1 Executive Summary

Royal HaskoningDHV has been commissioned by the Mauritius Ports Authority (MPA) to carry out an update of the Ports Master Plan for Port Louis and other locations around the island. The Port Master Plan is required by the constitution of the MPA and is revised from time to time. The previous master plan was completed in early 2009. This revision focuses on likely developments between 2015 and 2040.

The purpose of a Port Master Plan is to set up a framework within which the port can address commercial opportunities without impeding later developments. This requires a degree of flexibility and a master plan that exactly defines what is to happen to every square metre of land will fail because the trade will almost certainly not evolve exactly as the planning team project.

Since 2009, many things have changed in the port, the most significant being the cancellation of the harbour bridge project and the return of the land at Les Salines to the MPA. The government has also set up the Ocean Economy initiative to focus on an increased contribution by the maritime sector to the Mauritius economy.

The main developments in Port Louis have happened since the first deep water berths were built in the early 1970s. Incremental development since then has produced a number of inconsistencies in the layout of the port and this master plan seeks to rationalise the layout as well as to accommodate the evolving trade pattern.

The following sections present main conclusions and recommendations resulting from the studies. The last section includes the existing port layout and the proposed Port Master Plan layout for 2040.

1.1 Cargo and traffic forecasts

Between 1985 and 2014, the Mauritian economy grew at an average rate of 4.8% per annum, out-performing the world average of 2.8%. GDP growth for Mauritius is expected to rise from 3.2% in 2014 to 3.5% per annum for 2015-20.

The total troughput at Port Louis in 2014 was 8.2 million tonnes, an increase of 1.9% on the previous year. The 2015 figures show a slight drop but that is because the lines have programmed less transhipment in Mauritius while MCT is being extended. 60% of the cargo is containers with dry and liquid bulks accounting for most of the rest. General cargo, inter-island traffic and fish occupy comparatively small niche markets.

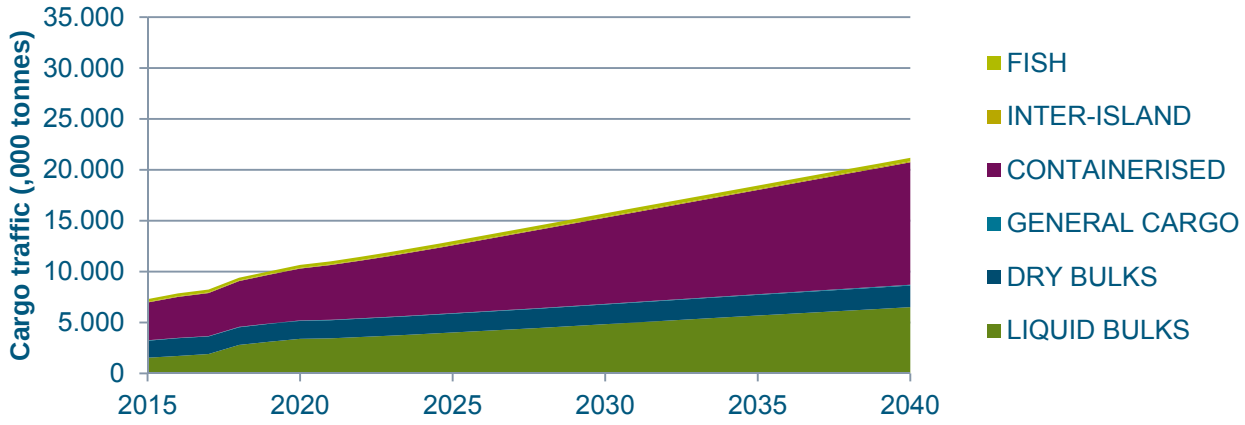
The trade growth in the Western Indian Ocean is strong and there will be a large number of developments at competing ports over the next 10-15 years. Mauritius will have to improve its port operations to stay competitive.

Bunkering and petroleum market

The Mauritius government aims to attract greatly increased marine bunker sales and to become a hub for the re-export of petroleum products to the region. The Petroleum Hub concept is reasonable but the scale of this market remains uncertain. Its success will depend on the price of products delivered to East African and Indian Ocean ports using transhipment in Mauritius compared with direct deliveries in small ships from the refineries in the Middle East and Asia. Before any large projects are started, the government of Mauritius should commission an independent, detailed study to examine this market or obtain guarantees from companies in the trade that are sufficient to underwrite the investment.

Cargo forecasts

The base case cargo forecasts for Port Louis are presented in the figure below. The troughputs are expressed in thousands of tonnes.



Base case forecast (,000 tonnes)	2015	2020	2025	2030	2035	2040
Fish[1]	143	299	341	348	348	348
Inter-Island	68	65	72	80	89	100
Containerised	4,129	5,081	6,683	8,396	10,046	12,049
General Cargo	50	40	46	54	63	73
Dry Bulks	1,820	1,774	1,847	1,929	2,019	2,121
Liquid Bulks	1,682	3,491	4,084	4,740	5,616	6,217
Total	7,879	10,750	13,074	15,548	18,182	20,908

1.2 Port operations

A review of port operations was undertaken with findings described below. Operations in the port are undertaken either by the Cargo Handling Corporation Limited or by individual operators.

1.2.1 Mauritius Container Terminal

Productivity at Mauritius Container Terminal has improved only marginally in the last 10 years. To maintain and enhance the present transhipment market share, immediate measures are required:

- Improved crane productivity;
- Increased berth productivity through improved crane deployment;
- Dredging and capacity expansion;
- Investment in improved handling equipment and IT systems;
- Training to improve the use of IT and to improve the flexibility of the labour force to cover multiple roles;
- Attracting a wider customer base and / or dedicated long term contracts.

The easiest way to bring these changes about would be to get one of the major international port groups involved in the operation of the terminal.

