



Appendix G Archaeological, Palaeontological and Cultural Theme SSVR

**Environmental and Social Impact Assessment for Field
Development in Block 11B/12B and associated
production activities, South Africa**

Draft Scoping Report

SLR Project No.: 700.000130.00001

14 September 2026



SITE SENSITIVITY VERIFICATION (IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020)

1. INTRODUCTION

Main Street 1549 (Pty) Ltd (Main Street),¹ together with its Joint Venture (JV) partners at the time,² conducted exploration activities in Block 11B/12B, located ~75 km off the South Coast of South Africa, roughly between Mossel Bay and Cape St Francis. These activities, undertaken under their Exploration Right (Ref. No. 12/3/067), included seismic surveys and exploration well drilling, which led to the discovery of gas and associated condensates in the Brulpadda 1AX (2019) and Luiperd 1X (2020) wells.

Following the discovery of gas-condensate within the Paddavissie Fairway, the JV partners evaluated several development scenarios, considering both current and potential future domestic gas market demand. In September 2022, the JV partners submitted an application for a Production Right (PR 12/4/013) (PR).

Under TEEPSA leadership, the JV also applied for an Environmental Authorisation (EA) and commissioned an Environmental and Social Impact Assessment (ESIA) for an early field development scenario, accompanied by a public participation process in 2022 and 2023. However, in 2024, TEEPSA resigned as operator of Block 11B/12B, and together with QatarEnergy and CNRI, withdrew from the project. Main Street, elected to continue with the Project and assumed operatorship.

As the new operator, Main Street planned to advance the Project through a downscaled, largely non-intrusive survey campaign to assess the metocean, benthic, geotechnical and geophysical conditions in the area, thereby informing potential future development scenarios. An EA application for this survey campaign was subsequently submitted, and the associated ESIA process commenced in February 2025.

As a result of the progressive evaluation and advancement of technical development work, and in accordance with the principles of integrated environmental management under National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), Main Street has expanded the ESIA to encompass the entire field development of the Paddavissie Fairway. This approach ensures comprehensive assessment of all reasonably foreseeable environmental

¹ Main Street is owned by Africa Energy SA Corp (Africa Energy) and Arostyle Investments (RF) Limited.

² Main Street's JV partners in the Exploration right were Canadian Natural Resources International (South Africa) Limited (CNRI), QatarEnergy International E&P LLC (previously Qatar Petroleum International Upstream LLC) and TOTAL Energies EP South Africa (now TotalEnergies EP South Africa S.A.S.) (TEEPSA).



and socio-economic impacts. This expansion in scope has led to the submission of the current EA application and associated ESIA process.

In terms of the requirements of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), published under the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), the proposed development and production activities require an application for Environmental Authorisation (EA) and the undertaking of an ESIA process. Main Street appointed SLR Consulting (South Africa) (Pty) Ltd (SLR) to undertake the ESIA process. CTS Heritage has in turn been appointed to undertake the Heritage Impact Assessment (HIA), which includes both archaeology and palaeontology.

As per the Department of Forestry, Fisheries and Environment (DFFE) Screening Tool results, various on-site specialist verifications are required to be undertaken to determine the site sensitivity and the associated EA process to be followed for the proposed development. These verifications will be undertaken in accordance with Government Notice (GN) 320 (20 March 2020) of NEMA EIA Regulations, 2014 (as amended). A HIA will subsequently be undertaken in line with Appendix 6 of the EIA Regulations and the 2007 Minimum Standards for Archaeological and Palaeontological Components of Impact Assessment Reports, and will be submitted to the South African Heritage Resources Agency (SAHRA) as required under section 38(8) of the National Heritage Resources Act (NHRA).

2. Site sensitivity verification

The site sensitivity verification was undertaken as follows:

- An archaeologist, H. Keyter, conducted a survey of the site and its environs from 20 to 21 July 2026 to determine what archaeological resources are likely to be impacted by the proposed development (specifically the onshore gas pipeline). This survey expands on a previous study in 2024 by CTS Heritage for the proposed Garden Route Gas to Power Project (subject to a separate EA application), which initially included the onshore pipelines covering much of the same area. The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS. The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999). Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner (EAP).
- A desktop-based palaeontological sensitivity screening was conducted for the current project area using the South African Heritage Resources Information System (SAHRIS) Palaeosensitivity Map and 1:250 000 geological maps published by the Council for Geoscience. This draws on a prior field assessment by R. Nel for the proposed Garden Route Gas to Power Project (subject to a separate EA application), which initially included the onshore



pipelines covering much of the same area. The R. Nel assessment identified no fossil material. Nevertheless, a desktop Palaeontological Impact Assessment is recommended for this project.

3. Outcome

In terms of site sensitivity with specific consideration of heritage resources, clarity on the broader context and its cultural value is important to understand overall heritage sensitivity and in order to contextualise site-specific findings. Please find both contextual information as well as site-specific information below.

Cultural Landscape

Mossel Bay, sometimes referred to as Mosselbaai and its variety of previous names, is mentioned several times in the Dictionary of Southern African Place Names (Raper et al. 2014):

- **Aguada de São Bras** (C 3422). Portuguese name of Mossel Bay, given by Vasco da Gama on 26 November 1497. 'The watering-place of St Blaize', so called because Da Gama filled his casks with fresh water there on the name-day of St Blaize. Cape St Blaize takes its name from this bay.
- **Aliwal South** (C 3422 AA). Alternative name about 1850 for Mossel Bay.
- **Angra dos Vaqueiros** (C 3421 BD). Now Mossel Bay. 'Bay of herdsmen'; thus named by Dias because he saw many cattle on the shore. Renamed Aguada de São Bras ('watering-place of St Blaize') by Vasco da Gama in 1497 and Mosselbaai by Paulus van Caerden in 1601.
- **Golfo dos Vaqueiros** (C 3422 AA). Portuguese name of Mossel Bay, bestowed in July 1501 by the navigator Joao da Nova because he saw Khoekhoen with herds of cattle there. The name means 'bay of herdsmen'.
- **Mossel Bay** (C 3422 AA). Inlet on the southern coast, 409 km east of Cape Town, between Fish Bay and Victoria Bay. It was named Aguada de São Bras by Vasco da Gama in 1497, Golfo dos Vaqueiros by Joao da Nova in 1501, and Mosselbaai by the Dutch navigator Paulus van Caerden in July 1601, because mussels (Dutch mossels) were all he could find to replenish the ship's stores.
- **Mossel Bay** (C 3422 AA). Town 409 km east of Cape Town, 90 km south of Oudtshoorn and 55 km south-west of George. It was founded in 1848 and became a municipality in 1852. Originally named Aliwal, it was renamed after the bay to avoid confusion with Aliwal North. The form Mosselbaai is preferred for official purposes.

In terms of Mossel Bay's modern history, in February 1488, the Portuguese explorer Bartolomeu Dias and his men landed on this piece of coast. They were able to replenish their drinking water from a natural spring. Dias's excursion ashore ended hastily when the local people chased him off in a hail of stones. In 1497, Da Gama also landed at Mossel Bay and was able to barter successfully for cattle with the local Khoe people in what is generally regarded as the first commercial transaction between Europeans and the indigenous people of South Africa. Mossel Bay was officially

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proclaimed a town in 1848, and it became a Municipality in 1852.

Prior to and during colonial settlement, the Mossel Bay landscape was inhabited by indigenous foraging and herding groups, such as the San and Khoekhoen. Halkett and Hart (1996) explain that *"After about 20 000 years ago large parts of southern Africa were inhabited by fully modern humans ancestral to the San hunter/gatherers. They persisted until sometime around 2000 years ago when herding people with sheep arrived at the Cape presumably from the north. Physically they resembled the San but probably had a very different lifestyle. It is speculated that hunter gatherers may have been displaced in some areas by these new arrivals who were politically more organised and lived in much larger groups in semisedentary encampments moving about the landscape in search of grazing and water. Pottery technology seems to have accompanied this influx. Cattle arrived later. Hunters and herders alike were eventually displaced by colonial expansion and were decimated by disease and warfare."*

Archaeology

A number of HIAs and Archaeology Impact Assessments (AIAs) have been undertaken in proximity to the proposed development area. Nilssen (2023) notes the following types of archaeological sites in the area:

"In descending age, the archaeological record in the area includes:

- **Early Stone Age (ESA)** stone implements such as hammerstones, cores, flakes and core tools (hand axes, cleavers, etc), but at this time no ESA sites with associated organic remains are known to occur in this area,
- **Middle Stone Age (MSA)** sites with stone artefacts, cultural and food remains are found in caves, such as those in the Provincial Heritage Site of the Pinnacle Point Site Complex west of Mossel Bay, but when they occur in the open, they are normally lacking in organic remains,
- **Later Stone Age (LSA)** sites with artefacts, cultural and food remains are also present in some of the fore-mentioned caves as well as open sites such as shell middens normally associated with rocky intertidal zones,
- **Pastoralist or herder** (pottery period) sites may occur in caves or in the open and pottery and the remains of sheep are also commonly found in shell middens; and
- **Colonial period sites** include shipwrecks, farmsteads, structures, transport infrastructure, middens, burials and cemeteries amongst others.

Prehistoric human burials, usually of LSA or more recent age, may occur anywhere in the landscape where soft sediments are present, and are sometimes at or near sites of human occupation both in the open and in caves or rock shelters."

Archaeological evidence from the broader area indicates occupation into the Early, Middle and Later Stone Ages with very highly significant archaeological sites dated to the MSA known from less than 10 km away at sites such as Cape St

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Blaize and Pinnacle Point (now a World Heritage Site). Shell middens provide insight into the lifeways of people from the LSA and earlier. There is a notable density of shell midden sites recorded along the coastline in proximity to the proposed pipeline route options, many of which are graded IIIB. Two additional shell middens are described in a publication by Jerardino (2016): NABA1 and NABA2. These sites – initially recorded by Deacon (1989) and later revisited by Kaplan (2004) – are dominated by *Donax Serra* and *Perna Perna* shells, and also contain burnt shell, charcoal, lithic material, and Cape fur seal bones. These two sites are outlined in Table 1.1 below. All sites assessed by Kaplan (2004) are presented in Table 1.2.

Table 1.1: Sites assessed by Jerardino (2016): NABA1 and NABA2

Site	Co-ordinates		Description
NABA1	-34.222619	21.965139	Recorded by Deacon (1989) and Kaplan (2004) during an AIA. It covers an area of about 5 X 4 m and erodes from all sides. It is situated on top of a reddish palaeo-surface about 30 m above sea level. <i>P. perna</i> is by far the most dominant species, followed by <i>D. serra</i> , <i>S. barbara</i> , <i>S. tabularis</i> (young adults), the large turban snail or alikreukel (<i>Turbo sarmaticus</i>), <i>H. spadicea</i> , as well as much lower concentrations of plough snail <i>Bullia spp.</i> , and <i>Scutellastra cochlear</i> and <i>S. granularis</i> limpets. Shell content is embedded in a dark matrix as evidenced by eroding exposed sections. It appears that this is the result of comminuted charcoal since quantities of eroding ash were also observed. No pottery was seen anywhere on the surface or sections. Many manuports (fist-size and larger rocks and beach pebbles), some of which were fire-cracked, were also spotted. Lithic débitage (silcrete, quartzite) and a few fragments of ostrich eggshell fragments were also identified on the surface and within eroding material. Two <i>Glycymeris spp.</i> shells without any perforations were found a few centimetres from each other on one of the site's edges, and a few Cape fur seal bones (<i>Arctocephalus pusillus</i>) were also identified in and amongst the shells.
NABA2	-34.222689	21.965444	This site covers an area of about 2 x 1.5 m and is also eroding from all sides. (Fig. 2). It is situated about 10 m below NABA1, on the slope of a large white sand dune. <i>D. serra</i> overwhelmingly dominates the shell assemblage, followed in frequency by <i>P. perna</i> , <i>H. spadicea</i> , the topshell or top snail <i>Oxystele sinensis</i> , and <i>T. sarmaticus</i> . Vertebrate remains that could be identified include Cape fur seal, cormorant (<i>Phalacrocorax spp.</i>), angulate tortoise (<i>Chersina angulata</i>), and also a small bovid (possibly <i>Raphicerus sp.</i>). Some shells showed evidence of burning, while ash and charcoal were seen eroding from exposed sections. Large and small quartzite flakes were found on the surface of the site. Given the profusion of eroded <i>D. serra</i> shells lying in a secondary context, measurements of shell lengths were obtained with a precision calliper (to the nearest 0.1 mm) from as many shells as possible within the time constraints of the site visit. Much care was taken to return measured <i>D. serra</i> shells to the exact same spot where they were found. Data were then entered on an Excel spreadsheet and averages as well as measures of variability were calculated.



Table 1.2: Sites recorded by Kaplan (2004)³

Site Number	Latitude	Longitude	Findings	Significance	Type	SAHRIS INV No.	Verified Grading based on Kaplan's (2004) Descriptions
NB 1	-34.213267	21.996267	LSA/MSA tool scatter, White Mussel and Brown Mussel fragments, on eroded dune slope	Low	Artefacts, Shell Midden	3421BB1	NCW
NB 2	-34.212833	21.9967	Dense LSA/MSA tool scatter (flakes, hammerstones, cores, scrapers), mostly quartzite	High	Artefacts, Shell Midden	3421BB11	IIIB
NB 3	-34.212	21.997267	Small White Mussel scatter, no cultural remains	Low	Shell Midden	3421BB15	NCW
NB 4	-34.212517	21.998467	Extensive LSA tool scatter (flakes, blades, grindstones) and some MSA tools, White Mussel fragments	High	Artefacts, Shell Midden	3421BB16	IIIB
NB 5	-34.2112	21.998783	Modern Christian burial (unmarked mound, wooden cross)	High	Graves/Burial Grounds	3421BB31	IIIA
NB 6	-34.21205	22.000217	Extensive LSA/MSA tool scatter incl. quartzite, silcrete, indurated shale; one ground hematite piece	High	Artefacts	3422AA41	IIIB
NB 7	-34.2111	22.004217	Large stone tool scatter, mostly quartzite with some silcrete; one White Mussel scraper	High	Artefacts	3422AA42	IIIB
NB 8	-34.21055	22.006083	Thin stone tool scatter (cores, flakes, chunks), quartzite; numerous land snails	Low	Artefacts	3422AA43	NCW
NB 9	-34.20935	22.010867	Large White Mussel shell mound, stone tools, one silcrete adze, undecorated pottery, modern disturbance	Medium to low	Artefacts, Shell Midden	3422AA44	NCW
NB 10	-34.21	22.00875	Thin quartzite tool scatter, some silcrete tools and coarse pottery, White Mussel shell	Medium to low	Artefacts, Shell Midden	3422AA40	NCW
NB 11	-34.189147	21.978405	Original farmhouse and outbuildings (vandalised interior), plus family cemetery with two graves (Jacobus & Magdalena Pienaar)	Potentially high (buildings); high (graves)	Ruin > 100 years, Burial Grounds & Graves	3421BB2	IIIB

³ <https://www.sahris.org.za/node/29840>

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Ultimately, the Mossel Bay and Nautilus Bay coastlines are considered particularly sensitive for impacts to significant archaeological heritage.

Away from the coast, the pipeline route options travel adjacent to existing road reserves, cutlines and agricultural fields. These corridors have therefore been significantly disturbed through past activities, and the likelihood of finding or impacting significant heritage resources in these contexts is therefore low.

Fifty-six observations of heritage resources and landscape features were recorded during this field survey. These observations reveal a varied landscape with sensitive heritage receptors primarily belonging to the historical agricultural period and the Stone Age occupation of the coastal belt. Large portions of the inland surveyed area currently comprise tilled fields and, as such, are largely devoid of sensitive heritage resources.

The Stone Age presence on the landscape is responsible for the most frequent observations of heritage features in the project area. Inland, the material is sparse and was frequently encountered in higher concentrations in disturbed contexts, such as jeep tracks or boundary fences. Sandy soil and dense vegetation likely jointly contribute to obscuring the archaeological material across much of the inland landscape. Higher concentrations of lithic artefact deposits were encountered along the coast. These deposits primarily took the form of quartzite artefact scatters, particularly where the red palaeosols (ancient, iron-rich soil horizons formed under previous climatic conditions, now exposed at the surface through erosion) had been exposed by erosion. Owing to these well-preserved coastal archaeological deposits and their close proximity to Pinnacle Point, Vleesbaai has been the subject of some archaeological research (e.g. Oestmo et al., 2014). Oestmo et al. (2014) suggest that these MSA deposits are close enough in proximity to the Pinnacle Point site that these artefact scatters may provide insight on the landscape movements of MSA hunter-gatherers around the Pinnacle Point residential site.

In addition to these MSA lithic artefact scatters, large-scale shell midden deposits appear closer to the foreshore dunes and some of these middens, while not formally recorded on SAHRIS, have been the subject of research (e.g. Jerardino, 2016). These shell midden materials appear to be younger in origin and likely date to the Holocene (Jerardino, 2016). Yet, deposits that preserve traces of shellfish harvesting at Pinnacle Point suggest that marine foraging strategies were employed deep into the Pleistocene, with the oldest marine shell-bearing layers dated to around ~164,000 years ago (Marean et al., 2007; Jerardino & Marean, 2010; Jerardino et al., 2014). The middens encountered during this survey were observed to contain dense limpet shell remains, with rarer occurrences of quartzite artefacts, charcoal fragments and faunal bones. No human remains were encountered, although Holocene shell middens have been known to be associated with human burials elsewhere in South Africa (e.g. Dewar, 2010).



Site Number	Latitude	Longitude	Findings	Significance	Type	SAHRIS INV No.	Verified Grading based on Kaplan's (2004) Descriptions
NB 12	-34.241733	21.934383	Extensive LSA/MSA tool scatter, possible workshop/activity site, sun-bleached bone, White Mussel	High	Artefacts, Shell Midden	3421BB3	IIIB
NB 13	-34.2417	21.935383	Large stone tool scatter, quartzite/silcrete/calcrete/quartz, possible workshop areas	High	Artefacts, Shell Midden	3421BB4	IIIB
NB 14	-34.24005	21.935467	Large quartzite tool scatter, some silcrete tools, ostrich eggshell	High	Artefacts	3421BB5	IIIB
NB 15	-34.239667	21.93605	Extensive stone tool scatter, ostrich eggshell	High	Artefacts	3421BB6	IIIB
NB 16	-34.240183	21.936833	Low-density LSA scatter, MSA tools incl. near-perfect Still Bay point	Low	Artefacts	3421BB7	NCW
NB 17	-34.237233	21.937467	Thin quartzite tool scatter near forest edge	Low	Artefacts	3421BB8	NCW
NB 18	-34.2375	21.938917	Thin stone tool scatter, quartzite and silcrete, several thousand ostrich eggshell pieces, Oyster shell	High	Artefacts, Shell Midden	3421BB9	IIIB
NB 19	-34.2384	21.9394	Large stone tool scatter, mostly quartzite, White Mussel fragments	High	Artefacts, Shell Midden	3421BB10	IIIB
NB 20	-34.237967	21.940033	Large LSA tool scatter and White Mussel fragments, some silcrete incl. CCS blade	High	Artefacts, Shell Midden	3421BB11	IIIB
NB 21	-34.236717	21.941567	Large stone tool scatter, quartzite, cache of unworked cobbles	High	Artefacts	3421BB12	IIIB
NB 22	-34.213508	21.934451	Original Doornfontein homestead (Late Victorian), proposed conversion to information centre and stables	High	Building, Burial Grounds & Graves	3421BB48	IIIB



In addition to the widespread Stone Age material, the project area has come to preserve a variable material record of agricultural occupation that stretches from historical times into the present. The sandy dunes and dense coastal vegetation are likely responsible for keeping agricultural fields further inland. As a result, the historical werfs, structures and ruins are scattered throughout the inland farm portions of the project area. The built fabric that remains on two of the historical Klipfontein werfs, one of which is now known as Doornfontein (OBS 16), suggests that the historical agricultural occupation of the region was already established at least around the early 20th century, if not earlier.

Additional modern structures, related to the region's status as a holiday destination, can also be found within the project area and surrounding regions. Several coastal reserves line the Vleesbaai coast and typically include small settlements of modern holiday chalets near the shore. These houses have variable construction but all appear to date to the late 20th century or more recent times.

Finally, a single burial site was found near one of the historical Klipfontein werfs (OBS 4). This burial site at OBS 4 is located approximately 400 m south of Option 1 and Option 2 (Map HRS1-5) in an old tilled field but was demarcated by fencing. The burial site includes at least seven burials ranging from recent to historical times. One of these graves, belonging to a Mr Helgaard Pienaar, is dated to 1932. Two graves demarcated by cement slabs, and which are probably older, do not have headstones.

Based on the findings of the field assessment (summarised in Table 2), there is a likelihood that significant heritage resources, especially along the coastline, may be impacted by the proposed development.

Several of the observations recorded by the present survey constitute low-density Stone Age material, modern infrastructure or historical agricultural features that have been largely destroyed or present little cultural or scientific value. These features are deemed to be 'Not Conservation Worthy' (NCW) from a heritage perspective and are not considered further here. The remaining sensitive heritage resources consist of dense Stone Age artefact scatters and midden deposits, historical buildings, and a burial site.

Some historical buildings were also encountered during the survey of the area. Several historical structures relating to the area's history of agriculture were observed. Most notable are the two historical Klipfontein werfs, which both date to at least the early 20th century and preserve substantial amounts of their original fabric despite some exterior alterations. These structures contribute meaningfully to the region's agricultural heritage and should not be disturbed during the construction or operational phases of the project. Kaplan (2004) did not initially recommend a grading for Doornfontein werf (OBS 16 in this report), but noted its high significance. As such, this report recommends a grading of IIIA, as well as a localised buffer that protects both the structures and associated graves. The werf is approximately



150 m south of the Option 1 corridor and 100 m west of the Option 2 corridor. These corridors avoid the recommended buffer (Map HRS3) and no impact is anticipated. The recommended buffer is therefore precautionary, providing protection should any future adjustments to the route options in this area result in encroachment towards the site. Moreover, since the pipelines will be buried, the impact to the cultural landscape can be minimised in this way.

Much of the agricultural infrastructure and built fabric within the project area is considerably younger and is a product of the continued farming activities taking place on the landscape. In this assessment, a grading of IIIC is recommended for OBS 3, 8, 9 and 11, and 50 m no-development buffers are recommended around each to preserve their immediate contexts. However, given the respectable distance between the proposed pipeline routes and these sites, no direct impact is anticipated.

Additionally, a single burial site was found in the project area. This site, OBS 4, is located approximately 400 m south of Option 1 and Option 2 (Map HRS2-5). Burial sites are often imbued with high levels of social significance and must not be disturbed by any development activities. Fortunately, this site is located some distance from the actual development footprint and, therefore, no impact is anticipated. Still, a precautionary 50 m no-development buffer is recommended here regardless.

