

ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED TRENCH EXCAVATIONS FOR OPTIC FIBRE CABLE FROM MELKBOS TO YZERFONTEIN, THEN VIA DARLING AND ATLANTIS TO DURBANVILLE, WESTERN CAPE

(Assessment conducted under Section 38 (8) of the National Heritage Resources Act No 25 of 1999)

Prepared for:
Enviroworks
Suite 116
Private Bag X01
Brandhof
9324

Tel: 086 198 8895
Email: Ester@enviroworks.co.za

February 2011



Prepared by:

Lita Webley & Liesbet Schietecatte
Archaeology Contracts Office
Department of Archaeology
University of Cape Town
Private Bag
Rondebosch
7701

Phone (021) 650 2357
Fax (021) 650 2352
Email: Lita.Webley@uct.ac.za

EXECUTIVE SUMMARY

The Archaeology Contracts Office (ACO) at the University of Cape Town was appointed by Enviroworks to undertake an **Archaeological Impact Assessment and complete a NID for proposed trench excavation for the laying of a fibre optic cable from Melkbos to Yzerfontein, then via Darling, Mamre, Atlantis and Philadelphia ending in Durbanville, Western Cape. The trench will be 1 m deep and 0.5 m wide.** During the archaeological survey, comment was made on the built environment and cultural landscape where this seemed appropriate.

Limitations

According to the initial Terms of Reference, the cable was going to be placed in the road reserve. A field survey, conducted by Lita Webley and Liesbet Schietecatte on the 11 November 2010, followed the road reserve. After field work had been completed, it was decided to place the cable within 3 m of the fence of the road reserve due to difficulty in obtaining permission from the road authorities. A second fieldtrip on the 3 February 2011 concentrated on the Tygerfontein Nature Reserve (TNR), south of Yzerfontein.

Archaeology/Palaeontology

Trenching for the cable may impact on below ground heritage resources (archaeology and/or palaeontology). The area of most significant concern is the TNR and along the southern part of Dassen Island Road in Yzerfontein. Prior research and surveys have shown the presence of deflation hollows with fossilized bones and stone tools.

Mitigation: The proposed alternative route along the fence line of the TNR, as opposed to the coastal road, is unlikely to impact on archaeological material and monitoring is not essential. However, archaeological material was observed along the verges of Dassen Island Drive and monitoring/excavations will be required. If substantial deposits of fossilized bone and/or shell middens are uncovered anywhere along the West Coast road, then work should be stopped so that an archaeologist can investigate further.

Built Environment

The field study identified no significant aspects of the built environment within the road reserve. It is difficult to comment on the land immediately outside the road reserve. However, moving the cable some 3 m within the fence line may impact on the lime kilns on the Yzerfontein-Darling road.

Mitigation: The lime kilns on the Yzerfontein Road must be avoided during the excavation for the cable.

Graves

A single wooden cross (probably representing a memorial rather than a grave) was recorded at the gate between Yzerfontein and Tygerfontein Reserve. However, other surveys have shown that informal graves may be located close to the road. In addition, pre-colonial graves may be located in soft dune sands.

Mitigation: If human remains are uncovered during trenching, work must stop immediately in that area and SAHRA must be contacted. They will advise on the process to be followed.

Cultural Landscape

Since this is an underground cable, there are few aspects of the cultural landscape which are threatened. However, the historic avenues of blue gums which line the Old Darling/Mamre road are situated close to the tar road and are considered part of the cultural landscape.

Mitigation: It is recommended the trenching is undertaken on the other side of the trees and that disturbance of the tree roots should be avoided.

1. INTRODUCTION

The Archaeology Contracts Office (ACO) at the University of Cape Town was appointed by Enviroworks to undertake an Archaeological Impact Assessment and complete a NID for proposed trench excavation for the laying of a fibre optic cable from Melkbos to Yzerfontein and then onto Darling, Mamre, Atlantis, Philadelphia ending in Durbanville in the Western Cape (Figure 1).

This is an underground pipeline and it is anticipated that the only issues of concern are archaeology and palaeontology. Reference is made to the built environment and cultural landscape, where this seemed appropriate.

2. DEVELOPMENT PROPOSALS

The development will involve:

- Trenching and Direct burial method:
- **The dimensions of the trenches with conduits will typically be 40 cm to 50 cm wide and 75 cm to 100 cm deep;**
- The initial proposal was to excavate the trench for the cable inside the road reserve. However, difficulty with obtaining permission from the road authorities have resulted in changes to the original proposal. The trench will be within 3 m of the fence line of the road reserve. Where sensitive areas are encountered the construction will deviate to the road reserve. No work will deviate deeper into private property;
- Backfill will consist of excavated material without stones (stone-free soil);
- Compaction of the filled trench will be done followed by the replacement of topsoil. Re-vegetation will be done were deemed necessary;
- Where water courses need to be crossed, the applicant proposes that for river crossings of 100 m or less in width, the horizontal directional drilling method (drilling of more than 2 m below the riverbed from one side of the river to the other) will be used and where river crossings of 100 m or more will be crossed, the method of bridge attachments will be used.