1.2.2 The Oil Jetty

The Oil jetty has very poor pumping rates for most cargo and this must be improved by investment in the pipelines and equipment on the jetty. The jetty lighting and firefighting systems are being improved.

[1] *The MPA fish traffic figures are shown for 2015. For the traffic forecast the Poseidon figures for 2015 (270,000 tonnes) are used; the difference is explained by the volumes of containerised fish being included in the Poseidon figures.*

Concentrating more of the fuel storage close to the jetty will significantly improve handling rates. The present fragmentation of storage around the port is inefficient and new storage should be concentrated near the jetty. Investment in the pipeline system that links the jetty to the storage is also required.

1.2.3 The CNOI Shipyard

This shipyard is built on a very small site and is extremely busy. The yards ability to work on large fishing vessels is important to fisheries section of the island's economy and they could contribute further if they were able to expand.

1.2.4 Quays 1-4

These berths handle most of the dry bulk and general cargo in the port.

Quay 1 provides the backup location for petroleum imports and the facilities need to be upgraded if this use is to continue. Quay 1 is supposed to handle the coal imports but in practice these are divided between Quay 1 and Quay 2 because Quay 1 is too narrow for efficient truck operations. The coal discharge on both quays is very slow as the cargo is trucked from the quay around Fort George to the coal storage. MCFI used to import large amounts of fertiliser across Quay 1 but their much reduced volume now arrives mostly in containers.

Quay 2 handles all cement imports and is reasonably busy.

Quays 3 and 4 used to handle containers from geared container ships and general cargo but both these trades have reduced significantly and the berths are under used. Shed 3 used to store most of the general cargo but is now severely underutilised. The berths also handle trade cars, project cargo and the occasional cruise liner that is too big to go on the cruise jetty but these are only occasional trades.

Fishing boats waiting for their next voyage tend to occupy any unused commercial berths, creating a difficult security problem.

1.2.5 Private Fish Quays at the Lataniers River

These berths have been privately built and do not come under the control of the MPA. They are very busy and handle most of the fish that is landed in Mauritius both from fishing boats and from freezer ships.

1.2.6 Quays A-D

Quays A-D are used for handling bulk grain imports, occasional molasses exports, inter Island trade and imports and exports of fuel oil from two sets of storage tanks. They also provide berths for the tugs and coastguard vessels. A significant proportion of the berth utilisation is laying-by time for fishing boats.

The quays used to handle large quantities of bagged rice for storage in Shed A, but this trade is now in containers and STC are trying to relocate their storage to another site.

Shed E includes the passenger facilities for inter-island passengers but most of the cargo is loaded on quays 3 and 4.

Originally most of the grain was discharged to the Moulins de la Concorde silos using a vacuum unloader feeding a conveyor system but this is slow and often grab cranes are used to load trucks to speed up the discharge.

1.2.7 Trou Fanfaron

The Taylor Smith Shipyard has recently expanded and the service it provides to fishing craft and yachts is vital to the island's economy.

The fishing berths at Trou Fanfaron show very high occupancy rates but most of this is lay-by for fishing boats with actual fish landings being quite small.

1.2.8 The Cruise Berth

This berth is used by most of the cruise vessels visiting Mauritius. At present the jetty has an unsurfaced access road and no permanent passenger facilities. This does not give a good impression to visitors but the design of a permanent cruise terminal is in hand. This building will also act as a central immigration point for all passengers and ship's crews.

1.2.9 The Bulk Sugar Jetty

Since bulk exports of sugar ceased, this jetty is just used to import small quantities of raw sugar and the fuel oil for the Fort Victoria and Saint Louis power stations. The jetty is privately owned but very underused.

1.2.10 Security

As part of the operations review, the security in the port was examined. The present system of security relies on the berth operators controlling access to the operational areas under the general supervision of the MPA. Security levels were found to be variable and the MPA is in the process of commissioning a complete review of the port security systems.

1.3 Facilities needed to handle the forecast cargo

Looking at the cargo forecasts, requests from port users and changes in ship sizes, it is clear that the following changes are needed:

- The container facilities at MCT are being expanded to an 800m berth length at present and there is space for a further expansion to approximately 960m. To fully utilise the berths, the efficiency of the storage area must be maximised. Changing regulations will require an improved gate layout;
- In the longer term, extra container terminal capacity is required beyond the 960m of quay available at Mer Rouge;
- The petroleum industry needs additional storage capacity;
- The CNOI shipyard is very congested and needs more space. The shipyard facilities in the port are major employers and without them much of the fishing industry would leave;
- The coal handling system should be improved to reduce dust nuisance in the port and to improve the rate of discharge;
- Additional facilities are needed for importing and storing grain and animal feed;
- Extra fishing vessel maintenance facilities are needed, and
- It is likely that facilities to handle LNG will be needed.

1.4 Land planning Port Louis

The master plan sets out a long term plan for land use in Port Louis. The plan focuses on making the best use of the space available while also optimising the use of the berths.

One issue which keeps coming up is that the various facilities in the port have become rather fragmented and in particular some tenants are occupying key plots of land when they do not use the adjacent berths.

It is important that MPA finds a way to move such tenants and that future land leases are tied to use of the berths.

The preferred layouts are discussed below.

1.4.1 Container terminal facilities at Mer Rouge

The Mauritius Container Terminal extension and strengthening to a length of 800m is well in hand. The next stage in the development is to extend the terminal inland to accommodate a new gate complex, customs and security facilities, empty container storage, terminal offices and truck parking. This will occupy land already owned by the Port and a small area leased to the Free Port. These improvements will optimise the use of the main stack area, allowing a further expansion to 960m of berth to be fully utilised.

Once the full capacity of the 960m long berth has been reached (variously estimated at 1.1-1.4 million TEU per year), a further expansion will be needed. The 2009 master plan suggested building a breakwater on the reef and a further terminal (the Island Terminal) on reclamation inshore of it. This will also protect MCT and the oil berth from wave action, reducing downtime. It will optimise the overall operation by allowing the new terminal to operate as a single unit with MCT. The scheme is however very expensive with the breakwater is estimated at US$224 million.

