

4 Project Alternatives

In terms of the EIA regulations (Regulation 6 (1) (d) GN No. R1183, dated 5 September 1997) and NEMA, the applicant is required to demonstrate that alternatives to the proposed project have been described and considered in sufficient detail.

4.1 “No Development” Alternative

The “No Development” (i.e. “do nothing”) alternative implies that none of the proposed development components are implemented. For the purposes of this study this means that neither the upgrade of Berths 601, 602, 603 and 604 nor the deepening of the BSD basin takes place. As such, the environmental status quo in respect of the biophysical environment would be maintained.

However, as described in Section 3.1, shipping lines use increasingly bigger cargo vessels that require deeper basins and ship-to-shore cranes with wider reach. Without modifications to the Port, these vessels would not be able to enter the Port of Cape Town due to inadequate water depth and berth infrastructure. Cargo vessels currently provide important business to the Port of Cape Town and a reduction in the number of vessels using the Port as a result of inadequate port infrastructure is likely to threaten the global competitiveness of the Port, with a knock-on effect on other industrial and business areas that depend on income from port activities.

4.2 Project Aspect Alternatives

The Scoping Report (Shangoni, 2005) identified and considered a number of alternatives for aspects the proposed berth deepening project. Table 4-1 shows these alternatives. Options that were screened out during the Scoping Phase are shaded in light grey. The motivation for excluding these options is provided in the Final Scoping Report (Shangoni, 2005), which was accepted by DEA&DP in June 2005 and informed the scope of the EIA phase conducted by SRK. As such, the exclusion of these options has been approved by the authorities and the motivations are not laid out again in detail in this EIR.

Alternatives screened out after the Scoping phase, but before the EIA phase, are shaded in darker grey.

Table 4-1: Project alternatives identified during scoping

| Aspect | Alternatives | Current Status |
|------------------|---------------------------------------|-------------------------------|
| Project | No Development alternative | Assessed in EIA phase |
| Location | Ben Schoeman Dock (Port of Cape Town) | Assessed in EIA phase |
| | Duncan Dock (Port of Cape Town) | Screened out during Scoping |
| | Port of Saldanha | Screened out during Scoping |
| Berth Alteration | Retain the existing quay structure | Screened out during Scoping |
| | Extend deck by 10 m into the basin | Assessed in EIA phase |
| | Extend deck by 20 m into the basin | Screened out during Scoping |
| Spoil Disposal | Land-based disposal of sediment | Screened out before EIA Phase |
| | Deepwater disposal (40m + depth) | Assessed in EIA phase |
| | Near-shore disposal (~15 m depth) | Screened out before EIA Phase |
| | Surf zone disposal (3 m – 5 m depth) | Screened out before EIA Phase |
| Blasting | Surface blasting | Screened out during Scoping |
| | Buried multiple small charges | Assessed in EIA phase |

Source: adapted from Shangoni (2006)

4.2.1 Project Aspect Alternatives Screened Out After the Scoping Phase

All dredge spoil disposal alternatives identified during the Scoping phase and listed in Table 4-1 were considered to be potentially viable in the Final Scoping Report. However, three of the four dredge spoil disposal alternatives were screened out following the submission of the Final Scoping Report and before the start of the EIA phase. The alternatives excluded at this stage are:

1. Land-based disposal of sediment;
2. Near-shore disposal of sediment; and
3. Surf zone disposal of sediment.

This approach and the motivations for screening out these disposal options were detailed in the Plan of Study for EIA submitted by SRK in September 2006. The Plan of Study, and hence the approach, were accepted by DEAT in October 2006. The motivations for exclusion of these alternatives in the EIA are detailed below.

4.2.1.1 Land-based disposal of dredge spoil

Two land-based disposal options for dredge spoil were considered during Scoping:

1. Disposal of dredge spoil that is contaminated and not compliant with the London Convention in a hazardous waste landfill site, as such dredge spoil cannot be disposed of at sea; and
2. Use of rock dredged from the BSD as construction material in the Container Terminal Expansion (CTE) project.

These alternatives have been screened out following the Scoping phase and are not assessed in detail in the EIA phase for the following reasons:

- *Compliance of sediment with London Convention:* The analysis of sediment to be dredged has shown that the material's contamination levels lie below the prohibition levels defined in the London Convention (CSIR 2006b, also see Section 3.2.1 of this EIR). As such, the dredge spoil can be disposed of at sea and land-based disposal at a hazardous waste landfill is not required;

- *Separation of CTE and berth deepening projects:* The CTE and berth deepening projects were linked and to be implemented in parallel when the Scoping phase for the berth deepening project was undertaken. This proposed parallel execution of the projects gave rise to the option of using dredged material from the BSD in the construction of the CTE. However, the two projects are independent of each other, and have since been separated. As such, the dredged material from the BSD is no longer required for the CTE project.

