HERITAGE IMPACT ASSESSMENT:
PROPOSED PROSPECTING ON PLOTS 516, 678 AND 668, PORT NOLLOTH, RICHTERSVELD MAGISTERIAL DISTRICT, NORTHERN CAPE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

SAHRA Case No.: TBC

Report for:

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On behalf of:

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by N.J. van Zyl to conduct an assessment of the potential impacts to heritage resources that might occur through proposed prospecting activities on the Remainder of Plot 516, Plot 678 and Plot 668 Port Nolloth. The centre of the study area is at approximately S29° 15' 30" E16° 53' 30". Test pitting and bulk sampling have been proposed in a total of 19 locations falling within a 2212 ha prospecting right area.

The area surrounds the town of Port Nolloth and is largely flat but with Holocene-aged white sand dunes. The large Port Nolloth Salt pan lies within the northern part of the prospecting area. Vegetation cover is light and visibility of the substrate was good. The area is far from pristine. Evidence of earlier mining and prospecting activities occurs in many areas and includes large open trenches and associated mine dumps as well as smaller, more recently excavated prospecting holes that have been backfilled. Many small tracks cross the study area and a new set of oxidation ponds and an associated pipeline have recently been constructed in the central part of the study area.

The field survey revealed massive numbers of Later Stone Age archaeological sites scattered unevenly throughout the study area. The vast majority were fairly ephemeral shell scatters with very little cultural material. Many other sites were larger shell scatters and, in a few instances, shell middens. Some of these had many stone artefacts on them. Other cultural finds noted included pottery (including two lugs and one impressed sherd), ostrich eggshell beads and a few flask mouth fragments. The beads fell into all four size classes potentially indicating a range of ages. In contrast to areas further south, it appears as though the majority of the material is deflated on the surface with very few instances of buried sites likely to occur. A likely reason is the different dune forms present here (elongated low dunes rather than hummock dunes).

Another important heritage resource was also revealed. This is the remnants of the historic 19th century copper railway which linked the mines around Concordia and Springbok with Port Nolloth from where the ore was exported. Alongside the railway dumps of coke (fuel) and domestic debris (mostly bottles that would have contained refreshments) were found. The entire copper mining landscape, including the railway, was under consideration for declaration as a world heritage site but the nomination was never completed. Copper mining was a significant driver of the economy of South Africa and the Northern Cape province. The railway remnants and related features within the study area are regarded here as having at least high local (Grade IIIA) significance, while the entire copper mining landscape is at least of Provincial significance (Grade II).

It is the stated intention to try and avoid impacts to archaeological resources as far as possible. To this end buffers of 50 m have been proposed around all waypoints to allow for the area of the site itself as well as a buffer area of at least 30 m around the site as required by SAHRA. It is likely that the small test pits and associated access routes, spoil heaps and work areas will be able to avoid all sites but when it comes to the far larger bulk sample trenches it is very likely that some impacts will occur and archaeological mitigation will be required.

The last heritage resource identified was the cultural landscape. Impacts to the landscape were considered insignificant because of the existing mining-related disturbance in the area and the fact that Namaqualand has been the target of diamond mining for nearly a century. The proposed project is thus an appropriate land use and, with rehabilitation, impacts will be temporary.

It is recommended that the proposed prospecting be approved but subject to the following recommendations:

- All prospecting excavation work (including test pits, bulk sample trenches, all access routes, all spoil heaps and all associated work areas around the heaps) needs to be accurately mapped and approved by SAHRA prior to commencement so as to ensure that impacts will not occur;
- All sites of Grade GPB or higher must be avoided with a buffer of 50 m from the waypoint location (to account for the site and a protective buffer of at least 30 m);
- All archaeological mitigation that still becomes required must be effected by a qualified archaeologist under a permit issued to that archaeologist by SAHRA;
- If any fossils, archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution; and
- Rehabilitation of the excavations must occur such that the landscape is left looking as similar as possible to its pre-prospecting condition.

Glossary

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

CRM: Cultural Resources Management

DMR: Department of Mineral Resources

EIA: Environmental Impact Assessment

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MSA: Middle Stone Age

NBKB: Ngwao-Boswa Ya Kapa Bokoni

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

PPP: Public Participation Process

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by N.J. van Zyl to conduct an assessment of the potential impacts to heritage resources that might occur through proposed prospecting activities on the Remainder of Plot 516, Plot 678 and Plot 668 Port Nolloth (Figure 1). The centre of the study area is at approximately S29° 15' 30" E16° 53' 30". Test pitting and bulk sampling have been proposed in a total of 19 locations falling within a 2212 ha prospecting right area (Figure 2).

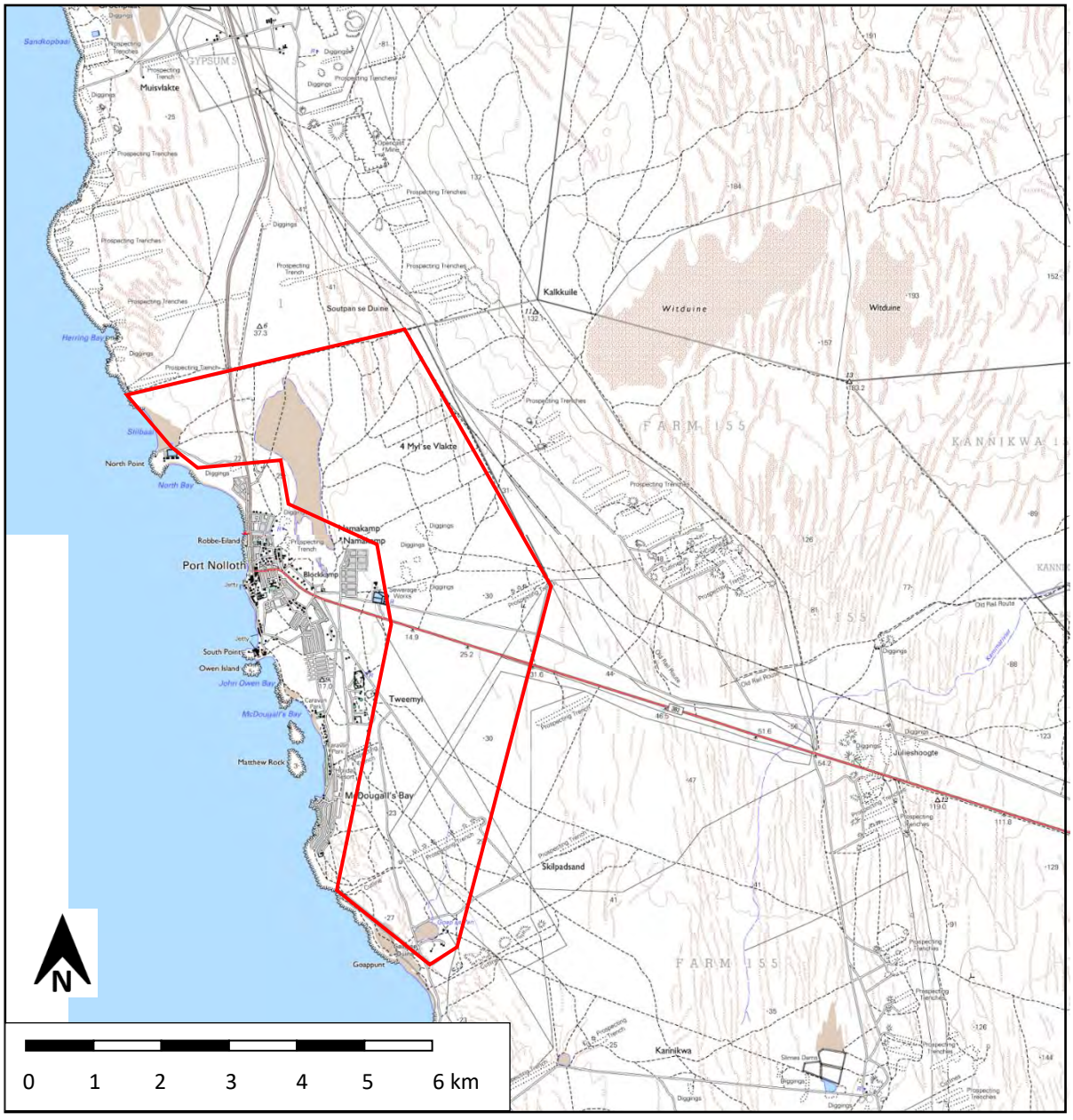


Figure 1: *Extract from 1:50 000 topographic mapsheets 2916BA & 2916 BD showing the location of the study area (red polygon = prospecting right area). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

Note that the locations of test pits will be determined through consideration of a number of factors, including constraints identified by specialists, while the bulk sample trench locations will be

determined based on the results of the test pitting. However, all activities related to this application – with the exception of access and processing – will be contained within the black numbered polygons in Figure 2. These polygons therefore constitute the study area considered in this report. A limited amount of prospecting has already been done in the north-eastern part of the area under an older prospecting right and those results will also feed into the present project.

Figure 2: *Aerial view of the Port Nolloth area showing the study area split into North, Middle and South sections (red polygons) and the 19 individual prospecting areas (black polygons). For convenience within the HIA only, numbers have been added to the nineteen bulk sampling locations prefaced by N, M or S to indicate the section in which that location falls.*

1.1. The proposed project

1.1.1. Project description

Construction Phase:

Development of infrastructure and logistics

- Access and service roads: Access to the exploration works will be via existing farm tracks. Existing farm tracks will also be used as haul roads and will be upgraded where needed.
- Water supply: Sea water will be used as process water and stored in mobile tanks at the processing area.
- Electricity supply: Electrical supply will be provided by generators.
- Logistics: No permanent infrastructure is present or will be required due to the small scale of operations and the close proximity of the Port Nolloth settlement.
- All logistics and infrastructure required for processing will be mobile units and plants.
- No workshops will be constructed, only a service and wash bay will be required for emergency maintenance. All major repairs will be done in workshops in Port Nolloth.
- Limited waste management facilities will be provided at the processing area and will consist of the following:
    - Plastic containers for domestic waste, which will be transported daily to the municipal solid waste disposal facility;
    - Temporary storage area for used lubrication products and other hazardous chemicals for the collection of the small volume of waste before it is removed to a registered disposal site; and,
    - Hydrocarbon management systems will consist of drip trays for stationary equipment and mobile fuel trailer in bunded parking area.

Mine logistics

- The logistics area will comprise a temporary service and wash bay, storage facilities, waste management facilities, ablution facilities and the processing plant, totalling a footprint of approximately 0.5 Ha in size.

Processing Plant Design

- The processing plant is a basic rotary pan plant where the sea water will wash the excavated material. The sea water will be returned from the dewatering screen for recycling.
- The tailings containing seawater and alluvial deposit that has been processed, will be deposited into the historically excavated area where the mobile processing plant is to be located.
- The pump will be placed on a rocky shore outside the inter-tidal zone and not on the beach. The intake pump will be a portable petrol-driven mono pump, to be positioned above the High Water Mark (HWM) of the sea, to extract sea water from the inter-tidal pools. No permanent or temporary infrastructure will be required at the intake. The portable pump will be removed at the end of every working day to reduce environmental risk and for security reasons.
- The seawater will be transported via a 50mm pipeline in a direct line to the edge of the processing plant located approximately 250m from the edge of the beach or approximately 230m from the HWM.
- The seawater will be stored in 3 x 10 000l plastic tanks within the processing plant area.
- The plant will be run for 12 hours a day over weekdays only.

Road Access and Haul Routes

- Existing public roads will be used as access and haul roads. Sections of new haul and access roads could be required, as could the upgrading of existing roads, which includes the potential for realignment of roads required during Phase 3 Bulk Sampling.

Security and access control

- The processing plant and logistics area will be fenced and access control provided to ensure security.

Power supply

- Power will be supplied by a genset (generator) located at the processing plant. A 100 litre fuel bowser will be used for the supply of fuels, and stored in a bunded area with a volume of less than 80m².

Water Supply

- Process water supply is to be sourced from the sea as described above.
- Potable water will be trucked in and stored in water tanks for domestic consumption.

Operational Phase

Phase 1

- Literature study, imagery analysis, geological mapping, geophysical survey

Phase 2

- Preliminary evaluation - Prospecting Pits

Due to the relatively shallow overburden, prospecting pits will be employed during this exploration program to allow for geological samples. The results of the existing exploration program have indicated that the paleo-channel running through the saltpan southwards and then westwards comprises a very promising target measuring about 3.5km long by 500m wide. The raised marine beaches on the rest of the property also comprises attractive targets.

Pit development will be as shown in Figure 3. Only three prospecting pits will be open at any given time, one in the process of rehabilitation, one that is operational and one in the process of development and it is anticipated that a maximum of 30 pits will be opened to a depth of approximately 6.5m. After results are logged the pit will be backfilled immediately for security and safety reasons before the project is moved to the next pit position. The total footprint of these pits at current natural ground level is estimated at about 88m^2 per pit but work areas around the pit and the storage of overburden and topsoil (total volume about 300m^2) means the total disturbance area will be substantially larger. Figure 3 shows the appearance and dimensions of these pits.

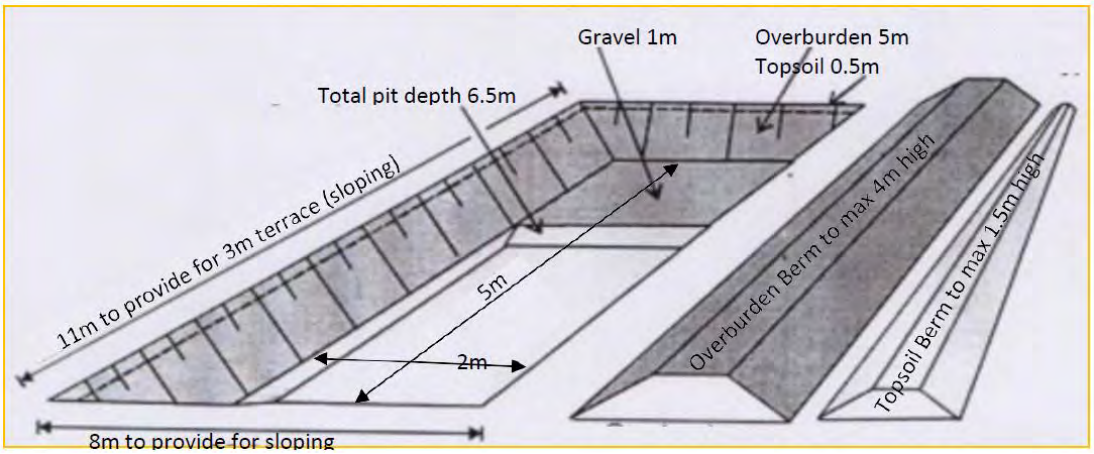


Figure 3: *Schematic drawing and measurements of a prospecting pit.*

Phase 3

- Bulk sampling (Trenches)

The bulk samples will consist of trenches excavated perpendicularly to the palaeochannel or palaeobeach. Between 5 and 10 such sample sites will be developed. They will look like the Figure 3 illustration, but far larger.

The trench width will be determined by the depth of overburden and the safe angle of repose of the deposits. Prospecting trenching development will be as follows:

- Remove topsoil to a depth of 50cm and stockpile.
- Remove the overburden to an average of 5m below the topsoil cover to a separate stockpile berm placed between the trench and topsoil berm.
- Extract alluvial material approximately 1m thick layer.
- Use an infield screen to remove fines and oversize materials leaving about 10% to be trucked to the processing plant and stockpiled.
- The excavation will then be backfilled with the overburden before the topsoil cover is returned and the area allowed to revegetate naturally.

Processing plant

- The mobile processing plant will be located to the north-west of Port Nolloth, between the R382 road and the sea. It will be within an old mine pit.
- Sea water will be pumped to the processing plant for use in processing.
- Various mechanical methods are used to sort the ore and the final sorting is done by hand.

Tailings Waste Management

- The tailings and slimes from the plant will be trucked during the return trips for backfilling in the excavation (approximately 99% of the processed volume).
- The tailings from the final hand sorting (approximately 1% of processed volume) will be disposed of in the existing historical excavation where the processing will take place and, if ten trenches are dug, will only fill about 10% of this excavation.

Phase 4 and 5

- Resource Estimation

The project manager monitors the program, consolidates and processes the data and amends the program depending on the results. This is a continuous process throughout the program and continues even when no prospecting is undertaken on the ground.
Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the manner in which the work program is to proceed in terms of activity, quantity, resources, expenditure and duration.

Decommissioning and Closure Phase

- At final closure, the floor of the excavation where processing occurs needs to be levelled and the sides sloped to create an even depression, or if prospecting advances to full scale mining then the excavation will remain for processing during mining activities.
- The decommissioning and closure phase at the end of the life of the mine will consist of implementing the Final Rehabilitation, Decommissioning and Closure Plan.

1.1.2. Identification of alternatives

Location and layout alternatives are not feasible as the site is determined by the location of the mineral resource being targeted. Similarly, the small-scale methods of extraction and processing are chosen based on them being the most appropriate to the project. The processing plant location is near the sea for practical reasons and within an old mine pit to reduce impacts; no other locations were considered. The above project description is thus the preferred alternative and the only other alternative considered is the No-Go alternative where no development takes place.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant since prospecting may impact on archaeological and/or palaeontological remains, while all above-ground aspects (temporary structures, plants, haul trucks) create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to compile a Heritage Impact Assessment (HIA) for the proposed prospecting project. The assessment was to be based on a thorough field survey as well as desktop research. All finds should be mapped using GPS co-ordinates to assist with planning the project. The report should also meet the requirements of the South African Heritage Resources Agency (SAHRA).

It should be noted that, following S.38(3) of the National Heritage Resources Act (No. 25 of 1999), all relevant heritage resources should be identified and assessed.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Mineral Resources (DMR) who will review the Environmental Impact Assessment (EIA) and grant or refuse authorisation. The HIA report will

outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. HERITAGE LEGISLATION

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

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or

aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation"; and d) "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";

- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

a) its importance in the community, or pattern of South Africa's history;
b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
i) sites of significance relating to the history of slavery in South Africa.

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)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

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). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an EIA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency

(SAHRA for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DMR.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources are presented in Table 1. Data were also collected via a field survey.

Table 1: *Information sources used in this assessment.*

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography and of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Field survey

The site was subjected to a detailed foot survey on 5th to 8th February 2021. This was during summer but, in this very dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks (Figure 4) were recorded on a hand-held Global Positioning System (GPS) receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

Figure 4: *Aerial view of the study area showing the survey tracks (blue lines).*

3.3. Specialist studies

A separate palaeontological study was commissioned. John Pether has compiled this palaeontological report which is submitted separately but should be read alongside this HIA.

3.4. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the

identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system[1] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.5. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.6. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. That some sites were seen only exposed in the sections of trenches or downcut roads shows that this could be a significant concern. From considerable experience, however, very few shell sites in Namaqualand exist without any surface trace. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. It is notable that, because of the strong prevailing southerly winds, areas to the north of disturbances (mine trenches, prospecting pits, mine dumps, etc) are often buried in wind-blown sand and visibility is very limited. The same occurs on the northern sides of natural sand dunes. Given the very large number of sites found, however, these limitations are not considered overly significant because it is likely that the majority of sites would still have been located and recorded. It should be noted that, due to time constraints, each site was recorded fairly briefly. The primary aim of the physical examination was to determine an appropriate grade and mitigation requirement so that further work as needed may be planned.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The study area surrounds the coastal town of Port Nolloth to its north, east and south. The Namaqualand coastline in general is characterised by open-cast diamond mining and, because of inadequate legislation in the past, many open trenches and unrehabilitated mine dumps stand

[1] The system is intended for use on archaeological and palaeontological sites only.

testament to the mining activities of past decades. In addition, off-shore diamond mining is also practised making diamond mining a central industry for the area.

The study area around the town is largely a dune field but vast numbers of sand roads and small jeep tracks run through the dunes. Other infrastructure present includes a number of oxidations ponds for sewage treatment, a landfill site, power lines and a few ruined structures relating to an old mining operation in the far south of the study area. The study area is split by the R382 which runs into Port Nolloth from Steinkopf to the east and then turns north to Alexander Bay.

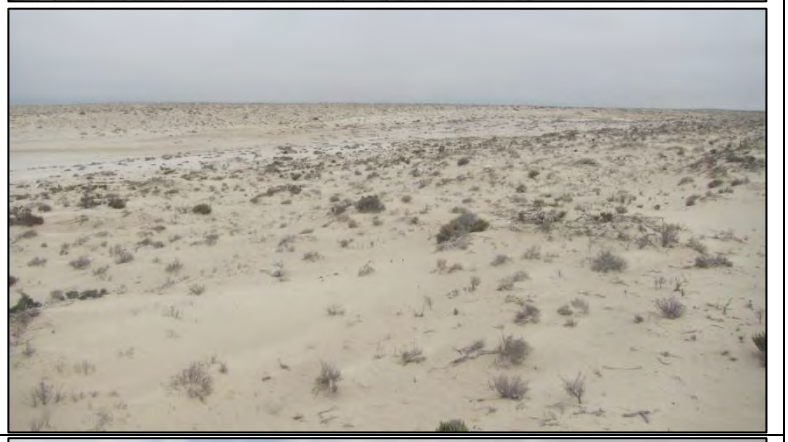
4.2. Site description

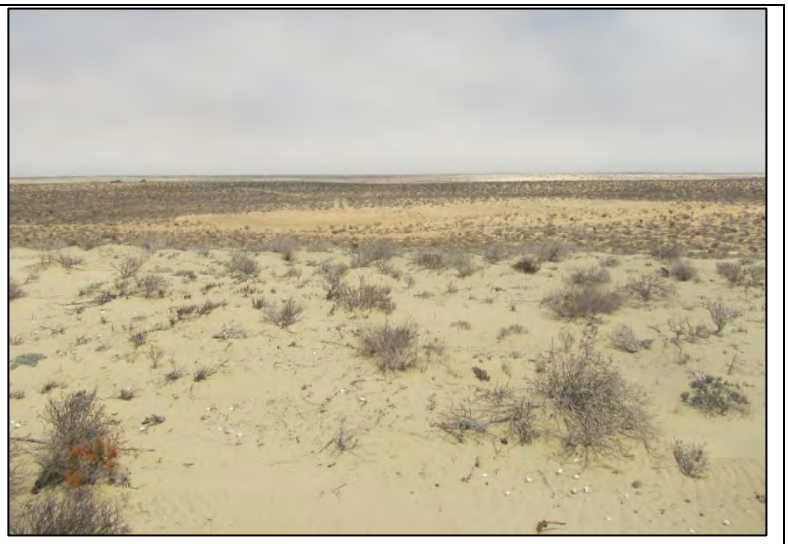
In general, the study area is characterised by low sand dunes with sparse, scrubby vegetation. The various prospecting blocks are illustrated and described in Table 2.