An alternative to the Island Terminal is to upgrade Quays 3 and 4 into a dedicated container terminal with rail mounted container cranes. This is a lot cheaper but it has limited expansion potential in the future. With upgraded berths, the harbour could be dredged deeper but the turning area would limit the size of ship that could be handled. Options to build container facilities on Les Salines or at Fort William have been looked at in the past but the presence of the city would isolate such a development from MCT and the Free Port. Les Salines also has the same ship size restrictions as Quays 3 and 4 and would require the demolition of the cruise berth.

The island terminal is the preferred option in this master plan although the high initial cost may make the project difficult to finance.

1.4.2 Fort George area

The area to the west of Fort George will need to be re-organised to allow CNOI to expand and to maximise space for petroleum storage close to the oil jetty. The preferred option is to move the coal storage elsewhere and revoke the lease on the small area of land north of the coal storage. This will maximise the amount of petroleum storage close to the oil jetty and removes the hazards associated with coal handling close to oil installations. If it is not possible to remove the coal, it should be moved further north to include the unused area leased to the CEB. This would release the land needed for CNOI but it does not solve the other problems of slow discharge of coal ships and trucking coal within the port.

A new small ship oil berth for vessels up to 120m long is proposed adjacent to the Petredec LPG storage. This jetty will handle small LPG tankers for re-exports and bunker barges loading fuel for transfer to the offshore anchorage. This will overcome capacity constraints at the existing oil jetty, making it easier for Mauritius to develop into a significant petroleum transhipment hub and offshore bunkering centre.

There has been a great deal of discussion about using the space within Fort George for storing cargo. The outer walls of the fort are historically significant as are some of the structures inside. The fort's location makes it difficult to give public access and so there is no way of earning revenue to fund work to conserve the fort. The very limited access through the fort walls limits what can be done but it would be possible to construct oil storage tanks in the centre of the fort and build the pipework without damaging the structures. Ground conditions within the fort are generally good so that the tanks could be built on gravel pads above the existing ground, allowing their complete removal at some future date. The decision on whether to allow

such a development within the fort has to balance economic advantage with the wish to conserve a historic site. This has to be a government decision.

1.4.3 Cargo area at Quays 1 and 2

Most of the land area behind Quay 1 is leased to MCFI. Their operations have reduced in scale and they have no need to be immediately behind a deep water berth. Their operation can be conducted on approximately 30% of their present site. The preferred option is to use part of the MCFI land combined with the site of Shed 1 to provide a new site for coal storage. At the same time, Quay 1 would be modified to be land backed, creating extra area. Quay 1 is being dredged to take larger ships and this scheme would allow direct transfer of the coal by conveyor, improving cargo discharge rates and removing the dust issues and costs from trucking the coal.

Lafarge Cement needs additional storage for blended cement products and in the long term this can be accommodated on the reclaimed land behind Quay 1. In the short term they could use Shed 1 with some upgrades.

If part of the MCFI site cannot be made available for coal storage, the next best option is to install a conveyor system from Quay 1 to the modified coal terminal moved north to accommodate CNOI. This conveyor was part of the original planning for the coal terminal but has never been installed. A part of the upgrades, the dust suppression on the site should also be improved.

If the MCFI site is not used for coal, the next best use is for oil storage as it is quite close to the Oil Jetty and it is possible to upgrade the oil handling facilities on Quay 1. If this is done, it must be a significant development, not the 4 small storage tanks that have been suggested. A small development fragments the oil storage further leading to inefficient land use and the spread of hazard areas.

Adjacent to the MCFI site is the existing CHCL offices. They want to relocate to a new site, making the existing building available for a new fire service and port security centre.

Inshore of the MCFI site there is an area of land adjacent to the Fort George power station, known as the Ex- Binani land. The preferred option is for some of this land to be used by CEB instead of their plot north of Fort George, with the balance being available for other port uses. The location of this land is strategic within the port and it is important that it is reserved for an industry that requires direct access to cargo berths. That could be the storage of bulk cargo for import/export or an activity such as a truck waiting area that supports berth usage.

1.4.4 Quays 3 and 4

The inter-island shipping activities will relocate to Quays 3 and 4 with part of Shed 3 (underused at present) being used to store general cargo for this service.

One of the objectives of the Ocean Economy initiative is to position Mauritius as a base for marine services for offshore exploration in the Indian Ocean. Quays 3 and 4 would provide the ideal location for this and there is sufficient space behind the berths to run a significant supply base operation while continuing the existing activities.

1.4.5 Quays A-D and E

This area and quay space is underused at present. It is proposed that Shed A is recovered from the State Trading Corporation and part of the site would be used to provide a common user grain and powdered animal feeds import facility. This facility could incorporate improved ship discharge facilities to be shared with Moulins de la Concorde. Building a common user facility removes the need for numerous small separate storage areas that use land very inefficiently.

The parking area next to Shed E would be allocated to the Capitainerie to maximise the use of that building.

The rest of Quay A-D and E, including Shed E would be available for use by the fishing industry. It would allow the construction of cold stores very close to good deep water quays so that risks to fish quality are minimised. The lease for this area could either be taken up by the existing industry players or by a new entrant into the market. Whoever gets the lease, it should be tied to revenue guarantees for the MPA so that one player does not lease the land just to exclude a new entrant.

1.4.6 The Waterfront

The Port Louis City Vision 2030 produced by Gaëtan Siew was reviewed and generally it provides a good framework for this area. It seeks to link the waterfront to the city by creating two platforms over the highway also allowing existing marginal land to be used for car parking. The plan fits in very well with the LRT plan if that goes ahead and it also links to the proposed ferry service along the west coast of Mauritius.