4.2.1.2 Near-shore and surf zone disposal of dredge spoil

Although considered viable alternatives in the Scoping Report, there are a number of potential impacts associated with the disposal of dredge spoil at near-shore or surf zone disposal sites, which has led to the decision by Transnet to exclude these options from the EIA phase in favour of alternatives less likely to generate adverse impacts and public concern. These potential impacts, as identified during the scoping phase, include:

- *Shoreline stability:* Coastlines are dynamic in nature and reshape constantly as a result of current, wave and wind action. As such, there is concern that the disposal of sediment close to or on the shore may alter the existing sediment regime and wave and current patterns within Table Bay. This would lead to increased erosion or accretion of sediment in areas of Table Bay. As there are a number of developments close to the shore of the Table Bay, some already affected by erosion, the public also expressed significant concern about the potential alteration of the coastline;
- *Health impacts:* Specialists expressed concern that it would prove difficult to assess with confidence the potential health impacts from disposing the dredged sediment close to human receptors and recreational areas. It also became clear during the Scoping phase that this was of significant concern to the public; and
- *Visual impacts:* Visual impacts from disposing of sediment near or on the shore could result from turbidity plumes in the water and distinct deposits of differently-coloured sediment on the shore. The potential significance of these impacts is increased as the proposed disposal sites would be located near human receptors and recreational areas within a scenic beach landscape.

4.2.2 Project Aspect Alternatives Considered in the EIA Phase

For all project aspects, one potentially viable alternative per aspect was retained and is assessed in more detail in the EIA phase. However, for the deepwater disposal of dredged sediments, *three* potential deepwater dredge disposal sites were identified in the EIA phase. These include:

- The dredge disposal site of the Port of Cape Town identified in CSIR (1991), located approximately 275 km from the Port of Cape Town at a water depth of 3 500 m;
- “Site 1”, located about 13 km from the Port of Cape Town at a water depth of approximately 65 m; and
- “Site 2”, located about 9 km from the Port of Cape Town at a water depth of approximately 40 m.

These deepwater dredge disposal site alternatives are discussed in more detail in the sections below.

4.2.2.1 Dredge Disposal Site at 3 500 m Depth

This site was identified by the CSIR in 1991 in its “First Report on The Situation of Waste Management and Pollution Control in South Africa” as a potential disposal site for dredge material from the Port of Cape Town.

In this EIA for the berth deepening project, this site is not considered to be viable and was screened out as a potential disposal site for dredge spoil from the BSD for the following reasons:

- *Economically unfeasible:* As the site is located some 275 km from the BSD, hopper barges would take approximately one day for a return trip to the disposal site to dump dredged material. As such, significantly more resources in terms of hopper barges, fuel and personnel would be required for disposal of dredge spoil at this site than would be needed if spoil was disposed at a site located closer to the BSD. It is also likely that Trailer Suction Hopper Dredgers, providing the shortest duration of dredging operation, could not be used if disposal were to take place at this site (CSIR 2006d).
- *Dispersal of sediment:* Disposing dredge spoil at this site is also likely to result in a large dispersal of mud into the water column during disposal due to the long distance between water surface and seabed.
- *Limited accessibility of site:* The characterisation and monitoring of the site would be problematic, as its distance and great depth would require long trips and the use of specialised equipment that is costly and difficult to obtain.

4.2.2.2 Dredge Disposal Site 1 at 65 m Depth and Site 2 at 40 m Depth

To identify two alternative deep water dredge disposal sites for consideration in this EIA, a number of criteria were applied. As far as feasible, a site was sought where (CSIR, 2006a):

- Seabed sediment composition is similar to that of the disposed material;
- Material is either retained in a discrete area (if sediment is of different composition than the general receiving environment) or allowed to disperse to facilitate habitat recovery;
- Impacts on biodiversity and/or rare and endangered species are limited;
- No existing sensitive areas are in the vicinity;
- Potential impacts on shoreline stability are avoided;
- Site characterisation is possible; and
- Disposal of dredge spoil is financially feasible, as significantly determined by the distance of the site from the dredged area.

Based on an existing high resolution bathymetric chart of Table Bay, two sites with a seemingly sandy seabed composition were preliminarily selected for further investigation. The location of Site 1 (~13 km from the Port and ~65 m deep) and Site 2 (~9 km from the Port and ~40 m deep) is indicated in Figure 4.1. Each of these potential dredge disposal sites is approximately 3 km x 2 km, or 6 km², in size.

