

**PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT
ELANDS BAY TO LAMBERTS BAY ROAD UPGRADE
THE PROPOSED NORTHERN SECTION ALTERNATIVES**

Prepared for

ENVIRONMENTAL PLANNING AND RESOURCE MANAGEMENT SERVICES

By

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Executive summary

Environmental Planning and Resource Management Services requested that the Agency for Cultural Resource Management (ACRM) undertake an Archaeological Impact Assessment of the proposed upgrading of the Elands Bay to Lamberts Bay road.

Jeffares & Green Consulting Engineers have prepared 11 alternative Northern Section routes that are considered as part of the screening process for the proposed project.

There are ultimately three alternatives within the Northern Section route which were considered; namely:

- The Ores Corridor - West of the railway line (Alternatives 1a-e)
- The Ores Corridor – East of the railway line (Alternatives 2a-d)
- Coastal Road (Alternatives 3a-b)

In October 2002, ACRM undertook a baseline archaeological study of the Southern Section Alternatives of the proposed Ores Road upgrade, from Elands Bay till the intersection with the Lamberts Bay - Paleisheuwel Roads (the MR538). The report is attached as Appendix 1.

The baseline archaeological study of the proposed Elands Bay to Lamberts Bay Road Upgrade (i.e. the proposed Northern Section Alternatives) has identified potentially significant impacts to pre-colonial archaeological material that will need to be either mitigated or managed prior to development activities.

The following findings were made:

The Ores Corridor - West of the railway line

Alternative 1a: No archaeological heritage remains were located.

Alternative 1b: Potentially significant archaeological heritage remains were located in the proposed New Gravel Link at Grootrif.

Alternative 1c: No archaeological heritage remains were located.

Alternative 1d: No archaeological heritage remains were located.

Alternative 1e: Potentially significant archaeological heritage remains were located in the proposed New Gravel Link(s) at Muisbosskerm, Albanie and Steenbokfontein. Archaeological heritage remains were also recorded alongside the MR538 near the entrance to the Lamberts Bay Township (New Surface Road).

Recommended actions for mitigating impacts include archaeological shovel testing in the proposed New Gravel Link(s) at Grootrif (Alternative 1b), Muisbosskerm, Albanie and Steenbokfontein (Alternative 1e) and near the entrance to the Lamberts Bay Township (Alternative 1e), in order to determine the significance of archaeological deposits.

The Orex Corridor – East of the railway line

Alternative 2a: No archaeological heritage remains were located.

Alternative 2b: No archaeological heritage remains were located.

Alternative 2c: No archaeological heritage remains were located.

Alternative 2d: No archaeological heritage remains were located.

No mitigation action is required.

Coastal Road (Alternatives 3a-b)

Construction of the current Coastal Road (MR538) and associated activities has impacted negatively on a number of well-known archaeological sites, at Grootrif, Steenbokfontein and Malkoppan, for example. Overall archaeological visibility in the Coastal Road is very high. Almost all the raised ground on the foredunes to the west of the Lamberts Bay road is covered with a scatter of archaeological material.

The current road also impacted on an unknown number of farm labourer graves on Steenbokfontein farm. Several graves still occur among the foredunes west of the road.

Although archaeological deposits at Grootrif, Steenbokfontein and Malkoppan have been sampled and dated, the proposed upgrading of the Coastal Road (Alternatives 3a-b) is likely to further impact negatively on these sites, as well as on extensive archaeological remains that occur in the road reserve between Grootrif and Lamberts Bay.

Human burials may also be exposed or uncovered during bulk earthworks and excavations.

Recommended actions for mitigating impacts in the Coastal Road (Alternatives 3a-b) include selected shovel testing of shell midden remains in the road reserve between Grootrif and Lamberts bay, in order to determine the significance of archaeological deposits.

Additional sampling of known shell middens at Grootrif, Steenbokfontein and Malkoppan is also recommended, should these be impacted further by the proposed road upgrade.

Monitoring of bulk earthworks and excavations during the construction phase of the proposed project is also required.

Farm labourer graves on the foredunes west of the Coastal Road must be identified, and ownership and identity of the graves established.

Increased physical and human pressures (i.e. secondary and long-term cumulative impacts) that is often associated with such developments, will also very likely impact negatively on fragile archaeological remains in the sensitive shoreline area.

The required Environmental Management Plan (EMP) for the proposed project must therefore include measures in order to manage increased pedestrian and vehicle access to the beach so as to minimise the impact on archaeological sites/remains.

1. INTRODUCTION

1.1 Background and brief

Environmental Planning and Resource Management Services requested that the Agency for Cultural Resource Management (ACRM) undertake a Phase 1 Archaeological Impact Assessment (AIA) of the proposed upgrading of the Elands Bay to Lamberts Bay road.

The aim of the study is to locate and map archaeological heritage remains that may be negatively impacted by the planning, construction and implementation of the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate against the impacts.

Jeffares & Green, as consulting road engineers, have prepared 11 alternative Northern Section routes that are considered as part of the screening process for the proposed project.

There are ultimately three alternatives within the Northern Section Route which need to be considered, namely:

- The Orex corridor - West of the railway line (Alternatives 1a-e)
- The Orex corridor – East of the railway line (Alternatives 2a-d)
- Coastal Road (Alternatives 3a-b)

In October 2002, ACRM undertook a Phase 1 baseline AIA of the Southern Section Alternatives of the proposed Orex Road upgrade, from Elands Bay till the intersection with the Lamberts Bay - Paleisheuwel Roads (the MR538), a distance of approximately 15 kms (Thomas 2001; Kaplan 2002). The report is attached as Appendix 1. Comments related to the report have been received from Heritage Western Cape, the delegated provincial heritage authority¹.

2. TERMS OF REFERENCE

The terms of reference for the archaeological study were:

1. to identify issues, constraints, opportunities or sensitive areas for each of the proposed routes;
2. to motivate from an archaeological perspective those routes that should not be considered due to the environmental impacts should they be developed, and to identify 'no-go' options;
3. to motivate from an archaeological perspective those routes that should be considered due to the limited environmental impact should they be developed, and
4. to present mitigating measures for each of the preferred routes to be included in the required Environmental Impact Report (EMP).

¹ Heritage Western Cape Letter dated 17 March 2004. HWC Ref No. C13/3/6/2/1/1/1/1C2.

3. APPROACH TO DOCUMENTING ARCHAEOLOGICAL SITES IN THE STUDY AREA

3.1 Assumptions

Since the receiving environment (i.e. Lamberts Bay) is located within a known archaeologically sensitive area (Kaplan 1993), the assessment assumes that:

- damage to heritage resources potentially will occur in the course of the proposed project; and thus that
- effective long-term management and mitigation must occur before the project is allowed to proceed.

3.2 Method

The approach used in the archaeological study entailed a foot survey of the 11 alternative Northern Section routes.

The specialist also consulted with archaeologists Mr Tim Hart from the Archaeology Contracts Office at the University of Cape Town, Mr Royden Yates from Iziko:South Africa Museum, and Dr Antoinette Jerardino, Senior Heritage Officer (Archaeologist) with Heritage Western Cape, who have worked extensively in the study area.

A desktop study was also undertaken.

4. THE STUDY AREA

The Elands Bay - Lamberts Bay region has been researched by archaeologists for nearly three decades. Studies have shown that people have occupied the west coast for at least a million years. Later Stone Age ²(LSA) people were attracted to the rocky coastline, which provided a predictable marine food supply. As a result of this, the existing Holocene coastline (i.e. the last 5000 years) is exceptionally rich in archaeological sites, especially shell middens (Kaplan 1993; Parkington et al 1988; Jerardino 1996), Research in the Lamberts Bay/Elands Bay area has involved sampling large shell middens (known as megamiddens). Most of these sites have been dated between 2-3000 years, but dates from Malkoppan indicate that some of these sites are at least older than 4000 years (Buchanan et al 1984; Jerardino 1994, 1996).

Archaeological sites are an important cultural resource because they contain information about the history of indigenous people. The destruction and disturbance of archaeological sites results in a loss of information about the pre-colonial past, which can never be recovered.

² A term referring to the last 20 000 years of precolonial history in southern Africa.

5. CONSTRAINTS AND LIMITATIONS

The assessment was partially constrained by thick vegetation cover in some sections of the proposed route(s) east of the Coastal Road, resulting in low archaeological visibility.

6. OPPORTUNITIES

Large numbers of archaeological sites in the study area have already been damaged and archaeological deposits destroyed, as a result of the construction of the Coastal Road (MR538). Currently, negative impacts on archaeological sites include the illegal use of 4 x 4 vehicles on the dunes, illegal mining of shellfish remains (personnel observation) and the use of informal parking areas alongside the coastal road at Grootrif (which are essentially large shell middens), for example .

