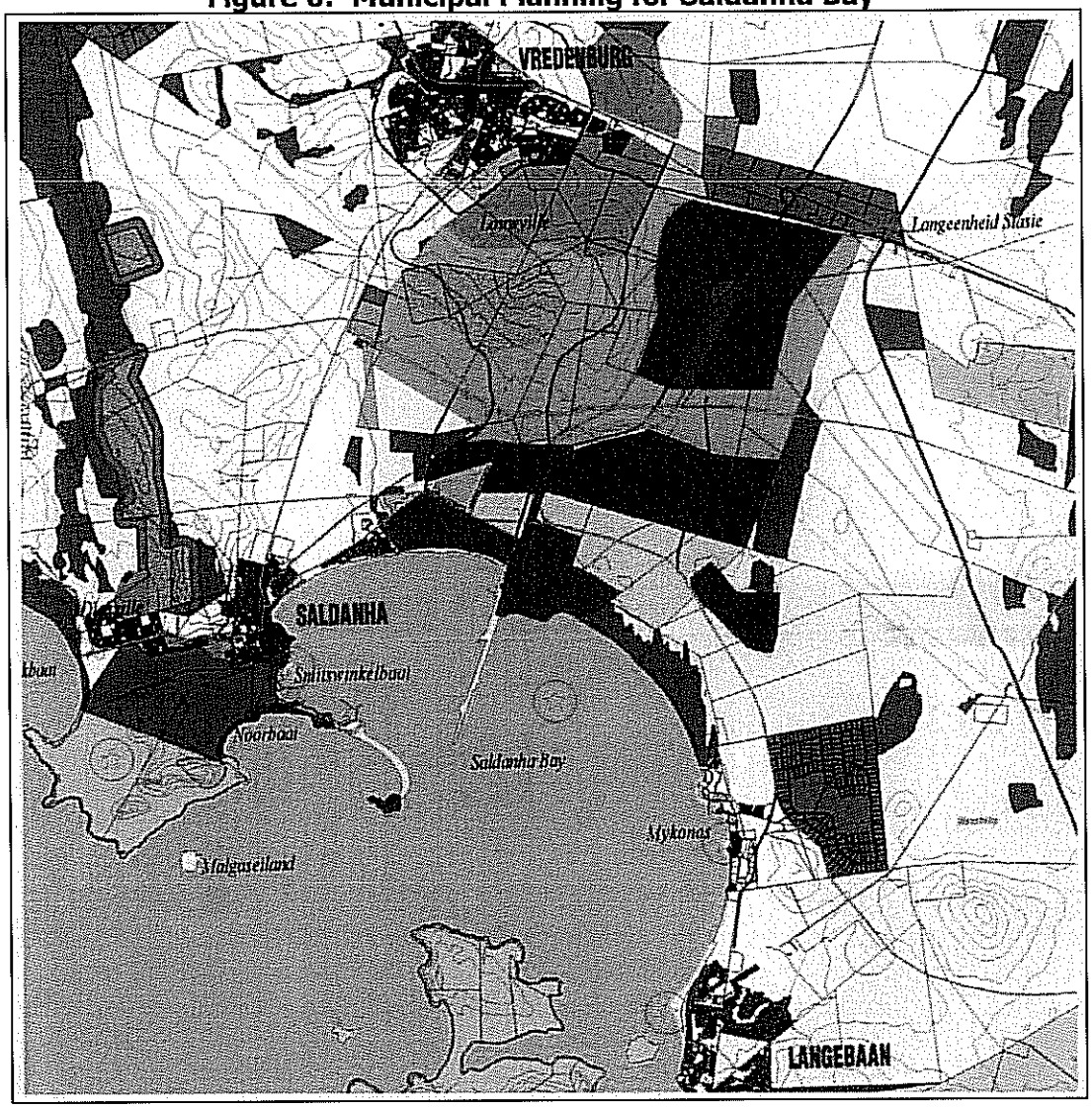


Figure 3.2 illustrates the planning for the development of the urban area of Saldanha, Vredenburg and Langebaan, which are away from the harbour, and industrial activities and with buffer areas planned in between.