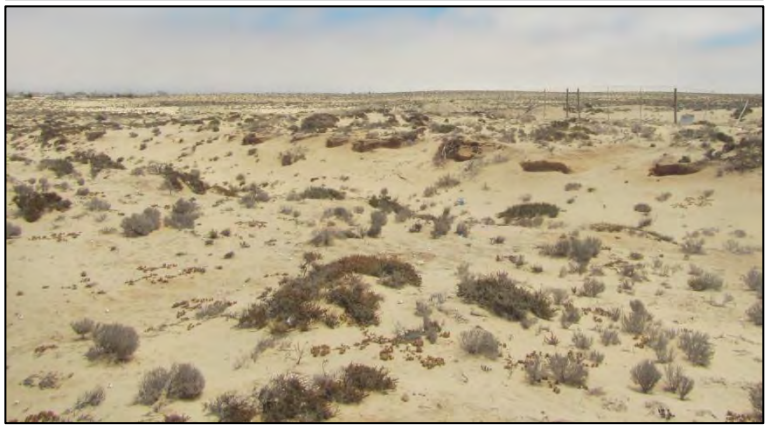
Table 2: *Description and illustration of the physical characteristics of the study area.*

N1	White aeolian dune sand with sparse vegetation. Much mobile sand due to proximity to and location to the north of a sandy beach. *View towards the south from the northern edge of block N1. The coast is visible to the right.*	
N2	Similar to N1 but less mobile sand. The south-eastern half of this block is extensively disturbed by earlier mining activities. *View towards the south from the northern edge of block N2. Port Nolloth is visible on the skyline.*	

	View towards the south-southeast across the southern half of the block and showing the extensive earlier disturbance. Port Nolloth is visible on the skyline. *View towards the east along the mine trench in the south-eastern part of block N2.*	 
N3	This block lies to the northwest of the Port Nolloth Salt Pan. It has sand dunes with low bushes and is crossed by two tracks. The south-eastern corner has minimal vegetation due to th wind-blown sand arising from the salt pan. *View towards the south from the northern tip of block N3.*	
N4	This long block curves around the northern end of the Port Nolloth Salt Pan. It is largely devoid of vegetation because of the aeolian sand that has blown northwards from the salt pan. In places along the northern margin of the pan a hard, calcareous horizon is exposed. *View towards the east from the eastern end of block N4. The pan is visible at top right.*	

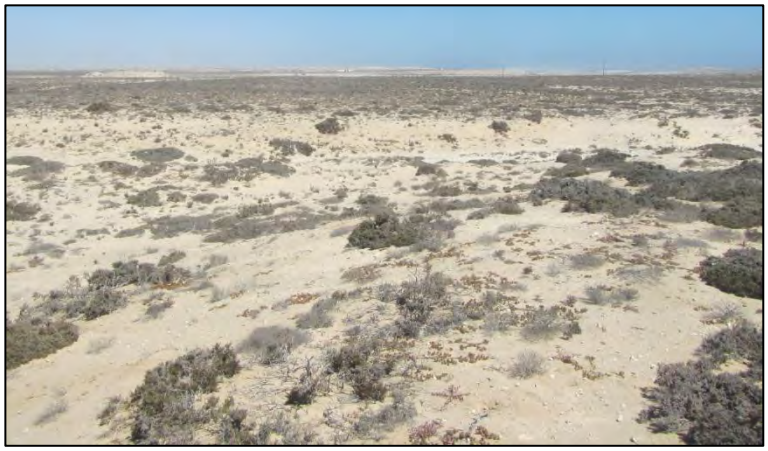
	View towards the south through the middle of N4 towards the salt pan. *View towards the northwest from the eastern end of block N4. The salt pan is visible at the left edge of the picture.*	 
N5	This is a long block running along the eastern edge of the Salt Pan. It is largely coated in wind-blown sand with very light vegetation cover and several tracks cross it. *View towards the north from the southern edge of N6 showing the vegetation cover with the pan to the left.* *View towards the south-southwest from the northern end of N6 showing the road running out of the pan. The pan and Port Nolloth are visible in the background. Recent wind-blown sand has covered the foreground.*	 

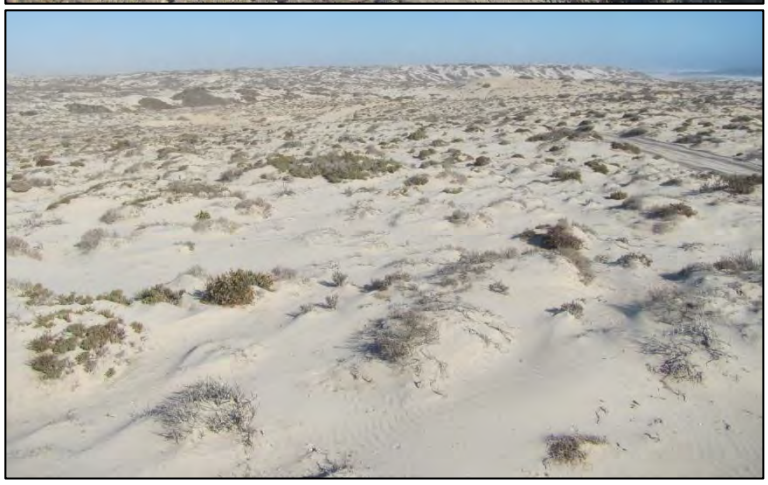
N6	This small block lies about 1 km northeast of the salt pan. It is on light orange sand with a reasonable vegetation cover. A section in the middle has been disturbed by prospecting activities and much sand has blown northwards from the disturbed area. *View towards the west from a dune ridge on the eastern edge of N5 showing the disturbed area in the background.*	
M7	This small block lies among low dune ridges 2 km east of the salt pan. A line of backfilled prospecting pits runs through the block from north to south. *View towards the north from just south of the block showing the line of prospecting pits extending into the distance.*	
M8	This small block lies among low dune ridges 1 km east of the salt pan. A line of backfilled prospecting pits runs through the block from north to south and sand road crosses it in the south with an old prospecting trench lying immediately south again. *View towards the east from a dune on the western edge of M8 and showing the disturbed area in the middle of the block (arrowed).*	

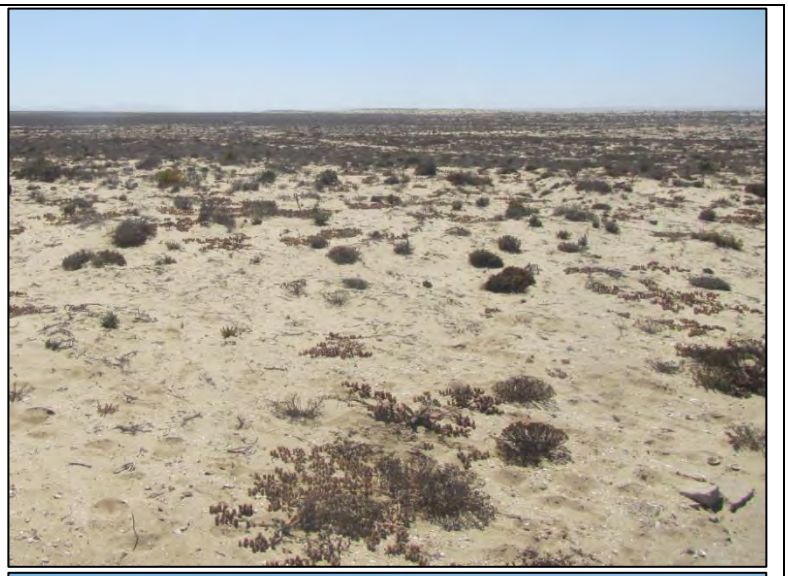
M9	This block is adjacent to the new oxidation ponds and is crossed by a southwest to northeast trending row of prospecting pits. A fair amount of wind-blown sand has fallen on the northern part as a result of the pond construction. *View towards the south from the middle of block M9 with the new oxidation ponds visible to the right.*	
M10	This long block lies just east of Port Nolloth. It is largely coated in white aeolian sand and has a tall dune ridge passing through its western part. Much of the central part of the block has been disturbed by earlier mining activities and construction of the oxidation ponds and related services. *View towards the southeast from the north-western corner of block M10. The high dune ridge is on the left skyline.* *Looking northwest through the centre of the study area and showing an old mine trench.*	 

	A disturbed area in the eastern end of M10. The fence relates to the oxidation ponds while the denuded area in the background has been prospected.	
M11	This small block lies east of the old oxidation ponds and north of the R382. It is comprised of the southern extension of the M10 dune ridge which is much deflated in M11 as well as a lower lying area to its east. *View towards the north from the deflated dune ridge running through M11. The low area is out of view to the right.*	
S12	This small block lies south of the R382 on the eastern outskirts of Port Nolloth. It is covered with much aeolian sand and has a dune ridge along its eastern edge. A low-lying area along the western margin has had a massive quantity of garbage dumped in it. *View towards the southwest through the middle of the block showing plenty of wind-blown sand.*	

	View towards the north from the south-western corner of the block. The low-lying area with garbage is arrowed.	
S13	This block has low north-south trending dune ridges in the west and east with a lower-lying area in between. Two tracks cross the block. *A deflated area in the eastern dune ridge which has revealed a slightly hardened calcrete-like surface covered in land snail shells.*	
S14	This block is very sandy and has a dune ridge running north-south through its centre and another along its eastern edge. A few tracks cross through the block and garbage dumping has occurred in the west. *View towards the south from the northern edge of block S13.*	
S15	This block is largely flat but still has very low dune ridges crossing it. It lies 1 km inland of McDougall's Bay. *View towards the west through the centre of block S15 with the water reservoir at McDougall's Bay just visible on the skyline at right.*	

S16	This small block is relatively flat except for its eastern edge which just laps onto a dune ridge that is taler than most in the area. An old mine trench runs along the northern edge of the block. *Looking south through S18 with a taller dune on the skyline to the left.*	
S17	This block has several wide and very low dune ridges with low areas in between. Several tracks run through the block and the southern end is disturbed by earlier mining. An ephemeral stream bed runs through the site from northeast to southwest, culminating in a wetland just outside the block. *Looking towards the south through the southern half of S17. An old mine dump is visible on the skyline at left.* *View towards the south from the northern end of block S17.*	 

	View towards the southwest along the ephemeral stream bed in the southern part of the block.	
S18	This block is immediately adjacent to the coastline and is characterised by tall, white coastal sand dunes. A mine trench has resulted in much disturbance of these dunes in the centre of the block and the southernmost dunes have been intensively used by off-road vehicles. A flat, deflated area occurs in the west adjacent to the sea and several tracks cross it. *View towards the east showing the mine trench cutting through tall dunes.* *View towards the south from the northern end of the block showing mobile dune sand in the flat, deflated area.*	 

S19	S19 lies 300 m from the coast and its western edge has low, white, aeolian dunes. The rest is quite flat with the exception of a slope that leads northwards into a wetland along the northern edge of the block. A few tracks and several abandoned mine buildings occur in the block. *View east showing the flat surface of the block.* *View towards the north down into the wetland area with its denser vegetation.*	 

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity map shows the Port Nolloth area as being of low sensitivity (Figure 5). However, it is known that the sensitivity mapping relates to the surficial sediments and that below these are sediments of high sensitivity. As such, a desktop study has been compiled for the project by palaeontologist John Pether. The report has been submitted separately but should be read in conjunction with this HIA.

Figure 5: *Extract from the SAHRIS Palaeosensitivity map showing the study area (red polygon) as being of low palaeontological sensitivity.*

5.2. Archaeology

5.2.1. Desktop study

Early Stone Age (ESA) and Middle Stone Age (MSA) material is known to occur along the Namaqualand coast. ESA artefacts have mostly been found fairly close to the coastline and are often found in the same contexts as MSA artefacts. Halkett (2002) reported a large scatter of ESA artefacts from Kleinsee, while Orton and Webley (2012b) found ESA and MSA artefacts associated with fossil bones on the high ground to the north of the Buffels River, northeast of Kleinsee. Some 20 km north of Kleinsee, Orton and Halkett (2006) described an extensive silcrete outcrop that displayed evidence of quarrying. There were scatters of ESA and MSA artefacts located across the outcrop. Further inland and the southeast of Kleinsee, Morris and Webley (2004) reported scatters of ESA artefacts, including handaxes, amongst sand dunes on the coastal plain and around pans. MSA bifacial points were found by Orton and Halkett (2005) associated with shell in a dunefield northeast of Kleinsee. Whether the association was real or spurious remains unknown. Halkett and Hart (1997) and Jerardino *et al.* (1992) reported scatters of MSA artefacts north of Kleinsee and at the Groen River Mouth respectively. North of Port Nolloth, an MSA shell midden was excavated from a rock shelter at Boegoeberg (Klein *et. al* 1999). It has unfortunately never been fully reported though.

LSA sites are substantially more common with many thousands of small to medium-sized shell middens and scatters occurring all along the coast and dating from the last *c.* 6000 years (Dewar 2008; Orton 2012). While these focus on the area within about 2 km to 3 km of the coast, shell scatters have been found along the Buffels River up to 12 km inland (Orton & Webley 2012b; Orton 2019a, 2019b). The vast majority of sites are single occupations with only a handful of stratified sites

on record. Most *in situ* shell middens are quite small, perhaps some 20-50 m^2 in area, although occasional larger sites of up to maybe 300 m^2 do occur. Deflated and dispersed shell scatters that have been open to the wind for a long time can cover larger areas. Almost all sites are open sites with just one coastal rock shelter known to contain LSA deposits (Webley 1992, 2002). Where deflation hollows occur on the vegetated coastal plain inland of the coast, as is the case to the southeast of Kleinsee, they often contain LSA sites (Orton 2012, 2019a, 2019b, 2019c, 2019d). Orton (2016b) has referred to the entire Namaqualand coastline and immediately adjacent interior as a Type 3 precolonial cultural landscape because of the vast numbers of sites located there. Certain areas are also suited to inclusion in his Type 4 where so many sites occur in one area that it is not possible to delimit individual sites.

The shell middens and scatters typically comprise of very few species of shells with the limpets *Cymbula granatina*, *Scutellastra granularis*, *Scutellastra argenvillei* and *Scutellastra barbara* forming the vast majority of all shells. Black mussels (*Choromytilus meridionalis*) and whelks (*Burnupena* sp.) are occasional inclusions, although these two are usually more common on older (mid-Holocene) sites (Orton 2012). The middens also include the bones of various animals with tortoise, steenbok and seals being the most frequently encountered (Dewar 2008). Fragments of ostrich eggshell show that ostrich eggs were also eaten.

The most common cultural material in these middens is stone artefacts, although ostrich eggshell beads and flask fragments, pottery and occasional worked bones and shells also occur. Orton (2012, 2016a) has shown that after several thousand years of continuity in the stone artefact assemblages there was considerable change through the last 3000 years. Three assemblage types were identified by Orton (2012) and referred to as Groups 1 to 3. Very briefly, the sequence is as follows:

- Group 1 assemblages seem to emphasise backed tools before about 3000 years ago but after this time scrapers dominate;
- Group 3 assemblages were introduced around 2100 years ago. The first pottery appears at approximately the same time and the two introductions could be connected; and
- Group 3 assemblages were introduced around 1500 years ago. The latter change may have been associated with the introduction of cattle to the region, since the oldest dated cattle bone from Namaqualand comes from a site that also has the earliest Group 2 assemblage (Orton *et al.* 2013).

The last 2000 years are especially important for archaeological research in Namaqualand because it is one of the areas through which sheep, pottery and the herding way of life entered South Africa around 2000 years ago. The details of how this happened are still highly contested (Orton 2015). Pottery serves as a good temporal marker for sites that are less than 2000 years old and many sites contain pottery. A sequence of pottery decoration in the region has been constructed by Orton (2012). Although ostrich eggshell beads have been at the centre of much debate over whether their size is indicative of ethnicity or economy (Orton 2015; Sadr 2014; Smith 2014; Smith *et al.* 1991), they have been shown in Namaqualand to increase in size gradually over time, which seems to negate any such associations (Orton 2012, 2016a). Within certain limits, the mean size of beads can allow broad estimation of the age of an assemblage.

Few sites have been excavated in the Port Nolloth area with the vast majority of excavations having occurred between Port Nolloth and Kleinzee and between Koingnaas and the Spoeg River mouth (e.g. Dewar 2008; Orton 2007, 2012; Orton & Halkett 2005, 2006; Webley 2001). However, it has recognised for more than a century that archaeological sites were present in the Port Nolloth area

(e.g. Colson 1905). Very little systematic research has ever been conducted, but Laidler (1929) and Rudner (1968) both visited and removed pottery from a number of sites. Many sites have no doubt been destroyed with one of the largest known middens in the area having been destroyed through construction of a house on top of it (in KaiKai).

Only two archaeological mitigation projects have been carried out in the area. One was by Webley and Orton (2010, 2013; Webley 2009) with the excavations being situated along the western margin of the salt pan. Two sites were sampled. One of them, PN2009/001, was a Group 1 site with many retouched artefacts. Most were sidescrapers and backed scrapers. The ostrich eggshell beads were generally very small with a range of 2.50 mm to 5.16 mm. The site was dated to 504 BC – AD 28 (Webley & Orton 2013). The second excavation was at a smaller site called PN2009/004 and which had a Group 2 assemblage and no beads. The second excavation was by Orton (2017). PN2011/001A, PN2011/001B and PN2011/001C were excavated; PN2011/001A actually lies within one of the area under consideration in this study. Large numbers of stone artefacts were revealed (including many retouched items), as well as large numbers of ostrich eggshell beads (and many manufacturing fragments), a few pot sherds, some worked ostrich eggshell fragments and historical material that included glass trade beads, rusted metal fragments, bottle glass and a glass marble. Analysis of the material suggests most material predates 2000 years ago, although the two scatters that contained pottery are obviously younger than 2000 years. The stone artefacts contained many backed tools and scrapers with the latter often dominating and suggestive of a date between about 3000 and 2000 years ago. Whether the historical items were intrusive or indicate contact period archaeology is unknown and awaits further research.

Another aspect of archaeology in Port Nolloth requiring consideration is the remnants of the 19th century copper railway which passed through the study area. Initially (from August 1852), Hondeklipbaai served as the local 'port' from which copper ore was exported prior to the construction of the railway line to Port Nolloth. Ore was transported on wagons in pairs pulled by four mules. Approval for construction of the railway was obtained in 1869 and the first section, which crossed the sandiest part of the coastal plain, was operational by mid-1870. By January 1876, the railway reached O'Okiep providing a direct rail link between the mines and the coast and completely ending all ore exports from Hondeklip Bay (Burman 1984; Hall n.d., in Schaefer 2008; Ross 2011). Until 1869 the 'village' of Port Nolloth had consisted primarily of one trader but the railway resulted in a rapid expansion; it grew to 300 inhabitants by 1872, 448 by 1875 and around 2000 by 1882 (Smalberger 1975). In early 1878 the process of converting the line for use by steam trains began. Steam trains were in use from Port Nolloth to Abbevlaack by 1 August 1886 and ran all the way to Anenous by 1 June 1887. Burman (1984) reports that the railway line was still owned by the Cape of Good Hope Copper Mining Company in 1909 and that it survived as late as 1945 at which point its then owners lifted most of the line and sold the metal as scrap.

5.2.2. Site visit

The survey revealed a very large number of archaeological sites. These are briefly described in Table 2. The distribution of sites is mapped in Appendix 2. A selection of sites and finds are further discussed and illustrated below.