The proposed project therefore presents potential opportunities for conducting further archaeological research into the pre-colonial history, settlement and subsistence of the area. The Lamberts Bay shoreline was clearly a region of intense prehistoric human activity during the last 5000 years, and has been the focus of sustained research over a number of years (Buchanan 1984; Jerardino 1996).

Other potential opportunities that the proposed project presents are the development of cultural resources as possible tourist attractions. The development of archaeological sites to be opened to the public is, however, subject to the implementation of a Heritage Management Plan (HMP), as required in terms of Section 47 (3) of the National Heritage Resources Act (No 25 of 1999).

7. IDENTIFICATION OF RISK SOURCES

The following project actions may likely impact negatively on archaeological sites. The actions are most likely to occur during the construction phase of the proposed project.

- Vegetation clearing operations may expose shell middens.
- Earthworks and excavations may expose or uncover buried shell middens and human burials. Parkington *et al* (1992) has shown that archaeological sites aligned behind the fossil dunes at Elands Bay, for example, are covered by up to 2 m of aeolian sands totally without archaeological content.
- Excavations for borrow pits may also expose or uncover archaeological remains, including human burials/burial remains.

8. LEGISLATIVE REQUIREMENTS

8.1 The National Heritage Resources Act (Act No. 25 of 1999)

The construction of a road, wall, powerline, pipeline, canal, or other similar form of linear development or barrier exceeding 300 m in length, requires an archaeological impact assessment in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999).

8.1.1 Archaeology (Section 35 (4))

No person may, without a permit issued by the responsible heritage resources authority, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object.

8.1.2 Burial grounds and graves (Section 36 (3))

No person may, without a permit issued by SAHRA or a provincial heritage authority, destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

9. MPACT ASSESSMENT AND DESCRIPTION

The archaeological sites were recorded and given a co-ordinate using a Garmin Gecko 201 GPS set on map datum WGS 84.

9.1 The Orex Corridor - West of the railway line

9.1.1 Alternative 1 (a) (Figure 1)

No archaeological heritage remains were located. It is interesting to note that no archaeological remains were located during an assessment of a proposed borrow pit near Wagendrift alongside the MR538 (Orton & Hart 2003).

9.1.2 Alternative 1(b) (Figure 2)

GD1 (GPS reading S 32°10 516 E 18°18 785)

A small scatter of shellfish occurs in the road reserve alongside the MR538 in the proposed New Gravel Link opposite the Grootdrif reefs (Figure 3). The shellfish remains are dominated by Black Mussel (*Choromytilus meridionalis*), with small amounts of limpets (genus *Patella*) occurring. No cultural remains were noted. Scattered fragments of Black Mussel were also noted in the Gravel Link, in open spaces surrounded by thick vegetation, about 75 m east of the MR538.

9.1.3 Alternative 1(c) (Figure 4)

No archaeological heritage remains were located.

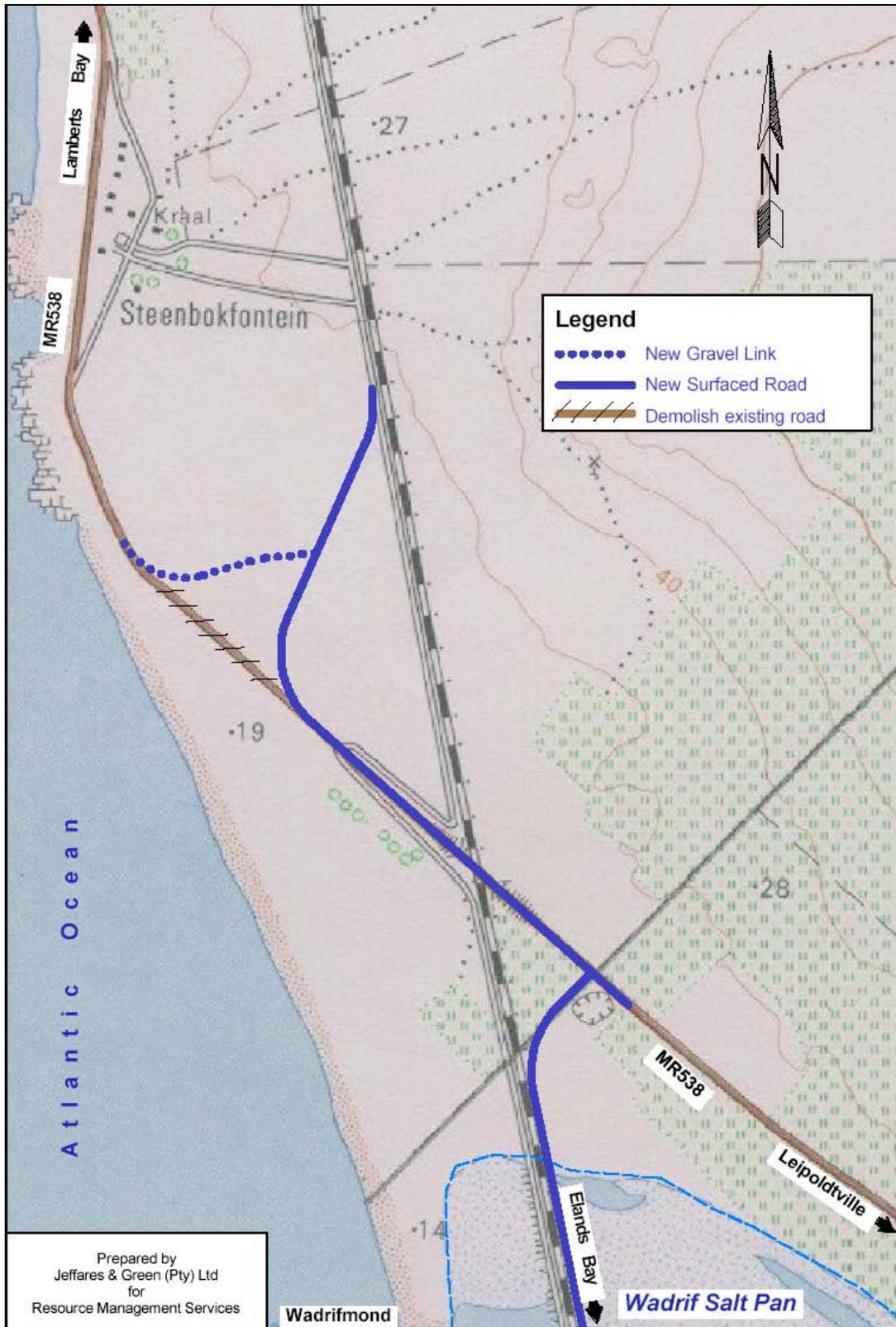


Figure 1. Alternative 1a.

