5 PREDICTED ENVIRONMENTAL IMPACTS

5.1 THE RATIONALE

This EIA report was prepared to meet its objectives as defined in the Environment Protection Act (EPA) 2002. Suitable mitigating measures will be worked out, aimed at preventing, minimizing and offsetting the adverse effects that are most likely to occur due to the proposed project.

The following key elements, which may be affected by the project, were duly considered in this report.

1. Disruption due to construction.
2. Oil spill on land and sea.
3. Wastewater disposal.
4. Solid waste disposal.
5. Air emissions.
6. Storm run-off
7. Noise pollution.
8. Traffic.

The sensitivity of these elements to the effects caused by the project was assessed and, subsequently, mitigating measures to avoid, minimize and reduce the environmental consequences had been defined. Experience with previous and similar projects and the “Best Professional Judgement” (BPJ) served as a fundamental basis for predicting environmental impact of the project.

The proposed project effects were evaluated at the following two stages.

- During the construction phase which are of short-term or temporary nature.
- During the operational phase when the effects are permanent and lasting.
5.2 IMPACT IDENTIFICATION

The groups and effects on which to assess impacts are listed in Table 5.1.

Table 5.1: Assessment groups on which to assess impacts

<table>
<thead>
<tr>
<th>Group</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical environment</td>
<td>1. Disruption due to construction (during construction phase)</td>
</tr>
<tr>
<td></td>
<td>2. Oil spill on land and sea.</td>
</tr>
<tr>
<td></td>
<td>3. Wastewater disposal.</td>
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<td></td>
<td>4. Storm Run-off.</td>
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<tr>
<td></td>
<td>5. Solid waste disposal.</td>
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<td></td>
<td>6. Air emissions.</td>
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<td></td>
<td>7. Traffic.</td>
</tr>
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<td></td>
<td>8. Flora &amp; fauna</td>
</tr>
<tr>
<td></td>
<td>11. Health &amp; Safety.</td>
</tr>
</tbody>
</table>

5.3 IMPACT DURING CONSTRUCTION STAGE

5.3.1 Disruption due to construction

Disruption due to construction is a term which covers effects on people and on the natural environment which can occur between the start of pre-construction works and the end of contract maintenance period. Disruption due to construction need not be as a result of a project directly.

The following summarize the effects during the construction phase of the project.

- Nuisance in the form of dust emanation and risk of polluting sea water.
- Noise and vibrations due to construction equipment.
- Removal of top soil and stockpile.
- Excavation of trenches for laying of services.
- Air pollution from constructing vehicles.
- Disposal of surplus excavated material.
- Exploitation of borrow pits for imported materials.
- Impact on the immediate surroundings.
- Visual impacts.
- Sanitation and solid wastes disposal in construction camps and work sites.
- Traffic impact.

### 5.4 IMPACT DURING OPERATIONAL PHASE

#### 5.4.1 Oil spill

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially marine areas, due to human activity, and is a form of pollution. The term is usually applied to marine oil spills, where oil is released into the ocean or coastal waters, but spills may also occur on land.

When spilled, the various types of oil can affect the environment differently. They also differ in how hard they are to clean up. Spill responders group oil into four basic types, along with a general summary of how each type can affect shorelines, as below.

**Type 1: Very Light Oils (Jet Fuels, Gasoline):**
- Highly volatile (should evaporate within 1-2 days).
- High concentrations of toxic (soluble) compounds.
- Localized, severe impacts to water column and intertidal resources.
- No cleanup possible.

**Type 2: Light Oils (Diesel, No. 2 Fuel Oil, Light Crudes)**
- Moderately volatile; will leave residue (up to one-third of spill amount) after a few days.
- Moderate concentrations of toxic (soluble) compounds.
- Cleanup can be very effective.
Type 3: Medium Oils (Most Crude Oils)
- About one-third will evaporate within 24 hours.
- Oil contamination of intertidal areas can be severe and long-term.
- Oil impacts to waterfowl and fur-bearing mammals can be severe.
- Cleanup most effective if conducted quickly.

