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Impact Assessment
Environmental

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Assessment/Analysis
Environmental

This report has been prepared by the Borrow er or its Consultant
ENVIRONMENTAL IMPACT ASSESSMENT

January 1995

GIBB (Mauritius)

20, Palmerston Road, Phoenix, Mauritius
MAURITIUS MARINE AUTHORITY

NEW CONTAINER TERMINAL AT
PORT LOUIS HARBOUR

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## NEW CONTAINER TERMINAL AT PORT LOUIS HARBOUR
### ENVIRONMENTAL IMPACT ASSESSMENT

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1.0 SUMMARY

The Mauritius Marine Authority intends to proceed with the construction of a New Container Terminal at the Mer Rouge Site, refer to Drawing No. MH35/01.

The project is to be partly financed by the World Bank. The Consulting Engineers for the design and supervision of the construction are Gibb (Mauritius) in association with Rendel Palmer & Tritton (UK).

2.0 PROJECT DESCRIPTION

The development of a New Container Terminal at Mer Rouge is a project of the Mauritius Marine Authority whose offices are located within the Port Administration Building, Mer Rouge, Port Louis.

The complete facility will essentially consist of:

- Three berths 560 m in length with two quay side container handling cranes
- Container Park 565 m x 300 m with 4 No. Rubber Tyred Gantry Cranes
- Trailer Park
- Fork-lift truck park
- RTG Maintenance Area
- Car Park and Offices
- Gatehouse
- Customs Examination Shed (1000 m²)
- Terminal Building (2000 m²)
- Workshop (1000 m²)
- Sub-Station (100 m²)
A layout of the container terminal facilities is shown in Drawing No. MH35/03.

A feasibility report prepared by the Consultants, dated December 1993, recommended that the New Container Terminal be located at Mer Rouge. This site was designated for industrial and Port related Development in the Port Louis Harbour - Master Plan for Development: 1990 to 2010. Moreover, a navigational channel and turning basin had already been dredged by deepening of the existing English channel in 1990. For this project no further dredging works are required.

The site for the container terminal facilities will require about 28 hectares of land for the present development. The sea bed level at the proposed quay line will be at -12.5 m Chart Datum. The design of the container terminal is based on the Feasibility Study Report and a Wave Model Study dated February 1993 undertaken by British Maritime Technology Caemaid Limited (BMT), Danish Hydraulics Institute (DHI) and Rendel Palmer and Tritton (RPT).

3.0 SITE AND LOCAL ENVIRONMENT

The Mer Rouge site is land reclaimed from the sea. The land reclamation was completed in December 1990 and covers an area of about 220 hectares. On the northern side of the site, separated by the Terre Rouge Estuary lies the Baie du Tombeau Area (residential), on the southern side an industrial complex and a power station, on the east is the Roche Bois residential area, the Northern Sewage Works, an oil storage farm and a cemetery. The reclaimed land borders the Terre Rouge Estuary which is considered as an environmentally sensitive zone.

The Mer Rouge site being land which has been reclaimed very recently, does not appear to have any established flora or fauna. Vegetation, mainly scrub, has started to grow albeit sparsely. At present, the main activity on the site is the sale of sand dredged from the English Channel, for construction purposes. This
dredged sand has been stockpiled since dredging of the channel was completed in 1991. Another important activity is work being carried out for the protection of the foreshore line against erosion from wave and tidal action.

The elements that need to be taken into consideration in relation to the development of the Mer Rouge site are:

(a) Current and Tides

Studies by Gibb (Mauritius) in the context of the Baie du Tombeau Sewerage Masterplan have indicated that principal current components which influence the nearshore circulation patterns are:

(i) South Equatorial Current (SEC)

Mauritius is situated in the South Equatorial Current which is governed by the trade winds, blowing from the subtropical zone in a WNW direction during summer and a more westerly direction during winter. This results in an ambient current pattern flowing from the east to the west around Mauritius. Mauritius lies with its longitudinal axis across the flow of the current with Port Louis and the Mer Rouge site on the leeward side. The general local longshore components of the west coast tend to be southerly.

Scattered onshore currents of short duration may occur due to local turbulence on the west coast resulting from the splitting of flow around the island.