Table 2 (overleaf): *Tabulated list of archaeological sites recorded during the survey. Their approximate size, contents, grade and suggested mitigation time required are all listed.* ***XX*** *= Avoid and preserve in situ. Mitigation is discussed in Section 6.2. CCS = cryptocrystalline silica.*

Way-point	Location	Description	Size (m)	C. granatina	S. granularis	S. argenvillei	S. barbara	C. meridionalis	Burnupena sp.	Bone	Rock lobster	Quartz	CCS	Silcrete	Quartzite	Quartz porphyry	Manuports	Hammer stone	Lower grindstone	Pottery	Ostrich eggshell	OES bead	Glass	Ceramic	Metal	Grade	Mitigation (hours)
971	S29 14 05.9 E16 51 24.9	Shell scatter that includes a CCS backed scraper and some burnt bone.	8x5	x	x	x		x		x		x	x				x				x					GPB	1
972	S29 14 04.3 E16 51 25.9	Ephemeral shell scatter.	2x1	x	x	x		x	x																	GPC	
973	S29 13 55.8 E16 51 23.6	Ephemeral shell scatter with some burnt bone.	1x1	x	x					x																GPC	
974	S29 13 54.1 E16 51 21.8	Shell scatter that has been slightly disturbed through the inclusion of some raised beach material from a nearby excavation. The silcrete includes a flake with cobble cortex.	8x8	x	x	x						x		x			x				x					GPB	1
975	S29 13 55.5 E16 51 21.3	This site is not well defined and some more shell lies down the slope towards the south where it is intermingled with some *ex situ* raised beach deposits. There is a good area in the northeast that can be sampled though.	20x 20	x	x	x		x				x									x					GPB	1
976	S29 13 56.7 E16 51 20.0	Ephemeral shell scatter.	1x1	x	x	x																				GPC	
977	S29 13 56.5 E16 51 20.5	Ephemeral shell scatter.	3x1	x	x	x											x				x					GPC	
978	S29 13 57.3 E16 51 20.9	Ephemeral shell scatter.	2x2	x	x	x																				GPC	
979	S29 13 56.1 E16 51 17.6	Cluster of spatially associated shell scatters of which two are ephemeral. One has quartz and one has ostrich eggshell.	30x 20	x	x	x						x									x					GPB	2
980	S29 13 56.3 E16 51 17.8																										
981	S29 13 56.2 E16 51 18.0																										
982	S29 13 56.4 E16 51 17.7																										
983	S29 13 56.4 E16 51 17.5																										

984	S29 13 55.8 E16 51 17.2																										
985	S29 13 56.0 E16 51 17.2																										
986	S29 13 57.6 E16 51 19.4	Ephemeral shell scatter.	2x2	x	x	x																				GPC	
987	S29 14 01.0 E16 51 21.1	Shell scatter that has been disturbed by the inclusion of raised beach materials and rock fragments from a nearby excavation.	5x5	x	x	x		x												x						GPC	
988	S29 14 06.2 E16 51 25.6	Ephemeral shell scatter.	8x5	x	x	x		x				x														GPC	
989	S29 14 12.1 E16 51 35.6	Ephemeral shell scatter.	15x 15	x	x	x																				GPC	
990	S29 14 10.8 E16 51 35.8	Shell scatter	5x5	x	x	x						x														GPB	1
991	S29 14 09.9 E16 51 35.7	Shell scatter	5x5	x	x	x																				GPB	1
992	S29 14 11.9 E16 51 36.2	Shell scatter.	8x5	x	x	x		x																		GPB	1
993	S29 14 13.4 E16 51 34.6	Shell scatter exposed in a jeep track.	10x 10	x	x	x		x		x			x							x	x					GPB	2
994	S29 14 11.5 E16 51 33.4	Shell scatter in a disturbed area. Poor context so original size indeterminate.	?	x	x	x		x																		GPC	
995	S29 14 10.3 E16 51 34.7	Shell scatter.	5x5	x	x	x											x									GPB	1
996	S29 14 10.2 E16 51 32.6	Shell scatter with some calcrete manuports. Also saw one kelp limpet here (*C. compressa*).	10x 5	x	x	x				x							x				x					GPB	1
997	S29 14 13.0 E16 51 44.2	Shell scatter	15x 10	x	x	x		x			x			x						x						GPB	1
998	S29 14 12.2 E16 51 44.4	Ephemeral shell scatter.	5x5	x	x	x															x					GPC	
999	S29 14 05.9 E16 51 24.9	Shell scatter	8x5	x	x	x		x																		GPB	1
1000	S29 14 11.1 E16 51 47.5	Dense shell scatter occurring in a few patches delimited by waypoints 1000-1002.	20x 15	x	x	x						x														GPB	2
1001	S29 14 11.4 E16 51 47.8																										
1002	S29 14 11.0 E16 51 48.1																										

1003	S29 14 11.7 E16 51 48.6	Ephemeral and very dispersed shell scatter without easily definable limits.	?	x	x	x	x																			GPC	
1004	S29 14 12.2 E16 51 48.7																										
1005	S29 14 12.5 E16 51 48.3	Shell scatter quite likely related to 1006.	8x5	x	x	x																				GPB	1
1006	S29 14 12.2 E16 51 48.1	Shell scatter quite likely related to 1005.	8x5	x	x	x																				GPB	1
1007	S29 14 12.7 E16 51 47.7	Shell scatter.	8x5	x	x							x														GPB	1
1008	S29 14 12.7 E16 51 47.2	Shell scatter.	10x 10	x	x	x						x														GPB	1
1009	S29 14 14.5 E16 51 46.9	Shell scatter.	10x 5	x	x	x						x														GPB	1
1010	S29 14 17.0 E16 51 51.8	Ephemeral shell scatter.	5x5	x	x	x																				GPC	
1011	S29 14 20.2 E16 51 53.3	This is a large area with a large number of shell scatters (more than the waypoints provided). There has been mining in the area immediately to the north and much gravel seems to have been dispersed over this area where the shell scatters lie. The gravel includes yellow rocks and cobbles. It is unknown to what degree these shell scatters have been disturbed but it appears that integrity is better towards the east and gets progressively worse towards the west where they eventually run out against a mine road/dump area. Suggest sampling some of the scatters in the east only.	120 x 90	x	x	x	x	x				x					x									GPB	4
1012	S29 14 19.9 E16 51 53.1																										
1013	S29 14 19.1 E16 51 53.1																										
1014	S29 14 18.5 E16 51 52.8																										
1015	S29 14 18.7 E16 51 52.3																										
1016	S29 14 18.5 E16 51 51.9																										
1017	S29 14 19.0 E16 51 51.5																										
1018	S29 14 18.9 E16 51 50.9																										
1019	S29 14 19.3 E16 51 50.8																										
1020	S29 14 19.7 E16 51 50.8																										
1021	S29 14 20.3 E16 51 49.9																										
1022	S29 14 20.3 E16 51 51.4																										
1023	S29 14 20.8 E16 51 52.5																										

1024	S29 14 21.3 E16 51 51.9																										
1025	S29 14 21.6 E16 51 51.4																										
1026	S29 14 22.3 E16 51 51.4																										
1027	S29 14 21.2 E16 51 49.7																										
1028	S29 14 18.7 E16 51 44.4	Shell scatter exposed in the wall of the mine trench.	5x?	x	x	x		x				x									x					GPB	1
1029	S29 13 41.9 E16 52 04.9	Very ephemeral shell scatter.	5x5	x	x	x																				GPC	
1030	S29 13 40.6 E16 52 07.0	Ephemeral shell scatter.	5x3	x	x	x																				GPC	
1031	S29 13 40.6 E16 52 08.5	Ephemeral shell scatter.	2x2	x	x	x																				GPC	
1032	S29 13 41.7 E16 52 08.5	Ephemeral shell scatter.	8x5	x	x	x															x					GPC	
1033	S29 13 43.0 E16 52 09.4	Ephemeral shell scatter exposed in a jeep track. Shells very crushed.	10x2	x	x	x																				GPC	
1034	S29 13 46.6 E16 52 09.6	Ephemeral shell scatter exposed in a jeep track. Shells very crushed.	8x8	x	x	x																				GPC	
1035	S29 13 46.1 E16 52 09.1	Small shell midden exposed in the side of a deflating jeep track. It goes into the dune so its full size cannot be determined.	3x2	x	x	x					x										x					GPB	2
1036	S29 14 02.7 E16 52 44.9	Ephemeral shell scatter exposed in a jeep track. Shells crushed.	5x3		x			x																		GPC	
1037	S29 13 48.0 E16 52 42.7	A large shell scatter with many cultural materials on it. The site is between the prospecting block and the site camp and has already experienced some disturbance by being driven over and from prospecting at its western end. It has subsequently been exposed by deflation and, while still retaining spatial integrity, is very vulnerable to destruction and clearly under direct threat. A silcrete flake was seen with cobble cortex. One hammerstone was a 'sausage-shaped stone'.	60x30	x	x	x		x			x	x				x		x	x		x					GPA	8
1038	S29 13 49.2 E16 52 44.0																										
1039	S29 13 47.9 E16 52 43.9																										

1040	S29 13 45.9 E16 52 44.2	Ephemeral shell scatter	5x5	x	x							x														GPC	
1041	S29 13 45.8 E16 52 43.6	Ephemeral shell scatter	5x5	x	x							x								x	x					GPC	
1042	S29 13 39.6 E16 53 04.5	Ephemeral shell scatter.	2x2	x	x																					GPC	
1043	S29 13 34.3 E16 53 11.5	Ephemeral shell scatter.	3x3	x	x			x																		GPC	
1044	S29 14 19.3 E16 53 55.1	Very ephemeral shell scatter.	5x2	x								x														GPC	
1045	S29 14 17.8 E16 53 58.3	Ephemeral shell scatter.	5x5	x	x																					GPC	
1046	S29 14 37.1 E16 54 04.3	Shell scatter.	10x 8	x	x					x											x					GPB	1
1047	S29 15 16.8 E16 54 02.6	A massive dump of late 19th and early to mid-20th century material associated with the copper railway. The materials include glass, ceramics, metal, bone, shell Including *Oxystele* sp.) as well as fuel for the locomotives (coke). Very large number of glass bottles. Graded IIIA as part of the regional copper mining landscape.		x	x	x		x	x	x											x		x	x	x	IIIA	XX
1048	S29 15 18.0 E16 54 03.3	A point on the railway berm.																								IIIA	XX
1049	S29 15 15.1 E16 53 52.7	Shell scatter.	10x 10	x	x																					GPB	1
1050	S29 15 13.7 E16 53 53.1	Shell scatter. Ostrich eggshell bead is very tiny.	8x5	x	x								x								x	x				GPB	1
1051	S29 15 12.8 E16 53 51.9	Ephemeral shell scatter.	10x 5	x	x	x															x					GPC	
1052	S29 15 11.5 E16 53 52.6	Shell scatter that may extend into the side of a sand dune.	3x3	x	x																x					GPB	1
1053	S29 15 14.7 E16 53 51.6	Ephemeral shell scatter.	3x5	x	x																					GPC	
1054	S29 15 10.2 E16 53 52.0	Ephemeral shell scatter.	5x5	x	x																					GPC	
1055	S29 15 10.3 E16 53 52.3	Ephemeral shell scatter.	5x5	x	x																					GPC	
1056	S29 15 10.7 E16 53 52.3	Ephemeral shell scatter.	5x5	x	x																					GPC	

1057	S29 15 10.1 E16 53 52.8	Ephemeral shell scatter.	5x5	x	x																					GPC	
1058	S29 15 08.8 E16 53 53.5	Ephemeral shell scatter.	15x 15	x	x	x															x					GPC	
1059	S29 15 08.4 E16 53 53.1	Ephemeral shell scatter.	15x 15	x	x																					GPC	
1060	S29 15 08.2 E16 53 52.5	Ephemeral shell scatter. Very widespread and difficult to tell where it originated from on the ground.	20x 20	x	x	x						x														GPC	
1061	S29 15 09.5 E16 53 51.2	Ephemeral shell scatter.	8x5	x	x															x	x					GPC	
1062	S29 15 07.9 E16 53 51.4	Ephemeral shell scatter. Very widespread and difficult to tell where it originated from on the ground.	15x 10	x	x																x					GPC	
1063	S29 15 07.6 E16 53 53.1	Shell scatter.	5x5	x	x							x														GPB	1
1064	S29 15 06.2 E16 53 53.4	Ephemeral shell scatter.	5x3	x	x																					GPC	
1065	S29 15 07.2 E16 53 51.7	Ephemeral shell scatter.	3x3	x	x																					GPC	
1066	S29 15 05.5 E16 53 52.0	Shell scatter.	10x 5	x	x							x									x					GPB	1
1067	S29 14 50.1 E16 53 23.3	Ephemeral shell scatter.	10x 10	x	x																					GPC	
1068	S29 14 50.5 E16 53 23.5	Ephemeral shell scatter.	5x5	x	x																x					GPC	
1069	S29 14 50.5 E16 53 21.6	Shell scatter.	5x5	x	x						x									x	x	x				GPB	1
1070	S29 14 50.3 E16 53 21.6	Shell scatter.	8x5	x	x																x					GPB	1
1071	S29 14 48.3 E16 53 22.4	Shell scatter.	10x 5	x	x							x														GPB	1
1072	S29 14 47.6 E16 53 22.6	Shell scatter.	10x 3	x	x	x															x					GPB	1
1073	S29 14 49.3 E16 53 02.5	Shell scatter.	10x 5	x	x		x	x			x										x					GPB	1
1074	S29 14 49.2 E16 53 02.0	Shell scatter.	3x3	x	x																x					GPB	1
1075	S29 14 48.8 E16 53 02.0	Shell scatter.	5x5	x	x																x					GPB	1

1076	S29 14 49.2 E16 53 01.7	Shell scatter.	10x5	x	x	x					x									x						GPB	2
1077	S29 14 50.0 E16 53 01.8	Shell scatter.	8x5	x	x			x																		GPB	1
1078	S29 14 46.4 E16 52 52.8	Ephemeral shell scatter.	5x3	x	x			x																		GPC	
1079	S29 14 46.6 E16 52 52.3	Ephemeral shell scatter.	2x2	x	x																					GPC	
1080	S29 14 41.6 E16 52 49.1	Shell scatter with plenty of modern rubbish.	?	x	x																					GPC	
1081	S29 14 24.9 E16 52 51.0	Ephemeral shell scatter.	2x1	x	x																					GPC	
1082	S29 14 24.0 E16 52 51.3	Ephemeral shell scatter.	3x3	x	x																					GPC	
1083	S29 14 20.3 E16 52 50.5	A series of shell scatters across the top of a low dune. The area occupied by these spatially related scatters is 150 x 50 m. Waypoints 1089, 1090 and 1095 are ephemeral scatters. The pottery at 1092 has impressed decoration.	5x5	x	x			x				x														GPB	16
1084	S29 14 21.0 E16 52 51.1		5x2	x	x																						
1085	S29 14 21.3 E16 52 50.9		5x3	x	x	x						x															
1086	S29 14 20.7 E16 52 50.6		3x3	x	x						x																
1087	S29 14 20.7 E16 52 50.4		5x3	x	x							x															
1088	S29 14 20.2 E16 52 50.2		5x3	x	x			x		x											x						
1089	S29 14 19.8 E16 52 50.6		3x1	x	x																						
1090	S29 14 19.5 E16 52 51.3		3x3	x	x							x															
1091	S29 14 19.0 E16 52 50.8		8x8	x	x							x															
1092	S29 14 18.6 E16 52 50.5		3x3	x	x	x														x							
1093	S29 14 18.3 E16 52 50.9		8x5	x	x	x																					
1094	S29 14 18.4 E16 52 51.2		20x8	x	x	x															x						
1095	S29 14 17.4 E16 52 50.9		3x3	x	x																						
1096	S29 14 17.1 E16 52 50.8		8x5	x	x	x				x																	

1097	S29 14 18.4 E16 52 49.9		10x 5	x	x	x															x						
1098	S29 14 04.4 E16 52 48.6	A shell midden cut by a road. Part visible and part buried.	8x3	x	x	x				x											x					GPB	2
1099	S29 14 05.1 E16 52 48.1	Several tiny patches of deflated shell showing through recent sand blown off the edge of a road. Much modern rubbish in this area so not recorded further. Cannot see extent of scatter.																								GPC	
1100	S29 14 35.0 E16 52 27.3	A large, dense shell scatter revealed by deflation after recent mining activity on the western side of the Port Nolloth Salt Pan.																								GPB	
1101	S29 15 36.7 E16 53 27.6	These points are all delimiting the extent of the PN2011/001A shell scatter extending to the south of where it was known before. The shell continues south along the same dune ridge. I only looked as far as the main road but it very likely continues to the south again. For part of this area I only walked around the outer edge to save time but it was visually confirmed that the dune is covered in shell scatters. The scatters were not checked for content. This section of the site falls outside the study area but the already recorded section to the north is within it and will require extensive mitigation which is what the mitigation allocated here is for. The size is the southern section of the site as recorded by waypoints 1101-1141. The 80 hours mitigation time is a minimum.	200 x 130																							GPA	80
1102	S29 15 37.1 E16 53 27.1																										
1103	S29 15 36.9 E16 53 26.7																										
1104	S29 15 36.7 E16 53 26.4																										
1105	S29 15 37.6 E16 53 26.0																										
1106	S29 15 38.1 E16 53 26.2																										
1107	S29 15 37.9 E16 53 26.8																										
1108	S29 15 37.6 E16 53 27.3																										
1109	S29 15 37.2 E16 53 27.5																										
1110	S29 15 37.1 E16 53 27.8																										
1111	S29 15 36.9 E16 53 28.4																										
1112	S29 15 37.5 E16 53 28.6																										
1113	S29 15 37.9 E16 53 28.5																										

1114	S29 15 38.0 E16 53 28.8																										
1115	S29 15 38.4 E16 53 29.1																										
1116	S29 15 38.8 E16 53 29.0																										
1117	S29 15 39.3 E16 53 28.9																										
1118	S29 15 39.7 E16 53 29.2																										
1119	S29 15 40.1 E16 53 29.5																										
1120	S29 15 40.4 E16 53 29.2																										
1121	S29 15 41.0 E16 53 29.3																										
1122	S29 15 41.5 E16 53 29.3																										
1123	S29 15 42.7 E16 53 29.8																										
1124	S29 15 42.6 E16 53 29.3																										
1125	S29 15 42.4 E16 53 28.8																										
1126	S29 15 42.3 E16 53 28.3																										
1127	S29 15 42.2 E16 53 27.8																										
1128	S29 15 42.0 E16 53 27.2																										
1129	S29 15 41.8 E16 53 26.4																										
1130	S29 15 41.7 E16 53 25.8																										
1131	S29 15 41.5 E16 53 25.1																										
1132	S29 15 40.6 E16 53 26.0																										
1133	S29 15 40.4 E16 53 26.1																										
1134	S29 15 39.9 E16 53 26.0																										

1135	S29 15 39.1 E16 53 25.7																										
1136	S29 15 38.3 E16 53 25.8																										
1137	S29 15 38.4 E16 53 26.2																										
1138	S29 15 38.7 E16 53 26.6																										
1139	S29 15 38.8 E16 53 27.4																										
1140	S29 15 38.3 E16 53 27.6																										
1141	S29 15 37.6 E16 53 27.9																										
n/a	S29 15 31.5 E16 53 26.0	This is a centre point on the large site recorded and partially sampled by Orton (2017). It is a continuation of the site recorded by waypoints 1101-1141. The dimensions here are the previously known northern section of the site. The 80 hours mitigation time is a minimum.	210 x80																							GPA	80
1142	S29 15 32.8 E16 53 24.7	Shell scatter.	8x8	x	x	x		x					x								x					GPB	1
1143	S29 15 32.4 E16 53 25.0	A wide, ill-defined shell scatter.	15x 15	x	x	x		x				x														GPC	
1144	S29 15 29.2 E16 53 24.5	Ephemeral shell scatter.	3x3	x	x			x																		GPC	
1145	S29 15 26.6 E16 53 24.0	Shell scatter.	15x 10	x	x	x	x	x				x	x								x		x			GPB	1
1146	S29 15 25.3 E16 53 26.0	A point on the copper railway berm. To the west of this point an approximately 100 m long section of it has been dug up for the laying of a pipeline.																								IIIA	XX
1147	S29 15 24.9 E16 53 25.9	A heavily disturbed shell scatter on the edge of the new pipeline excavation. A swathe of small shell fragments running to the north from this point may have been blown there.	?	x	x			x				x	x													GPC	
1148	S29 15 24.7 E16 53 26.4	Shell scatter located just to the north of the railway berm. It has	5x5	x	x							x											1			GPB	1

		historical materials (glass and coal/coke) but whether these are associated with the shell is unknown.																									
1149	S29 15 24.0 E16 53 26.5	Small shell midden. Recorded before as PN2016/001. The historical material seems integral with the midden.	3x2	x	x	x				x		x			x											GPB	2
1150	S29 15 22.9 E16 53 25.6	Ephemeral shell scatter that also has some coke on it.	10x 5	x	x					x		x														GPC	
1151	S29 15 20.7 E16 53 20.7	Ephemeral shell scatter.	5x5	x	x	x						x														GPC	
1152	S29 15 18.6 E16 53 20.6	Ephemeral shell scatter.	5x2	x	x	x						x													x	GPC	
1153	S29 15 17.6 E16 53 24.0	Waypoints 1153 to 1168 represent a series of spatially related shell scatters on the crest of the tallest dune in the area. 1163 has lots of *C. meridionalis* shells. 1167 has lots of quartz and some pottery. Scatters towards the west have far more historical materials on them with those to the east having virtually none. This site would be endangered if mining cuts into the dune immediately to the southwest because of slumping and new mobilisation of the disturbed sand.	80x 60	x	x	x						x	x	x			x				x		x		x	GPB	8
1154	S29 15 17.1 E16 53 24.0																										
1155	S29 15 17.3 E16 53 23.5																										
1156	S29 15 16.6 E16 53 23.8																										
1157	S29 15 16.8 E16 53 24.2																										
1158	S29 15 17.2 E16 53 24.5																										
1159	S29 15 17.5 E16 53 24.9																										
1160	S29 15 17.2 E16 53 25.3																										
1161	S29 15 16.8 E16 53 25.2																										
1162	S29 15 16.0 E16 53 25.2																										
1163	S29 15 16.0 E16 53 25.5																										
1164	S29 15 18.2 E16 53 24.0																										
1165	S29 15 16.1 E16 53 24.1																										
1166	S29 15 16.1 E16 53 24.6																										