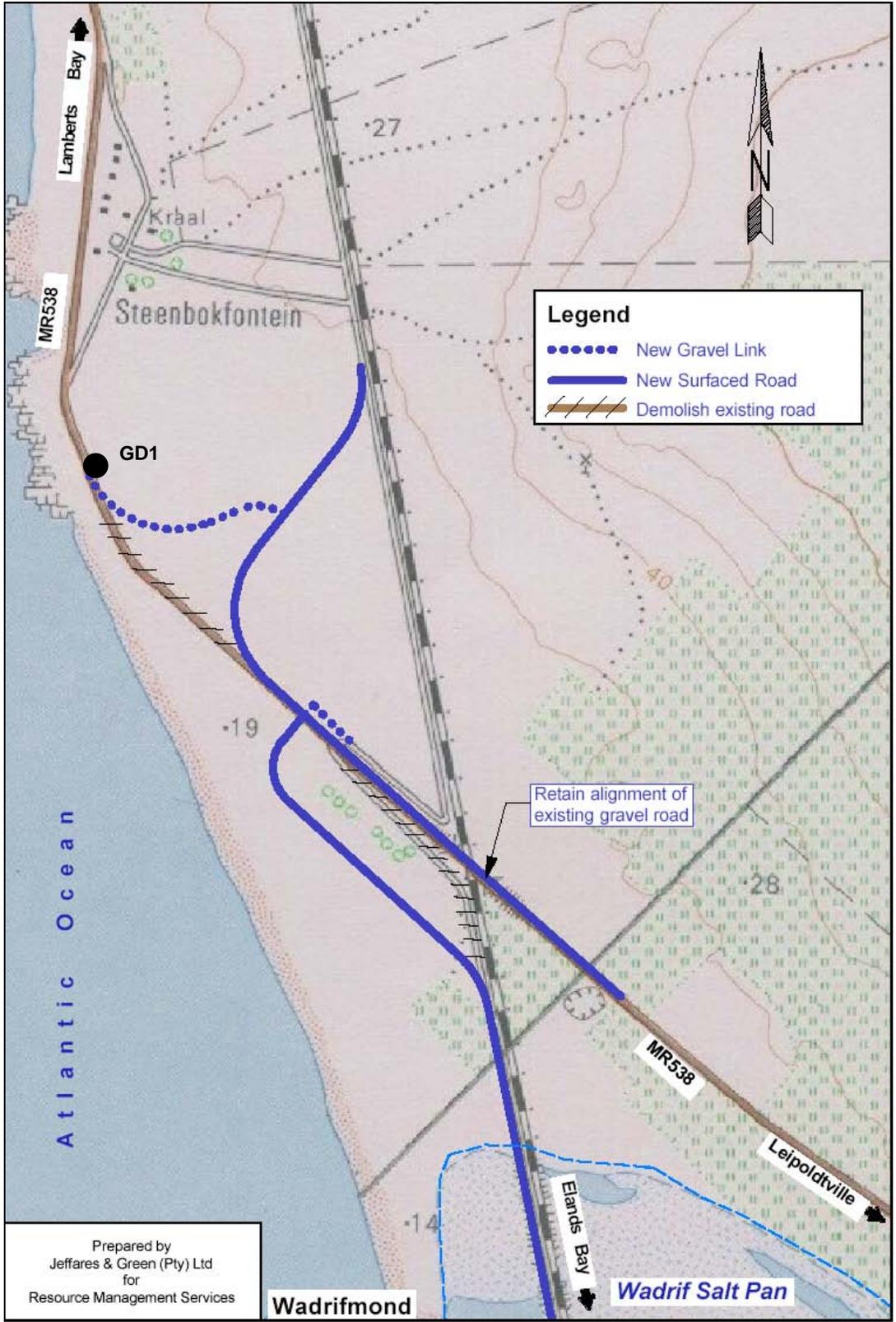


Figure 2. Alternative 1b.



Figure 3. GD1. Scattered shellfish remains in the proposed Grootrif Gravel Link (Alternative 1b).

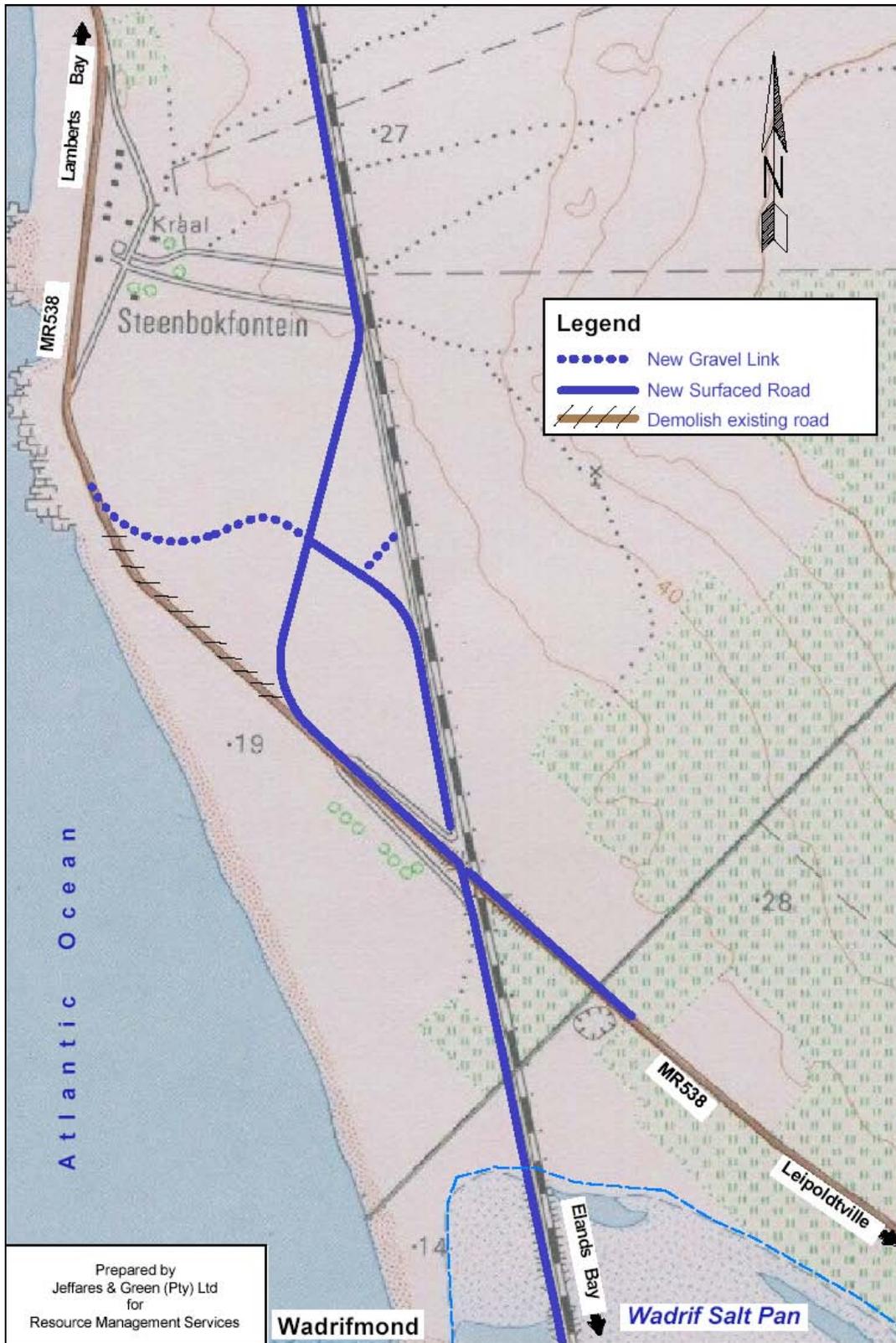


Figure 4. Alternative 1c.

9.1.4 Alternative 1(d) (Figure 5)

No archaeological heritage remains were located.

9.1.5 Alternative 1(e) (Figure 6)

- Steenbokfontein Gravel Link

STB1 (GPS reading S 32° 10 186 E 18° 18 859)

A relatively large scatter of shellfish remains occurs in an open area close to the family cemetery on the farm Steenbokfontein (Figure 7). The site is severely disturbed and degraded. Two quartz stone flakes, one silcrete chunk, and one piece of burnished pottery were found. Higher frequencies of shellfish were also noted among the thick bush immediately east of the Coastal Road (MR538) as well as in the road reserve. Black Mussel dominate the shellfish remains on this site, with smaller amounts of limpets (genus Patella) also occurring. Shellfish remains are also associated with extensive dune mole rat activity in the area surrounding the cemetery, suggesting that below ground archaeological deposits also occur.

- Albanie Gravel Link

ALB1 (GPS reading S 32° 09 382 E 18° 18 889)

Thin patches of shellfish remains occur in an area measuring about 25 m x 25 m in extent, on a raised vegetated dune crest about 175 m east of the Albanie farmhouse, and about 10-15 m north of a small concrete dam (Figure 8). Limpets (genus Patella) appear to dominate the shellfish remains, with relatively high frequencies of Black Mussel also occurring. Some whelk was also noted. One silcrete adze, one quartz crystal awl, one silcrete core and flake, three quartzite flakes, three quartz flakes, and two quartz chunks were also found on this relatively undisturbed site.

- Grootvlei Gravel Link

GV1 (GPS reading S 32° 08 861 E 18°18 609)

GV2 (GPS reading S 32° 08 876 E 18° 18 691)

Patches of shellfish remains occur in a severely disturbed context in degraded fields either side of the Grootvlei farm building, about 30-40 m east of the Coastal Road. Limpets (genus Patella) dominate the shellfish remains, with some Black Mussel and whelk also occurring. One silcrete core, one quartz flake, one quartz chunk and one piece of ostrich eggshell were noted. Large amounts of domestic debris such as glass, metal bits, and plastic, litters the site. Dumping is also evident. Dune mole rat burrowing is extensive across the area. No shellfish remains were associated with the dune mole rat burrows, suggesting that most of the archaeological remains are confined to the surface.

