

Impact Assessment and Mitigation Addendum: Environmental Recommendations for Fuel Buoy and Pipeline relocation

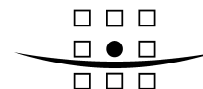
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5 March 2008

Final Report

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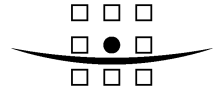
George Hintzenweg 85
P.O. Box 8520
Rotterdam 3009 AM
The Netherlands
+31 (0)10 443 36 66 Telephone
00 31 10 4433 688 Fax
info@rotterdam.royalhaskoning.com E-mail
www.royalhaskoning.com Internet
Arnhem 09122561 CoC

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Drafted by Franca Sprong, Edirio Almada, Renilde Becqué
Checked by Charles Haine
Date/initials check
Approved by Ruud Platenburg
Date/initials approval

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1 INTRODUCTION

This section provides an addendum on the “Impact Assessment and Mitigation Part 2 of Environmental Impact Assessment, Palmeira Port, Cape Verde, (Final Report 5 March 2008)”.

It provides a concise preliminary assessment and recommendations for the relocation of the fuel buoy and related oil pipeline in the bay of Palmeira, in order to allow for the expansion of Palmeira Port. When more details on the relocation are available, additional environmental scoping will have to take place in order to further identify the environmental and social impacts and their significance as well as mitigation measures for as far as required.

For the actual relocation the owner of the buoy and pipeline (Shell/Enacol) will have to comply with Capeverdean and other relevant legislation, which may include drafting and submitting a Request for an Environmental Permit and/or an Environmental Impact Assessment.

