CHAPTER 5

Heritage resources

CHAPTER 5: Heritage resources

Integrating Author	Jayson Orton[1]
Contributing Authors	Lita Webley[2], John Pether[3], Vanessa Maitland[4]
Peer Reviewer	David Halkett[5]
Archaeology: Jayson Orton *Archaeology and living heritage: Lita Webley* Palaeontology: John Pether *Maritime heritage*: Vanessa Maitland	

[1] ASHA Consulting

[2] Independent Heritage Practitioner

[3] Independent Geological and Palaeontologist Consultant

[4] Independent Maritime Archaeologist

[5] ACO Associates cc

Recommended citation: Orton, J., Webley, L., Pether., J. & Maitland, V. (2025). Heritage Resources: Strategic Environmental Assessment for the proposed Boegoebaai Port and Special Economic Zone. Report to CSIR.

Executive Summary

This review considers the nature and distribution of various heritage resources within the proposed Boegoeberg Port and SEZ. The locations and names, of the various Zones referred to in the text are shown in Figures S.1 & S.2 along with survey tracks, key findings and the more highly sensitive areas.

Summary of Findings

Palaeontology

- The SEZ is of generally low sensitivity, although excavations could intersect the buried late Pliocene Hondeklipbaai Formation in Zone 1 (Port Precinct). This area is considered to be of medium sensitivity, with the rest of the study area rated low sensitivity.
- Bone accumulations from hyena lairs could be recovered along any cliff (whether exposed or buried) where the geology is favourable. They can be of high significance if they date to the Pleistocene.

Terrestrial Archaeology

- Isolated occurrences of Early Stone Age material have been identified in deflated areas such as pans (Zones 3, 4, 6 & 7).
- A Middle Stone Age occurrence has been identified at Namakwakop in Zone 1 (Port Precinct). The hyena lair and the MSA shelter excavated near Boegoeberg South in Zone 2) highlight the possibility of MSA sites in buried shelters. If these shelters contain pre-modern human remains, they assume high significance.
- Significant occurrences of Later Stone Age shell middens and other occupation debris, likely spanning the period from the mid-Holocene to the most recent past, occur along the coast (Zones 1, 3, 7 & 8 but likely occur in other zones too), at the pans (Zones 3, 4, 6 & 7) and at inland locations at water sources (Zone 9). These areas are generally of very high (within 0.5 km of the coast) or high (0.5-4.5 km from the coast) sensitivity with the remaining land being low sensitivity.
- Impacts are likely to occur throughout the Port and SEZ study area but will be more concentrated closer to the coastline.

Graves

- Three known graves occur in Zone 2 at the western foot of Boegoeberg South. Oral history refers to the grave of the original Paul (Bierkaptein) Links, at the Boegoeberg, and the significance of the area for the Nama people (Zones 1 & 2). Unmarked (and hence unmappable) pre-colonial burials (particularly LSA graves) can occur anywhere in the study area, but they are generally far more common in coastal dunes than inland. It is therefore possible that graves could be uncovered anywhere in the study area during construction. Known graves are allocated very high sensitivity, but the rest of the area is not rated due to the impossibility of mapping unknown graves and very low likelihood of occurrence.

Maritime Heritage

- Many shipwrecks have been reported off the Namaqualand coast. Location data is often poor and wrecks often drift between the place of foundering and finally settling. One pre-1965 wreck is very highly likely to fall within the sea adjacent to the SEZ study area, while four others are highly likely to do so. Areas mentioned in the literature are accorded medium sensitivity, while the remainder of the area is of low sensitivity.

- Although impacts are unlikely to occur, any impact to a historical shipwreck has the potential to be highly significant, such as the 16th century Portuguese wreck, the Bom Jesus, found on the Namibian coast.

Living Heritage

- Oral information (Land Claims Court Case) emphasises that, before the erection of security fences, Nama herders from the Richtersveld followed a transhumance cycle that included Boegoeberg, Rietfontein, Visagiespan, Swartbank and Witbank, effectively encompassing the entire study area.
- Although herders were prevented from accessing the mining area after the discovery of diamonds in 1925, they still continued to use Portions 4 and 6 of Farm 2 (the Korridor Wes farms) as confirmed by 1937 aerial photographs. *Soon after 1925 the mining area was fenced off*, with Farm 2 following in the mid-1950s. After Portions 4 and 6 of Korridor Wes were returned to the community in 2007, stock owners returned to the areas termed Swartbank and Witbank during the winter months, although the storage of water in drums at their stockposts seems to extend the annual period of use for some herders. Seasonal stockposts, constructed using modern materials, are still found in these areas and also in that part of Farm 1 outside the mine area, confirming the continued association of the site with living heritage (Zones 2, 9 & 10). These areas used by small-scale herders are rated as high sensitivity with the remaining land outside the mine being medium sensitivity and land within the mine being low sensitivity (Figure 5-43).
- Development would prevent access to this land, impacting the traditional transhumance cycle of the local herders re-established on it after 2007.

Cultural Landscape

- Immediately to the east of the study area is the buffer zone of the **Richtersveld Cultural and Botanical Landscape World Heritage Site (RCBL).** It was proclaimed in 2007 because "*as a cultural landscape, it reflects the long-standing and persistent traditions of the Nama, the indigenous community. The cultural landscape comprises all the elements linked to the transhumance lifestyle of the Nama pastoralists* ".
- The area is a relatively flat plain, sloping downhill from east to west. The landscape is open, windswept and desolate. West of the R382, prospecting trenches and mine dumps litter the landscape. East of the R382 are sparsely vegetated arid coastal lowlands with far sparser evidence of mining. The Boegoeberg Twins form an important element of the landscape between Port Nolloth and Alexander Bay and have historical significance.
- The proposed industrial development for the SEZ will be highly visible for a considerable distance along the coast and will impact on the sense of place due to its strong contrast with the existing landscape.
- The R382 is identified as a scenic route because it provides access to the RCBL World Heritage Site, the Richtersveld National Park, the Orange River and Namibia.
- From a purely visual point of view, the coastline, R382 corridor, Boegoeberg Twins and the pans are the main highly sensitive areas.

Recommendations

A Heritage Impact Assessment (HIA) will be required for every Environmental Impact Assessment. Notwithstanding the heritage resources on site, HIAs will be needed in order to satisfy the requirements of the National Heritage resources Act (No. 25 of 1999). A separate Visual Impact Assessment must be included in every EIA process.

Palaeontology

- There are no areas of highly sensitive fossiliferous strata in the SEZ Project Area that require protection as NO-GO areas.
- Every project MUST be evaluated by a palaeontologist to determine the need for a palaeontological specialist study despite the known low surface sensitivity because, depending on depth of excavation, significant impacts could still arise below surface.

Terrestrial Archaeology

- Archaeological specialist studies will be required in all EIAs and detailed surveys of each project footprint must take place.
- Due to the density and distribution of archaeological sites recorded during the initial field surveys, it will not be feasible to mitigate all impacts. The appointed archaeologists will need to determine which archaeological sites best characterize each development footprint in order to sample the most appropriate sites. This may include some sites of lower significance.
- It is likely that monitoring of development may be required in the coastal areas where middens can be buried within sand dunes or under recent wind-blown sand.

Maritime Heritage

- A Maritime Heritage specialist study will need to be included in the heritage application for the Port development, as well as any other developments that might require, for example, undersea pipelines.

Graves

- Graves would be considered along with archaeology in any EIA process that occurs in the Port and SEZ areas.
- Given the size of the Port and SEZ, it is possible that a number of graves could be uncovered. Discussions with SAHRA, the Northern Cape Heritage Resources Authority and representatives of local communities must be initiated in advance of the development to determine whether reburial of human remains – perhaps in Zone 2 (the conservancy area) – should be considered.

Living heritage

- The local herder community should be consulted to determine their response to the loss of their winter grazing lands, specifically those areas termed Swartbank and Witbank. Among other things, consultation should aim to understand:
    - Why these areas were chosen for grazing;
    - The value of the pasturage in terms of seasonal grazing requirements;
    - Any alternative options; and
    - How nature and culture are intertwined within their world view.

Cultural landscape / sense of place

- The R382 and surrounding area are significant for a number of reasons, largely tourism-related. Further consideration should be given to the appropriateness of the site, and the local community, SANParks, UNESCO, SAHRA and local tourism operators should all be engaged in this process. Although the proposed development lies outside the buffer zone of the RCBL Heritage Site (Figure 5-36), the potential indirect impacts (visual and increased movement of sand) cannot be disregarded. Discussions will need to be initiated with the South African Government and the UNESCO commission regarding the potential impact of the proposed Boegoebaai Port and SEZ development on the World Heritage status of the RCBL.

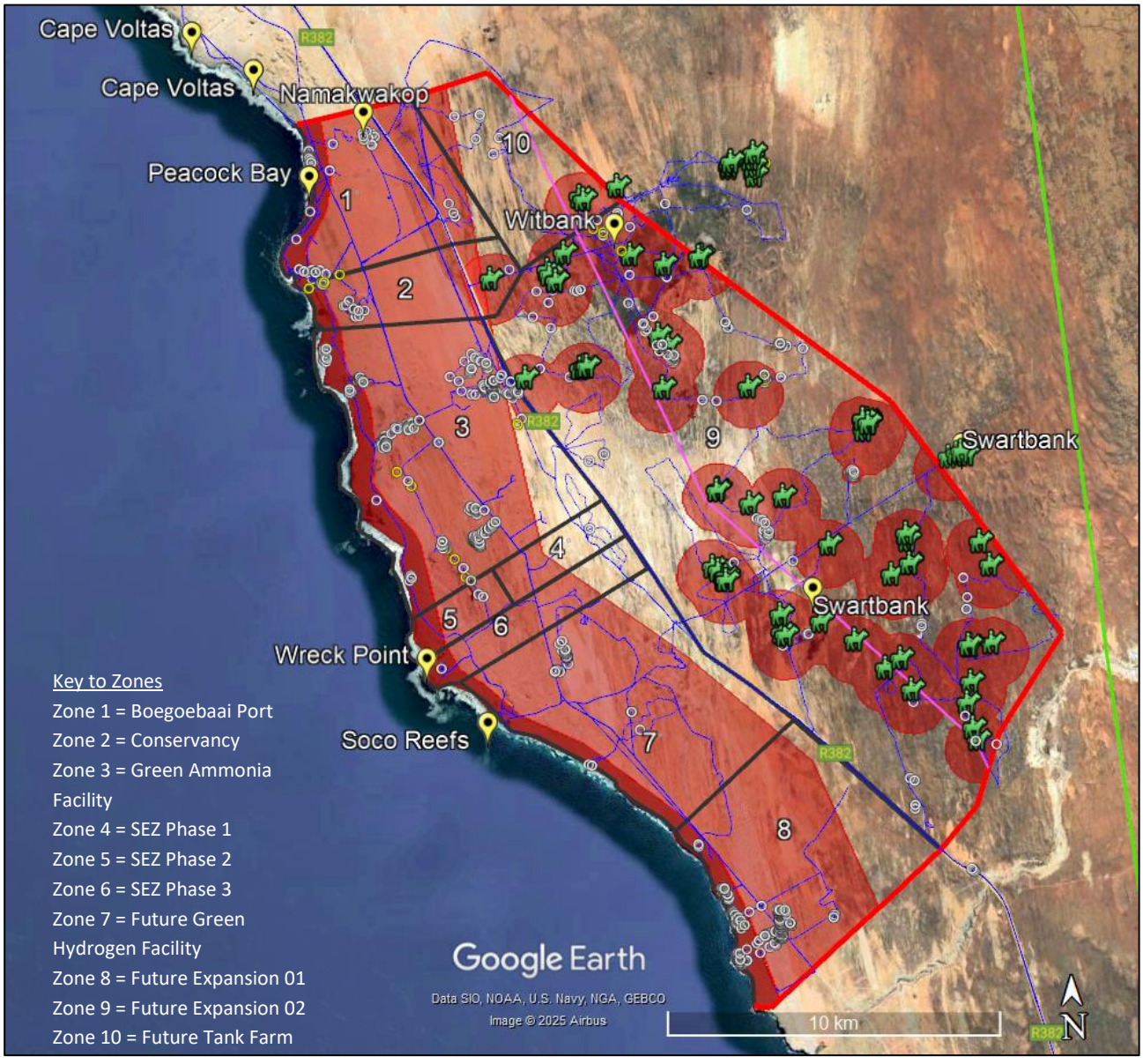

Figure S.1: Map of the Port and SEZ study area (red polygon with black internal divisions) showing field survey tracks (blue), all archaeological sites recorded during the surveys (yellow and white circles), recent transhumant herder camps (green symbols) and all areas regarded as of high or very high sensitivity (red and dark red shading) for any aspect of heritage. The pink line separates Farm 1 (to the west) from the Korridor Wes farm portions (to the east) and the RCBL World Heritage Site buffer zone lies east of the green line. Note that all place names are from modern maps except Witbank which is referred to as Visagiefonteinkop on modern maps.

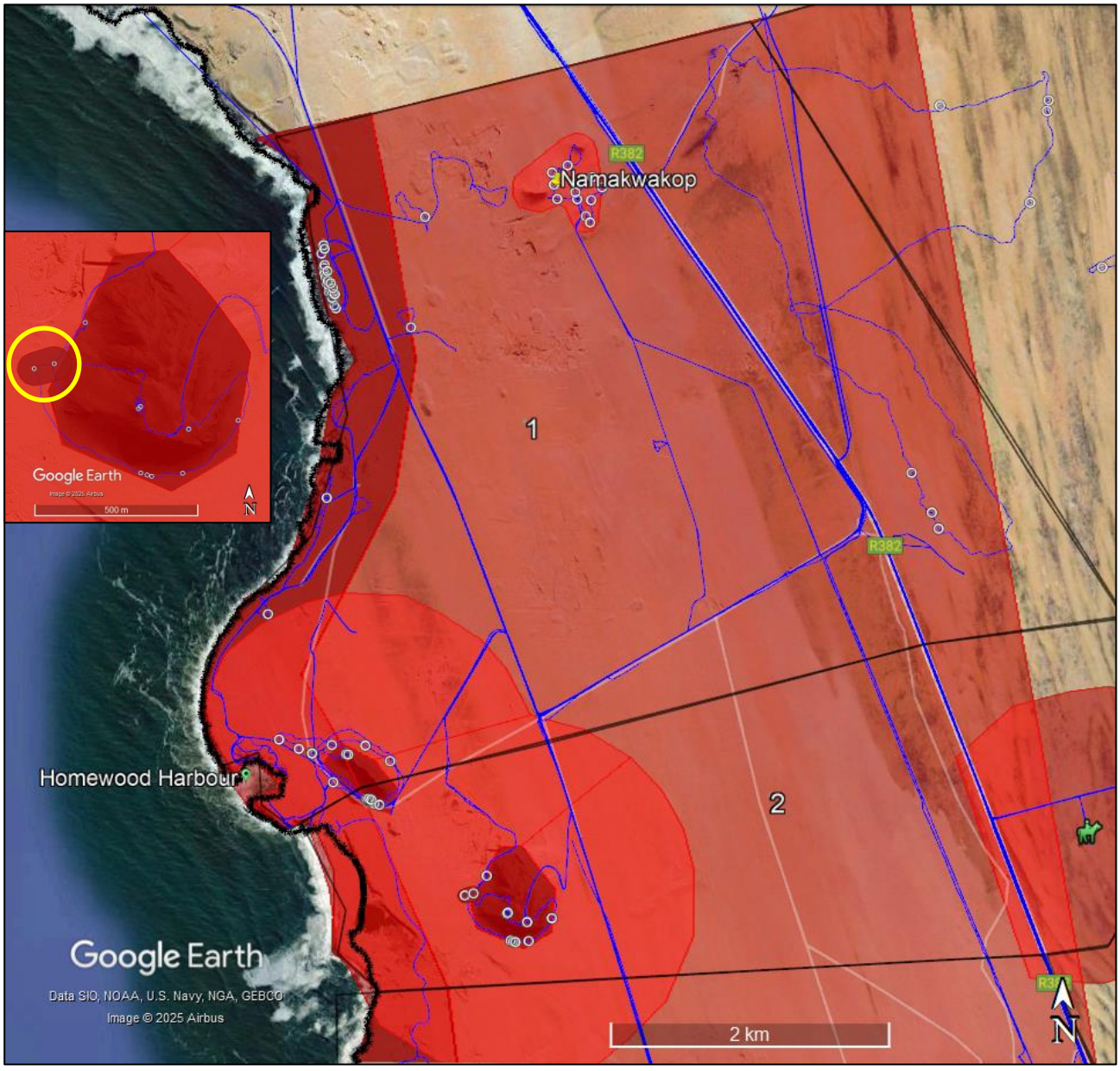

Figure S.2: Enlargement focusing on Zones 1 and 2. Key as per Figure 1. The inset shows Boegoeberg South with the graves in the yellow circle.

Contents

Tables

Figures

CHAPTER 5. HERITAGE

5.1 BRIEF LEGISLATIVE CONTEXT

The National Heritage Resources Act No. 25 of 1999 (NHRA) protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(d) lists "landscapes and natural features of cultural significance" as part of the National Estate.