Figure 6: Municipal Planning for Saldanha Bay



5.2 Future development of Saldanha Multipurpose Terminal

The total cargo to be handled during the financial year 2002/2003 is expected to be 2,458,000 tonnes while the capacity of the present Terminal is 4,000,000 tonnes per year. Figure 7 shows the evolution of traffic in recent years

Due to the existing layout of the port, short term development of additional quays is limited to the natural extension of the existing quay parallel to the causeway. An addition of one berth of about 300 m is possible to the South. Further extension is assumed to occur in north-westerly direction. Depending on the actual demand in the future, a choice should be made out of the different alternatives as developed in the Saldanha Port Development Framework (October 2002).

Figure 7: SAPO Cargo volumes: Port of Saldanha

Commodity	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03 Year to Date
Exports						
Lead	121,795	103,244	108,114	87,155	68,650	41,845
Copper	18,900	21,284	25,150	20,875	25,101	13,506
	140,695	124,528	133,264	108,030	93,751	55,351
Pig Iron	15,468	25, 457	55,300	60,572	64,185	42,508
Zircon	40,980	53,734	92,773	82,337	104,902	51,924
Rutile	2,993	5,007	2,648	11,395	21,345	16,535
Chloride Slag	29,003	33,305	48,719	107,569	110,475	60,001
Sulphate Slag	21,366	22,753	40,870	33,628	15,319	38,206
	109,810	140,256	240,310	295,501	316,226	209,174
Steel Coils		58,150	303,085	529,834	797,742	358,921
Cold Rolled Steel			112,207	331,481	273,815	217,793
Granite & Minors		316	153,803	148,287	123,744	44,261
Total Exports	250,505	323,250	942,669	1,413,133	1,605,278	885,500
Imports						
Anthracite	11,081	20,998	42,237	22,000	43,999	43,997
Coal		47,116	110,756	86,093	103,396	63,133
Pellets		144,890	425,291	536,107	566,142	275,540
Steel Coils				70,746	0	38,236
Total Imports (MPT)	11,081	213,004	578,293	714,946	719,537	420,906
Total throughput	261,586	536,254	1,520,962	2,128,079	2,324,815	1,306,406
Port Capacity	800,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000

5.3 Future Environmental Issues

Environmental aspects will be of major importance in the development of the Saldanha Multipurpose Terminal. In particular, contaminated effluent running of to the sea from cargo spills onto the quay or spills during loading of vessels has to be carefully considered. Saldanha Bay consists of a closed bay system with the Langebaan lagoon at its southern extremity. The lagoon is a declared "Ramsar" site (wetland of international significance) and forms part of the West Coast National Park. The bay and the lagoon are also extensively used for recreation and mariculture with majority of the lagoon falling within the boundaries of the National Park. All new cargo developments will have to provide an environmental management plan for their cargo and the control of associated pollution.

The drainage system on the existing quay should be extended with a facility to receive the so called 'first flush', being the first amount of water collected by the drainage system after

a shower as this amount of water carries the contaminated effluent from spillage on the pavement.

6 Physical Limits to Terminal Expansion

There is ample space for expansion of the Saldanha Multipurpose Terminal. All proposed alternatives show an extension in north-westerly direction by reclaiming land adjacent to the causeway and extending the navigation channel by means of dredging. A thorough geotechnical survey is necessary to identify the depth of the solid rock bottom before any dredging is commenced.

Road connections at Saldanha Port are excellent but rail connections have today nearly reached their maximum capacity. This apparently is one of the reasons why manganese ore could not be railed to Saldanha and had to be diverted to Port Elizabeth. This means that rail connection to Saldanha have to be improved.

The proposed integration of SAPO's Bulk Terminal (iron ore) and Spoornet's OREX line to Sishen would form the IRON ORE EXPORT CHANNEL. This channel will improve the performance of the iron ore export, with plans to reach 38 million tonnes by 2010. Currently export is 25 million tonnes. At that time the capacity of the OREX line to Sishen will have reached its maximum capacity, only for iron-ore transport. Railway line extensions to facilitate any other commodities (multipurpose terminal) will have to be operational at that time.