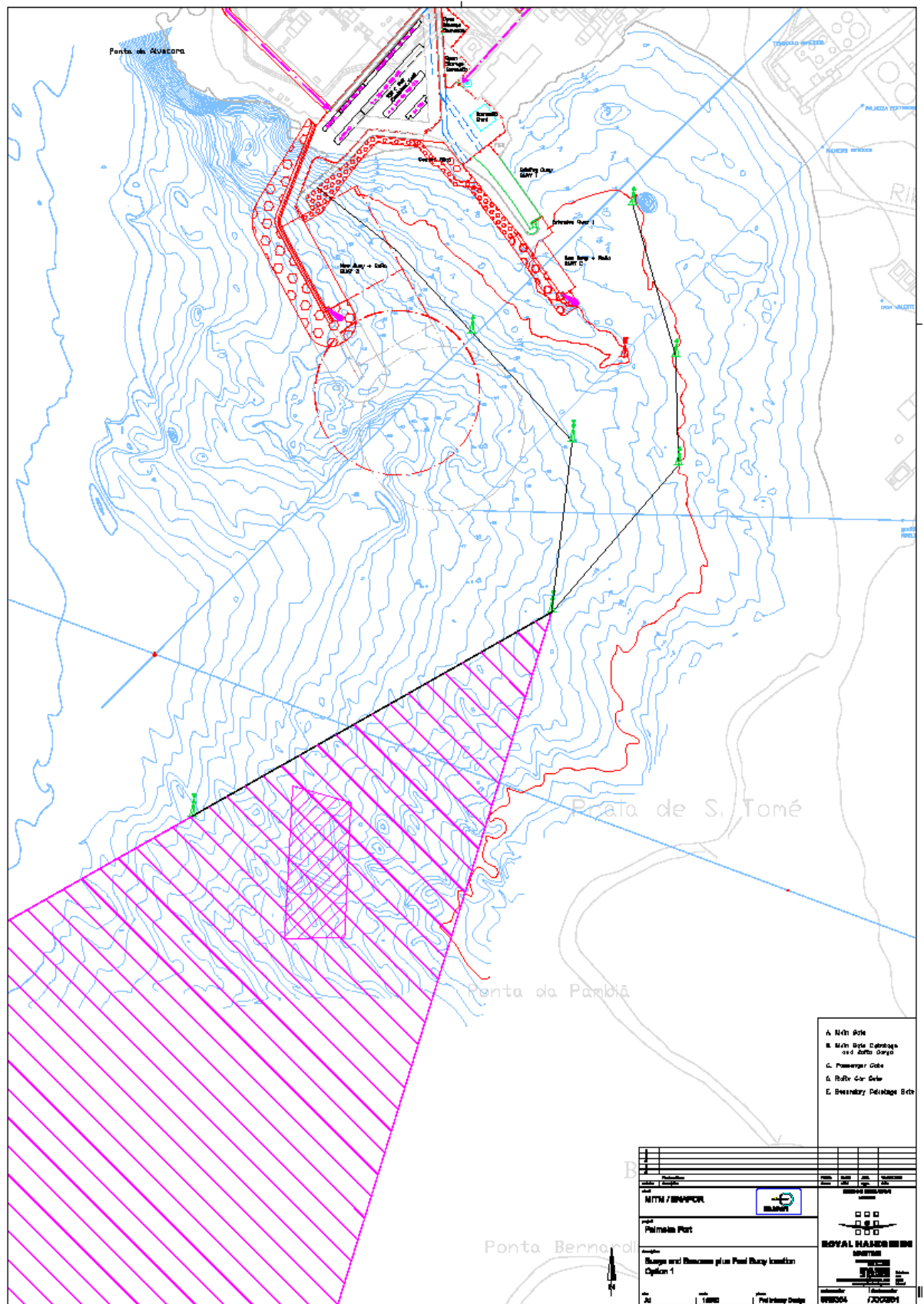
Alternatives

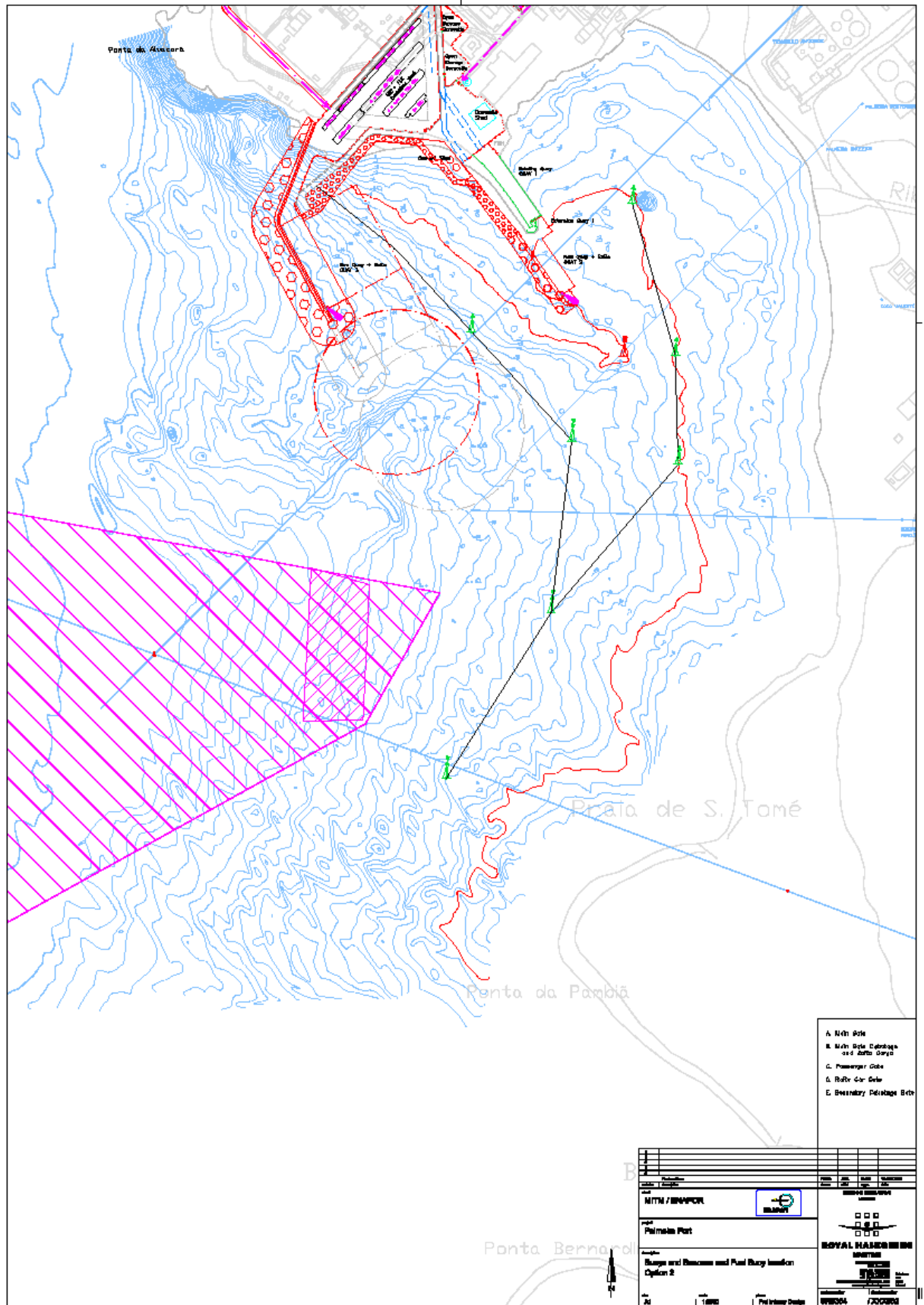
Five options have been proposed for relocation of the buoy and pipeline. They can be summarized as follows:

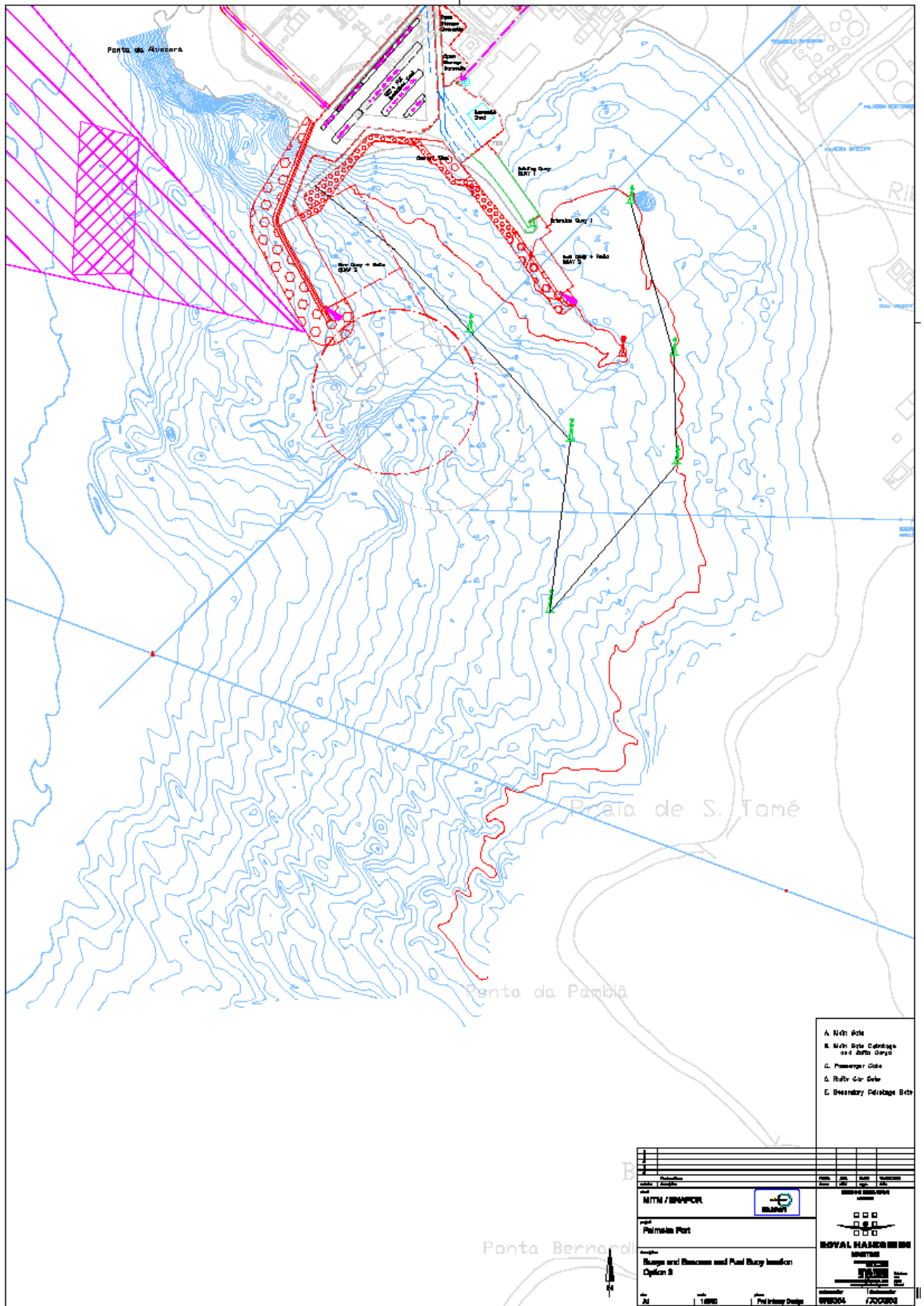
1. Option 1 is a full relocation to the South. All vessel traffic will be routed north of the buoy location and will not interfere with the fuel unloading activities.
2. Option 2 is a relocation to the south, but not as far as Option 1. Vessels can enter the port from the West, and also from the South. The South route however will cross the fuel pipeline.
3. Option 3 is located West of the Phase 2 breakwater. This location does not interfere with shipping activities, but is located close to the water inlet of Electra.
4. Option 4 is a shift of 85 m only. Buoys will have to be relocated again before Phase 3 is going to be built. Vessels can enter the port from the West, and also from the South. The South route however will cross the fuel pipeline.
5. Option 5 is located at the Phase 2 quay. This option is preferred from Navigation point of view, but interferes with the activities at the quay. When located at the quay it will be much easier to control possible spills.