Development in the Port and SEZ would require assessment under the NHRA with the following being the primary triggers:

- Section 38(1)(a): Any development that involves a linear feature more than 300 m long; and
- Section 38(1)(c)(i): Any development that involves changes the character of a site exceeding 5000 m^2.

However, Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3) of the NHRA. Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. The responsible heritage authority in this instance is the South African Heritage Resources Agency (SAHRA) which has a Development Applications Unit to comment on all applications submitted under Section 38(8).

5.2 THE BOEGOEBAAI STUDY AREA

The study area lies on the semi-arid West Coast in northern Namaqualand, an area known as the Richtersveld. The coastal stretch is characterised by an extensive sandy plain that rises gently from the coast towards the east (Figure 5-1 & Figure 5-2). Rock is exposed in a few places; the most notable of these are the Boegoeberg Twins (Figure 5-3), but a few small outcrops occur in the north of the study area and some bedrock exposures are evident on the high ridge running northwest to southeast just inside the eastern edge of the study area (Figure 5-4). Although much of the area is covered by sparse vegetation, there are areas of exposed mobile dunes in places, largely due to recent disturbance from mining (Figure 5-5). In the past – as indicated by 1937 aerial photography – mobile dunes were far less frequent and were located primarily close to the coast. The result of the sand mobilisation is that there is very little visibility of the pre-mining land surface and archaeological visibility in these areas is consequently low (Figure 5-6). This issue is pervasive within about 5 km of the coast, but in the far north the disturbed area is less than 3 km wide.

Figure 5-1: View towards the east through the centre of the study area from near the coast and showing the sandy coastal plain.

Figure 5-2: View towards the west through the northern part of the study area from near its eastern boundary.

Figure 5-3: View towards the west across the sandy coastal plain towards the rocky Boegoeberg Twins.

Figure 5-4: View of one of the granite outcrops on the high lying ground in the east of the study area.

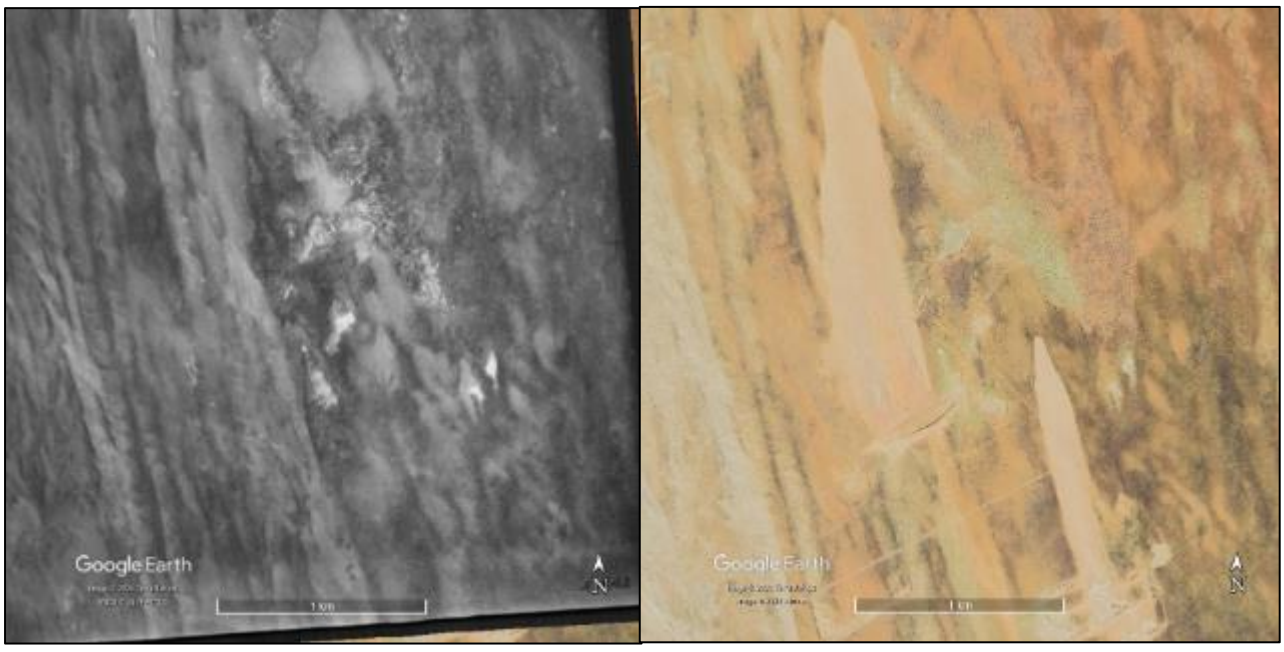

Figure 5-5: Identical 1937 (aerial photograph 122_052_47642 from 1937) and 2023 (Google Earth 2024) showing recent sand mobilisation owning to mine disturbance near the southern end of the study area.

Figure 5-6: Recently mobilised sand obscuring the pre-mining land surface in an unmined area.

5.3 METHODOLOGY

5.3.1 Palaeontology

The palaeontological study was done entirely from the desktop and is based on published scientific literature and the specialist's extensive field experience of the formations involved and their fossil content. The new stratigraphic terminology proposed by De Beer (2010) is mainly used, but is elaborated and modified according to the specialist's own observations. The observations of De Villiers & Söhnge (1959), Keyser (1972) and Gresse (1988) in the SAD/Alexkor diamond mining open pits are important sources.

Field observations were also made during the archaeological surveys, and were incorporated. It is assumed that the fossil potential of the various geological formations in the study area will be similar to that in nearby areas where records exist. One palaeontological site in Zone 2, a hyena lair named Boegoeberg 1, has been excavated as a research project (Klein 1999).

A limitation on predictive capacity exists in that it is not possible to predict the buried fossil content of an area or formation other than in general terms due to the absence of localised subsurface palaeontological investigations in the area. Note that different types of fossils occur in a single formation and can differ in their scientific/palaeontological importance.

5.3.2 Terrestrial Archaeology and History

The terrestrial archaeological study was a combined desktop and field study. While extensive data are available from the Port Nolloth to Hondeklipbaai coastline and other surrounding areas, archaeological work within the Alexkor Mine is limited to two brief field surveys (Parkington 1993; Kaplan 2008), and a single research excavation at a site close to the Boegoeberg Twins (known as Boegoeberg 2; although not published, it is mentioned in Klein *et al.* 1999). For this reason, new fieldwork was carried out within the mine as well as in the adjacent hinterland with the aim of providing more detailed data for the area and confirming that expectations from further south would remain true there.

The field study was limited as follows:

- A full, detailed survey of the approximately 33 km^2 study area was not feasible as this would take many months to complete. Figure 5-7 shows the survey tracks.

- For the sake of time on site, the records made during the survey are brief and not intended to allow for full mitigation requirements to be determined. Rather, they provide an indication of the distribution and extent of archaeological sites and allow for planning of further work as may be needed during subsequent EIA studies.

- Substantial disturbance has occurred due to historical and ongoing mining, and it was not always possible to determine whether an area had been mined and rehabilitated or if it had never been mined. One small area that looked mined on aerial photography was found during the site visit to contain intact archaeological sites.

- Some areas have been recently covered by wind-blown sand originating from topsoil dumps and surface examination of such areas is meaningless.

Figure 5-7: Aerial view showing the archaeological survey coverage (blue lines).

5.3.3 *Maritime Heritage*

A shipwreck database was compiled from the available written and oral sources and interrogated for the assessment. The study was limited as follows:

- The database is a research tool that is constantly evolving as information is discovered and added.
- Locational data are often scarce and/or inaccurate. Shipwrecks are therefore allocated to an area based on limited information and certain assumptions regarding the dynamic nature of the environment; and
- The wreckage of ships foundering at sea outside the study area may drift many kilometres on or just below the surface after being abandoned. For precautionary reasons, these are also included in the project-specific database.

5.3.4 *Living Heritage*

A desktop review of living heritage practices in the wider Richtersveld area is supplemented with observations from historical and modern aerial photography and on-site observations of modern small-scale herders. Use was made of the proceedings of the Richtersveld Community versus Alexkor Limited and Government of the Republic of South Africa case in the Lands Claims Court in 2000. The Court Proceedings (2000) revealed information on traditional land use patterns that occur in the study area.

The study is limited by the fact that no oral information was collected from the herders as to their pastoralist strategies.

5.3.5 Cultural landscape

The cultural landscape was assessed using the authors' collective knowledge of the Namaqualand environment along with visual sensitivity mapping commissioned especially to inform the landscape study. The latter was undertaken by visual specialists (Oberholzer & Lawson 2024), but it is noted that no visual chapter was included in the SEA. The visual sensitivity mapping was based on available spatial datasets (Table 5-1) with sensitivity assigned as shown in Table 5-2.

Table 5-1: Sources of Information for visual sensitivity mapping. Source: Oberholzer & Lawson (2024).

Feature Class	Data Source	Data Description
Topographic features	CD NGI 1:500 000 topographic map series; Google Earth (2024) with terrain; and steep slopes data.	Topographic maps for prominent elevations, ridgelines, scarps, ravines and geological features, particularly where these occur in combination with steep slopes to create complex landscapes.
Steep slopes	SRTM DEM (NASA SRTM GL1 v003 (Shuttle Radar Topography Mission).	Two categories of slopes used: steeper than 1:4 and 1:4 to 1:10. Areas with high geographic density of steep slopes.
Rivers and water bodies	OSM (Open Street Map) Rivers and Wetlands SANBI NFEPA Rivers and Wetlands 2011	Major perennial rivers, estuaries, lagoons, lakes, wetlands, and pans.
Ramsar sites	DFFE SACAD Q2 2024	Database of conservation areas.
Coastal zone	1:250 000 and 1:50 000 topographic map series; NGI shapefiles (latest version).	A 1 km strip of coastline. Sections of coastlines differentiated where these are distinct.
National Parks	DFFE SAPAD Q2 2024	Database of protected areas. Some parks have viewshed protection areas.
Protected Areas	DFFE SAPAD Q2 2024 SANBI Protected Areas Database	Includes proclaimed / protected nature reserves, biosphere reserves, game reserves and wilderness areas.
Private reserves and game farms.	DFFE SAPAD Q2 2024 SANBI Protected Areas Database, Google Maps.	Includes guest farms, resorts and tourism destinations, where known.
Towns and villages	CD NGI 1:250 000 topo-cadastral map series	Digitised Spatial Data of towns and settlements.
National Roads	OSM (Open Street Map) Roads	Routes as mapped.
Provincial Roads	OSM (Open Street Map) Roads	Includes main arterial routes.
Scenic routes	1:250 000 and 1:50 000 topographic map series; Google Maps with terrain.	Includes mountain passes, poorts and coastal routes with intact landscapes.

Table 5-2: Visual Sensitivity Mapping Categories and Recommended Buffers for the Port and Mixed-use Special Economic Zone (SEZ). Source: Oberholzer & Lawson (2024).

Scenic Resources	Very high visual sensitivity	High visual sensitivity	Medium visual sensitivity	Legislative framework
Topographic feature: prominent scarps, peaks and ridges	within 100 m	within 200 m	-	NEMA, DFFE Screening Tool. NHRA
Steep slopes	Slopes > 1:4	-	-	NEMA, DFFE Screening Tool.
Coastal zones, estuaries	within 1 km	-	-	ICM Act
Scenic water features (major rivers, wetlands, pans)	within 100 m	within 200 m		NEMA DFFE Screening Tool.
Cultural landscapes	Feature	within 200 m		NHRA
Protected Landscapes / Sensitive Receptors				
National Parks	within 1 km	within 1,5 km	within 2 km	National Parks Act
RAMSAR sites	within 1 km	within 1,5 km	within 2 km	RAMSAR Convention
Nature Reserves, Botanical Gardens	within 500 m	within 1 km	within 1,5 km	Provincial ordinances
Private reserves, game farms, guest farms, resorts	within 500 m	within 1 km	within 1,5 km	PSDFs and MSDFs.
Settlements, towns, villages	within 500 m	within 1 km	within 1,5 km	MSDFs, zoning schemes and bylaws.
Scenic routes, passes, poorts	within 1 km	within 1,5 km	within 2 km	NHRA
National routes (rural)	within 500 m	within 1,5 km	within 2 km	
Provincial / arterial routes	within 500 m	within 1 km	within 1,5 km	
Main district roads (rural)	within 250 m	within 500 m	Within 1 km	

5.4 DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.4.1 Palaeontology

The geological map of the proposed Port and SEZ is complex, when compared with adjacent geological maps which map the surface geology (Figure 5-8). This is because the map attempts to depict the subsurface formations as well. The geology of the area is briefly described below.

The various bedrock formations underlying the coast belong to the GARIEP SUPERGROUP, which is a suite of volcanic and sedimentary rocks, deposited between 770 and 550 Ma (million years ago). The highly deformed bedrock underlying the Port and SEZ is the Holgat Formation. Although early microfossils appear at times in these rocks, they are not of palaeontological concern.

The bedrock is overlain by much younger formations deposited during the last 66 million years of the Cenozoic Era. The various formations comprising the Cenozoic deposits, between the Orange River and Elands Bay, are termed the **West Coast Group** (Roberts *et al.* 2006).

Table 5-3: Namaqualand Coastal Stratigraphy – The West Coast Group.

Formation Name	Deposit type	Age
Witzand	Aeolian pale dunes & sandsheets.	Holocene, <~12 ka.
Curlew Strand, Holocene High	**Marine, 2-3 m Package.**	**Holocene, 7-4 ka.**
Swartlintjies & Swartduine	Aeolian dune plumes.	Latest Quat., <20 ka.
Hardevlei	Aeolian, semi-active surficial dunes, >100 m asl.	Latest Quat., <25 ka.
Koekenaap	Aeolian, surficial red aeolian sands.	later late Quat., 80-30 ka.
Local Coastal Aeolianites*	Aeolianites, limited pedogenesis, weak pedocrete	Mid-late Quat., ~250-80 ka.
Curlew Strand, MIS 5e, LIG.	**Marine, 4-6 m Package.**	**earliest late Quat., ~125 ka.**
Fossil Heuweltjiesveld palaeosurface on Olifantsrivier & Dorbank fms.		
Dorbank*	Aeolian, reddened, semi-lithified.	later mid-Quat., ~400-140 ka.
Curlew Strand, MIS 11.	**Marine, 8-12 m Package.**	**mid Quat., ~400 ka.**
Olifantsrivier	Aeolianite, colluvia, pedocrete.	early-mid Quat., ~2-0.4 Ma.
Graauw Duinen Member 2	Aeolianite, colluvia, pedocrete.	latest Plio-early Quat.
Hondeklipbaai	**Marine, 30 m Package, LPWP.**	**late Pliocene, ~3 Ma.**
Graauw Duinen Member 1	Aeolianite, colluvia, pedocrete.	mid Pliocene.
Avontuur	**Marine, 50 m Package, EPWP.**	**early Pliocene, ~5 Ma.**
Later Miocene Aeolianites*	Aeolianites, weathered.	later Miocene (14-5 Ma)
Kleinzee	**Marine, 90 m Package, MMCO.**	**mid Miocene, ~16 Ma.**
Unnamed*	Aeolianites, leached, faulted.	Oligocene
Koingnaas	Fluvial, kaolinized gravels, sands, plant fossils.	late Eocene
De Toren	Silcreted colluvial palaeosurfaces 200-400 m asl.	Paleocene - Eocene
* - Informal		
MMCO – Mid-Miocene Climatic Optimum. EPWP – Early Pliocene Warm Period. LPWP – Late Pliocene Warm Period. MIS – Marine Isotope Stage.		

The **Early Coastal Plain**, including the **De Toren** and **Koingnaas Formations** (44-34 Ma), contain fossil pollens (Table 5-3). Notably, the Koingnaas pollen assemblage, with many extinct types of uncertain affinity and no analogues elsewhere, indicates that the uniqueness of the Cape Floristic Region is rooted in "deep time" (De Villiers & Cadman 2002). The Koingnaas Formation deposits are remainders of a fossil landscape when the tropical wooded Namaqualand coast more nearly resembled the forests of the south coast.