Type 4: Heavy Oils (Heavy Crude Oils, No. 6 Fuel Oil, Bunker C)
- Little or no evaporation or dissolution.
- Heavy contamination of intertidal areas likely.
- Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion).
- Long-term contamination of sediments possible.
- Weathers very slowly.
- Shoreline cleanup difficult under all conditions

Only Type 1 and 2 oil, i.e gasoline and diesel will be of concern for this proposed oil farm. Every activity of the proposed project may have a potential risk of oil spill. Both oil spill at sea and inland are considered in this EIA report and the activities/causes that will be potentially risky are identified as follows.

**Oil spill at sea:**

- Offloading of gasoline and diesel from tankers at the oil jetty.
- Leakage of hose, valves and pipes connections from the tanker at the oil jetty.
- Rupture of pipelines along the oil jetty.
- Any accidental spillage.

**Oil spill inland:**

- Filling the oil tanks.
- Rupture of oil tanks.
- Cleaning of tanks.
- Rupture of bund walls.
- Rupture of pipelines located inland, such as the pipelines from the proposed oil farm to the individual fuel depots of the 4 major stakeholders.
- Leakage at the pumping station during loading into road tankers.
- Leakage at all connecting points in the pipeline inside the proposed terminal boundary lines.
- Fire outbreak.
- Natural disaster such as cyclones or even a tsunami.

As more fully detailed in Chapter 3 of this report, the proposed oil farm will be set up using the most stringent international norms/standards/regulations and that it will in line with the Port Louis Harbour Oil Spill Plan and the National Oil Spill Contingency Plan, it is anticipated that the risk of a major oil spill, as a result of the proposed oil farm, will be insignificant.

### 5.4.2 Impact of diesel

Diesel is a light, refined petroleum product. Small diesel spills will usually evaporate and disperse naturally within a day or less. This is particularly true for typical spills from a fishing vessel. Thus, seldom is there any oil on the surface for responders to recover.

When spilled on water, diesel oil spreads very quickly to form a thin film of rainbow and silver sheens, as depicted in Plates 5.1 and 5.2.

Diesel oil has a very low viscosity and is readily dispersed into the water column when winds reach 5-7 knots or with breaking waves. Diesel oil is much lighter than water (specific gravity is between 0.83 and 0.88, compared to 1.03 for seawater). It is not possible for this oil to sink and accumulate on the seafloor as pooled or free oil unless adsorption occurs with sediment. However, it is possible for the diesel oil that is dispersed by wave action to form droplets that are small enough be kept in suspension and moved by the currents.

Oil dispersed in the water column can adhere to fine-grained suspended sediments (adsorption) which then settle out and get deposited on the seafloor. It is less likely to occur in open marine settings. This process is not likely to result in measurable sediment contamination for small spills.
Plate 5.1: Diesel spill on road forming the rainbow and silver sheens

Plate 5.2: Diesel spill at sea
Diesel oil, having a viscosity of 7.97 CSt (@15 °C), is not sticky or viscous, compared to black oils. When small spills do strand on the shoreline, the oil tends to penetrate porous sediments quickly but also tend to be washed off quickly by waves and tidal flushing. Thus, shoreline cleanup is usually not needed. Diesel oil is readily and completely degraded by naturally occurring microbes, under time frames of one to two months.

**Effects on Wildlife and Plants:**
In terms of toxicity to water-column organisms, diesel is considered to be one of the most acutely toxic oil types. Fish, invertebrates, and seaweed that come in direct contact with a diesel spill may be killed. However, small spills in open water are so rapidly diluted that fish kills have never been reported.

Crabs and shellfish can be tainted from small diesel spills in shallow, near shore areas. These organisms bio-accumulate the oil but will also depurate (filter out) the oil, usually over a period of several weeks after exposure.

Small diesel spills can affect marine birds by direct contact, though the number of birds affected is usually small because of the short time the oil is on the water surface. Mortality is caused by ingestion during preening as well as by hypothermia from matted feathers.

The surrounding natural resources and activities which could be negatively impacted as a result of an oil spill at sea during offloading activities at the oil jetty are as follows.