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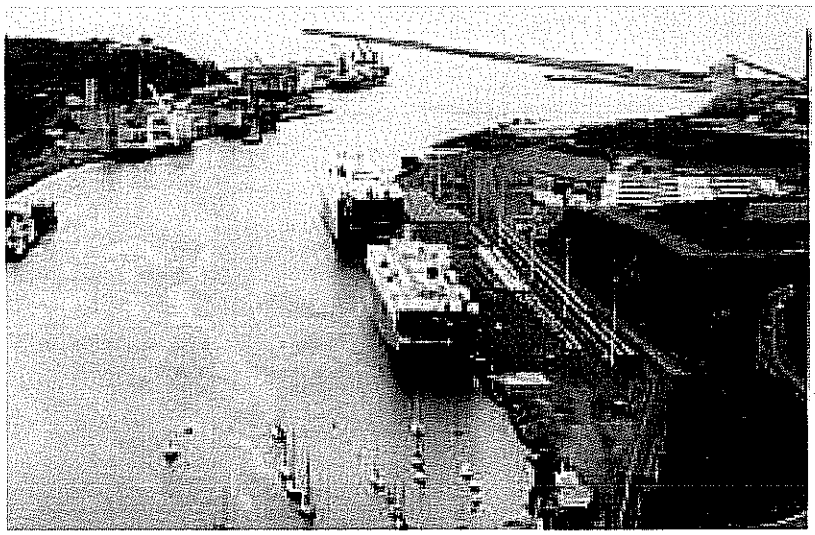
1 Introduction

The port of East London is a river mouth port on the Buffalo River. The port thus has two distinct sides, East and West, and separate terminals located on sets of berths on the two sides of the river.

The operational area of the port is limited on the outer end by the breakwater and the entrance channel, and on the inner (upriver) end by the low-level rail bridge across the river.

Figure 1: Overview of the port



On the east side, which is the original main port side, there are, from seaward in:

- The container terminal on Quay 6 which includes berths, K and L
- The Break bulk berths on Quays 3/4 which include berths F, G and I
- C berth for port vessels and stand-by. Not listed as an official cargo working berth
- The Dry Dock and ship repair yards
- The fishing berths and leisure / recreational pontoons.

On the west side of the river, from the entrance up river are:

- The tanker berth, used for imports of fuel oils.
- Berths S and T which are used for the export of grain and are being converted for imports.
- A set of shallow berths and old slipways used for the repair of fishing vessels

- Berths N, O , P, Q, and R which are used for the motor vehicle industry, both import and exports.

For the purposes of this report, only the container quay, break bulk quays, the grain berths and the motor vehicle berths will be discussed. All SAPO activity within th eport is recorded as a single business unit. NPA proposed that the oil tanker berth, operated privately, be considered as a separate (4th) business unit, along with the car terminal, the grain elevator and the MPT.

2 Physical Limits of the Port & Condition of Built Facilities

2.1 The east bank

2.1.1 The Container terminal.

The container terminal is the most important section of the port on the east bank. It occupies Quay 6, which consists of berths "K" and "L" which together provide 506 metres of quay length with an allowable draught alongside of 10.4 metres. The container area is further extended by the addition of the cross berth "K" on quay 5. 84 metres long, which was originally designed to provide Ro-Ro facilities for stern ramped vessels, and berth "I" on quay 4 which has a length of 186 metres and a permissible draught alongside of 8.5 metres.

Figure 2: Container operations on "K" and "L" berths

Operations in the container terminal are limited by the available working, parking and storage space, which have been increased by the taking over of previously existing road links and by the demolition of some redundant buildings.

It is reported that the maximum quay handling capacity is about 185,000 TEU's pe r year, with containers for the DCSA plant being allowed 7 days of free storage and other container customers restricted to 4 days. At predicted growth rates of 6%, which may be optimistic, the available capacity of the terminal on the east bank will be fully used. Plans are in hand for the establishment of a new container terminal to be constructed on the west bank on land currently used for small craft repairs and servicing and by a redundant building owned by Osner Properties.

Container operations are currently focussed on berths "K" and "L" with ships using their own gear to land containers with transport to the berth stacks by straddle

carrier. The port has available a mobile crane of capacity 72 tonnes, straddle carriers of 40 tonne capacity and heavy fork lift trucks ranging from 15 to 42 tonne capacity.

