HERITAGE IMPACT ASSESSMENT OF PROPOSED REVERSE OSMOSIS PLANT AT THE IRON ORE HANDLING FACILITY PORT OF SALDANHA, WESTERN CAPE

Prepared as part of an EIA for:

P.D. Naidoo & Associates

SRK Consulting

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Prepared by
Tim Hart

Archaeology Contracts Office
Department of Archaeology
University of Cape Town
Private Bag
Rondebosch
7701

Phone (021) 650 2357
Fax (021) 650 2352
Email Timothy.Hart@uct.ac.za

EXECUTIVE SUMMARY

The Archaeology Contracts Office of the University of Cape Town was appointed to assess the heritage impact of the proposed construction of a Reverse Osmosis (RO) Plant at the Iron Ore Handling Facility, Port of Saldanha. This assessment is a specialist component of a broader Environmental Impact Assessment (EIA) process. The iron ore handling facility is the shipping end of the Sishen Saldanha iron ore export corridor. It is at this point that ore trains from Sishen are offloaded; the ore is stockpiled and then loaded on bulk carriers that are berthed at the Saldanha Ore Jetty. The process of handling the iron ore has historically generated significant quantities of red iron ore dust which has impacted the area in the past. The RO plant is intended for de-salinating sea water which is to be used for dust suppression during the ore handling process. Although the proposal is relatively unobtrusive in terms of its physical footprint and bulk, the construction of linear features such as a short access road and pipelines triggers a Heritage Impact Assessment process as part of the overall EIA.

Three alternative sites have been suggested for the proposed location of the Reverse Osmosis plant (RO plant).

Site 1: The eastern edge of existing reclamation dam with 3 options for seawater intake and brine discharge,
Site 2: At the juncture of the ore terminal and small bay on previously disturbed land currently containing gravel and construction rubble with 2 options for seawater intake and brine discharge.
Site 3: On reclaimed land at the edge of the multipurpose terminal with 4 options for seawater intake and brine discharge..

Impact assessment

The study has revealed that the area is not rich in heritage resources; meaning that the proposed activity is generally acceptable. The proposed activity will largely take place on recently reclaimed land – intrusion into *insitu* sediments will be extremely limited at site 1, only resulting in a very slight chance that palaeontological material will be impacted. The small size and low height of the proposed facility will not cause any impacts in terms of cultural landscape. No impacts are expected in terms of any other form of generally protected heritage.

Fatal flaws

There are no fatal flaws.

Conclusion and recommendations

Sites 2 and 3 are marginally favoured over site 1. Site 1 will need minor mitigation measures:

- Geo-technical drill cores are to be retained for further reference;
- A qualified palaeontologist is to be notified if any material such as fossil shell or fragmented bone is manifested during beach well construction.

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GLOSSARY

Archaeological material *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

Fossil *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

Geophysical survey *A scientific study generally conducted by geologists and sedimentologists to describe and assess the below ground conditions of a given area.*

Heritage *That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000)*

Palaeontological *Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.*

SAHRA *South African Heritage Resources Agency*

Structure (historic) *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

Varswater Formation *Sediments laid down under estuarine circumstances by the proto-Berg River during the Pliocene. Certain members of this formation are highly fossiliferous.*

Velddrif Formation *Shelly estuarine sands of the last interglacial (Pliestocene) that can be consolidated into calcrete.*

Wreck *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*

1 Introduction

The Port of Saldanha is currently an important export port for iron ore, where it is loaded on large bulk carriers via the Saldanha Bay ore jetty – a now prominent feature of the area. The ore is mined at Sishen in the Northern Cape, where it is loaded onto dedicated trains, transported some 860 kms to the coast and stockpiled before shipment via the ore handling facility.