All of the sites discussed above fall well outside of the proposed pipeline corridors, and no direct impact to heritage resources is expected in these cases. As such, the inland corridors are acceptable from a heritage perspective, and no recommendations for micro-siting or rerouting are necessary. Should future layout planning result in any adjustment to the alignment, however, this must remain cognisant of, and avoid, the no-go buffers outlined in Table 2 and mapped in Map HRS2-5.

In contrast to the inland corridors, the coastal landfall points at Option 1, Option 1a, and Option 2a present a considerably more constrained heritage picture. The MSA artefact scatters resting on the red palaeosols are of varying artefact densities and exposure from beneath the overlying dunes. Yet these scatters hold some archaeological value for their potential to contribute to our understanding of the Pinnacle Point Cave occupants and how these groups exploited the landscape (Oestmo et al. 2014). Similarly, the midden deposits are also of fluctuating density and exposure but are part of a widespread layer of Holocene material along the Vleesbaai coast that preserves the traces of persistent exploitation of marine resources by coastal foragers (Jerardino, 2016). Aside from the scientific value of these materials, there is also the potential for some of these midden deposits to contain burials, as has been seen elsewhere in South Africa in Holocene midden sites.



Nine sensitive shell middens identified during this assessment fall within these corridors (Table 2, Map HRS6), specifically:

- Option 1
 - OBS 28
- Option 1a
 - OBS 30
- Option 2a
 - OBS 31
 - OBS 32
 - OBS 33
 - OBS 46
 - OBS 47
 - OBS 48
 - OBS 49

A further three high-significance sites recorded by Kaplan (2004) are located within these corridors (Table 1.2; Map HRS6):

- Option 1a
 - NB 12
 - NB 13
- Option 2a
 - NB 18

Five more of Kaplan's (2004) high-significance sites are situated between 18 m and 130 m from the Option 2a corridor (Table 1.2; Map HRS6):

- Option 2a
 - NB 14 (~46 m)
 - NB 15 (~18 m)
 - NB 19 (~25 m)
 - NB 20 (~65 m)
 - NB 21 (~130 m)



The density of artefact and shell midden sites in the coastal zone underscores its archaeological sensitivity. This sensitivity is compounded by the fact that the pipelines will be buried, posing a significant risk to in-situ deposits that may exist below the surface. As such, the areas mapped in Map HRS6 around Option 1, Option 1a, and Option 2a are considered particularly sensitive, and realignment to bypass the identified sites and sensitive areas would be preferable.

Other sites are located outside the corridors but in close proximity (Table 2; Table 1.1; Map HRS7 and HRS8):

- Option 2
 - OBS 38 (~20 m)
- Option 3
 - NABA1 (~20 m)
 - NABA2 (~40 m)

Under current alignments, no impact to OBS 38, NABA1, or NABA2 is anticipated. This nonetheless underscores the general density of archaeological sites across the coastal zone.

A total of fifty-six archaeological observations were recorded during the field assessment, twenty-one of which were assessed as significant and therefore conservation-worthy. All significant sites, as well as observations not worthy of conservation, are summarised in Table 2 below. The rows highlighted by a colour indicate those sites that are conservation-worthy, and the colour corresponds to assessed grading: green indicates Grade IIIC, orange indicates Grade IIIB, and red indicates Grade IIIA.

Option 1, Option 1a, and Option 2a are the least preferred landfall points from a heritage perspective, given the density of identified sites within these corridors.

Should Option 1, Option 1a, or Option 2a be taken forward, avoidance, through realignment of the landfall point to avoid the identified coastal sites and sensitivities, remains the first-choice approach. However, given the density and distribution of archaeological material in this area, realignment is unlikely to avoid all sensitivities entirely. Where avoidance cannot be achieved, a Work Plan approved by HWC would be required prior to construction. For these options, the Work Plan would need to cover pre-construction mitigation at the specific sites that cannot be avoided (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and/or Kaplan's (2004) sites), such as detailed survey, sampling, and/or salvage excavation; and a construction-phase Monitoring Brief across the wider coastal zone.



The landfall point at Option 3 is the most preferred from a heritage perspective. Unlike Options 1, 1a, and 2a, its route to the coast runs directly inland rather than parallel to the coastline, resulting in a more limited and localised footprint and a correspondingly lower likelihood of significant impact. For Option 3, and for all other route options, an approved Work Plan would still be required, but would need to cover a construction-phase Monitoring Brief only in the recommended strip of the coastal zone (the orange polygon mapped in Maps HRS2, 4, and 5) since no known sensitive sites requiring pre-construction mitigation would be affected.

In terms of construction phase monitoring, all construction activities taking place in the identified high-sensitivity area a must be monitored by a qualified archaeologist or heritage practitioner under the Monitoring Brief established through the Work Plan, to account for previously unrecorded archaeological sites and/or human remains that may be exposed during construction. This Work Plan would typically be developed once the final route has been approved, ahead of construction commencing. Material encountered may be assessed in the field for significance: material of low or no significance may require no further action; material of moderate significance may require work to pause in the immediate vicinity of the find for on-site recording and collection; and material of high significance (e.g. dense in-situ shell midden deposits or human remains) may trigger a stop-works order for that area, with the response, ranging from further recording to salvage excavation, proceeding under the terms approved in the Work Plan, without the need for a separate new permit application. The specific requirements of the Monitoring Brief will be determined during the Work Plan process, and must be incorporated into the EMPR;



Table 2: Conservation-worthy archaeological sites recorded during the field assessment⁴

POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_003	Historic Klipfontein werf, which is still inhabited and forms part of a working farm. This werf probably dates to at least the early 20th century. Several of the buildings have been altered or extended. Werf includes some buildings with partial stone wall	n/a	Structure	Historic	-34.20791	21.947399	IIIC	50m Buffer	n/a
OBS_004	Formalised burial site with at least seven graves, some of which are historical. The site is located adjacent to a tilled agricultural field and is very overgrown.	n/a	Graves/Burial Grounds	Historic	-34.20937	21.944189	IIIA	50m Buffer	n/a
OBS_008	Abandoned mid 20th century house. Still in a relatively good condition	n/a	Structure	Historic	-34.205863	21.954111	IIIC	50m Buffer	n/a
OBS_009	Inhabited mid 20th century house with modern informal extensions	n/a	Structure	Historic	-34.207279	21.958141	IIIC	50m Buffer	n/a
OBS_011	Inhabited mid 20th century house. Still in good condition	n/a	Structure	Historic	-34.206639	21.963640	IIIC	50m Buffer	n/a
OBS_016	Previously recorded historic Klipfontein (Doomfontein) werf (SAHRIS inventory number: 3421BB48) and associated graves. Recorded by Kaplan (2004). The site probably dates to at least the early 20th century although some of	n/a	Structure	Historic	-34.21351	21.934449	IIIA	Localised Buffer ⁵	n/a

⁴ The rows highlighted by a colour indicate those sites that are conservation-worthy, and the colour corresponds to assessed grading: green indicates Grade IIIC, orange indicates Grade IIIB, and red indicates Grade IIIA.

⁵ Localised avoidance buffer refers to a site-specific area around the heritage resources. It is not a fixed-radius buffer (i.e., 30 m or 50 m), but is based on the distribution of archaeological material and site context, allowing for greater flexibility. The area represents ground to be avoided during construction and is provided in the project spatial data.

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	the structures are newer. The main farmhouse is a large building with a pitched roof								
OBS_028	Low density of in situ midden material and quartzite/quartz artefacts eroding from the hillside. Found low quantities of marine shell fragments nearby. Observed potential combustion features.	0 to 5	Shell Midden	LSA+MSA	-34.243305	21.932890	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 1
OBS_030	In situ midden material eroded from the dune side consisting of low density marine shells and quartzite artefacts. Includes potentially intact stratigraphy and layers of calcrete.	0 to 5	Shell Midden	MSA	-34.242368	21.934325	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 1a
OBS_031	Entire dune covered in eroding midden deposits, including limpet shells and quartzite artefacts. Observed lithic artefacts include a large boulder core. Rare instances of charcoal	10 to 30	Shell Midden	LSA+MSA	-34.241303	21.936288	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_031	Entire dune covered in eroding midden deposits, including limpet shells and quartzite artefacts. Observed lithic artefacts include a large boulder core. Rare instances of charcoal	10 to 30	Shell Midden	LSA+MSA	-34.241161	21.936108	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_032	Potential Stone Age campsite resting on palaeosol layer and which has been eroded from overlying beach sand matrix. Site includes quartzite lithics and charcoal, distributed in a clear circular pattern, suggesting the campsite has been nearly perfectly p	10 to 30	Artefacts	MSA	-34.241132	21.936011	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_033	Midden material resting on the red palaeosols. Includes limpet shells, charcoal and flakes with prepared platforms made on quartzite and silcrete.	10 to 30	Shell Midden	MSA	-34.241091	21.935858	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_038	Midden material consisting of limpet shells and quartzite flakes and cores	5 to 10	Shell Midden	LSA	-34.23005	21.951871	IIC	Monitoring Brief	n/a
OBS_038	Midden material consisting of limpet shells and quartzite flakes and cores	5 to 10	Shell Midden	LSA	-34.230016	21.951668	IIC	Monitoring Brief	n/a
OBS_039	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Shell Midden	LSA	-34.230659	21.950339	NCW	Monitoring Brief	n/a
OBS_040	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Shell Midden	LSA	-34.231352	21.950448	NCW	Monitoring Brief	n/a
OBS_041	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Shell Midden	LSA	-34.231518	21.949124	NCW	Monitoring Brief	n/a
OBS_043	Midden material consisting of limpets and distal bones. Appears to be a midden site	5 to 10	Shell Midden	LSA	-34.231877	21.949777	IIC	Monitoring Brief	n/a
OBS_046	Midden deposits consist of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.240022	21.937854	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_046	Midden deposits consist of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.239948	21.937808	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_046	Midden deposits consist of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.239947	21.937743	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_047	Midden deposits coincided with soil transition to a red and compact palaeosol. Includes a higher density of lithics but lower density of shells	5 to 10	Shell Midden	MSA	-34.239901	21.937684	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_048	Lithic artefact scatter consisting of quartzite and silcrete cores and flakes. One silcrete flake was observed to show a gradual change in colour, suggesting that it may have been heat treated	0 to 5	Artefacts	MSA	-34.239322	21.937944	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_049	Midden deposits consist of limpet and mussel shells. Site also contains quartzite cores and flakes	10 to 30	Shell Midden	MSA	-34.239047	21.938262	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_049	Midden deposits consist of limpet and mussel shells. Site also contains quartzite cores and flakes	10 to 30	Shell Midden	MSA	-34.238952	21.938141	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_050	Midden deposits consist of dense lithic artefacts resting on the red palaeosols. Appears to be preserving activity centres. Includes a knapping site, with many flakes and cores distributed around a hammerstone	10 to 30	Artefacts	MSA	-34.238119	21.939354	IIIC	Monitoring Brief	n/a

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Palaeontology

The area proposed for development is predominantly underlain by sediments of **low and insignificant palaeontological sensitivity, with small areas of moderate and high sensitivity** (Map PS1). The Council of Geoscience Geology Map 3420 Riversdale indicates that the area proposed for development is underlain by Ss: Skurweberg Formation, light-grey quartzitic sandstone, massive and/or cross-bedded; Db: Baviaanskloof Formation, brown-weathering micaceous and felspathic sandstone with shale beds, and Dr: Rietvlei Formation, siltstone and arenaceous shale as well as thin micaceous sandstone beds which weather reddish brown, in the Nardouw Subgroup – from Table Mountain Group in the Cape Supergroup. It is also underlain by Tw: Wankoe Formation, calcarenite with aeolian cross-bedding and calcrete lenses; Td: De Hoopvlei Formation, calcarenite shells and conglomerate lenses; and Qsr: Quaternary Strandveld Formation, predominantly white dune sand with finely comminuted shell material – all three in the Bredasdorp Group. T-QI: Loam and sandy Loam, and Qg: light-grey to pale-red sandy soil. Finally, there is a small underlying portion comprising Je: Enon Formation, Uitenhage Group.

The palaeosensitivity of the study area is therefore variable. According to the SAHRIS Palaeosensitivity Map, the Wankoe, De Hoopvlei and Strandveld Formations have unknown sensitivity; the Skurweberg and Enon Formations, as well as Qg and T-QI have low sensitivity; the Baviaanskloof Formation has moderate sensitivity, and the Rietvlei Formation high sensitivity.

Bredasdorp Group: Wankoe Formation

The Wankoe Formation is of Plio-Pleistocene age and, according to a recent palaeontological assessment by Pether (2021a), comprises calcretised aeolianites: *“Subsequent to the marine inundations a huge pile of ancient dune sand has accumulated episodically on the coastal platforms, blown inland from the ancient sandy shorelines. These variously-cemented dunes (aeolianites) are much evident in the regional landscape as old, calcrete-capped, rounded dune ridges (“Wankoe se Rante” or “Die Harde Duine”) and are particularly well displayed where erosion, road cuttings and limestone quarries reveal their internal, large-scale dune-slipface crossbedding. The older aeolianites that cover the Miocene and Pliocene De Hoopvlei Formation marine deposits are consigned to the Wankoe Formation (Tw) in which is also a composite. The maximum ages of these old aeolianites are the ages of the marine formations that underlie them and thus the Wankoe Formation aeolianites must also become younger towards the coast.”* Oftentimes, these aeolianites are poorly exposed due to extensive soil and vegetation cover (Almond 2012).

Bredasdorp Group: Strandveld Formation

According to Nel (2024a) for a development near Stanford, the Strandveld Formation features terrestrial gastropods, shell middens, calcified plant roots and stems, and evidence of human activity. Notable terrestrial gastropods include

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Achatina zebra, Trigonephrus sp., Burnupia sp., Trachycystis sp., and Fauxulus sp., which indicate a more recent environment with considerable vegetation. Shell middens in this formation contain marine shells like sand-mussel (*Donax serra*), limpets (*Patella spp.*), and alikreukel (*Turbo sp.*), as well as artefacts and pottery fragments, pointing to ancient human activity and interaction with the coastal environment. Calcified plant roots and stems, known as dikaka, suggest periods of vegetation followed by the fossilisation of plant material.

Bredasdorp Group: De Hoopvlei Formation

In a nearby Palaeontology Impact Assessment (PIA) by Pether (2021b), he notes that *“This is a poorly-sorted marine conglomerate in which oyster shells are preserved (Figure 10) (Viljoen & Malan, 1993). Other fossil shells are not mentioned, but moulds of shells are often present in such occurrences. These shelly marine conglomerates are at the highest elevation at which such beds are recorded (~120 m asl.). However, the mid-Miocene fossil fauna is poorly recorded due to poor preservation and the difficulties of studying shell moulds. Most of the shelly fauna recorded from the De Hoopvlei Formation has been sourced from the younger, lower-lying, Pliocene parts in which the shell content is better preserved. A study of the cryptic fossils in the high elevation outcrops of the De Hoopvlei Formation is likely to reveal an assemblage that differs from the existing, “bulk” species assemblage recorded hitherto. Consequently, the high-elevation outcrops of the De Hoopvlei Formation ... are accorded MODERATE palaeontological sensitivity”*

Nardouw Subgroup: Skurweberg Formation (Nel 2026)

To date, no body fossils have been recorded from the Skurweberg Formation. Fossil occurrences are restricted to trace fossils preserved mainly within finer-grained mudstone intervals and include trilobite scratch burrows (Cruziana), arthropod trackways, annulated sediment-feeder burrows (Arthropycus alleghaniensis), and vertical tube burrows (Skolithos) associated with sandier horizons (Malan et al., 1989; Theron et al., 1989; Almond, 2008; Pether, 2022). Locally, Skolithos burrows form characteristic “pipe-rock” facies, reflecting the activity of suspension-feeding invertebrates in shallow marine to estuarine environments (Malan et al., 1989; Theron et al., 1989; Almond, 2008; Pether, 2022). The Skurweberg Formation is regarded as having a Low palaeontological sensitivity due to the scarcity of fossil material, the absence of body fossils, and the effects of deformation, jointing, and deep weathering on the resistant quartzitic lithologies. The formation within the current project area is therefore considered to have Low Palaeontological Sensitivity.

Nardouw Subgroup: Baviaanskloof Formation (Nel 2026) and Rietvlei Formation (Nel 2024b)

The Nardouw Subgroup consists of the Goudini, Skurweberg, and Rietvlei formations (west of 21°E). East of 21°E, the equivalent to the Rietvlei Formation is the Baviaanskloof Formation.

Nel (2024b) explains that significant fossils have been discovered in the eastern equivalent of the Rietvlei Formation, the



Baviaanskloof Formation. The upper unit of this formation hosts a diverse array of marine invertebrates, including homalonotid trilobites, articulate and inarticulate brachiopods, nuculid and other bivalves, plectonotid gastropods, and bryozoans (Boucot et al., 1963; Toerien & Hill, 1989; Theron et al., 1991; Johnson, 1976; Hill, 1991; Rossouw et al., 1964). The formation has also produced fossils of early land plants (Gess & Prestianni, 2021). This site is notable for its exceptionally well-preserved and diverse flora, comprising approximately fifteen taxa, including new species such as Krommia parvapila, Elandia itshoba, and Mtshaelo kougaensis (Gess & Prestianni, 2021). Of particular importance are species belonging to the genus Cooksonia, which provide valuable insights into the evolution of early land plants and the environmental conditions of the period.

In a nearby PIA, Nel (2026) notes that the Baviaanskloof Formation preserves some of the earliest Devonian-aged fossils known from South Africa and records the first appearance of the characteristic Malvinohosan fauna in the Cape Basin (Penn-Clarke, 2019; Penn-Clarke et al., 2018a; Penn-Clarke and Harper, 2023; Gess and Reddy, 2024; Penn-Clarke et al., 2026). The formation is also significant for preserving some of South Africa's oldest terrestrial plant remains. Although bioturbation is common throughout the Baviaanskloof Formation, trace fossils are relatively sparse. The only distinct ichnofossils reported to date are simple horizontal tubular burrows, indicative of benthic invertebrate activity within shallow marine depositional environments (Hill, 1991; Gess and Prestianni, 2021). Based on the scientific importance of the Baviaanskloof Formation the formation has been ascribed a Very High Palaeontological Sensitivity.

Uitenhage Group: Enon Formation (Nel 2026)

The Enon Formation of the Uitenhage Group is dominated by coarse-grained, high-energy fluvial and alluvial deposits, including conglomerates and sandstones (McLachlan & McMillan, 1976; Shone, 1976). These depositional conditions are largely unfavourable for the preservation of body fossils. Where fossils do occur, they typically comprise poorly preserved and abraded remains, including occasional silicified or charcoallified wood fragments and rare bone fragments (McLachlan & McMillan, 1976; Muir, 2020). No fossil material was recorded within Enon Formation exposures during the site survey. The Enon Formation within the project area is therefore regarded as having Moderate palaeontological sensitivity.

Cenozoic Deposits (Nel 2026)

Quaternary and Cenozoic deposits—including alluvium, loam, and sandy loam—exhibit Low Palaeontological Sensitivity, occasionally preserving trace fossils, plant impressions, and terrestrial vertebrate remains. However, their fossil content is generally sparse and sporadic.

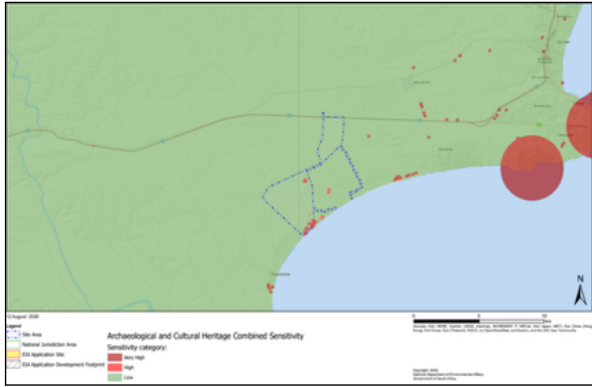
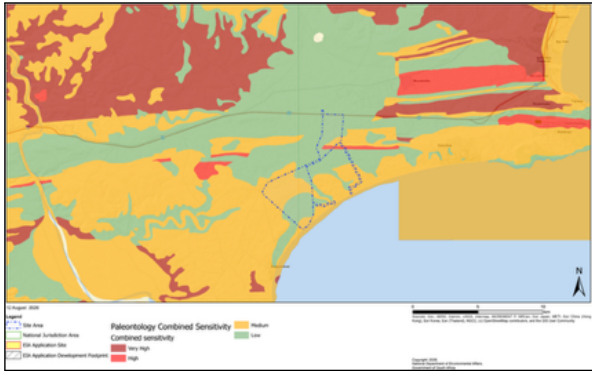
Overall, a recent assessment by Nel (2026) for a separate portion of the Garden Route Gas to Power Project identified no fossil material. Nel has confirmed that the study area is underlain by geological units of low palaeontological sensitivity. A



portion of the site underlain by the Wankoe Formation is rated as moderately sensitive on the DFFE Screening Tool (Section 4), though this has not been formally verified. No significant in-site fossil material is anticipated across the development area, although isolated shell or similar material may occur. A desktop Palaeontological Impact Assessment rather than a field-based assessment is therefore recommended.

4. National Environmental Screening Tool

Table 2: SSVR Table

Theme	Screening Tool Sensitivity	Confirmed Sensitivity	Summary
Cultural Heritage	 DFFE Screening Tool – Very High Sensitivity (generated 12 August 2026)	Medium	Disputed The cultural value of the broader area has medium significance in terms of its settler and agricultural history.
Archaeology		Very High	Confirmed Sensitivity varies across the study area, but the coastline's particularly high density of shell midden sites drives an overall very high sensitivity rating for the proposed development area.
Palaeontology	 DFFE Screening Tool – High Sensitivity (generated 12 August 2026)	Low	Disputed The geology underlying the development area is not very sensitive for impacts to significant fossil heritage.



5. Conclusion

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Palaeontology, Cultural Heritage and Archaeology. The development area is mapped relative to significant heritage resources in the maps below.