- The waters off the Port Louis harbor designated as fishing reserves.
- The stretched of coral reefs extending northward and southward of each side of Port Louis harbor.
- Mangroves at Grand River North West Bay.
- The Rivulet of Terre Rouge Estuary Bird Sanctuary.
- Fort William Power Station which utilizes sea water for cooling purposes.
- Fish landing stations at Bain des Dames, Fort William and Roche Bois.
- Caudan and Port Louis waterfronts.
5.4.3 Domestic wastewater

Domestic wastewater will be generated from the administrative block. It is characterised as a low - medium organic source of pollution (indicated by biological oxygen demand (BOD) or chemical oxygen demand (COD)) containing suspended solids, nutrients (nitrogen and phosphorus) as well as pathogens, and it is a serious public health and environmental concern if not disposed of appropriately. In order to implement a safe and hazard-free wastewater disposal, an on-site treatment system comprising of septic tanks and absorption pit/leaching field is required.

It is proposed to use a septic tank followed by an absorption pit/leaching field, as means of subsurface absorption.

5.4.4 Storm run-off

Storm run-off from the proposed oil farm will be contaminated with oil, particularly around the dike area and the pumping station. The storm runoff will be channeled to a suitable oil-water separator to remove oil contamination prior to final discharge.

5.4.5 Solid waste

Domestic solid wastes:
Solid wastes to be generated by the proposed project will consist of normal non-toxic domestic refuse produced by from the office block all of which are normally biodegradable materials and small quantities of metal, plastics, and glass.

Toxic oil sludge:
Toxic oil sludge will be generated from the oil-water separator as well as the sludge from the bottom of the tanks, when cleaning will be effected. This sludge is classified as hazardous.
5.4.6 Air Emissions

The main source of air emission will be the formation and accumulation of hydrocarbon vapour in confined spaces such as the head space of the storage tanks. Hydrocarbon vapour may accumulate to toxic concentrations in these head spaces of the storage tank. A suitable venting system will be provided in all tanks to prevent accumulation of hydrocarbon vapour. The abatement of such hydrocarbon vapour will hence be through natural dispersion into the atmosphere via the vents provided in the storage tanks.

As a measure of mitigation, hydrocarbon detectors will be installed at strategic locations not only to detect leakages, but also to monitor level of these toxic vapours in the surrounding ambient air.

No inhabitants or residents will be affected by these hydrocarbon vapours, as the proposed oil farm will be located downwind and far from the existing nearby centers of populations, i.e the Roche Bois as indicated in the context plan (Annex B2).

5.4.7 Traffic Impact

An additional of 8 passenger cars movement per day will be generated by the proposed project. These vehicles will move in and out the proposed oil depot through the Roche Bois and/or Quay D roundabouts and thereafter onto/from the M2 motorway to and from the different parts of the island.

During peak times, the two mentioned roundabouts are already heavily congested and this proposed project will hence have an insignificant additional traffic impact.

5.4.8 Flora & Fauna

The proposed site is presently reclaimed bare land and there is no rare flora or fauna species protected by law. Further, the land is not covered by trees or plants which, although not rare, form part of a visual asset to the landscape. Nor is the site used for migrating species, which normally require preservation.
There is therefore no direct impact of the development on the Island’s flora and fauna since the land-take does not involve the destruction of trees or rare plants.

There is in addition no direct impact of the development on the fauna since the land-take resulting from the development does not involve the destruction of shelter or breeding sites for animal species.

5.4.9 Socio-Economic Impacts

This proposed oil farm will certainly have positive socio-economic impacts of the country in terms of ensuring the energy security of the island and job creation. These positive socio-economic impacts of the proposed project are detailed in the following sections.

5.4.9.1 Ensuring Energy Security

Mauritius imported some 1,305,000 MT of petroleum products in 2012, representing more than 15% of the fuel imports in 2011. Moreover, the growth rate of fuel use in Mauritius is estimated at 2-3% annually. Indicators showed that there is an urgent need to increase the fuel storage capacity not only to meet the future growing demand in fuel, but also to ensure the island’s energy security. This proposed project will undoubtedly contribute positively towards achieving the aim of the country in increasing fuel storage capacity and ensuring energy security.

5.4.9.2 Job Creation

The proposed oil farm will create employment opportunity during the construction phase to around 75 workers. Categories of employees, excluding the consultancy Project team members, will include engineers, technicians, foremen, gangmen, machine operators, mason, welders, steel workers, carpenters, plumbers, electricians, gardeners, among others.

During the operational phase, 10 persons will be employed. All the workers will be properly trained in oil spill response, fire-fighting measures, safety as well as public health hazard issues associated with the activities of the proposed oil farm.