Part of the plan is to use the Old Granary building, the Post office and the old hospital as the core of a cultural centre also linking to the Aapravasi Ghat world heritage site. These developments are considered to fit very well with the port master plan as they use buildings in a sensitive historical context that are not easy to retain for port use.

The plan also shows the existing fishing berths and backup areas at Trou Fanfaron being converted to a yacht marina with supporting buildings. The port master plan sees this area slowly going out of use by the fishing industry. Whether the quays then become a yacht marina depends on the demand for such facilities, something that is not proven. The port master plan enhances these ideas with a public walkway along the seaward side of the Old Granary, linking a development at Trou Fanfaron with the area around the Old Customs House.

The Port Masterplan and the city plan diverge quite seriously when considering the United Docks owned land to the north of Trou Fanfaron and the area of the Taylor Smith shipyard. The city masterplan shows the whole of this area as a residential development which could be placed at many locations on the island and does not directly use the waterfront setting. As described earlier, the shipyard makes a significant contribution to the economy and United Docks have a plan to convert their site into a fish landing quay with cold stores and fish processing. The larger back up area allows a much better fisheries complex than is possible on the existing Trou Fanfaron wharves.

At this stage it is not clear how the City Vision 2030 would be financed.

1.4.7 The Caudan Area

This will continue in leisure use with a new breakwater constructed to improve the sheltered area for small craft. The breakwater will also provide secure berths for visiting superyachts.

To make this development worthwhile, the various private landowners around the Caudan Basin must get together and develop a plan for the area which exploits its history and setting. This plan would be built around a leisure boating development retaining the area as a cyclone shelter for yachts.

1.4.8 Les Salines

Now that Les Salines has been returned to the MPA, the proposal is to divide it up into three main zones:

- The zone surrounding the existing cruise berth will be used for the expanded terminal and its associated parking and facilities, incorporating space for future expansion. It links to the bulk sugar jetty as a standby cruise berth, for times when two cruise vessels are in port at the same time;

- The area between the cruise berth and Le Suffren Hotel will be used as an expansion of the Caudan area, featuring tourist attractions. One developer is already well ahead with planning an acquarium and this could be joined by a water park and similar attractions. The waterfront area would be linked to the roads with a series of footpaths. A corridor along the water's edge will be kept for public access. The area immediately east of the cruise terminal area (0.8 ha) would be kept as a green space, to provide an attractive view of Mauritius for arriving cruise passengers. This area would be available for craft stalls, food stalls and art displays to link in with the waterfront attractions;
- The balance of the land adjacent to the main access road and bagged sugar terminal is best suited to light industry and logistics centres, offering employment to those who live nearby. It will also provide a site for support facilities, such as equipment stores for the cruise terminal.

1.4.9 The Bulk Sugar Terminal

The bulk sugar jetty is a valuable resource for Mauritius that is underused at present. It is important that in addition to its present uses, it should be available for other purposes such as a standby cruise berth for times when two cruise vessels are in port at the same time.

The owners are determined to keep both the large bulk sugar sheds for other uses even though their plans do not seem to use the space efficiently. There is the potential to use at least one of the sheds to store other bulk products.

1.4.10 Fort William

With a proposal in place to develop large petroleum storage facilities at Albíon on the short term, refer to section 1.6.4, two land use plans for Fort William are being presented. The planned layout is based on the scenario that petroleum storage will take place at Fort William. An alternative layout is based on the scenario that there is no demand for oil storage facilities at Fort William, in the event of large oil storage development at Albíon.

Land planning based on petroleum storage at Fort William

When the new reclamation is complete, it will provide sites for a new shipyard, a dedicated coastguard and marine services area, the site for an LNG storage and regasification unit. The main focus of this area is on ship building, the fishing industry and other strategic port development.

Strategic port development could also entail development of 1) short term small-scale oil storage facilities once the Fort George petroleum cluster is full and new petroleum port facilities at Albíon are not yet in place (refer to section 1.6.4), or 2) large petroleum storage if port development at Albíon would not materialise in the medium to long term. In case this scenario occurs, an additional deep water jetty, servicing large tankers up to 150,000 DWT is required if Mauritius becomes an oil storage and trading hub and most of the storage is at Fort William, as a fall back option to a petroleum port at Albíon. Cross-harbour pipelines would in that case form a link to the Fort George petroleum cluster, allowing oil companies and CEB to use both Fort William and Fort George jetties irrespective of where their tank farms and facilities are located. LNG would be landed on the bulk sugar jetty and piped to the storage tanks with the gas crossing the harbour to the Fort George power station.

To the north of the land reclamation, a new breakwater will be constructed to provide shelter to the other facilities and to provide a secure mooring area for fishing boats. This will remove the security risks from having fishing boats moored all over the harbour. Adjacent to the moorings there will be an area to service fishing equipment.

On the south side of the reclamation there is a proposal by LHF to build a fish landing and processing centre. Details of this project are scarce but any development plan must include a full EIA including a detailed study of the effects on the coastal regime. There is potential for this scheme to damage the public

beach, the water intakes to the Fort Victoria power station and divert the flood flows from Grand River North-West. An alternative would be for LHF to develop the fisheries facilities on the north side of the Fort William reclamation or to take up the lease on the proposed fisheries area at Quay A-D.

Land planning based on large oil storage development at Albíon

In the event of a large oil storage development at Albion, it is unlikely that there will be demand for large oil storage facilities at Fort William. In this case the north edge of the reclamation area will still be used as a fishing harbour with an enhanced area for fish processing as well as repairs and maintenance. The coastguard area will remain as planned but the area between the fishing and the coastguard provides a site for a third shipyard. This would be equipped with a dry dock for ships up to 250m long as well as a shiplift with full rail transfer facilities to have up to 6 ships onshore at the same time. The remaining areas would be used for port based logistics, open storage and support industries to the fishing and shipyard, such as ship chandlery. Having these logistics and storage areas available at Fort William means that some of the land at Les Salines could be released for urban development.