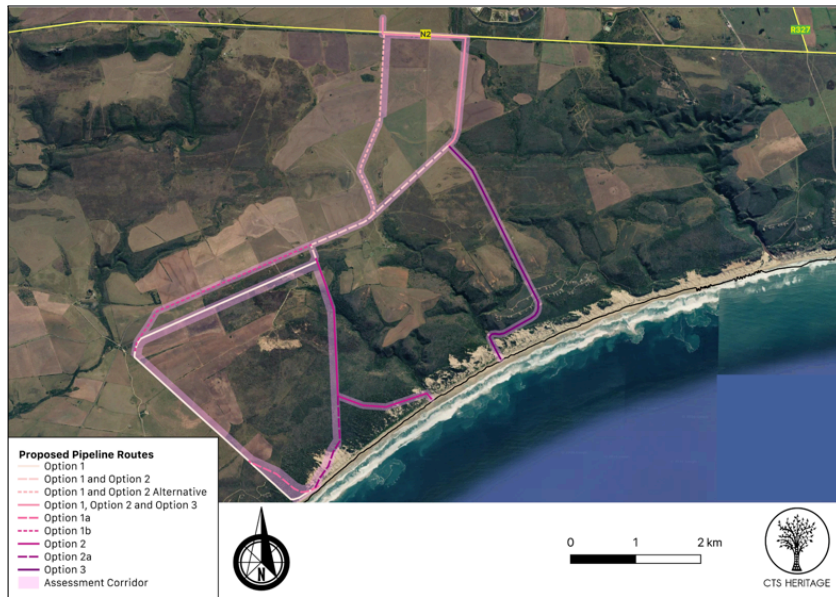
The site proposed for development has MEDIUM sensitivity for impacts to cultural heritage, and VERY HIGH sensitivity for impacts to archaeology. Nevertheless, no impact to conservation-worthy heritage resources is anticipated insofar as the recommended mitigation outlined in Table 1 is applied throughout subsequent phases of the development. Based on the SAHRIS PalaeoSensitivity Map, portions of the study area show potentially moderate to high fossil sensitivity. However, the desktop screening described above suggests that the underlying geology is predominantly of low palaeontological sensitivity, and this is supported by a prior field assessment covering portions of the study area, which identified no fossil material. Consequently, a desktop Palaeontological Impact Assessment is considered sufficient in this case, together with a Chance Fossil Finds Procedure to account for any fossils that may be encountered, though this is considered unlikely.

Ultimately, given the demonstrated heritage sensitivity of the proposed development area, a HIA is required.

A HIA process will be undertaken and will be reported on in a separate HIA report that will be submitted to the SAHRA as is required in terms of section 38(8) of the NHRA. This forms part of the overall ESIA process, and the HIA will also be included in the ESIA Report. The HIA will be undertaken in line with Appendix 6 of the EIA Regulations and will comply with the requirements of the 2007 Minimum Standards for Archaeological and Palaeontological Components of Impact Assessment Reports.

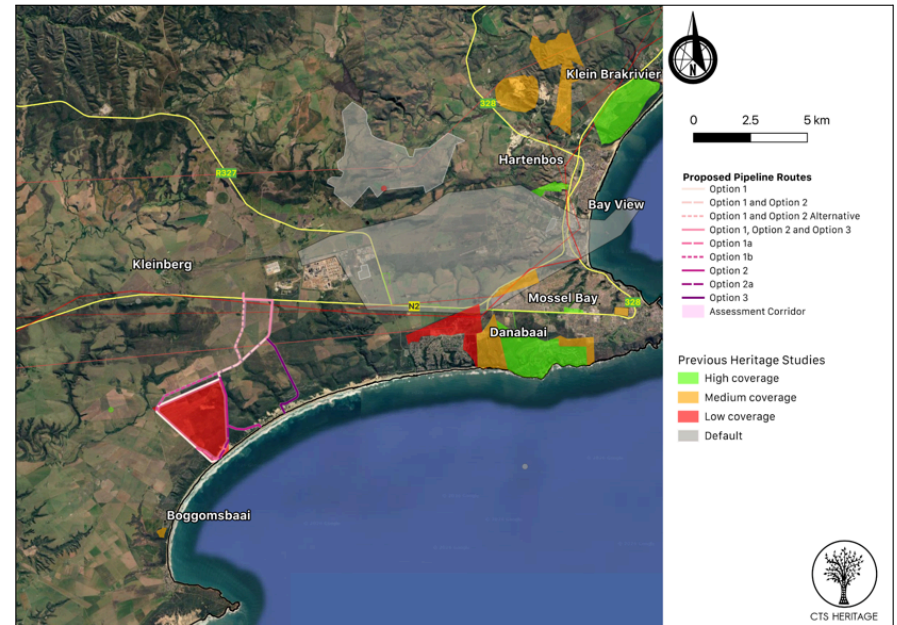


6. Mapping



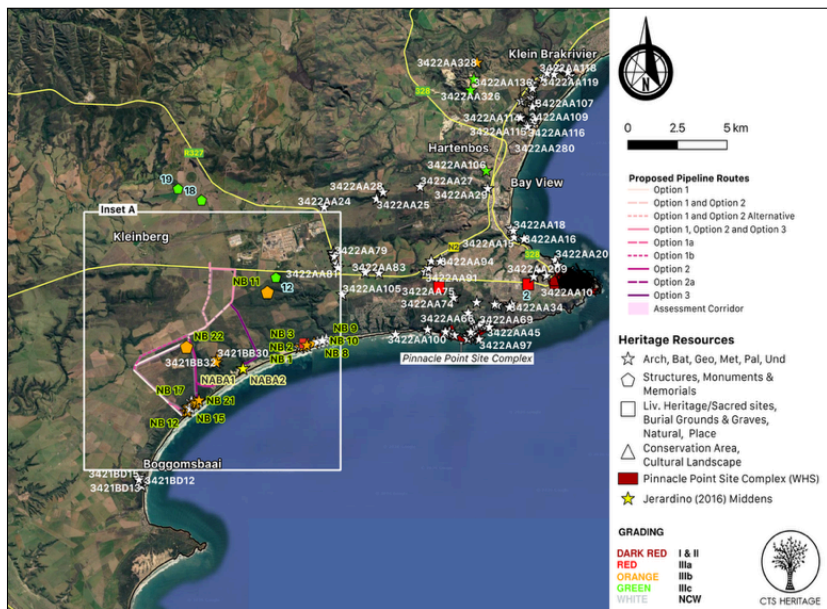
Map O2: Satellite image (2026) indicating the proposed development.

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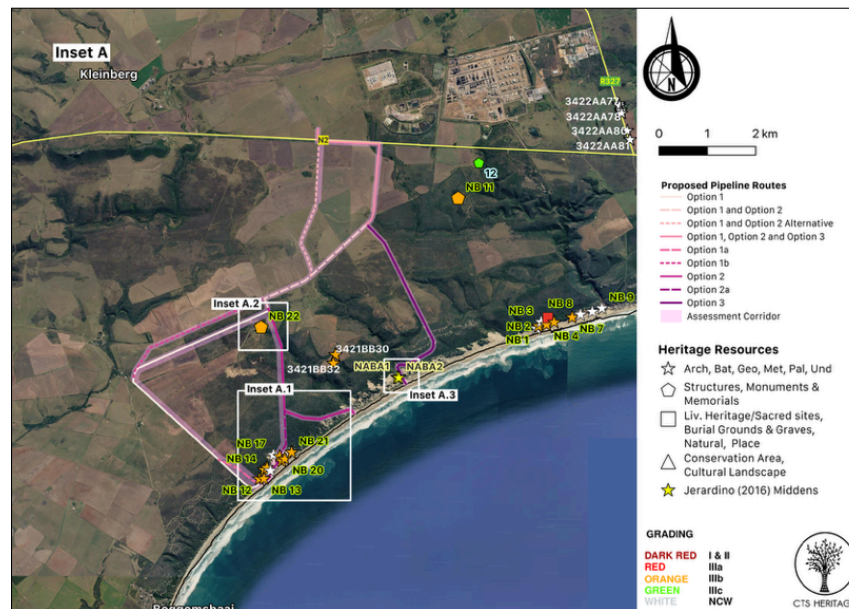
Map HIAS1: Map of previous Heritage Impact Assessments surrounding the proposed development area.

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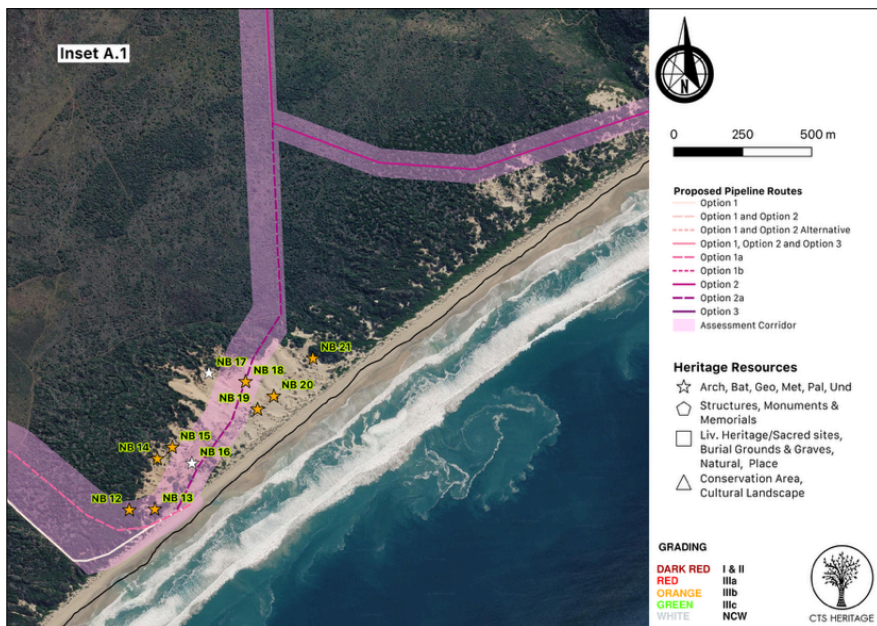
Map HRSP1: Map of Heritage Resources Previously identified in and near the study area, with SAHRIS InvNos indicated. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016). Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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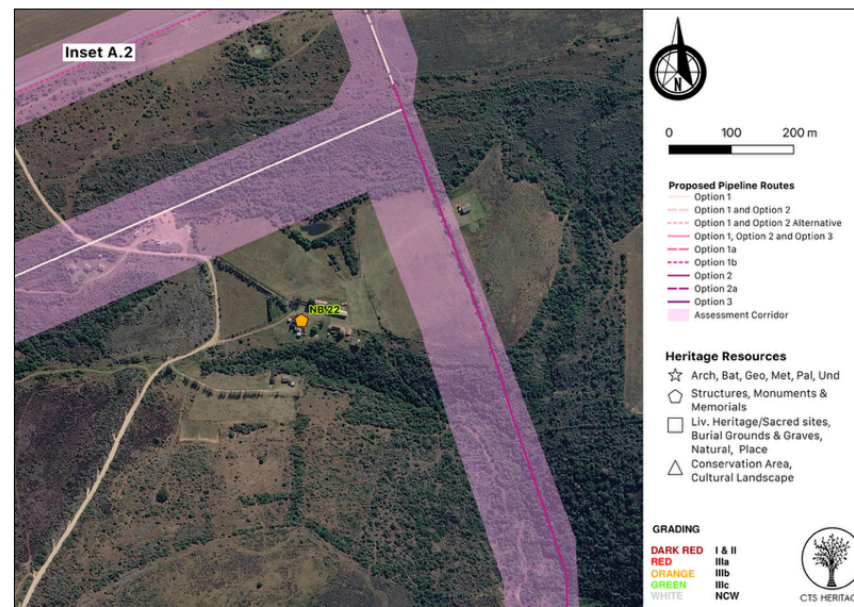
Map HRSP2: Inset A - Closer view of Heritage Resources Previously identified in and near the study area, with SAHRIS InvNos indicated. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016). Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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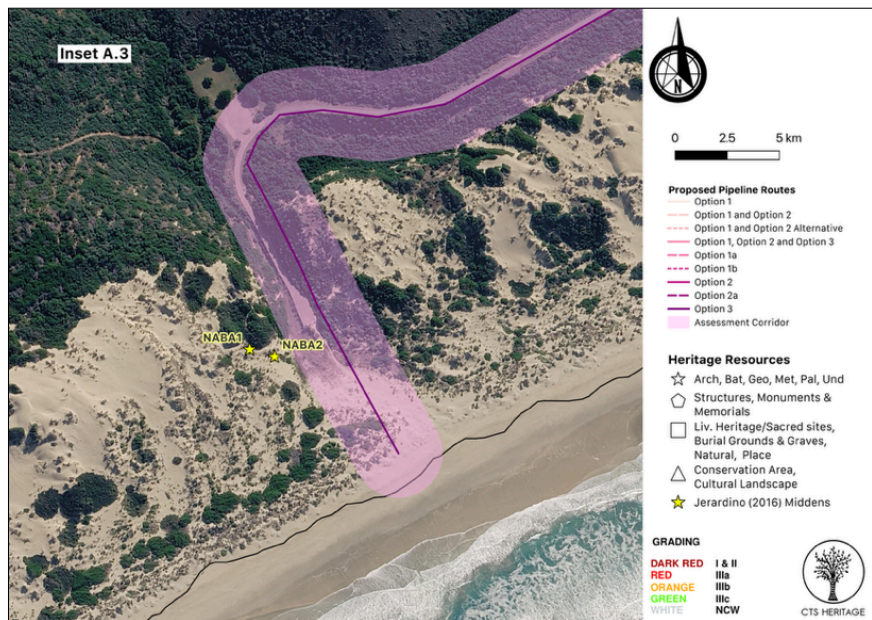
Map HRSP3: Inset A.2 - Closer view of the coastline along which shell middens have been previously identified, with SAHRIS InvNos indicated. Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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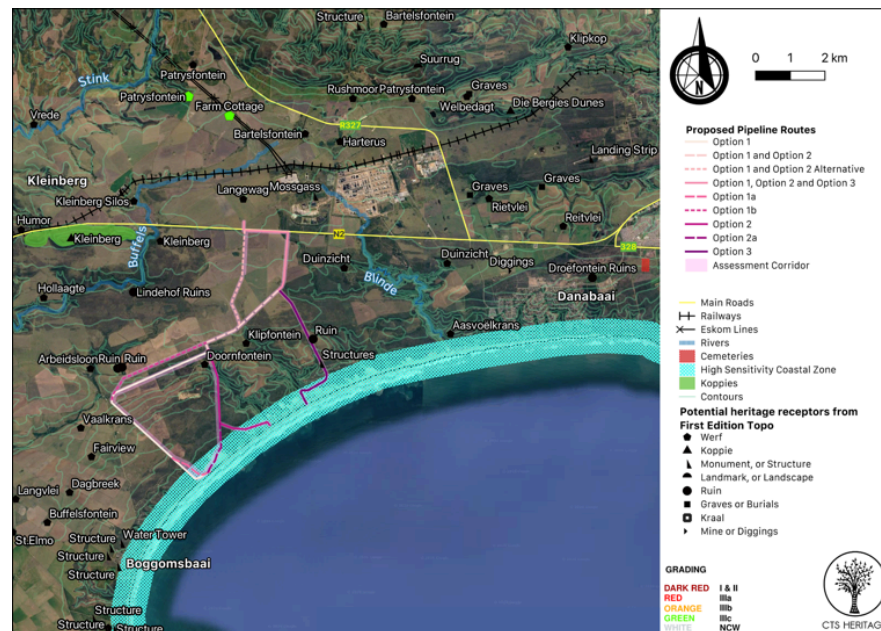
Map HRSP4: Inset A.2 - Closer view of the Doornfontein werf recorded in a previous assessment, with SAHRIS InvNos indicated. Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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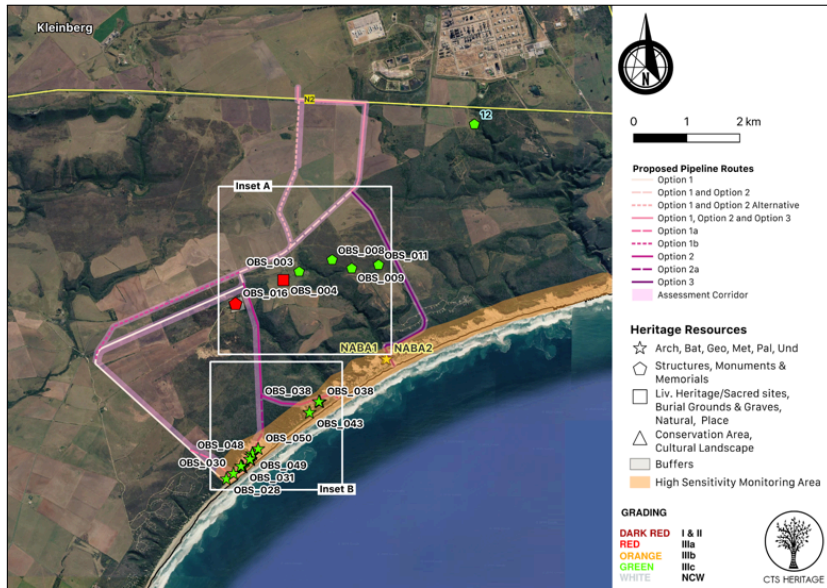
Map HRSP5: Inset A.3 - Closer view of the NABA1 and NABA2 in relation to the proposed onshore route options. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016).

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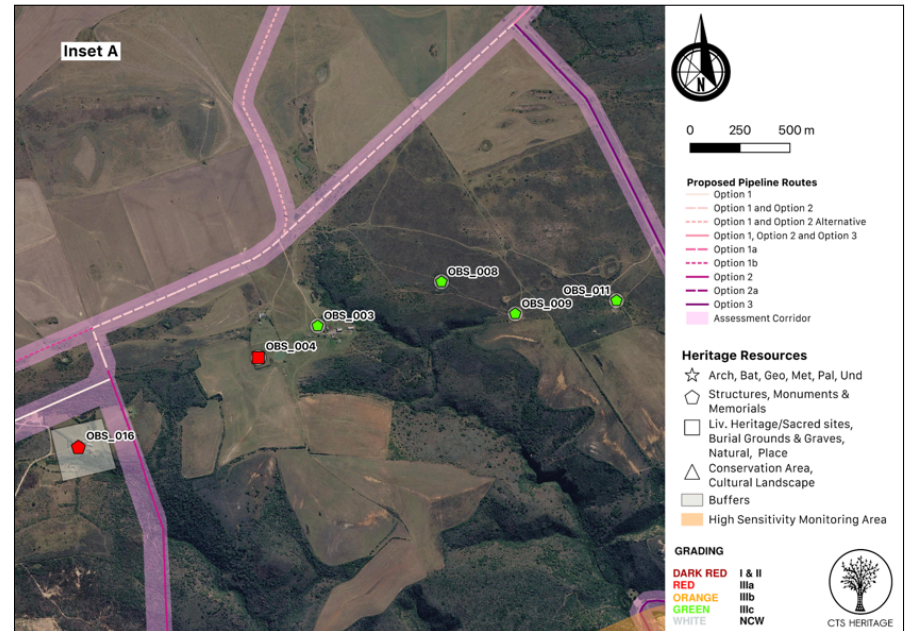


Map CL1: Cultural Landscape Map indicating sensitive receptors near the proposed development, extracted from the Current and First Edition Topographic 1:50 000 maps.

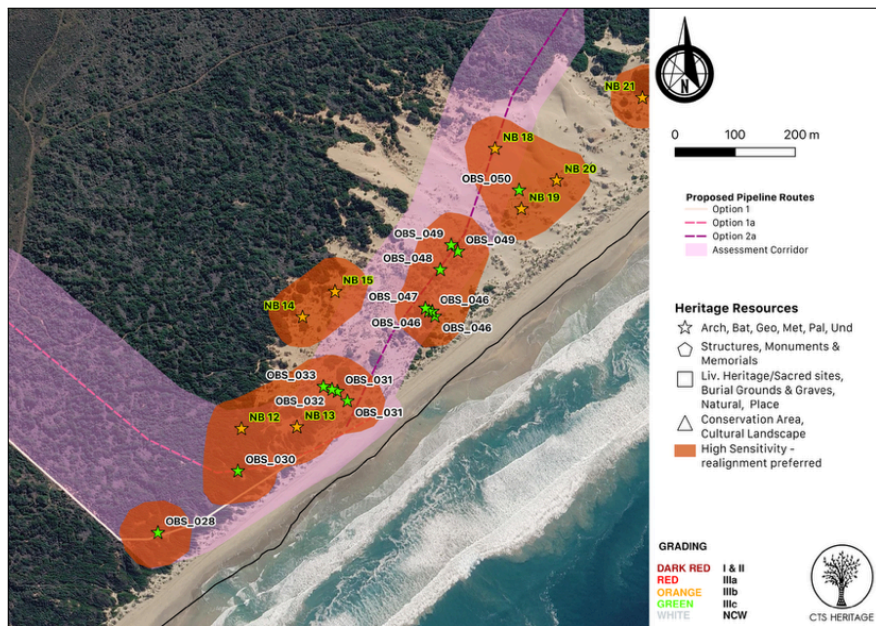
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Map HRS2: Map of all conservation-worthy sites noted during this assessment, with a nearby site (12, blue label) recorded during a recent assessment by CTS Heritage (2026). The orange polygon represents the sensitive coastal zone that must be subject to a Monitoring Brief should any construction activities occur within it, regardless of the chosen corridor.

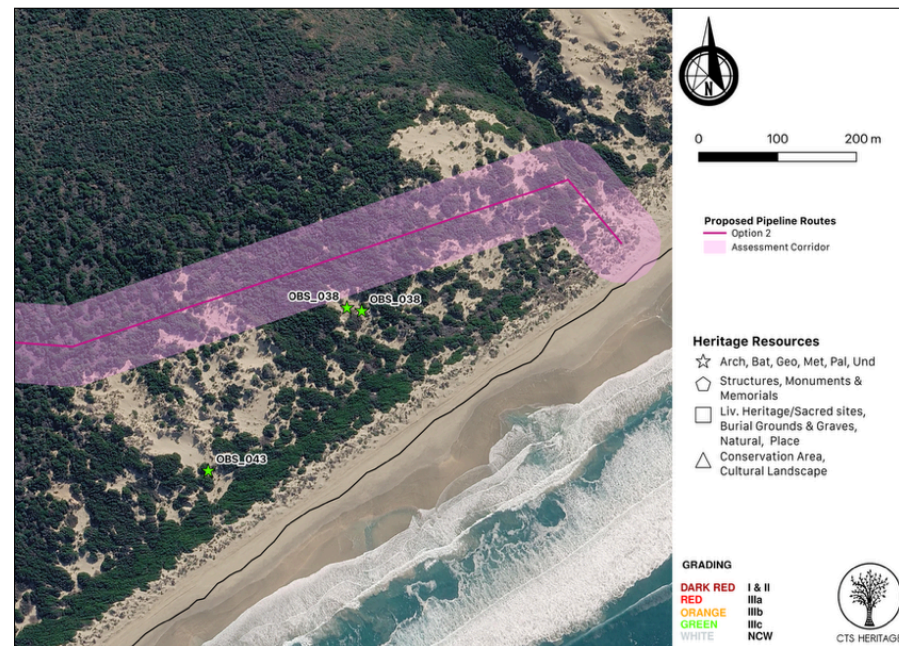


Map HRS3: Inset A - closer view of conservation-worthy sites noted during this assessment.