The ore handling process generates iron ore dust which has been a local environmental issue. Transnet is committed to controlling dust emissions and has introduced, amongst others, a system of water sprayers to suppress dust on stock piles and conveying apparatus. The current water supply is derived from the local municipal system, however due to increased demands for iron ore and Transnets' intention to expand shipping capacity, indications are that the most environmentally feasible and cost effective option is to de-salinate sea water for dust suppression. Raw sea water cannot be used for this purpose as it degrades the quality of the iron ore.

The Archaeology Contracts Office (ACO) was appointed by PDNA/SRK Joint Venture to:

- Assess the potential (heritage and archaeological) impacts associated with the construction and operation of the proposed RO plant;
- Provide an assessment of all the alternatives, including the three location alternatives and the no development alternative;
- Indicate whether the sites are environmentally acceptable or unacceptable for an RO plant in terms of the respective impacts assessed by the relevant specialists;
- Recommend appropriate and practical mitigation measures to minimise the negative impacts and maximise potential benefits associated with the three sites;
- Indicate the environmentally preferred site.

Loosely defined, *heritage is that which is inherited*. The National Heritage Resources Act of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage includes:

- Cultural landscapes
- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards.

1.1 The proposed activity

The proposed activity is a very minor intervention in heritage terms; however the potential construction of pipelines and access roads technically triggers section 38 of the National Heritage Rescources Act 25 of 1999. The activities envisaged will involve:

- An RO plant containment building (approximately 2400 m² surface footprint) with room for three RO modules, an electric sub station, a motor control room, a pump house, a store room, office and ablution facilities and space for parking;
- Sea water supply and brine discharge via pipelines, beach wells or boreholes on the quay;
- Submersible pumps and piping for the extraction and discharge of sea water;
- A sea water storage tank alongside the RO building;
- A potable water storage tank alongside the RO building;
- Storage reservoir(s) totaling 5Ml, 48 hour potable water storage capacity next to the existing reservoir, or located on Transnet National Ports Authority land to the west of the Iron Ore Handling Facility:
- A service road connecting the RO building to the nearest road infrastructure; and
- All requisite electrical and communication facilities between the RO installations and the Iron Ore Handling Facility.

Three alternative sites have been identified for the placement of the RO plant. These are depicted on Figure 1.

Alternative site 1:

Located to the east of the Iron Ore Handling Facility, the RO plant would be situated in the vicinity of the coastal dunes at the existing reclamation dam with 3 possible options under investigation for the seawater intake and brine discharge. These are

a) Beach well intake and pipeline outfall into Big Bay
b) Pipeline intake and pipeline outfall from and into Big Bay
c) Beach well intake and beach well discharge into Big Bay (during the hydro-geological investigations, it was determined that beach well discharge was not feasible in this location).

Alternative site 2:

Located north and northwest of the Iron Ore Handling Facility. The RO plant would be established in an area at the corner of the Quay and the shoreline currently containing stockpiles of gravel and construction rubble. Two possible options are being considered for seawater intake and brine discharge:

a) Beach well intake and pipeline outfall into Small Bay
b) Pipeline intake and pipeline outfall into Small Bay

Due to space constraints, beach well discharge wells in addition to beach well intakes were not considered feasible.

Alternative 3:

Located on the southern section of the Quay of the Iron Ore Handling Facility. The RO plant would be positioned on the souterh edge of the Multipurpose Terminal. There is no appropriate stretch of beach in this area, however the Quay itself provides potential opportunity for boreholes and the ore jetty for outfall and brine dispersal . Four possible options are being considered:

a) Pipeline intake at Small Bay and pipeline outfall at Small Bay
b) Pipeline intake at Small Bay and pipeline discharge at Big Bay
c) Borehole intakes on the quay adjacent to the Stockpile Yard and pipeline discharge at caisson 3 of the Ore Jetty into Big Bay.
d) Borehole intake on quay close to the Multipurpose Terminal and pipeline discharge at caisson 3 of the Ore Jetty into Big Bay.