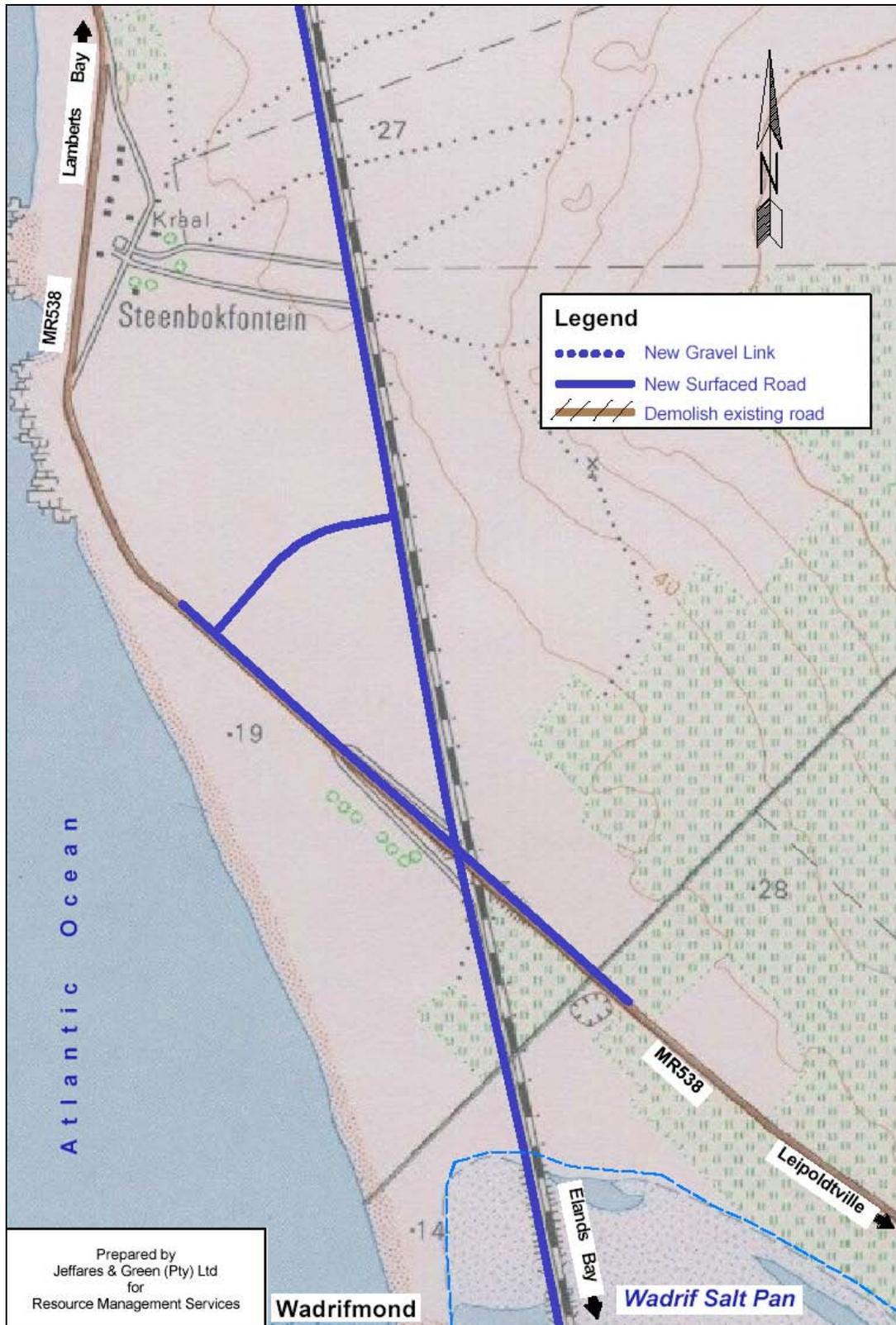


Figure 5. Alternative 1d.

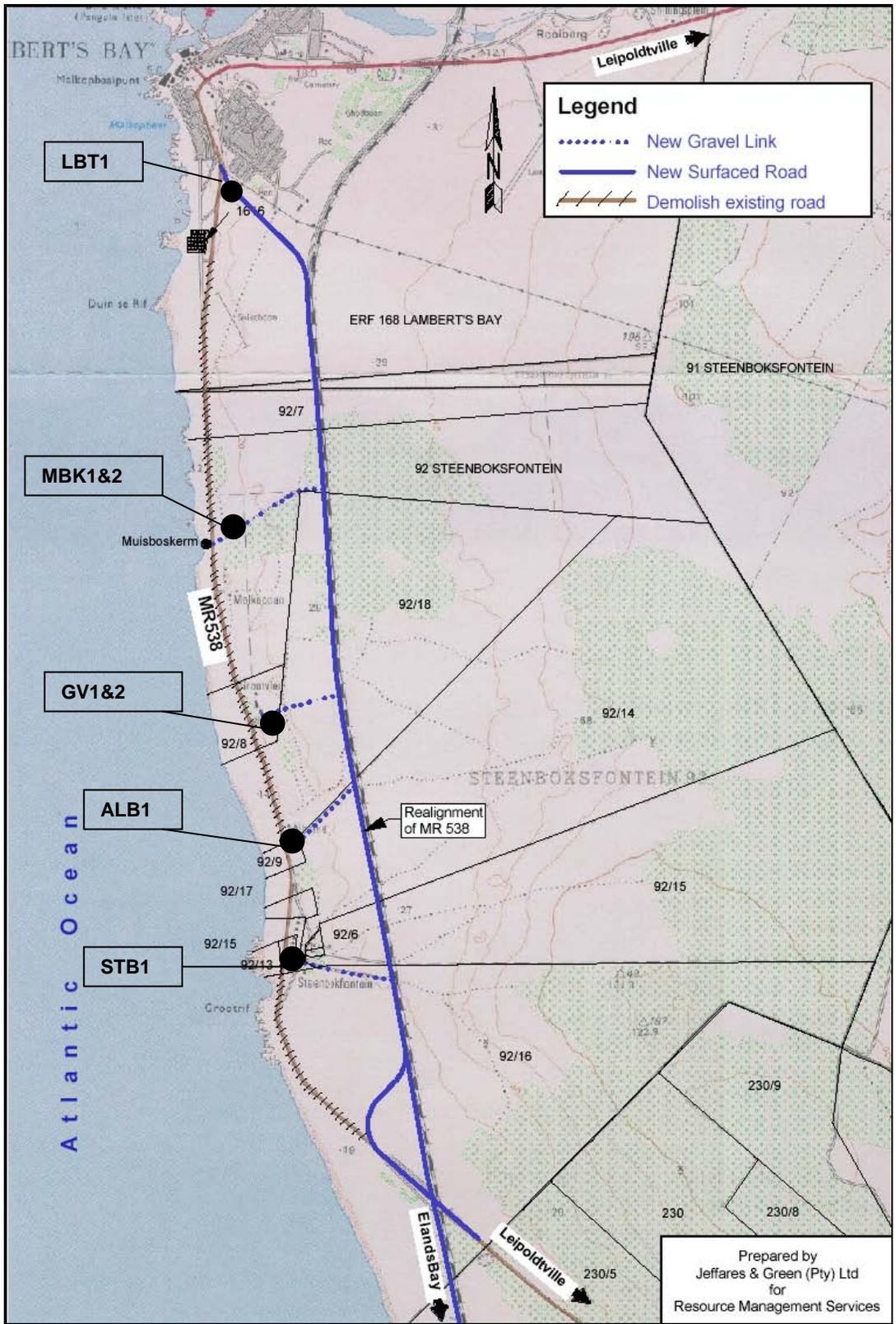


Figure 6. Alternative 1e.



Figure 7. STB 1. Scattered shellfish remains in the proposed Steenbokfontein Gravel Link (Alternative 1e).



Figure 8. ALB 1. Scattered shellfish remains in the proposed Albanie Gravel Link (Alternative 1e).

- Muisbosskerm Gravel Link

MBK1 (GPS reading S 32° 08 003 E 18° 18 406)

A thin scatter of shellfish remains was located in open patches of ground on the east facing vegetated dune slopes about 75 m east of the Coastal Road. Limpets (genus Patella) dominate the shellfish remains, with some whelk and a few fragments of Black Mussel also occurring. Except for one quartz flake, no other cultural items were noted.

MBK2 (GPS reading S 32° 07 983 E 18° 18 456)

The site is located about 30-40 m east of MBK 1 and comprises an extensive scatter of shellfish remains in a large open field measuring several hundred metres in extent (Figure 9). Some disturbance and burrowing is evident, but the site appears to be relatively undisturbed. Large amounts of shellfish occur on the site, thin in parts, thicker in others, dominated by high frequencies of limpets (genus Patella), with some Black Mussel, barnacle and whelk also occurring in places. Four silcrete flakes, two pieces of pottery, two silcrete cores, five quartz flakes, three quartz chunks, one quartzite flake and two pieces of ostrich eggshell were found. It is very likely that this is the same site recorded as MKP 18 by Halkett & Mutti (1998) during an assessment of a section of the farm Malkoppan. Test excavation revealed a single buried lens of shell about 100mm thick at a depth of about 350 mm below the surface (Halkett & Mutti 1998).