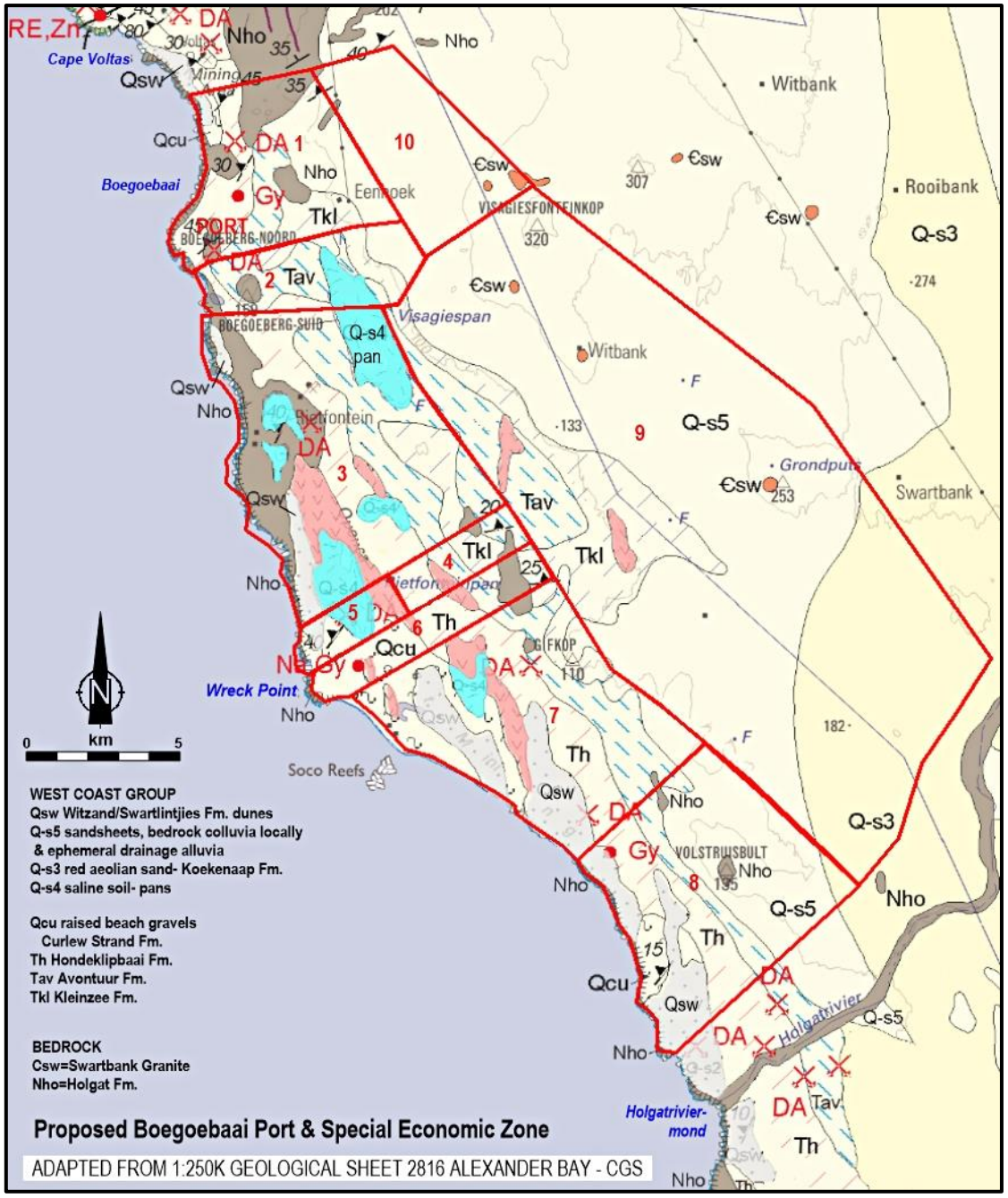

Figure 5-8: Geological context of the Boegoebaai Port and SEZ. The map attempts to depict the subsurface formations as well. Thus, the polygons Tkl, Tav, Th and Qcu are marine formations which are beneath the aeolian formations and are not currently exposed. The turquoise polygons are pans.

The **Fossiliferous Marine Deposits**, including the **Kleinzee, Avontuur** and **Hondeklipbaai Formations**, relate to periods when part of the coastal plain was occupied by the sea, but marine deposits from these times have eroded away, or remain as buried residual patches beneath the thick cover (Table 5-3). Fossil shells are found in places in these Miocene and Pliocene marine formations, and each contains warm-water species and also important extinct fossil shell species which are characteristic of that formation, and which facilitate correlation of formations over wide regions. Rare, scientifically important petrified bones and teeth of marine and terrestrial mammals occur in the basal gravels and sometimes in the overlying marine sands. These finds have been vital to the dating of the formations.

The pre-Quaternary marine deposits of the Alexkor mine are mostly decalcified (J. Pether, pers. obs.) and the preservation of fossil shells is very patchy, with the exception of the ubiquitous, calcitic, thick oyster shells. These Mio-Pliocene fossil shells are therefore of LOW sensitivity. Fossil bones are exceedingly

sparse in the main thickness of the marine deposits, with scattered whale and seal bones most common. Although occasional teeth have been rescued in the mines, most excavated scientifically significant material is now hidden in oversize dumps. Due to the scarcity and rare recovery of vertebrate fossil material from the deposits, any finds of identifiable bones such as teeth, jaws, skulls, ear-bones and limb bones with their articulating ends are of HIGH significance, even if found out of context on mine dumps.

Close to the coast, the Hondeklipbaai Formation is eroded and overlain by the younger, Quaternary "raised beaches". The name **Curlew Strand Formation** has been proposed for this composite of raised beaches, and three successive raised beaches are recognized at 8-12, 4-6 and 2-3 m asl., with ages of ~400 ka (ka = thousand years ago), ~125 ka and 7-4 ka, respectively (Table 3). The fossil shells in these raised beaches are predominantly the cold-water fauna of modern times.

The shelly raised beach deposits of the Curlew Strand Fm. are dominated by extant shell species still living today and are of LOW sensitivity with respect to shell fossils (Figure 5-9). The areas of low bedrock elevation close to the coast and now occupied by pans would have been sheltered embayments/lagoons during the higher sea levels, with the warmer water hosting "extralimital" tropical shell species, "guests" of Angolan/West African origin. These are of scientific interest, but such finds have not been reported, possibly because these deposits may have been deflated away, or dissolved in fresh waters during wetter periods such as the Last Ice Age.

Figure 5-9: Mid-Holocene raised beach at waypoint 141.

The **Aeolian Formations** (Table 5-3) comprise a number of terrestrial deposits. These include the **Later Miocene Aeolianites** which are older Aeolian deposits of the marine Kleinzee Formation which have been eroded and reworked. The **Graauw Duinen Formation** comprises three main, distinct aeolian formations. The overlying **Olifantsrivier Formation** is a reddened aeolianite with interbedded palaeosols, pedocretes, abundant root casts and termite burrows. Isolated Early Stone Age (ESA) artefacts are found in this formation and Middle Stone Age (MSA) artefacts are found on the eroded surfaces. The lower part of the Formation is older than 1.9 Ma while the upper part, in which the ESA occurs, dates to the early Quaternary/earliest middle Quaternary.

Overlying these deposits one finds yellow-brown to red-brown, semi-cemented beds of aeolian sand colloquially called "dorbank" and lumped together into the **Dorbank Fm**. The occurrence of Middle Stone Age (MSA) artefacts within its upper deposits indicates an age younger than about 400 ka, while dates obtained from the upper deposits constrain its age to older than about 130 ka.

For the most part the overlying aeolian formations (*i.e.* **Koekenaap, Hardevlei, Swartlintjies & Witzand fms**.) have a sparse fossil bone content. Most commonly seen is the ambient fossil content of dune sands: land snails, tortoise shells and mole bones. Other palaeosurfaces are formed by wind deflation exposing and concentrating fossils, sometimes with associated archaeology (Figure 5-10). Importantly, the bones of

larger animals (*e.g.* antelopes) are also more persistently present along the major palaeosurface formed on top of the eroded marine deposits and the palaeosurfaces which separate the major aeolianite units. The most spectacular and highly significant bone concentrations found in aeolianites are due to the bone-collecting behaviour of hyaenas. These could occur in any geologically appropriate settings. Out-of-context fossil bones originating in these formations and found in dumps are of low significance because they are generally of extant taxa but, occasionally, unexpected or recently extinct species may occur and would be more significant.

Figure 5-10: Fossil bones in association with archaeological materials at waypoint 603.

Pans located further inland have distinctly different deposits such as pan limestones, evaporites (for example gypsum and salt), muds of unusual compositions, diatomaceous layers, and organic-rich, peaty beds, with interbedded windblown sand layers. Palaeontological finds around these pans are expected to be fossil bones of late Quaternary age and to be those of extant species. These are accorded a LOW palaeontological sensitivity. However, rare bones of recently extinct or unexpected species can sometimes also be found.

In summary, the yellow to white, unconsolidated dunes and sandsheets (Hardevlei and Witzand Fms west of the R382) are mainly of Holocene age. The reddened soils of the Koekenaap Fm., mainly east of the R382, were deposited episodically during the late Quaternary. These surficial formations overlie the calcrete capping aeolian and colluvial deposits which are preliminarily attributed to the early and mid-Quaternary Olifantsrivier Fm. The accuracy of these predictions is based on fairly comprehensive analyses of the geology of the area.

5.4.2 Terrestrial archaeology

The field data is appended as **Appendix 5-1**.

5.4.2.1 Desktop study

Archaeological sites are extremely common along the Namaqualand coast (Dewar 2008; Dewar & Orton 2013; Orton 2012) but research along the coastal section of the Richtersveld, between Alexander Bay and Port Nolloth, has been very sparse. Only two very brief field surveys have been undertaken within the Alexkor mining area. Kaplan (2008) recorded just fifteen sites along 73 km of coastline. The report stressed that large numbers of sites had likely been destroyed by mining. Although regular pre-disturbance

surveys were recommended, these were not implemented. Parkington (1993) had earlier commented that some of the sites he saw were "extremely valuable archives and require(d) immediate and urgent attention". One of these sites was located south of the proposed SEZ and contained fossil animal bones and "superabundant" ESA and MSA artefacts. He also mentions seeing many shell middens but spatial data were not provided. As a result of the continued lack of archaeological mitigation in the mine, widespread destruction of sites has occurred with just one having been (partially) rescued from destruction within the mining area (Klein *et al.* 1999). Located in a buried rock shelter and known as BOG2, it contained the remnants of an MSA deposit substantially disturbed by mining. This observation highlighted the possibility of finding MSA sites in buried rock shelters but also in the open. Their importance is elevated if they are stratified. The possibility of pre-modern human remains at such sites, while extremely low, is not impossible.

Just five other surveys are known to have taken place close to the study area. A survey at Alexander Bay showed that shell middens occur along the Orange River, becoming more frequent towards the coast (Orton 2010). Just inland of Alexander Bay Hart (2015) found a small LSA scatter with stone artefacts and ostrich eggshell. Within and just beyond the eastern part of the WP1 study area, Hart (2010) reported some ephemeral stone artefact scatters of Pleistocene age as well as a Holocene Later Stone Age (LSA) site associated with a granite outcrop. In the same area, Hart (2013) reported MSA artefacts in a deflation area with fossil bone and ostrich eggshell, and Orton (2024) found similar Pleistocene finds and some small LSA shell and artefact scatters. Rudner (1968) has reported on pottery to the north and south of the study area but he did not visit the area between the Orange River mouth and a point just north of the town. To the south, around Port Nolloth, several surveys have revealed hundreds of LSA archaeological sites (Kaplan 2011a, 2011b, 2011c; Orton 2021; Webley 2009a). Excavations at a few of them have revealed deposits dating to 2670 ± 30 BP calibrated to 331 BC – AD 10 (UGAMS-6607) and containing many stone tools, ostrich eggshell beads and some engraved ostrich eggshell fragments (Orton 2017; Webley & Orton 2013).

Some 28 km inland of the WP2 study area, recent work at Spitzkloof has revealed *in situ* LSA and MSA deposits in rock shelters, the latter extending back to pre-Still Bay times (>70 000 BP) (Dewar & Stewart 2012; Dewar *et al.* 2023; Hopper & Dewar 2023). A survey inland of Port Nolloth revealed Pleistocene-aged stone artefacts (Küsel *et al.* 2009). In the northern Richtersveld a number of LSA sites have been recorded (Halkett 1999; Orton & Webley 2009; Van der Walt 2010) and some excavated (Brink & Webley 1996; Halkett 2001; Miller & Webley 1994; Orton 2007; Orton & Halkett 2001, 2010; Smith *et al.* 2001; Webley 1997, 2001; Webley *et al.* 1993). Early Stone Age (ESA) artefacts are also known to occur in Namaqualand but, in the Sandveld, are generally located below the surficial aeolian sands and are only seen where the underlying deposits are exposed through processes such as natural erosion, on pans or in mining areas. Such finds are far better documented in southern Namaqualand (Orton 2022) but a handaxe was found in the salt pan at Port Nolloth (J. O. personal observation).

5.4.2.2 Site visit

Despite the extensive disturbance of the coastal part of the study area, particularly along the coast, numerous archaeological sites were recorded during the surveys (Figure 5-11 and Appendix 5-1).

Figure 5-11: Aerial view showing the archaeological sites on record in and close to the WP1 study area. Yellow symbols represent sites previously recorded by others, white represent new finds. The cluster of finds at Namakwakop in the north is arrowed.

The vast majority of sites was expected to lie along the coast and, where undisturbed areas were found, the surveys proved this to be true. However, dense clusters of sites were also found as far as 4.5 km inland. These sites are mostly shell middens and scatters with associated finds including stone artefacts, ostrich eggshell fragments, flask mouths and beads, pottery, crayfish mandibles and occasionally animal bones (these last do not preserve well in this environment). Some sites were found to have been partly destroyed by mine-related activities and there is no doubt that intact sites lie buried beneath recently mobilised sand. Nonetheless, it is clear from the surveys that many culturally significant shell middens and

scatters are present along the coastline of the WP1 study area. Figures 14 to 20 illustrate these shell midden sites.

Figure 5-12: Ostrich eggshell fragments on a shell midden at waypoint 4944.

Figure 5-13: A coastal shell midden at waypoint 4949.

Figure 5-14: CCS artefacts, ostrich eggshell fragments and a partly made bead at waypoint 219.

Figure 5-15: Flaked tone artefacts, hammerstones and ostrich eggshell beads at waypoint 688.

Figure 5-16: Decorated (incised at left and impressed at right) potsherds at waypoint 4954.

Figure 5-17:Pierced lug at waypoint 4954.

Figure 5-18: Unpierced boss at waypoint 087.

Other interesting observations from the coastal part of the survey are as follows:

- At a series of four small koppies in the north known as Namakwakop there is some dark rock that appears to have been used for making MSA artefacts (Figure 5-11, Figure 5-19 & Figure 5-20).

Figure 5-19: Outcrop of very dark brown rock at Namakwakop (waypoint 658)

Figure 5-20: MSA stone artefacts at waypoint 658.

- Around the southern slopes of Boegoeberg North (Zone 2 or Conservancy) there are scatters of glass and shellfish in association with stone features and rusting iron. Although these scatters could represent 20th century Nama pastoralist settlements, their association with nearby mining debris suggests that early European and/or Nama miners were utilizing the coastal resources. These are likely early mining camps (i.e. late 1920s/early 1930s) and, if so, are not currently protected as archaeology (Figure 5-21) as they are younger than 100 years (see Section 2(ii) of the NHRA).

Figure 5-21: Glass and shellfish near the base of Boegoeberg North at waypoint 672.

- Occasional ESA handaxes and other ESA and MSA artefacts were seen in deflated areas such as at and close to Visagiefontein (Figure 5-22 & Figure 5-23).

Figure 5-22: Handaxe at waypoint 683 located 480 m northwest of Visagiefontein.

Figure 5-23: Broken handaxe and other artefacts at waypoint 555 at Visagiefontein.

It is notable that most sites occurred on dune tops. However, only some dunes hosted sites. Of particular note were some very dense clusters of sites located several kilometres inland and likely associated with water sources. It is important to stress that this is not a comprehensive account of all the sites and further surveys will definitely reveal many more sites throughout the study area.

Highlights from the surveys are as follows (see Figure 5-11 for Zone references):

- The MSA artefacts from Namakwakop in the far north of **Zone 1**.
- A stretch of the coast in Zone 1 (Port Precinct) with many shell middens, has not been impacted by mining.
- Further south, in **Zone 2** (Conservancy), are a number of sites (including potential historical archaeological sites and graves) around the Boegoeberg Twins.

- There are dense concentrations of shell middens in the pan areas of **Zone 3**. They contain permanent water sources and are likely to have attracted LSA herder groups.

- Visagiepan in **Zone 3** contains a very dense spread of shell middens, some extremely large and of high local significance. Despite information about historic settlement at the pan, no evidence for this was found. The pan is of archaeological interest because of the nearby permanent water. A few isolated ESA handaxes were found in the pan.

- Further south in **Zone 3** is Rietfonteinpan which also contains many shell middens. At its southern end, there is an historic kraal dating to 1911 (see also Pieter van Wyk pers comm.).

- In **Zone 7** there is shell midden with many decorated potsherds that is of high local significance.

- Inland, within the eastern part of **Zone 9**, are two areas of particular interest: Witbank and Grondputs. These comprised diffuse scattered middens with archaeological material around rocky outcrops (approximately 11 km from the coast).

- Finally, in the far south, in **Zone 8**, is a dense distribution of shell middens along the coast. Further north, the coast is sandy (and also heavily mined) and no middens were recorded.

Apart from the potential historical archaeological material recorded at the Boegoeberg North hill, no evidence was found for any 19th century European settlement at either Homewood Harbour or Peacock Bay in Zone 1. These all appear to have been destroyed by mining.