Additional stacking is available behind the corner berth of "K" and behind berth "I" with containers transferred from the working berths by tractor / trailer combinations and lift on/off either by straddle carrier or by using the available heavy fork lift trucks fitted with automatic spreaders.

Data provided by SAPO indicate the following volumes of container movements:-

	2000/01 TEU's	Container Units	2001/02 TEU's	Container Units	2002/03 TEU's	Container Units
Import	13,293	8,736	28,898	16,505	21,821	12,316
Export	12,932	7,047	32,925	20,287	23,004	12,569
Coastal	1,902		1,361		498	
Tranship	60		4,545		42	
Total	28,187	15,783	67,729	36,792	45,365	24,885

The figures quoted for the year 2002/03 are for the nine months April to December which indicates an annual volume of about 60,000 TEU's. The ratio of 6m to 12m units is decreasing gradually with the current ratio operating at about 1:5.

Delivery and acceptance of containers is primarily by road, with only about 2% being handling via the Spoornet rail linkages.

2.1.2 The Break Bulk or Combi terminal

The remaining berths on the east side of the river constitute Quay 3 with berths "F" and "G" providing a combined nominal berthing length of 360 metres. The two berths are backed by old cargo sheds with a total area of 4000 m^2, which are used for transit storage. The quay aprons in front of these sheds is relatively narrow and is a relic of the traditional form of port operations from the 1970's and are served by small capacity wharf cranes.

Break bulk cargoes handled in the port have declined in contrast to the increase in containerised traffic and the transfer of much of the motor vehicle related work to the west bank. This trend is likely to continue as the previous mainstay cargoes of scrap steel and wheat have been removed and other break bulk cargoes are increasingly containerised, or packaged in such a manner as to form unitised cargo which requires heavy capacity cranes and space for manoeuvring transport on the quays.

During the last two years 2001/02 and 2002/03 the total volumes of cargo handled over the Break-bulk or Combi quays has declined to about 60,000 tonnes, with significant variations based on the arrival of ships and the particular tonnage of cargo shipped or delivered.

2.2 The West Bank

2.2.1 The Oil Terminal

The berth for oil tankers is located at the root of the western breakwater and has a total length of 259 metres with an allowable draught of 10.4 metres. The tanker berth is connected to the Gately tank storage area by pipeline and operations are closely linked through the oil companies. Storage capacity at the Gately tank farm is reported to be 193,000 m^3 with reported annual volumes of oil products running at about 850,000 tonnes, mostly for local distribution and consumption.

2.2.2 The Grain Silo and Terminal

The grain silo complex in East London was constructed to service the significant volumes of grain exports, primarily maize, from the agricultural areas inland from East London. Prior to 1996 all grain exports were channelled through the Maize Board, which purchased the whole crop and exported any surplus. Since 1996 individual farmers and farm co-operatives have the ability to vary the volumes grown and market their product separately. This, along with to poor growing conditions, has led to a reduced surplus available for export with and much of that surplus moved by road for export via Durban.

The silo is concrete built with 56 chambers and 17 interspaces, providing total storage of about 76,000 tonnes and ample opportunity for segregation by grain type or parcel.

The silo and grain elevator were built as an export facility, with the silo able to accept grain from rail or road wagons with full systems for the extraction of dust, the screening of product, fumigation and weighing. Delivery of grain from the silo could be to rail or road wagons, but the most important element was the elevated conveyor belt system leading to the loading facility on berth "T". The high-level loading gallery consists of a series of spouts and delivery tubes over a total length of 200 metres and the capability of using four loading spouts simultaneously. Berth "S" is used as an extension of the berthing space and as a lay-by berth for vessels.

The total berth length available on berths "S" and "T" is 388 metres, however S berth has limited land area being bounded immediately by the Spoornet mainline to the terminus yard and the line to the Gately tank farm.

Plans are in hand for the conversion of part of the export facility to allow the import of bulk grain using grabs, hoppers and a conveyor belt system into the loading, or in-take, section of the silos.

The silo and the elevated loading facility has a staffing of about 35 persons with additional manual labour employed on a casual basis on demand.

2.2.3 The Car Terminal.

The car terminal on the west bank fronts on to berths "N", "O", "P" and "R", which have a total length of 555 metres and available draught alongside of 9.0 metres.