- Lamberts Bay Township (New Surfaced Road)

LBT1 (GPS reading S 32° 06 141 E 18° 18 427)

A very thin scatter of shellfish remains was located in open patches of ground immediately alongside the Coastal Road at the entrance to Lamberts Bay Township (Figure 10). The shell comprises mainly fragments of limpets (genus Patella), with a few fragments of Black Mussel and whelk occurring. Dumping of modern debris is widespread in the surrounding area, which is also disturbed and severely degraded. Some tortoise bone was also noted, but this may not be archaeologically derived. A small scrape revealed the presence of in-situ limpet shell about 5cm below the surface.



Figure 9. MBK 2. Scattered shellfish remains in the proposed Muisbosskerm Gravel Link (Alternative 1e).



Figure 10. LBT. Scattered shellfish remains in the proposed Lamberts Bay Gravel Link (New Surfaced Road).

9.2 The Orex Corridor – East of the railway line

9.2.1 Alternative 2(a) (Figure 11)

No archaeological heritage remains were located, although a cluster of sites have been recorded among the prominent sandstone outcroppings on the farm Steenbokfontein 92, among them the well-known Steenbokfontein Cave (University of Cape Town site records & Jerardino 1996).

The sites will not be impacted by the proposed road upgrade.

Two open sites occur, several kilometers north of the above cluster of sites, on the farm Steenbokfontein 91, east of the railway line (University of Cape Town site records).

The sites will not be impacted by the proposed road upgrade.

9.2.2 Alternative 2(b) (Figure 12)

No archaeological heritage remains were located.

9.2.3 Alternative 2(c) (Figure 13)

No archaeological heritage remains were located.

9.2.4 Alternative 2(d) (Figure 14)

No archaeological heritage remains were located.

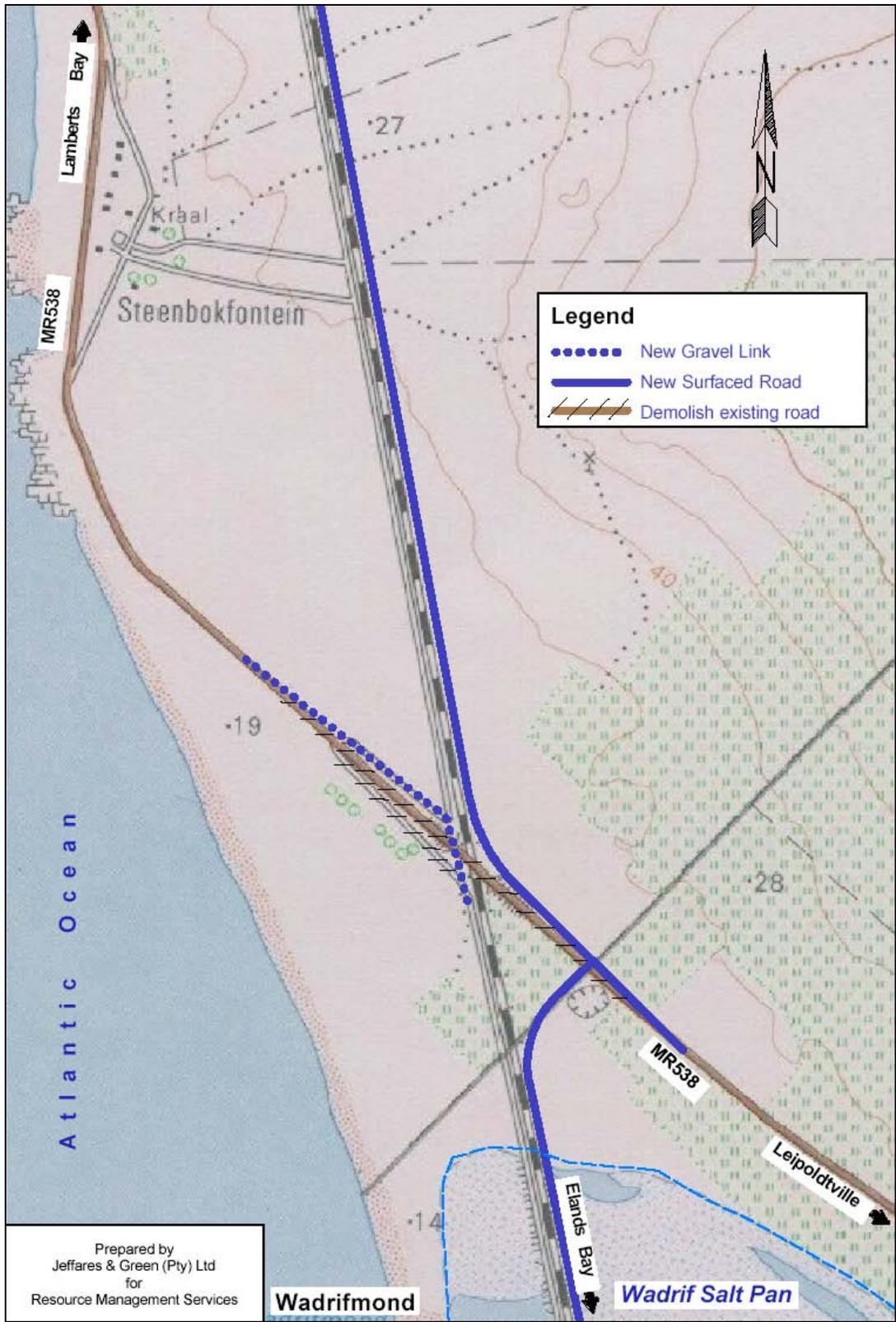


Figure 11. Alternative 2a.

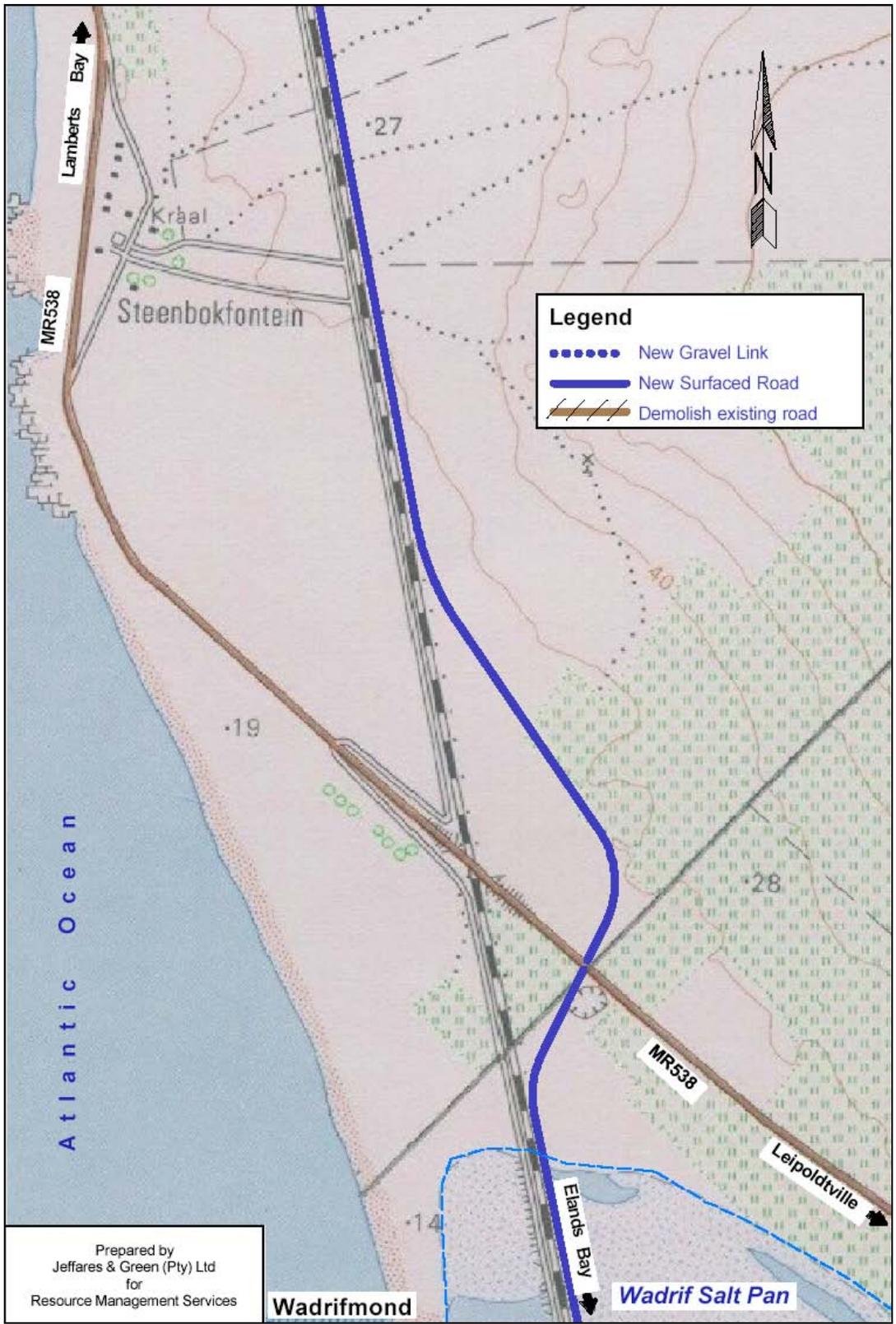


Figure 12. Alternative 2b.