1.5 Risks associated with hazardous installations

A separate quantitative risk assessment (QRA) was carried out on the hazards and risks associated with the present and planned petroleum installations in Port Louis. This analysis showed that the existing pattern of petroleum storage is acceptable provided class A products such as Mogas are moved closer to the oil jetty and the one remaining gas sphere goes out of use.

The present arrangements for loading and discharging tankers gives some cause for concern and all jetties should be fitted with loading arms, leak detection and alarm systems, automatic ESD (Emergency Shut Down) systems, up to date and fully functional firefighting arrangements and spill control systems. These measures should be retrofitted to the existing oil jetty and also to planned new jetties and discharge points. Berths which just handle fuel oil have less stringent requirements but they still require basic firefighting and full pollution control equipment.

If the LNG is landed on the bulk sugar jetty, the facilities there will need some upgrading. This location is far enough from the proposed small tanker jetty for there to be no interaction in terms of risk.

The LPG mounded storage sites and the LNG storage do not have significant risks outside their immediate footprint although in a very extreme event either type of storage can produce large amounts of heat, requiring the orderly evacuation of the immediate area.

Public events, attracting large numbers of visitors to the port area must be avoided.

Taking into account these measures, the QRA demonstrates that the individual risks and societal risks for the existing situation and planned masterplan developments in Port Louis are considered acceptable.

1.6 Land planning for locations away from Port Louis

1.6.1 The Jin Fei Area

The Jin Fei area is located at Riche Terre, a distance of 3km north of Port Louis and has a total area of 202 hectares. The area has been designated for an extension of the port's free zone. An important part of the plan is a link road between the area and the port, avoiding the congestion of the motorway. The planning of this link road is in hand with the Road Development Authority, taking due account of the need to minimise the impact on the Ramsar Convention listed Riche Terre Estuary bird reserve immediately north of the port.

1.6.2 Dockers Flat

The Dockers Flat area adjoins the Riche Terre bird reserve. The presence of this Ramsar designated area severely restricts the options for development.

When the link road to the Jin Fei area is built, part of the Dockers Flat area can be used for light warehousing, truck parking, container storage and other low impact activities, provided a buffer zone to the bird reserve is maintained.

1.6.3 Grand River North-West

Grand River North-West has been identified as a potential site for the development of a marina complex. The Port Louis waterfront marina developments will always struggle to provide all the support facilities for yachts as they do not have the space available. The two developments complement each other, with Grand River North-West probably being more attractive to sailors who live in the centre of the island. A marina in this location also has the potential to strengthen the function of the existing public beach of Le Sable Noir.

The development will have to be carefully designed so that it does not restrict flood flows out of the river and also does not change the conditions at the power station intakes.

1.6.4 Albíon

As in earlier master plans, an area at Albíon will be reserved for future large scale energy projects.

The following proposals have been discussed:

- Joint venture Mangalore Petrochemical and Refineries Ltd and Indian Oil Corporation in association with the State Trading Corporation of Mauritius: A petroleum storage facility to act as a distribution depot for East Africa and the Indian Ocean. This development requires a jetty servicing 150,000 DWT tankers as well as smaller vessels. First stage development is expected to be operational by year 2020;
- Near Shore Resources Ltd: A proposal for new, small floating refinery with storage for crude oil and products onshore. This scheme has considerable technical challenges associated with the wave climate but these can probably be overcome. The installation is expected to be operational by 2020;
- Central Electricity Board (CEB**):** A proposal by CEB to develop a power station on the site using LNG as the fuel. This proposal aims to allocate land to accommodate their long term expansion plan for power generation. The liquid gas would be landed at Albíon and stored onshore before being regassified and used in the power station. There is also a proposal from CEB to use Albíon as the site for a large solar farm to generate electricity from the sun, and
- Nearshore storing and regasification of LNG: There are various proposals for storing and regasification of LNG using nearshore facilities.

Neither of the business plans for these projects has been made available and it is not the role of the master plan to comment on their viability.

A CEB proposal to build a power station at Albíon is considered suitable from a technical point of view. The only difficulty with landing LNG at Albíon is that a new gas main would be required to supply gas to Fort Victoria and the other power stations. This main would have to cross a number of properties and the Grand River North-West.

Any fuel supplied to the local market from Albíon will have to depart the site by truck. The road links from the Albíon site to the rest of the island will probably have to be upgraded to handle this traffic.

Based on the first two proposals above, the Government may finance the development of Albíon as a petroleum port so as to accommodate private investment for facilities at the site. This petroleum port is to be serviced by its own oil jetty, capable of handling 150,000 DWT tankers. There are no port facilities available at present and it is understood that the construction of a jetty is essential to attract any investment in on-land facilities at Albíon. With such a jetty in place, large scale petroleum projects, such as storage and re-exports of petroleum products, could be implemented in the short term at Albíon.

At present the coastal strip of land at the Albíon site is owned by the Government of Mauritius but this is too narrow for many types of project and is not adequate to accommodate all the projects being considered. In this respect, it is recommended that the freehold land area adjacent to the land owned by the Government be acquired for the development of projects associated with the objective of promoting Port Louis as a petroleum hub. This area exceeds any immediate need but it provides ample reserves of land for the future. The land is mostly low grade agricultural land and therefore of low value. There are two small settlement areas totalling less than 10 hectares and these will have to be relocated. There is a current application to develop a further 43 hectares and this could seriously disrupt the use of the balance of the site for storing hydrocarbon products. Albíon is the only large site that is available on the sheltered west coast of Mauritius for a major port related development. All the other possible sites are already being used for housing or as tourist developments. It is therefore very important that the government ensures that the whole of this 400 Hectare site is kept available for port related use and is not encroach upon by other users. It is recommended that the land is purchased by government so that Mauritius has good options for port development in the future.