Northerly currents may also occur due to changes in the direction and magnitude of the ambient current.
(ii) **Tidal Current**

The tidal regime is typically representative of isolated islands where no major land masses concentrate the tidal flows. The tidal range is small with a maximum spring tide variation of 0.5 m.

These tidal variation generate tidal currents of reverse ebb and flood currents over six hours, the significance of which depends on the strength of the ambient currents and the configuration and topography of the coast lines, the magnitude of these tidal currents will be small.

Tidal currents which are inwards in the flood and outwards on the ebb tide have been observed at the mouth of Terre Rouge River.

(b) **Winds**

Mauritius lies in the predominant south-easterly trade wind belt and generally experiences a consistent regime of easterly winds as evidenced in the wind records from 1971 to 1980, produced by the Meteorological office. The only available longterm wind data applicable to Mer Rouge site, are the data from Padya (1984), measured at Fort William for the period 1971 to 1980. Fort William is south of Mer Rouge site.

The monthly, day and night wind data from Fort William are compiled in Table 7.1 as percentage occurrences for three speed categories of onshore, offshore and longshore (South and North) conditions as follows:

- **Offshore**: NNE to SSE
- **Onshore**: WSW to NNW
- **longshore (South)** : NNW to NNE
- **(North)** : SSE to WSW
Table 7.1 - Percentage of occurrences of Wind Direction and speed at Fort William, Port Louis, 1971 - 1980

<table>
<thead>
<tr>
<th>DIRECTION TO</th>
<th>SPEED</th>
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<tbody>
<tr>
<td></td>
<td>0.3 m/s</td>
</tr>
<tr>
<td>Offshore</td>
<td>22.7%</td>
</tr>
<tr>
<td>Onshore</td>
<td>1.7%</td>
</tr>
<tr>
<td>Longshore South</td>
<td>0.8%</td>
</tr>
<tr>
<td>Longshore North</td>
<td>1.2%</td>
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</table>

Note 1: Calm Conditions were recorded for 11.2% of the time

The percentage occurrences of offshore and onshore wind conditions were 79.4% and 4.1% respectively. For onshore wind conditions the speed exceeded 5 m/s for only 1.1% of the time. Calm conditions were recorded for 11.2% of the time.

c) Terre Rouge Estuary

The Mer Rouge site borders the Terre Rouge estuary. However the proposed container terminal facilities is situated approximately 500 m from the estuary. The estuary is recognized as an environmentally sensitive zone as it is a wintering ground for migratory birds from the Northern Hemisphere. The Terre Rouge estuary has been declared a bird sanctuary and conservation strategies are being developed to ensure the protection of the estuary as a feeding ground for birds and also to develop the area as a tourist attraction and a leisure site.
Present Threat

The present threats to the estuary are mainly from:

- Leachates from the Roche Bois dumping site.
- Effluent discharges from Abbatoir and other industrial sources into Terre Rouge River.

(d) Baie du Tombeau Lagoon

There are local reports that the Baie du Tombeau lagoon has deteriorated over the past twenty years. There are no baseline data to support these reports. However, observations by Gibb on the Baie du Tombeau project have indicated that part of the lagoon close to the English Channel tends to have the poorest environmental quality. This may be due to:

- Inputs from the Terre Rouge River.
- Inputs from the Northern sea outfall.

However, no baseline data is available to lend support to these possibilities.

Two important factors that need mentioning:

- During the dredging operation, it was reported that most of the lifted suspended solids and sediments were carried away towards the deep sea by the south currents.

- Present observations of the discharge by the northern sea outfall are that there are no substantial accumulation of solids along the reclaimed foreshore line and a tendency of the discharged effluent
to be carried away in a plume into the open sea by the driving force of the current in the English Channel.

(e) The Northern Sea Outfall

The Northern sea outfall discharges effluent from the Port Louis North sewerage system via the Northern Works at Roche Bois.

Due to land reclamation of Mer Rouge, the outfall practically discharges effluent on the foreshore line, in shallow water. The construction of the container facilities and berths will require either a further extension of the outfall or a relocation of this outfall to a new location in Baie du Tombeau as recommended in the Baie du Tombeau Sewerage Project.