3. HERITAGE LEGISLATION

The National Heritage Resources Act, No 25 of 1999 (Section 38 (1)) makes provision for a compulsory notification of the intent to development when any development exceeding 5000 m² in extent, or any road or linear development exceeding 300m in length is proposed. This report is conducted in terms of Section 38 (1) of the Act.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

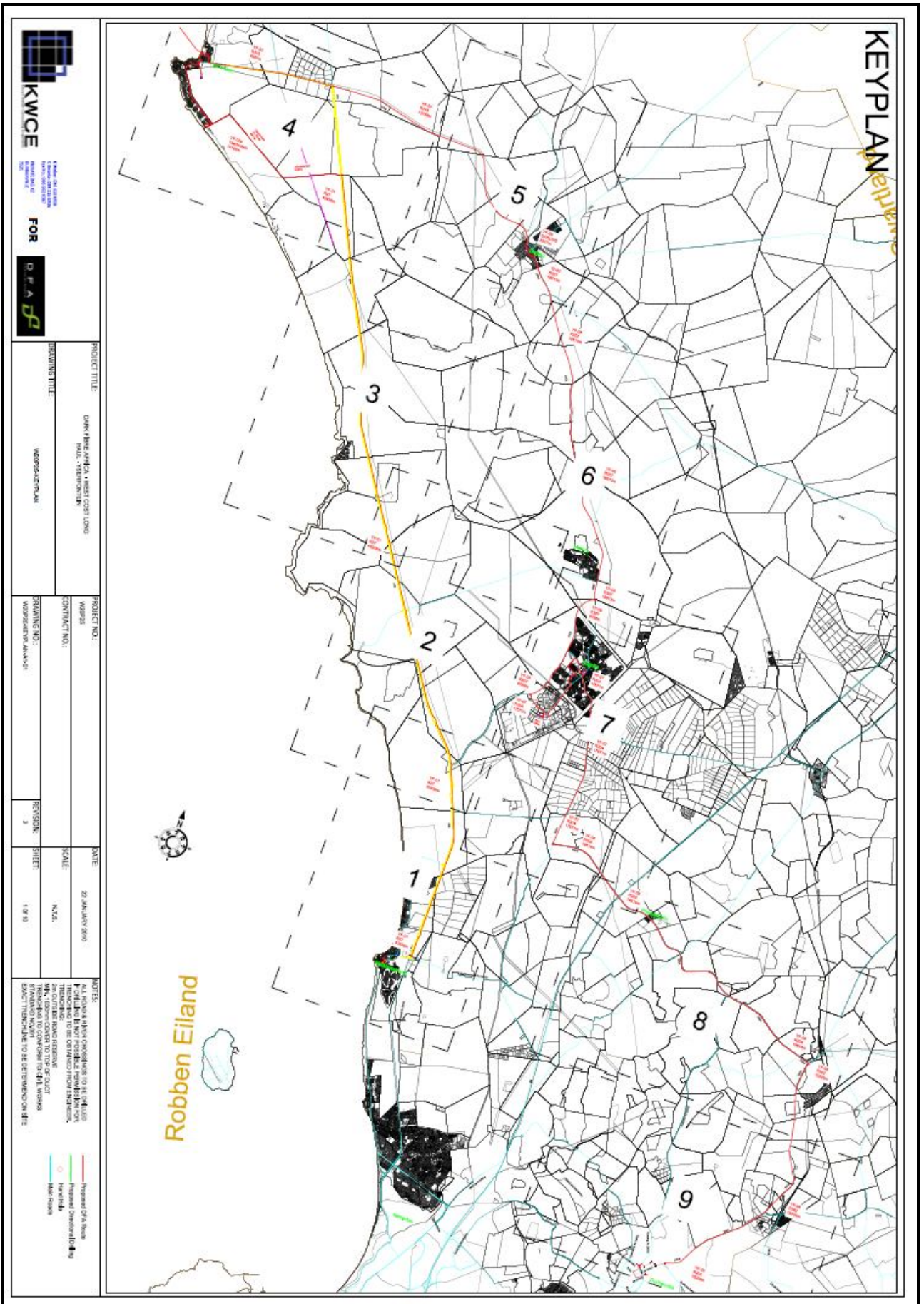


Figure 1: Location map showing position of route of the proposed optic fibre cable from Melkbos to Yzerfontein, then via Darling, Mamre, Atlantis and Philadelphia to Durbanville. Map supplied by client.

4. THE RECEIVING ENVIRONMENT

The cable will be buried outside the road reserve, up to 3 m from the fence:



Plate 1: View of the road reserve adjoining the R27 North. Note the dense vegetation.

- From Melkbos along the R27 (West Coast Road) northward but before the intersection of the R27 and R315/307 (the Yzerfontein Road);
- Left into the Tygerfontein Nature Reserve and along the fence of the property to Yzerfontein (Figure 2);