1167	S29 15 18.1 E16 53 24.8																											
1168	S29 15 17.9 E16 53 24.3																											
1169	S29 15 14.7 E16 53 24.6	Shell scatter.	15x 10	x	x							x									x					GPB	1
1170	S29 15 19.0 E16 53 24.4	Shell scatter.	10x 5	x	x																				x	GPC	
1171	S29 15 19.1 E16 53 24.0	Shell scatter. Some of the ostrich eggshell is burnt.	2x2	x	x			x				x									x					GPC	
1172	S29 15 21.0 E16 53 25.9	Ephemeral shell scatter.	8x5	x	x																					GPC	
1173	S29 15 22.5 E16 53 27.0	A partly disturbed shell scatter right o the edge of a mined area.	5x5	x	x	x						x											x		x	GPB	1
1174	S29 15 25.7 E16 53 33.8	Shell scatter immediately adjacent to the recent pipeline trench excavation. The site probably extended into the trenched area as there is some shell in the trench fill. Size indeterminate due to disturbance but part of the site is still in good condition.	?	x	x	x					x	x			x						x				x	GPB	1
1175	S29 15 25.3 E16 53 34.0	Shell scatter.	5x5	x	x	x				x		x	x									x				GPB	1
1176	S29 15 22.8 E16 53 36.7	A point on the copper railway berm. There are many small fragments of coke, some glass and ceramics and plenty of metal.																						x	x	x	IIIA	XX
1177	S29 15 23.1 E16 53 40.9	Shell scatter that has been disturbed by mining.	8x8	x	x																x					GPC	
1178	S29 15 21.7 E16 53 41.9	A point on the copper railway berm. There are many small fragments of coke, some glass and ceramics and plenty of metal.																						x	x	x	IIIA	XX
1179	S29 15 20.8 E16 53 46.0	A small dump alongside the copper railway berm.		x	x				x															x	x	x	IIIA	XX
1180	S29 15 20.5 E16 53 47.0	A larger dump alongside the copper railway berm. Plenty of coke and historical artefacts. Large amount of metal here. Bottle with “SIX TO GALLON” on its base. Several bottles with reconstructed text “THE EXELSIOR MINERAL WATER		x				x		x														x	x	x	IIIA	XX

		PURITY GUARANTEED" on the front and "ONE PENNY CHARGED ON THIS BOTTLE AND ALLOWED WHEN RETURNED" on the back.																									
1181	S29 15 22.8 E16 53 52.8	Very ephemeral, widespread shell scatter.	30x 30	x	x																x					GPC	
1182	S29 15 22.1 E16 53 53.1	A series of spatially related shell scatters on a low dune ridge. The pottery at 1185 has an internally reinforced and horizontally pierced lug. Mitigation suggested to focus at 1182, 1184, 1185, 1187 and 1189. The entire series of scatters is 110 x 35 m. 1186-1188, and 1190-93 are all ephemeral scatters.	3x3	x	x							x									x	x				GPB	3
1183	S29 15 22.4 E16 53 53.2		3x3	x	x																x						
1184	S29 15 22.8 E16 53 53.3		3x3	x	x															x							
1185	S29 15 22.7 E16 53 53.1		3x3	x	x	x														x							
1186	S29 15 23.2 E16 53 53.5		8x5	x	x							x															
1187	S29 15 22.6 E16 53 53.8		8x5	x	x															x							
1188	S29 15 22.1 E16 53 53.9		5x5	x	x																						
1189	S29 15 21.6 E16 53 53.3		8x8	x	x	x														x	x						
1190	S29 15 21.5 E16 53 53.1		3x3	x	x	x																					
1191	S29 15 21.0 E16 53 53.1		5x3	x	x												x										
1192	S29 15 20.8 E16 53 53.1		3x3	x	x																						
1193	S29 15 20.3 E16 53 53.2		5x5	x	x																						
1194	S29 15 19.7 E16 53 53.3		8x8	x	x																x				x		
1195	S29 15 22.0 E16 53 52.7		5x3	x	x																						
1196	S29 15 22.3 E16 53 52.7		5x3	x	x																						
1197	S29 15 24.0 E16 53 53.5	Shell scatter.	15x 15	x	x	x		x				x	x								x				x	GPC	
1198	S29 15 24.3 E16 53 53.9	Small and discrete shell scatter with associated historical artefacts. Might be a part of 1197.	2x2	x	x					x											x		x	x	x	GPB	1

1199	S29 15 24.5 E16 53 54.2	Ephemeral shell scatter.	8x5	x	x			x																			GPC	
1200	S29 15 24.7 E16 53 53.6	Shell scatter with associated historical artefacts.	8x8	x	x	x		x																x	x	x	GPB	1
1201	S29 15 24.7 E16 53 53.1	Shell scatter with associated historical artefacts.	8x5	x	x	x		x		x														x		x	GPB	1
1202	S29 15 29.6 E16 53 37.3	Very ephemeral shell scatter.	5x5	x	x																						GPC	
1203	S29 15 28.7 E16 53 32.7	A scatter of metal fragments with pieces of three historical bottles.	2x5																					x		x	GPC	
1204	S29 15 28.1 E16 53 27.3	Shell scatter.	2x2	x	x	x						x	x											x			GPB	1
1205	S29 15 28.1 E16 53 26.6	Widespread shell scatter but with the densest part being in the southwest.	20x 20	x	x	x						x				x	x				x			x			GPB	1
1206	S29 15 51.3 E16 53 24.1	Ephemeral shell scatter in a deflation hollow. Quite a lot of ostrich eggshell.	20x 15	x	x	x											x				x			x	x	x	GPB	1
1207	S29 15 50.7 E16 53 25.2	Shell scatter with a dense patch of about 5x5 m in he middle. :Lighter scatter all around.	20x 20	x	x	x							x														GPB	1
1208	S29 15 50.7 E16 53 25.9	Shell scatter.	8x5	x	x	x																				x	GPB	1
1209	S29 15 51.7 E16 53 26.4	Widespread and very fragmented shell scatter.	20x 20	x	x	x						x	x								x						GPB	1
1210	S29 15 54.0 E16 53 27.0	Widespread, ephemeral and very fragmented shell scatter. Too ephemeral to determine size.	?	x	x	x																					GPC	
1211	S29 15 54.5 E16 53 28.8	Shell scatter. Lots of whole shell. CCS scraper seen.	8x8	x	x	x						x	x								x						GPB	1
1212	S29 15 55.7 E16 53 27.6	Widespread, ephemeral and very fragmented shell scatter. Too ephemeral to determine size.	?	x	x	x																					GPC	
1213	S29 16 00.0 E16 53 29.5	Widespread ephemeral shell scatter but with a small, dense patch of 3x3 m at the waypoint.	40x 40	x	x	x																					GPB	1
1214	S29 15 58.9 E16 53 29.9	Shell scatter.	15x 15	x	x							x									x						GPB	1
1215	S29 16 02.6 E16 53 29.4	Widespread shell scatter but a dense patch with many *C. meridionalis* shells at the waypoint.	40x 30	x	x	x		x				x	x				x				x						GPB	1

1216	S29 16 02.9 E16 53 29.0	A small historical (contact) shell scatter with charcoal, rubber and a piece of a press stud.	3x3	x	x	x				x	x	x												x	x		GPB	1
1217	S29 16 04.3 E16 53 28.4	Widespread, ephemeral fragmented shell scatter.	20x 20	x	x	x																					GPC	
1218	S29 16 34.4 E16 53 16.9	There is a massive shell scatter visible along both sides of a large road stretching for at least 50 m. It was not examined for content.	50+	x	x	x																						
1219	S29 16 34.5 E16 53 20.0	Ephemeral shell scatter.	10x 10	x	x	x																					GPC	
1220	S29 16 34.0 E16 53 22.3	Shell scatter.	10x 10	x	x	x		x	x													x				x	GPC	
1221	S29 16 29.9 E16 53 28.2	Ephemeral shell scatter with modern rubbish contaminating it.	8x5	x	x	x																x					GPC	
1222	S29 16 29.5 E16 53 28.4	Shell scatter. CCS backed flake seen.	5x5	x	x	x							x														GPB	1
1223	S29 16 29.0 E16 53 28.4	Shell scatter.	3x3	x	x	x																					GPC	
1224	S29 16 29.0 E16 53 27.8	Shell scatter that seems to extend into a small dune.	5x5	x	x	x				x																	GPB	1
1225	S29 16 28.9 E16 53 27.2	Shell scatter in a deflation hollow.	15x 8	x	x	x																x					GPB	1
1226	S29 16 28.7 E16 53 28.2	Dense shell scatter with two small patches.	8x5	x	x																						GPB	1
1227	S29 16 28.8 E16 53 29.4	Shell scatter contaminated by modern rubbish.	3x3	x	x	x						x										x					GPC	
1228	S29 16 28.4 E16 53 29.9	Waypoints 1228 to 1248 are a series of shell scatters spread over a dune top. 1229 and 1233 have lots of whole shell. 1230, 1236, 1239, 1241-1243 are all widespread scatters. 1238 has a dense scatter (needs 4hrs mitigation). 1231 has an unfinished bead. 1235 has a CCS segment. 1239 has a flask mouth.	180 x 100	x	x	x						x															GPB	32
1229	S29 16 28.3 E16 53 29.6			x	x	x																						
1230	S29 16 27.9 E16 53 30.1			x	x	x						x		x								x		x				
1231	S29 16 27.6 E16 53 30.5			x	x	x						x	x							x	x	x						
1232	S29 16 27.2 E16 53 30.8			x	x	x						x					x											
1233	S29 16 27.0 E16 53 30.7			x	x	x																						
1234	S29 16 26.4 E16 53 30.5			x	x	x		x				x	x				x					x		x				

1235	S29 16 26.8 E16 53 31.1			x	x	x						x		x							x							
1236	S29 16 27.8 E16 53 31.2			x	x	x						x					x				x							
1237	S29 16 28.6 E16 53 31.0			x	x	x		x				x									x							
1238	S29 16 28.8 E16 53 30.3			x	x	x	x					x	x	x							x		x					
1239	S29 16 29.5 E16 53 30.5			x	x	x						x		x							x							
1240	S29 16 29.7 E16 53 29.8			x	x	x						x																
1241	S29 16 30.0 E16 53 30.5			x	x	x						x								x	x							
1242	S29 16 30.4 E16 53 30.6			x	x	x																						
1243	S29 16 30.6 E16 53 31.5			x	x	x						x		x							x							
1244	S29 16 31.3 E16 53 31.6			x	x	x						x									x	x						
1245	S29 16 31.9 E16 53 30.6			x	x	x																						
1246	S29 16 31.3 E16 53 30.9			x	x	x											x				x							
1247	S29 16 31.0 E16 53 30.7			x	x	x											x				x							
1248	S29 16 31.4 E16 53 30.1			x	x																							
1249	S29 16 32.8 E16 53 30.7	Ephemeral shell scatter.	10x 10	x	x																						GPC	
1250	S29 16 21.6 E16 53 54.9	Widespread ephemeral shell scatter.	30x 30	x	x																x				x		GPC	
1251	S29 16 23.4 E16 53 55.6	Ephemeral shell scatter.	5x5	x	x																x						GPC	
1252	S29 16 22.0 E16 54 07.3	Shell scatter with two patches.	20x 20	x	x	x												x		x							GPB	2
1253	S29 16 23.5 E16 54 06.7	Ephemeral shell scatter.	5x5	x	x																						GPC	
1254	S29 16 24.7 E16 53 58.2	Just a few shell fragments a several small potsherds.	2x2	x	x															x	x						GPC	
1255	S29 16 44.6 E16 54 13.5	Ephemeral shell scatter.	10x 10	x	x																						GPC	

1256	S29 16 37.2 E16 54 08.5	Series of spatially associated shell scatters, but most of them are ephemeral. Only 1258, 1259, 1263 and 1264 were not ephemeral. Mitigation to focus on 1263 and 1264.	5x3	x	x	x																				GPB	2
1257	S29 16 36.9 E16 54 07.2		5x5	x	x																							
1258	S29 16 33.9 E16 54 06.5		10x 5	x	x																							
1259	S29 16 33.5 E16 54 07.5		5x5	x	x	x																						
1260	S29 16 34.0 E16 54 07.9		8x5	x	x	x																						
1261	S29 16 34.6 E16 54 08.0		10x 10	x	x	x																						
1262	S29 16 35.2 E16 54 07.9		5x5	x	x	x																						
1263	S29 16 35.7 E16 54 08.3		10x 10	x	x	x						x																
1264	S29 16 35.5 E16 54 08.9		15x 15	x	x	x														x	x							
1265	S29 16 35.7 E16 54 09.2		5x5	x	x	x					x																	
1266	S29 16 36.2 E16 54 09.0		5x5	x	x																	x						
1267	S29 16 37.8 E16 54 07.7		5x5	x	x	x																						
1268	S29 16 34.8 E16 54 07.2		5x5	x	x																							
1269	S29 16 34.5 E16 54 07.6		20x 15	x	x																x							
1270	S29 16 32.7 E16 54 08.3		10x 5	x	x																x							
1271	S29 16 34.3 E16 54 08.9		5x5	x	x																							
1272	S29 16 28.2 E16 54 08.4	Three points on a shell scatter exposed in the side of a jeep track. Cannot tell the size but extends 60 m in the track. Some burnt bone.	60x ?	x	x	x				x		x					x				x					GPB	1
1273	S29 16 29.7 E16 54 07.0																											
1274	S29 16 29.3 E16 54 07.5																											
1275	S29 16 29.3 E16 54 08.4	Ephemeral shell scatter.	5x5	x	x																						GPC	
1276	S29 16 31.2 E16 54 07.7	Shell scatter.	20x 8	x	x							x		x							x					GPB	2

1277	S29 16 36.9 E16 53 38.7	Shell scatter.	20x 10	x	x	x						x						x			x					GPB	1
1278	S29 16 38.0 E16 53 36.9	Ephemeral shell scatter.	3x3	x	x																					GPC	
1279	S29 16 40.1 E16 53 38.0	Shell scatter.	15x 8	x	x																					GPC	
1280	S29 16 40.9 E16 53 38.6	Widespread shell scatter but there is a dense patch at the waypoint.	20x 20	x	x	x					x						x									GPB	1
1281	S29 16 41.1 E16 53 38.0	Shell scatter.	8x8	x	x	x																				GPC	
1282	S29 16 41.0 E16 53 36.9	Ephemeral shell scatter.	5x5	x	x																					GPC	
1283	S29 16 33.9 E16 53 31.0	Shell scatter with lots of ostrich eggshell.	5x5	x	x	x											x				x					GPC	
1284	S29 16 34.4 E16 53 29.7	Shell scatter in a small deflation hollow.	10x 5	x	x	x																				GPC	
1285	S29 16 42.6 E16 53 31.8	Widespread ephemeral shell scatter. 1286 is a dense patch within the larger scatter.	40x 40	x	x	x														x						GPB	1
1286	S29 16 43.1 E16 53 31.3			x	x	x					x																
1287	S29 16 41.1 E16 53 32.0	Shell scatter.	10x 10	x	x							x								x	x					GPC	
1288	S29 16 40.4 E16 53 31.8	Shell scatter.	15x 10	x	x	x																				GPC	
1289	S29 16 40.4 E16 53 32.6	Shell scatter.	5x5	x	x	x																				GPC	
1290	S29 16 40.8 E16 53 33.1	Shell scatter.	10x 10	x	x	x															x					GPC	
1291	S29 16 41.5 E16 53 33.1	Shell scatter.	10x 10	x	x	x																				GPC	
1292	S29 16 40.8 E16 53 33.7	Shell scatter.	8x8	x	x																					GPC	
1293	S29 16 39.8 E16 53 33.4	Ephemeral shell scatter.	15x 15	x	x	x																				GPC	
1294	S29 16 39.0 E16 53 32.9	Ephemeral shell scatter.	5x5	x	x																x					GPC	
1295	S29 16 39.1 E16 53 32.0	Ephemeral shell scatter.	15x 8	x	x							x									x					GPC	
1296	S29 16 38.3 E16 53 30.8	Shell scatter	10x 8	x	x	x					x	x		x							x					GPB	1
1297	S29 16 37.9 E16 53 31.4	Ephemeral shell scatter.	5x5	x	x	x																				GPC	

1298	S29 18 14.2 E16 53 51.6	Small, faily discrete shell scatter just beyond the area disturbed by building work at the old mine buildings.	5x5	x	x	x		x	x			x														GPB	1
1299	S29 18 13.0 E16 53 53.5	There is a huge area of almost continuous shell scatter spread along the hill on the southern side of the wetland. 1304 is a midden cut by a road; it may be indicative of what some areas are like below the ground. The pottery at 1322 occurs a few meters away from the shell scatter and includes a lug. 1316 has a flask mouth. Most scatters are relatively uninteresting but those at waypoints 1299, 1304, 1306, 1316 and 1322 have been identified for sampling. Testing of various other spots should take place with excavations being expanded as needed. The scatters all run into one another so only an overall size of the area covered has been given. Several points were recorded as representative samples of the whole but most were only given GPS co-ordinates.	180 x 150	x	x	x		x	x			x		x						x	x					GPB	24
1300	S29 18 12.2 E16 53 53.4																											
1301	S29 18 11.9 E16 53 53.3																											
1302	S29 18 11.7 E16 53 53.9																											
1303	S29 18 11.6 E16 53 54.4																											
1304	S29 18 11.6 E16 53 54.8			x	x	x		x				x																
1305	S29 18 11.2 E16 53 55.7																											
1306	S29 18 11.8 E16 53 55.4			x	x	x		x				x									x							
1307	S29 18 12.3 E16 53 55.1																											
1308	S29 18 12.4 E16 53 54.4																											
1309	S29 18 13.5 E16 53 53.6																											
1310	S29 18 13.7 E16 53 53.2																											
1311	S29 18 13.5 E16 53 52.8			x	x	x		x	x		x										x							
1312	S29 18 14.0 E16 53 52.6																											
1313	S29 18 14.7 E16 53 52.6																											
1314	S29 18 14.2 E16 53 53.5																											
1315	S29 18 14.0 E16 53 53.8			x	x	x														x								
1316	S29 18 13.9 E16 53 54.2			x	x						x										x							
1317	S29 18 13.3 E16 53 54.3																											

1318	S29 18 15.1 E16 53 53.5																										
1319	S29 18 15.5 E16 53 54.1																										
1320	S29 18 15.5 E16 53 54.5																										
1321	S29 18 15.3 E16 53 53.8																										
1322	S29 18 14.7 E16 53 51.7			x	x	x		x				x								x	x						
1323	S29 18 13.5 E16 53 51.3																										
1324	S29 18 13.3 E16 53 50.9																										
1325	S29 18 14.2 E16 53 50.4																										
1326	S29 18 14.0 E16 53 49.9																										
1327	S29 18 13.8 E16 53 49.6																										
1328	S29 18 14.0 E16 53 49.3																										
1329	S29 18 12.2 E16 53 51.3																										
1330	S29 18 13.0 E16 53 51.8																										
1331	S29 18 12.9 E16 53 52.5																										
1332	S29 18 12.4 E16 53 52.5																										
1333	S29 18 12.1 E16 53 52.7																										
1334	S29 18 10.8 E16 53 53.8																										
1335	S29 18 11.1 E16 53 53.0																										
1336	S29 18 15.4 E16 53 47.9	Shell scatter.	5x5	x	x	x		x				x									x					GPC	
1337	S29 18 16.4 E16 53 48.2	Ephemeral shell scatter.	10x 8	x	x																					GPC	
1338	S29 18 18.0 E16 53 48.8	Ephemeral shell scatter.	5x5	x	x							x														GPC	

1339	S29 18 19.1 E16 53 49.0	Shell scatter with three or more small patches of denser shell.	10x 10	x	x	x						x								x						GPC	
1340	S29 18 19.0 E16 53 49.8	Ephemeral shell scatter.	15x 10	x	x	x															x					GPC	
1341	S29 18 18.4 E16 53 50.0	Shell scatter.	10x 5	x	x	x					x										x					GPC	
1342	S29 18 18.7 E16 53 51.2	Shell scatter with several small patches of denser shell.	20x 20	x	x	x		x	x		x	x	x							x						GPB	2
1343	S29 18 18.6 E16 53 52.2	A series of spatially related shell scatters with similar appearance, though *C. meridionalis* occurs variably. At 1343 a small excavation alongside a road has revealed a subsurface midden but it has lots of surface scatter as well. Only 1343 and 1344 were recorded in detail and mitigation should focus on these two.	70x 35	x	x	x					x	x	x	x							x					GPB	6
1344	S29 18 19.1 E16 53 52.3			x	x	x			x		x	x	x	x							x						
1345	S29 18 19.3 E16 53 53.0																										
1346	S29 18 19.8 E16 53 52.9																										
1347	S29 18 20.2 E16 53 53.1																										
1348	S29 18 20.1 E16 53 53.6																										
1349	S29 18 19.3 E16 53 53.4																										
1350	S29 18 18.1 E16 53 53.4	Shell scatter.	10x 5	x	x	x			x			x									x					GPC	
1351	S29 18 18.3 E16 53 52.4	Ephemeral shell scatter.	10x 10	x	x	x		x												x						GPC	
1352	S29 18 18.5 E16 53 51.6	Widespread, low density shell which may actually be the edge of the 1343-49 site. Not possible to determine the size of the scatter here due to intersecting other sites.	?	x	x			x	x			x														GPC	
1353	S29 18 20.6 E16 53 50.8	Shell scatter.	5x5	x	x	x															x					GPC	
1354	S29 18 21.9 E16 53 52.0	A series of spatially related and similar-looking shell scatters.	25x 10	x	x	x		x	x			x			x	x										GPB	2
1355	S29 18 22.0 E16 53 52.0																										
1356	S29 18 21.8 E16 53 51.6																										
1357	S29 18 21.6 E16 53 51.4																										

1358	S29 18 21.5 E16 53 51.8																										
1359	S29 18 21.2 E16 53 52.6	Ephemeral shell scatter.	8x5	x	x	x		x																		GPC	
1360	S29 18 20.7 E16 53 53.0	An elongated large shell scatter with multiple denser patches.	60x 15	x	x	x	x	x	x			x	x	x	x					x	x					GPB	4
1361	S29 18 21.0 E16 53 53.1																										
1362	S29 18 21.3 E16 53 53.3																										
1363	S29 18 21.6 E16 53 53.5																										
1364	S29 18 21.8 E16 53 53.7																										
1365	S29 18 21.9 E16 53 53.3																										
1366	S29 18 22.1 E16 53 53.6																										
1367	S29 18 22.4 E16 53 54.0																										
1368	S29 18 22.8 E16 53 54.2	A shell scatter with four denser patches.	15x 15	x	x	x						x								x						GPB	2
1369	S29 18 22.7 E16 53 53.9																										
1370	S29 18 23.0 E16 53 53.6																										
1371	S29 18 23.2 E16 53 54.0																										
1372	S29 18 21.5 E16 53 50.1	Ephemeral shell scatter.	10x 5	x	x																					GPC	
1373	S29 18 20.4 E16 53 49.9	Ephemeral shell scatter.	15x 5	x	x																					GPC	
1374	S29 18 20.4 E16 53 48.5	Shell scatter.	8x8	x	x	x		x																		GPC	
1375	S29 18 21.0 E16 53 47.9	Shell scatter.	15x 10	x	x	x		x				x														GPC	
1376	S29 18 21.8 E16 53 47.9	A shell scatter with multiple denser patches patches.	40x 20	x	x	x		x				x		x							x					GPB	4
1377	S29 18 22.1 E16 53 47.2																										
1378	S29 18 22.4 E16 53 47.6																										