5.4.3 Maritime Heritage

A list of shipwrecks that may occur within or close to the study area is attached as **Appendix 5-2.**

The north-western coastline of South Africa has long featured in maritime texts and maps with Cape Voltas, lying just north of the study area, featuring quite prominently (Figure 5-24). However, the accuracy of the records is often questionable. A historical description of Cape Voltas is as follows: "… is 2 leagues to the southward of Orange or Gariep River. According to Capt. Morrell, Cape Voltas is a high bluff point, projecting into the sea; and there are several rocks lying about half a mile to the West of it, beyond which there are no dangers. About 1 mile North of the Cape there is a small bay [Alexander Bay], not more than 2 miles in length, and 1½ in width; within which the anchorage is not safe, as the ground is foul, and heavy rollers are continually heaving in from the westward at all seasons of the year. Ships, however, which are in want of fire-wood, may lie off and on, and obtain any quantity from the head of the Bay, where they will find immense quantities piled up on the beach, which come down the Orange or Gariep River" (Purdy & Findlay 1844).

Figure 5-24: An excerpt of Diego Homen's chart of southern Africa, Cape Voltas or Cabo das Voltas is circled (1561).

5.4.3.1 Shipwreck database

The nature of the environment in which foundered vessels can drift a long way before settling, poor historical reporting, and the length of time since the wrecks occurred means that maritime cultural heritage sites are hard to locate with any accuracy. It is important to have a database, because if maritime archaeological sites are uncovered during development of the project, it will be easier to identify the wreck and thus assess its cultural and historical significance. Figure 5-25 & Figure 5-26 map the known wrecks, while Table 5-4 summarises the data as they pertain to the SEA study area.

There are several points to bear in mind when compiling and using the database.

- There are thousands of reported wrecks around the South African coastline and thousands more that disappeared mid-ocean.
- Shipwrecks in the historical reports were often assigned to the nearest landmark, even if that landmark was many miles away.
- There is some anecdotal evidence that the Phoenicians circumnavigated Africa (Herodotus 1954). However, if this is true, these ships had to stay close to the coastline and therefore are unlikely to be far offshore.
- There is increasing evidence that the Chinese voyages of the 1400s explored parts, if not all, of the African coast (Paine 2013). However, the archival evidence to date, and availability to Western researchers, limits this knowledge.
- The first recorded European voyages down the west coast of Africa were by the Portuguese. When the Portuguese first sent out their explorers, they stayed close to the coastline, in order to map the land. The present-day Cape Voltas may be a survival of the Portuguese name Volta

das Angras. Dias and his fleet passed the Orange River Mouth in 1487/1488 (Axelson, 1973). Thereafter, the rate of exploration and trade increased exponentially, as is evidenced by the increase in shipwrecks over the centuries.

- These early voyages were not well documented, and the archives often merely report that a fleet of a certain number of vessels left and only a certain number returned. Often only vague reference is made to their place and manner of loss. Additionally, it seems that there were often private vessels that accompanied the fleets, these are underreported (Subrahmanyam 1997).

- While the Vereenigde Nederlandsche Geoctroyeerde Oostindische Compagnie or Dutch East India Company (VOC) kept detailed records of their voyages and this information is freely available online (Huygens Instituut 2023), there is evidence of a vast unofficial Dutch trade, specifically in the trans-Atlantic slave trade, of which there are fewer records. Additionally, there was a rich history of pirates and privateers operating along the coast of which there are few records except brief newspaper articles referring to unsuccessful attacks (Sutton 2009).

The Shipwreck Database uses conventions to indicate the likelihood of a wreck being in a given area as follows:

Very high:	More than 90% sure that wreck is within study area
High:	More than 70% sure that wreck is within study area
Medium:	More than 40% sure that wreck is within study area
Low:	Less than 40% sure that wreck is within study area

Figure 5-25**:** West Coast Shipwrecks within approximately 50 km of the study area (Google Earth 2024; Hocking 1969; Levine 1989; Maitland 2023; Reocities 2022; SAHRA 2022; Turner 1988; U-boat.net 2022; van den Bosch 2009).

Figure 5-26**:** Shipwrecks near the study area (Google Earth 2024; Hocking 1969; Levine 1989; Maitland 2023; Reocities 2022; SAHRA 2022; Turner 1988; U-boat.net 2022; van den Bosch 2009).The area shaded red represents Zone 1, the Port Precinct.

Table 5-4: Shipwreck database summary table as it applies to the WP1 study area.

Likelihood of wrecks falling in study area	N heritage (pre-1965)	N other (1965 onwards)
Very High (>90% certainty):	1	2
High (>70% certainty):	4	0
Medium (>40% certainty):	1	0
Low (<40% certainty):	43	1
Total	49	3

5.4.4 Graves

Pre-colonial graves (and specifically LSA graves) are often found in coastal dune contexts where the sand is easy to excavate by hand and population densities were generally higher than inland because of the readily available marine food supply. However, graves are only rarely reported from Namaqualand with most of those on record being from the Kleinsee to Hondeklipbaai area (Dewar 2008; Dewar & Orton 2013). Morris's (1992) catalogue of human remains lists a few burials from the mouth of the Orange River and further inland in the Richtersveld, but none are reported from the study area. However, according to Kaplan (2008), a human burial, likely that of a LSA hunter-gatherer was exposed in a dune cutting, during prospecting operations at Muisvlakte several years ago. The skeleton was subsequently removed by SAPS in Port Nolloth but unfortunately the whereabout of the skeleton remains unknown.

Two, or possibly three, graves were seen along the western margins of Boegoeberg South within Zone 2 (originally recorded by Kaplan 2008 but revisited by us). The graves consist of large piles of stone on the sandy plain (Figure 29). They have no headstones or footstones and have no grave goods, such as marine shell, glass jars etc. It is clear that they have not been maintained for many years. According to oral history related during the Land Claims Court Case of 2000, *"Buchuberg[1] is a sacred place for the aboriginal inhabitants of the Richtersveld. It is also reputed to contain the grave of Kaptein Paul Links"* (Court Proceedings 2000).

The next nearest known graves, belonging to shipwreck victims, were reported by Kaplan (2008) just south of Alexander Bay Harbour and outside the SEZ study area.

[1] The spelling 'Buchuberg' was used during the Land Claim Court Case of 2000 whereas the Afrikaans spelling 'Boegoeberg' is used in the SEZ report and other literature.

Figure 5-27: A stone cairn, which may represent a burial, at the foot of Boegoeberg South. It is situated in Zone 2, the Conservancy area.

5.4.5 History

Information on the history of the area is limited to the navigation charts of early seafarers and the accounts of early travellers. Very little is known on the region prior to the 19th century. The earliest reference to the Boegoeberg Twins was by Robert Jacob Gordon on 16th August 1779. He wrote: "Saw the two little rocky mountains mentioned before at a distance. I went up with Paterson. The easterly one is the larger. We named them 'De Twee Gebroeders (i.e. the two brothers)". Gordon also named the Orange River after the Prince of Orange (Raper & Boucher 1988). Subsequently, in the map by Bell, drawn in 1855, they are labelled as 'The Twins'. Thereafter the labelling for the two hills has varied (Buchuberg, Buchuberg Twins, etc.). The current naming is Boegoeberg North and Boegoeberg South, and they fall in Zone 2 (Conservancy).

According to Penn (1995), not a great deal is known about the territory along the lower Orange River in the 18th century although he speculates that the poor grazing would not have been able to support large Khoekhoen herder groups. He considered it more likely that the San were the chief inhabitants of the area. During his mid-1830s trip, James Alexander (1838) heard that the Namaqua Khoekhoen living in the area swam to an island at Port Nolloth to catch seals. Charles Bell, who visited the region in 1854, also met with Paul Links, and his seasonal movements are reported to include Boegoeberg (Simons 1988). Dr E. Richter, of the Rhenish Mission Society, visited the area in 1830 and it was subsequently named after him. A mission station was established at Kuboes in the mid-19th century (Strassberger 1969). The beams of the church at Kuboes are reported to have been made with the wood from a wreck in the Wreck Point/Holgatpunt area (Court Proceedings 2000). After the annexation of 1847, the Richtersveld was considered by the Colonial Government to be Crown Land.

Later reports suggest that hunters, traders and early prospectors were present in the area by the mid-19th century although the full extent of European settlement is less known.

By the end of the 19th century (Figure 5-28), the coastline between Cape Voltas and the Holgat River, included: Peacock Bay/Roadstead, Harrison's Cove, Homewood Harbour and Wreck Point. The two inland salt pans are Visaghifontein (sic) and Rietfontein, and the inland hills are called Wittebankberg, Witbank and Zwart Bank, with the very low rise between the latter and the coast being named Duiker Kop. A trader called Captain Wiliam Homewood is reported to have anchored his boat in Homewood Harbour in the mid-19th C. When Cornell (1910) visited the area, there were apparently the "*ruins of substantial buildings, boatslips etc., standing deserted today…*".

Visagiepan was apparently named after a farmer who had a house on the edge of the pan where he obtained water from a number of wells.

Figure 5-28: The 1907 Reconnaissance Series maps of the Orange River Mouth and Port Nolloth & Okiep maps (948 D) indicating the topography and local names which had been attached to places.

By the 1890s, the inhabitants of the Richtersveld demanded clarity regarding their ownership of the land. At this stage there were about eight or ten Dutch families living along the Orange River between the mouth and Aris.

In 1925 diamonds were discovered near Port Nolloth. Claims for diggings were awarded by the Government as they considered the land to be unalienated Crown lands. The Certificate of Reservation of land known as the Richtersveld, measuring 350 000 morgen, was promulgated in 1930. The subject land (i.e. coastal strip) and the corridor farms were not included. Eventually in 1934 a formal "ticket of occupation" was issued by the government giving the indigenous groups communal rights to the land which was technically still held in trust by the state. The Richtersveld then became a Reserve under a Management Board. In 1957, a fence was erected along the boundary between the Richtersveld Reserve and the Corridor farms although Boegoeberg itself, was only fenced off in 1963. Farm 2 (Korridor Wes) was sub-divided into a number of smaller portions (Court Proceedings 2000).

The fences prevented the Richtersveld people from using those portions for grazing and watering their stock. In 1989, the Alexander Bay Development Corporation was established, and the alluvial diggings were de-proclaimed. Three years later, through the Alexkor Limited Act, the Alexander Bay Development

Corporation was converted into a company under the Companies Act, to be known as Alexkor Limited. In 1998, the community applied through the Land Claims Court for restitution of land which included land mined by Alexkor as well as state-owned land (Court Proceedings 2000). The Constitutional Court awarded the land and mineral rights to the community of the Richtersveld in 2007.

5.4.6 Living heritage

Desktop

According to the National Policy document on Living Heritage (2009), citing the National Heritage Resources Act, No. 25 of 1999 (NHRA), "living heritage is defined as: cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems; and the holistic approach to nature, society and social relationships" (Section 2(xxii)). Although living heritage is not specifically protected by the NHRA, places associated with living heritage are.

The Boegoeberg Port and SEZ study area was historically used by indigenous groups moving across the landscape from the mountains to the coast. When the first explorers, traders, hunters, and prospectors arrived in the Richtersveld during the 19th century, they encountered various indigenous groups, including Bushmen hunter-gatherers and Nama speaking herders.[2] When James Alexander (1838) visited the area in 1834/5, he encountered Chief Paul Lynx (Links) and a group of around 100 people living at Aris on the Orange River. The illustration of their dwellings suggests that they were Namaqua Khoekhoen. Detailed descriptions of the nomadic herders were provided by Winifred Hoernlé who visited the Richtersveld in 1912 and 1923/4 (Hoernlé 1985; Carstens *et al.* 1987). A camp or kraal consisted of male members of the same patrilineal clan, with their wives and children. They were under the nominal authority of the chief or 'kaptein'. Their boundaries were not fixed but changed with environmental and social conditions. They were predominantly herders, with cattle, sheep and goats. However, they also relied on a variety of other sources of sustenance such as game, wild fruit, plant foods and honey. However, by the time Boonzaaier (1980) commenced with his anthropological studies in the area in 1977, only 37% of economically active males were full time herders. The figure is likely to be less now. Many families may keep livestock, but they are often combined into a single herd and cared for by an employed shepherd.

The transhumance cycles of the Nama herders in the Richtersveld have been documented by various anthropologists (Boonzaaier 1980, Moolman 1981, Mussgunug 1995, Hendricks *et al*. 2004). Due to the extremely dry climate, seasonal mobility was essential. Most farmers live in permanent dwellings in Kuboes or elsewhere, while their herds move in an annual orbit, following summer and winter grazing areas under the care of a shepherd. During the summer months, the livestock need to drink water every day or two, and herders tend to move along the banks of the Orange River. During the winter months, they move to the mountainous areas in the east of the Richtersveld, or into the Sandveld in the west. Herders often leave their huts or frameworks behind after they have moved, indicating that they may return. Although communal land ownership is practiced, a herder may be associated with a particular camp site on the basis of continued or repeated use.

Historical transhumant land use patterns were discussed during the proceedings of the Land Claim Court in 2000. The broader Richtersveld was considered to consist of four (overlapping) areas. It was asserted that by the 19th century:

- The North-Western area was from Kuboes to the Garib[3] River (Orange River) mouth and southward to The Cliffs – the winter grazing in the Sandveld included the coastal areas of **Buchuberg, Rietfontein, Holgat** and inland to **Witbank and Swartbank**.

- The Middle area was from Lekkersing to the coast and from Rietfontein in the north to Port Nolloth in the south (Court Proceedings 2000: chapter 2, page 21). In the winter it included **Holgat, Rietfontein, Witbank and Swartbank.**

- The Eastern and Southern areas are not relevant to this report.

[2] They were descendants of the Namaqua Khoekhoen.
[3] During the Court Case (2007) the Orange River was termed the Garib River. The spelling Gariep is also used.

The repeated reference to **Witbank** and **Swartbank**, points to the importance of these two locations for winter grazing (i.e. mainly Zone 9 but possibly also Zone 10).

These temporary settlements are called “veeposte” (directly translated as stockposts) although people often talk of a “staaning” (Mussgunug 1995). These stockposts consist of a temporary dwelling and, in the case of winter stockposts, also a kraal or two. The duration of stay at a stockpost depends on the grazing and water. During the winter months, the stock spends the night in the kraal, and after being milked in the morning, they are taken out for grazing. They are returned to the stockpost in the evenings. Herders often place their stockposts near rocky outcrops in winter, so that the stock are provided with protection against the rain and cold wind. The lambs and kids are kept in a small kraal (*lammerhok*) often attached to the large kraal for the first two months after they are born, after which they are allowed to go out into the veld. This allows the herder to control the milking of the livestock. Many herders send their livestock out into the veld in a different direction every day, as this prevents overgrazing.

The stockpost structure comprises various elements. These have been described by Webley (1982 and 2009b), Mussgunug (1995) and Mills (1995). There has been considerable variability in the design and layout of stockposts with accelerated change over the last 50 years. We describe the historical and modern forms, illustrating the latter from the study area.

The “matjieshuise” (mat house or !haru-oms) comprised a lathe framework of about 40 to 60 poles which were covered by up to 16 reed mats. The house had a single door facing eastward. The decline in the use of such huts relates to a lack of suitable rush. It is also time-consuming to make the mats, and the majority of women no longer know how to make them. The herders therefore use hessian, plastic sheeting, cardboard and other bits of material to cover the frame. Hut frames are also made of modern materials (Figure 5-29 & Figure 5-30), with caravans also sometimes used (Figure 5-31). Nearby was the “kookskerm” (cooking shelter) which traditionally comprised a semi-circle of bushes enclosing a central hearth. This allowed the herder to keep an eye on his livestock while he sat at the fire. However, today, cooking shelters are composed of any available raw material, such as sheets of metal (Figure 5-29). The cooking shelter had a wood pile, an ash heap and a “haakstok” (forked branch or n//a pole).

Figure 5-29: A stockpost hut in the study area with barrels of water standing outside. The ‘kookskerm’ is between the door and barrels.

Figure 5-30: The framework of a modern herder hut made from wood and the canopy of a bakkie.

Figure 5-31: The 'hut' of a modern stockpost. This was temporarily out of use with bales of straw stored inside the caravan.

Kraals are typically constructed in the winter months to provide the livestock with protection from the cold and predators. They are generally positioned some 20 m from the house and often on the slopes of a rocky outcrop. The kraal facilitated the milking of the ewes as the lambs were born in winter and spring. Kraals (made of wire, poles, bushes or stone) therefore often had lamb kraals (Figure 5-32). The thick dung accumulation is sometimes all that is visible after a stockpost has moved.

Figure 5-32: Lamb kraal in the corner of the main kraal.

5.4.7 Fieldwork and Historical Aerial Photography

A number of modern stockposts were recorded to the east of the R382 (Figure 5-29 to Figure 5-33).