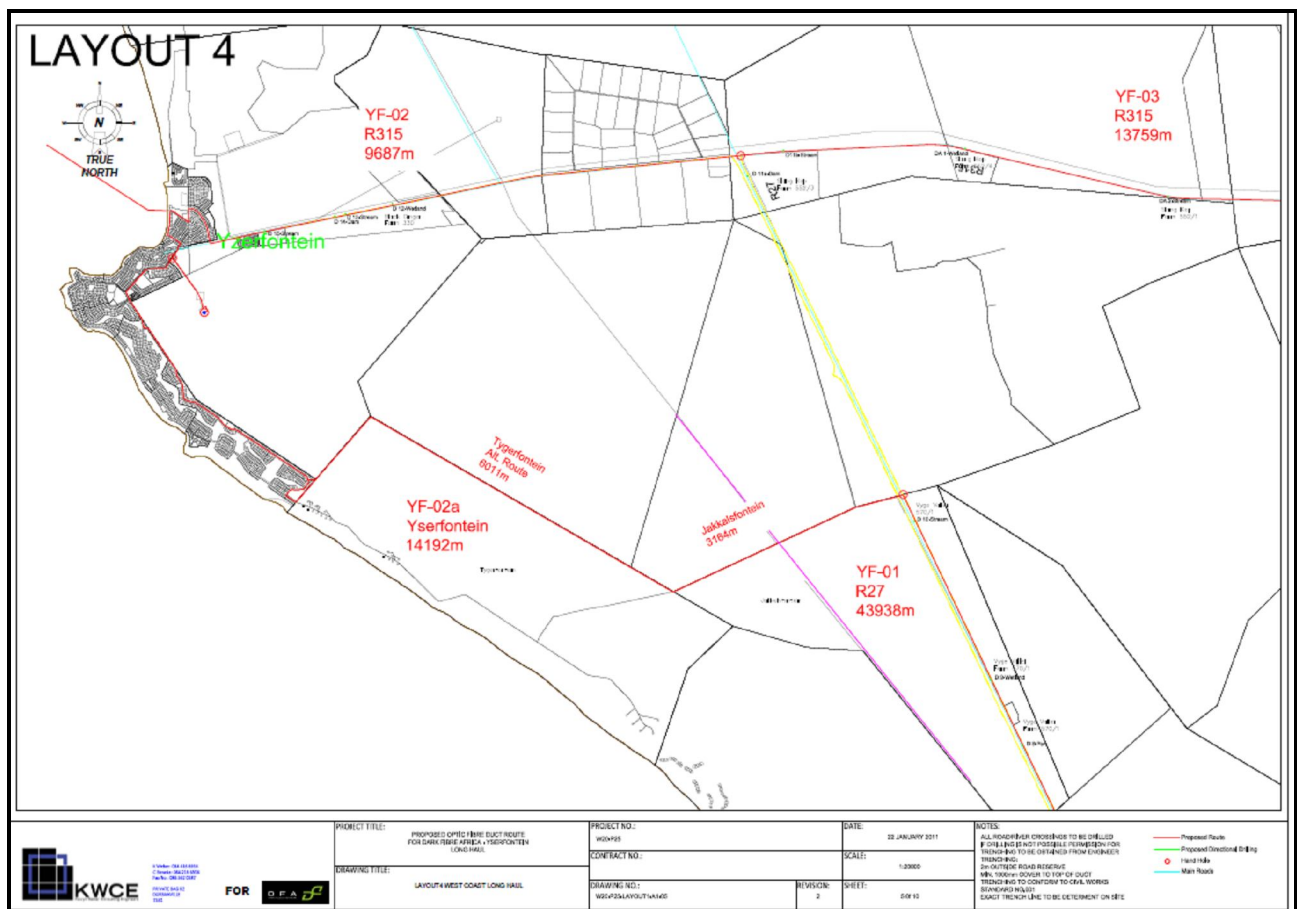


Figure 2: Note the route taken through Tygerfontein follows the boundary fence. Map supplied by client.

- Through Yzerfontein (Plate 2);