1379	S29 18 22.7 E16 53 47.9																										
1380	S29 18 22.9 E16 53 47.9																										
1381	S29 18 22.4 E16 53 48.4	Shell scatter.	5x5	x	x	x																				GPC	
1382	S29 18 22.4 E16 53 48.8	Shell scatter.	2x2	x	x	x						x														GPC	
1383	S29 18 21.8 E16 53 48.9	Ephemeral shell scatter.	10x 10	x	x	x																				GPC	
1384	S29 18 19.5 E16 53 47.8	Shell scatter.	10x 10	x	x	x																				GPC	
1385	S29 18 23.0 E16 53 48.6	Shell scatter.	5x2	x	x																		x			GPC	
1386	S29 18 23.2 E16 53 47.3	Shell scatter with two denser patches.	15x 8	x	x	x														x						GPB	1
1387	S29 18 23.2 E16 53 47.0																										
1388	S29 18 24.0 E16 53 47.5	Shell scatter with multiple patches running into one another.	20x 20	x	x			x	x			x	x								x					GPB	2
1389	S29 18 24.8 E16 53 47.7	Shell scatter.	10x 10	x	x	x		x	x												x					GPC	
1390	S29 18 23.3 E16 53 48.8	Shell scatter with many whole shells.	2x2	x	x																					GPC	
1391	S29 18 17.1 E16 53 44.6	Shell scatter.	8x5	x	x	x																				GPC	
1392	S29 18 17.4 E16 53 44.8	Shell scatter.	8x5	x	x	x																				GPC	
1393	S29 18 19.4 E16 53 45.0	This is the base of a mast that was part of the old diamond mine infrastructure. Not a heritage resource.																								n/a	
1394	S29 18 19.3 E16 53 44.3	Shell scatter revealed in a small trench and now quite disturbed.	10x 5	x	x	x		x				x														GPC	
1395	S29 18 20.7 E16 53 44.2	Widespread shell scatter around 1393 and very disturbed as a result.	30x 30	x	x	x						x														GPC	
1396	S29 18 21.3 E16 53 45.0	Shell scatter with multiple denser patches. 1396 has a fish bone. 1400 lies on the summit of a small dune.	30x 30	x	x	x		x	x	x		x	x	x							x					GPB	8
1397	S29 18 21.6 E16 53 44.6																										
1398	S29 18 22.0 E16 53 44.4																										

1399	S29 18 22.0 E16 53 45.1																											
1400	S29 18 22.2 E16 53 45.5																											
1401	S29 18 21.5 E16 53 46.1																											
1402	S29 18 21.3 E16 53 43.1	Shell scatter.	5x5	x	x	x	x	x				x														GPC	
1403	S29 18 20.8 E16 53 42.8	Shell scatter.	5x5	x	x	x							x													GPC	
1404	S29 18 23.2 E16 53 44.7	Shell scatter with many small patches of denser shell.	20x 20	x	x	x		x	x			x	x								x					GPB	2
1405	S29 18 20.9 E16 53 38.9	Shell scatter with many small patches of denser shell.	30x 15	x	x	x		x																		GPC	
1406	S29 18 19.0 E16 53 38.1	Shell midden cut and badly disturbed by a road and earthmoving.	8x5	x	x	x		x																		GPC	
1407	S29 18 19.0 E16 53 37.2	Shell midden cut and disturbed by a road and earthmoving. Examination shows it is clearly lacking cultural content.	8x5	x	x	x		x																		GPC	
1408	S29 18 19.0 E16 53 41.8	Large shell scatter with three denser patches. Shell mostly very fragmented.	30x 30	x	x	x															x					GPC	
1409	S29 18 17.9 E16 53 41.2	Shell scatter overlooking the wetland.	30x 20	x	x	x		x				x														GPB	1
1410	S29 18 17.8 E16 53 40.1	Shell scatter overlooking the wetland.	5x5	x	x	x						x															
1411	S29 18 05.8 E16 53 58.4	Very ephemeral shell scatter in a slight deflation.	10x 10	x	x							x									x					GPC	
1412	S29 17 59.3 E16 54 02.9	Ephemeral shell scatter.	10x 5	x	x	x															x					GPC	
1413	S29 17 58.5 E16 54 02.4	Ephemeral shell scatter.	10x 5	x	x	x		x																		GPC	
1414	S29 17 58.3 E16 54 01.7	Ephemeral shell scatter.	10x 5	x	x	x		x																		GPC	
1415	S29 17 58.7 E16 54 00.7	A large shell scatter with two denser patches on the crest of a low dune.	30x 15	x	x	x		x				x								x						GPB	2
1416	S29 17 59.0 E16 54 00.1			x	x	x		x													x						
1417	S29 17 57.1 E16 53 49.0		10x 8	x	x	x												x			x					GPB	2

1418	S29 17 56.3 E16 53 48.6	Three spatially related and quite light shell scatters on the crest of a low dune ridge.	10x 10	x	x	x						x	x								x							
1419	S29 17 55.9 E16 53 48.2		15x 10	x	x	x					x	x																
1420	S29 17 54.8 E16 53 49.5	Shell scatter.	10x 10	x	x			x	x												x					GPC		
1421	S29 17 56.0 E16 53 51.2	Shell scatter deflated in a road. Cannot tell original size.	15x ?	x	x	x		x				x														GPC		
1422	S29 17 54.9 E16 53 52.2	Widespread ephemeral shell scatter that runs along the top of a low dune ridge. 1423 is a small shell midden within this scatter. 1425 is another patch of denser shell.	130 x 20	x	x			x				x									x					GPC		
1423	S29 17 53.9 E16 53 52.7			x	x	x		x					x													GPB	1	
1424	S29 17 51.3 E16 53 54.0			x	x			x				x									x					GPC		
1425	S29 17 51.4 E16 53 52.7			x	x			x				x	x								x					GPB	1	
1426	S29 17 54.3 E16 53 50.8	Ephemeral shell scatter.	5x2	x	x	x						x									x					GPC		
1427	S29 17 51.1 E16 53 51.0	Very widespread ephemeral shell scatter with no focal points. Might be part of 1423-1425.	60x 20	x	x	x		x	x			x									x					GPC		
1428	S29 17 49.6 E16 53 51.6																											
1429	S29 17 54.3 E16 53 42.6	Heavily deflated shell scatter in a road. Cannot tell the original dimensions.	15x ?	x	x	x						x	x													GPC		
1430	S29 17 54.5 E16 53 41.9	A small deflated shell scatter.	5x5	x	x	x						x									x					GPC		
1431	S29 17 53.2 E16 53 41.8	A shell scatter cut by a road and with many stone artefacts visible and a very tiny ostrich eggshell bead.	15x ?	x	x	x		x				x	x								x	x				GPB	2	
1432	S29 17 52.6 E16 53 42.5	A large shell scatter along the crest of a low dune ridge.	60x 60	x	x	x		x				x									x					GPB	2	
1433	S29 17 52.1 E16 53 42.9																											
1434	S29 17 51.6 E16 53 42.7																											
1435	S29 17 51.2 E16 53 43.1																											
1436	S29 17 48.1 E16 53 46.9	Shell midden exposed in a road. Cannot tell original size. The shell layer is about 0.5 m below the	20x ?	x	x	x	x	x				x					x				x					GPC		

		surface. A close examination showed almost no cultural material despite the amount of shell present.																									
1437	S29 17 47.0 E16 53 45.3	A heavily deflated and fragmented shell scatter in a low-lying area.	10x 10	x	x	x		x	x			x	x								x					GPB	1
1438	S29 17 49.5 E16 53 45.1	A heavily deflated and fragmented shell scatter but the shell is revealed in tiny deflated patches on the crest of a low dune.	30x 20	x	x	x		x	x			x	x								x					GPB	2
1439	S29 17 49.6 E16 53 42.3	A heavily deflated and fragmented shell scatter in a low-lying area.	50x 50	x	x	x		x	x			x	x								x					GPC	
1440	S29 17 46.5 E16 53 42.6	Small shell scatter that might actually just be shells dug out of a burrow at some point. Perhaps this is what is visible in the surrounding areas after deflation?	2x2	x	x																					GPC	
1441	S29 17 45.3 E16 53 41.9	A large, deflated shell scatter which may run into a small dune. The shell occurs in small deflated patches.	30x 2	x	x	x		x				x									x					GPC	
1442	S29 17 45.9 E16 53 41.3	Two somewhat denser shell patches with better preserved shell than the rest of the deflated scatter in this area.	15x 8	x	x	x		x	x												x					GPB	1
1443	S29 17 47.6 E16 53 38.7	Very widespread and ephemeral shell scatter. Where it has been cut by a road there is very little shell visible which shows that it is not a buried scatter.	50x 50	x	x	x		x				x	x								x					GPC	
1444	S29 17 45.6 E16 53 38.7	Shell scatter with some quite dense patches. A collected Conus shell was seen. 1444 to 1451 are probably all linked by very ephemeral shell scatter.	15x 10	x	x	x															x					GPB	1
1445	S29 17 44.3 E16 53 38.6	Another denser patch of shell in the background of ephemeral scatter.	15x 10	x	x	x		x																		GPC	
1446	S29 17 43.3 E16 53 38.8	A widespread shell scatter over the crest of a low dune ridge.	40x 40	x	x	x		x	x											x	x					GPC	
1447	S29 17 42.6 E16 53 38.2	Another dense shell patch in the same wider ephemeral scatter.	15x 15	x	x	x		x																		GPC	
1448	S29 17 42.3 E16 53 39.6	Shell scatter.	3x3	x	x	x						x														GPC	

1449	S29 17 41.2 E16 53 39.1	Widespread, deflated shell scatter but with some denser patches.	50x 50	x	x	x																				GPC	
1450	S29 17 38.1 E16 53 40.8	Widespread, deflated shell scatter but with a denser patch at the waypoint.	20x 15	x	x	x																				GPC	
1451	S29 17 37.1 E16 53 39.9	A somewhat more discrete shell scatter with less scatter around it.	10x 10	x	x	x																				GPC	
1452	S29 17 34.4 E16 53 40.1	Shell scatter revealed by a road. Cannot tell original dimensions.	15x ?	x	x	x		x				x														GPC	
1453	S29 17 34.0 E16 53 39.4	A dense shell scatter cut by a mine trench and that seems to run into the dune. Cannot tell original size.	8x?	x	x	x					x	x														GPB	1
1454	S29 17 33.4 E16 53 40.8	Shell midden cut by the mine trench. Cannot tell original size.	5x?	x	x	x																				GPB	1
1455	S29 17 35.0 E16 53 41.5	Two patches of shell scatter.	15x 15	x	x	x																				GPC	
1456	S29 17 41.9 E16 53 42.0	Shell scatter.	15x 5	x	x	x																				GPC	
1457	S29 17 42.3 E16 53 41.3	Shell scatter.	10x 10	x	x	x						x								x						GPB	1
1458	S29 17 40.6 E16 53 50.2	Ephemeral shell scatter.	10x 10	x	x	x		x																		GPC	
1459	S29 17 41.0 E16 53 56.4	Ephemeral shell scatter in the lee of a dune (1459) extending to the summit of the dune at 1460. The shell on the dune crest is much denser.	100 x 60	x	x	x		x				x								x						GPC	
1460	S29 17 42.3 E16 53 57.6																											
1461	S29 17 41.4 E16 54 00.9	Widespread shell scatter in a low-lying area between dunes. The glass fragment is historical.	20x 20	x	x			x												x		x				GPC	
1462	S29 17 40.4 E16 54 03.6	Ephemeral shell scatter of the crest of a dune.	20x 20	x	x	x																				GPC	
1463	S29 17 39.7 E16 54 04.3	A small scatter of historical material which may be mid-20th century and thus not archaeology. Includes a TALANA bottle base and a piece of a Stellenbosch Farmers Winery bottle. Also part of a shoe made with leather and small nails.																								GPC or n/a	
1464	S29 17 39.4 E16 54 05.4																											
1465	S29 17 25.7 E16 53 59.5	Ephemeral shell scatter.	5x5	x	x	x																				GPC	

1466	S29 17 26.1 E16 53 58.8	Ephemeral shell scatter.	10x 5	x	x	x																				GPC	
1467	S29 17 28.6 E16 53 49.0	A shell midden cut by a mine trench. It extends into the dune. Cannot tell original size.	10x ?	x	x	x		x				x	x				x				x					GPB	1
1468	S29 17 29.2 E16 53 47.5	A small shell midden cut by a mine trench. It extends into the dune. Cannot tell original size.	5x?	x	x	x		x									x									GPB	1
1469	S29 17 23.8 E16 53 38.7	Ephemeral and heavily deflated shell scatter.	10x 10	x	x	x															x					GPC	
1470	S29 17 23.4 E16 53 37.5	Shell scatter on a low dune ridge.	20x 20	x	x	x															x					GPC	
1471	S29 17 24.3 E16 53 37.3	Shell scatter on a low dune ridge.	20x 20	x	x	x															x					GPC	
1472	S29 17 20.5 E16 53 37.3	Shell scatter.	15x 10	x	x							x														GPC	
1473	S29 17 16.7 E16 53 41.2	Ephemeral shell scatter.	10x 10	x	x	x																				GPC	
1474	S29 17 16.1 E16 53 40.9	Ephemeral shell scatter. This scatter selected for sampling as an example of the sites in this area.	10x 10	x	x	x																				GPC	1
1475	S29 17 14.9 E16 53 40.8	Ephemeral shell scatter.	10x 10	x	x	x																				GPC	
1476	S29 17 14.5 E16 53 40.0	Ephemeral shell scatter.	10x 10	x	x	x																				GPC	
1477	S29 17 14.8 E16 53 36.4	Shell scatter with lots of stone artefacts and a collected *Bullia* shell.	25x 25	x	x	x						x														GPB	4
1478	S29 17 15.6 E16 53 37.3	Shell scatter.	10x 8	x	x	x																				GPC	
1479	S29 17 18.3 E16 53 37.3	Shell scatter.	5x5	x	x	x						x									x					GPC	
1480	S29 17 18.7 E16 53 37.7	Shell scatter.	5x5	x	x	x						x														GPC	
1481	S29 17 08.9 E16 53 32.8	Ephemeral shell scatter revealed in a road. Cannot tell original size but seems very small.	5x?	x	x																					GPC	
1482	S29 17 11.6 E16 53 24.1	Shell scatter with lots of pottery.	5x5	x	x	x						x	x				x			x	x					GPB	2
1483	S29 17 12.1 E16 53 25.2	Shell scatter with two patches.	10x 5	x	x																x					GPC	

1484	S29 17 11.2 E16 53 25.6	Shell scatter with lots of pottery.	5x5	x	x	x																				GPB	1
1485	S29 17 12.1 E16 53 24.7	Shell scatter.	5x5	x	x															x	x					GPC	
1486	S29 17 18.8 E16 53 25.9	Shell scatter. Revealed in road. Cannot tell original size.	10x ?	x	x						x															GPC	
1487	S29 17 21.9 E16 53 23.9	Ephemeral and very fragmented shell scatter.	8x5	x	x	x																				GPC	
1488	S29 17 23.4 E16 53 23.9	Ephemeral and very fragmented shell scatter.	20x 10	x	x	x																				GPC	
1489	S29 17 25.0 E16 53 24.9	Ephemeral and very fragmented shell scatter.	10x 5	x	x	x																				GPC	
1490	S29 17 34.8 E16 53 37.3	A shell midden exposed in a mine trench. Cannot tell original size but only a very short section of *in situ* shell is visible.	3x?	x	x	x						x	x													GPB	1
1491	S29 17 34.4 E16 53 38.1	A shell midden exposed in a mine trench. Cannot tell original size.	8x?	x	x			x									x									GPC	
1492	S29 17 34.1 E16 53 38.8	Shell scatter.	5x5	x	x	x	x																				GPC	
1493	S29 17 34.9 E16 53 37.0	Shell scatter.	8x5	x	x			x				x															GPB	1
1494	S29 17 37.5 E16 53 38.0	Widespread ephemeral shell scatter.	15x 15	x	x			x					x														GPC	
1495	S29 17 38.7 E16 53 39.7	Deflated area with widespread fragmented shell.	40x 40	x	x																						GPC	
1496	S29 17 39.4 E16 53 38.5	Shell scatter.	20x 20	x	x	x		x				x	x	x				x			x						GPB	1
1497	S29 17 42.6 E16 53 34.8	Shell scatter.	5x5	x	x	x																					GPC	
1498	S29 17 42.9 E16 53 32.2	Shell scatter with quite a lot of stone artefacts.	5x5	x	x	x						x		x							x						GPB	1
1499	S29 17 40.2 E16 53 33.4	Shell scatter.	8x8	x	x	x			x			x									x						GPC	
1500	S29 17 41.6 E16 53 37.4	Shell scatter.	10x 5	x	x	x																					GPC	
1501	S29 17 47.2 E16 53 35.5	Widespread, very ephemeral shell scatter.	40x 40	x	x																						GPC	
1502	S29 17 49.5 E16 53 34.9	Ephemeral shell scatter.	5x5	x	x	x						x															GPC	
1503	S29 17 50.2 E16 53 35.5	Ephemeral shell scatter.	10x 10	x	x	x						x															GPC	

1504	S29 17 49.0 E16 53 39.1	Ephemeral shell scatter.	5x2	x	x																					GPC	
1505	S29 17 50.0 E16 53 41.7	Ephemeral shell scatter.	15x 5	x	x	x																				GPC	
1506	S29 17 51.6 E16 53 40.5	A huge shell midden cut by a road. Cannot tell original size.	25x ?	x	x	x					x	x		x							x					GPB	2
1507	S29 17 53.3 E16 53 37.0	A scatter of quartz artefacts.	8x5									x														GPB	1
1508	S29 18 05.0 E16 53 52.0	A deflated and fragmented shell scatter.	15x 10	x	x	x						x									x					GPC	
1509	S29 17 43.7 E16 52 55.5	Shell scatter.	20x 20	x	x	x																				GPC	
1510	S29 17 44.9 E16 52 58.6	Ephemeral shell scatter.	5x5	x	x																					GPC	
1511	S29 17 45.4 E16 52 58.7	Shell midden.	10x 10	x	x											x										GPB	1
1512	S29 17 48.7 E16 53 04.1	Occasional quartz flakes noted above the dorbank along the edge of a mine trench. Presumably MSA?	n/a									x														GPC	
1513	S29 17 54.0 E16 53 05.9	Deflated shell scatter in a road.	10x 5	x	x	x																				GPC	
1514	S29 17 54.7 E16 53 05.1	Deflated shell scatter in a road.	15x 10	x	x	x																				GPC	
1515	S29 17 56.9 E16 53 05.0	Deflated shell scatter in a road.	15x 20	x	x	x										x										GPC	
1516	S29 17 56.5 E16 53 04.2	Shell scatter.	20x 20	x	x	x																				GPB	2
1517	S29 17 55.1 E16 53 04.2	Shell scatter.	15x 10	x	x	x		x																		GPB	1
1518	S29 17 54.6 E16 53 04.3	Shell scatter.	5x5	x	x	x		x																		GPC	
1519	S29 17 54.3 E16 53 02.9	Shell scatter.	8x8	x	x	x		x																		GPC	
1520	S29 17 53.8 E16 53 02.8	Shell scatter.	15x 10	x	x	x		x				x				x										GPB	1
1521	S29 17 53.4 E16 53 03.2	Shell scatter.	10x 10	x	x	x		x				x						x								GPC	
1522	S29 17 51.3 E16 52 57.2	Very deflated shell scatter.	10x 10	x	x	x						x				x					x					GPB	1
1523	S29 17 51.3 E16 52 56.0	Shell scatter.	8x8	x	x	x						x				x										GPB	1

1524	S29 17 49.7 E16 52 57.6	Shell scatter.	5x3	x	x	x											x									GPC	
1525	S29 17 47.5 E16 52 56.6	Shell scatter.	10x 10	x	x	x																				GPC	

The survey revealed large numbers of LSA shell scatters throughout the study area but with a remarkably uneven distribution. Some blocks closer to the coast had fewer sites than anticipated, while some further inland had more than expected. The distribution was also clearly related to landscape features with dense clusters of sites occurring on most dune ridges. Again, though, some dunes lacked sites where they might otherwise have been expected. These ridges varied from barely perceptible (Figure 6) to very prominent (Figure 7). While significant sites are known to occur around the Port Nolloth Salt Pan (Webley & Orton 2013; with another revealed by recent erosion in the same place = waypoint 1100), this area yielded less sites than expected. It is clear that to the north of the pan any sites present would have been buried by wind-blown sand; the plume of sand extending northwards from the pan is clear on aerial photography (Figure 2). The area was probably not very pleasant to camp in anyway so there is a good chance that this area is genuinely largely free of archaeology. To the east, however, sites were also sparse but one large cluster of shell scatters was found on the crest of a dune showing that at least some occupation did occur in that area.