The car terminal essentially services the requirements of the Daimler Chrysler car plant which is located immediately behind the berths on the high ground. A four-storey garage and parking area has been constructed which can accept vehicles directly from the plant and permits direct access to the berths for loading. The facility, which consists of 2,800 fully protected parking bays, was opened in March 2001.

Figure 3: Multi-storey garage and service centre

Additional storage in the open is also available, on the surfaced area between the garage and the berths. Operation of the terminal is closely controlled by DCSA with specially trained and equipped teams of drivers bringing cars into the garage area and delivering units to the car carriers berths.

It should be noted that approximately 62% of the total throughput of the port can be directly attributed to the car trade and DCSA in particular, this includes fully built units (FBU's) and containerised packages of car parts and other units.

2.3 Rail/Road logistics in the port

A major factor in the historical development of the port of East London was its excellent linkage to the national rail network and its operational links with the rail operator (Spoornet). However it is reported that virtually half of the permanent way infrastructure in the port is used for non-port rail movements. The in-port rail network now acts as an inhibitor to development, with sets of rail lines running along the length of the quays and effectively limiting the on-dock transfer of cargo units using wheeled vehicles.

The low level Buffalo River bridge is a main line access for rail wagons to the west bank rail terminus with its links to the Gately oil tank farm and the proposed Industrial Development Zone.

The road system in the port is also a cause for operational concern as the linkage between the two opposing sides of the port has to be via the built up and industrialised areas of the town and the bridges over the Buffalo river. The development plan for the port has recognised this, estimating that the overall cost of relocating the internal port roads would be in the order of 50 million Rand ((2000).

The national road network surrounding East London and linking the city to other important industrial areas is also not in good condition, with transport difficulties experienced in the coastal links, R72 towards Port Elizabeth, inland towards Bloemfontein and Gauteng, on the N6, and northwards to Durban using the N2.

3 Operational Issues

3.1 Containers

The port has limited stacking and storage capacity and allowing for dwell times of only four days could currently handle about 67,000 TEU annually. Almost two-thirds of the container capacity using the port is related to the Daimler Chrysler plant, which may render the port vulnerable in case of changes in the economics of the motor industry world-wide and in South Africa. More storage space could be made available by the demolition of sheds and reallocation of available scarce land, but this would result in increasing internal port costs for the transport of containers from ship's side to stack and render the development potentially unattractive.

3.2 Bulk

The physical limitations of the port limit the maximum size of bulk vessels to about 30,000 tonnes deadweight. This maximum capacity is considered by many to be too small for the potential grain trade, which would want to use panamax sized vessels, and too large for specialist exports such as copper and scrap, where shipment parcels are often less than 5,000 tonnes.

Port management have major operational quandaries in respect of the break-bulk function. These include:

- The relatively shallow draught allowable on the berths of 9.8 metres
- The length of quay, which is really now only suitable for a single berth
- The narrow working aprons
- The old cargo sheds, with their raised floor levels for rail operation, and the small doors
- The in-port road system, immediately to the rear of the sheds
- The in-port rail links
- The restricted potential, without major excavation works, for expansion
- Continued penetration of containers into traditional Break-bulk cargo

Operationally, the probable solution will be a combination of these berths into the container terminal, with the demolition of the cargo sheds, the removal of the old quay cranes and the general refurbishment of the whole area into a stacking and sorting area for containers.

3.3 Grain Terminal

The loading rate for maize is up to 1,200 tonnes per hour. It is reported that the largest annual export reached 3.4 million tonnes, but this has declined to less than 100,000 tonnes over the last five years. Meanwhile, with the decline in the volume of

maize exports there has been an increase in demand for imports of wheat. The port system, as originally designed, could not cope with this and wheat and other grain products were imported over the break-bulk quays on the east side of the port. In the nine months April to December 2002 a total of 150,203 tonnes of bulk products were imported.

3.4 Car carriers

Once again this is an industry dependant trade which has to take into account world-wide changes in motor vehicle production and sales. The vulnerability of South Africa as an isolated production area is a risk. The construction of the dedicated covered storage and delivery garage for DCSA on land in the western part of the port does offer potential for expansion.