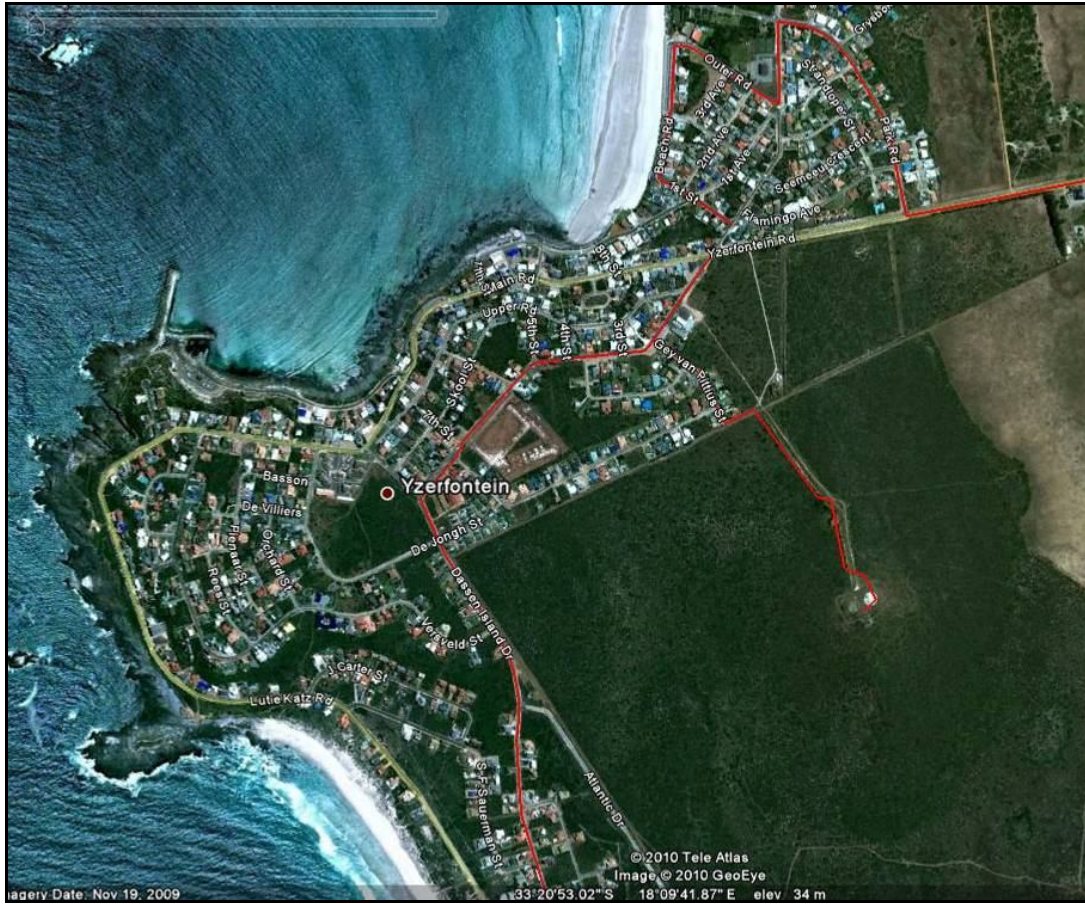


Plate 2: Route taken by cable through Yzerfontein.



Plate 3: View of landscape around Darling.

- Leaving town, along the Yzerfontein Road, across the intersection of the R27 and then into the R315, along the Old Darling Road to Darling;



Plate 4: View taken by the cable in Darling. Note the avenue of trees along the R307 leaving town.

- Through Darling (Plate 4);
- Following the R304, bypass Mamre;



Plate 5: View of the road between Mamre and Atlantis on the R304 (Old Darling Road).

- Turn left into the R307 (Dassenberg Road), then travel through Atlantis along Reygersdal Road and back along the R304;
- Left into the 304 and cross the N7;
- Through the town of Philadelphia;
- At intersection of R304 and R302 (at Klipheuwel), turn south;
- Follow the R302 south, it becomes the Klipheuwel Road and then Wellington Road as it enters Durbanville from the north;
- Ends in Durbanville.

4.1 Archaeological background

The mineralised bones of ancient fauna are often found along this stretch of the coastline. For example, fossilised animal bones have been reported along the coast at Tygerfontein (Avery et al. 1990), at Duynfontein near the Koeberg Nuclear Power station (Klein 1976) and just north of Yzerfontein around the saltpan (Avery 1994). Fossilised bones have also been seen by Orton (2007 & 2009b) at Bakoond and the ACO (1995) at Tygerfontein.

Inland from the coastal plains, according to Almond & Pether (2008), the palaeontological potential is likely to be very low with the underlying shale geology noted as being un-fossiliferous.

The fossil site of Duinefontein in the Koeberg Private Nature Reserve contains Early Stone Age implements dating back at least 200 000 years ago. Early Stone Age implements have been reported from the farm Vaatjie and the farm Brakkefontein, south of Atlantis (Hart 2008). Middle Stone Age occupation has been excavated from a small rock shelter at the harbour in Yzerfontein (Klein et al. 2004).

The rocky shoreline along the Yzerfontein coastline was also attractive to Later Stone Age (LSA) hunter-gatherers and Khoekhoe pastoralists. Surveys of the Tygerfontein Reserve have been undertaken by Avery et al. (1990), the Archaeology Contracts Office (1995) and by Kaplan (2005) who undertook a survey of the coastal strip in the Tygerfontein Nature Reserve and re-surveyed archaeological sites discovered by the ACO.

During a survey of the farm Tygerfontein 564, Avery et al. (1990) reported on the discovery of 7 archaeological/palaeontological sites and they are shown in Figure 2. The majority of the sites are described as consisting of fossilized bone found in wind deflated hollows. Although Middle and Later Stone Age stone artefacts were reported from these hollows, Avery et al. (1990) do not believe that they are associated. During a further survey by the ACO (1995), they reported on four sites and Kaplan's 2005 survey provided the GPS co-ordinates more precisely. Their positions are shown in Figure 2. TFN1 is described as a deflation hollow containing MSA artefacts and fossilised bone (high significance); TFN2 also contains MSA artefacts and fossilised bone (medium-high significance). TFN3 is a shell midden with stone artefacts and pottery suggesting a post-2000 BP date (medium-high significance). TFN4 is another shell midden with LSA material including silcrete flakes and pottery (medium significance).

Middle Stone Age implements (200 000 to 40 000 Years ago) have been reported in association with fossilised animal bones from Melkbostrand (Hart 2008). Artefacts dating to the Middle Stone Age have also been reported from Olifantskop to the east of Melkbostrand (Orton & Hart 2004) and from near Vissershok (Hart 2008). Later Stone Age artefacts have been reported from various sites in this area, for example at Olifantskop (Orton & Hart 2004).

The Darling hills area comprises rolling wheat fields and patches of indigenous Renosterveld on undulating hills on granites and shales. The Darling Hills would undoubtedly have been used extensively by the Khoekhoen for grazing their stock and their settlements would likely have dotted the open landscape. Orton (2010a) surveyed a number of farms in the Darling area and reported that archaeological resources were rare and widely scattered. Most surface finds were isolated artefacts relating to the Early (ESA) and Later Stone Ages (LSA). Beyond indicating the presence of Stone Age people in the landscape, very little may be learned from these artefacts as they do not occur in informative contexts. He discovered a single site with an indeterminate collection of grindstones and hammerstones as well as a small number of colonial period artefacts.