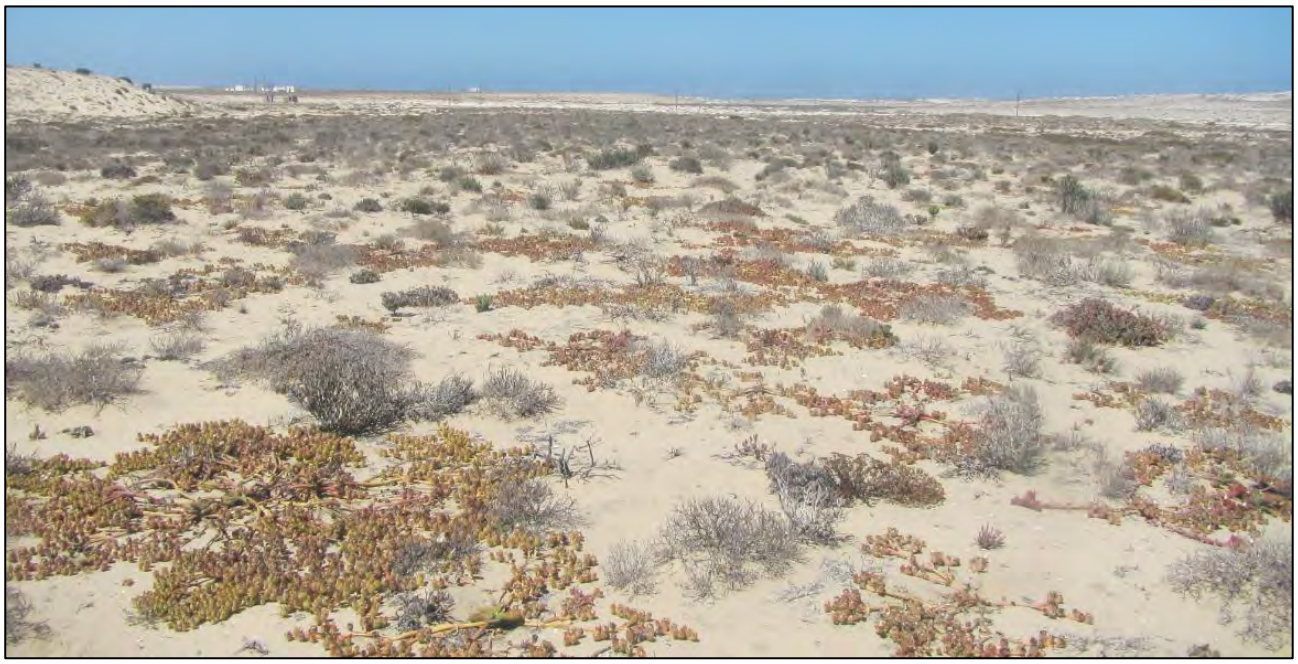


Figure 6: *Looking towards the coast along a very low, almost imperceptible, dune ridge housing the sites at waypoints 1422 to 1425 in Block S17.*

It is likely that most sites would have had at least some surface manifestation, but a few sites were noted to occur only in artificially created sections. Sites seen n section were generally more intact with more whole shell. These included sites seen in and along the edges of roads and tracks (Figures 8 & 9) and also in the sides of mine trenches (Figure 10). Although most of these sites were only buried by a small amount of sand, one site (that shown in Figure 10) was far deeper but its burial depth may have been increased by the addition of sand to the surface above the intersected midden.

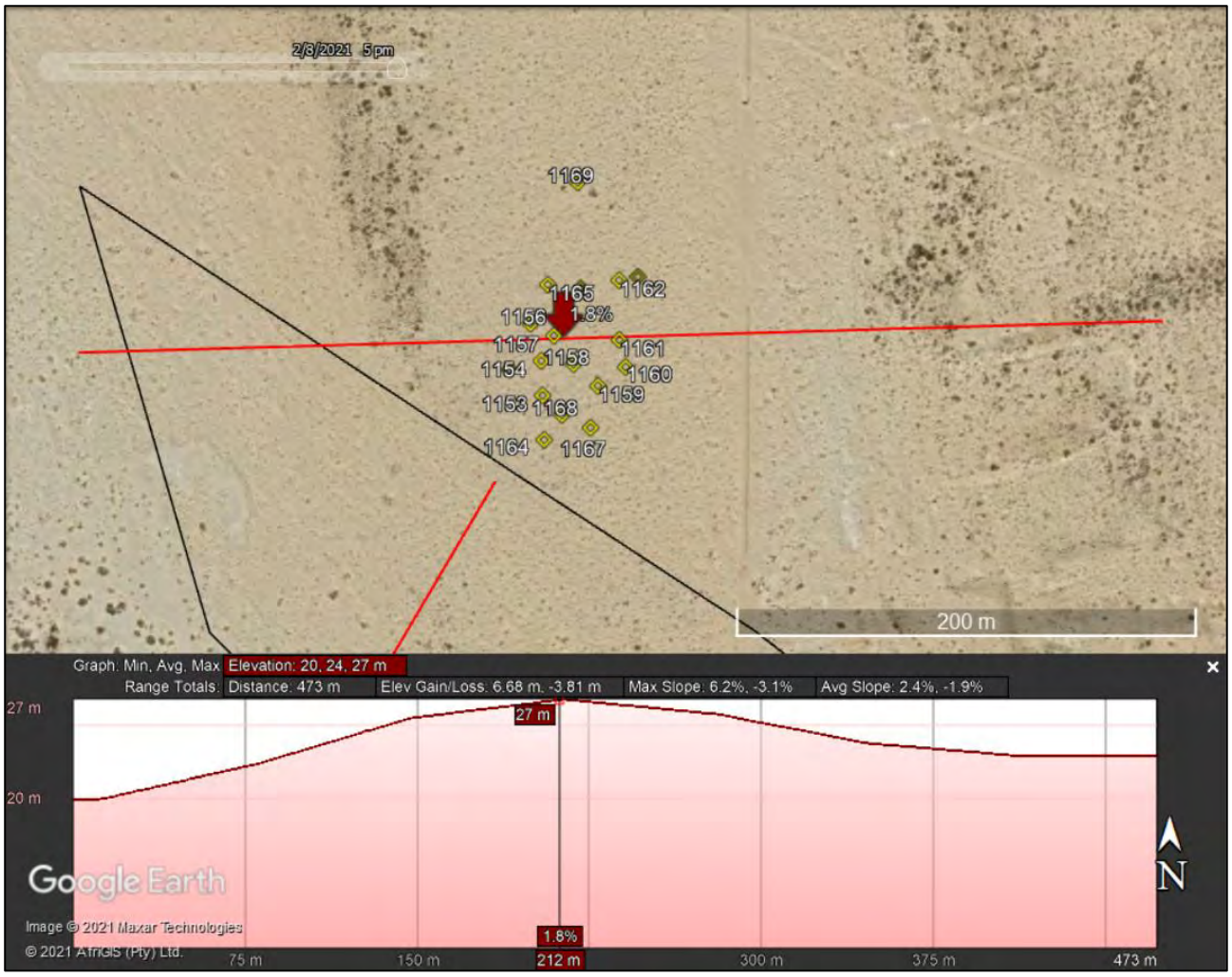


Figure 7: *Elevation profile created in Google Earth showing the prominent ridge on which the sites at waypoints 1153 to 1168 lie. The profile follows the red line with the arrow showing that the shell scatters are clustered on the crest of the ridge. They are just outside the edge of Block M10.*

Figure 8: *Shell exposed in the side of a sand road at waypoint 1506 in Block S17.*

Figure 9: *Close up of the intact shell layer at waypoint 1506 showing intact shells.*

Figure 10: *Buried shell midden revealed in the side of a mine trench at waypoint 1028 in Block N2. The level from which the shells are originating is obvious between the two arrows.*

The surface appearance of the sites was all fairly similar with the main difference being the degree of fragmentation of the shells. Those sites that had been exposed for longer periods of time had more highly fragmented shells, while recently exposed or younger sites tended to have far more whole shell. Figures 11 to 13 show the range of fragmentation observed during the survey. In sites where black mussel shells occur the degree of fragmentation is higher because these shells break very easily. Some sites are fragmented due to disturbance, especially where they have been driven over (Figure 14).

Figure 11: *Well-preserved shell in a site that has recently been exposed at waypoint 1098 in Block N5 by erosion along the edge of the road to the present mine camp.*

Figure 12: *Moderately fragmented shell at waypoint 1076 between blocks N5 and M8. The* S. argenvillei *shells are stronger and tend to break up last. It is largely this species that survives intact here.*

Figure 13: *A highly fragmented shell scatter at waypoint 1441 in Block S17. This scatter contains a fair amount of black mussel shell which is more heavily fragmented than the limpets.*

Figure 14: *A fairly fragmented shell scatter at waypoint 1037 just outside Block N4. It has been disturbed by vehicles driving over it and has subsequently deflated revealing plenty of archaeological material including a lower grindstone (in picture).*

Many sites were very ephemeral and clearly of very low significance (Figure 15). These were graded GPC. Many others were denser and could clearly yield some useful scientific data, even if only data related to the shell species collected and deposited on the sites. These sites were graded GPB. Other sites were more obviously of higher significance because higher densities of cultural material were visible (Figure 14). These were allocated a GPA grading. The most significant LSA archaeology was documented in and to the south of Block M11. There is an enormous collection of shell scatters here, part of which was sampled within Block M11 by Orton (2017) prior to construction of the nearby oxidation ponds. This was site PN2011/001A. Very close by and straddling the edge of Block M10 was PN2011/001B or which part was excavated and part preserved *in situ*. The excavations at these sites revealed large amounts of cultural material that contribute significantly to our understanding of the past (Figure 16). Several small areas were sampled and it is clear that a massive complex of sites occurs along this dune ridge (see Figure A2.20 in Appendix 2). Excavations revealed that some middens were present beneath the surface but all areas sampled were restricted to a single occupation layer. It is very likely that almost all sites in the study area will be single layer, single occupations.

Figure 15: *A very ephemeral shell scatter at waypoint 1045 just outside Block M7. Only a few shells can be seen.*

Uncharacteristically for the region, the survey revealed a large number of pot sherds. Altogether, pottery was seen at 32 sites. This is in keeping with historical records, even though much pottery has been removed from the area in the past. The vast majority of sherds were plain body sherds with just one decorated piece and two lugs being seen (Figures 16 to 18). One sherd showing direct evidence of coil manufacture was also noted, because the pot had broken along the join between two coils revealing the characteristic 'step' along the break (Figure 19).

Figure 16: *An impressed pot sherd from waypoint 1092 in Block N5. Scale in cm.*

Figure 17: *A pot lug from waypoint 1185 just outside Block M10. Scale in cm.*

Figure 18: *A pot lug from waypoint 1322 in Block S19. Scale in cm.*

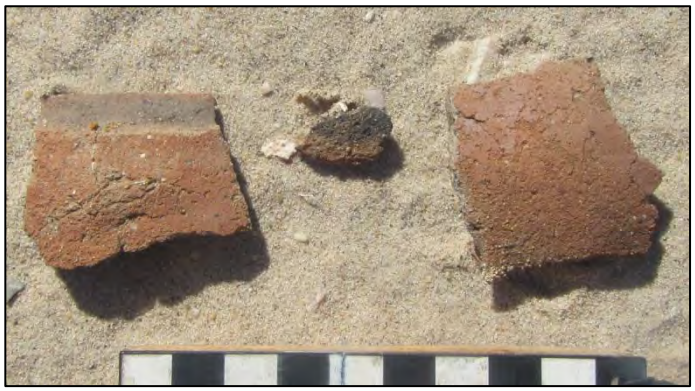


Figure 19: *Pottery from waypoint 1342 in Block S19 with the left sherd showing the step break typical of a coil-manufactured pot. Scale in cm.*

A number of artefacts made from ostrich eggshell were also found. These included a number of beads (one at each of seven sites). Following Orton (2008), the beads were found to be in a range of sizes (Figures 20 to 23) but, as occurs elsewhere in Namaqualand, small (less than 5 mm maximum dimension) and medium (≥5 and <6 mm) beads were most common. One unfinished bead was seen (Figure 24). Two flask mouths were also seen (Figures 25 & 26) but no engraved eggshell fragments were found.

Figure 20: *Stone artefacts and a small ostrich eggshell bead (c. 3.7 mm) from waypoint 1050 in Block M9. Scale in cm.*

Figure 21: *Pottery, a medium ostrich eggshell bead (c. 5.6 mm) and rock lobster mandibles from waypoint 1069 in Block M8. Scale in cm.*

Figure 22: *A large ostrich eggshell bead (c. 7.0 mm) from waypoint 1182 just outside block M10. Scale in cm.*

Figure 23: *A very large ostrich eggshell bead (c. 7.9 mm) from waypoint 1266 in Block S13. Scale in cm.*

Figure 24: *A potsherd, an unfinished bead and a silcrete stone artefact from waypoint 1231 just outside Block S14. Scale in cm.*

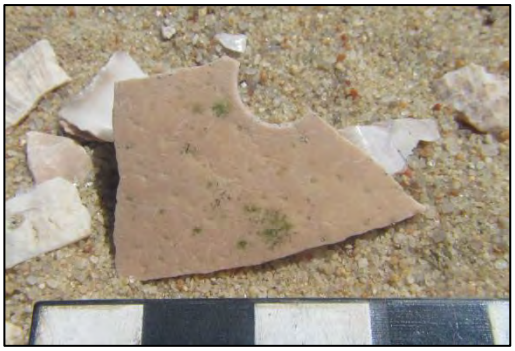


Figure 25: *A flask mouth fragment from waypoint 1239 in Block S14. Scale in cm.*

Figure 26: *Pottery and a flask mouth fragment from waypoint 1316 in Block S19. Scale in cm.*

The remaining cultural materials seen were stone artefacts. Flaked stone artefacts are always the most common cultural finds. They were made from a variety of materials with quartz dominating. However, CCS, silcrete, quartzite and quartz porphyry were all noted. Five hammer stones and two lower grindstones were noted but, oddly, no upper grindstones were found. A number of scatters had rocks on them that were not visibly used but were obviously brought to the sites by the occupants for some or other purpose; these are referred to as manuports.

Aside from the ubiquitous shell, other food remains included bone fragments (seen on 19 scatters) and rock lobsters; represented by their mandibles (seen on 23 scatters). Bone tends to not preserve very well in this harsh environment but there is no doubt that more will be present in buried middens since some sites in Namaqualand have yielded very rich faunal assemblages (Dewar 2008). Rock lobsters are commonly found in the region because, in contrast to their friable exoskeletons, their very durable calcareous mandibles preserve very well (Figure 21).

All the finds above are from the LSA and just one older observation was made. This was an area along a old mine trench were occasional stone artefacts in quartz were seen eroding out from the

interface of the white aeolian sands and the underlying red sand (waypoint 1512 in Block S18). Only a small number were seen and recovering a suitable sample would be impossible due to the massive amount of earthmoving that would be required.

The LSA shell middens and scatters are not of overly high significance in and of themselves. However, taken together they represent a significant proportion of the Stone Age occupation of the landscape and, once excavation data from many of them is interpreted together, the results would be of high local significance.

Although Stone Age archaeology dominates the findings, the most important archaeological materials seen were historical materials associated with the historical copper railway running from the inland copper mines around Concordia and Springbok to the coast at Port Nolloth. Although the railway lines and sleepers no longer survive, the alignment is present in the form of the earth berm that was built to support and level the railway (Figures 27 to 29). It has been lost in the west where Port Nolloth has been built over it and in the vicinity of the study area sections have been disturbed by the recent construction of the pipeline leading to the new oxidation ponds. In one place the pipeline has even been placed in the historic railway berm.

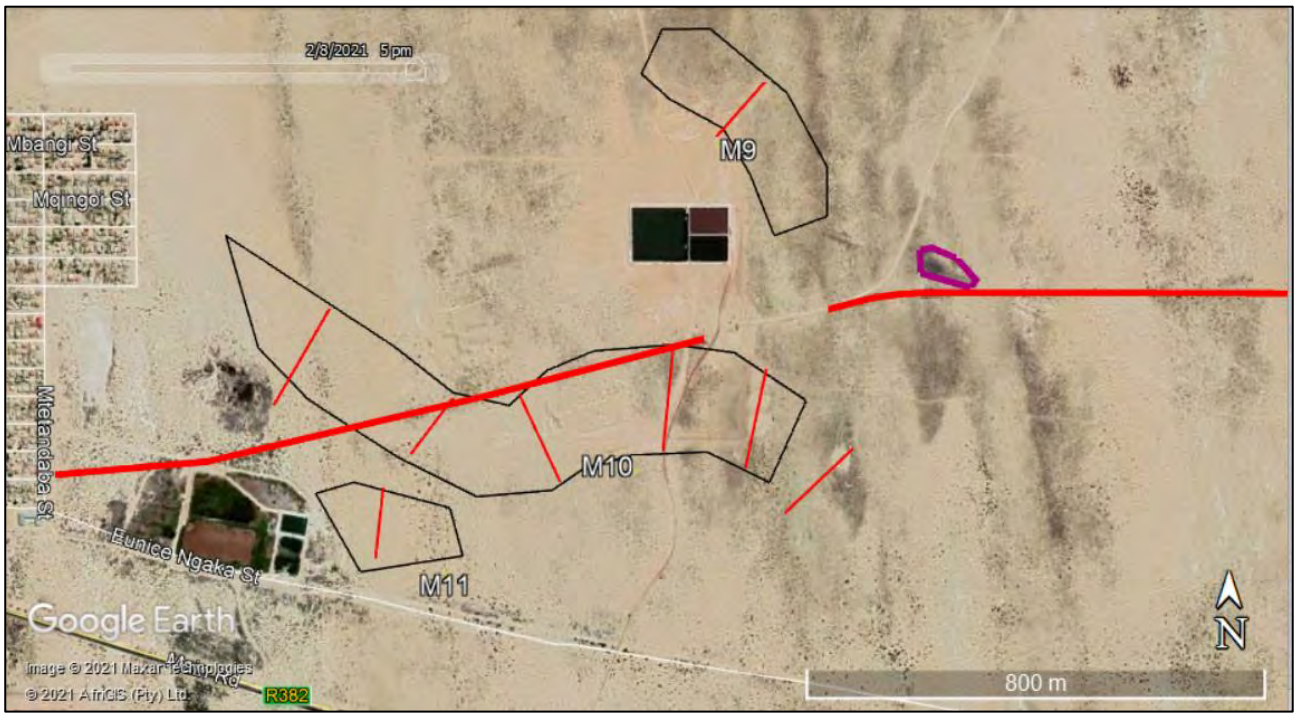


Figure 27: *Map showing the preserved railway line berm (thick red line) and associated dump (purple polygon). There are also small patches of dumped material in some areas along the railway itself.*

Figure 28: *Looking towards the west along the railway berm (visible at right) and showing dumped materials (dark spots in the foreground) and the alignment of the trench that was unfortunately dug through the berm when the new oxidation ponds were built.*

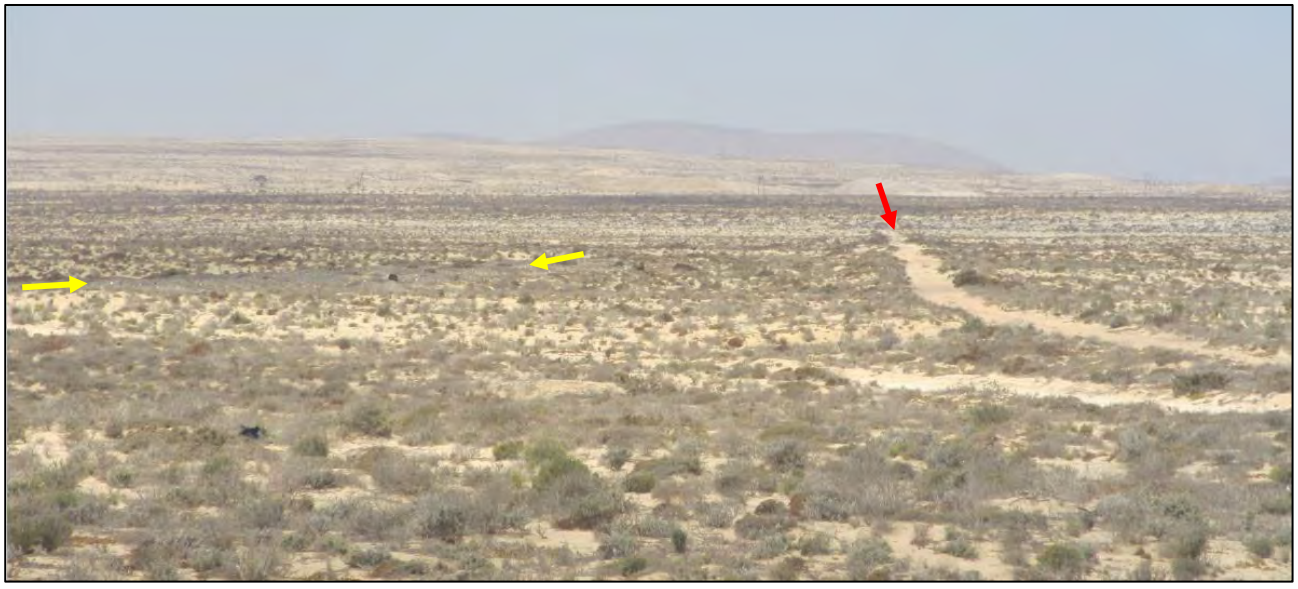


Figure 29: *View towards the east showing the railway berm (red arrow) and large associated historic dump (grey smear between yellow arrows).*

Associated with the railway are historic dumps of domestic waste and coke which was used as a fuel for the steam engines which started running on the line from 1886. Dumped materials were found in three places within the study area (at waypoints 1176, 1178 and 1179/80), although more may

have been found if the whole railway was walked. Some of the dumps are small but a fair amount of material was present at waypoint 1180 just outside the edge of Block M10 (Figures 30 to 33) and a large dump was found at waypoint 1047 some 200 m southeast of Block M9 (Figures 34 to 38). A small excavation was found within this larger dump and it showed that the material is not a surface veneer but has some depth to it. This railway is a significant part of the historic copper mining landscape which was considered for declaration as a World Heritage Site. The nomination was not carried through though. Nonetheless, the whole landscape is considered as being of at least high provincial significance with all the components seen in and around the study area being at least high local significance.