Reservoir

A potable water storage reservoir (s) up to 5ML capacity will be needed for storage of desalinated water along with a pipeline from the RO plant and pipelines to where the water is needed at the Iron Ore Handling Facility. Three site options for a reservoir have been identified. These are:

a) The existing site – reservoir alternative 1 close to the existing reservoir between the Stockpile Yard close to the dunes (see Figure 1)
b) Alternative reservoir site 2 situated in highly transformed landscape of the stockpile yard close to the conveyor (see figure 1)
c) Alternative reservoir 3 - a new site on Transnet National Ports Authority land to the west of the Quay (see Figure 1).

2 The study approach

Much of the information that has informed this study is derived from the substantial body of data that has been collected for the proposed iron ore terminal expansion project, the physical scope of which incorporates all three alternative RO plant sites.

2.1 Information base

The information used to inform this study comes from a variety of sources. This has involved a review of literature of recent heritage related projects in the area, as well as drawing on the author's own personal experience. Tim Hart and members of his office (ACO) have been involved with work at Hoedjiespunt, Langebaanweg Fossil Park, Spreeuwalle as well as numerous smaller projects in the Langebaan area. In terms of maritime heritage, the South African Heritage Resources Agency (SAHRA) database of maritime heritage has been scrutinized and maritime archaeologists at both the National Maritime Survey and Iziko Museum consulted. Ms Pippa Haarhof (West Coast Fossil Park paleontologist) and Professor John Rogers (UCT Marine Geo-science) has provided information about the palaeontological sensitivity of the site. Reliable published sources with respect to maritime heritage have proved to be very scarce (there are no accounts of any Dutch East India Company ships being wrecked in the study area), however the recent comprehensive geo-physical

survey of the study area, completed as part of the phase 2 expansion EIA of the Iron Ore Handling Facility, is informative.

Further information about physical setting and context has been obtained by a site visit to the proposed alternatives. The area where site alternative 1 is situated was physically ground truthed by the ACO in early 2007.

2.2 Assumptions

The kinds of heritage resources assessed during this study are those defined as generally or specifically protected by the National Heritage Resources Act of 2000.

2.3 Limitations

Assessment of archaeological and palaeontological heritage is based on the data derived from previous excavations at Spreeuwalle and the palaeontological study for the Phase 2 Iron Ore Handling Facility. No trial excavations were conducted, although previously existing quarries and borrow pits in the dune area were inspected.

2.4 Methodology

A detailed literature review was used to establish the kinds of heritage material that could be affected by the proposed activities. This was followed up by ground-proofing of undisturbed land that would be affected. This, as standard practice, involves recording of any heritage material, establishing position using a hand-held GPS receiver. The area known as “the dunes” was searched by Tim Hart and Erin Finnegan while much of the maritime background was researched by Liesbet Schietecatte, National Maritime Archaeological Survey, SAHRA. Information with respect to the below surface extent of fossiliferous deposits was obtained from Graham Avery (Iziko Museums), Pippa Haarhoff (Langebaanweg Fossil Park) and Prof John Rogers (Department of Marine Geoscience, UCT).

3 Description of the study area, context and setting

Saldanha Bay is a large sheltered anchorage on the West Coast of South Africa some 120 km north of Cape Town. The southern and south western portion of the bay (Posberg Pensinsula) takes the form of a shallow Lagoon which is presently conserved within the West Coast National Park. The northern portion of the bay (Hoedjies Bay) now falls within the Port of Saldanha – a deep water harbour, industrial area and the port town of Saldanha Bay. On the eastern shore lies the resort town of Langebaan - a popular weekend holiday town for Capetonians. Until the construction of the R27 provincial road in the 1970s, the bay was a relatively isolated area only accessible by road via a long and tedious drive from Cape Town via the towns of Malmesbury and Darling. The construction of the road and establishment of the deep water harbour have seen massive development take place. Langebaan has transformed from a sleepy coastal village to a development *mecca* complete with yacht harbour, resorts, casino and supermarkets. Similarly the Port of Saldanha has grown

significantly absorbing much of what was until recently a bleak and deserted stretch of shoreline along the northern edge of the Bay. Despite the rampant development, there are still areas that retain the sense of wilderness that until recently characterized the area. Along the Eastern side of the bay (Spreeuwalle shoreline) are semi-stabilised dunes, large tracts of Strandveld vegetation punctuated by granite outcrops which are a characteristic of this area.