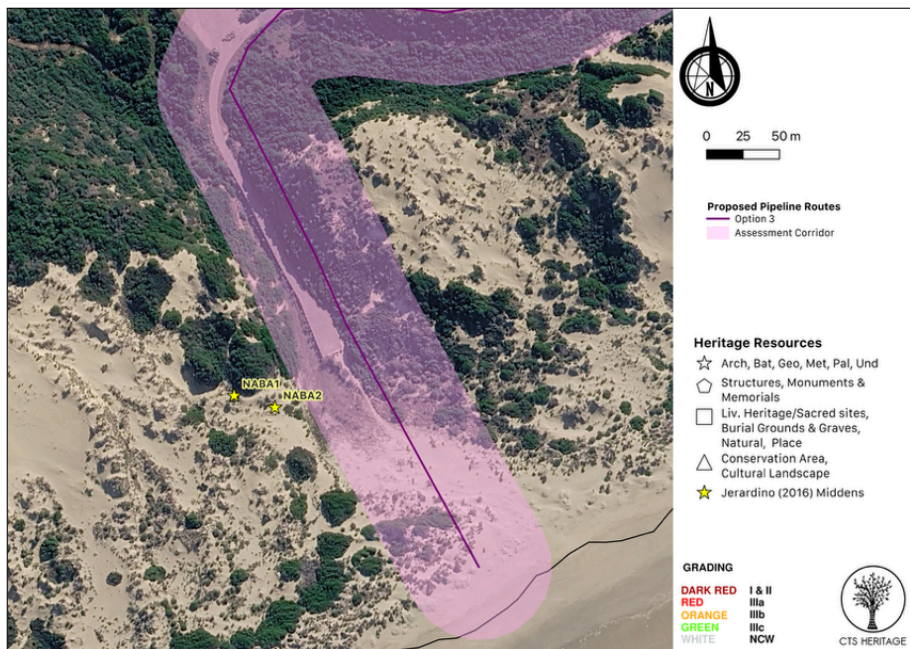
Map HRS6: Map showing heritage sites identified in this report alongside sensitive Kaplan (2004) sites (green labels). Overall, archaeological sensitivity is high in the coastal zone around Option 1, Option 1a and Option 2a. Realignment is preferred.

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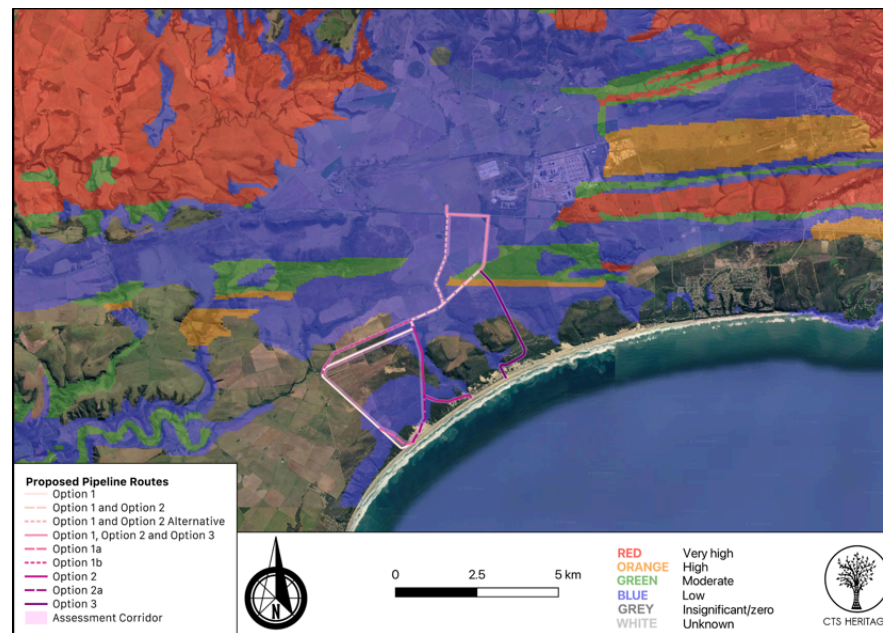
Map HRS7: Map showing the proximity of OBS 38 and OBS 43 to the Option 2 corridor

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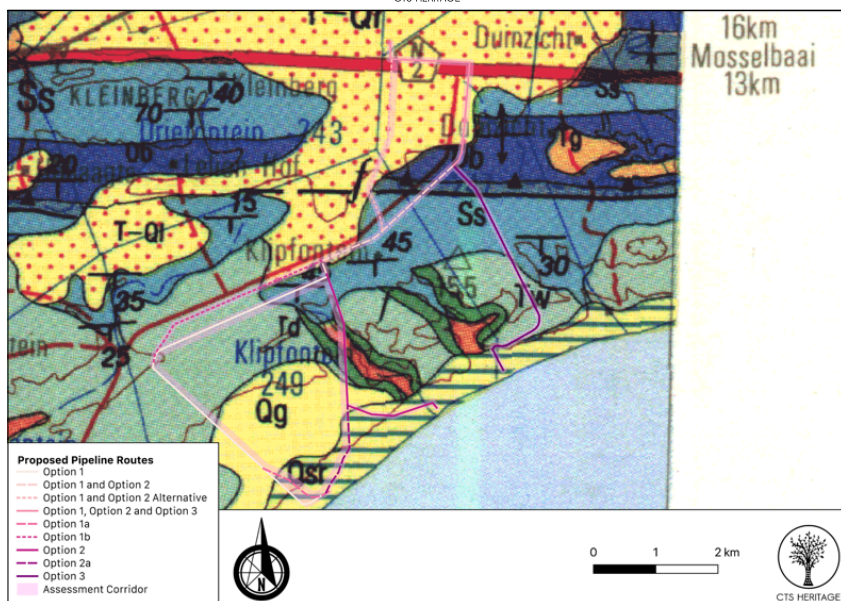
Map HRS8: Map showing the proximity of NABA1 and NABA2 to the Option 3 corridor

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Map PS1: SAHRIS Palaeosensitivity Map indicating Very High fossil sensitivity underlying the study area.

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Map GM1: Extract from the 3420 Riversdale Geology Map showing that the development area is underlain by Quaternary deposits (Qg and T-Q1), the Strandveld (Qst), Wankoe (Tw) and De Hoopvlei (Td) formations of the Bredasdorp Group, the Jurassic Enon Formation (Je), and the Silurian-Devonian Skurweberg (Sk/Ss), Baviaanskloof (Db) and Rietvlei (Dr) formations.

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22



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Reference List from SAHRIS (HIAs etc.)			
Report Type	Author(s)	Date	Title
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AIA Phase 1	Jonathan Kaplan	01/03/2007	Phase 1 Archaeological Impact Assessment: Proposed Development on the Remainder of the Farm Droogfontein No. 245, Mossel Bay
AIA Phase 1	Jonathan Kaplan	01/06/2007	Phase 1 Archaeological Impact Assessment: Proposed Development Outeniquasbosch Safari Park Farms Outeniquasbosch 149 and Hartenbos 217 Mossel Bay
AIA Phase 1	Peter Nilssen	03/07/2007	Archaeological Heritage Impact Assessment the Farm Dawn Dunes 136 Portion 33 and the Farm Rensburg Estate 137 Portion 1, District Mossel Bay, Western Cape Province: Proposed Residential Development
AIA Desktop	Harriet Clift, Lita Webley	08/03/2011	Heritage Scoping report with preliminary impact assessments Fibre optic data cable: Graaff-Reinet to Yzerfontein
AIA Phase 1	Peter Nilssen	24/03/2009	Archaeological Impact Assessment with Comment on Paleontology Construction of Sewer Pipelines for Mossdustria and Erf 6422, District Mossel Bay, Western Cape Province
AIA Phase 1	Lita Webley	01/01/2009	Phase 1 Archaeological Impact Assessment: Tarka Land Restitution Project, Mossel Bay, Western Cape
PIA Phase 1	John E Almond	08/04/2011	FibreCO Data Cable Project: Route 3 from Graaff-Reinet via George and Cape Town to Yzerfontein, Western and Eastern Cape Provinces
Archaeological Specialist Reports	Celeste Booth	20/05/2015	FibreCo Telecommunications Ltd (FibreCo) was given environmental authorisation (EA) by the Department of Environmental Affairs in 2011 to construct and operate a fibre optic data cable along the national road between Cape Town and Durban (divided into three routes for assessment and authorisation purposes â€” routes 3, 4 and 5). An agreement reached between FibreCo and other telecommunication companies regarding the construction of the Cape-Durban route has resulted in changes to Route 3 (this project). Routes 4 and 5 have been assessed and discussed in a separate report.
Heritage Impact Assessment Specialist Reports	Dr J de Jongh	08/03/2015	Specialist Study: Heritage Impact Assessment For The Installation Of The Sirius Fibre Optic Cable Between Johannesburg And Yzerfontein, Gauteng, Free State, Eastern And Western Cape Provinces
AIA Phase 1	Peter Nilssen	05/06/2012	Proposed Upgrade of the Mossel Bay Point on Erven 3419, 3794, 15131 and 3626, Mossel Bay, Western Cape Province

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23



Heritage Statement	Jayson Orton	12/03/2010	HERITAGE STATEMENT FOR THE PROPOSED OUTENIKUAS DRIFT ON THE GOURITZ RIVER, RIVERSDALE AND MOSSEL BAY MAGISTERIAL DISTRICTS, WESTERN CAPE
HIA Phase 1		01/09/2014	Heritage Impact Assessment: Maandagskop proposed sand and stone quarry expansion on Portion 12 (Remaining extent) of the farm Hartenbosch No: 217
PIA Desktop	John Pether	28/04/2014	Palaeontological Desktop Assessment: Extension of quarrying on portion 12 of Farm Hartenbosch 217 (Maandagskop Crusher) Mossel Bay, Western Cape
AIA Phase 1	Jonathan Kaplan	31/10/2009	Archaeological Impact Assessment Proposed Development Erf 2833 Great Brak River Southern Cape
HIA	Peter Nilssen	15/05/2012	Proposed Development of the Mossel Bay Wind Farm: Including Portion 13 of Farm Hartebeest Kuil 213, Portions 3, 5, 12, 13 & 15 of Farm Welbedagt 215 and Portion 11 of Farm Bartelsfontein 226, Mossel Bay, Western Cape Province
PIA Desktop	John Almond	31-07-2012	PALAEONTOLOGICAL SPECIALIST STUDY: DESKTOP ASSESSMENT Proposed Lunsklip Wind Farm on farms Melkoutefontein 480 (Portion 135), Holvlei 630 (Remainders 2 and 3), Luinsklip 472 (Remainder portions 7, 2, 25) and Luinsklip 626, Still Bay, Western Cape

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ARCHAEOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA for the

The Proposed Field Development in Block 11B/12B and associated production activities

Prepared by CTS Heritage



Nicholas Wiltshire
Henrick Keyter
Gemma Poretti

In Association with
SLR Consulting (South Africa) Proprietary Limited

September 2026



EXECUTIVE SUMMARY

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some ephemeral inland Stone Age materials and modern infrastructure and buildings of limited scientific or heritage value were identified. However, the majority of the significant heritage resources identified relate to the coastal Stone Age deposits and historic farming occupation of the project area. The identified resources include the remnants of artefact scatters, shell middens, historical werfs and structures, as well as one formalised burial site.

The archaeological and heritage resources identified during this assessment fall into two broad categories: those associated with the inland corridor sections, and those associated with the coastal landfall points. The inland corridor sections are considered acceptable from a heritage perspective, containing sites that fall well outside the proposed development corridors, and no impact to heritage resources is anticipated in these areas, provided the no-development buffers identified in this report are respected during any future layout adjustments.

The coastal landfall points present a considerably more constrained heritage picture, owing to the density and distribution of Stone Age artefact scatters and shell middens in this zone. Nine sensitive shell middens identified during this assessment, together with a further eight high-significance sites recorded by Kaplan (2004), fall within or in close proximity to the Option 1, Option 1a, and Option 2a corridors. A summary of these sites, and their position relative to each corridor option, is provided in Table 1 below. On this basis, Option 1, Option 1a, and Option 2a are the least preferred landfall points from a heritage perspective, given the density of identified sites within these corridors.

Should Option 1, Option 1a, or Option 2a be taken forward, avoidance, through realignment of the landfall point to avoid the identified coastal sites and sensitivities, remains the first-choice approach. However, given the density and distribution of archaeological material in this area, realignment is unlikely to avoid all sensitivities entirely. Where avoidance cannot be achieved, a Work Plan approved by Heritage Western Cape (HWC) would be required prior to construction. For these options, the Work Plan would need to cover pre-construction mitigation at the specific sites that cannot be avoided (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and/or Kaplan's (2004) sites), such as detailed survey, sampling, and/or salvage excavation; and a construction-phase Monitoring Brief across the wider coastal zone, as described below.

The landfall point at Option 3 is the most preferred from a heritage perspective. Unlike Options 1, 1a, and 2a, its route to the coast runs directly inland rather than parallel to the coastline, resulting in a more limited and localised footprint and a correspondingly lower likelihood of significant impact. For Option 3, and for all other route options,

an approved Work Plan would still be required, but would need to cover a construction-phase Monitoring Brief only, since no known sensitive sites requiring pre-construction mitigation would be affected.

Table 1: Summary of archaeological sites and their position relative to the corridor options assessed

Site Number	Reference	Grade	Corridor Option	Position
OBS 28	This report	IIIC	Option 1	Within corridor
OBS 30	This report	IIIC	Option 1a	Within corridor
OBS 31	This report	IIIC	Option 2a	Within corridor
OBS 32	This report	IIIC	Option 2a	Within corridor
OBS 33	This report	IIIC	Option 2a	Within corridor
OBS 46	This report	IIIC	Option 2a	Within corridor
OBS 47	This report	IIIC	Option 2a	Within corridor
OBS 48	This report	IIIC	Option 2a	Within corridor
OBS 49	This report	IIIC	Option 2a	Within corridor
NB 12	Kaplan (2004)	IIIB	Option 1a	Within corridor
NB 13	Kaplan (2004)	IIIB	Option 1a	Within corridor
NB 14	Kaplan (2004)	IIIB	Option 2a	~46 m from corridor
NB 15	Kaplan (2004)	IIIB	Option 2a	~18 m from corridor
NB 18	Kaplan (2004)	IIIB	Option 2a	Within corridor
NB 19	Kaplan (2004)	IIIB	Option 2a	~25 m from corridor
NB 20	Kaplan (2004)	IIIB	Option 2a	~65 m from corridor
NB 21	Kaplan (2004)	IIIB	Option 2a	~130 m from corridor
OBS 38	This report	IIIC	Option 2	~20 m from corridor
NABA1	Jerardino (2016)	Ungraded	Option 3	~20 m from corridor
NABA2	Jerardino (2016)	Ungraded	Option 3	~40 m from corridor

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- The identified and graded archaeological sites and high-sensitivity areas listed in Table 3 and mapped in HRS1-8 are avoided, and that the recommended no-development buffers are adhered to throughout all phases of development;
- Where the approved route follows Option 1, Option 1a, or Option 2a and cannot avoid known sensitive sites (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and Kaplan's (2004) sites)a Work Plan must be submitted to and approved by Heritage Western Cape (HWC) prior to construction. The Work Plan must set out the methodology for pre-construction mitigation at each affected site (e.g. survey, sampling, and/or salvage excavation), which must be completed and reported on prior to construction proceeding through these areas, as well as the methodology for construction-phase Monitoring Brief;
- The sand dunes along the coastline, mapped as an orange polygon in HRS2, 4 and 5, are considered a sensitive area containing high-density lithic scatters and shell middens. Regardless of the route option selected, all construction activities in this area must be monitored by a qualified archaeologist or heritage practitioner under the Monitoring Brief established through the Work Plan, to account for previously unrecorded archaeological sites and/or human remains that may be exposed during construction. This Work Plan would typically be developed once the final route has been approved, ahead of construction commencing. Material encountered may be assessed in the field for significance: material of low or no significance may require no further action; material of moderate significance may require work to pause in the immediate vicinity of the find for on-site recording and collection; and material of high significance (e.g. dense in-situ shell midden deposits or human remains) may trigger a stop-works order for that area, with the response, ranging from further recording to salvage excavation, proceeding under the terms approved in the Work Plan, without the need for a separate new permit application. The specific requirements of the Monitoring Brief will be determined during the Work Plan process, and must be incorporated into the EMPr;;
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. Outside the coastal zone addressed by the Monitoring Brief above, if any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal or ash concentrations, shell-bearing horizons), fossils, burials, or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find, and HWC must be alerted immediately to determine an appropriate way forward.



CTS HERITAGE

CONTENTS

1. INTRODUCTION

- 1.1 Background Information on Project
- 1.2 Description of Property and Affected Environment

2. METHODOLOGY

- 2.1 Purpose of Archaeological Study
- 2.2 Summary of Steps Followed
- 2.3 Constraints & Limitations

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

- 3.1 Background and History
- 3.2 Archaeology
- 3.3 Built Environment

4. IDENTIFICATION OF HERITAGE RESOURCES

- 4.1 Field Assessment
- 4.2 Archaeological Resources Identified
- 4.3 Selected Photographic Record of Observations

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

- 5.1 Assessment of Impact to Archaeological Resources

6. CONCLUSION AND RECOMMENDATIONS

7. REFERENCES

- Reference List from SAHRIS (HIAs etc)
- Additional References used

5

5

6

11

11

11

11

13

13

14

21

30

30

40

58

64

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68

72

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74



CTS HERITAGE

1. INTRODUCTION

1.1 Background Information on Project

Main Street 1549 (Pty) Ltd (Main Street),¹ together with its Joint Venture (JV) partners at the time,² conducted exploration activities in Block 11B/12B, located ~75 km off the South Coast of South Africa, roughly between Mossel Bay and Cape St Francis. These activities, undertaken under their Exploration Right (Ref. No. 12/3/067), included seismic surveys and exploration well drilling, which led to the discovery of gas and associated condensates in the Brulpadda 1AX (2019) and Luiperd 1X (2020) wells.

Following the discovery of gas-condensate within the Paddavissie Fairway, the JV partners evaluated several development scenarios, considering both current and potential future domestic gas market demand. In September 2022, the JV partners submitted an application for a Production Right (PR 12/4/013) (PR).

Under TEEPSA leadership, the JV also applied for an Environmental Authorisation (EA) and commissioned an Environmental and Social Impact Assessment (ESIA) for an early field development scenario, accompanied by a public participation process in 2022 and 2023. However, in 2024, TEEPSA resigned as operator of Block 11B/12B, and together with QatarEnergy and CNRI, withdrew from the project. Main Street, elected to continue with the Project and assumed operatorship.

As the new operator, Main Street planned to advance the Project through a downscaled, largely non-intrusive survey campaign to assess the metocean, benthic, geotechnical and geophysical conditions in the area, thereby informing potential future development scenarios. An EA application for this survey campaign was subsequently submitted, and the associated ESIA process commenced in February 2025.

As a result of the progressive evaluation and advancement of technical development work, and in accordance with the principles of integrated environmental management under National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), Main Street has expanded the ESIA to encompass the entire field development of the Paddavissie Fairway. This approach ensures comprehensive assessment of all reasonably foreseeable environmental and socio-economic impacts. This expansion in scope has led to the submission of the current EA application and associated ESIA process.

In terms of the requirements of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), published under the NEMA, the proposed development and production activities require an application for EA and the undertaking of an ESIA process. Main Street appointed SLR Consulting (South Africa) (Pty) Ltd (SLR) to undertake

¹ Main Street is owned by Africa Energy SA Corp (Africa Energy) and Arostyle Investments (RF) Limited.

² Main Street's JV partners in the Exploration right were Canadian Natural Resources International (South Africa) Limited (CNRI), QatarEnergy International E&P LLC (previously Qatar Petroleum International Upstream LLC) and TOTAL Energies EP South Africa (now TotalEnergies EP South Africa S.A.S.) (TEEPSA).



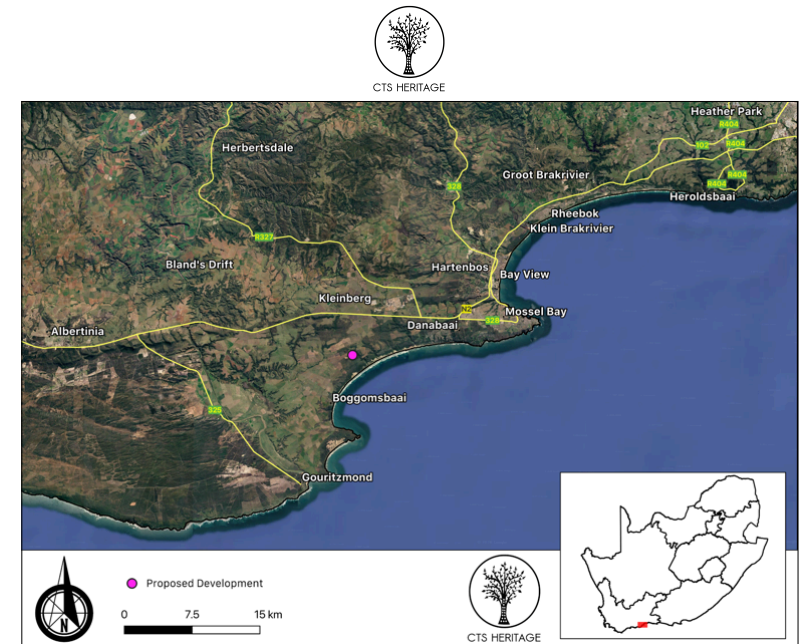
the ESIA process. CTS Heritage has in turn been appointed to undertake the Heritage Impact Assessment (HIA), which includes both archaeology and palaeontology. This Archaeological Impact Assessment (AIA) report is therefore a specialist input compiled in support of the overarching HIA

1.2 Description of Property and Affected Environment

The onshore development footprint lies largely south of the N2, roughly 17 km southwest of central Mossel Bay, a small coastal town in the Western Cape along the southern coast. The Gourikwa power station and Petro SA Gas to Liquids Refinery lie north/northeast across the N2 from the onshore development area. Two route alternatives pass in close proximity to the Nautilus Bay and Springerbaai eco estates respectively. Access to the site is provided via the N2 and the P1532, which connects Vleesbaai to the N2.

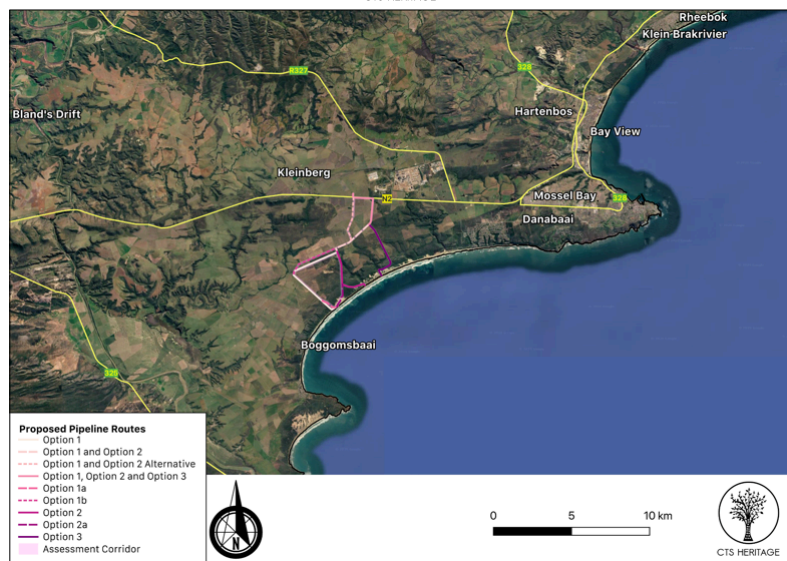
Topographically, the project area comprises relatively flat terrain that merges into gently undulating vegetated dunes along the coast. The sandy soil persists quite far inland, as has been revealed by the sand mining currently taking place on Klipfontein 249. Several small drainage features, such as at Brakwaterkloof, are present along the coastal stretch and lead from the dunes out into the Indian Ocean. Wetland delineation within the project area identified several aquatic feature types within and adjacent to the proposed corridor, including channelled and unchannelled valley-bottom wetlands, seeps, depressions, and associated drainage lines, as well as artificial water bodies such as dams (The Biodiversity Company 2026). The vegetation across the project area is variable, ranging from tilled agricultural fields, planted with agricultural feed at the time of survey, to dense coastal thicket vegetation. Nine major terrestrial habitat types were delineated within the project area, including Modified, Disturbed Areas, Hartenbos Dune Thicket, Disturbed Hartenbos Dune Thicket, Albertinia Sand Fynbos, Disturbed Albertinia Sand Fynbos, Canca Limestone Fynbos, Southwestern Strandveld, and Cape Seashore Vegetation, as well as a set of Freshwater Features (The Biodiversity Company 2026). . The beach between Springerbaai and Nautilus Bay consists of a long stretch of unbroken coastline. For the most part, the dunes are covered by thicket vegetation, but in some areas large portions of the dunes are presently exposed. These modern dune sands frequently cover older compacted sand formations known as palaeosols.