Figure 30: *Artefacts from the small railway dump at waypoint 1180. Scale in cm.*

Figure 31: *Artefacts from the small railway dump at waypoint 1180. Scale in cm.*

Figure 32: *Iron fragments from the small railway dump at waypoint 1180. Scale in cm.*

Figure 33: *Artefacts from the small railway dump at waypoint 1180. Scale in cm.*

Figure 34: *The surface appearance of the larger railway dump at waypoint 1047. Scale in cm.*

Figure 35: *Artefacts from the larger railway dump at waypoint 1047. Scale in cm.*

Figure 36: *Artefacts from the larger railway dump at waypoint 1047. Scale in cm.*

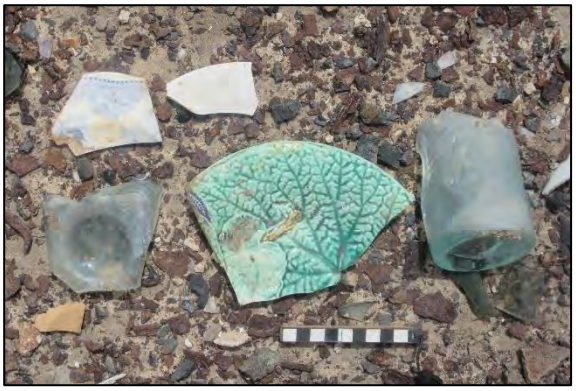


Figure 37: *Artefacts from the larger railway dump at waypoint 1047. Scale in cm.*

Figure 38: *Coke and iron fragments from the larger railway dump at waypoint 1047. Scale in cm.*

Figure 39: *A small excavation into the larger railway dump at waypoint 1047 showing that it is not confined to the surface. Scale in cm.*

A few isolated historical glass and ceramic artefacts were noted, especially along the eastern margin of the Salt Pan (Figure 40 & 41). They are of no concern. In one place in the south a small scatter of historical materials was seen (Figure 42 & 43). They may relate to the early-mid-20th century and could relate to a camp of explorers (e.g. for diamonds). The scatter is small and of low significance.

Figure 40: *Isolated historical items from the eastern margin of the Salt Pan. Sale in cm.*

Figure 41: *Isolated historical item from the eastern margin of the Salt Pan. Sale in cm.*

Figure 42: *Historical artefacts from waypoint 1464 in the edge of Block S16. Scale in cm.*

Figure 43: *Historical artefacts from waypoint 1464 in the edge of Block S16. Scale in cm.*

5.3. Graves

No graves were seen in the study area, although several historical and recent graveyards do occur in and around Port Nolloth. Morris (1992) records several skeletons as having been found in the Port Nolloth area and many more have subsequently been reported from the local mining areas. Unmarked precolonial graves are not visible at the surface and their locations cannot be predicted due to a lack of surface markings. They cannot be further assessed and can only be dealt with if found during prospecting.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

Port Nolloth goes back to the late 19th century and owes much of its development to the copper mining industry. The relevant aspects have already been discussed in Section 5.2.1. Further discussion of the town history is provided by Smalberger (1975). Briefly, the town was originally known as Robbe Bay and by about 1856 there were only two or three residents. By 1864 there were said to be four or five wooden houses. As noted above, the town grew rapidly once permission to build the railway to Port Nolloth was granted. Of most relevance to the present study is Webley's (2009, citing Jowell & Folb 2004 and personal communication from a Mr De Wet) that the salt pan was used for cricket and athletics and also as a light aircraft airstrip. Figure 44 shows the extent of Port Nolloth as it was in 1937. The main town was clustered in one location with a string of houses spread out towards the north along the coastline. The historic copper railway (which was still intact at that stage, is clearly visible, as is the larger historic dump described above.

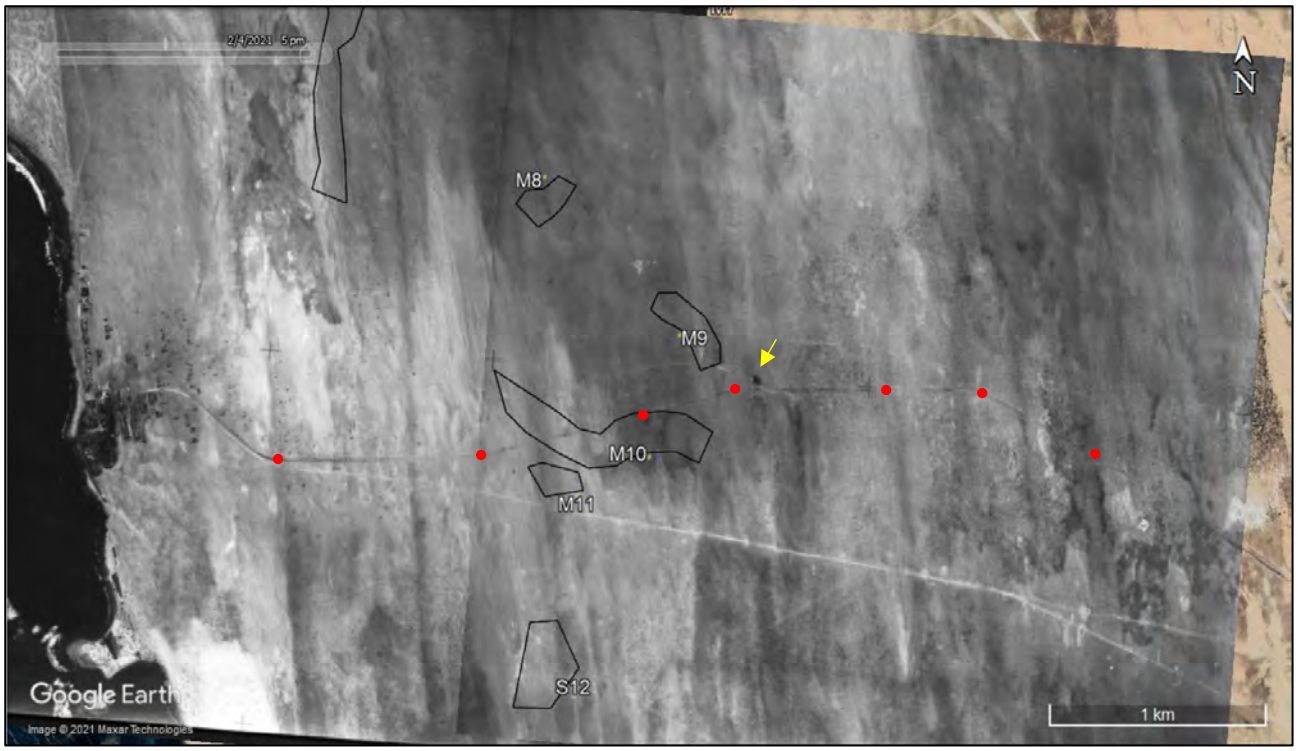


Figure 44: *Aerial view of Port Nolloth dated 1937 overlaid on google Earth to show the position of the study area relative to the historic town. It is not clear how many of the dark dots inland of the main town might be small houses/huts or whether they are vegetation. The surviving copper railway berm is marked by red dots and the historic dump is visible as a dark dot (yellow arrow).*

5.4.2. Site visit

Aside from the historical archaeological materials related to the copper railway and isolated historical artefacts described above, no other historical aspects were recorded or require further consideration. Historical buildings occur in the beachfront area of Port Nolloth but they are far from the study area. It is noted that an old mining operation used to be present in the far south of the study area. A few ruined buildings occur in Block S19 (Figure 45) but they are not old enough to be heritage resources and are of no further concern.

Figure 45: *View of the old mine structures in Block S19.*

5.5. Cultural landscapes and scenic routes

The Port Nolloth area is very flat and offers long views in all directions. It is a sandy, windswept 'wasteland' with a remote and typically West Coast feel (Figures 46 & 47). The wider area to the north and south is strongly dominated by diamond mining and old unrehabilitated trenches and

mine dumps are a feature of this landscape (Figure 48). Although the Port Nolloth townlands area has never been mined, the scars of prospecting occur widely. The newly proposed diamond prospecting is in keeping with this historic use of the local landscape. The R382 is certainly scenic but its scenic value diminishes considerably when one approaches the area that has been affected by mining activities.

Figure 46: *View towards Port Nolloth and the coast which lie 22 km away in the distance. The flatness of the landscape is evident.*

Figure 47: *View towards Port Nolloth and the coast which lie 5 km away in the distance. The flatness of the landscape is evident.*

Figure 48: *Oblique aerial view towards the east-northeast showing the scars of diamond mining to the north and south of Port Nolloth. Source: Google Earth.*

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ''cultural significance'' means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are of greatly varying cultural significance but, taken together, the LSA resources are deemed to have medium to high cultural significance for their scientific value. The most significant LSA resources are assigned Grade GPA, but many sites are GPB or GPC. The historical resources related to the copper railway are deemed to have high cultural significance for their historical, social and technological values. They are assigned Grade IIIA, although the wider copper mining landscape and all related features is at least Grade II.

Graves are deemed to have high cultural significance for their social value and would be considered Grade IIIA.

The cultural landscape has low-medium cultural significance for its aesthetic, historical and social significance[2].

While full mapping of all recorded sites is contained in Appendix 2, Figures 49 to 52 provide mapping of sites by significance to allow a better understanding of the relationship between the significant resources are the prospecting areas. It is evident from Figure 50 that three prospecting blocks (N6, N7 & S16) do not require any mitigation at all, while nine others require relatively little (N1, N3, N4, M8, M9, S12, S13, S15 and S18). Note that N4 has no sites within it but one site between it and the existing camp must be excavated as it is highly threatened. The remaining seven blocks (N2, N5, M10, M11, S14, S17 and S19[]) will all require more work. Mitigation is further discussed in Section 10.

[2] The SAHRA grading system does not apply to cultural landscapes.

Figure 49: *Aerial view of the study area showing all recorded waypoints by grade. Red symbols and lines = Grade IIIA, Orange symbols = Grade GPA, yellow symbols = Grade GPB, white symbols = Grade GPC.*

Figure 50: *Aerial view as above but with Grade GPC sites excluded. Effectively, this map shows all sites requiring mitigation or avoidance.*

Figure 51: *Aerial view as above but with Grade GPC and GPB sites excluded.*

Figure 52: *Aerial view of the area where the copper railway and associated features (Grade IIIA) occur. These features must be avoided during prospecting.*

5.7. Summary of heritage indicators

Archaeological resources are fragile and very easily damaged or destroyed, especially in a landscape prone to erosion when the surface is disturbed. These sites have the potential to provide much scientific information on the past inhabitants of the area.

- Indicator: Significant LSA archaeological resources must not be disturbed without appropriate study.
- Indicator: The historic copper railway and related features must be protected from damage.

It is quite possible that graves could be found during excavation. They are very sensitive to disturbance.

- Indicator: Disturbance of accidentally discovered graves must be minimised until an appropriate way forward has been determined.

The cultural landscape can be easily affected by visual intrusion from inappropriate development. The proposed project is consistent with the past mining and prospecting activities that have happened in the area but without rehabilitation the quality of the landscape can be further diminished.

- Indicator: Effective rehabilitation must take place to restore the landscape as close as possible to its present condition.

6. ASSESSMENT OF IMPACTS

Palaeontological resources, archaeological resources, graves and the cultural landscape have all be identified as issues requiring formal impact assessment. Palaeontology is dealt with in the separate specialist report but the other three aspects are considered here.

6.1. Impacts to archaeological resources

Direct impacts to archaeological resources would occur primarily during the construction phase with only a small chance of impacts occurring during operation or closure (e.g. if an excavator drives beyond the demarcated area while closing an excavation). Nevertheless, the same sort of impacts could occur in all phases but with a higher probability during construction. The assessment below thus applies to construction. Because of the regional significance of the copper railway, the potential impacts have regional extent. Many smaller Stone Age sites could be totally destroyed so an intensity of high is assigned. Combined with the high probability of impacts this means the potential significance before mitigation is **high negative** (Table 3). Avoidance (with a 50 m buffer around the waypoints to allow for the area of the site plus a buffer of at least 30 m) of most significant sites should be possible but, if not, archaeological mitigation would be simple to effect and the significance after mitigation would be **low negative**. Although the likelihood of residual impacts means that a negative impact will still be felt, there is a strong likelihood that a benefit in terms of scientific knowledge gain would accrue. There are no fatal flaws in terms of archaeology.

Table 3: *Assessment of impacts to archaeology.*

Potential impacts on archaeological resources	
Nature and status of impact:	Direct, negative
Extent and duration of impact:	Regional, permanent
Intensity	High
Probability of occurrence:	Highly probable
Degree to which the impact can be reversed:	Low
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	High
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	Mandatory avoidance of some areas with 50m buffer, avoidance (with 50m buffer) or archaeological excavation of others
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

6.1.1. Mitigation

The assigned heritage grade and the nature of mitigation go hand in hand as shown in Table 4. Many sites are very ephemeral and/or obviously lack cultural materials. These sites are graded GPC and require no further work. Sampling of sites graded GPB will entail excavation of at least one square meter, and more where this becomes warranted (i.e. if many cultural materials are found). More significant sites were graded GPA and will need a larger scale excavation that samples a wider area and gathers valuable scientific data. This work would have to be done under a permit issued to the consulting archaeologist by SAHRA. It is noted, however, that the intention is to try and avoid as many archaeological sites as possible, so mitigation as described here will only be required for those sites that cannot be avoided. For avoidance, buffers of 30 m around sites are required by SAHRA. To effect this, buffers of 50 m around the waypoints have been provided to account for the area of the site plus a buffer of at least 30 m for all waypoints of GPB or higher grading.

Table 4: *Grades and associated mitigation of archaeological sites.*

Grade	Mitigation	Purpose of mitigation
GPC	None	No apparent cultural significance, no mitigation required.
GPB	Small sample	The small sample provides a record of the site and its contents with the main record anticipated to be of the shellfish. This sampling also serves as a test excavation to determine whether further excavations might be required. This would be in the event that the initial sample produces an elevated density of cultural materials. Some sites were allocated slightly more time because the chances of encountering cultural materials seemed higher from the initial surface examination. Note that as a precautionary measure in some large clusters of scatters (that might represent single site complexes) where only certain waypoints have been suggested for mitigation, all waypoints have been assigned the same grade so that if significant subsurface deposits are found the whole site will be available for potential further investigation.
GPA	Excavation	Sites where many cultural materials were evident on the surface were assigned a grade of GPA. These are sites with a medium-high local cultural significance because there is clearly much scientific data to be gained through their excavation. At these sites a fairly large area should be sampled.
IIIA	Avoidance and *in situ* protection	This grade was allocated to all finds related to the historic copper railway. The copper mining landscape is of very high local cultural significance and must not be disturbed by prospecting.

6.1.2. Management

Management measures are also required. This will entail the careful planning by the developer of the project layout, both the test pitting phase and the bulk sampling phase. Maps should be prepared showing all areas that will require disturbance. These should be examined by an archaeologist and submitted to SAHRA for the record. Any mitigation required will need to be decided upon and commissioned. Prospecting work may not commence in the relevant areas until SAHRA has approved of the disturbance plan (if no impacts are expected) or the mitigation report.

6.2. Impacts to graves

Impacts to graves could occur during the construction phase, although the probability of this occurring is low. The chances of impacts occurring during operation and closure are negligible. The impacts would be of local extent but would be permanent. Because human remains are involved, the intensity is considered high. Without mitigation an impact of **high negative** might be expected. Chance finds of graves would need to be protected and reported and, with mitigation the impact significance would reduce to **medium negative**. The post-mitigation impact is not seen as low because it is inevitable that some disturbance of a grave will have occurred by the time it is noticed and reported. It is impossible to predict the location of unmarked graves and there are thus no fatal flaws with regards to graves.

Table 5: *Assessment of impacts to graves.*

Potential impacts on graves	
Nature and status of impact:	Direct, negative
Extent and duration of impact:	Local, permanent
Intensity	High
Probability of occurrence:	Low
Degree to which the impact can be reversed:	Low
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	Immediately protect and report chance finds of burials.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium

6.2.1. Mitigation

There are no pre-construction mitigation measures that can be applied. However, provision needs to be made for the immediate protection and reporting of any accidental finds of human remains to an archaeologist for evaluation and rescue as necessary. The SAHRA protocols at the time for dealing with human remains will need to be followed.

6.3. Impacts to the cultural landscape

As noted above, the extreme density of archaeological resources means that the landscape is also a precolonial cultural landscape. This aspect is considered under Section 6.1 with this section focusing on the more recent aspects of the landscape. Impacts to the cultural landscape will occur during all phases but these impacts are temporary, localised and, given the existing mining disturbance in the landscape, of low intensity. This means the significance of impacts is **low negative**. The only mitigation measure is to ensure that rehabilitation happens once excavation is complete. With mitigation the impact significance remains at the **low negative** level. There are no fatal flaws with regards to cultural landscapes.

Table 6: *Assessment of impacts to the cultural landscape.*

Potential impacts on the cultural landscape	
Nature and status of impact:	Direct, negative
Extent and duration of impact:	Local, short term
Intensity	Low.
Probability of occurrence:	Definite
Degree to which the impact can be reversed:	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	High

Proposed mitigation:	Rehabilitation of all excavations
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

6.3.1. Mitigation

The only mitigation measure suggested is to ensure that correct rehabilitation measures are applied. This measure has already been included into the project design.

6.4. Existing impacts to heritage resources

The primary existing impacts are to archaeology. These impacts relate to historical and recent mining and/or prospecting activities that have disturbed sites as well as to the many formal and informal tracks that are used by vehicles. All these impacts result in disturbance of the surface which then results in the acceleration of natural erosion as occurred at the site demarcated by waypoints 1037 to 1039 (Figure 53).

Figure 53: *Aerial view of an archaeological site affected by natural erosion after anthropogenic disturbances in it surrounds. Vehicle tracks pass through the site (which is demarcated by the three waypoints) and a prospecting pit lies immediately northwest of waypoint 1037. Despite these disturbances, the archaeological material was in reasonable shape showing that natural deflation had caused its exposure.*

6.5. The No-Go alternative

The option of not implementing the project means that the status quo will be retained and no new impacts would occur. Existing impacts in the form of natural erosion and deflation of archaeological materials is the only impact that would happen under this scenario. The significance of such impacts is very low because of the generally slow nature of natural erosion. However, other uses of the area, such as off-road driving, will accelerate impacts to some degree. These uses would continue to happen anyway regardless of whether the project proceeds or not.

6.6. Cumulative impacts

Much mining and prospecting activity has occurred on the Namaqualand coast over the last century. This has resulted in massive destruction of archaeological sites and large-scale alteration of the landscape. The present project could result in a small addition to this but, with mitigation this is of no concern. In fact, as more sites are mitigated our scientific knowledge of the area will increase.

6.7. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. Because of the temporary nature of the proposed development and the planned rehabilitation, such an impact is not envisaged.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

From the heritage point of view, the following points should be included:

- Accurate mapping of each excavation area (test pits and bulk samples) must be compiled prior to implementation. These maps must be submitted to SAHRA via SAHRIS for the record and must indicate the positions of:
    - All archaeological sites of Grade GPB or higher;
    - The excavation locations;
    - The topsoil and overburden stockpile locations;
    - The maximum work area required around the above; and
    - The route proposed for access.
- A chance finds procedure for the protection and reporting of fossils needs to be in place (see palaeontological specialist study for details). Fossils should be reported to SAHRA (phone 021 462 4502) and/or a palaeontologist.
- A chance finds procedure for the protection and reporting of human remains needs to be in place. Archaeological human remains should be reported to SAHRA (phone 021 462 4502) and/or an archaeologist.

8. EVALUATION OF IMPACTS RELATIVE TO SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The prospecting itself will not lead to much socio-economic benefit but it is the necessary first stage in the mining process. Should the deposits prove feasible for mining then there is no doubt that mining would create much-needed job opportunities and bring investment into the town of Port Nolloth. The heritage impacts are easy to mitigate and thus the long term socio-economic benefits are seen as outweighing heritage impacts.

9. CONSULTATION

The project is part of an EIA process and will thus be subjected to a full public participation process (PPP) as required by NEMA. The heritage specialist studies will be included in the EIA Phase consultation.

10. CONCLUSIONS

10.1. Discussion

Table 7 presents a rough summary of the mitigation time requirements per prospecting block; these times assume the entire block would be disturbed, though it is known that this will not be the case because prospecting test pit and bulk sample locations will be determined within those blocks during the course of the project. Although this concluding discussion proceeds on the basis of the whole study area (i.e. the entirety of each of the 19 polygons), it must be noted here that most, if not all, of the significant archaeology (Grade GPB or higher) will likely be avoided by the test pitting and that much will also likely be avoided by the bulk samples. As such, the final mitigation requirements will be substantially less than the full amount indicated. Two reasons for this discussion are (1) to allow for good planning on the part of the applicant and (2) to place the information on record so that in the future, if full mining proceeds, these areas would not need to be re-examined.

The mitigation times indicated in Table 7 are rounded off in days and they represent a minimum because there is every possibility that subsurface archaeological deposits will be discovered during the initial sampling and that expanded excavations might be required in some places where this was not anticipated from the surface survey. In this arid environment where erosion proceeds very quickly in disturbed areas, it is not recommended that test excavations be carried out. This is so as to retain site integrity until such time as disturbance for prospecting or mining is definitely required. From many years of excavation experience in coastal Namaqualand, the chances of test excavations finding areas that must be protected are effectively zero because shell sites of very high significance are largely absent from this coastline. The initial archaeological sampling of each site will function as the test and should be started about six months before commencement of prospecting to allow time for excavations, processing, analysis, reporting and approval by SAHRA. It is inevitable that

some sites will require expanded excavations, but most of the time the surface observations and mitigation recommendations are correct.