Within the last 30 years, Saldanha Bay has been transformed from a minor fishing port into a significant center of heavy industry within the Western Cape. Since the construction of the bulk terminal and dredging of the bay to accommodate large bulk carriers in the 1970's, several other companies have developed large operations in the area, namely the Saldanha Steel smelter, and the Namakwa Sands Smelter which both use the Port of Saldanha's general cargo facilities. Thus, within a relatively short period of time the northern edge of the bay has been transformed from windswept wilderness into a near- industrial landscape. The iron ore handling terminal has established itself as a dominant and overwhelming landmark. The proposed activity will take place on one of the three identified sites that lie within the ore handling facility.

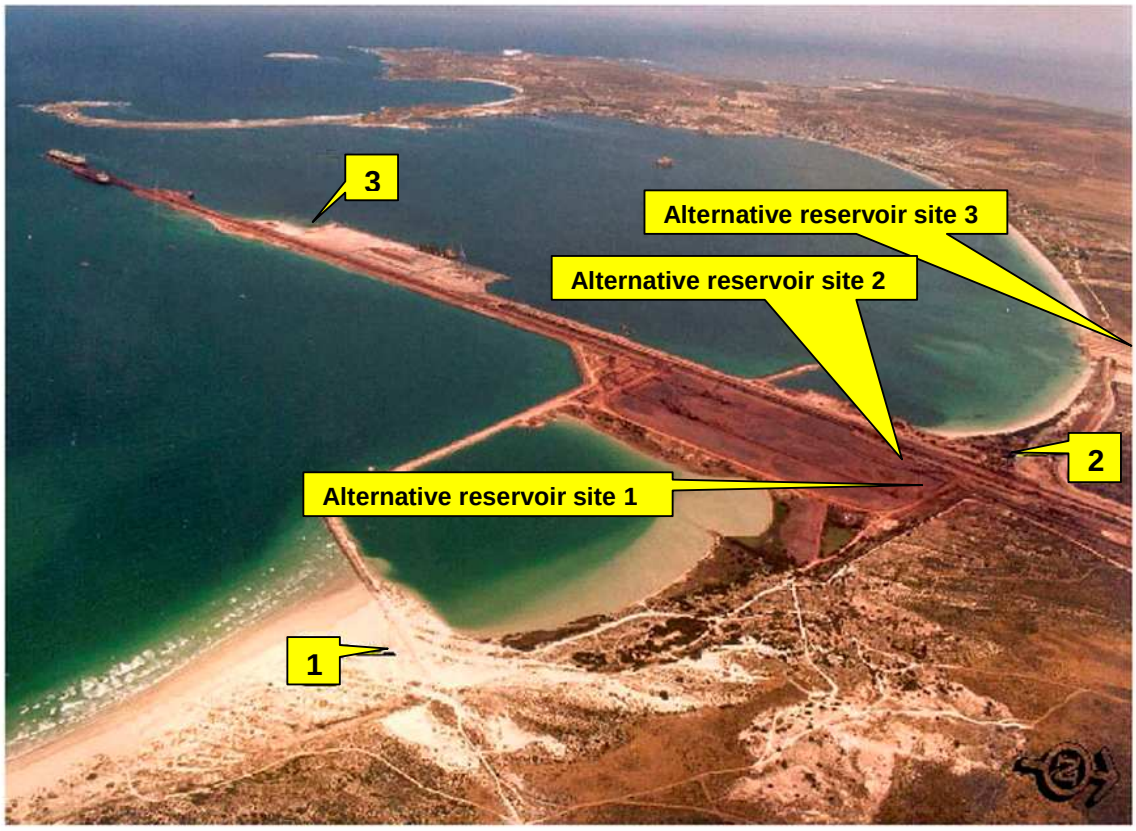

Figure 1 The proposed RO plant site alternatives 1-3, existing and alternative reservoir sites (PDNA SRK TRANSNET SRK Project 364470/42G Background Information Document 2007)