The general region has come to host a diverse range of economic activities and cultural layers. The Gourikwa power station, PetroSA Gas to Liquid refinery including existing pipelines, and the sand mine on Farm Klipfontein 249 contribute to an industrial character of the region away from the coastline. Around these industrial centres, much of the inland region is engaged in farming, specifically the cultivation of crops and livestock feed as well as livestock rearing. The coastal belt hosts popular holiday destinations, and is increasingly covered in modern eco estates and holiday accommodations, as at Nautilus Bay, Springerbaai and Vleesbaai.



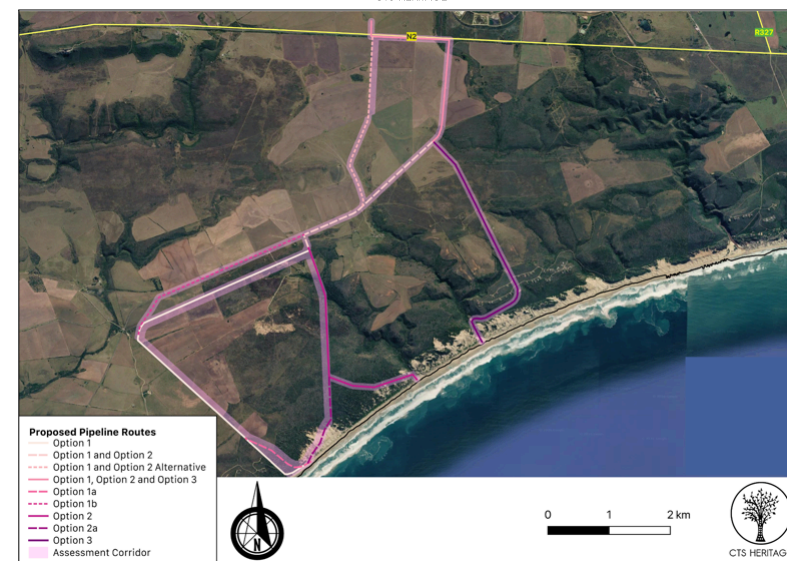
Map A: Satellite image indicating proposed location of onshore development.

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Map O1: Satellite image (2026) indicating the onshore development area.

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Map O2: Satellite image (2026) indicating the proposed onshore development at a closer range.

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2. METHODOLOGY

2.1 Purpose of Archaeological Study

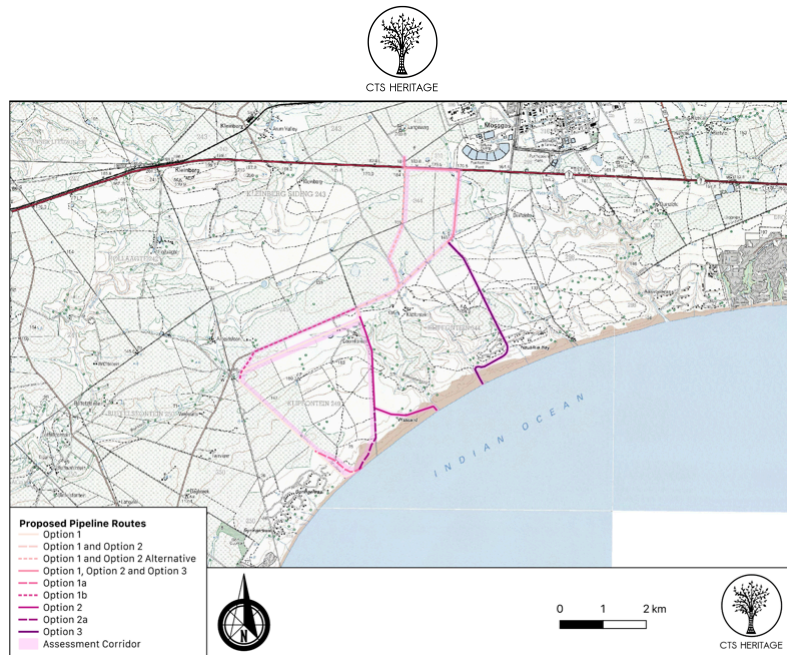
The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) in terms of impacts to archaeological resources.

2.2 Summary of Steps Followed

- An archaeologist, H. Keyter, conducted a survey of the site and its environs from 20 to 21 July 2026 to determine what archaeological resources could potentially be impacted by the proposed development. This survey expands on a previous study in 2024 by CTS Heritage over the same area.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints & Limitations

The survey proceeded well and achieved a high degree of coverage of the onshore project area. The study made use of regional roads, jeep tracks, drone aerial survey and foot-based surveys to cover as much of the area as possible. However, this study was constrained by the dense coastal thicket vegetation belt. This vegetation significantly inhibited movement across portions of the project area and likely obscured the visibility of archaeological material. Similarly, due to the dynamic environment of coastal contexts, much archaeological material is likely buried under the shifting beach dune sands. Notwithstanding these limitations, the remaining portions of the project area were thoroughly surveyed and sensitive heritage resources were identified.



Map 03: 1:50 000 Topographic Map for the onshore development area.

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

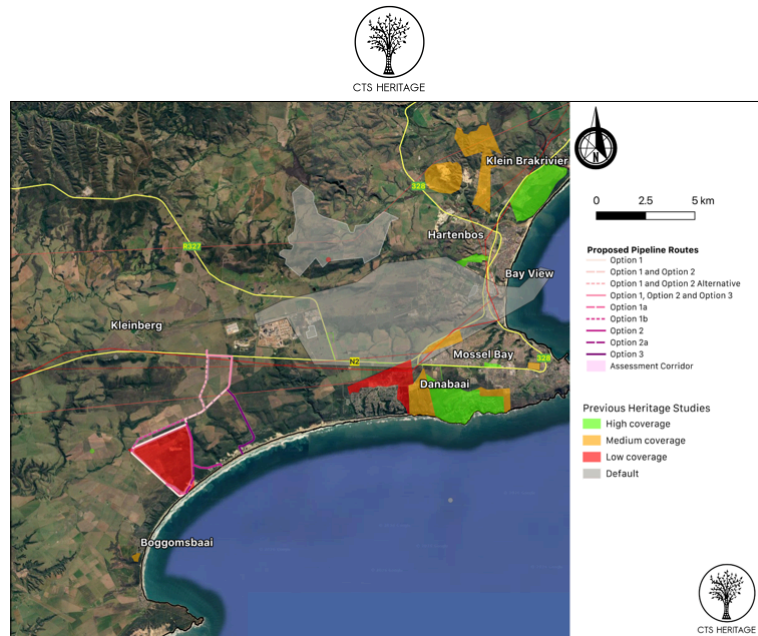
3.1 Background and History

Mossel Bay, sometimes referred to as Mosselbaai and its variety of previous names, is mentioned several times in the Dictionary of Southern African Place Names (Raper et al. 2014):

- **Aguada de São Bras** (C 3422). Portuguese name of Mossel Bay, given by Vasco da Gama on 26 November 1497. 'The watering-place of St Blaize', so called because Da Gama filled his casks with fresh water there on the name-day of St Blaize. Cape St Blaize takes its name from this bay.
- **Aliwal South** (C 3422 AA). Alternative name about 1850 for Mossel Bay.
- **Angra dos Vaqueiros** (C 3421 BD). Now Mossel Bay. 'Bay of herdsmen'; thus named by Dias because he saw many cattle on the shore. Renamed Aguada de São Bras ('watering-place of St Blaize') by Vasco da Gama in 1497 and Mosselbaai by Paulus van Caerden in 1601.
- **Golfo dos Vaqueiros** (C 3422 AA). Portuguese name of Mossel Bay, bestowed in July 1501 by the navigator Joao da Nova because he saw Khoekhoen with herds of cattle there. The name means 'bay of herdsmen'.
- **Mossel Bay** (C 3422 AA). Inlet on the southern coast, 409 km east of Cape Town, between Fish Bay and Victoria Bay. It was named Aguada de São Bras by Vasco da Gama in 1497, Golfo dos Vaqueiros by João da Nova in 1501, and Mosselbaai by the Dutch navigator Paulus van Caerden in July 1601, because mussels (Dutch mossels) were all he could find to replenish the ship's stores.
- **Mossel Bay** (C 3422 AA). Town 409 km east of Cape Town, 90 km south of Oudtshoorn and 55 km south-west of George. It was founded in 1848 and became a municipality in 1852. Originally named Aliwal, it was renamed after the bay to avoid confusion with Aliwal North. The form Mosselbaai is preferred for official purposes.

In terms of Mossel Bay's modern history, in February 1488, the Portuguese explorer Bartolomeu Dias and his men landed on this piece of coast. They were able to replenish their drinking water from a natural spring. Dias's excursion ashore ended hastily when the local people chased him off in a hail of stones. In 1497, Da Gama also landed at Mossel Bay and was able to barter successfully for cattle with the local Khoe people in what is generally regarded as the first commercial transaction between Europeans and the indigenous people of South Africa. Mossel Bay was officially proclaimed a town in 1848, and it became a Municipality in 1852.

Prior to and during colonial settlement, the Mossel Bay landscape was inhabited by indigenous foraging and herding groups, such as the San and Khoekhoen. Halkett and Hart (1996) explain that "After about 20 000 years ago large parts of southern Africa were inhabited by fully modern humans ancestral to the San hunter/gatherers. They persisted until sometime around 2000 years ago when herding people with sheep arrive at the Cape presumably from the north. Physically they resembled the San but probably had a very different lifestyle. It is speculated that hunter gatherers may



Map HIAS1: Map of previous Heritage Impact Assessments surrounding the onshore development area.

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have been displaced in some areas by these new arrivals who were politically more organised and lived in much larger groups in semisedentary encampments moving about the landscape in search of grazing and water. Pottery technology seems to have accompanied this influx. Cattle arrived later. Hunters and herders alike were eventually displaced by colonial expansion and were decimated by disease and warfare."

3.2 Archaeology

As noted in the updated heritage inventory completed for Knysna: "Forty fossilised hominid footprints, dating to about 90,000 years ago, along with various other archaeological discoveries suggest that humans have lived in Knysna for well over 300,000 years. The first of these were various San Hunter-gatherer peoples who inhabited most of Southern Africa in the palaeolithic. The San were gradually displaced and absorbed by south migrating Khoekhoe peoples.

The indigenous inhabitants of the Knysna area are a southern Khoekhoe people called the Houtunqua or Outeniqua. Their name means "The People Who Bear Honey". From the Khoekhoegowab words 'hao 'honey', tun'(teni) verb 'to carry', and khoe rendered as qua meaning 'people'. Little is known about Houtunqua society prior to European contact. What little historical sources exist are not elaborate. It is suspected that at the height of the Houtunqua's society territory stretched from the mouth of the Krom River in the east, along the Outeniqua Mountains which bear their name, up until the **mouth of the Grootbrak River** in the west.

Archaeological evidence suggests that the Houtunqua kept livestock and practised Nomadic Pastoralism but made extensive use of the resources in mountain forests. Excavations in the region have unearthed many caves showing signs of pre-colonial occupation. The discovery of shell middens at Knoetzie beach confirms the idea that like other Khoekhoe peoples, the Houtunqua made use of the ocean for its resources.

Oral tradition among the Houtunqua tells how the Houtunqua held specific superstitions about Europeans and believed them to be "baleful spirits". Thus the Houtunqua went out of their way to avoid contact with Europeans. Where other Khoekhoe tribes established formal relations and trade with Europeans, the Houtunqua receded deeper and deeper into the mountain forests. As a result the Houtunqua disappeared from the historical record for some time with some Houtunqua eventually assimilating into colonial society of the time."

A number of HIAs and AIAs have been undertaken in proximity to the onshore development area. Nilssen (2023) notes the following types of archaeological sites in the area:

"In descending age, the archaeological record in the area includes:

- **Early Stone Age (ESA)** stone implements such as hammerstones, cores, flakes and core tools (hand axes, cleavers, etc), but at this time no ESA sites with associated organic remains are known to occur in this area,
- **Middle Stone Age (MSA)** sites with stone artefacts, cultural and food remains are found in caves, such as those



in the Provincial Heritage Site of the Pinnacle Point Site Complex west of Mossel Bay, but when they occur in the open, they are normally lacking in organic remains,

- **Later Stone Age (LSA)** sites with artefacts, cultural and food remains are also present in some of the fore-mentioned caves as well as open sites such as shell middens normally associated with rocky intertidal zones,
- **Pastoralist or herder** (pottery period) sites may occur in caves or in the open and pottery and the remains of sheep are also commonly found in shell middens; and
- **Colonial period sites** include shipwrecks, farmsteads, structures, transport infrastructure, middens, burials and cemeteries amongst others.

Prehistoric human burials, usually of LSA or more recent age, may occur anywhere in the landscape where soft sediments are present, and are sometimes at or near sites of human occupation both in the open and in caves or rock shelters".

Archaeological evidence from the broader area indicates occupation into the Early, Middle and Later Stone Ages with very highly significant archaeological sites dated to the MSA known from less than 10 km away at sites such as Cape St Blaize and Pinnacle Point (now a World Heritage Site). Shell middens provide insight into the lifeways of people from the LSA and earlier. There is a notable density of shell midden sites recorded along the coastline in proximity to the proposed pipeline route options, many of which are graded IIIB. Two additional shell middens are described in a publication by Jerardino (2016): NABA1 and NABA2 (Table 2.1). These sites – initially recorded by Deacon (1989) and later revisited by Kaplan (2004) – are dominated by *Donax Serra* and *Perna Perna* shells, and also contain burnt shell, charcoal, lithic material, and Cape fur seal bones.

Table 2.1: Sites assessed by Jerardino (2016): NABA1 and NABA2

Site	Co-ordinates		Description
NABA1	-34.222619	21.965139	Recorded by Deacon (1989) and Kaplan (2004) during an AIA. It covers an area of about 5 X 4 m and erodes from all sides. It is situated on top of a reddish palaeo-surface about 30 m above sea level. <i>P. perna</i> is by far the most dominant species, followed by <i>D. serra</i> , <i>S. barbara</i> , <i>S. tabularis</i> (young adults), the large turban snail or alikreukel (<i>Turbo sarmaticus</i>), <i>H. spadicea</i> , as well as much lower concentrations of plough snail <i>Bullia</i> spp., and <i>Scutellastra cochlear</i> and <i>S. granularis</i> limpets. Shell content is embedded in a dark matrix as evidenced by eroding exposed sections. It appears that this is the result of comminuted charcoal since quantities of eroding ash were also observed. No pottery was seen anywhere on the surface or sections. Many manuports (fist-size and larger rocks and beach pebbles), some of which were fire-cracked, were also spotted. Lithic débitage (silcrete, quartzite) and a few fragments of ostrich eggshell fragments were also identified on the surface and within eroding material. Two <i>Glycymeris</i> spp. shells without any perforations were found a few centimetres from each other on one of the site's edges, and a few Cape fur seal bones (<i>Arctocephalus pusillus</i>) were also identified in and among st the shells.
NABA2	-34.222689	21.965444	This site covers an area of about 2 x 1.5 m and is also eroding from all sides. . It is situated about 10 m below NABA1, on the slope of a large white sand dune. <i>D. serra</i> overwhelmingly dominates the shell assemblage, followed in frequency by <i>P. perna</i> , <i>H. spadicea</i> , the topshell or top snail <i>Oxysteles sinensis</i> ,



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and *T. sarmaticus*. Vertebrate remains that could be identified include Cape fur seal, cormorant (*Phalacrocorax spp.*), angulate tortoise (*Chersina angulata*), and also a small bovid (possibly *Raphicerus sp.*). Some shells showed evidence of burning, while ash and charcoal were seen eroding from exposed sections. Large and small quartzite flakes were found on the surface of the site. Given the profusion of eroded *D. serra* shells lying in a secondary context, measurements of shell lengths were obtained with a precision calliper (to the nearest 0.1 mm) from as many shells as possible within the time constraints of the site visit. Much care was taken to return measured *D. serra* shells to the exact same spot where they were found. Data were then entered on an Excel spreadsheet and averages as well as measures of variability were calculated.

In addition to the NABA1 and NABA2 middens, Kaplan (2004) completed an archaeological assessment for a proposed golf estate development in Nautilus Bay. Kaplan's survey area overlaps with the pipeline corridors assessed here, particularly around the landfall points at the coast. Kaplan recorded a high density of Stone Age artefacts and shell midden material in this strip of coastline; many of which he identified as significant. The sites recorded by Kaplan during his 2004 survey are summarised in Table 2.2, and their positions relative to the proposed pipeline corridors mapped in Map HRSP1 to HRSP4.



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Table 2.2: Sites recorded by Kaplan (2004)³

Site Number	Latitude	Longitude	Findings	Significance	Type	SAHRIS INV No.	Verified Grading based on Kaplan's (2004) Descriptions
NB 1	-34.213267	21.996267	LSA/MSA tool scatter, White Mussel and Brown Mussel fragments, on eroded dune slope	Low	Artefacts, Shell Midden	3421BB1	NCW
NB 2	-34.212833	21.9967	Dense LSA/MSA tool scatter (flakes, hammerstones, cores, scrapers), mostly quartzite	High	Artefacts, Shell Midden	3421BB11	IIIB
NB 3	-34.212	21.997267	Small White Mussel scatter, no cultural remains	Low	Shell Midden	3421BB15	NCW
NB 4	-34.212517	21.998467	Extensive LSA tool scatter (flakes, blades, grindstones) and some MSA tools, White Mussel fragments	High	Artefacts, Shell Midden	3421BB16	IIIB
NB 5	-34.2112	21.998783	Modern Christian burial (unmarked mound, wooden cross)	High	Graves/Burial Grounds	3421BB31	IIIA
NB 6	-34.21205	22.000217	Extensive LSA/MSA tool scatter incl. quartzite, silcrete, indurated shale; one ground hematite piece	High	Artefacts	3422AA41	IIIB
NB 7	-34.2111	22.004217	Large stone tool scatter, mostly quartzite with some silcrete; one White Mussel scraper	High	Artefacts	3422AA42	IIIB
NB 8	-34.21055	22.006083	Thin stone tool scatter (cores, flakes, chunks), quartzite; numerous land snails	Low	Artefacts	3422AA43	NCW
NB 9	-34.20935	22.010867	Large White Mussel shell mound, stone tools, one silcrete adze, undecorated pottery; modern disturbance	Medium to low	Artefacts, Shell Midden	3422AA44	NCW
NB 10	-34.21	22.00875	Thin quartzite tool scatter, some silcrete tools and coarse pottery, White Mussel shell	Medium to low	Artefacts, Shell Midden	40	3422AA NCW
NB 11	-34.189147	21.978405	Original farmhouse and outbuildings (vandalised interior), plus family cemetery with two graves (Jacobus & Magdalena Pienaar)	Potentially high (buildings); high (graves)	Ruin > 100 years, Burial Grounds & Graves	3421BB 2	IIIB
NB 12	-34.241733	21.934383	Extensive LSA/MSA tool scatter, possible workshop/activity site, sun-bleached bone, White Mussel	High	Artefacts, Shell Midden	3421BB 3	IIIB
NB 13	-34.2417	21.935383	Large stone tool scatter, quartzite/silcrete/calcrete/quartz, possible workshop areas	High	Artefacts, Shell Midden	3421BB 4	IIIB
NB 14	-34.24005	21.935467	Large quartzite tool scatter, some silcrete tools, ostrich eggshell	High	Artefacts	3421BB 5	IIIB

³ <https://www.sahris.org.za/node/29840>

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Ultimately, the Mossel Bay and Nautilus Bay coastlines are considered particularly sensitive for impacts to significant archaeological heritage.

Away from the coast, the pipeline route options travel adjacent to existing road reserves, cutlines and agricultural fields. These corridors have therefore been significantly disturbed through past activities, and the likelihood of finding or impacting significant heritage resources in these contexts is therefore low.

Similarly, in 2023, Nilssen conducted another HIA adjacent to the proposed development area. He noted that *"Earlier archaeological assessments in the immediate surroundings of the study area found that even though Stone Age implements occur in the area, the landscape is significantly disturbed by natural processes, by colonial period agricultural activities, and by more recent industrial, business and infrastructural developments, and therefore, any archaeological remains within disturbed areas are of low significance and Not Conservation Worthy (Hart 2005, Henderson 2019, Kaplan 2009, Nilssen 2006, 2009a & 2009d)."*

Another nearby HIA by Nilssen (2012) identified *"Fifteen archaeological occurrences/sites ... and these consist of stone artefact scatters of mostly Early and Middle Stone Age origin, but specimens of the Later Stone Age were also noted. While some occurrences/sites occur in previously undisturbed areas, others are in ploughed and disturbed contexts. Apart from these Stone Age artefacts, no other material – including structural – remains of historic or prehistoric significance were identified in the studied area."*

Pinnacle Point Site Complex World Heritage Site

The area proposed for onshore development is located approximately 10 km west of the Pinnacle Point Site Complex, which forms part of the Emergence of Modern Human Behaviour World Heritage Site. As noted in the nomination dossier submitted for this site completed by Marean (2011), *"The density of sites in a small stretch of coastline, and the inter-digitations of the archaeological, paleontological, and geological sites, makes it impossible to draw firm lines between individual sites and single out one or a few to the exclusion of others. Rather, the near-continuous distribution, and its novel ability to represent a swathe of human settlement variation through time and space, warrants the entire locality to be part of the World Heritage Site nomination. For this reason we recognize the Pinnacle Point Site Complex (PPSC) that spans the coastal area below the cliffs from PP1 in the east to PP21 (caves) and to PP18, 19, 22, 31 (shell middens) in the west."*

Marean (2011) continues to note that *"The Pinnacle Point Site Complex preserves in a short stretch of coastline Africa's densest concentration of well-preserved archaeological sites dating to the time of the origins of our species (Homo sapiens). As a result of the calcretes formed on the cliff top and their alkaline buffering action, all the PP sites have excellent fossil bone preservation, unlike many caves along the Cape coast. This makes Pinnacle Point as rich in*



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NB 15	-34.239667	21.93605	Extensive stone tool scatter, ostrich eggshell	High	Artefacts	6	3421BB	IIIB
NB 16	-34.240183	21.936833	Low-density LSA scatter, MSA tools incl. near-perfect Still Bay point	Low	Artefacts	7	3421BB	NCW
NB 17	-34.237233	21.937467	Thin quartzite tool scatter near forest edge	Low	Artefacts	8	3421BB	NCW
NB 18	-34.2375	21.938917	Thin stone tool scatter, quartzite and silcrete, several thousand ostrich eggshell pieces, Oyster shell	High	Artefacts, Shell Midden	9	3421BB	IIIB
NB 19	-34.2384	21.9394	Large stone tool scatter, mostly quartzite, White Mussel fragments	High	Artefacts, Shell Midden	10	3421BB	IIIB
NB 20	-34.237967	21.940033	Large LSA tool scatter and White Mussel fragments, some silcrete incl. CCS blade	High	Artefacts, Shell Midden	11	3421BB	IIIB
NB 21	-34.236717	21.941567	Large stone tool scatter, quartzite, cache of unworked cobbles	High	Artefacts	12	3421BB	IIIB
NB 22	-34.213508	21.934451	Original Doornfontein homestead (Late Victorian), proposed conversion to information centre and stables	High	Building, Burial Grounds & Graves	48	3421BB	IIIB

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archaeological evidence as the world's two densest and most significant clusters of sites from this time interval: the Mount Carmel Caves in Israel and Les Eyzies in France.