4 Environmental Issues

The port of East London is the only example of a pure river port on the South African coast and lies at the mouth of the Buffalo river in the Eastern Cape.

The prime environmental factors which will have an impact on the potentials for growth and development relate to its physical size, the available depths of water in the approaches and the port basin and the landward limitations imposed by the riverside cliffs which bound the port operational area.

As a river port, the port of East London has two sides bounded at the outer end by the breakwaters and entrance channel and at the inner end by the main low level cross river rail bridge and the high level road bridge, which effectively precludes any port development further upstream.

The main commercial factors influencing the future development of the port are thus the marketing and cost advantages to hinterland industries of setting up in the Eastern Cape and of using the port as a conduit for imports and exports. In this respect the regional development plans indicate the development of an Industrial Development Zone (IDZ) which could have significant influence on port development, particularly of the Western side.

Discussion of the environmental factors affecting the port of East London will be limited to:

- The harbour, entrance, channel
- Shipping, trends in coastal and international trade
- Impact on residential and industrial properties
- Currently identified commercial trades.

4.1 The Harbour

The entrance channel from the open sea into the port is relatively short and is protected from swells by twin breakwaters which then result in an entrance of only 180 metres immediately before the turning basin. Port management impose a limitation on the maximum length of vessels of 245 metres and a maximum draught of 10.4 metres, with the possibility of allowing vessels with a draught of 10.7 metres to enter at high tide and in calm conditions. The main channel is subject to sand siltation,resulting from the South to North littoral drift along the coast. The harbour bottom along the line of the berths is bed rock which imposes ordinary restrictions on further deepening without expensive blasting and a re-engineering of the quay wall structures, which are based on this bedrock layer.

4.2 Shipping

The trends in international shipping suggestines will consolidate their shipping activities by reducing the number of port calls and increasing the size and capacity of their vessels to meet projected demand. This trend has recently been most apparent at DC

Vessels using the Port of East London are mostly container or combi type vessels, car carriers and tankers.

Container vessels

The projected development of Cape Town, Coega or Durban as container hub ports would affect the viability of the East London Container Terminal. Although the port could serve as a feeder port, this would depend on the economic viability of operating a coastal feeder service against the cost of transhipment by road or rail.

Car carriers

For car carriers the future is relatively secure due to the development of the Daimler Chrysler plant and the dedicated car export terminal on the Western bank.

Dry Bulk vessels

Bulk vessels would service the relatively minor scrap steel trade, the potentially large bulk grain import trade and the possibilities of shipments of small parcels of specialised minerals and metals. However in many countries such shipments are increasingly containerised.

The bulk grain silo and export facility in the port is underused and consideration is being given to the conversion of the current loading facilities into bi-directional units so that grain can be imported in bulk and stored for onward movement in the grain silo.

Tankers

This is a private operation on the port's premises, linked with the Gately oil storage tank farm to the west of the port. Reported utilisation and capacity indicate no real need for development in the immediate future. NPA in East london propose that the Tanker berth be treated as a separate (4th) business unit.

5 Proximity to Urban Development and Impact on Future Plans

The port berths and working area are bounded by rock cliffs averaging more than 25 metres high, which effectively segregate the port from any residential or industrial development in the neighbourhood. Initial residential development in the East London municipality was to the East and inland, while later residential and industrial developments have been to the west. The port is thus surrounded by established properties.

Port operations in the valley created by the river are therefore unseen from the city and cause minimal environmental nuisance. The exception to this is the grain export elevators which were reported to spread grain dust over the western parts of the town during windy conditions.

The impact of port related transport was mitigated by the use of the available rail network operated by Spoornet, but the increase in road transport and the movement of cars from the DCSA plant did cause some local congestion. This has been partially solved by the development of the car export facility immediately adjacent to the car factory, but the rail network within the port remains a major factor in the efficiency of cargo movement over the berths.

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1 Introduction

The Port of Durban has, since its inception, been regarded as a port whose transport infrastructure was mainly supported by rail, with significant areas of land within the port taken up by railway tracks, sidings and marshalling areas operated by Transnet's sister organisation Spoornet.

With the development of road freight transport the domination of rail declined and increasing volumes of cargoes moved in and out of the port by road. Linked to that increase in road useage the passenger car became the prime means of moving people, either for work or pleasure.