3.1 Heritage context and identification of heritage resources

In recent years the area has become famous for its fossil wealth – just inland of Langebaan is the largest Miocene (5-6 million years old) Fossil deposit in the world, parts of which are on display at Langebaanweg

Fossil Park. This material was deposited in sandbar sediments at the mouth of the proto-Berg River (an ancient river and estuary that was the precursor to the Berg River), the course of which changed over the millennia in response to sea level changes. Close to Hopefield, further inland, are the Pleistocene fossil beds at Elandsfontein (last million years) famous for the discovery of the early human species *Homo ergaster* (Saldanha man). On the edges of the lagoon Dr Dave Roberts and Dr Lee Berger discovered the 200 000 year old footprints of an early modern human fossilized in calcrete sediments. At Hoedjiespunt Prof. John Parkington has excavated on the site of an ancient hyena lair where skull fragments and teeth of an early human were found showing that parts of the body of this unfortunate person were consumed by hyenas more than 300 years ago. Nearby, fossilized within the calcretes and aeoleanites are shell fish, animal bone, ashy hearths of people who lived in the area more than 100 000 years ago. A further find at Spreeuwalle between Paradise Beach and the ore terminal has been investigated by Dr Graham Avery and Mr Dave Halkett, but unfortunately most of the material lies below sea level as the site dates to a time when sea levels were lower than that of today. A plethora of Late Stone Age sites dating to within the last 5000 years has been excavated on Club Mykonos and surrounding land firmly demonstrating the hunter gatherers, and later Khoekhoen pastoralists where camping on those parts of the bay where there were rocky shorelines that could provide them with shellfish and other marine foods. Thus it can be seen, like most places in South Africa, Saldanha Bay has a past which spans millions of years.

Since its discovery Saldanha Bay (named after Antonio de Saldanha who visited the Cape in the early 1500's) was used as a safe anchorage by virtually every sea going nation who had trading interests in the east. It was never permanently settled in any meaningful way until quite late in the history of the Cape. The Dutch East India Company VOC *(Vereenigde Oostindische Compagnie)* chose Table Bay as their favoured location to establish a permanent re-victualing station even though the anchorage of Table Bay was far inferior and much more dangerous than that of Saldanha. The reason for this is that Table Bay had permanent water, arable land, supplies of wood and was generally well suited to land based settlement (The lack of water at Saldanha impeded its development until a permanent water supply was constructed by the military engineers at the beginning of World War 2). Being anxious to maintain a presence at Saldanha Bay, the VOC established a small garrison on the Posberg Peninsula in 1666. The handful of men equipped with one or two small cannons kept a watch on shipping as the French who were frequently at war with the Dutch used the bay with alacrity, even invading the tiny Dutch garrison. Being many days journey from Cape Town the tiny Dutch garrison was plagued with difficulties. At times the local Cochoqua were in conflict with the VOC forcing the abandonment of the garrison between 1673 and 1677. The bay remained in Dutch hands until the first British occupation of 1795. Development of the area was restricted to sparse farms and fishing which was centered at the small hamlet of Hoedjiesbaai. Strategically, being an undefended bay, Dutch shipping was trapped and taken by British forces on at least three separate occasions between 1781 and 1806. Without adequate defenses, Saldanha Bay became a trap rather than a safe anchorage in times of conflict – a factor which further inhibited its development. In 1820 a group of Irish settlers landed at Saldanha Bay and lived there for a period of time before moving inland where they established the town of Clanwilliam in the Olifants River Valley where they were allocated land. In the early 20th century whale fisheries were established at Donkergat and Salamander Bay which saw increased growth of the hamlet with the installation of jetties and coaling facilities. By the late 1930's the whaling industry had collapsed. Several ex-whale catchers were converted for military service and

served with distinction through World War 2; others were scuttled at Salamander Bay and Donkergat. A number of hulks were removed by the South African Navy in 1982 and dumped in deeper water off-shore.