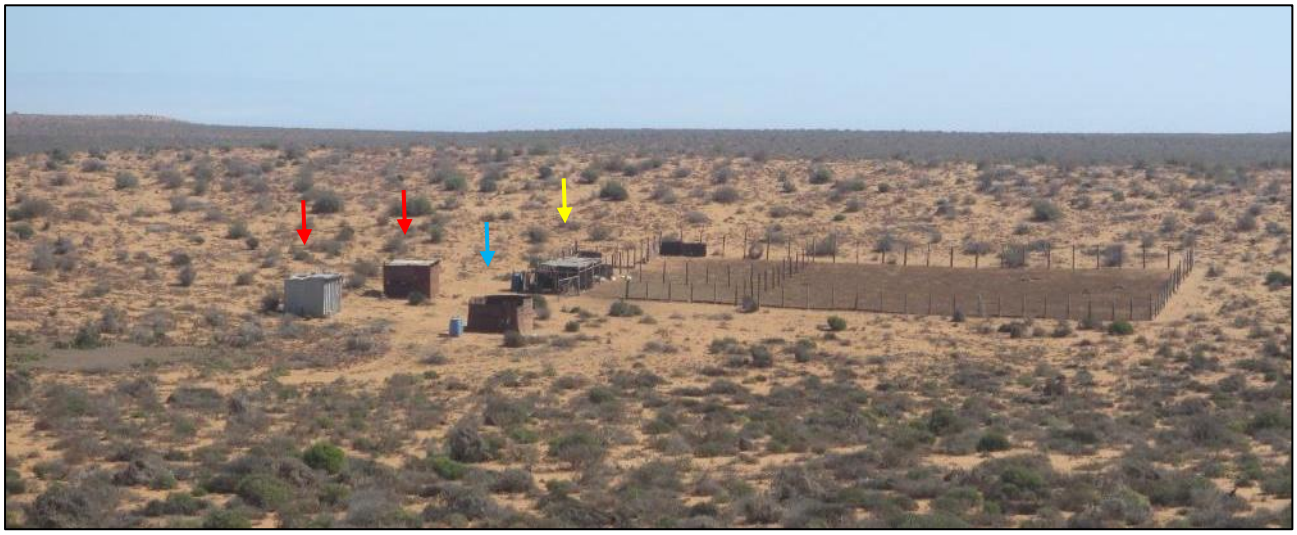

Figure 5-33: Modern stockpost with two huts (red arrows) a cooking shelter (turquoise arrow), roofed lamb kraals (yellow arrow) and a main kraal with three enclosures.

In addition, aerial photographs were also consulted to identify historical and modern stockposts in the study area and to plot their distribution. Rectangular shapes, which are likely to indicate kraals, are seen on the 1937 aerial photographs (Figure 5-34) and current (8 September 2023) Google Earth imagery of the study area. Many of the latter were verified in the field.

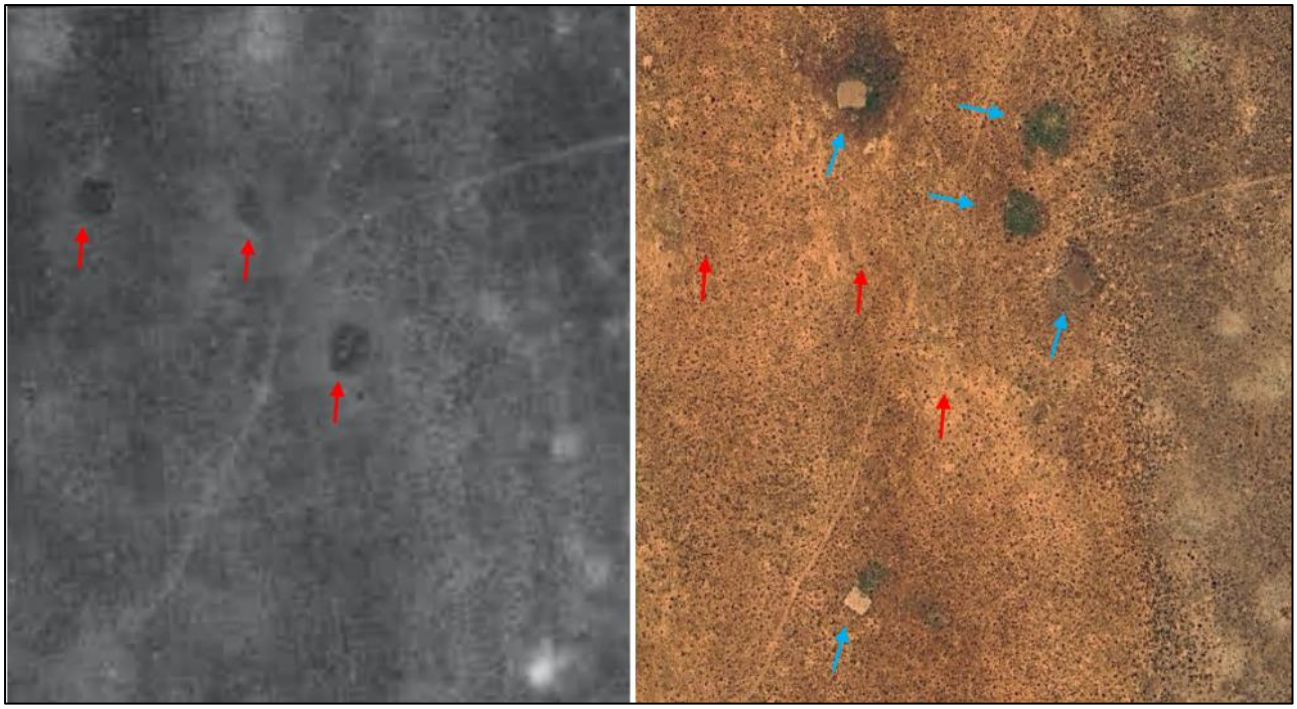

Figure 5-34: Equivalent 1937 (122_046_47776) and 2023 (Google Earth) aerial images showing the locations of historical (red arrows) and recent – but now abandoned – stockposts (turquoise arrows).

Although there are oral records of pastoralists utilizing the grazing around Boegoeberg, Rietfonteinpan and Visagiepan (as noted above), no stockposts were visible on the 1937 aerial photography within the mining area (i.e. Zones 1 – 8). It should be noted that diamond mining commenced in 1925 and pastoralists were evicted from the area soon afterwards so it is possible that their settlements are no longer visible. Also, it is clear from modern settlement pattern that the higher lying ground away from the sandier lowlands are preferred, likely due to the better quality grazing there.

All visible current and recently abandoned stockposts visible on Google Earth (images dating to 8 September 2023) are shown on Figure 37. They are usually identified by the rectangular kraal footprint.

However, it is difficult to determine whether the stockpost is currently in use temporarily out of use, or recently abandoned from aerial photography. Over time the kraal loses its rectangular shape and after some years becomes a darker patch on the landscape comprised of pioneer species colonising the more fertile sand.

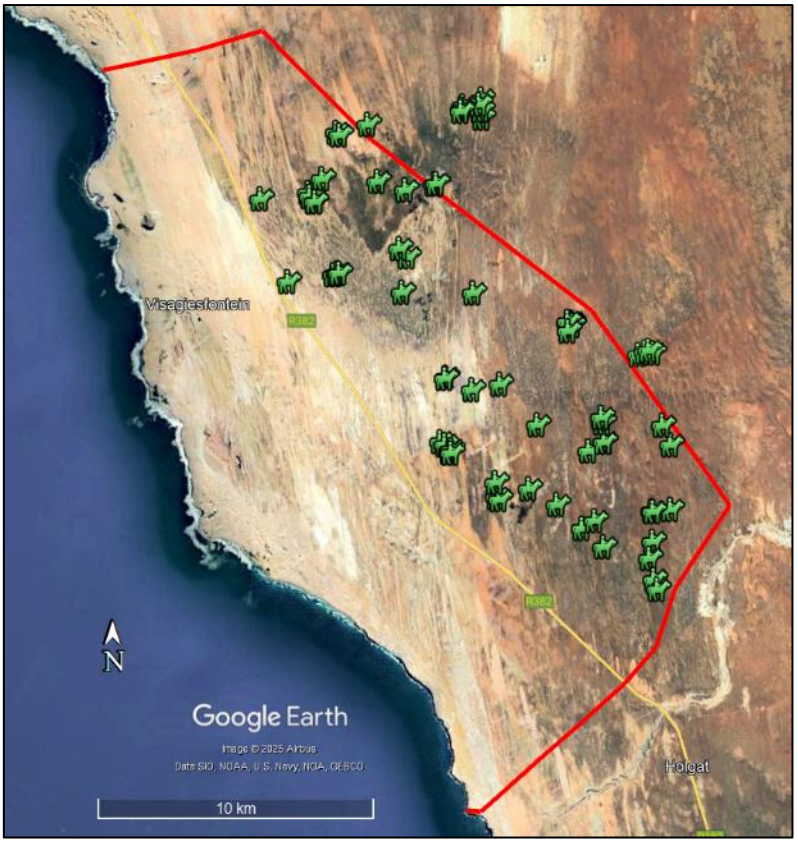

Figure 5-35: The location of the stockposts as identified from 2023 imagery on Google Earth (2024). They are clearly arranged in two groups, approximately around Witbank in the north, and Swartbank in the south.

This modern distribution is supported by historic sources and oral history which emphasise the use of **Witbank** (also spelled Witte Bank) and **Swartbank** (also spelled Zwart Bank) for grazing purposes (Figure 5-35). It is difficult to determine how many herders are currently using the land as grazing for their animals. An examination of the area using Google Earth (2024), suggests at least 10-15 herders are likely to be using the land on a seasonal basis. This figure is increasing annually, as more pressure is placed on the land within the Richtersveld Reserve.

5.4.8 Cultural landscape /Sense of place

The most significant aspect of the cultural landscape is the Richtersveld Cultural and Botanical Landscape (RCBL) World Heritage Site which lies some 27 km northeast of the WP1 study area (Figure 5-36). Its buffer zone, however, comes to within 1.3 km of the eastern edge of the study area. The description of the RCBL is as follows (Republic of South Africa 2007):

> The 160,000 ha Richtersveld Cultural and Botanical Landscape sustains the semi-nomadic pastoral livelihood of the Nama people, reflecting seasonal patterns that may have persisted for as much as two millennia in southern Africa. It is the only area where the Nama still construct portable rush-mat houses (*haru om*) and includes seasonal migrations and grazing grounds, together with stock posts. The pastoralists collect medicinal and other plants and have a strong oral tradition associated with different places and attributes of the landscape.

A buffer zone has been created around the RCBL in order to further control impacts on it (Figure 5-36). It must be noted that the transhumant lifestyle practiced by the Nama includes the lands of the buffer zone as well as the land within the present WP1 study area as described above. Although Townsend (2015:1) comments that “the World Heritage Site and its buffer zone, together, comprise the declared Richtersveld Provincial Heritage Site” (PHS), no evidence of such a PHS could be located.

The area is a relatively flat plain, sloping from east to west. It comprises a desolate and windswept landscape. West of the R382 prospecting trenches and spoil heaps litter the landscape. East of the R382 are arid coastal lowlands which are sparsely vegetated and stretch into the buffer zone of the RCBL. Notably, there is an area of high ground just inside the eastern edge of the study area which visually separates the coastline from the interior.

The R382 is considered a scenic route and the main access to the Orange River. It is the gateway to the Richtersveld National Park, as well as the RCBL and receives tourists who are drawn to its arid landscape. It also provides access into Namibia via the bridge at Oranjemund and the pont at Sendelingsdrif.

Hart (2010) notes that tourists travelling on the R382 are likely to focus on the coastal area and the views towards the Boegoeberg which are the most "significant and scenic features on the landscape between Alexander Bay and Port Nolloth".

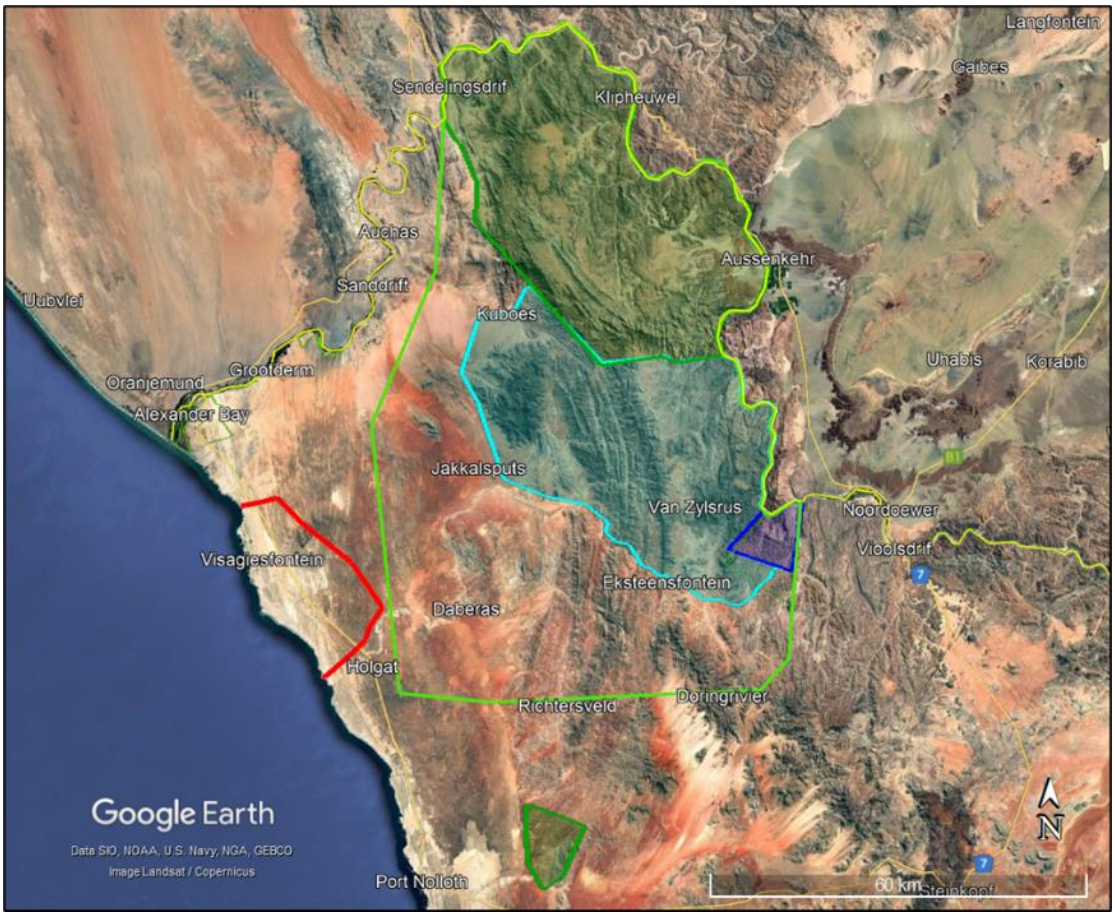

Figure 5-36: Aerial view showing Richtersveld National Park (green shading), Richtersveld WHS (turquoise shading), Nababeep Nature reserve (blue shading), and the WHS buffer zone (green polygon). The WP1 study area is the red polygon.

5.5 SENSITIVITY MAPPING

5.5.1 Palaeontology

The theoretical palaeontological sensitivity of the study area is taken from the Palaeosensitivity Map at the South African Heritage Resources Information System (SAHRIS n.d.). The subsurface geology, i.e. the buried marine formations, are rated as Very High sensitivity (Figure 5-35). However, this "very high"

sensitivity mapping is anomalous because, despite the presence of such marine formations elsewhere in the region, the sensitivity map only classifies the surficial *in situ* aeolian sands which are deemed as being of low palaeontological sensitivity (Figure 5-35 inset). The pans of the area may have once been embayments with scientifically interesting warmer water species in them, but given the current lack of evidence for such species being present, they are also considered as of low sensitivity.

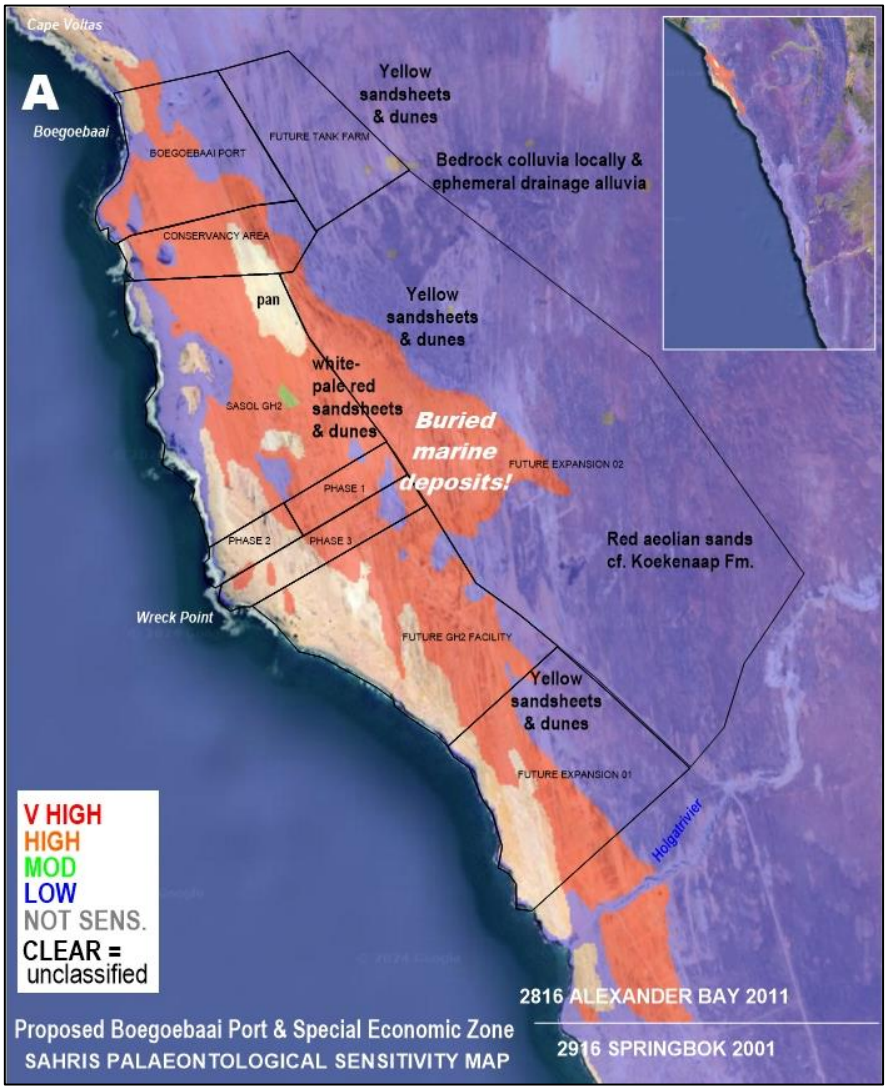

Figure 5-37: The SAHRIS palaeontological sensitivity classification (SAHRA n.d.). The inset shows that the depiction of buried marine formations (VERY HIGH) is anomalous when compared with surrounding areas.