4.0 PREDICTED ENVIRONMENTAL IMPACTS AND THEIR MITIGATION

4.1 Aesthetics

The proposed container terminal facilities has been designed to satisfy criteria for a modern terminal. On loading and off loading of containers will be carried out in a more orderly fashion than at present, using modern equipment such as cranes etc.

Although the proposed terminal should be aesthetically acceptable, it is suggested that a visual screen be erected along the southern bank of the Terre Rouge Estuary in the "Green-belt" zone. The visual screen could consist of filao trees planted along the zone. This may reduce any visual disturbance for the inhabitants of the northern bank of Terre Rouge River and part of Baie du Tombeau residential area.
4.2 Noise Pollution

At present, a source of noise pollution at the Mer Rouge site is from the Sable des Mascareignes where truck loaders and other heavy machinery are involved in the removal of stockpiled sand. This operation is carried out day and night and the noise does not appear to affect the inhabitants of the surrounding areas. This may be due to the distance from the site of operation to the nearest dwelling and the offshore winds which tend to carry any noise away from the residential areas. The proposed container terminal is even further distant from residential areas.

Possible source emanation from the proposed terminal will be mainly from container trucks loading and offloading. However, the noise level should be within acceptable levels. Cranes will be powered by electricity instead of diesel and hence will not represent a major source of noise.

4.3 Air Pollution

At the present container terminal the machinery use to load and offload containers such as cranes and fork-lift are diesel powered. In the proposed container terminal, diesel powered, cranes will be replaced by electric powered. Fork-lift will be slowly phased out and used mainly for out-of-gauge and empty containers. The main source of air pollution will be from exhaust gases from container trucks. However, due to the opened site and the prevailing wind direction, air pollution will much less than any urban area.

4.4 Surface Runoffs

The surface runoffs from the container terminals will be discharged via gulleys to the existing surface water drain on the south of the site and two new drains perpendicular to the berths. The storm water drains will be
fitted with solid traps (to retain fine solids such as dusts etc) and grease traps (to retain any oil from oil leaks from container trucks mainly).

4.5 Wastewater Disposal

Wastewaters from offices and cafeteria will be disposed through septic tanks and absorption pits or alternatively by direct connection to the sewerage system. Initially the flow of the wastewaters will be low as the workforce density is expected to be low. However in the longterm, with the further development of the Mer Rouge site and the future implementation of the Sewerage Master Plan, it is expected that this area will be linked to a sewer network.

4.6 Access Road to Terminal

The access road to and from the container terminal facilities will be via a new route as being proposed in the Port Master Plan presently under preparation. The alignment of this access road is to be finalised and does not form part of this present study.

5.0 MONITORING AND MAINTENANCE

As the Mer Rouge site is land which has been reclaimed very recently, project activities will have little effect as the land is virtually barren and does not have an established flora and fauna.

On the marine side, dredging operations could have had major environmental impacts on the nearby marine ecosystems particularly the fringing reefs of the nearby lagoons. However the dredging of the English Channel has already been completed since 1990. No further dredging will be required during the foreseeable future.
5.1 Construction of the Berths

Two options have been retained for the structure viz: The sheet piled structure and the concrete blockwall structure. However, the first option has finally been adopted based purely on technical grounds.

It is possible that some fine particles (silt, fine sand etc) will be disturbed from the seafloor during the construction of the quay. The hydraulic hammer that will be mobilized for the works will produce some noise. Taking into consideration the wind direction the noise level should not be a significant disturbance.

5.2 Transport of Construction Materials to Site

The transport of construction materials to site need to be planned and options evaluated. The best option should avoid:

- noise and congestion
- pedestrian hazards
- disruption in traffic pattern

As it is likely that a major proportion of the materials will arrive via the existing port, no traffic or congestion problems are anticipated.

6.0 CONCLUSION

As containerisation continues its development as the most modern and efficient means of cargo handling, it has become absolutely essential for Mauritius to own a modern container terminal.
The proposed container terminal facilities at Mer Rouge site is unlikely to have any major negative environmental impact on the landside as the land has recently been reclaimed with no established fauna and flora. On the marine side the dredging of the channel and turning basin has already been completed since 1990. No further dredging will be required during the foreseeable future.

Note:

In view of the size of the drawings mentioned in the Report, they are only available by special request from PIC.