Immediately post World War II, the major car manufacturers were located in the industrial areas of the United States, Europe and the Far East and there has always been a regular volume of cars imported through the ports of South Africa, either for local use or for transit to other countries in the region.

The globalisation of world manufacturing and trade and the introduction of GATT (General Agreement on Tariffs and Trade) plus the normalisation of the political situation in South Africa meant that manufacturers, from these areas, could target new site locations where establishment grants were available, labour was plentiful and relatively cheap and land areas offered the potential for expansion, if required.

The functions of climate and security also entered into the equation as comparison between the good climate and security situation in South Africa and the harsh climate and institutional and organised crime in the states of the Former Soviet Union (FSU) provide further incentive for inward investment.

In response to these global trends the Government of South Africa introduced a Motor Industry Development Programme (MIDP) which further encourages and supports the establishment of manufacturing industries in areas with high unemployment. This directly contributed to the establishment of Daimler Chrysler at East London and the Izusu, Opel and Volkwagon works at Uitenhage related to Port Elizabeth, both in the Eastern Cape. Meanwhile BMW were established in Pretoria and Toyota and other manufacturers established in Durban.

However despite attractive incentives the economics of establishment, supply and distance resulted in the growth of vehicle manufacture and supply in the Kwa-Zulu-Natal area around Durban.

Rail and road transit distances, and thus tariffs, for the delivery of vehicles from Durban, Cape Town and Port Elizabeth to Gauteng were in the order of 1:2 and 1:1.5, resulting in a time and cost disadvantage for Port Elizabeth and Cape Town relative to Durban.

The port of Durban began receiving an increase Pure Car and Truck carriers (PCTC) in 1998. Vehicles were initially handled through berth 104, with storage at Berth 9 (Navy Base)

For most of the 1980's and early 1990's the goods marshalling yards and tracks leading to the old import consolidation shed at Cato Creek had been derelict and creating an eyesore

and potential trouble spot for the developing city and tourist areas close to Addington and Point, and a plan was formulated for the removal of the old shed and tracks and the complete rehabilitation of the area into a dedicated car terminal. Growth requirements and spatial constraints warranted finding a bigger and more secure terminal site.

1.1 The New Car Terminal

In 1997 work commenced on the demolition of the old cargo shed and the removal of over 12 km of rail tracks associated with 2.5 km of raised concrete goods loading and transfer platforms

The ground was cleared and graded and underground electrical and communication ducting installed, plus a totally new storm water drainage system. Finally an area of approximately 8.5 hectares was paved with asphalt to a high standard capable of bearing the static and dynamic loads in a car terminal and the effects of temperatures in the mid 30's ^{0}C. Perimeter fencing was also renewed and established providing a high degree of security.

A twin track rail siding parallel to one side of the area was retained and upgraded to provide facilities for specially designed double height car transport wagons.

Thus the project was facilitated by the close co-operation that existed between Portnet and Spoornet and the other linked entities within the Transnet organisation.

By early 1998 the terminal was opened for business. However there was still a major problem to be solved; the accessibility of the terminal from the quay. The location necessitated driving over sets of remaining rail tracks, which for a motor manufacturer, or importer is an anathema. Even very close and clean paving is not really suitable as the demands of the trade are for complete safety and protection of the vehicles until they reach the eventual customer. Damage of any kind is simply not tolerated. Exit of cars from the terminal was via an entrance made directly on to Bay Terrace and the city road network.

The new organisations of NPA (National Ports Authority) and SAPO (South African Port Operations) devised a plan that will avoid this while providing efficient access, by the construction of a fly-over bridge from berths "Q" and "R" directly into the terminal. This is associated with the construction of a new 3 storey parking building, plus the opening of a new exit/entrance gate directly on to Bay terrace, and thus on to the Victoria Embankment arterial road and subsequently the national motorway network.