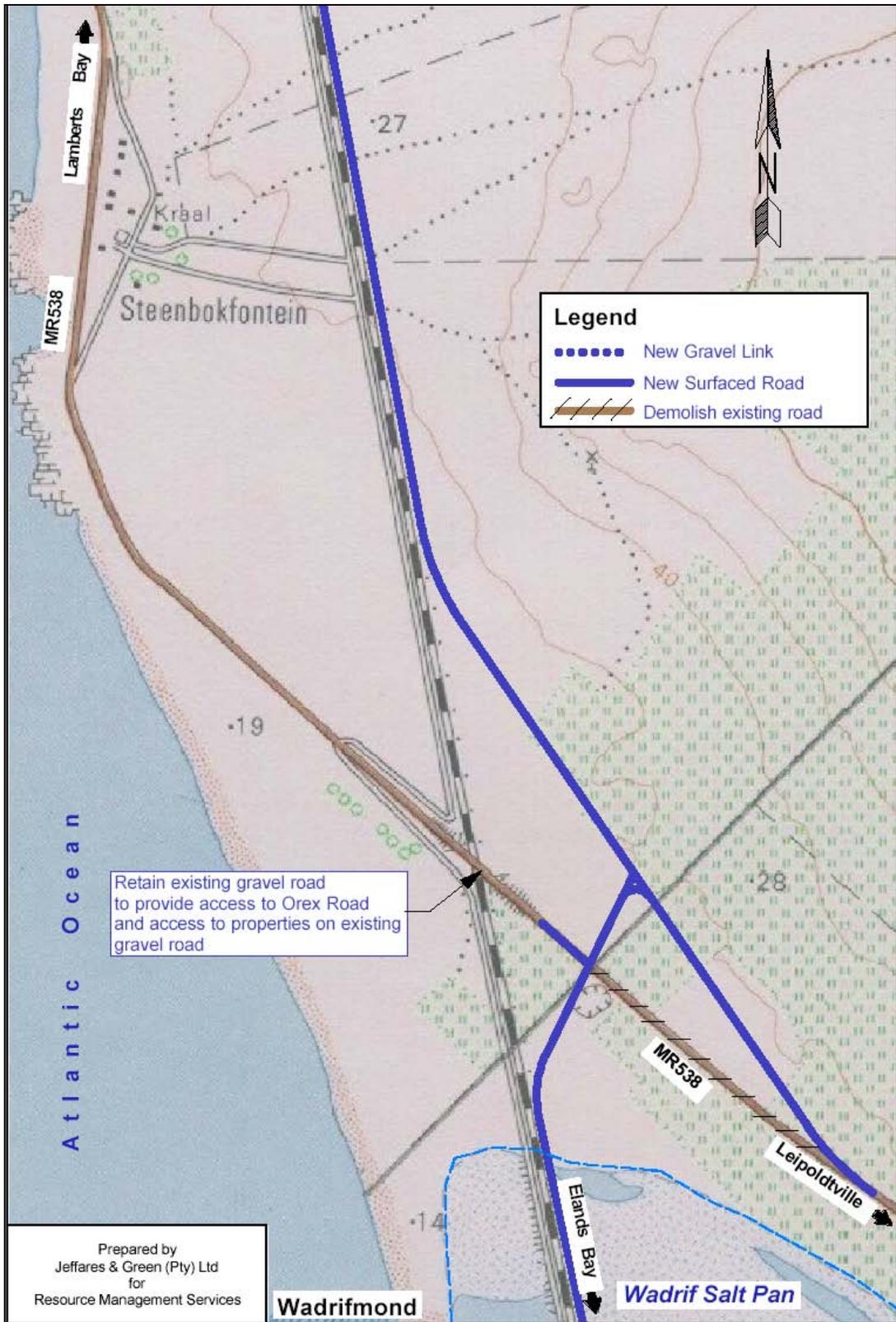


Figure 13. Alternative 2c.

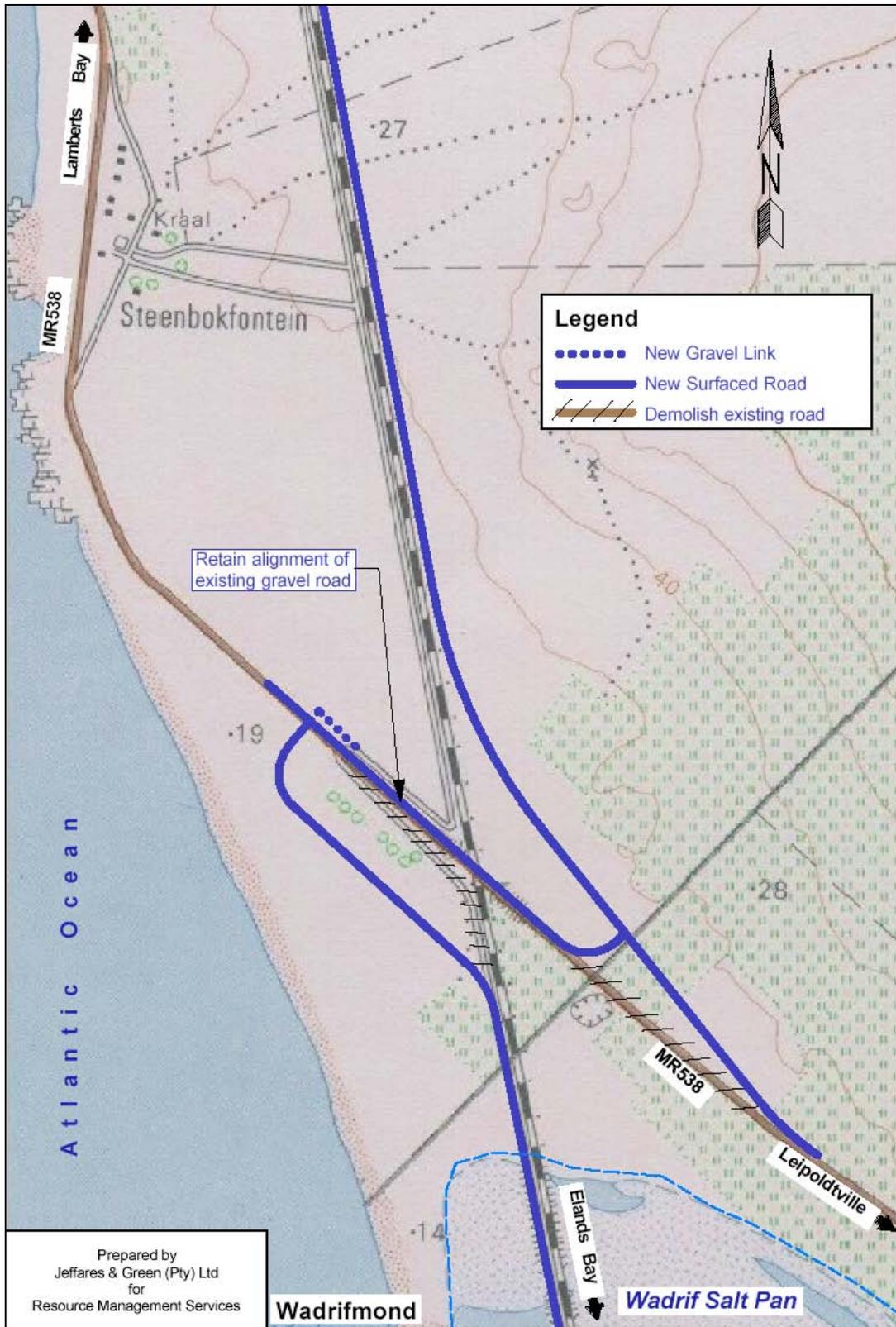


Figure 14. Alternative 2d.

9.3 Coastal Road

9.3.1 Alternatives 3a & 3b (Figures 15 & 16)

Archaeological visibility in the Coastal Road is very high. This is due to the close proximity of the road to the rocky shoreline, which attracted precolonial LSA hunter-gatherers. Almost all the raised ground on the foredunes to the west of the Lamberts Bay road is covered with a scatter of archaeological material (Hart & Halkett 1995).

Surveys undertaken in the Lamberts Bay area have recorded a relatively large number of archaeological sites. Eighteen sites have been recorded on the farm Malkoppan, of which at least five or six are located in, or close to the road reserve. This includes the well-known site MKP1 (dated to over 4000 years) which is exposed in the side of a borrow pit visible from the road, and dispersed over quite a large area on the opposite side of the road (Hart & Halkett 1995; Halkett & Mutti 1998; Jerardino 1994).