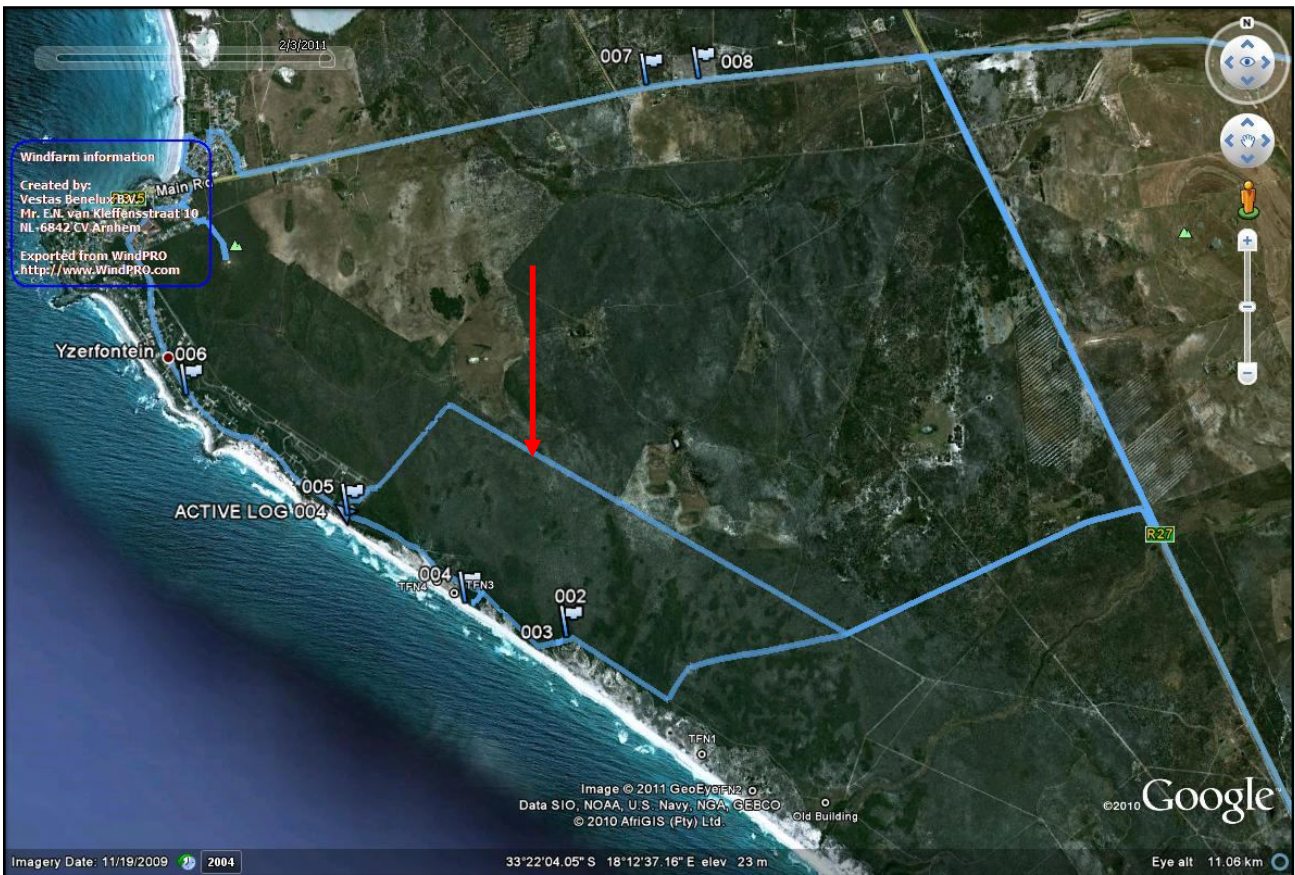


Figure 2: Archaeological sites in the Tygerfontein Reserve recorded by Avery et al. in 1990 as well as Webley & Schietecatte during the November 2010 survey. The alternative route along the fence line, as proposed in February 2011, is indicated by the red arrow.

Halkett (2005) has reported ESA scatters from the Atlantis area and ESA/MSA scatters from Kalbaskraal. In a foot survey along the N7 highway between the Melkbos and Atlantis intersections, Orton (2010b) reported finding several scatters of stone artefacts, some associated with silcrete outcrops. Little archaeological research has been carried out in this part of the Western Cape, but many contract jobs have been undertaken both in the Swartland extending to the north and on the coastal plain to the west. These generally report scatters of stone artefacts, often associated with outcrops of silcrete.

South of the Klipheuwel Road, Orton (2009b) has surveyed the farms Groot Phesantekraal 1165 and Joostenbergs Vlakte 725 near Durbanville and reported ESA and MSA artefact scatters as well as a Later Stone Age scatter on the river bank. Halkett & Hine (2008) surveyed Fisantekraal also on the Klipheuwel road into Durbanville reported a distribution of ESA/MSA artefacts in a ploughed field.