Because these more sensitive formations are deeply buried, a sensitivity of low is appropriate throughout the study area, but with one exception. The exception is in the south-western part of Zone 1 (Port area) where any remaining *in situ* underlying late Pliocene Hondeklipbaai Fm. is considered likely to have a thinner overburden and could easily be exposed during development. This area is considered to be of medium sensitivity (Figure 5-38). However, the status of unmined marine gravels in that area is currently unknown. No other area in the SEZ is considered to be worthy of more than low sensitivity.

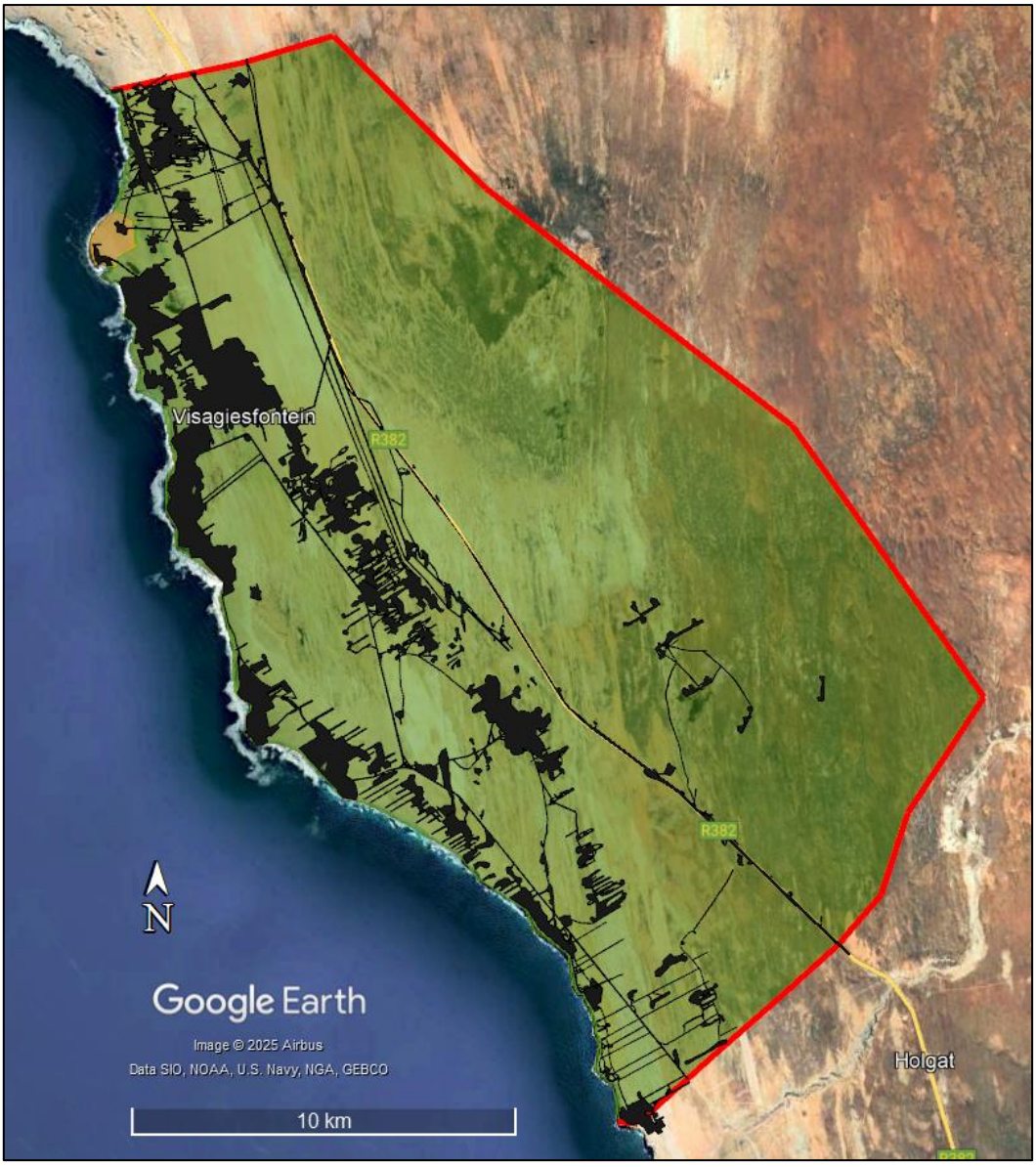

Figure 5-38*: Sensitivity map for palaeontology. Orange = medium sensitivity,* green = low sensitivity. Black areas are disturbed and generally of zero sensitivity, but areas that are unmined but just recently buried will still retain their underlying sensitivity.

5.5.2 Terrestrial Archaeology

The identification of definitive sensitivity zones is entirely dependent on detailed field surveys. Sites may vary in cultural significance from very low (and not worthy of sampling) to very high (potential provincial significance). For this reason, only tentative suggestions can be made based on the survey data obtained. Figure 5-39 illustrates a generalised sensitivity map which does not account for specific areas of high or very high sensitivity encountered during the fieldwork but rather extrapolates zones of sensitivity based on where high sensitivity areas were noted relative to the shoreline and inland rock outcrops. The reason specific highly sensitive areas have not been individually delineated is to avoid creating the idea that they are the only such areas in the proposed Port and SEZ footprint. The density of sites (white circle symbols on Figure 41) does, however, give an indication of where some of these highly sensitive areas lie (there will be others). It should also be noted that, *in general*, sites located further inland are more ephemeral and thus have lower cultural significance. Some specific areas of known high sensitivity are, however, noted here:

- The presence of buried sites like the hyena lair (BOG1, actually palaeontological) and MSA site (BOG2) excavated in Zone 2 (conservancy area) (Klein et al. 1999) suggest the possibility of further, buried sites particularly near the coastal cliffs.

- The high significance of the MSA at Namakwakop relates to MSA sites found both on marine terraces (Dewar & Orton 2013) and further inland, i.e. Spitzkloof (Dewar *et al.* 2023). Parkington (1993) comments: "The potential contribution of these sites to our understanding of human prehistory and mid- to upper Pleistocene environments should not be underestimated".

- The large number of LSA shell midden sites, some with pottery, around the Visagiefontein and Rietfontein pans indicate the importance of water in this arid area. It would have been a strong drawcard for nomadic/transhumant groups wishing to utilise the coastal resources. Some of these sites have high scientific significance and may contribute to our understanding of the advent of LSA pastoralism (Dewar & Marsh 2018).

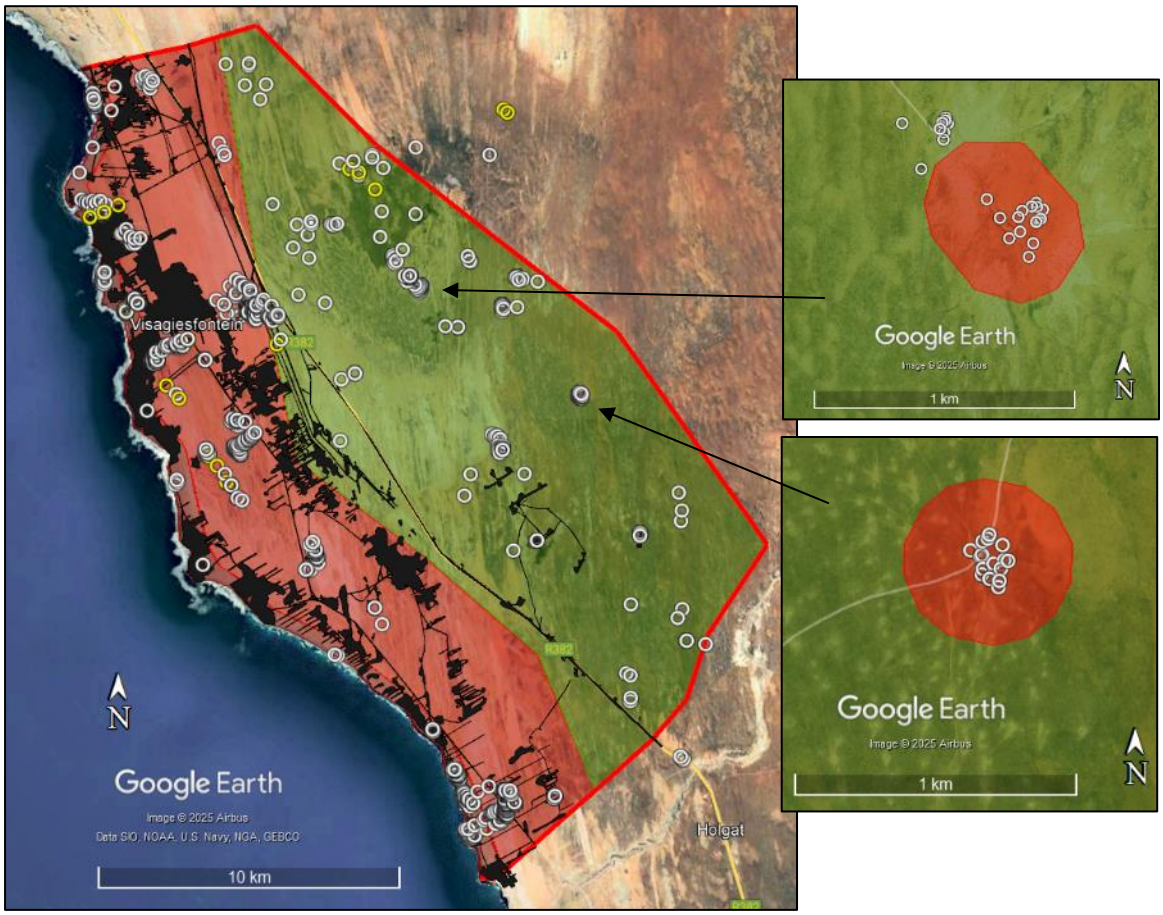

Figure 5-39: Sensitivity mapping for terrestrial archaeology. Dark red = very high (within 0.5 km of the shoreline), red = high sensitivity (0.5-4.5 km from the shore), green = low sensitivity. Black areas are disturbed and of zero or low sensitivity depending on whether they are mined or just recently buried respectively. White circles indicate sites recorded during our 2024 surveys, yellow circles are sites previously reported by others.

5.5.3 Maritime Heritage

Because of the low likelihood of actually encountering shipwrecks, the majority of the sea area adjacent to the proposed SEZ has been rated as of low sensitivity. However, Cape Voltas (just north of the study area), Wreck Point and Soco Reefs are all mentioned in the shipwreck database as foundering localities which means that these places have a slightly higher likelihood of hosting wrecks. These latter areas are indicated in Figure 5-40 as medium sensitivity and are within 2 km of the coastline.

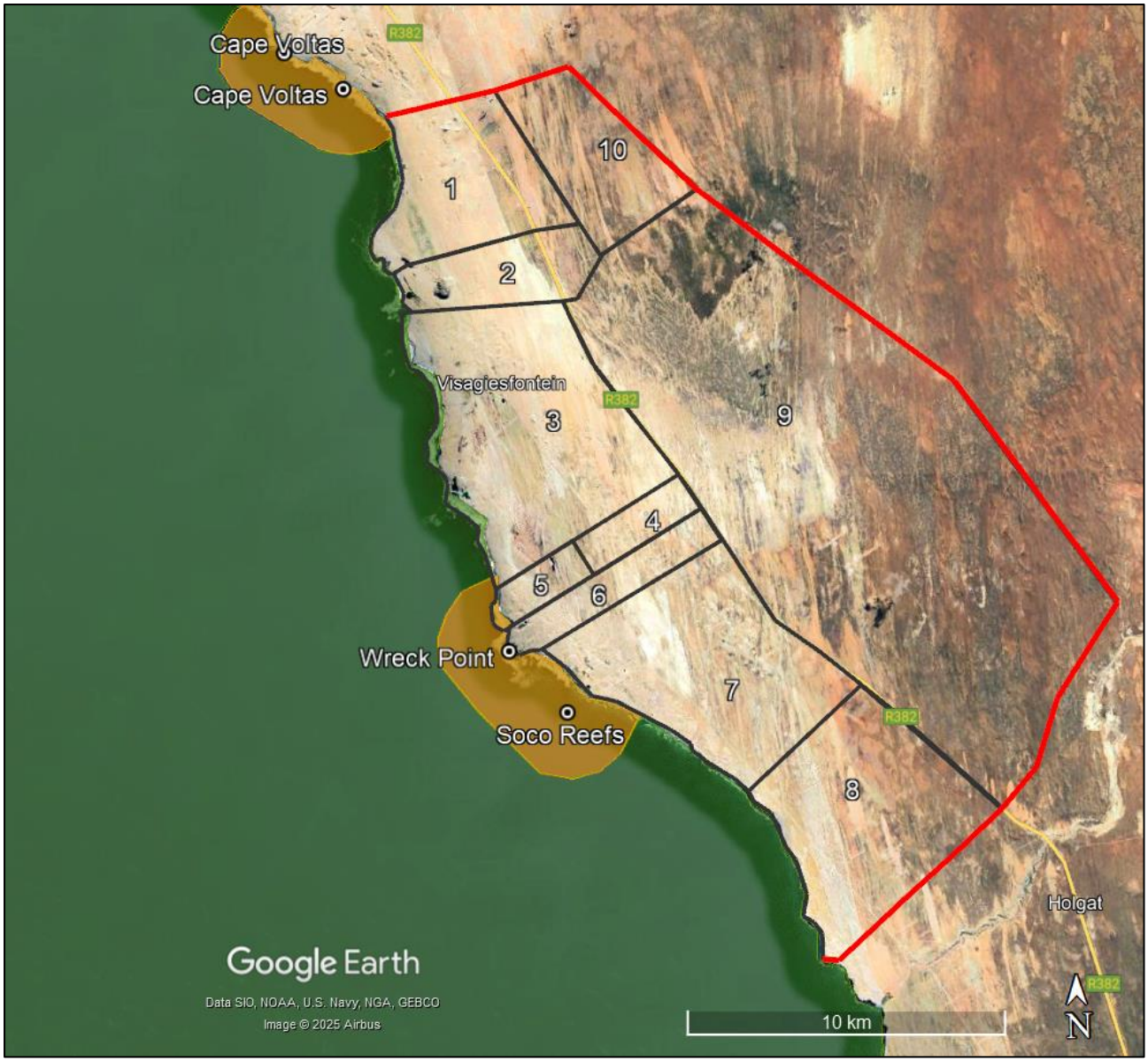

Figure 5-40: Sensitivity mapping for maritime heritage. Orange = medium, green = low.

5.5.4 Graves

It is likely that LSA graves will occur in some of the archaeological shell middens identified during the survey along the coast. Graves have **high local cultural significance** and are automatically of very high sensitivity. Known graves occur at the western foot of Boegoeberg South. Oral history refers to the grave of Paul (Bierkaptein) Links, who was "kaptein" of the Nama people in the 19th century, at the Boegoeberg. The grave location is unknown but would have **very high significance** if found. This falls within the area designated as a Conservancy but further protection measures may be required, such as fencing. No overall sensitivity mapping for graves is provided for the Port and SEZ since the locations of graves cannot be determined and the actual probability of impacts occurring in any one place is very low. However, the known graves at Boegoeberg South are mapped in Figure 5-41.

Figure 5-41: Sensitivity mapping for graves (dark red = very high sensitivity) to the west of Boegoeberg South in Zone 2 (the Conservancy area).

5.5.5 Living Heritage

The **Richtersveld Cultural and Botanical Landscape World Heritage Site (RCBL)** is situated to the east of the study area. It one of the few areas in southern Africa where transhumance pastoralism is still practiced; as a cultural landscape it reflects long-standing and persistent traditions of the Nama, the indigenous community.