An archaeological assessment of four proposed borrow pits situated on the Lamberts Bay Trunk Road (Lamberts Bay-Wagendrift) has also identified important archaeological remains at Steenbokfontein Farm (Orton & Hart 2003).

Construction of the gravel road to Lamberts Bay and associated activities, have clearly damaged and severely disturbed a number of well-known archaeological sites and deposits. These include large archaeological sites (known as megamiddens) at the informal parking areas at Grootrif (Figures 17-22), and a large midden aligned either side of the road, about 100m north of the entrance to Steenbokfontein Farm (Figures 23 & 24). Borrow pits capped by 4000 year old LSA shell middens are also located alongside the Coastal Road at Malkoppan (described above) north of Muisbosskerm (Figures 25-28).

Most of the above sites have been recorded by archaeologists from the University of Cape Town, of which four (including MKP1 and Grootrif B, D & G) have been radiocarbon dated. These sites have been described in a doctoral thesis tracking the changing social landscapes in this region over the last 4500 years (Jerardino 1994, 1996).

According to archaeologist Mr Tim Hart of the Archaeology Contracts Office at the University of Cape Town (pers. comm.) construction of the Coastal Road also impacted negatively on an unknown number of farm labourer graves on Steenbokfontein farm. Mr Gerrit Burger (pers. comm.) of the Farm Steenbokfontein subsequently confirmed this, and also indicated that several farm labourer graves still occur hidden among the foredunes west of the Coastal Road.

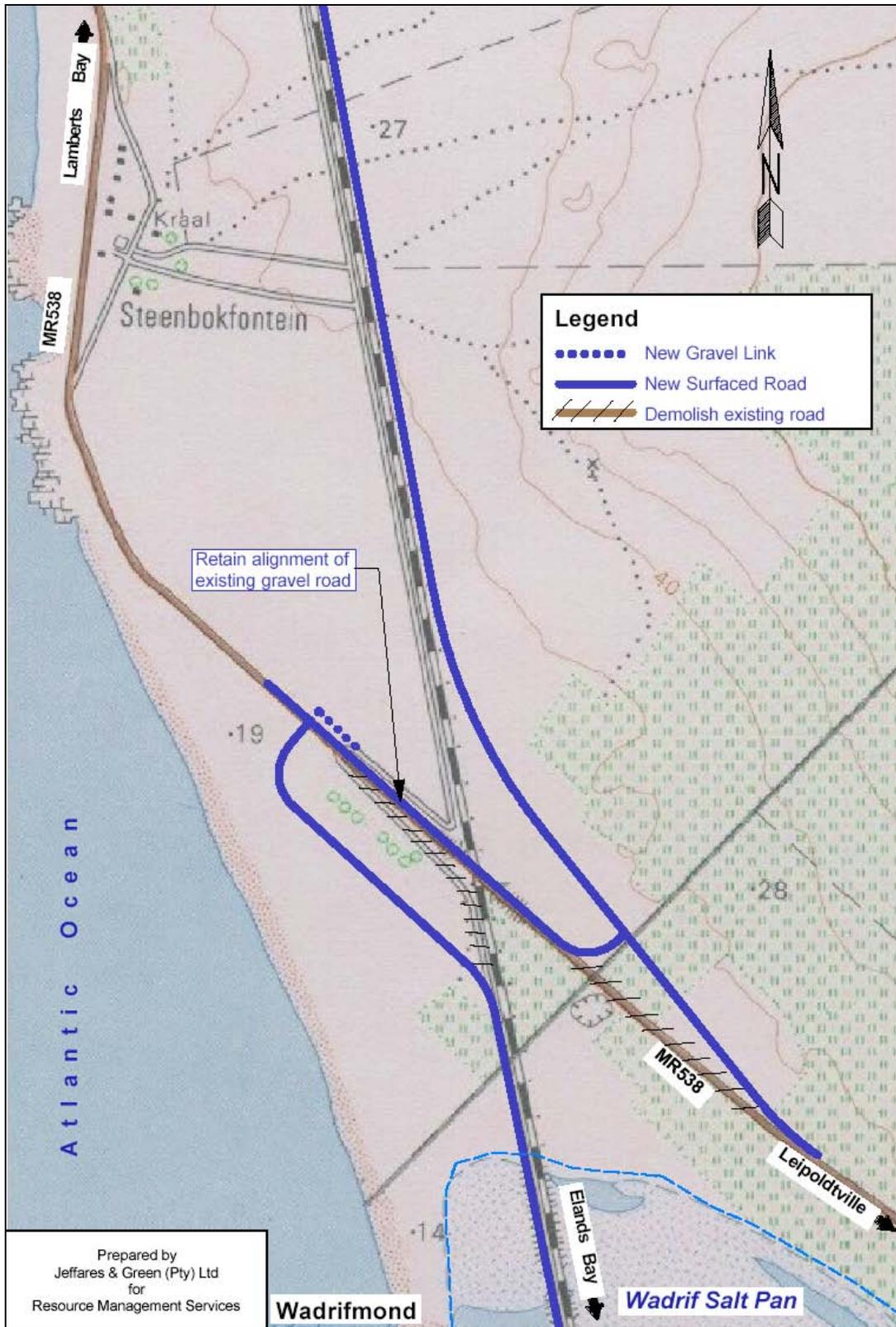


Figure 15. Alternative 3a.

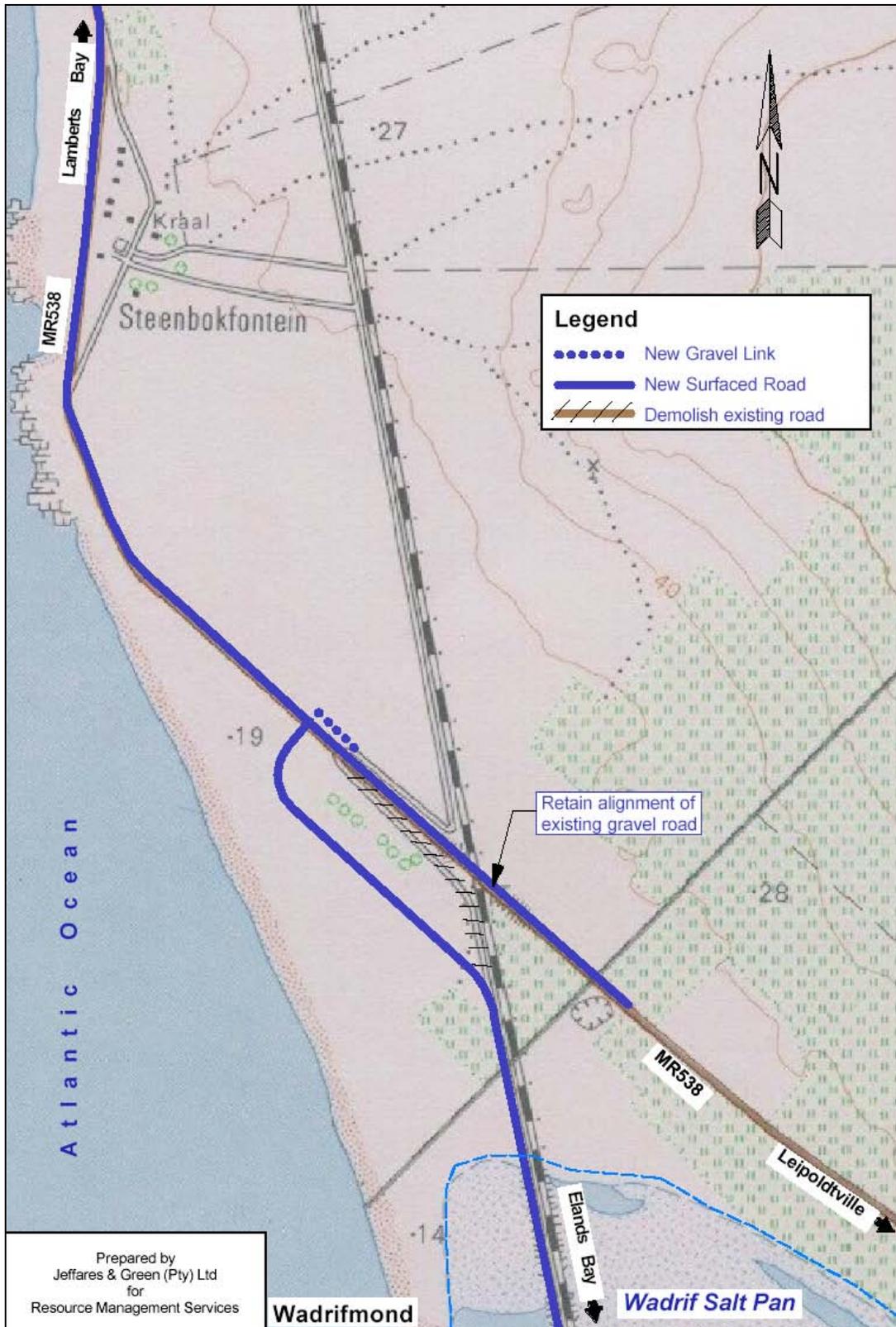


Figure 16. Alternative 3b



Figure 17. Shell midden remains at Grootrif (Alternatives 3a & 3b).