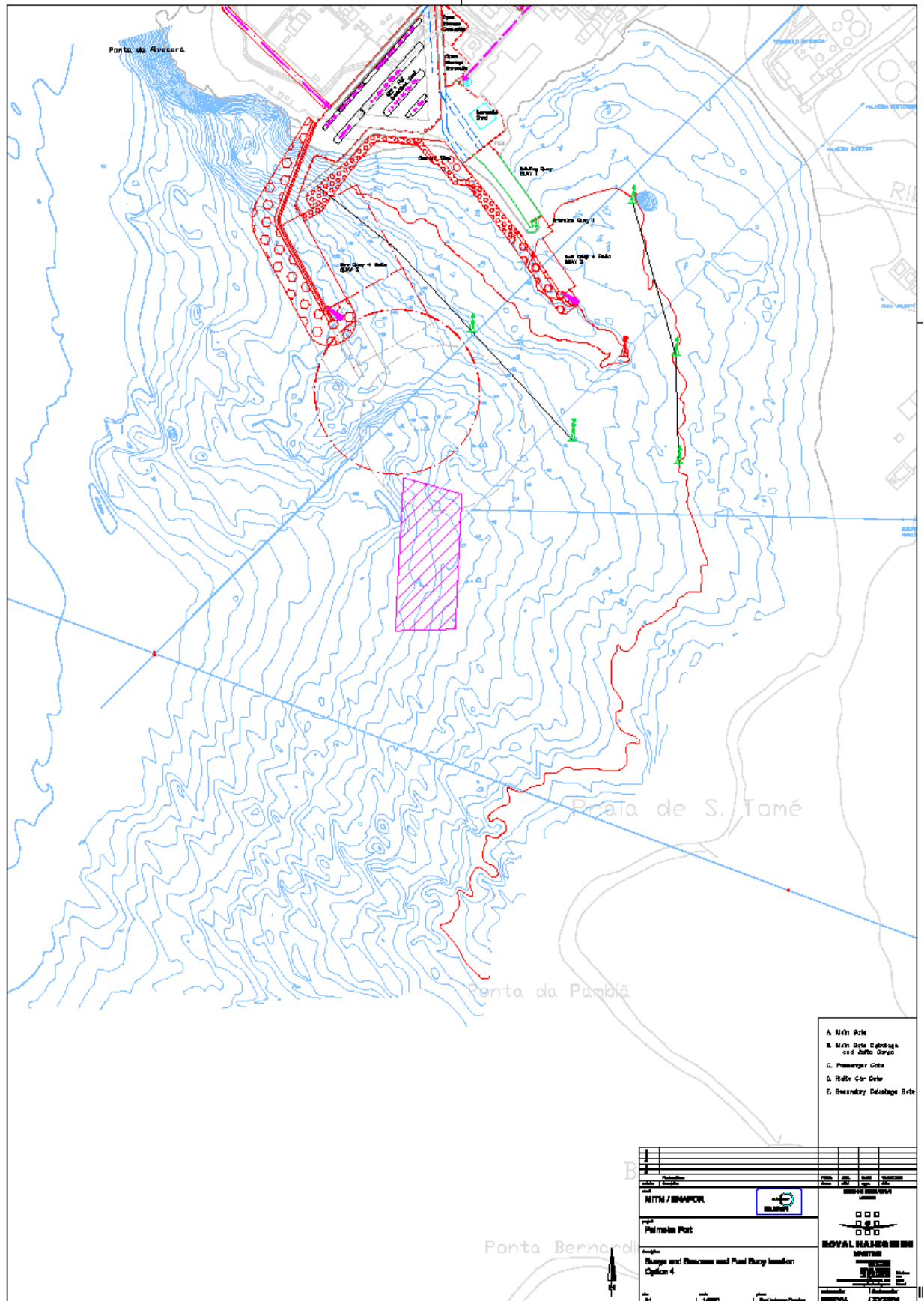
Maps of the first four options are provided on the next pages.