This study has confirmed that transhumant herders, from the Richtersveld, have utilized the land within the study area historically and have a centuries old tradition with respect to the landscape and settlement patterns. They have reintroduced this practice to the eastern part of the study area after the land was returned to the community in 2007. The land outside the mine thus has **a high cultural significance** with respect to maintenance of the pastoralist tradition of the Nama peoples. For practical purposes, we have buffered all visible stockposts (presumably all dating between 2007 and the present) by 1 km as high sensitivity to indicate areas favoured for settlement and in which living heritage traditions are being – or have recently been – practiced (Figure 5-42). Other areas are generally more sandy and less favourable for transhumant settlement and grazing and are accorded medium sensitivity, although they are still important to the overall success of the transhumance lifestyle. Within the mine area the land is heavily disturbed and even less favourable for small stock rearing. This area is accorded low sensitivity.

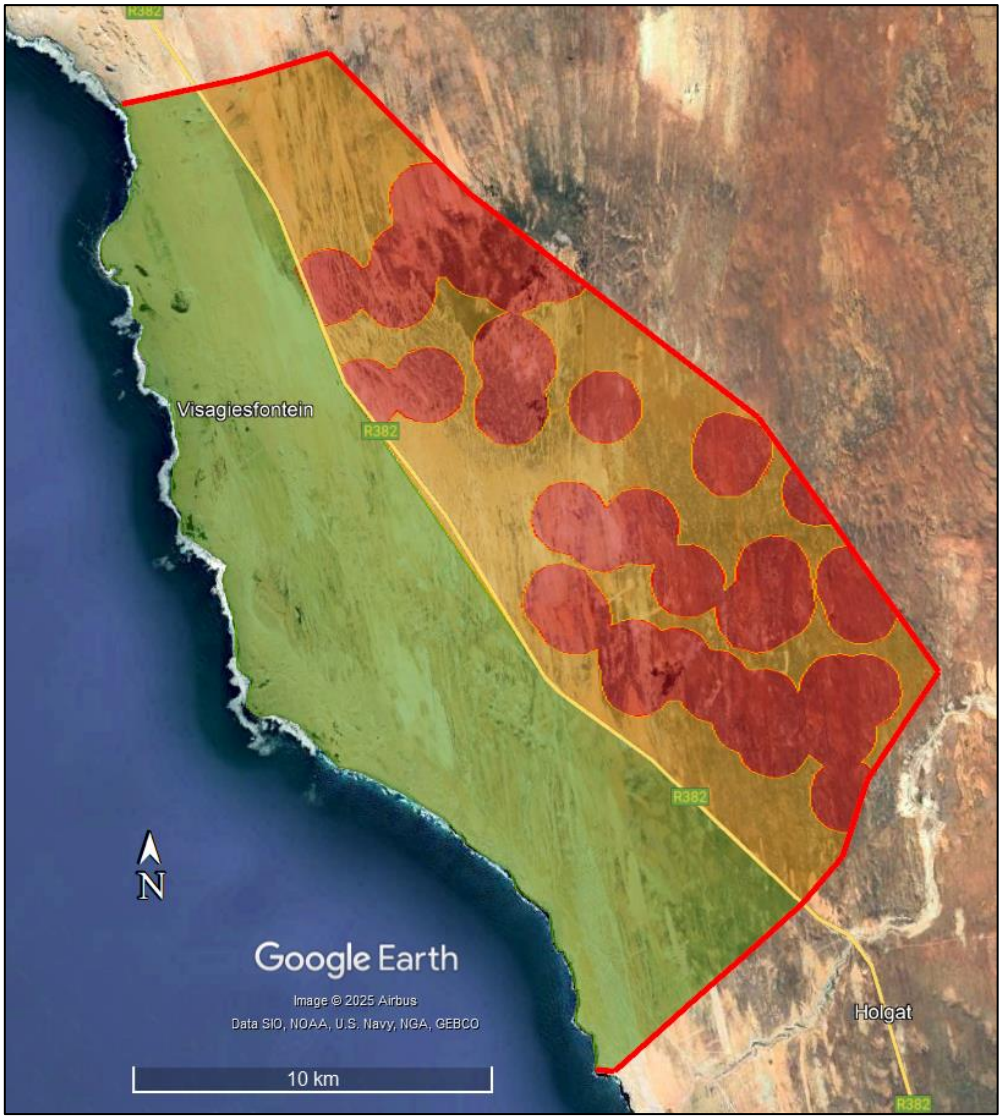

Figure 5-42: Sensitivity mapping for living heritage. Red = high (1 km buffer around recent/current stockposts as seen on the 2023 Google earth imagery, orange = medium (all other land east of R382, green = low).

5.5.6 Cultural Landscape / sense of place

From a purely visual point of view, the following features are identified as highly sensitive: the WHS buffer zone, the coastline, the R382 which links Port Nolloth in the south to Alexander Bay in the north, and the pans (Figure 5-43). From a cultural perspective (largely aesthetics) we add the Boegoeberg Twins (very high sensitivity) with a 1 km buffer of high sensitivity, Namakwakop as high sensitivity, but with a far smaller buffer, and the two areas of higher-lying ground in the east (here taken as above 175 m.a.s.l.) as medium sensitivity (Figure 5-44).

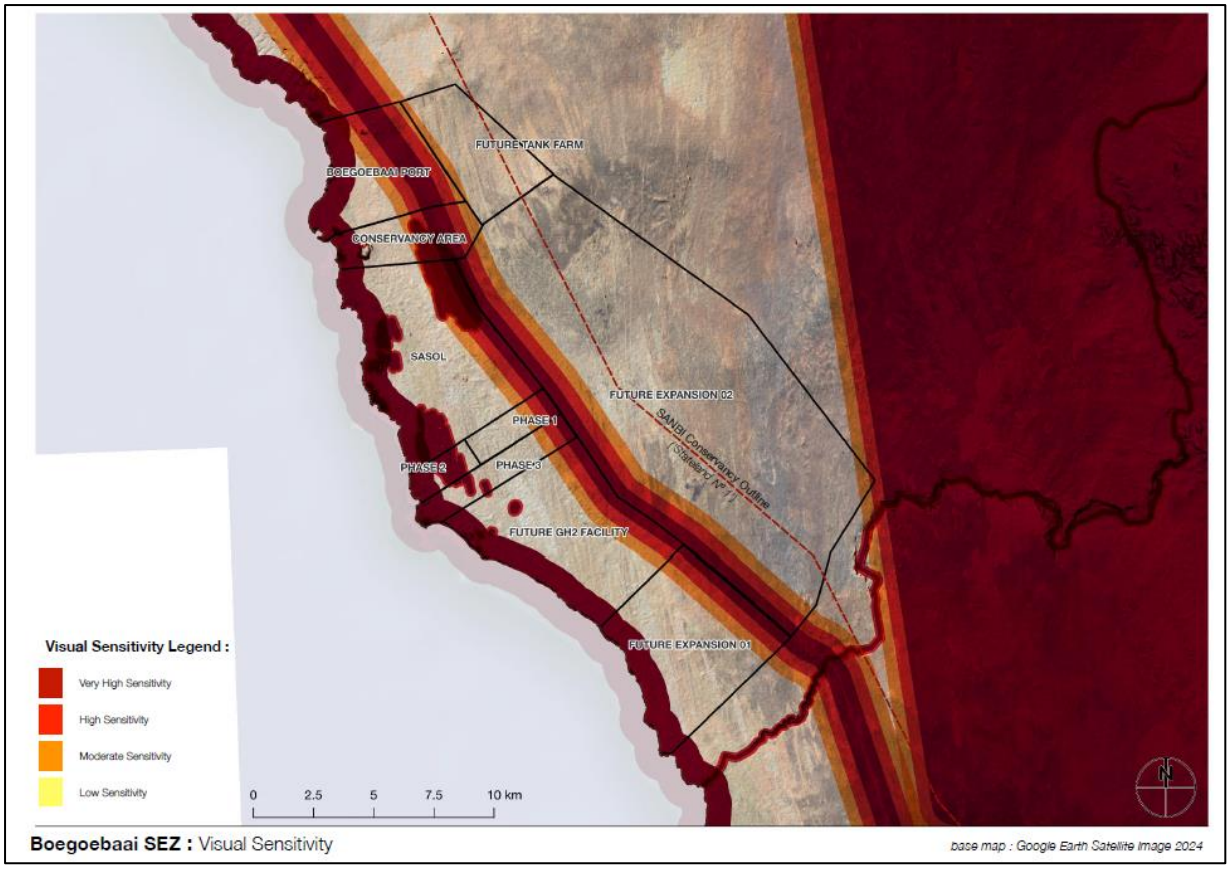

Figure 5-43: Visual Sensitivity mapping for the Boegoebaai Port and SEZ. Source: Oberholzer & Lawson (2024).

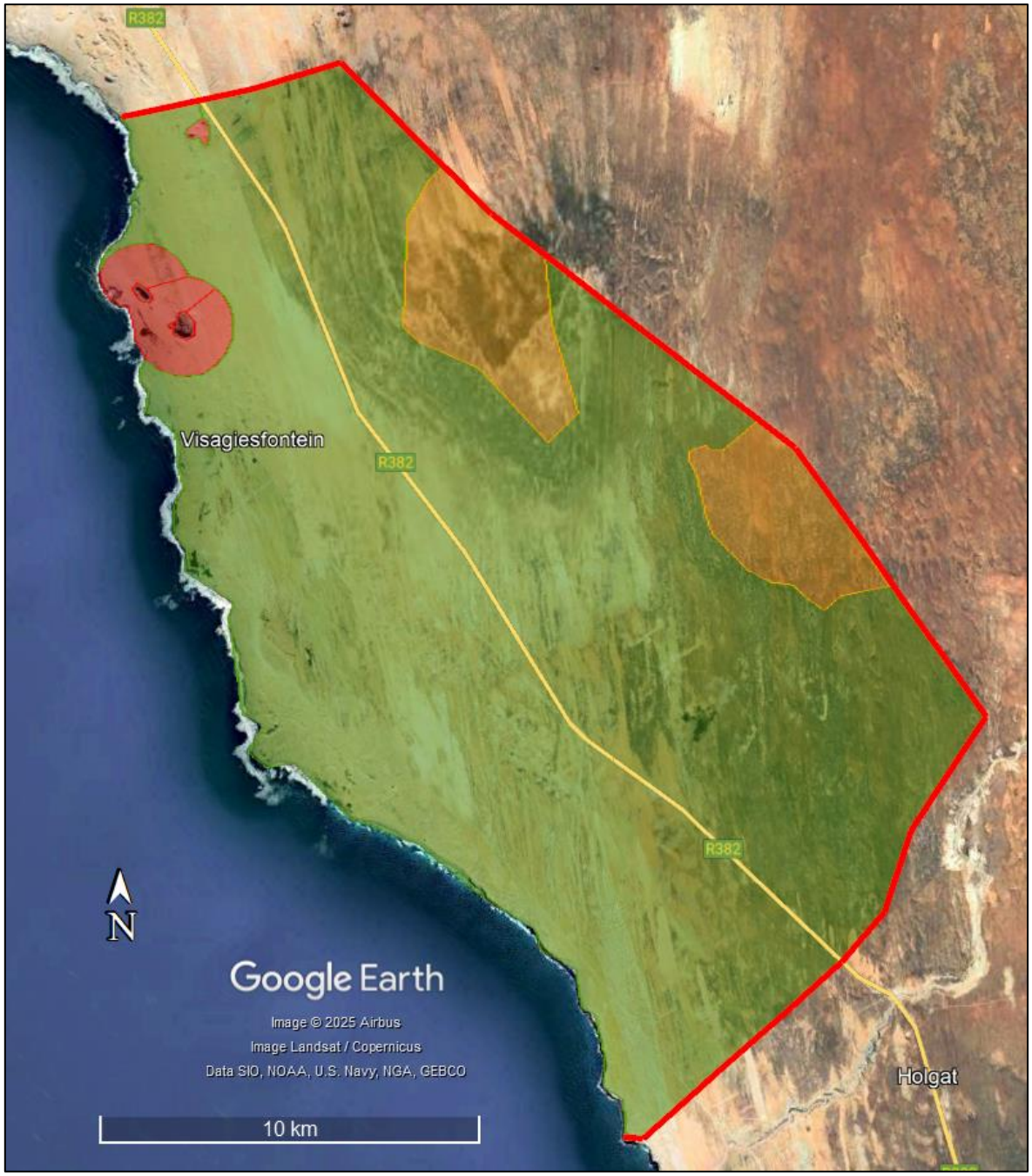

Figure 5-44: Visual sensitivity mapping for the cultural landscape. Red = high sensitivity; orange = medium sensitivity and green = low sensitivity.

5.6 ASPECT AND IMPACT REGISTER

Table 5-5: Aspect and Impact Register for heritage

Port infrastructure aspect / Port and SEZ subzone	Potential Impact	Receiving environment of concern (spatially explicit)
Palaeontology		
Zone 1 (Port)	Construction could expose and/or destroy fossils	Marine deposits of late Pliocene Hondeklipbaai Fm. behind cliffs in proposed port area
All zones	Construction could expose and/or destroy fossils	All unmined areas, but higher likelihood on coastal lowlands
All zones	Backfilling of soils from dumps could expose fossils	Mine dumps used to backfill mine pits
Zones 1, 2, 3, 5, 6, 7 & 8	Construction could expose and/or destroy raised beach deposits	Areas where raised beaches of the Curlew Strand Fm are preserved
Terrestrial archaeology		
Zones 1, 2, 3, 4, 5, 6, 7 & 8	Construction could expose and/or destroy MSA sites in old sea cliffs buried by wind blown sand	All areas along the coast which have rocky outcrops, whether visible or buried
Zones 1, 2, 3,4, 5, 6, 7 & 8	Construction could expose and/or destroy LSA shell scatters and middens	All areas where archaeological shell middens occur along undisturbed coastline
Zone 1	Construction could expose and/or destroy MSA artefact scatters	The rocky outcrops of Namakwakop in the NE of Zone 1
Zones 3, 4, 6 & 7	Construction could expose and/or destroy LSA shell scatters and middens	Around and within Visagiepan and Rietfontein Pan
Zone 9	Construction could expose and/or destroy LSA shell scatters and contact period/historical scatters	High sensitivity areas around granite outcrops in the eastern part of the SEZ
Graves		
Zone 2	Construction could impact known graves	Identified graves at western foot of Boegoeberg South
All zones	Construction could expose and/or destroy unknown graves	Unmarked graves could occur anywhere that has not been mined
Maritime Heritage		
Zone 1	Offshore construction work for the breakwater and other port facilities may expose and/or destroy submerged shipwrecks	Any areas where seabed impacts would occur through construction of foundations or dredging
Zones 2, 3, 5, 6, 7, & 8	Offshore construction work for any other ancillary infrastructure may expose and/or destroy submerged shipwrecks	Any areas where seabed impacts would occur through construction of, for example, intake or discharge pipelines
Living Heritage		
Zones 2, 9 & 10	Development would disrupt transhumant settlement patterns and prohibit access to the area	All areas used by small-scale pastoralists outside the mine area, especially areas known as Witbank/ Visagiesfonteinkop, Swartbank and Grondputs/ Zwartwater
All zones	Development of the Port and SEZ would massively alter the landscape context in which small-scale herding occurs through the addition of industrial facilities	Entire Port and SEZ study area
Cultural Landscape		
All zones	Despite the existing mining, development will irrevocably alter the sense of place of the region through the addition of industrial facilities	Entire Port and SEZ study area

5.7 RECOMMENDED STRATEGIC MANAGEMENT ACTIONS

A Heritage Impact Assessment (HIA) will be required for every Environmental Impact Assessment. Notwithstanding the heritage resources on site, HIAs will be needed in order to satisfy the requirements of the National Heritage resources Act (No. 25 of 1999). A separate Visual Impact Assessment must be included in every EIA process.

5.7.1 Palaeontology

- There are no areas of highly sensitive fossiliferous strata in the SEZ Project Area that require protection as NO-GO areas.
- Every project MUST be evaluated by a palaeontologist to determine the need for a palaeontological specialist study despite the known low surface sensitivity because, depending on depth of excavation, significant impacts could still arise below surface.

5.7.2 Terrestrial Archaeology

- Archaeological specialist studies will be required in all EIAs and detailed surveys of each project footprint must take place.
- Due to the density and distribution of archaeological sites recorded during the initial field surveys, it will not be feasible to mitigate all impacts. The appointed archaeologists will need to determine which archaeological sites best characterize each development footprint in order to sample the most appropriate sites. This may include some sites of lower significance.
- It is likely that monitoring of development may be required in the coastal areas where middens can be buried within sand dunes or under recent wind-blown sand.

5.7.3 Maritime Heritage

- A Maritime Heritage specialist study will need to be included in the heritage application for the Port development, as well as any other developments that might require, for example, undersea pipelines.

5.7.4 Graves

- Graves would be considered along with archaeology in any EIA process that occurs in the Port and SEZ areas.
- Given the size of the Port and SEZ, it is possible that a number of graves could be uncovered. Discussions with SAHRA, the Northern Cape Heritage Resources Authority and representatives of local communities must be initiated in advance of the development to determine whether reburial of human remains – perhaps in Zone 2 (the conservancy area) – should be considered.