There is widespread scientific consensus that the modern human lineage arose in Africa between 200,000 and 150,000 years ago. However, archaeological sites dating between 200,000 and 120,000 years ago are extremely rare in Africa (there are only 3 radiometrically dated archaeological sites from the continent) likely due to widespread hyper-aridity associated with global glacial conditions. One is found at Pinnacle Point (PP13B), meaning that the PPSC may preserve traces of the modern human progenitor population. PP13B contains the world's oldest evidence for coastal exploitation (shellfish), the earliest radiometrically dated use of pigment (ground red ochre), and the earliest evidence for complex bladelet technology. PP5-6, currently under excavation, has one of the thickest continuous sediment stacks of MSA sediments in South Africa (> 14 meters), and probably in all of Africa. Eight meters of sediment in the middle of this stack are currently dated between 86,000 and 48,000 years ago, and the sediments likely reach to 200,000 years ago or older at the base.

Later Stone Age sites are abundant at PP as well, and the most recent, pre-colonial human occupation of the area is represented by coastal shell midden deposits dating (due to the presence of Cape Coastal pottery) to the last 2000 years. Archaeological materials comprise a mix of Later Stone Age and Pastoralist habitation and are particularly important because they are not disturbed by animal burrowing (very common along South Africa's coast) and retain high resolution behavioural data.

In a novel co-association, Pinnacle Point preserves a rich record for paleoclimate and paleoenvironment in the form of speleothems, raised beaches, fossil dunes, and paleontological assemblages. All are spread continuously across the area and together provide a globally unparalleled record of human, climate, and environmental co-evolution. PPSC preserves a unique sequence of human occupation from 170,000 to pre-colonial human occupation embedded in a rich record for climate and environmental change and warrants inclusion in a World Heritage Site."

The Emergence of Modern Human Behaviour World Heritage Sites have been listed under the following Outstanding Universal Values:

- Criterion (iii): The archaeological layers at the Diepkloof Rock Shelter, Pinnacle Point Site Complex, and Sibhudu Cave provide exceptional evidence of behavioural and palaeoenvironmental developments in the Middle Stone Age. They contain early evidence of symbolic thought and advanced technologies. The great variety of materials, the early dates, and the excellent state of conservation make the evidence of this important step in human development exceptional.
- Criterion (iv): Diepkloof Rock Shelter, Pinnacle Point Site Complex, and Sibhudu Cave preserve exceptionally well-stratified and well-dated sedimentary records of ancient human life dating from about 162,000 to



38,000 years ago. The development of modern human behaviour and complex cognition are illustrated by the evidence of abstract thinking, the ability to plan and strategize, and technological innovation, including, for example, the preparation and use of adhesives and the heat treatment of lithic materials.

- Criterion (v): Diepkloof Rock Shelter, Pinnacle Point Site Complex, and Sibhudu Cave offer some of the most important evidence known for the consistent exploitation of coastal resources during the Middle and Late Pleistocene. As current sea levels rise due to climate change, much of the ancient record of human coastal resource use has been obliterated or is in grave danger. As such, the excellent state of conservation of these rare sites is pivotal for preserving evidence of palaeoclimates and palaeoenvironments.

3.3 Built Environment

The first and current edition 1:50 000 topographical maps, along with satellite imagery, indicate that there are several farm werfs, ruins and structures in proximity to the proposed pipeline routes – several of which are likely older than 60 years. A notable example is the Doornfontein werf first recorded by Kaplan (2004) as NB 22 (SAHRIS Inv. No. 3421BB14). Kaplan described it as follows: *"The original Doornfontein homestead was noted (Figure 20). The Late Victorian building is in very good condition. Some alterations have been made at the back of the house, but the building still retains its integrity and original form. The developers propose to convert the main building into an information centre, while some of the outbuildings will be converted for stabling horses. The homestead and one or two of the outbuildings are older than 60 years and therefore protected under the NHRA (Act No. 25 of 1999)."* Kaplan assessed the werf as having high heritage significance; however, no grading was recommended as Kaplan proposed that the structure be inspected by a built-environment specialist to determine its conservation value. Consequently, no grading is provided on SAHRIS, but the werf is no doubt considered conservation-worthy.

Likewise, a recent assessment by CTS Heritage (2026) across Mossel Bay identified several historical structures that were assessed as significant and graded IIIC. The findings of that assessment are summarised in Table 2.3 below. The closest of these sites to the pipeline corridors assessed here is Site 012, located approximately 2 km east of Option 1, Option 2 and Option 3.

Table 2.3: Sites recorded in a Mossel Bay Archaeological Assessment by CTS Heritage (2026)⁴

POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation	Survey
001	Formal cemetery outside Mossel Bay	n/a	Graves/ Burial Grounds	Modern	-34.186005	22.072306	IIIA	Has formal boundary	April 2026
002	Mossel Bay municipal	n/a	Graves/	Modern	-34.184279	22.121041	IIIA	Has formal	April

⁴ Row colours indicate the assigned heritage resource grading, following the convention used throughout this report and accompanying mapping: green denotes Grade IIIC, orange denotes Grade IIIB, and red denotes Grade IIIA.

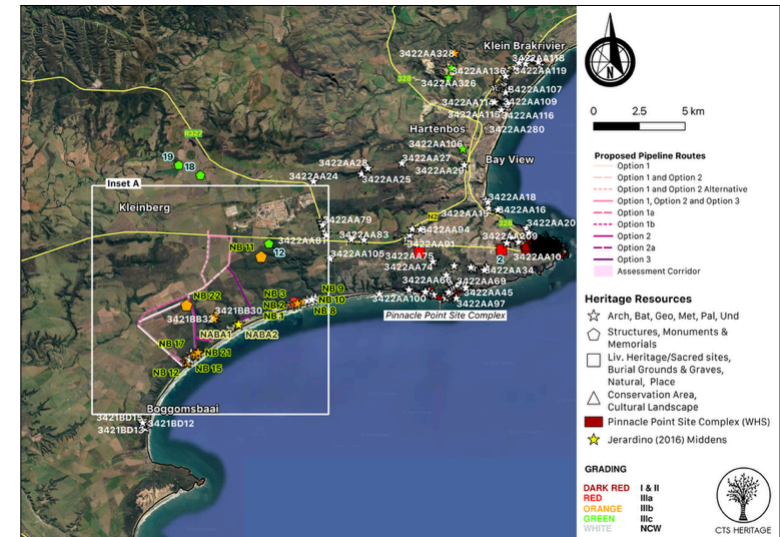


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POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation	Survey
	cemetery		Burial Grounds					boundary	2026
003	Bartolomeu Dias Maritime Museum, hipped corrugated iron roof, sandstone walls	n/a	Structure	Historic	-34.179475	22.141953	IIIA	Formalised, no buffer required. Site 3422AA282 on SAHRIS	April 2026
004	Munro's Hoek Cottages. Series of thatched vernacular buildings, whitewashed walls	n/a	Structure	Historic	-34.179993	22.139912	IIIA	Formalised, no buffer required	April 2026
005	Kramat	n/a	Graves/ Burial Grounds	Historic	-34.179537	22.138587	IIIA	Formalised, no buffer required	April 2026
012	Farm cottage	n/a	Structure	Historic	-34.1825634	21.9829653	IIIC	n/a	July 2025
018	Farm cottage	n/a	Structure	Historic	-34.149015	21.9419641	IIIC	Formalised, no buffer required	July 2025
019	Patryfontein Farmhouse	n/a	Structure	Historic	-34.1441253	21.9290681	IIIC	Formalised, no buffer required	July 2025



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Map HRSP1: Map of Heritage Resources Previously identified in and near the study area, with SAHRIS InvNos indicated. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016). Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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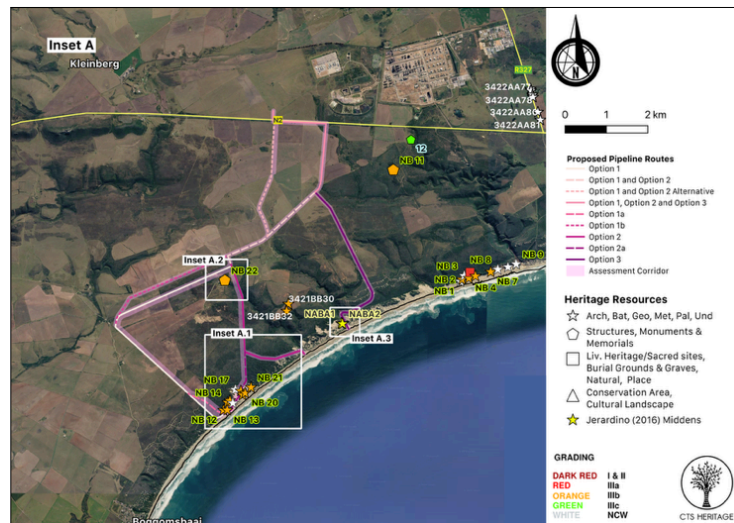
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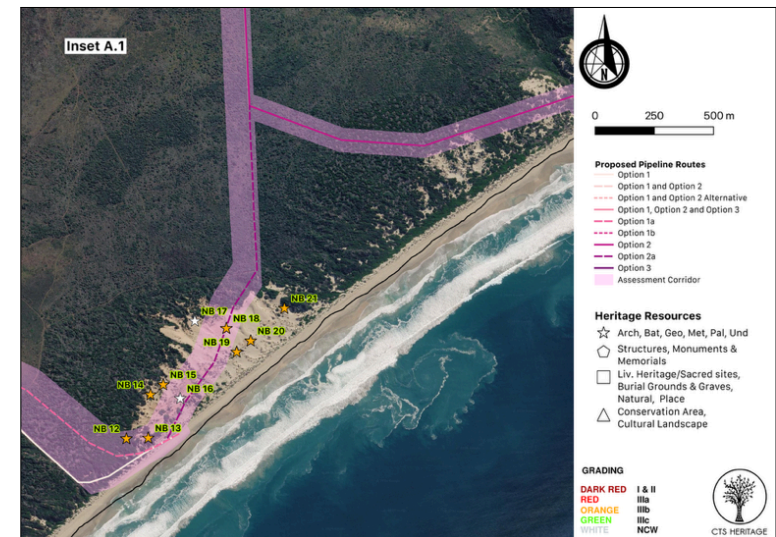
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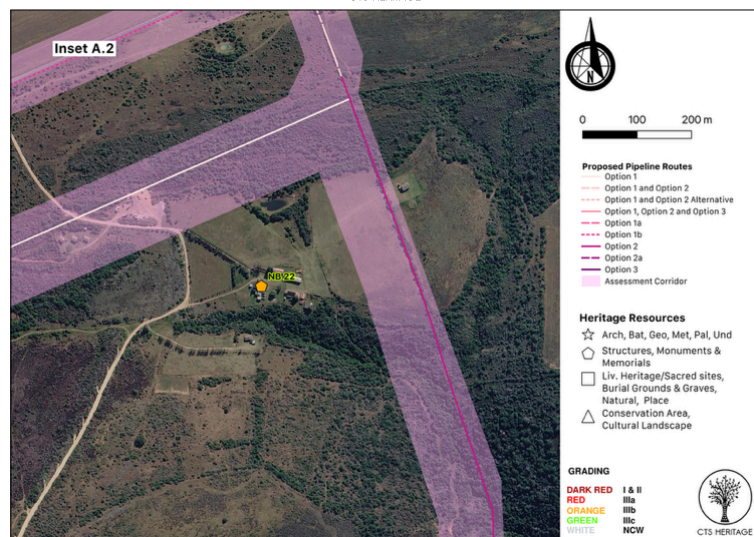
Map HRSP2: Inset A - Closer view of Heritage Resources Previously identified in and near the study area, with SAHRIS InvNos indicated. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016). Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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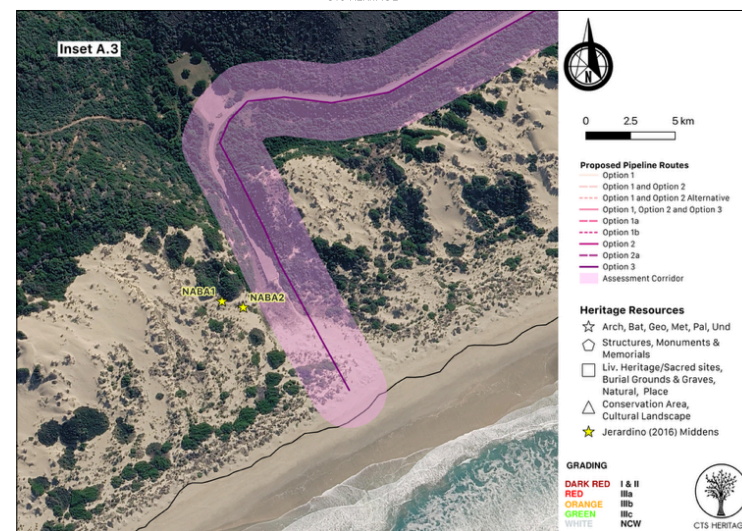
Map HRSP3: Inset A.2 - Closer view of the coastline along which shell middens have been previously identified, with SAHRIS InvNos indicated. Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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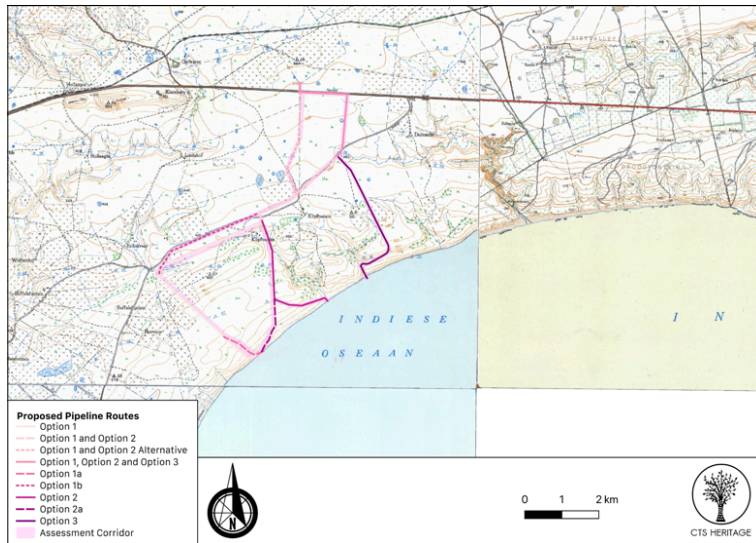
Map HRSP4: Inset A.2 - Closer view of the Doornfontein werf recorded in a previous assessment, with SAHRIS InvNos indicated. Sites with labels outlined in green indicate those recorded in Kaplan's (2004) heritage assessment.

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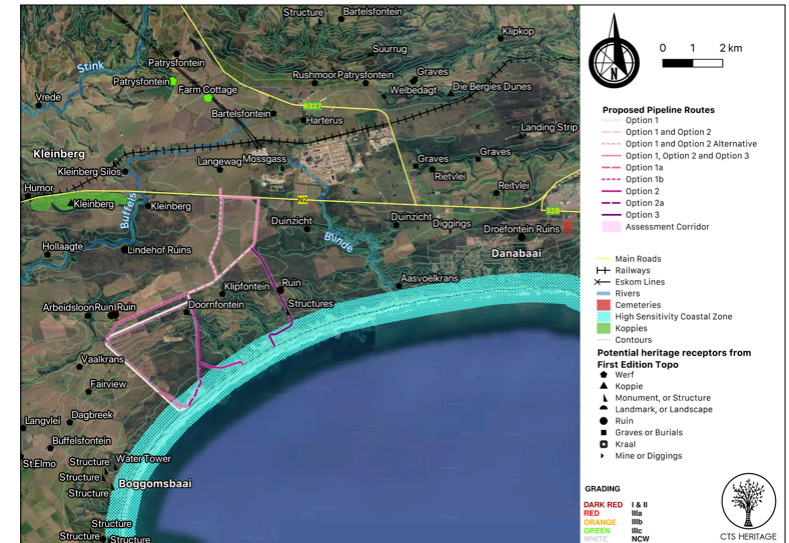
Map HRSP5: Inset A.3 - Closer view of the NABA1 and NABA2 in relation to the proposed onshore route options. Sites with labels outlined in yellow indicate shell middens described by Jerardino (2016).

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Map FET1: First Edition Topographic Map indicating the location of historical werfs that may still exist across the study area. These werfs are plotted in Map CL1 below.

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Map CL1: Cultural Landscape Map indicating sensitive receptors near the proposed development, extracted from the Current and First Edition Topographic 1:50 000 maps.

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

Fifty-six observations of heritage resources and landscape features were recorded during this field survey. These observations reveal a varied landscape with sensitive heritage receptors primarily belonging to the historical agricultural period and the Stone Age occupation of the coastal belt. Large portions of the inland surveyed area currently comprise tilled fields and, as such, are largely devoid of sensitive heritage resources.

The Stone Age presence on the landscape is responsible for the most frequent observations of heritage features in the project area. Inland, the material is sparse and was frequently encountered in higher concentrations in disturbed contexts, such as jeep tracks or boundary fences. Sandy soil and dense vegetation likely jointly contribute to obscuring the archaeological material across much of the inland landscape. Higher concentrations of lithic artefact deposits were encountered along the coast. These deposits primarily took the form of quartzite artefact scatters, particularly where the red palaeosols had been exposed by erosion. Owing to these well-preserved coastal archaeological deposits and their close proximity to Pinnacle Point, Vleesbaai has been the subject of some archaeological research (e.g. Oestmo et al., 2014). Oestmo et al. (2014) suggest that these Middle Stone Age (MSA) deposits are close enough in proximity to the Pinnacle Point site that these artefact scatters may provide insight on the landscape movements of MSA hunter-gatherers around the Pinnacle Point residential site.

In addition to these MSA lithic artefact scatters, large-scale shell midden deposits appear closer to the foreshore dunes and some of these middens, while not formally recorded on SAHRIS, have been the subject of research (e.g. Jerardino, 2016). These shell midden materials appear to be younger in origin and likely date to the Holocene (Jerardino, 2016). Yet, deposits that preserve traces of shellfish harvesting at Pinnacle Point suggest that marine foraging strategies were employed deep into the Pleistocene, with the oldest marine shell-bearing layers dated to around ~164,000 years ago (Marean et al., 2007; Jerardino & Marean, 2010; Jerardino et al., 2014). The middens encountered during this survey were observed to contain dense limpet shell remains, with rarer occurrences of quartzite artefacts, charcoal fragments and faunal bones. No human remains were encountered, although Holocene shell middens have been known to be associated with human burials elsewhere in South Africa (e.g. Dewar, 2010).

In addition to the widespread Stone Age material, the project area has come to preserve a variable material record of agricultural occupation that stretches from historical times into the present. The sandy dunes and dense coastal vegetation are likely responsible for keeping agricultural fields further inland. As a result, the historical werfs, structures and ruins are scattered throughout the inland farm portions of the project area. The built fabric that remains on two of the historical Klipfontein werfs, one of which is now known as Doornfontein (OBS 16), suggests that the historical agricultural occupation of the region was already established at least around the early 20th century, if not earlier.

Additional modern structures, related to the region's status as a holiday destination, can also be found within the project area and surrounding regions. Several coastal reserves line the Vleesbaai coast and typically include small settlements of modern holiday chalets near the shore. These houses have variable construction but all appear to date to the late 20th century or more recent times.

Finally, a single burial site was found near one of the historical Klipfontein werfs (OBS 4). This burial site at OBS 4 is located approximately 400 m south of Option 1 and Option 2 (Map HRS1-5) in an old tilled field but was demarcated by fencing. The burial site includes at least seven burials ranging from recent to historical times. One of these graves, belonging to a Mr Helgaard Pienaar, is dated to 1932. Two graves demarcated by cement slabs, and which are probably older, do not have headstones.