To minimize the risks of oil spills or leaks from pipeline damage, a pipeline route which does not interfere with the main routes for marine traffic in the bay is preferable. In addition the pipeline should be located at sufficient distance from the water inlet of the desalination plant of Electra, in case of spills. Finally interference with other port activities could increase environmental risks. Therefore option 1 provides the least risk of accidental spills and leaks, provided that the terrain, currents and waves allow for safe operation of the pipeline and buoy.









2 CONSTRUCTION PHASE

Impact assessment

A major risk for the relocation of the buoy and associated pipeline, including dismantling and replacing, and/or extending the pipeline, would be the risk of oil spills and the subsequent pollution of water bodies and possibly coasts. Oil spills during construction could occur due to relocation or removal without or insufficient proper emptying and cleaning of the pipeline prior to this activity. And in case of disposal of the pipeline local soil, surface and groundwater contamination from residual oil in the pipe could occur at its disposal location.

The negative impacts of a marine oil spill to marine life in Palmeira bay, including corals, fish and other marine species may be of local however major significance. The impacts on fish stock in the bay may also temporary affect the fisherman in Palmeira village. And the water quality of sea water near the water inlet of the desalination plant may be severely impacted.

If a marine oil spill were to enter outside the bay, oil could be carried with the main current and waves southwards towards Murdeira Bay, a protected marine reserve. In this bay, as well as along the adjacent coast of Sal, the presence of cetaceans (whales and dolphins), various turtle species, and a high variety of fish and other marine species have been identified. The bay acts as an important nursery for many species. An oil spill may therefore have a major significant impact on marine biodiversity south of Palmeira bay.

In addition it could impact on fishery activities along the coast, and on tourism activities near Murdeira Bay and near Santa Maria village, due to the pollution of sea water and beaches.

If an oil spill were to occur on land this could also have significant impacts on health, safety and groundwater quality.

Other impacts of construction, such as sediment disturbance and dispersion of potential contamination present in or on the sediment, smothering of marine organisms such as corals, destruction of corals under the footprint of the relocated pipeline, air emissions, noise, possibly waste pipeline disposal, and wastewater discharge due to cleaning of the pipeline are expected to be temporary and of minor negative impact provided proper mitigation measures are taken.

Mitigation measures

The current, flexible pipeline can contain a maximum of 25 m³ of oil products. Before relocation the pipeline should be emptied out, for example by using water pressure, and the oil should be collected and if not suitable for use it should be properly disposed off (such as with the Casa Vermelha).

In case of removal of the existing pipeline, prior to removal the empty pipeline should be cleaned. This may be carried out by flushing the pipeline with sea water and collecting the oily waste water for treatment and disposal. The pipeline if not suitable for reuse should be disposed of at a proper (hazardous) waste disposal facility.

The contractor should develop and implement an Oil Contingency and Emergency Response Plan to cope with any eventual spill, leaks, fire/explosion risks during buoy and pipeline relocation.

A training for the contractor employees should be conducted to further minimize oil spills during emptying, relocation and/or cleaning and removal of the pipeline.

3 OPERATIONAL PHASE

3.1 Impact assessment

Leaks, discharges and oil spills during the operational phase can occur from pipeline breaks or the unloading of oil products at the buoy in Palmeira bay, resulting in pollution of water bodies and possibly coasts and impacting on marine biodiversity, and possibly fisheries, the water inlet for the desalination plant and marine or beach tourism activities.

3.2 Mitigation measures

To prevent these leaks, discharges and spills the main environmental mitigation measures proposed are:

- using accepted pipeline standards;
- assuring and monitoring proper operation, inspection and maintenance of all facilities through the implementation of an Environmental Management and Monitoring Plan
- developing an Oil Spill Contingency and Emergency Response Plan;
- staff training and awareness.

Additional mitigation measures include e.g.:

- ensuring the presence of sufficient emergency shut down valves in the pipeline;
- installation of an additional oil-water separator tank
- monitoring of oil levels in the oil-water separation discharges