2 Facilities in the Car Terminal

2.1.1 Infrastructure. (January 2003)

- 8.5 hectares of paved and level parking area marked out into bays
- 2 x 600 metre dedicated car terminal rail transfer tracks
- An associated rail loading facility
- Electrical system, with ducting for terminal lighting and communications, including CCTV monitoring
- Perimeter fencing to South African standards on terminal and on port berths "Q" and "R".
- Stormwater drainage, so that even during the heaviest of rains the terminal is clear

2.1.2 Infrastructure under development (2003)

- Dedicated bridge linking the berths to the storage and parking yards
- Construction of a three storey parking garage to bring parking capacity to 3,500
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2.1.3 Superstructure

- Facilities for the loading of rail transporters
- Facilities for the loading and unloading of road transporters
- Marked and numbered parking bays, each 4.5m x 2.5m
- Vehicle inspection facilities
- Administration building adjacent to the Car Terminal, leased by NPA to SAPO,
- Security and documentation including the IT control system

3 Operations

The terminal is operated by SAPO, with a core team of 34 people, including managers, administrators, and terminal operators. Security and some inspection services are hired in from the private sector (contract labour).

Cars are delivered from the ship by drivers (stevedores) employed by the line, or their agent and are accepted into SAPO's care at the handover inspection facility, where the cars are given an initial inspection. Cars are then driven to their designated parking bays. The stevedores then return by pick-up back to the ship for the next sequence.

Once cars are in the allocated bay SAPO staff perform the detailed acceptance check, complete all registration and collect keys for secure keeping. The terminal is under tight security, with physical guards supplemented by camera monitoring, assisted at night by the excellent lighting of the terminal area.

SAPO staff performs delivery of cars to road and rail transport, with transfer of responsibility taking place on acceptance by the driver or train supervisor.

3.1.1 South African Car Trade

The National Association of Automobile Manufacturers of South Africa (NAAMSA) provide the following throughput volumes for the years 1996 to 2000.

Year	Imports	Exports	Total
1996	33,000	10,600	43,600
1997	36,000	12,500	48,500
1998	41,000	15,000	56,000
1999	43,000	33,000	76,000
2000	45,000	40,000	85,000

Since the Durban Car Terminal has become an operating reality in 1998 its volumes have grown to the extent that during the year 2002 they report the following:

An average of 17 ship calls per month with mixed volumes of import and export of about 600 units per call, giving an annual throughput in the order of 114,000 units. (2003 = 118,000 units)

The average dwell time for cars in the terminal ranges from 3 to 6 days for imports to up to 12 days for exports, giving a potential capacity of about 200,000 cars per annum. The original terminal was designed for an annual throughput of 60,000 cars and with the numbers to be expected during 2003 being well over the 100,000 the terminal is operating beyond its theoretical capacity. The construction of the new three storey parking garage will ease matters but with the potential carrying capacity of the larger car carriers reaching 5-6000 units there is a need to identify additional parking and storage area, perhaps outside the port area.

3.1.2 Other vehicles

In common with many international car terminals the terminal is called upon to handle movements of goods vehicles and heavy agricultural and industrial vehicles. Such units have no real place in a car terminal, as they take up space, destroy surfaces and invariably have a delayed dwell time due to the individual documentation procedures required. The Durban Car Terminal caters for such demand by offering temporary storage in secure holding areas on the back of berth "Q". There is a fully-fledged IT logistics service.

4 The future

The Durban Car Terminal due to its limited space and immediate lack of expansion possibilities has to concentrate on maintaining low storage occupancy (dwell time) and in the facilitation of onward movements by co-ordinated efforts involving customer relations and computer linkages to ensure that the terminal is not seen to be a terminal, but more a part of the seamless logistical chain from manufacturer to dealerships and eventual owners.

If the trade and volumes increase the terminal could employ its own drivers (stevedores) and expand through the employment of dedicated, trained and equipped teams, able to provide fast discharge of vessels and to be available to provide checking and delivery functions in the terminal. A stevedoring team of about 42 persons ((3 x 14) + 2) would be adequate.

The essential requirements for the successful operation of a car terminal are:

- **Quality** - Zero damage and losses
- **Performance** - Customer responsive with minimum bureaucracy
- **Cost** - To keep costs at a minimum consistent with Activity Based Costing and transparency of actions.

4.1.1 Potential for Concession

The terminal represents an excellent opportunity for involvement by the private sector, as virtually all of the infrastructure development has been completed and the terminal can operate as a self-contained unit within the port's umbrella.