5.7.5 Living heritage

- The local herder community should be consulted to determine their response to the loss of their winter grazing lands, specifically those areas termed Swartbank and Witbank. Among other things, consultation should aim to understand:
    - Why these areas were chosen for grazing;
    - The value of the pasturage in terms of seasonal grazing requirements;
    - Any alternative options; and

- How nature and culture are intertwined within their world view.

5.7.6 *Cultural landscape / sense of place*

- The R382 and surrounding area are significant for a number of reasons, largely tourism-related. Further consideration should be given to the appropriateness of the site, and the local community, SANParks, UNESCO, SAHRA and local tourism operators should all be engaged in this process. Although the proposed development lies outside the buffer zone of the RCBL Heritage Site (Figure 5-36), the potential indirect impacts (visual and increased movement of sand) cannot be disregarded. Discussions will need to be initiated with the South African Government and the UNESCO commission regarding the potential impact of the proposed Boegoebaai Port and SEZ development on the World Heritage status of the RCBL.

5.8 REFERENCES

Alexander, JE. 1838. Expedition of discovery into the interior of Africa, Part 1. Henry Colburn: London. (Facsimile reproduction 1967 Cape Town).

Boonzaaier, E. 1980. Social Differentiation in the Richtersveld, a Namaqualand Rural Area. MA thesis: University of Cape Town.

Brink, J. & Webley, L. 1996. Faunal evidence for pastoralist settlement at Jakkalsberg, Richtersveld, northern Cape Province. *Southern African Field Archaeology* 5: 70–78.

Carstens, P., Klighardt, G. & West, M. 1987. Trails in the Thirstland: The anthropological field diaries of Winifred Hoernlé. Centre for African Studies: University of Cape Town.

Court Proceedings. 2000. The Proceedings of the case between the Richtersveld Community, the Kuboes Community, the Sanddrift Community, the Lekkersing Community, the Eksteenfontein Community and the Adult Members of the Richtersveld Community versus Alexkor Limited and the Government of the Republic of South Africa in the Land Claims Court of South Africa in October 2000.

De Beer, C.H. 2010. The geology of the Garies area. Explanation: 1:250000 Sheet 3017 Garies. Council for Geoscience South Africa. 100 pp

De Villiers, J. & Söhnge, P.G. 1959. Geology of the Richtersveld. *Memoir of the Geological Survey of South Africa* **48**: 1295.

De Villiers, S. E. & Cadman, A. 2002. An analysis of the palynomorphs obtained from Tertiary sediments at Koingnaas, Namaqualand, South Africa. *Journal of African Earth Sciences* 33:17–47.

Dewar, G. 2008. *The archaeology of the coastal desert of Namaqualand, South Africa: a regional synthesis*. Oxford: British Archaeological Reports International Series 1761.

Dewar, G. & Stewart, B. 2012. Preliminary results of excavations at Spitzkloof Rockshelter, Richtersveld, South Africa. *Quaternary International*. Online version doi:10.1016/j.quaint.2011.04.046.

Dewar, G. & Orton, J. 2013. Subsistence, settlement and material culture on the central Namaqualand coastline. In: Jerardino, A., Malan, A. & Braun, D. (eds) The Archaeology of the West Coast of South Africa: 109-123. Oxford: Archaeopress.

Dewar, G. & Marsh, E.J. 2018. The comings and goings of sheep and pottery in the Coastal Desert of Namaqualand, South Africa. The Journal of Island and Coastal Archaeology. Online version DOI: 10.1080/15564894.2018.1438538

Dewar, G. Mackay, A. & Stewart, B.A. 2023. Spitzkloof A Rockshelter, South Africa. In: Beyin, A., Wright, D.K., Wilkins, J., Olszewski, D.I. (eds) Handbook of Pleistocene Archaeology of Africa: 177-1690. Cham: Springer.

Google Earth. 2024. *Google Earth Pro.* Google.

Gresse, P.G. 1988. Washover boulder fans and reworked phosphorite in the Alexander Bay Formation. *South African Journal of Geology* **91** (3): 391-398.

Halkett, D. 1999. A Phase One Archaeological assessment of heritage resources in the Trans Hex diamond concession Richtersveld. Report for Trans Hex Group Ltd. University of Cape Town: Archaeology Contracts Office.

Halkett, D. 1999. An Archaeological assessment of power line routes between Muisvlak and Eksteenfontein, Richtersveld. Unpublished report for Niham Shand. ACO, University of Cape Town.

Halkett, D. 2001. A Report on Archaeological Excavations on the Orange River Floodplain between Jakkalsberg and Sendelingsdrift: Richtersveld. Report for Trans Hex Mining Limited. University of Cape Town: Archaeology Contracts Office.

Hart, T. 2010. Proposed Richtersveld Wind Farm. Report prepared for G7 Renewable Energies (Pty) Ltd. St James: ACO Associates.

Hart, T. 2013. Proposed Richtersveld Wind Farm: Findings of supplementary heritage survey 2013. Unpublished report for G7 Renewable Energies (Pty) Ltd. St James: ACO Associates cc.

Hart, T. 2015. Archaeological Impact Assessment: Proposed Richtersveld Solar Farm. Richtersveld Community Reserve. Unpublished report prepared for Cape EAPrac on behalf of Richtersveld Sunspot (Pty) Ltd. ACO Associates.

Hendricks, H.H., Midgley, W.J., Bond, W.J. and Novellie, P.A. 2004. Why Communal Pastoralists do what they do in the Richtersveld National Park. *African Journal of Range and Forage Science* 21 (1): 29-36.

Herodotus. 1954. *The Histories.* Harmondsworth: Penguin Books Ltd.

Hoernlé, W. 1985. (ed). The Social Organization of the Nama and other essays. Centenary Volume: a collection of nine previously published essays edited by Carstens, P. Witwatersrand University Press: Johannesburg.

Hocking, C. 1969. *Dictionary of Disasters at Sea during the Age of Steam: Including sailing ships and ships of war lost in action 1824 – 1962: A-L.* (Vol. 1). London: Lloyd's Register of Shipping.

Homen, D. 1561. *Portuguese Chart of the southern part of Africa.* Map.

Hopper, C. & Dewar, G. 2023. A preliminary report of the excavation at Spitzkloof D Rockshelter, Namaqualand, South Africa. *Southern African Field Archaeology* 18: article 2667.

Huygens Instituut. 2023. The Dutch East India Company's shipping between the Netherlands and Asia 1595-1795 Database. *The Dutch East India Company's Shipping between the Netherlands and Asia 1595-1795*. Available at: https://resources.huygens.knaw.nl/das/search

Kaplan, J. 2008. Report: The Archaeological and Palaeontological Importance of the Alexkor Diamond Mining Area Northern Cape Province. Report for Site Plan Consulting. Riebeek West: Agency for Cultural Resource Management.

Kaplan, J. 2011a. Archaeological Impact Assessment Proposed Desalination Plant Port Nolloth Northern Cape. Unpublished report prepared for Bvi Consulting Engineers. Rondebosch: Agency for Cultural Resource Management.

Kaplan, J. 2011b. Archaeological Impact Assessment proposed Port Nolloth oxidation ponds and sewer pipeline Northern Cape. Unpublished report prepared for Bvi Consulting Engineers. Rondebosch: Agency for Cultural Resource Management.

Kaplan, J. 2011c. Archaeological impact assessment the proposed Port Nolloth waste site Northern Cape. Unpublished report prepared for Bvi Consulting Engineers. Rondebosch: Agency for Cultural Resource Management.

Klein, R.G., Cruz-Uribe, K., Halkett, D., Hart, T. & Parkington, J. 1999. Paleoenvironmental and human behavioral implications of the Boegoeberg 1 Late Pleistocene hyena den, Northern Cape Province, South Africa. *Quaternary Research* 52: 393–403.

Küsel, U., Van der Ryst, M. & Ecotone, S.K. 2009. Cultural Heritage Resources Impact Assessment of a Portion of the Farm Kannikwa Vlakte 157 within the winter rainfall region of the Namaqualand Division ± 15 from Port Nolloth. Report for unknown client. Magalieskruin: African Heritage Consultants CC.

Levine, M. 1989. *Shipwreck History of Southern Africa: A Chronology of Shipping Disasters 1488-1989.* Unpublished.

Maitland, V. 2023. *Maritime & Underwater Cultural Heritage Database.* Shipwreck and MUCH Database - In Progress.

Miller, D. & Webley, L. 1994. The metallurgical analysis of artefacts from Jakkalsberg, Richtersveld, Northern Cape. *Southern African Field Archaeology* 3: 82–93.

Mills, G. 1995. Dwellings and Domestic groups: architectural design at the Richtersveld. In Einiqualand: studies of the Orange River Frontier (ed) A.B. Smith. Page 209 - 235. UCT Press: Rondebosch

Moolman, E. 1981. Die huidige stand van kleinveeboerdery in 'n Richtersveldse Gemeenskap. Khoisis: Occasional Papers of the University of Stellenbsoch 2: 1-19.

Mussgunug, U. 1995. An ethno-archaeological study of pastoralism along the Orange River at the Richtersveld. In Einiqualand: studies of the Orange River Frontier (ed) A.B. Smith. Page 165-208. UCT Press: Rondebosch.

Morris, A.G. 1992. A Master Catalogue of Holocene Human Skeletons from South Africa. Witwatersrand University Press: Johannesburg.

Oberholzer, B. & Lawson, Q. 2024. Regional Visual Sensitivity Proposed Boegoebaai Port, Mixed-use Special Economic Zone (SEZ), including wind and solar energy facilities, Namakwa Region. Report prepared for ASHA Consulting. Bernie Oberholzer & Quinton Lawson.

Orton, J. 2007. Excavations at four sites near Jakkalsberg in the Richtersveld. *The Digging Stick* 24(1): 9–13.

Orton, J. 2010. Heritage Impact Assessment for the services upgrade in Alexander Bay, Namakwa Magisterial District, Northern Cape. Unpublished report prepared for Doug Jeffery Environmental Consultants (Pty) Ltd. Archaeology Contracts Office, University of Cape Town.

Orton, J.D.J. 2012. Late Holocene archaeology in Namaqualand, South Africa: hunter-gatherers and herders in a semi-arid environment. Unpublished D. Phil. thesis. Oxford: University of Oxford.

Orton, J. 2017. Permit Report: Mitigation of PN2011/001 at Port Nolloth, Namakwaland Magisterial District, Northern Cape. Report for BVI Consulting Engineers. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2021. Heritage Impact Assessment: Proposed Prospecting on Plots 516, 678 and 668, Port Nolloth, Richtersveld Magisterial District, Northern Cape. Report for N.J. van Zyl. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2022. Phase 1 Archaeological Survey of Approved Mining Areas at the Namakwasands Mine, Brand-Se-Baai, Vredendal Magisterial District, Western Cape. Report prepared for Tronox Mineral Sands (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2024. Archaeological Preconstruction Survey: Proposed Richtersveld Wind Energy Facility on Portions 2 and 3 of Korridor Wes 2, Namaqualand, Northern Cape. Report for HCV Africa. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J.D.J. & Halkett, D.J. 2001. Mid-Holocene denticulates in the Richtersveld. *Southern African Field Archaeology* 10:19–22.

Orton, J. & Halkett, D. 2010. Stone tools, beads and a river: two Holocene microlithic sites at Jakkalsberg in the northwestern Richtersveld, Northern Cape. *South African Archaeological Bulletin* 65: 13–25.

Orton, J. & Webley, L. 2009. Phase 1 archaeological impact assessment of mining areas in the Oena Mine, Richtersveld, Namakwaland Magisterial District, Northern Cape. Unpublished report prepared for Surf Zone Diamonds Pty (Ltd). University of Cape Town: Archaeology Contracts Office.

Paine, L. 2013. *The Sea and Civilization.* London: Atlantic Books.

Parkington, J. 1993. Archaeological Importance of the Alexkor Mining Area. Environmental Management Programme Report (EMPR) for Alexkor.

Penn, N. 1995. The Orange River Frontier Zone, C.1700-1805. In Einiqualand: studies of the Orange River Frontier (ed) A.B. Smith. Page 21-109. UCT Press: Rondebosch.

Purdy, J. & Findlay, A. G. 1844. *The New Sailing Directory for the Ethiopic or Southern Atlantic Ocean; including the Coasts of Brazil, &c. to the Rio de la Plata, the Coast thence to Cape Horn, and the African Coast to the Cape of Good Hope, &c. ... Composed and arranged from a great variety of documents.* (3rd ed., rev.corrected, by A.G. Findlay). London: R.H. Laurie.

Raper, P & Boucher, M. 1988. (eds) Robert Jacob Gordon: Cape Travels, 1777 to 1786. Brenthurst Press: Johannesburg.

Republic of South Africa. 2007. *Government Gazette* No. 30043, 4 July 2007.

Reocities. 2022. Reocities Web. Accessed online at: http://www.reocities.com/Heartland/ridge/2216/text/MARITIME.TXT on 01 October 2017.

Roberts, D.L., Botha, G.A., Maud, R.R. & Pether, J. 2006. Coastal Cenozoic Deposits (Chapter 30). In: Johnson, M. R., Anhaeusser, C. R. and Thomas, R. J. (eds.), *The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria: 605-628.

Rudner, J. 1968. Strandloper pottery from South and South West Africa. Vol 49 Part a: Annals of the South African Museum. Cape Town.

SAHRA. n.d. SAHRIS Palaeo Map. Accessed at: https://sahris.sahra.org.za/ on 8 December 2024.

Simons, P.B. 1998. The life and work of Charles Bell: an appraisal. Fernwood Press: Cape Town.

Smith, A.B., Halkett, D., Hart, T. & Mütti, B. 2001. Spatial patterning, cultural identity and spatial integrity on open sites: evidence from Bloeddrift 23, a pre-colonial herder camp in the Richtersveld, Northern Cape province, South Africa. *South African Archaeological Bulletin* 56: 23–33.

Strassberger, E. 1969. The Rhenish Mission Society in South Africa. 1830-1950. Cape Town: Struik Ltd.

Subrahmanyam, S. 1997. *The Career and Legend of Vasco da Gama.* Cambridge: Cambridge University Press.

Sutton, A. 2009. *'Infested with Pyratts': Piracy and the Atlantic Slave TRade.* MA. Vanderbilt University.

Townsend, S. August 2015. Heritage Impact Assessment (Basic Assessment): A proposed solar energy power plant at Portion 10 (Arris) of Farm No 2, Korridor Wes, Namakwaland, Northern Cape. Unpublished report for Richtersveld Sunspot (Pty) Ltd.

Turner, M. 1988. *Shipwrecks and Salvage in South Africa: 1505 to the Present.* Cape Town: C. Struik.

U-boat.net. 2022. U-boat.net Database. U-Boat.Net. Accessed online at: https://uboat.net on 18 October 2022.

UNESCO. 2024. Richtersveld Cultural and Botanical Landscape. Accessed online at https://whc.unesco.org/en/list/1265/ on 27 December 2024.

Van den Bosch, F. 2009. *South African Shipwreck Database.* CD-ROM. Cape Town:

Webley, L. 1982. Settlement studies among descendants of Nama herders: an ethno-archaeological approach. Khoisis: Occasional Papers of the University of Stellenbosch 3: 1-26.

Webley, L. 1997. Jakkalsberg A and B: the cultural material from two pastoralist sites in the Richtersveld, Northern Cape. *Southern African Field Archaeology* 6: 3–19.

Webley, L., 2001. Excavations at /hei-/khomas (Vaalhoek) in the Richtersveld, Northern Cape. *Southern African Field Archaeology* 10: 46–74.

Webley, L. 2009a. Archaeological impact assessment: Port Nolloth Borrow Pits, Richtersveld Municipality, Northern Cape. Unpublished report prepared for Richtersveld Municipality. Archaeology Contracts Office, University of Cape Town.

Webley, L. 2009b. The Namaqualand stockpost. Vernacular Architecture Society of South Africa 21: 21-35.

Webley, L., Archer, F. & Brink, J. 1993. Die Toon: a late Holocene site in the Richtersveld National Park, northern Cape. *Koedoe* 36 (2): 1–9.

Webley, L. & Orton, J. 2010. Port Nolloth. Phase 2 archaeological impact assessment: Port Nolloth Borrow Site 1 (PN001), Richtersveld Municipality, Northern Cape. Unpublished report prepared for Richtersveld Municipality. Archaeology Contracts Office, University of Cape Town.

Webley, L. & Halkett, D. 2011. Heritage Impact Assessment: proposed Aggeneis-Oranjemund 400kV powerline and substation upgrade, Northern Cape Province. Unpublished report for Savannah Environmental (Pty) Ltd.

Webley, L. & Orton, J. 2013. Excavations of two shell middens at Port Nolloth on the Namaqualand coastline, Northern Cape Province. The South African Archaeological Bulletin 68 (197): 86-92.

5.9 DIGITAL APPENDICES 5-1 & 5-2

SEPARATE DIGITAL DOCUMENT

Appendix 5-1:	Title??
Appendix 5-2:	A list of shipwrecks that may occur within or close to the study area