In 1942 Saldanha Bay became a defended anchorage with boom defenses, a mine field and batteries on each side of the entrance to the bay. The bay itself was extensively used by convoys and warships alike. A permanent naval base was established and the area's water problems were at last resolved when military engineers established a water supply which was piped from the Berg River. The strategic importance of Saldanha Bay continues to grow with its status as the Cape's only deep sea Port.

In short, the heritage of the area is diverse and ancient including both land and marine components. Those elements of the cultural historical landscape identified above which could be potentially affected by the proposed development are the palaeontological and geological formations relating to the ancient Berg River, the coastal dune cordon which may contain pre-colonial heritage and possibly the maritime archaeology of the bay. The proposed activity is too small to be considered to constitute any possible impact and cultural landscape.

3.2 Comparative description of environment and heritage affected by proposed activities

Alternative site 1. This site lies in an area of land that was heavily disturbed by the building of the existing reclamation dam. The seaward edge of the dunes is also heavily disturbed by past earthmoving as far as the stock yard. There is an existing access track through the dunes to the site as well as potential access from the stock yard over the disturbed land on the edge of the reclamation dam. Intake beach wells or an intake pipe line are proposed to be constructed into the sands of the beach immediately to the east for options A to C. These are expected to be about 10 m deep. Fossililiferous sediments potentially exist at 15 – 25 m below sea level. No maritime archaeology exists in the immediate area. The heritage context of the site is adjacent to a visually significant recent industrial enterprise.

Alternative site 2. This site is a scruffy patch of land used for the *ad hoc* storage of rubble and stockpiles of building materials. Beach wells may be used for intake (option A) with pipeline outfall while option B proposes both intake and brine discharge taking place via pipelines directly in to the sea. The is no known maritime heritage in the area, while the action of sinking beach wells is considered far too minor to constitute any significant impact in the largely recently accumulated beach sediments.

Alternative site 3. The proposed site is on reclaimed land at the edge of the multipurpose terminal, being part of the larger quay. No intervention in any natural sediments or landscape is envisaged. While there are engineering options for the construction of intake wells along the quay adjacent to the Stockpile Yard or Multipurpose Terminal, the entire area is recently reclaimed and is of no heritage significance. No maritime archaeology exists in the immediate area, the activity takes place within an existing industrial environment.

Reservoir

All 3 proposed reservoir sites (the existing site and the 2 alternative sites) lie in largely disturbed areas of land. Similarly the pipeline servitudes pass through disturbed environments within the envelope of the Iron Ore Handling Facility.

Existing reservoir site; expansion of the existing site will require some cutting into the dune body, however indications are that this action is unlikely to impact any heritage (area has been recently surveyed – Hart in prep). The associated pipelines and access road are in highly disturbed areas.

Alternative reservoir site 2 is located on the edge of the existing stockpile area close to the conveyor system. This is site lies in the heart of the industrial landscape on land which is reclaimed from the sea. No impacts will take place.

Alternative reservoir site 3 is situated close to an old borrow pit on Transnet National Ports Authority land. Being a largely surface construction it will not impact any buried fossil shell deposits. The area has had surface disturbance and is archaeologically insensitive. The proposed pipeline servitude follows alongside an existing road and railway line which is also highly disturbed. Again, the setting and context is industrial dominated – the proposed activity will not constitute a landscape impact.