4.1.1 Landscape Context Photographs of the Project Area



LCP1: View from entrance road to project area that connects Vleesbaai and the N2



LCP2: View of Nautilus Drive, which grants access to the Nautilus Bay Coastal Reserve



LCP3: View of vegetation on farm Klipfontein 344



LCP4: View from a hill of Nautilus Bay from below and Vleespunt visible in the distance



LCP5: View of the farm entrance to Doornfontein Werf and Mosselbay Sand Quarry



LCP6: Dense natural vegetation near the P1532 connecting Vleesbaai to N2



LCP7: Dense natural vegetation near the P1532 connecting Vleesbaai to N2



LCP8: View of the tilled fields which cover parts of farm Klipfontein 249 and 344



LCP9: View of Vleesbaai from tilled fields on Klipfontein



LCP10: Fenced boundary between Klipfontein 249 and Springerbaai Eco Estate



LCP11: View of ocean and coastal thicket vegetation along Klipfontein 249 and Springerbaai boundary



LCP12: Southerly view towards Springerbaai, Boggomsbaai and Vleesbaai



LCP13: Dense vegetation along boundary fence between Klipfontein 249 and Klipfontein 344



LCP14: Dense coastal thicket vegetation, Brakwaterkloof and the Indian Ocean in the distance



LCP15: Coastal vegetation and exposed sand dunes common in the onshore project area



LCP16: View of the red palaeosols that have been uncovered by erosion of the coastal sand dunes

4.1.2 Drone Imagery of Project Area



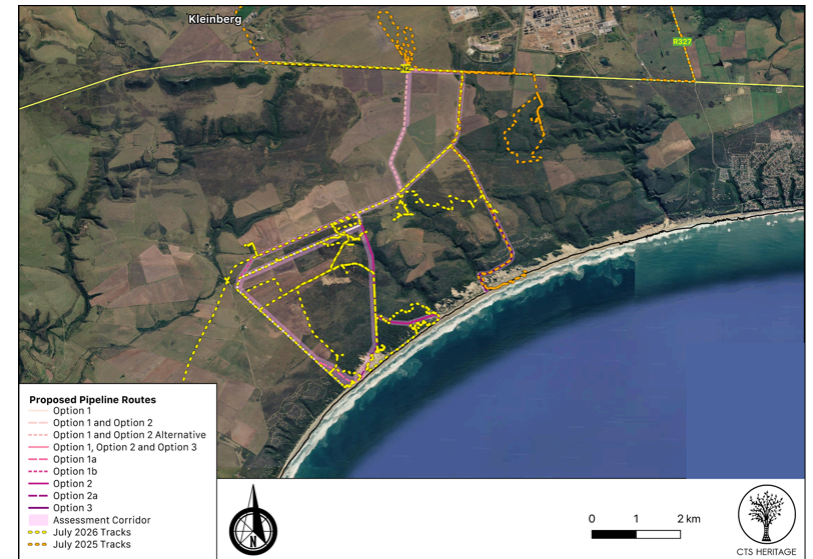
DRONE1: Northerly aerial view with Doornfontein werf and the horse stables visible in the distance



DRONE2: Aerial view of Brakwaterkloof and Indian Ocean



DRONE3: Aerial view of the onshore project area, with Vleespunt visible in the distance



Map GPS Trackpaths1: Field survey tracks map for assessment conducted on 20 to 21 July 2026.

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4.2 Archaeological Resources Identified

A total of fifty-six archaeological observations were recorded during the field assessment, twenty-one of which were assessed as significant and therefore conservation-worthy. All significant sites, as well as observations not worthy of conservation, are summarised in Table 3 below. The rows highlighted by a colour indicate those sites that are conservation-worthy, and colour corresponds to assessed grading: green indicates Grade IIIC, orange indicates Grade IIIB, and red indicates Grade IIIA.

Table 3: Observations noted during the field assessment⁵

POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_001	Klipfontein farmhouse and werf. Original fabric, which includes whitewashed walls at the back of the house, may date to the mid 20th century. Recent additions have significantly altered the heritage significance of the structure	n/a	Structure	Modern	-34.207384	21.944389	NCW		n/a
OBS_002	Livestock kraal	n/a	Structure	Modern	-34.206449	21.947092	NCW		n/a
OBS_003	Historic Klipfontein werf, which is still inhabited and forms part of a working farm. This werf probably dates to at least the early 20th century. Several of the buildings have been altered or extended. Werf includes some buildings with partial stone wall	n/a	Structure	Historic	-34.20791	21.947399	IIIC	50m Buffer	n/a
OBS_004	Formalised burial site with at least seven graves, some of which are historical. Site is located adjacent to a tilled agricultural field and is very	n/a	Graves/ Burial Grounds	Historic	-34.20937	21.944189	IIIA	50m Buffer	n/a

⁵ Row colours indicate the assigned heritage resource grading, following the convention used throughout this report and accompanying mapping: green denotes Grade IIIC, orange denotes Grade IIIB, and red denotes Grade IIIA.



POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	overgrown.								
OBS_005	Completely demolished ruin. Probably an old farm labourer's house. Does not appear on the first edition topo map	n/a	Ruin	Modern	-34.204517	21.948781	NCW		n/a
OBS_006	Completely demolished ruin. Probably an old farm labourer's house. Does not appear on the first edition topo map	n/a	Ruin	Modern	-34.20577	21.949560	NCW		n/a
OBS_007	Completely demolished ruin. Probably an old farm labourer's house. Does not appear on the first edition topo map	n/a	Ruin	Modern	-34.206259	21.952089	NCW		n/a
OBS_008	Abandoned mid 20th century house. Still in a relatively good condition	n/a	Structure	Historic	-34.205863	21.954111	IIIC	50m Buffer	n/a
OBS_009	Inhabited mid 20th century house with modern informal extensions	n/a	Structure	Historic	-34.207279	21.958141	IIIC	50m Buffer	n/a
OBS_010	Natural pan	n/a	Landscape	n/a	-34.2052	21.963349	NCW		n/a
OBS_011	Inhabited mid 20th century house. Still in good condition	n/a	Structure	Historic	-34.206639	21.963640	IIIC	50m Buffer	n/a
OBS_012	Werf Ruins consisting of several concrete structures. Most of these structures have been reduced to their foundations. Does not appear on	n/a	Ruin	Modern	-34.20686	21.968820	NCW		n/a



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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	the first edition topo map								
OBS_012	Werf Ruins consisting of several concrete structures. Most of these structures have been reduced to their foundations. Does not appear on the first edition topo map	n/a	Ruin	Modern	-34.207453	21.968508	NCW		n/a
OBS_012	Werf Ruins consisting of several concrete structures. Most of these structures have been reduced to their foundations. Does not appear on the first edition topo map	n/a	Ruin	Modern	-34.20759	21.969694	NCW		n/a
OBS_013	Lithic artefact scatter consisting of fine grained quartzite flakes, several of which have prepared platforms.	5 to 10	Artefacts	MSA	-34.205571	21.967022	NCW		n/a
OBS_014	Lithic artefact scatter consisting of very weathered artefacts made on coarse quartzite and quartz. One of the observed artefacts is a scraper.	5 to 10	Artefacts	MSA	-34.210886	21.933606	NCW		n/a
OBS_015	Lithic artefact scatter consisting of weathered artefacts eroding from disturbed area. Scatter includes cores and flakes, some of which exhibit retouch	10 to 30	Artefacts	LSA+MSA	-34.211969	21.931985	NCW		n/a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_016	Previously recorded historic Klipfontein (Doornfontein) werf (SAHRIS inventory number: 3421BB48) and associated graves. Recorded by Kaplan (2004). Site probably dates to at least the early 20th century although some of the structures are newer. The main farmhouse is a large building with a pitched roof	n/a	Structure	Historic	-34.21351	21.934449	IIIA	Localised Buffer ⁶	n/a
OBS_017	Modern building currently used as a stable	n/a	Structure	Modern	-34.211984	21.937234	NCW		n/a
OBS_018	Modern holiday chalet	n/a	Structure	Modern	-34.214391	21.934259	NCW		n/a
OBS_019	Large lake/farm dam	n/a	Landscape	Modern	-34.21415	21.928730	NCW		n/a
OBS_020	Mid 20th century house that appears to have been abandoned or is no longer being actively inhabited.	n/a	Structure	Historic	-34.21938	21.928965	NCW		n/a
OBS_021	Three modern farm labourers' houses in a row. Constructed with exposed brick and pitched rooves	n/a	Structure	Modern	-34.21273	21.930969	NCW		n/a
OBS_021	Three modern farm labourers' houses in a row. Constructed with exposed brick and pitched rooves	n/a	Structure	Modern	-34.21273	21.930730	NCW		n/a
OBS_021	Three modern farm labourers' houses in a row. Constructed with exposed brick and pitched rooves	n/a	Structure	Modern	-34.21274	21.930479	NCW		n/a

⁶ Localised avoidance buffer refers to a site-specific area around the heritage resources. It is not a fixed-radius buffer (i.e., 30 m or 50 m), but is based on the distribution of archaeological material and site context, allowing for greater flexibility. The area represents ground to be avoided during construction and is provided in the project spatial data.

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_022	Lithic artefact scatter consisting of weathered flakes and cores made on quartzite. Observed artefacts include a radial core	0 to 5	Artefacts	MSA	-34.213178	21.928763	NCW		n/a
OBS_023	Ruin of an early to mid 20th century farm werf. Ruins are constructed with red brick but are mostly demolished	n/a	Ruin	Historic	-34.21462	21.909089	NCW		n/a
OBS_024	Ruin of an early to mid 20th century farm labourers house	n/a	Ruin	Historic	-34.214904	21.907662	NCW		n/a
OBS_025	Small modern house within the Springerbaai Eco Estate	n/a	Structure	Modern	-34.231489	21.907881	NCW		n/a
OBS_026	Modern Springerbaai holiday chalet	n/a	Structure	Modern	-34.241127	21.928515	NCW		n/a
OBS_027	Very low density lithic artefact scatter consisting of three observed quartzite flakes. Local area has isolated flakes eroding from the sandy soil	0 to 5	Artefacts	MSA	-34.242369	21.930879	NCW		n/a
OBS_028	Low density of in situ midden material and quartzite/quartz artefacts eroding from the hillside. Found low quantities of marine shell fragments nearby. Observed potential combustion features.	0 to 5	Shell Midden	LSA+MSA	-34.243305	21.932890	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 1
OBS_029	Observed an isolated quartzite artefact eroding from dune side	0 to 5	Artefacts	MSA	-34.24261	21.934843	NCW		n/a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_030	In situ midden material eroding from the dune side consisting of low density marine shells and quartzite artefacts. Includes potentially intact stratigraphy and layers of calcrete.	0 to 5	Shell Midden	MSA	-34.242368	21.934325	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 1a
OBS_031	Entire dune covered in eroding midden deposits, including limpet shells and quartzite artefacts. Observed lithic artefacts include a large boulder core. Rare instances of charcoal	10 to 30	Shell Midden	LSA+MSA	-34.241303	21.936288	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_031	Entire dune covered in eroding midden deposits, including limpet shells and quartzite artefacts. Observed lithic artefacts include a large boulder core. Rare instances of charcoal	10 to 30	Shell Midden	LSA+MSA	-34.241161	21.936108	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_032	Potential Stone Age campsite resting on palaeosol layer and which has been eroded from overlying beach sand matrix. Site includes quartzite lithics and charcoal, distributed in a clear circular pattern, suggesting the campsite has been nearly perfectly p	10 to 30	Artefacts	MSA	-34.241132	21.936011	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_033	Midden material resting on the red palaeosols. Includes limpet shells, charcoal and flakes with prepared platforms made on quartzite and silcrete.	10 to 30	Shell Midden	MSA	-34.241091	21.935858	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_034	Isolated lithic artefacts eroding from the sandy soil	0 to 5	Artefacts	MSA	-34.222727	21.939426	NCW		n/a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	next to jeep track. Artefacts consist of flakes and a core made on quartzite and quartz								
OBS_035	Lithic artefact scatter consisting of quartzite cores and flakes with platform preparation	0 to 5	Artefacts	MSA	-34.224023	21.939516	NCW		n/a
OBS_036	Isolated quartzite flakes with platform preparation	0 to 5	Artefacts	MSA	-34.229459	21.940332	NCW		n/a
OBS_037	Isolated quartzite flakes with platform preparation	1 to 5	Artefacts	MSA	-34.229823	21.942295	NCW		n/a
OBS_038	Midden material consisting of limpet shells and quartzite flakes and cores	5 to 10	Shell Midden	LSA	-34.23005	21.951871	IIIC	Monitoring Brief	n/a
OBS_038	Midden material consisting of limpet shells and quartzite flakes and cores	5 to 10	Shell Midden	LSA	-34.230016	21.951668	IIIC	Monitoring Brief	n/a
OBS_039	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Shell Midden	LSA	-34.230659	21.950339	NCW	Monitoring Brief	n/a
OBS_040	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Shell Midden	LSA	-34.231352	21.950448	NCW	Monitoring Brief	n/a
OBS_041	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there	10 to 30	Shell Midden	LSA	-34.231518	21.949124	NCW	Monitoring Brief	n/a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	are no observed lithic artefacts or charcoal fragments present								
OBS_042	Low density cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	0 to 5	Observation	n/a	-34.23177	21.949432	NCW		n/a
OBS_043	Midden material consisting of limpets and distal bones. Appears to be a midden site	5 to 10	Shell Midden	LSA	-34.231877	21.949777	IIIC	Monitoring Brief	n/a
OBS_044	Cluster of limpet shells eroding from dune. Unclear whether this is a shell midden or not since there are no observed lithic artefacts or charcoal fragments present	10 to 30	Observation	n/a	-34.232095	21.949831	NCW		n/a
OBS_045	Thousands of snail shells eroding from the dunes.	n/a	Observation	n/a	-34.239693	21.937875	NCW		n/a
OBS_046	Midden deposits consisting of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.240022	21.937854	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_046	Midden deposits consisting of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.239948	21.937808	IIIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a

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POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
OBS_046	Midden deposits consisting of dense limpet shell deposits. Includes the occasional lithic artefacts, primarily quartzite flakes.	30+	Shell Midden	LSA	-34.239947	21.937743	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_047	Midden deposits coinciding with soil transition to a red and compact palaeosol. Includes a higher density of lithics but lower density of shells	5 to 10	Shell Midden	MSA	-34.239901	21.937684	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_048	Lithic artefact scatter consisting of quartzite and silcrete cores and flakes. One silcrete flake was observed to show a gradual change in colour, suggesting that it may have been heat treated	0 to 5	Artefacts	MSA	-34.239322	21.937944	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_049	Midden deposits consisting of limpet and mussel shells. Site also contains quartzite cores and flakes	10 to 30	Shell Midden	MSA	-34.239047	21.938262	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_049	Midden deposits consisting of limpet and mussel shells. Site also contains quartzite cores and flakes	10 to 30	Shell Midden	MSA	-34.238952	21.938141	IIC	High-Sensitivity – realignment preferred. Monitoring Brief	Option 2a
OBS_050	Midden deposits consisting of dense lithic artefacts resting on the red palaeosols. Appears to be	10 to 30	Artefacts	MSA	-34.238119	21.939354	IIC	Monitoring Brief	n/a

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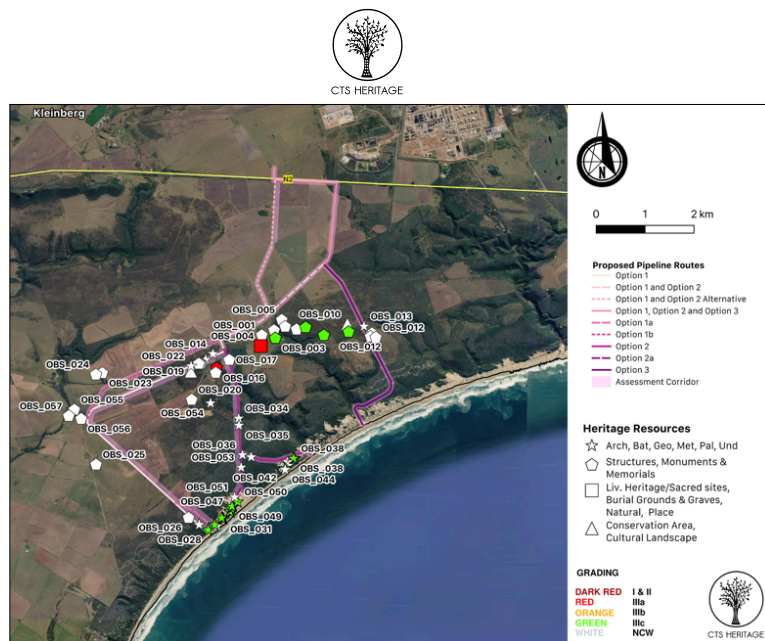


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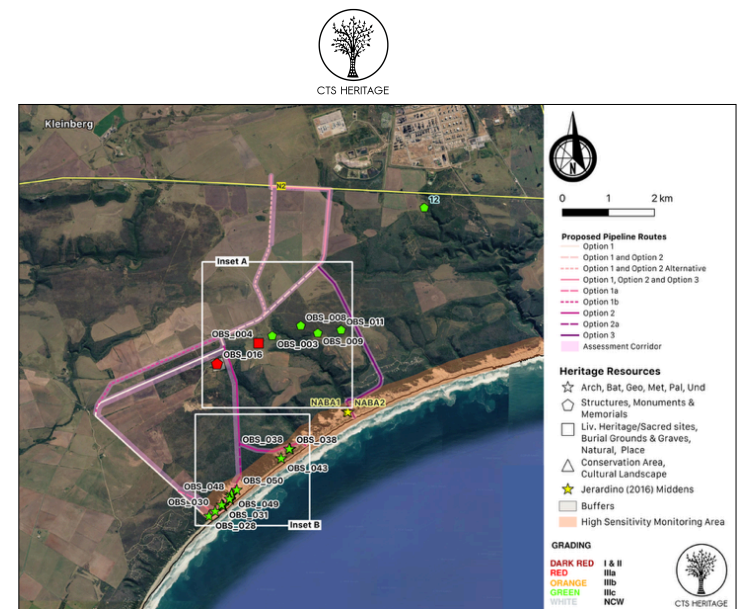
POINT ID	Description	Density	Type	Period	Latitude	Longitude	Grading	Mitigation/Buffers	Pipeline Corridor Alternative (see Map HRS6)
	preserving activity centres. Includes a knapping site, with many flakes and cores distributed around a hammerstone								
OBS_051	Lithic artefact scatter consisting of cores and flakes made on quartzite and quartz	5 to 10	Artefacts	LSA+MSA	-34.23724	21.938680	NCW		n/a
OBS_053	Isolated quartzite flakes disturbed by jeep track	0 to 5	Artefacts	MSA	-34.231756	21.940078	NCW		n/a
OBS_054	Large sand mine	n/a	Observation	Modern	-34.21997	21.933160	NCW		n/a
OBS_055	Small mid 20th century house, but does not appear on the first edition topo map. May currently be used as a gift shop	n/a	Structure	Modern	-34.221416	21.902963	NCW		n/a
OBS_056	Reception/community building just near the entrance of the Springerbaai Eco Estate. Structure has a large thatched roof	n/a	Structure	Modern	-34.223087	21.904484	NCW		n/a
OBS_057	Large structure currently known as the Stoepsit Restaurant. The original fabric of the structure probably dates to the mid 20th century, although the appearance of the structure has been significantly changed by modern alterations. Does not appear on the	n/a	Structure	Modern	-34.22258	21.901730	NCW		n/a

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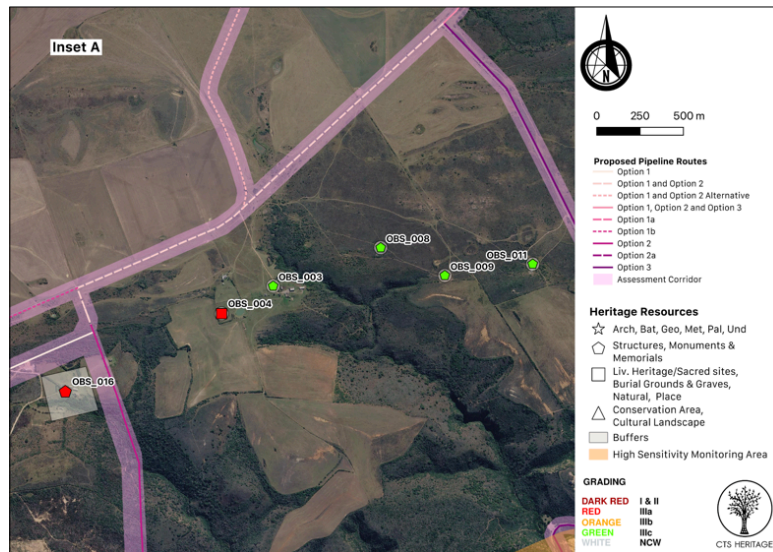
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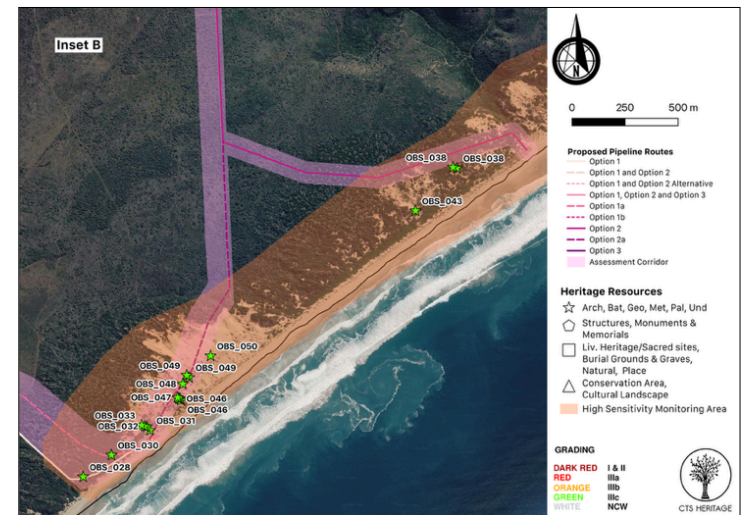


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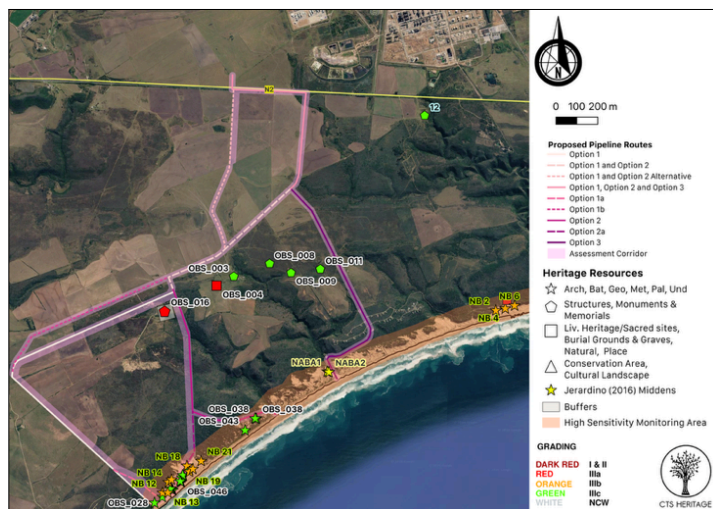
Map HRS3: Inset A - closer view of conservation-worthy sites noted during this assessment.

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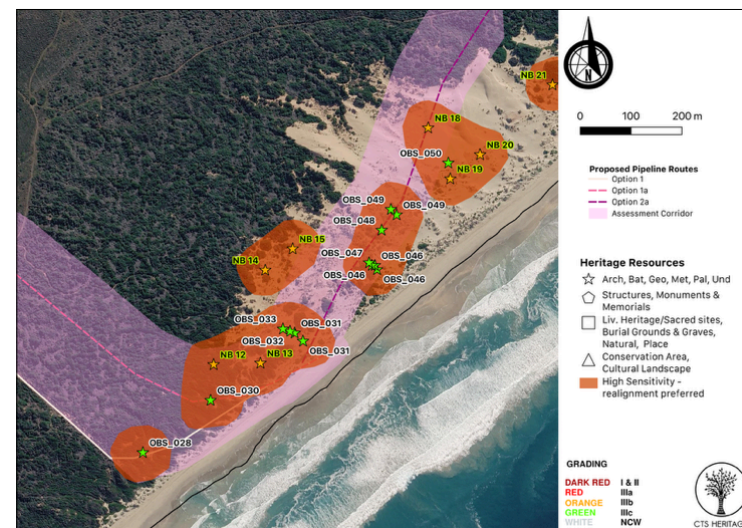
Map HRS4: Inset B - Closer view of the coastline and the conservation-worthy archaeological sites noted during this assessment. The orange polygon represents the sensitive coastal zone that must be subject to a Monitoring Brief should any construction activities occur within it, regardless of the corridor.