For any of these developments to go ahead, a jetty has got to be built and that will require an initial investment of approximately MRs3 billion. There has been much discussion about using a single point mooring but these can only normally handle a single product. To make such an investment worthwhile, the initial project would have to be large or incorporate several developments.

It is understood that the Ministry of Housing and Lands will prepare a land use plan for the whole area, under the Town and Country Planning Act. The land use plan will be based on a dedicated port masterplan for Albíon that will need to be prepared following completion of the Port Louis masterplan studies in 2016.

It is also understood that Government will improve and enlarge the access road from the main road of Riviere Noire to Pointe aux Caves to service the future facilities, and that a jetty will be financed and constructed to initiate private investments at Albíon. The Ministry of Housing and Lands will proceed with the acquisition of the identified private lands. Prior to investing in port facilities by Government, there is need for firm commitments from the private sector to start the development concurrently.

1.6.5 Vieux Grand Port

A previous study in 1999 compared the cost of operating a jet fuel jetty in Vieux Grand Port with the cost of trucking jet fuel from Port Louis to the airport in Plaisance. The conclusion was that even with the rapid projected growth in jet fuel, it was significantly cheaper to keep importing the jet fuel through Port Louis. Jet fuel consumption has not grown at the rate predicted in 1999 and the conclusions of the report are still valid.

The same study showed that the only way to make the channel into the lagoon safe was to straighten it by removing 1.4 million cubic metres of coral reef. Besides the obvious environmental damage and cost, this would open up the lagoon to much greater wave action.

To deliver jet fuel to a liquid bulk terminal in the Mahebourg lagoon would require a new custom built ship that is able to operate in the rough sea conditions that frequently occur on the east coast of Mauritius. The vessel will also have to negotiate the difficult channel into the lagoon and so will have to be more powerful than the normal fuel barges and with special rudder arrangements. Even with a new custom built ship,

there will still be interruptions to the service because of bad weather and consideration will also have to be given to how the service will be provided when the ship is dry docked for maintenance or inspection.

There have also been suggestions that jet fuel could be landed using a single point mooring off Blue Bay just south of Mahebourg. The shore profile in this area means that the mooring would be in deep water making it expensive. For most of the year, tankers coming to the mooring would be manoeuvring in rough seas with a rocky shore immediately downwind of them. This would not be safe, producing a high risk of a major pollution incident in the event of any sort of equipment failure on the tanker.

Also given the importance of the environmentally sensitive areas in the lagoon and in line with relevant policies of the outline planning scheme of Grand Port Savanne, a jet fuel unloading facility at Vieux Grand Port/Mahebourg would represent a highly significant environmental risk and is not recommended.

The realistic option to supply jet fuel to Plaisance Airport is to build a permanent pipeline. To avoid issues with wayleaves, the simplest approach would be for the pipe to follow the line of the motorway although the elevation changes approaching 500m will require careful design. The advantages of a pipeline system are:

- Low operating costs once installed;
- High reliability;
- No interruptions during cyclones and other weather events, and
- Low environmental and security risks.

It is recommended to use Vieux Grand Port for a leisure development and it is proposed to develop a service quay for small craft and sports fishing boats. This can be provided easily at the site previously used by the sand dredging operation adjacent to the Vieux Grand Port Battle memorial. Another option would be to build a protected marina adjacent to the jetty at Bois des Amourettes.

At present fish farming is concentrated in the northern part of the lagoon and uses Grande Riviere Sud-Est as its base. If this activity extends to the southern part of the lagoon, the Mahebourg area comes into the picture for loading out supplies and landing fish. The proposed Mahebourg service quay could accomodate shallow draught catamarans normally used by fish farms. The impact on the Mahebourg waterfront is considered small, as most supplies are transferred direct from trucks and the fish are also loaded straight into temperature controlled transport.

1.7 Project costs and feasibility

Cost estimates for each project in Port Louis have been prepared and the economic and financial feasibility has been assessed as part of the Port Masterplan. Results for the major projects have been listed below.

	MRs m	US$ m	Economic Assessment	Trigger
MCT expansion (gate complex)	793	22	Small financial returns	Completion of the MCT Phase 1 expansion.
Island Terminal			Negative financial returns Neutral economic returns	Container traffic grows beyond 1.3M TEU/annum. To be addressed in planned feasibility study.
Phase 1 (breakwater & dredging)	13,414	373		
Phase 2 (460m of quay)	8,723	242		
Phase 3 (390m of quay)	6,030	168		
Second oil jetty at Fort George	342	10	Positive financial returns	Attraction of additional petroleum traffic.
Berth 1 reconstruction: civil works only	637-1,113	18-31	Small financial returns	Linked to purchase of handling equipment / land rationalising plan.
Quays ADE redevelopment	3	0.1	Positive financial returns	-
New cruise terminal	400	11	Negative financial returns	Joint effort for increasing tourist numbers. To be addressed in dedicated cruise terminal study.
Fort William oil jetty (fall back option for petroleum port at Albíon)	3,668	102	Negative financial returns Positive economic returns	Attraction of large volumes of additional petroleum traffic.
Fort William breakwater	150	4	Justified on safety & security or environmental grounds.	
Caudan breakwater	150	4	Justified on safety & security or environmental grounds.	

1.8 Conclusions

The Ports Master Plan shows that a range of projects are needed to take the Mauritius economy forward. The scale of these projects varies considerably but before any commitments are entered into, each project must be demonstrated to have a sound business case and finance behind it. Each project must also pass the environmental thresholds required by the national regulations.

Full details of the study and the projects that arise from it are given in the full text of the plan.