4 Findings

4.1 Maritime heritage

No shipwreck material has been identified close to any of the three alternatives (extensive investigations have already been completed for the ore handling facility expansion project).

The chances of impacts to marine fossil bearing sediments during construction of beach wells and pipelines is very low due to the comparatively shallow depths and the small amount of disturbance created by this activity.

4.2 Land based heritage

No land based archaeological or palaeontological material will be impacted. Site 1 is already highly disturbed, sites 2 and 3 are on reclaimed land.

4.3 Built environment and other generally protected heritage

No protected structures were identified in the study area. No graves were identified.

The comparatively small RO plant building and infrastructures is insignificant in bulk and massing when compared with massive industrial milieu which characterises the area.

5 Assessment of impacts

5.1 The ways in which heritage can be impacted

Destruction of tangible heritage inevitably takes place during the construction process of development activities rather than during the operational phases as the main source of impact normally is due to the disturbance of undisturbed ground or landscape and/or demolition of structures and places protected by the National Heritage Resources Act 25 of 1999. Invariably the kinds of impacts resulting are irreversible and of permanent duration. Cultural landscapes are highly sensitive to accumulative impacts and large scale development activities that change the character and public memory of a place, however this issue is greatly reduced in low bulk development such as the proposed activity.

Archaeological sites (including shipwrecks), as well as fossil deposits and graves are highly fragile and context sensitive, which means that their value is very easily destroyed when the landscape in which they are situated is disturbed by bulk excavation, or installation of services. Mitigation can be achieved through scientific recording, sampling or excavation - however these are also destructive processes. In general, full rectification of heritage impacts is not normally possible in the case of archaeology and paleontology, but is possible to a degree in the context of built environment where restoration and reconstruction can be achieved (but with loss of authenticity). Generally, the best way to avoid impacts is to identify potential sensitivities first, then to take pro-active measures to avoid impacting the resource and ensure conservation thereafter.

5.2 Impacts caused by the proposed activity for each alternative

Alternative site 1: Overall impacts to heritage are considered to be extremely low. There is a very small chance that Pleistocene fossil bearing sediments may be impacted by the beach wells, however given the very small scale of the proposed activity, the impact will be of very low significance. There are no significant accumulative impacts.

***Mitigation*:** If engineering options involving beach wells are selected, the drilling contractors should report the discovery of any fossil shell/bone to a qualified palaeontologist as this information could contribute to the body of scientific knowledge about the geological history of the bay which may be considered a positive impact.. Similarly drilling cores should be retained for inspection by a palaeontologist (if need be). It is not expected that an inspection plan will be of benefit during well sinking if site 1 is selected as visibility of the well profiles will be very restricted.

Table 1. Alternative 1

Alternative 1	***Extent***	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
With mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Possible	Very low	Positive	Medium
Without mitigation	Local 1	Very Low 1	Long term 3	Low 5	Possible	Low	Negative	Medium

Alternative 2 There are no identified heritage impacts. There are no accumulative impacts.

Table 2. Alternative 2

Alternative 2	***Extent***	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
With mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High
Without mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High

Alternative 3 There are no identified heritage impacts. There are no accumulative impacts.

Table 3. Alternative 3

Alternative 3	***Extent***	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
With mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High
Without mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High

5.2.1 Ranking of alternatives

Most favoured: Alternatives sites 2 and 3 are expected to have no significant impacts in heritage terms,

Least favoured: Alternative site 1 is marginally less favoured in that there is a *slight* chance that impacts of low consequence may result if fossil bearing sediments are penetrated during well construction.

5.2.2 Reservoir

Neither the existing reservoir site or the alternative reservoir sites are expected to result in any heritage impacts. Both areas are disturbed as are the proposed servitudes for pipelines and access.

Table 4 Proposed reservoir (existing and alternative options)

Reservoir	***Extent***	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
With mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High
Without mitigation	Local 1	Very low 0	Long term 3	Very Low 4	Improbable	Insignificant	Neutral	High

5.3 The no-go alternative

The impacts that will be caused by the proposed activity (all three reservoir alternatives) are of such low consequence that they are similar to the no-go alternative – the status quo will be maintained.