4.2 Historical Background

After the establishment of the Cape Colony in 1652, the VOC desperate to stabilise the food supply and the growth of herds released some of its employees to become freeburgers. Company herds were sent northward for grazing and a number of outposts were established in the area which forms the focus of this study. For example, in 1701 a military post was established at Groen Kloof, where Mamre stands today. The name Groene Kloof, the green valley, was the prime grazing land of Odaso's Cochoqua, the people also known as the Saldanha Khoekhoen. This area is characterised by open with rolling fields stretching into the distance. Large trees are very sparse with the agricultural lands interrupted only by occasional stands of invasive alien bush or patches of indigenous vegetation.

By the start of the 18th century some 29 farms were already occupied in the Darling/Mamre area and farmsteads dot the landscape among the hills. Early land grants would have resulted in the construction of farm buildings but not many of these are still standing. Those at Olifantskop are a well preserved (Hart 2008) example of the type of architecture observed in this area.

The towns through which the fibre optic cable will run date to the 19th and 20th centuries and their history is briefly described below:

Melkbos: is located on land initially known as Losperds Bay. It is close to Blaauwberg Hill and was the focus of the Battle of Blaauwberg in 1806. The town of Melkbosh Strand was developed by The Cape Lands Development Company in 1924; at that stage the only buildings in the area comprised the Damhuis, a few holiday houses and the post office.

Yzerfontein: is situated on the farm of the same name which dates back to 1824. However, the subdivision of the farm only occurred in 1930 when a portion of land was sold to the Yzerfontein Seaside Estates. While it was a popular destination for upcountry farmers during the 19th century, the town only dates to 1937. There is apparently a 19th century “fish house” and an old jetty.

The two lime kilns next to the R315 lie on the farms De la Rey and Jacobus Kraal. These stone kilns were stacked with wood and mussel shells, producing quicklime which was used as whitewash. The two kilns date to the 1940s and are both Provincial Heritage Sites.

Darling: The town of Darling was established in 1853 on a part of the farm Langfontein (Fransen, 2006) “and laid out on a rectangular street grid of elongated blocks, with a wider strip for the river down the middle” (Fransen 2006:226). It is described as retaining much of its rural character. It contains a number of older buildings but few of them are of “great individual architectural interest”.

Mamre: the Moravian mission (dating to 1807) was established on the farms Groenekloof, Louwsploas and Cruijwagenskraal and was initially known as Groenekloof. It was already an established farm in 1790 when Robert Jacob Gordon travelled through the area. According to Fransen (2006) most of the older thatched, white-washed cottages in Louwskloof have been demolished – it is described as having “almost total loss of character”, but nevertheless a “precious heritage site and the village layout a good example of mission-village layout” (2006: 128). The mission station and watermill are both Provincial Heritage Sites.

Atlantis: Was founded in 1976 by the Apartheid government and was intended as a “coloured township”. It was established on the farms Melkpost, Hartebeeskraal and Witzand.

Philadelphia: is described as possibly the smallest formally established and laid-out “kerkdorp” in the Cape. The farming community of Koeberg did not want to travel to Durbanville for church services as they acquired a portion of the farm Dassenville and in 1858 started construction of the church. The Dutch Reformed Church is a Provincial Heritage Site. The town comprises a small rectangular grid system with streets lined in blue gums (Fransen 2006).

Durbanville: dates to 1825 when a group of farmers requested the governor’s permission to build a church on the farm Pampoenkraal. In 1836 the name of the settlement changed to D’Urban, and subsequently this was changed to Durbanville in 1886 to avoid confusion with the town of the same name in Natal. There are a number of buildings in town which date to the 1870’s.

4.3 Graves and Cemeteries

Morris (1993) has reported human burials from Blaauwberg (20 listed) and Melkbosstrand (22 listed). Orton (2010b) has reported on a small informal graveyard on the Atlantis/N7 intersection suggesting that informal graveyards may exist in close proximity to the road reserves. According to Avery et al. (1990) a local farmer has reported finding two burials in the dunes close to the border between the town of Yzerfontein and Tygerfontein Reserve.

4.4 Cultural Landscape

The construction of a trench for a fibre optic line is unlikely to impact on the cultural landscape. Darling and Mamre were located on the old wagon route and an overlay of the 1890 map on the present road system suggests that the present R304 lies very close to the original road. The avenue of blue gum trees which line sections of this "Old Darling Road", particularly to the south of Atlantis, may be remnants of this road. Aerial photographs of 1938 suggest that there were trees along this route, but perhaps they were not as dense as they are today.

5. METHOD

A field survey was conducted by Lita Webley and Liesbet Schietecatte on the 11 November 2010. Lita Webley re-visited the Tygerfontein Reserve on the 3 February 2011 to assess the changes to the proposed trench through the reserve. A hand held Garmin GPS devices were used to record tracks and photographs were taken with a digital camera.

- Various scientific and CRM reports were consulted for background information to this area;
- A map of 1890 was consulted to determine the location of the old roads in this area;
- Aerial photographs of 1938 were consulted to look at the Old Darling Road.

5.1 Limitations

Initially, the proposal indicated that the fibre optic cable would run in the road reserve. However, after field work was completed, the decision was taken to place the cable outside the road reserve, some 3 m from the fence line. However, this is unlikely to impact on the findings of this report.