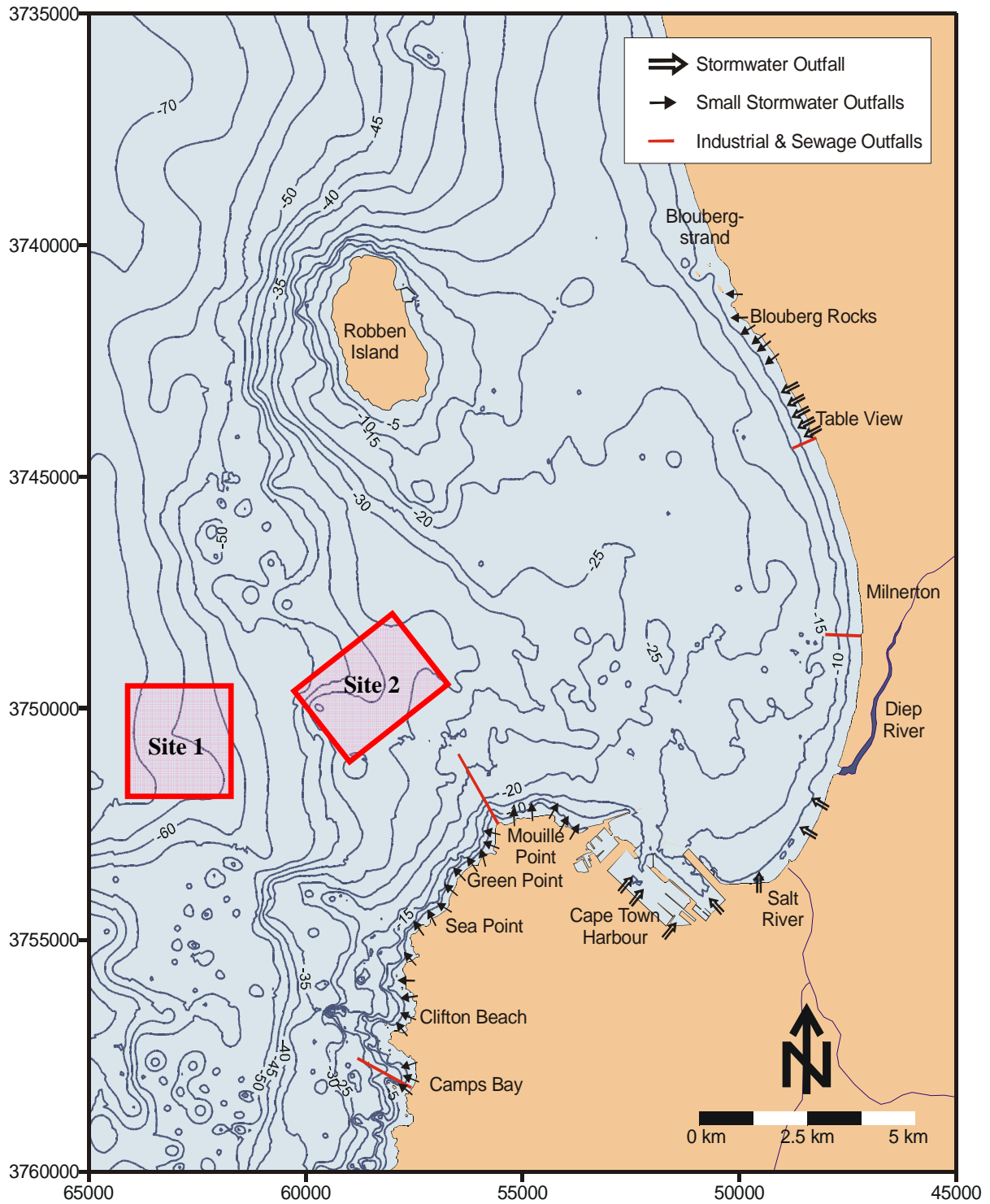


Figure 4-1: Proposed dredge spoil disposal sites

Source: Lwandle, 2006a

The assumptions that were made about the composition of the seabed at both sites based on the bathymetric chart were subsequently confirmed by a second high resolution bathymetric chart that extends further west than the originally used chart (CSIR, 2006a).

Side-scan sonar and single beam bathymetric surveys were conducted at Site 1 and Site 2 on 31 August 2006. The analogue side-scan record was used to select suitable grab sampling sites to collect seabed samples for site characterisation. At each sampling site, five replicate van Veen grab

samples were retrieved. The sampled sediment was analysed for granulometric (sediment particle size and texture) and chemical characteristics as well as for benthic macrofauna at the two sites, as required for the permit application in terms of the Dumping at Sea Control Act 73 of 1980 and the London Protocol 1996.

Data from these surveys was also used to identify and confirm the suitability of the candidate sites for harbour dredge spoil disposal and to provide a baseline for the impact assessment (CSIR, 2006a). The geological and ecological characteristics of Site 1 and Site 2 thus determined are described in Chapter 5: Description of the Affected Environment (Sections 5.1.2 and 5.1.4).

Site 1 and Site 2 were both deemed potentially viable for the disposal of dredge spoil from the BSD. Their suitability for disposal of dredged material in general and suitability relative to each other is assessed in Chapter 7: Assessment of Environmental Impacts.

4.3 Other Alternatives Considered in the EIA Phase

Project implementation alternatives such as different dredging options making use of a combination of Trailing Suction Hopper Dredger, Cutter Suction Dredger and/or Backhoe Dredger, with different associated durations of dredging options, are described in Chapter 3: Project Description (Section 3.2.4).