6 Conclusion

Overall the proposed activity is considered inconsequential in heritage terms. The addition of yet another minor industrial building, servitudes and associated infrastructure to the massive bulk of what already exists on the ore handling terminal site is an insignificant landscape change with respect to any of the three site alternatives and their intake and outlet options or the proposed reservoir (s). There is a slight chance of an impact of very low

consequence at site 1 if beach well construction impacts fossil bearing sediments. This however could be a positive impact provided that a sample of drill cores is kept and a qualified palaeontologist be notified in the event of an impact.

7 Recommendations

The proposed activity is supported on sites 2 and 3 without need for mitigation. The proposed activity is supported on site 1 provided that very minor mitigation measures are followed:

- Retain a sample of representative drill cores from the geotechnical study for palaeontological examination. These may supplement the broader study which is in progress with respect to the palaeontological scientific study of a wider series of geological cores extracted from the bay seabed for the proposed Iron Ore Handling Facility expansion.
- There are no requirements for the reservoir sites or RO plant sites 2 and 3.

References

Dickason, G.B. 1973. Irish settlers to the Cape: history of the Clanwilliam 1820 settlers from Cork Harbour. Cape Town: A.A. Balkema.

Hart, T.J.G. & Jerardino, A.M. 1998. Phase 2 archaeological sampling of Late Stone Age archaeological sites at Paradise Beach, Club Mykonos. Unpublished report prepared for CML Developers. ACO. UCT.

Hart, T.J. G and Gribble J. 1998. Phase 2 archaeological sampling of Late Stone Age middens, Leentjiesklip 2, Langebaan. Unpublished report prepared for Langebaan Waterfront Pty Ltd. ACO. UCT.

Hendey Q.B. 1982 Langebaanweg, a record of past life. Cape Town: South African Museum.

Parkington, JE. Poggenpoel, C. Halkett, D. & Hart, T.2004 Initial observations from the Middle Stone Age Coastal settlement in the Western Cape In Conard, N. Eds. Settlement dynamics of the Middle Paleolithic and Middle Stone Age. Tubingen: Kerns Verlag.

Parkington, J.E. and Poggenpoel, C.E. 1987 Phase 1 archaeological assessment of Club Mykonos, Langeebaan. Unpublished report prepared for Club Mykonos, Langebaan.

Parkington J.E., Poggenpoel, C.E. and Hart, T.J.G 1988, Report on the first phase of excavations at Lynch Point, Langebaan. Unpublished report repared for Club Mykonos, Langebaan.

PDNA SRK TRANSNET SRK Project 364470/42G Background Information Document 2007

Schire, C., Cruz-Uribe, K. & Klose, J. 1993. The site history of the historical site at Oudepost I, Cape. *South African Archaeological Society Goodwin Series* **7**:21-32.

Militaria. 1993 SA Navy Anniversary Issue 22/1

Miller, WR, Ramsay PJ and MacHutchon, MR 2006 Marine geophysical survey of an area adjacent to the iron ore jetty, Port of Saldanha. Protekon (Pty) Ltd : Unpublished report.

Navy news. 1983 Deel 11 No 5 1983

Van der Waag, Ian. *2005* A brief military history of the Saldanha Bay. Military History Department, University of Stellenbosch. Area http://academic.sun.ac.za/mil/mil_history/saldanha.htm

Van Rooyen, D., Gertenbach JJ 2007 Draft Factual Geotechnical Report, Expansion to the Port of Saldanha. Geotechnical Services: Unpublished report.

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Consultation with Jaco Boshoff, Maritime archaeologist, Iziko Museums of Cape Town.

Consultation with Pippa Harhoff, West Coast Fossil Park

Consultation with Dr Antonietta Jerardino, SAHRA