6. FINDINGS

The results of the survey are discussed in the order in which they were recorded:

No heritage issues of significance were observed between Melkbos and the turn-off to the Tygerfontein Nature Reserve.

1. Tygerfontein Nature Reserve

The trench will run along the fence line of the property terminating at the southernmost section of Yzerfontein in Dassen Island Drive (Figure 2).

During the initial survey in November 2010, a single fragment of fossilized bone was recovered from the edge of the gravel road in association with numerous chunks of calcrete (Site 002). The road at this junction crosses a sand dune and it would appear that in the construction of the road, calcrete layers were disturbed and the fossilized bone brought to the surface (Plates 6 & 7). Although the area was examined closely, no further bones were recovered. We know from the ACO (1995) report, that fossilized bones have been found along this stretch of coast. No stone artefacts were recovered.

However, during the second survey on the 3 February 2011, along the fence line (Figure 2) of TNR, no calcrete deposits were observed and no archaeological material was recorded.

2. Yzerfontein

Site 004 is located immediately outside the gate of the reserve, as one enters the town of Yzerfontein from the south. It is a wooden cross, inscribed with the name Ricardo Grovers (Plate 8). It is unlikely to represent a grave and is probably a memorial to someone recently deceased. There is no date on the cross.



Plate 8: Cross at the gate which separates Tygerfontein Reserve and Yzerfontein. **Plate 9:** The telephone pole in the foreground is placed on top of a shell midden.

Site 005 is a badly disturbed shell midden in the road reserve, located adjoining a vacant plot along Dassen Island Drive, in southern Yzerfontein (Plate 9). This site has been highly disturbed by the construction of the tar road and the remnants along the road may have been bulldozed. It is possible the entire midden has been re-worked. The cable makes deviation to the top of the hill behind Yzerfontein. There is a recently constructed road going up the hill to a cell phone tower. Chunks of calcrete have been exposed during the construction of the access road.

Sites 006 and 007 represent two lime kilns which are already Provincial Heritage sites (Plate 10). These two lime kilns were built in the 1940s and are located on the farms De la Rey and Jacobus Kraal. The kilns were stacked with wood and mussel shells and used in the production of lime for white washing houses. They are located right next to the Yzerfontein Road. They are not in the road reserve, but are situated at the fence line.



Plate 10: Lime kiln adjoining the road reserve along the Yzerfontein Road (site 007 & 008). These kilns lie immediate outside the fence line of the road reserve any may be impacted by the trench.

3. Darling

There are short avenues of blue gum trees at both the entrance and the exit to Darling. They may represent remnants of an earlier access road into town. There is sufficient space to excavate the trench for the cable behind the line of trees.

4. Atlantis

There are historic blue gum tree avenues both entering and leaving Atlantis on the Old Darling/Mamre Road. While not officially declared heritage sites, these historic tree alignments are considered a significant element of the local cultural landscape. They represent the remnants of the old route between Cape Town and Saldanha Bay.



Plate 10: the Avenue of blue gums lining the R304 to the south of Atlantis.

Philadelphia & Durbanville

The R304 crosses the N7, and then goes through the town of Philadelphia.

The R304 crosses the Diep River before reaching the t-junction of Klipheuwel. At the t-junction, the trench will follow the Klipheuwel Road south to Durbanville. The road becomes Wellington Road as it enters town. There do not appear to be any heritage issues with respect to Durbanville.

7. MITIGATION

7.1 Archaeological

The alternative route proposed for the trench through the Tygerfontein Nature Reserve (TNR) avoids the coast which is known to be rich in archaeology and palaeontology. However, the trenching next to Dassen island Drive in Yzerfontein will impact on shell middens.

- **Significance:** Avery et al (1990) and the ACO (1995) reports note that the fossils in TNR remains are of medium-high significance; the shell middens at Yzerfontein may be of low-medium significance.
- **Mitigation:** It is recommended that an archaeologist is contacted if any fossils/stone artefacts are found during trenching in TNR. An archaeologist should be appointed to monitor the trenching along the southern section of Dassen Island Road in Yzerfontein.

7.2 Built Environment

The lime kilns along the Yzerfontein Road are Provincial Heritage Site. They are placed immediately outside the fence of the road reserve and may be impacted by the trenching.

- **Significance:** Medium
- **Mitigation:** The foundations of the lime kilns not be undermined by the trenching.

7.3 Graves

No graves were recorded during the survey. A single wooden memorial cross was recorded at the gate between Yzerfontein and Tygerfontein Reserve. However, other surveys have shown that informal graves may be located close to the road. Further, pre-colonial graves may be located in soft dune sands.

- **Significance:** High
- **Mitigation:** If human remains are uncovered during trenching, work must stop immediately in that area and SAHRA must be contacted. They will advise on the process to be followed.

7.4 Cultural Landscape

The route taken by the trenching along the Old Darling/Mamre Road to the south of Atlantis may impact on the avenue of blue gum trees which line the road. The space between the road and the trees is very narrow.

- **Significance:** These historic tree alignments are considered to be of high significance;
- **Mitigation:** Ensure that the trenching is done on the other side of the avenue and that the roots of the trees are not disturbed.

8. CONCLUSIONS AND RECOMMENDATIONS

The trench for fibre optic cables will have a maximum dimension of 1 m deep by 0.5 m wide. It will be positioned up to 3 m from the fence, marking the road reserve.