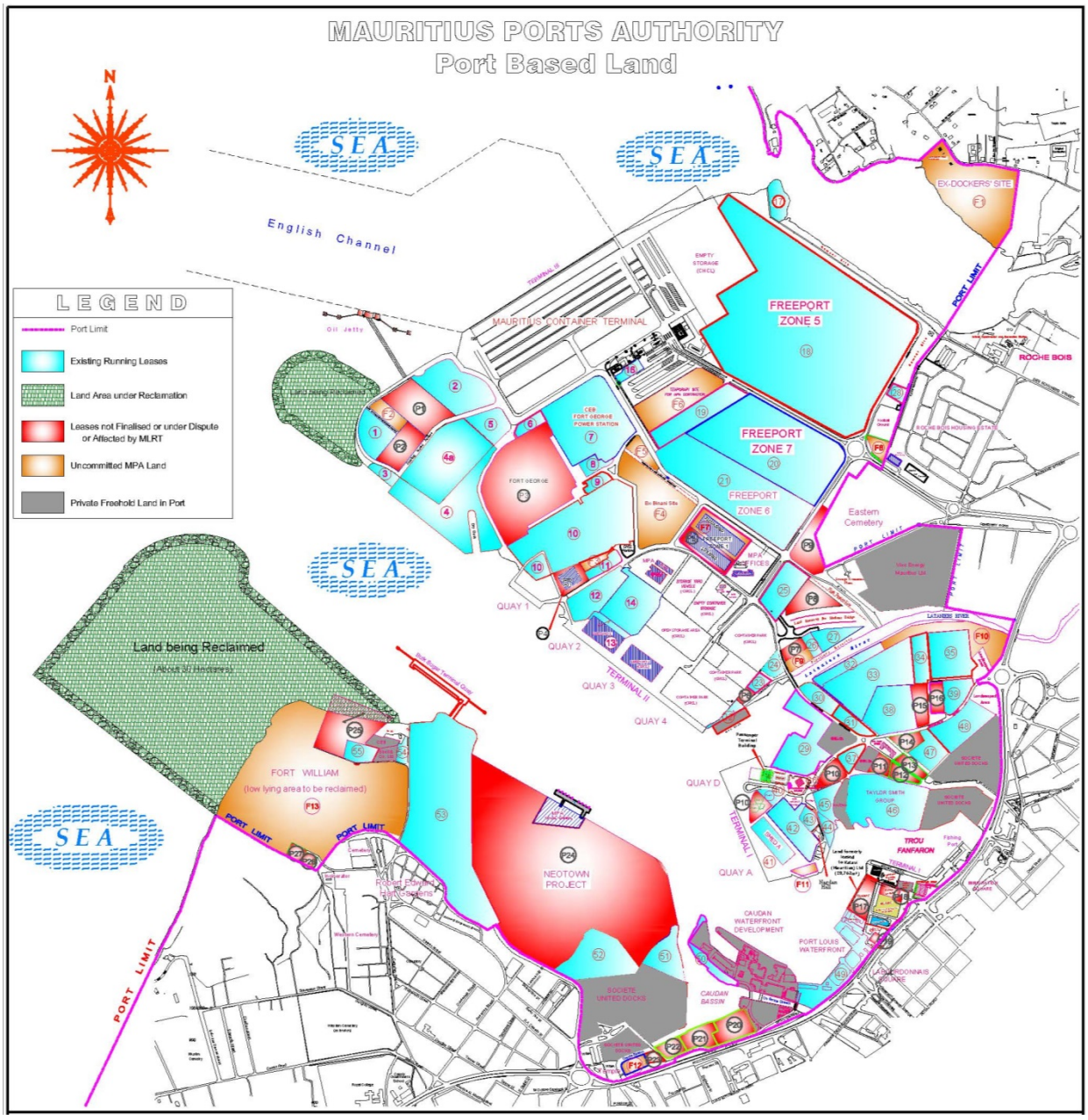


Figure 1-1: Existing land leases in the port (source: MPA)