Figure 18. Shell midden remains alongside the road at Grootrif (Alternatives 3a & 3b).



Figure 19. Shell midden remains at Grootrif (Alternatives 3a & 3b).



Figure 20. Shellfish remains at Grootrif (Alternatives 3a & 3b).



Figure 21. Shellfish remains alongside the road at Grootrif (Alternatives 3a & 3b).



Figure 22. Shellfish remains alongside the road at Grootrif (Alternatives 3a & 3b).



Figure 23. Shell midden remains alongside the road at Steenbokfontein (Alternatives 3a & 3b).



Figure 24. Shell midden remains alongside the road at Steenbokfontein Alternatives 3a & 3b.



Figure 25. Borrow pit alongside the road at Malkoppan.



Figure 26. Shell midden remains at Malkoppan borrow pit.



Figure 27. Borrow pit alongside the road at Malkoppan



Figure 28. Shell midden remains at Malkoppan borrow pit.

10. IMPACT STATEMENT

10.1 Orex – West of the Railway Line (Alternatives 1a-1e)

The proposed Gravel Links (Alternatives 1b & 1e) will impact negatively on potentially significant archaeological heritage remains at Grootrif, Steenbokfontein, Albanie, and Muisbosskerm, and near the entrance to Lamberts Bay Township (New Surfaced Road).

The impact of the proposed project on archaeological heritage remains in Alternatives 1a, 1c, & 1 d is likely to be low.

The probability of locating significant archaeological remains in Alternatives 1a, 1c, & 1 d during implementation of the proposed project is also likely to be low.

10.2 Orex – East of the railway line (Alternatives 2a-2d)

The impact of the proposed project on archaeological heritage remains in Alternatives 2a-2d is likely to be low.

The probability of locating significant archaeological remains in Alternatives 2a-2d during implementation of the proposed project is also likely to be low.

10.3 Coastal Road (Alternatives 3a & 3b)

The impact of the proposed project on archaeological heritage remains in the Coastal Road (Alternatives 3a & 3b) is likely to be high, although it is unclear how much the current road will be widened.

Impacts are most likely to occur between Grootrif and Malkoppan north of Muisbosskerm.

Proposed upgrading of the road may also impact negatively on several farm labourer graves hidden among the foredunes at Steenbokfontein Farm.

Increased physical and human pressures (i.e. secondary and long-term cumulative impacts) that is often associated with such a development, will also likely impact negatively on well-known archaeological sites located at Grootrif, Steenbokfontein and Malkoppan, as well as sites in the shoreline dune area.

The challenge is to effectively manage these secondary and long-term cumulative impacts.

11. PREFERRED ROUTE

Clearly, based on the results of the archaeological assessment of the proposed Elands Bay to Lamberts Bay Road Upgrade (i.e. the proposed Northern Alternatives), the preferred route is Alternative 2a-2d i.e. The Orex Corridor (East of the railway line).

However, proposed upgrading of the Coastal Road (Alternatives 3a-3b) does present potential research and heritage conservation opportunities, which should not be ignored.

12. RECOMMENDATIONS

12.1 The Orex Corridor - West of the railway line (Alternatives 1a-e)

- Recommended actions for mitigating impacts include archaeological shovel testing in the proposed New Gravel Link(s) at Grootdrift (GD1), Muisbosskerm (MBK1 & MBK2), Albanie (ALB1), Steenbokfontein (STB1) and Lamberts Bay Township (LBT1), in order to determine the significance of archaeological deposits.
- Vegetation clearing must be monitored by a professional archaeologist.
- Earthworks and excavations must be monitored by a professional archaeologist.
- Proposed borrow pits must be inspected for archaeological remains.
- The Environmental Control Officer (ECO) is to be briefed by a professional archaeologist what to look out for during vegetation clearing operations. Leveling and alteration of dunes, for example, may expose buried shell middens and human remains.
- Contractors, staff and particularly plant operators must be briefed by the archaeologist what to look out for during vegetation clearing operations and road construction activities.
- Heritage remains uncovered or disturbed during vegetation clearing and earthworks must not be disturbed until inspected by the ECO and verified by a professional archaeologist.
- Should any human remains be disturbed, exposed or uncovered during earthworks, these should immediately be reported to a professional archaeologist, or the South African Heritage Resources Agency (Mary Leslie @ 021 462 4502).

Burial remains should be treated sensitively at all times. Human remains should not be removed until inspected by a professional archaeologist.

- The EMP must detail reporting procedures to manage the discovery of any heritage artefacts during the construction phase of the project. This would include the recovery or exposure of human burials during construction activities, for example.

12.2 The Orex Corridor – East of the railway line (Alternatives 2a-d)

- Vegetation clearing must be monitored by a professional archaeologist.
- Earthworks and excavations must be monitored by a professional archaeologist.
- Proposed borrow pits must be inspected for archaeological sites.
- The ECO is to be briefed by a professional archaeologist what to look out for during vegetation clearing operations. Leveling and alteration of dunes, for example, may expose buried shell middens and human remains.
- Contractors, staff and particularly plant operators must be briefed by the archaeologist what to look out for during vegetation clearing operations and road construction activities.
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Burial remains should be treated sensitively at all times. Human remains should not be removed until inspected by a professional archaeologist.

- The EMP must detail reporting procedures to manage the discovery of any heritage artefacts during the construction phase of the project. This would include the recovery or exposure of human burials during construction activities, for example.

12.3 The Coastal Road (Alternatives 3a-b)

- Recommended actions for mitigating impacts include selected shovel testing of shell midden remains either side of the Coastal Road (MR538), in order to determine the significance of archaeological deposits. Archaeological remains in the road reserve will likely be severely negatively impacted during proposed road works, although it is currently unclear how much the road will be widened.
- Additional sampling of known shell middens at Grootrif, Steenbokfontein and Malkoppan may be required should road works impact on these sites.
- Farm labourer graves on the foredunes west of the Coastal Road must be identified, and ownership and identity of the graves established.
- Earthworks and excavations must be monitored by a professional archaeologist.
- Proposed borrow pits must be inspected for archaeological sites.

- The ECO is to be briefed by a professional archaeologist what to look out for during vegetation clearing operations. Leveling and alteration of dunes, for example, may expose buried shell middens and human remains.
- Contractors, staff and particularly plant operators must be briefed by the archaeologist what to look out for during vegetation clearing operations and road construction activities.
- Heritage remains uncovered or disturbed during vegetation clearing and earthworks should not be disturbed until inspected by the ECO and verified by a professional archaeologist.
- Should any human remains be disturbed, exposed or uncovered during earthworks, these should immediately be reported to a professional archaeologist, or the South African Heritage Resources Agency (Mary Leslie @ 021 462 4502).

Burial remains should be treated sensitively at all times. Human remains should not be removed until inspected by a professional archaeologist.

- The EMP must detail reporting procedures to manage the discovery of any heritage artefacts during the construction phase of the proposed project. This would include the recovery or exposure of human burials during construction activities, for example.

13. TOWARD AN ENVIRONMENTAL MANAGEMENT PLAN

Increased physical and human pressures (i.e. secondary and long-term cumulative impacts) that is often associated with such developments, will very likely impact negatively on archaeological remains in the shoreline area. For example, anticipated increase in pedestrian traffic, the increased use of informal parking areas alongside the Coastal Road and of tracks/paths leading over the dunes to the beach, will continue to damage sensitive and fragile archaeological heritage remains in the study area.

The required Environmental Management Plan (EMP) for the proposed project must therefore include measures in order to manage increased pedestrian and vehicle access to the beach so as to minimise the impact on archaeological sites/remains.

The EMP must, for example, make provision for the following archaeological management measures:

- The large shell middens (mostly flattened and currently used as informal parking areas) at the Grootdrift reefs should be covered with beach/building sand to protect them from further damage. Remaining shell midden deposits should be fenced off so as to protect them from further damage.
- Access to the beach should be managed and controlled by use of well-maintained footpaths. Remaining informal tracks and footpaths should be closed off and rehabilitated.
- Other protective measures could include appropriate signage/information boards indicating the presence and importance of archaeological remains.

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