The impact will be largely sub-surface and of an archaeological/palaeontological nature. The impact on the built environment and cultural landscape are likely to be minimal.

A few areas of concern were identified:

1. The construction of the trench along Dassen Island Drive in the southern section of Yzerfontein may impact on sub-surface archaeological resources. It is recommended that an archaeologist should monitor the construction of the pipeline along Dassen Island Road;
2. Two historic lime kilns, both Provincial Heritage sites, are located immediately outside the road reserve, abutting the fence line, along the Yzerfontein Road. They may be impacted by the construction of the pipeline. These will need to be avoided;
3. A single memorial cross was found in the road reserve near Yzerfontein. Informal graves may be encountered in the road reserve during trenching. If uncovered, graves should be reported to SAHRA;
4. The trench will run along the old Mamre/Darling road. The section south of Atlantis is lined with an historic avenue of blue gums. The trench should be placed in the far side of the trees.

Other aspects of the built environment, such as farm gates, etc may be impacted by the construction of the pipeline and these will need to be avoided. It is difficult to comment on this as the fieldwork was concerned with the road reserve.

9. REFERENCES

Archaeology Contracts Office. 1995. A Phase One archaeological assessment of Tygerfontein.

Avery, G., Van Rijssen, W.J.J. & Wilson, M. 1990. Archaeological and Palaeontological Survey on Tygerfontein 564, Malmesbury Division. Unpublished Report, South African Museum.

Avery, G. 1994. Archaeological survey at Ysterfontein: coast to Ysterfonteinsoutpan (3318AC). Report prepared for 16 Mile Beach Development Trust, Cape Town South African Museum Cape Town.

Fransen, H. 2006. Old towns and villages of the Cape: a survey of the origin and development of towns, villages and hamlets at the Cape of Good Hope. Cape Town: Jonathan Ball Publishers.

Halkett, D. 2005. EIA for a new regional landfill site to service the City of Cape Town: Archaeology and Cultural Heritage Specialist Study.

Halkett, D. & Hine, P. 2008. Archaeological Impact Assessment of Proposed development on portions 1 and 2 of Farm 123 (Bella Riva & Farmika), Fisantekraal, Durbanville Magisterial District.

Hart, T. 2008a. Heritage Impact Assessment for the proposed construction of transmission lines with respect to the relocation of the three Acacia Park gas turbines and one Port rex gas turbine to Ankerlig Power Station, Atlantis Industria, Western Cape.

Hart, T. 2008b. Proposed development 553/5 Denneberg, Yzerfontein, West Coast District.

Kaplan, J. 2005. Phase 1 Archaeological Impact Assessment: Proposed Development of a Private Nature Reserve on Tygerfontein Farm No 564, Yzerfontein, Swartland Municipality.

Klein, R.G. 1976. A preliminary report on the 'Middle Stone Age' open air site of Duinefontein. South African Archaeological Bulletin 31:12-20

Klein, R., Avery, G., Cruz-Uribe, K., Halkett, D., Parkington, J., Steele, T., Volman, T. & Yates, R. 2004. The Ysterfontein 1 Middle Stone Age site, South Africa, and early human exploitation of coastal resources. Proceedings of the National Academy of Sciences of the United States of America: Vol 101(16): 5708-5715.

Morris, A. 1993. A master catalogue; Holocene Human skeletons from South Africa. Johannesburg: Wits University Press.

Orton, J. 2007. Final Report on Excavations at Erven 2149, 2157 and 2158 (Bakoond), Yzerfontein, Malmesbury Magisterial District, Western Cape Province.

Orton, J. 2009a. Hunters or Herders? Evidence from the cultural assemblages at Bakoond, Western Cape, South Africa. Before Farming 2009/4: 1-16.

Orton, J. 2009b. Survey and mapping of heritage on parts of Groot Phesantekraal 1165 and Joostenbergs Vlakte 725, Belville Magisterial District, Western Cape.

Orton, J. 2010a. Heritage Impact Assessment for the Proposed Rhebokfontein Wind Energy Facility, Malmesbury Magisterial District, Western Cape.

Orton, J. 2010b. Heritage Impact Assessment for the proposed expansion of the N7 between the Melkbos and Atlantis Junctions, Malmesbury Magisterial District, Western Cape.

Orton, J & Hart, T. 2004. Heritage scoping study of the farm Groot Oliphantskop (Farm 81) for the proposed Omega substation, Western Cape.

INVESTIGATION TEAM

Lita Webley
Liesbet Schietecatte

APPENDIX OF SITES AND LOCATIONS

Site Name	Type	GPS Co-ordinates	Description	Significance
002/3	Fossil Bone	S33 23 06.9 E18 12 06.1	Fossil bone found at side of road in Tygerfontein Reserve	High
005	Shell midden	S33 22 27.0 E18 10 42.8	Shell midden on edge of Dassen Island Road, Yzerfontein. Badly damaged by road construction.	Low
006	Lime Kiln	S33 21 48.0 E18 09 41.7	Lime kiln on the Yzerfontein road, on the fence of the road reserve	PHS
007	Lime Kiln	S33 20 10.7 E18 12 39.1	Lime kiln on the Yzerfontein road, on the fence of the road reserve	PHS
009	Avenue of trees	S33 34 35.3 E18 30 18.6	Avenue of trees along Old Darling/Mamre road	High