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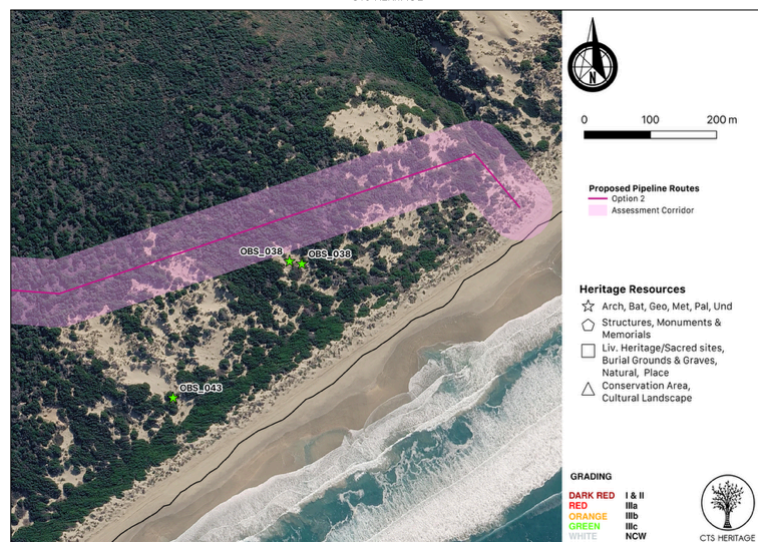
Map HR55: Map of all conservation-worthy sites recorded during this assessment, alongside middens studied by Jerardino (yellow stars), SAHRIS sites (Inv. No. labels), and a nearby site (12, blue label) recorded in a recent assessment by CTS Heritage (2026). The orange polygon represents the sensitive coastal zone that must be subject to a Monitoring Brief should any construction activities occur within it, regardless of the corridor.

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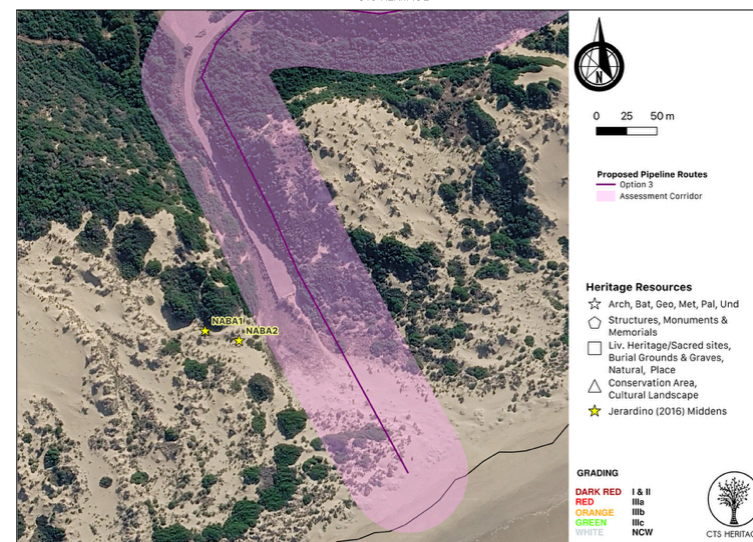
Map HR56: Map showing heritage sites identified in this report alongside sensitive Kaplan (2004) sites (green labels). Overall, archaeological sensitivity is high in the coastal zone around Option 1, Option 1a and Option 2a. Realignment is preferred.

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Map HR57: Map showing the proximity of OBS 38 and OBS 43 to the Option 2 corridor

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Map HR58: Map showing the proximity of NABA1 and NABA2 to the Option 3 corridor

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4.3 Selected Photographic Record of Observations

OP1 - OP17 (a full photographic record is available upon request)



OP1: Observation 003



OP2: Observation 004



OP3: Observation 008 and 009



OP4: Observation 011



OP5: Observation 016



OP6: Observation 028





OP7: Observation 030



OP8: Observation 031



OP9: Observation 032



OP10: Observation 033



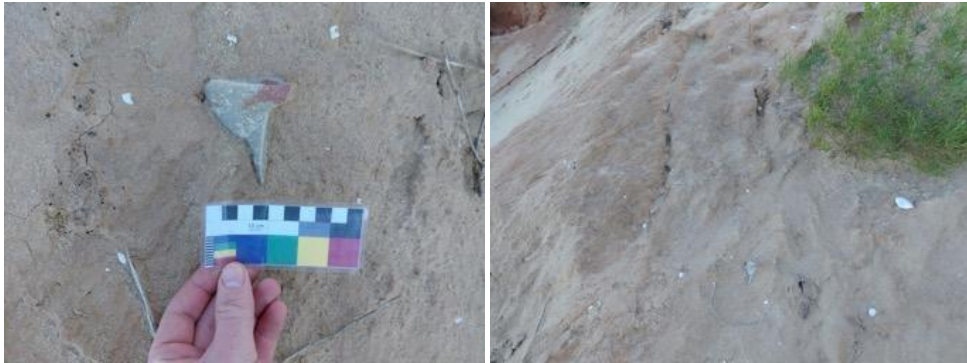
OP11: Observation 038



OP12: Observation 043



OP13: Observation 046



OP14: Observation 047



OP15: Observation 048



OP16: Observation 049



OP17: Observation 050



5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Archaeological Resources

Several of the observations recorded by the present survey constitute low-density Stone Age material, modern infrastructure or historical agricultural features that have been largely destroyed or present little cultural or scientific value. These features are deemed to be 'Not Conservation Worthy' (NCW) from a heritage perspective and are not considered further here. The remaining sensitive heritage resources consist of dense Stone Age artefact scatters and midden deposits, historical buildings, and a burial site.

Some historical buildings were also encountered during the survey of the area. Several historical structures relating to the area's history of agriculture were observed. Most notable are the two historical Klipfontein werfs, which both date to at least the early 20th century and preserve substantial amounts of their original fabric despite some exterior alterations. These structures contribute meaningfully to the region's agricultural heritage and should not be disturbed during the construction or operational phases of the project. Kaplan (2004) did not initially recommend a grading for Doornfontein werf (OBS 16 in this report), but noted its high significance. As such, this report recommends a grading of IIIA, as well as a localised buffer that protects both the structures and associated graves. The werf is approximately 150 m south of the Option 1 corridor and 100 m west of the Option 2 corridor. These corridors avoid the recommended buffer (Map HRS3) and no impact is anticipated. The recommended buffer is therefore precautionary, providing protection should any future adjustments to the route options in this area result in encroachment towards the site. Moreover, since the pipelines will be buried, the impact to the cultural landscape can be minimised in this way.

Much of the agricultural infrastructure and built fabric within the project area is considerably younger and is a product of the continued farming activities taking place on the landscape. In this assessment, a grading of IIIC is recommended for OBS 3, 8, 9 and 11, and 50 m no-development buffers are recommended around each to preserve their immediate contexts. However, given the respectable distance between the proposed pipeline routes and these sites, no direct impact is anticipated.

Additionally, a single burial site was found in the project area. This site, OBS 4, is located approximately 400 m south of Option 1 and Option 2 (Map HRS1-5). Burial sites are often imbued with high levels of social significance and must not be disturbed by any development activities. Fortunately, this site is located some distance from the actual development footprint and, therefore, no impact is anticipated. Still, a precautionary 50 m no-development buffer is recommended here regardless.

All of the sites discussed above fall well outside of the proposed pipeline corridors, and no direct impact to heritage resources is expected in these cases. As such, the inland corridors are acceptable from a heritage perspective, and



no recommendations for micro-siting or rerouting are necessary. Should future layout planning result in any adjustment to the alignment, however, this must remain cognisant of, and avoid, the no-go buffers outlined in Table 3 and mapped in Map HRS2-5.

In contrast to the inland corridors, the coastal landfall points at Option 1, Option 1a, and Option 2a present a considerably more constrained heritage picture. The MSA artefact scatters resting on the red palaeosols are of varying artefact densities and exposure from beneath the overlying dunes. Yet these scatters hold some archaeological value for their potential to contribute to our understanding of the Pinnacle Point Cave occupants and how these groups exploited the landscape (Oestmo et al. 2014). Similarly, the midden deposits are also of fluctuating density and exposure but are part of a widespread layer of Holocene material along the Vleesbaai coast that preserves the traces of persistent exploitation of marine resources by coastal foragers (Jerardino, 2016). Aside from the scientific value of these materials, there is also the potential for some of these midden deposits to contain burials, as has been seen elsewhere in South Africa in Holocene midden sites.

Nine sensitive shell middens identified during this assessment fall within these corridors (Table 3, Map HRS6), specifically:

- Option 1
 - OBS 28
- Option 1a
 - OBS 30
- Option 2a
 - OBS 31
 - OBS 32
 - OBS 33
 - OBS 46
 - OBS 47
 - OBS 48
 - OBS 49

A further three high-significance sites recorded by Kaplan (2004) are located within these corridors (Table 2.2; Map HRS6):

- Option 1a
 - NB 12
 - NB 13



- Option 2a
 - NB 18

Five more of Kaplan's (2004) high-significance sites are situated between 18 m and 130 m from the Option 2a corridor (Table 2.2; Map HRS6):

- Option 2a
 - NB 14 (~46 m)
 - NB 15 (~18 m)
 - NB 19 (~25 m)
 - NB 20 (~65 m)
 - NB 21 (~130 m)

The density of artefact and shell midden sites in the coastal zone underscores its archaeological sensitivity. This sensitivity is compounded by the fact that the pipelines will be buried, posing a significant risk to in-situ deposits that may exist below the surface. As such, the areas mapped in Map HRS6 around Option 1, Option 1a, and Option 2a are considered particularly sensitive, and realignment to bypass the identified sites and sensitive areas would be preferable.

Other sites are located outside the corridors but in close proximity (Table 2.1; Table 3; Map HRS7 and HRS8):

- Option 2
 - OBS 38 (~20 m)
- Option 3
 - NABA1 (~20 m)
 - NABA2 (~40 m)

Under current alignments, no impact to OBS 38, NABA1, or NABA2 is anticipated. This nonetheless underscores the general density of archaeological sites across the coastal zone.

On this basis, Option 1, Option 1a, and Option 2a are the least preferred landfall points from a heritage perspective, given the density of identified sites within these corridors.

Should Option 1, Option 1a, or Option 2a be taken forward, avoidance, through realignment of the landfall point to avoid the identified coastal sites and sensitivities, remains the first-choice approach. However, given the density and distribution of archaeological material in this area, realignment is unlikely to avoid all sensitivities entirely. Where avoidance cannot be achieved, a Work Plan approved by HWC would be required prior to



construction. For these options, the Work Plan would need to cover pre-construction mitigation at the specific sites that cannot be avoided (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and/or Kaplan's (2004) sites), such as detailed survey, sampling, and/or salvage excavation; and a construction-phase Monitoring Brief across the wider coastal zone (see recommendations below for further details).

The landfall point at Option 3 is the most preferred from a heritage perspective. Unlike Options 1, 1a, and 2a, its route to the coast runs directly inland rather than parallel to the coastline, resulting in a more limited and localised footprint and a correspondingly lower likelihood of significant impact. For Option 3, and for all other route options, an approved Work Plan would still be required, but would need to cover a construction-phase Monitoring Brief only in the recommended strip of the coastal zone (the orange polygon mapped in Maps HRS2, 4, and 5) since no known sensitive sites requiring pre-construction mitigation would be affected.

6. CONCLUSION AND RECOMMENDATIONS

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. Some ephemeral inland Stone Age materials and modern infrastructure and buildings of limited scientific or heritage value were identified. However, the majority of the significant heritage resources identified relate to the coastal Stone Age deposits and historic farming occupation of the project area. The identified resources include the remnants of artefact scatters, shell middens, historical werfs and structures, as well as one formalised burial site.

The archaeological and heritage resources identified during this assessment fall into two broad categories: those associated with the inland corridor sections, and those associated with the coastal landfall points. The inland corridor sections are considered acceptable from a heritage perspective, containing sites that fall well outside the proposed development corridors, and no impact to heritage resources is anticipated in these areas, provided the no-development buffers detailed in Table 3 and mapped in Map HRS2-5 are respected during any future layout adjustments.

The coastal landfall points present a considerably more constrained heritage picture, owing to the density and distribution of Stone Age artefact scatters and shell middens in this zone. Nine sensitive shell middens identified during this assessment, together with a further eight high-significance sites recorded by Kaplan (2004), fall within or in close proximity to the Option 1, Option 1a, and Option 2a corridors (Table 3, Map HRS6). A summary of these sites, and their position relative to each corridor option, is provided in Table 1 below.

On this basis, Option 1, Option 1a, and Option 2a are the least preferred landfall points from a heritage perspective, given the density of identified sites within these corridors.

Should Option 1, Option 1a, or Option 2a be taken forward, avoidance, through realignment of the landfall point to avoid the identified coastal sites and sensitivities, remains the first-choice approach. However, given the density and distribution of archaeological material in this area, realignment is unlikely to avoid all sensitivities entirely. Where avoidance cannot be achieved, a Work Plan approved by Heritage Western Cape (HWC) would be required prior to construction. For these options, the Work Plan would need to cover pre-construction mitigation at the specific sites that cannot be avoided (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and/or Kaplan's (2004) sites), such as detailed survey, sampling, and/or salvage excavation; and a construction-phase Monitoring Brief across the wider coastal zone (see recommendations below for further details).

The landfall point at Option 3 is the most preferred from a heritage perspective. Unlike Options 1, 1a, and 2a, its route to the coast runs directly inland rather than parallel to the coastline, resulting in a more limited and localised

footprint and a correspondingly lower likelihood of significant impact. For Option 3, and for all other route options, an approved Work Plan would still be required, but would need to cover a construction-phase Monitoring Brief only, since no known sensitive sites requiring pre-construction mitigation would be affected.

Table 1: Summary of archaeological sites and their position relative to the corridor options assessed

Site Number	Reference	Grade	Corridor Option	Position
OBS 28	This report	IIIC	Option 1	Within corridor
OBS 30	This report	IIIC	Option 1a	Within corridor
OBS 31	This report	IIIC	Option 2a	Within corridor
OBS 32	This report	IIIC	Option 2a	Within corridor
OBS 33	This report	IIIC	Option 2a	Within corridor
OBS 46	This report	IIIC	Option 2a	Within corridor
OBS 47	This report	IIIC	Option 2a	Within corridor
OBS 48	This report	IIIC	Option 2a	Within corridor
OBS 49	This report	IIIC	Option 2a	Within corridor
NB 12	Kaplan (2004)	IIIB	Option 1a	Within corridor
NB 13	Kaplan (2004)	IIIB	Option 1a	Within corridor
NB 14	Kaplan (2004)	IIIB	Option 2a	~46 m from corridor
NB 15	Kaplan (2004)	IIIB	Option 2a	~18 m from corridor
NB 18	Kaplan (2004)	IIIB	Option 2a	Within corridor
NB 19	Kaplan (2004)	IIIB	Option 2a	~25 m from corridor
NB 20	Kaplan (2004)	IIIB	Option 2a	~65 m from corridor
NB 21	Kaplan (2004)	IIIB	Option 2a	~130 m from corridor
OBS 38	This report	IIIC	Option 2	~20 m from corridor
NABA1	Jerardino (2016)	Ungraded	Option 3	~20 m from corridor
NABA2	Jerardino (2016)	Ungraded	Option 3	~40 m from corridor



Subject to the recommendations below being implemented, there is no objection to the proposed development from an archaeological perspective.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- The identified and graded archaeological sites and high-sensitivity areas listed in Table 3 and mapped in HRS1-8 are avoided, and that the recommended no-development buffers are adhered to throughout all phases of development;
- Where the approved route follows Option 1, Option 1a, or Option 2a and cannot avoid known sensitive sites (e.g., OBS 28, 30, 31, 32, 33, 46, 47, 48, 49, and Kaplan's (2004) sites) identified within the Option 1, Option 1a, and Option 2a corridors) a Work Plan must be submitted to and approved by Heritage Western Cape (HWC) prior to construction. The Work Plan must set out the methodology for pre-construction mitigation at each affected site (e.g. survey, sampling, and/or salvage excavation), which must be completed and reported on prior to construction proceeding through these areas, as well as the methodology for construction-phase Monitoring Brief;
- The sand dunes along the coastline, mapped as an orange polygon in HRS2, 4 and 5, are considered a sensitive area containing high-density lithic scatters and shell middens. Regardless of the route option selected, all construction activities in this area must be monitored by a qualified archaeologist or heritage practitioner under the Monitoring Brief established through the Work Plan, to account for previously unrecorded archaeological sites and/or human remains that may be exposed during construction. This Work Plan would typically be developed once the final route has been approved, ahead of construction commencing. Material encountered may be assessed in the field for significance: material of low or no significance may require no further action; material of moderate significance may require work to pause in the immediate vicinity of the find for on-site recording and collection; and material of high significance (e.g. dense in-situ shell midden deposits or human remains) may trigger a stop-works order for that area, with the response, ranging from further recording to salvage excavation, proceeding under the terms approved in the Work Plan, without the need for a separate new permit application. The specific requirements of the Monitoring Brief will be determined during the Work Plan process, and must be incorporated into the EMP;
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. Outside the coastal zone addressed by the Monitoring Brief above, if any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal or ash concentrations, shell-bearing horizons), fossils, burials,

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or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find, and HWC must be alerted immediately to determine an appropriate way forward.

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7. REFERENCES

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AIA Phase 1	Peter Nilssen	11/07/2006	Archaeological Heritage Scoping Report: Proposed Cemetery - Portion 8 of Erf 225, Mossel Bay Farms, Mossel Bay Municipal District:
AIA Phase 1	Jonathan Kaplan	01/10/2003	Report Archaeological Assessment Portion 16 of the Farm Rensburg Estate No 137 Great Brak River
AIA Phase 1	Hilary Deacon	22/01/1999	The Point, Mossel Bay: Proposed Development Phase 1 Archaeological Report
AIA Phase 1	Peter Nilssen	01/06/2008	Archaeological Heritage Impact Assessment Two Portions of Erf 2861 and the Whole of Erf 6422, Mossel Bay, Magisterial District Eden, Western Cape Province: Proposed Asazani/Zinyoka Subsidised Housing Project
AIA Phase 1	Jonathan Kaplan	01/06/1997	Archaeological Study: Proposed Pinnacle Point Development
AIA Phase 1	Jonathan Kaplan	01/03/2003	Phase 1 Archaeological Impact Assessment Portion 1 of the Farm Droogfontein 245 Mossel Bay
AIA Phase 1	Jonathan Kaplan	01/09/2004	Phase 1 Archaeological Impact Assessment Proposed Development Phase II and Phase III Nautilus Bay, Mossel Bay
AIA Phase 1	Kathleen Schulz	01/02/2005	Phase 1 Report Historical Heritage Assessment for Proposed Development of Portions of Outeniquabosch 149 & Hartenbosch 217. Hartenbosch - South Cape
AIA Phase 1	Peter Nilssen	01/05/2005	Proposed Rezoning and Subdivision of Portion of Remainder 249 Vyf-Brakkefontein 220, Kwanongaba, Mossel Bay Archaeological Heritage Impact Assessment
AIA Phase 1	Peter Nilssen	01/06/2005	Proposed Rezoning and Development of Remainder Portion Vyfbrakkefontein 220, Hartenbos Heuwels, Mossel Bay Archaeological Heritage Impact Assessment
AIA Phase 1	Peter Nilssen	08/08/2005	Development at Pinnacle Point, Mossel Bay, Archaeological Monitoring of Vegetation Clearing & All Earthmoving Activities
AIA Phase 1	Peter Nilssen	28/09/2005	Proposed Rezoning and Subdivision of a Portion of Vaalevalley 219, Mossel Bay, Western Cape Province Archaeological Heritage Impact Assessment

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AIA Phase 1	Jonathan Kaplan	01/03/2007	Phase 1 Archaeological Impact Assessment: Proposed Development on the Remainder of the Farm Droogfontein No. 245, Mossel Bay
AIA Phase 1	Jonathan Kaplan	01/06/2007	Phase 1 Archaeological Impact Assessment: Proposed Development Outeniquasbosch Safari Park Farms Outeniquasbosch 149 and Hartenbos 217 Mossel Bay
AIA Phase 1	Peter Nilssen	03/07/2007	Archaeological Heritage Impact Assessment the Farm Dawn Dunes 136 Portion 33 and the Farm Rensburg Estate 137 Portion 1, District Mossel Bay, Western Cape Province: Proposed Residential Development
AIA Desktop	Harriet Clift, Lita Webley	08/03/2011	Heritage Scoping report with preliminary impact assessments Fibre optic data cable: Graaff-Reinet to Yzerfontein
AIA Phase 1	Peter Nilssen	24/03/2009	Archaeological Impact Assessment with Comment on Paleontology Construction of Sewer Pipelines for Mossdustria and Erf 6422, District Mossel Bay, Western Cape Province
AIA Phase 1	Lita Webley	01/01/2009	Phase 1 Archaeological Impact Assessment: Tarka Land Restitution Project, Mossel Bay, Western Cape
PIA Phase 1	John E Almond	08/04/2011	FibreCO Data Cable Project: Route 3 from Graaff-Reinet via George and Cape Town to Yzerfontein, Western and Eastern Cape Provinces
Archaeological Specialist Reports	Celeste Booth	20/05/2015	FibreCo Telecommunications Ltd (FibreCo) was given environmental authorisation (EA) by the Department of Environmental Affairs in 2011 to construct and operate a fibre optic data cable along the national road between Cape Town and Durban (divided into three routes for assessment and authorisation purposes à€” routes 3, 4 and 5). An agreement reached between FibreCo and other telecommunication companies regarding the construction of the Cape-Durban route has resulted in changes to Route 3 (this project). Routes 4 and 5 have been assessed and discussed in a separate report.
Heritage Impact Assessment Specialist Reports	Dr J de Jongh	08/03/2015	Specialist Study: Heritage Impact Assessment For The Installation Of The Sirius Fibre Optic Cable Between Johannesburg And Yzerfontein, Gauteng, Free State, Eastern And Western Cape Provinces
AIA Phase 1	Peter Nilssen	05/06/2012	Proposed Upgrade of the Mossel Bay Point on Erven 3419, 3794,15131 and 3626, Mossel Bay, Western Cape Province

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PIA Desktop	John Pether	28/04/2014	Palaeontological Desktop Assessment: Extension of quarrying on portion 12 of Farm Hartenbosch 217 (Maandagskop Crusher) Mossel Bay, Western Cape
AIA Phase 1	Jonathan Kaplan	31/10/2009	Archaeological Impact Assessment Proposed Development Erf 2833 Great Brak River Southern Cape
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