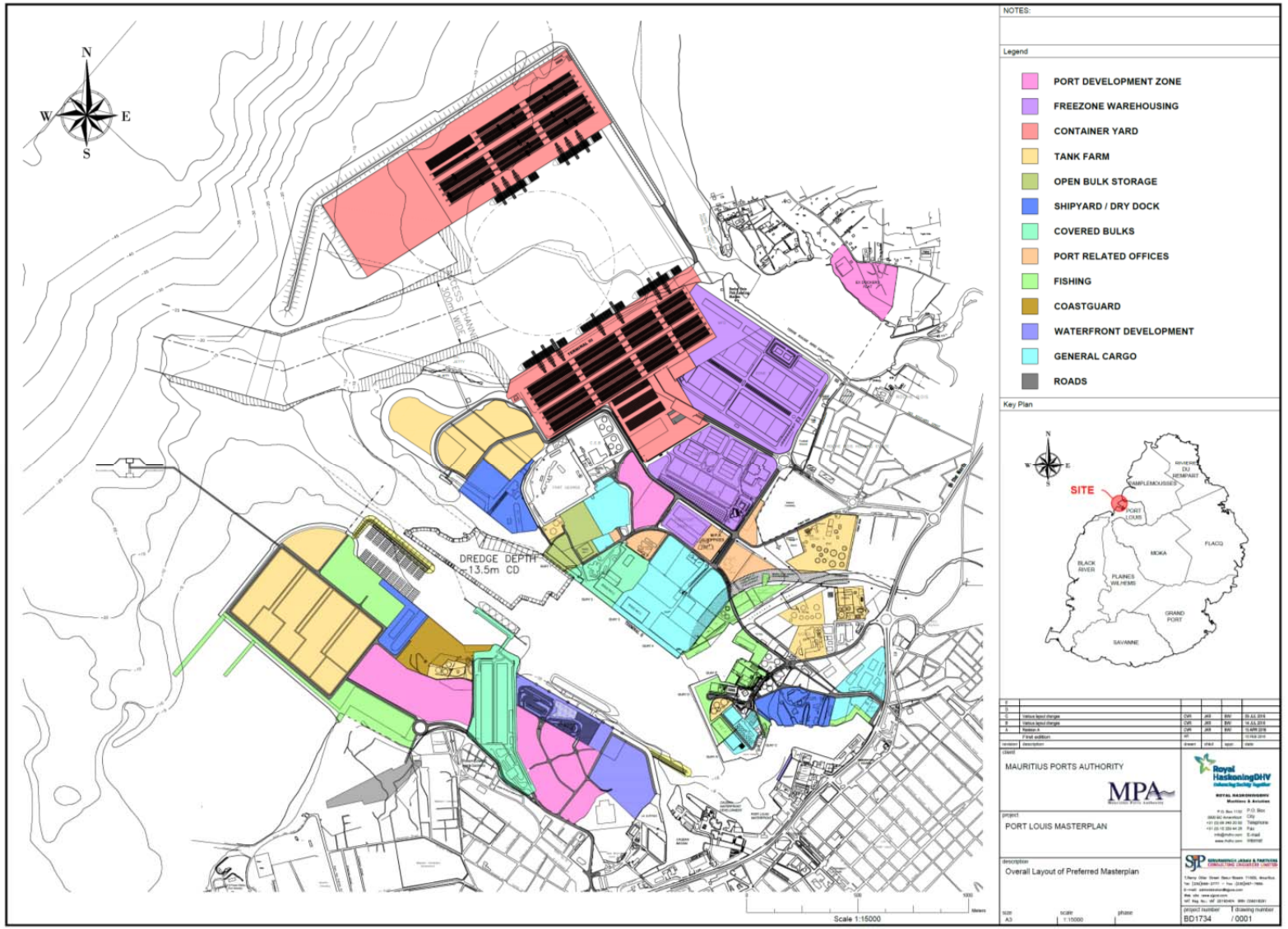


Figure 1-2: Preferred Port Masterplan

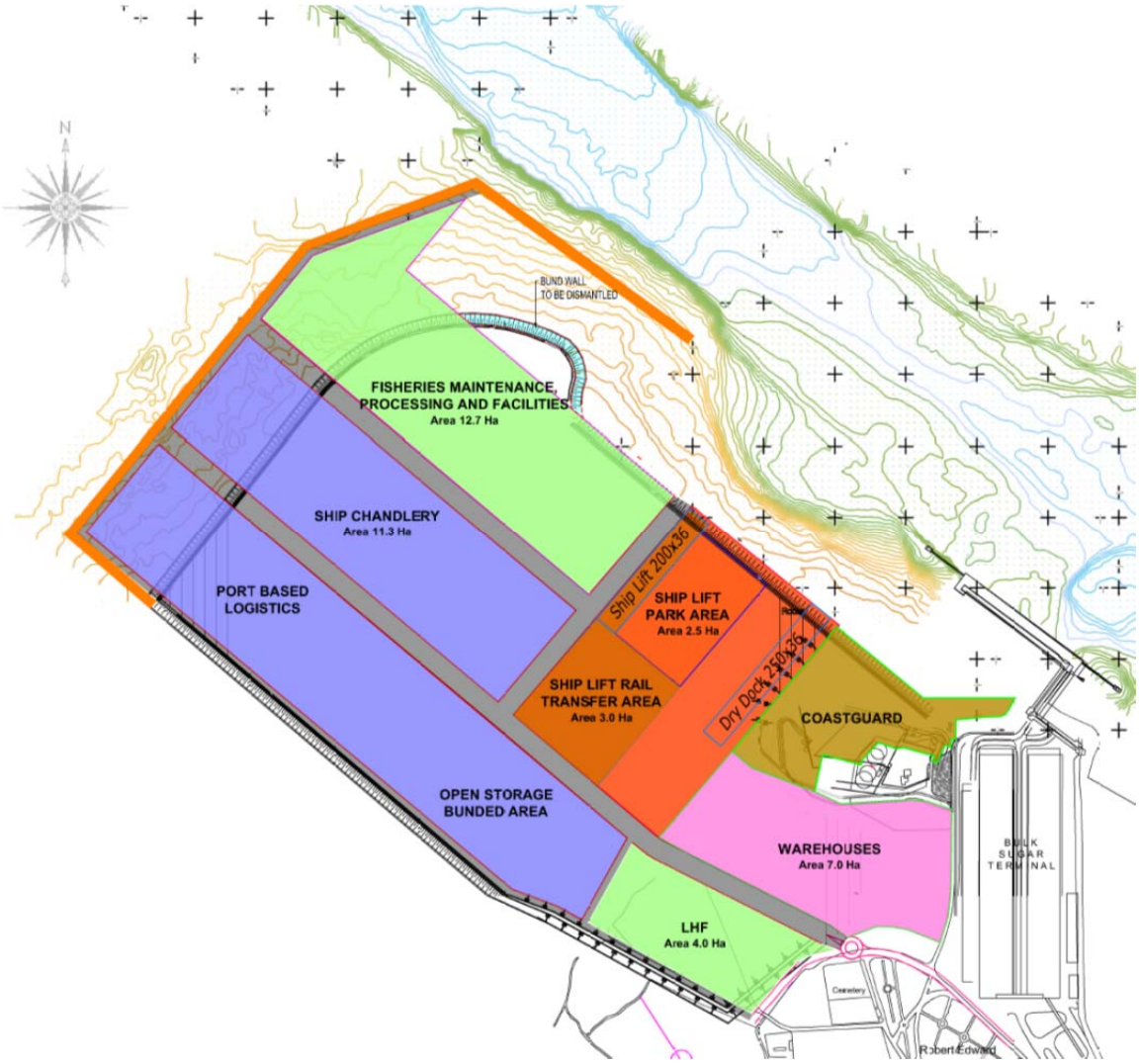


Figure 1-3: Fort William alternative land use planning.