Table 7: *Summary of mitigation requirements per block for all sites recorded and assuming all might be disturbed.*

Block	Mitigation time estimate (days)	Notes
N1	1	
N2	2	
N3	1	
N4	1	No sites occur within the block but one important site (Grade GPA) lies between the block and the existing mine camp and has already been slightly disturbed by prospecting. This site is significant, highly threatened, and must be excavated if any activity occurs in the vicinity. Deflation and disturbance will continue to erode the site's integrity.
N5	2	Most of the work in this block is on one large site that could be avoided if the developer so wishes. An optional No-Go with 50 m buffer has been proposed for this site.
N6	0	
M7	0	
M8	1	
M9	1	
M10	3 Part to be avoided.	Two large sites lie on dune crests immediately outside the northern edge of the block and both will be impacted by erosion if trenching occurs in close proximity. One of them (in the east) will require very little mitigation due to its ephemeral nature but an optional No-Go area has been proposed for the western site if the developer wishes to protect this area. This block also contains the remnants of the copper railway that must be avoided and preserved (buffer 50 m from all features).
M11	10	This block contains the very large PN2016/001A site and, while avoidance is not a requirement, it is perhaps best excluded from the prospecting program because of the large amount of time that would be required to do an adequate mitigation excavation. This would effectively mean that almost all of Block M11 becomes unavailable for prospecting. An optional No-Go with a 50 m buffer has been proposed to effect protection. Should it be protected and it then becomes desirable to mine the area in the future, the mitigation requirement will apply. Note that a further 10 days would be needed on the southern extension which falls outside of Block M11 if that area were to be mined.
S12	1	
S13	1	The archaeology is extensive here but due to its ephemeral nature only a small amount of mitigation is recommended.

S14	5	Most of the work in this block is on one large site that could be avoided if the developer so wishes. An optional No-Go with a 50 m buffer has been proposed for this site.
S15	1	
S16	0	
S17	3	There are many small sites scattered across this block which makes avoidance likely unfeasible.
S18	1	
S19	6	Half of the mitigation time is for a large area in the northeast of this block and an optional No-Go with 50 m buffer has been proposed for this area. The remainder of the time required is spread across the block

Given the extent and nature of the archaeology present, it is proposed here that, rather than aiming to comprehensively sample every shell scatter, mitigation should effectively aim to maximise academic benefit. This would mean obtaining small samples from all of those sites indicated in Table 2 for sampling and then only expanding excavations at those sites where high quality scientific data are likely to be obtained. This may be data pertaining to the artefactual content of the sites or it may be spatial data, even on sites where cultural materials are limited. It is contended that limited data from many sites and high quality data from a small number is better than moderate quality data from all sites. This approach will necessitate decision-making on site with mitigation time reallocated as required to maximise the quality of data obtained. This approach can be equally applied to full mining (as occurred in the neighbouring mines to the south) or to areas that end up needing mitigation for the bulk sampling. Once the latter areas are known, a discussion should be initiated with the archaeologist to plan the mitigation and a permit will then need to be sought from SAHRA and issued to the mitigating archaeologist.

Figures 53 and 54 show required and optional No-Go areas. The historic copper railway and associated features have been buffered by 50 m on either side and this area MUST be excluded from all excavation work. Should the applicant still wish to prospect within this 100 m wide zone then drilling can be conducted to within 10 m on either side of the railway, since drilling results in minimal disturbance and the railway embankment is stable. The optional No-Go areas are effectively those areas where archaeological mitigation work would be required and the developer may, to reduce costs, choose to protect those areas through implementation of the No-Go zones. However, none of those areas require mandatory protection because the archaeology is not significant enough.

It is likely that the initial test pit work could avoid all or most of the archaeological sites but it will be important to plan access routes and topsoil and overburden spoil heaps (bearing in mind the areas required around these heaps for excavators to work and the buffers required around the archaeological sites) in such a way as to avoid damaging any significant archaeological sites in the vicinity of the test pits. Effectively, if any areas with shell visible on the surface are avoided then impacts will be near zero. Once bulk sampling commences then it is likely that some mitigation will be required because it would be very difficult to avoid the archaeology with the substantially larger areas that would require disturbance.

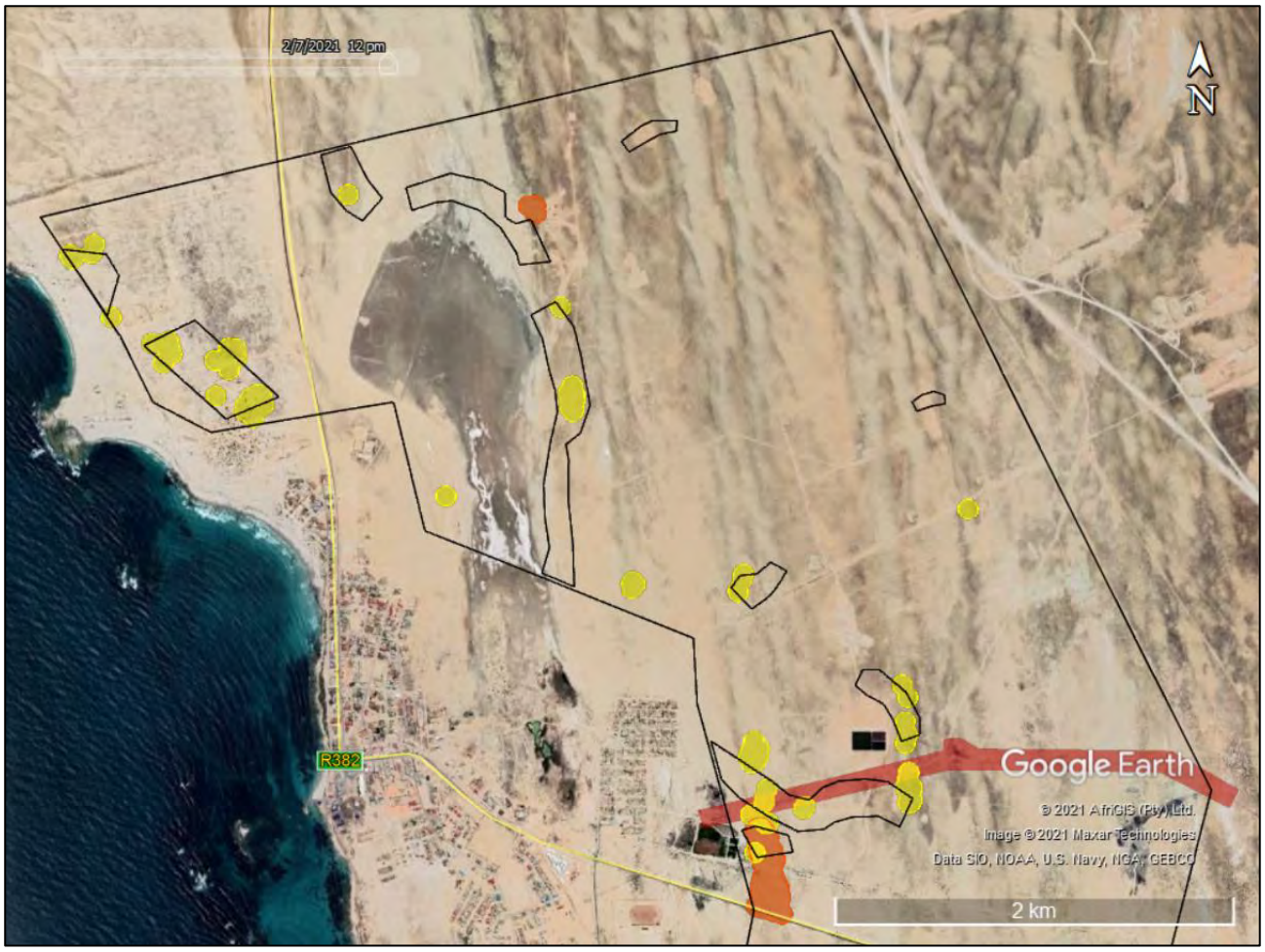


Figure 53: *Aerial view of the northern part of the study area showing mandatory (red; Grade IIIA) and optional No-Go areas (orange; Grace GPA and yellow; Grade GPB) around all sites.*

10.2. Summary

By far the most significant concern for this prospecting project is archaeology. There is only one site and related features (the historic copper railway) that MUST be protected and preserved. Should mining be proposed for this area at a later stage then the discussion will need to be reopened with a view towards implementing appropriate mitigation measures, although protection of the site may still be insisted upon by SAHRA. The remaining archaeology can all be very easily mitigated as required, although some areas require more work than others.

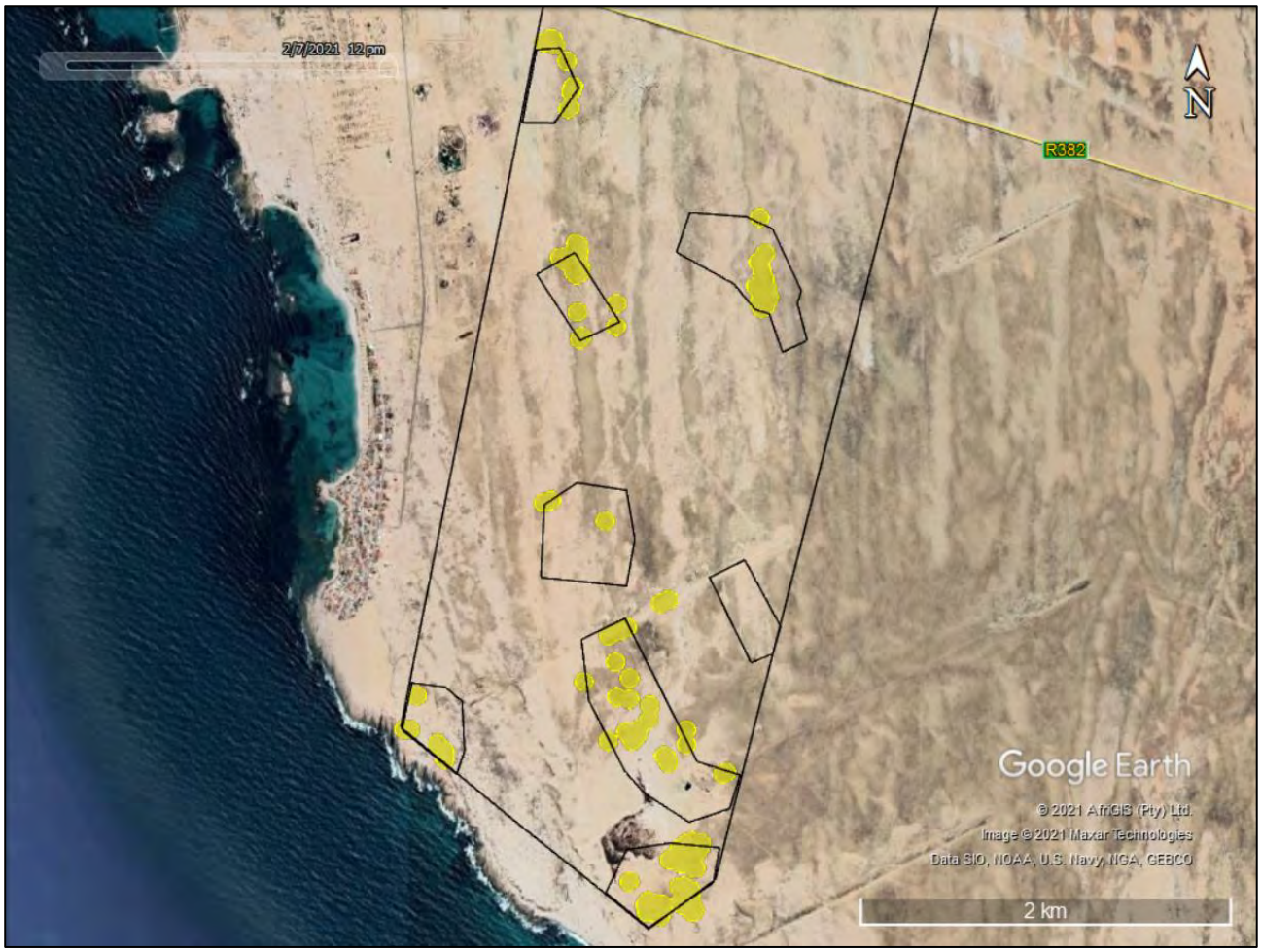


Figure 54: *Aerial view of the southern part of the study area showing optional No-Go areas (yellow; Grade GPB) around all sites.*

Table 8: Heritage indicators and project responses.

Indicator	Project Response
Significant LSA archaeological resources must not be disturbed without appropriate study.	The applicant will need to carefully plan the layout of access roads and test pit and bulk sample locations will need to be carefully planned to minimise or avoid impacts. Final layout plans for test pits and bulk samples are to be submitted to SAHRA for approval. Any required archaeological mitigation work will need to be carried out.
The historic copper railway and related features must be protected from damage.	To be confirmed when layout plans submitted for SAHRA approval
Disturbance of accidentally discovered graves must be minimised until an appropriate way forward has been determined.	No response possible. Action to be taken in the event of accidental discovery.

Effective rehabilitation must take place to restore the landscape as close as possible to its present condition.	Rehabilitation is planed as part of the project.

10.3. Reasoned opinion of the specialist

Given that impacts can be avoided or easily mitigated, it is the opinion of the heritage specialist that this prospecting project may be authorised in full.

11. RECOMMENDATIONS

It is recommended that the proposed prospecting be approved but subject to the following recommendations:

- All prospecting excavation work (including test pits, bulk sample trenches, all access routes, all spoil heaps and all associated work areas around the heaps) needs to be accurately mapped and approved by SAHRA prior to commencement so as to ensure that impacts will not occur;
- All sites of Grade GPB or higher must be avoided with a buffer of 50 m from the waypoint location (to account for the site and a protective buffer of at least 30 m);
- All archaeological mitigation that still becomes required must be effected by a qualified archaeologist under a permit issued to that archaeologist by SAHRA;
- If any fossils, archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution; and
- Rehabilitation of the excavations must occur such that the landscape is left looking as similar as possible to its pre-prospecting condition.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 40 Brassie Street, Lakeside, 7945
Telephone: (021) 789 0327
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
  Stone Age archaeology (awarded 2007)
  Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
  Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➢ *Memberships and affiliations:*

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 archaeological test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
  - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
  - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
  - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
  - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
  - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
  - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – Mapping

In the mapping that follows, the following symbols are used:
Black polygons = prospecting areas
Red lines = target lines for test pitting
Exclamation mark = disturbed area
Red symbol = Grade IIIA
Orange symbol = Grade GPA
Yellow symbol = Grade GPB
White symbol = Grade GPC

Figure A2.1: *Block N1*

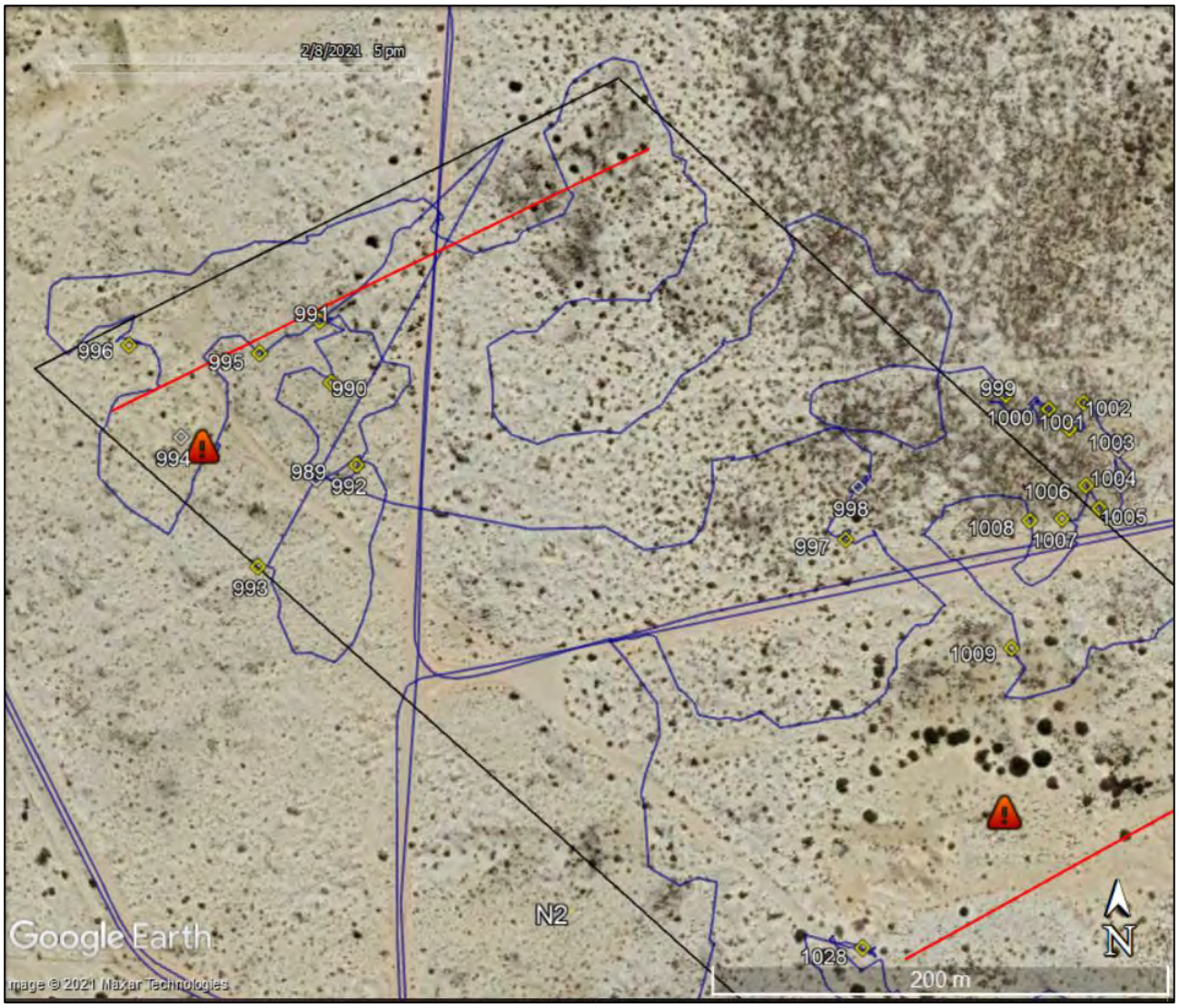

Figure A2.2: *North-western half of Block N2.*

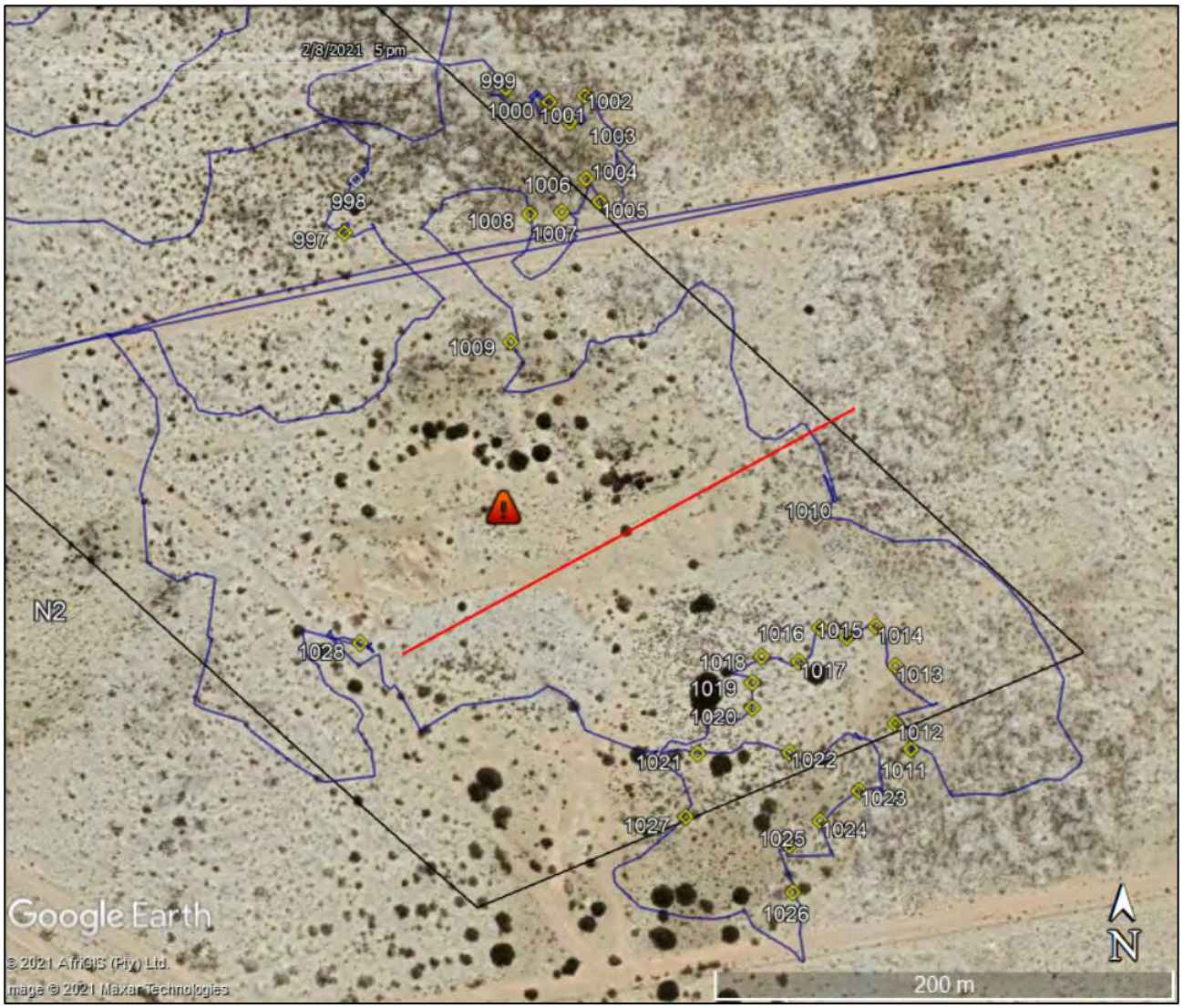

Figure A2.3: *South-eastern half of Block N2.*

Figure A2.4: *Block N3.*

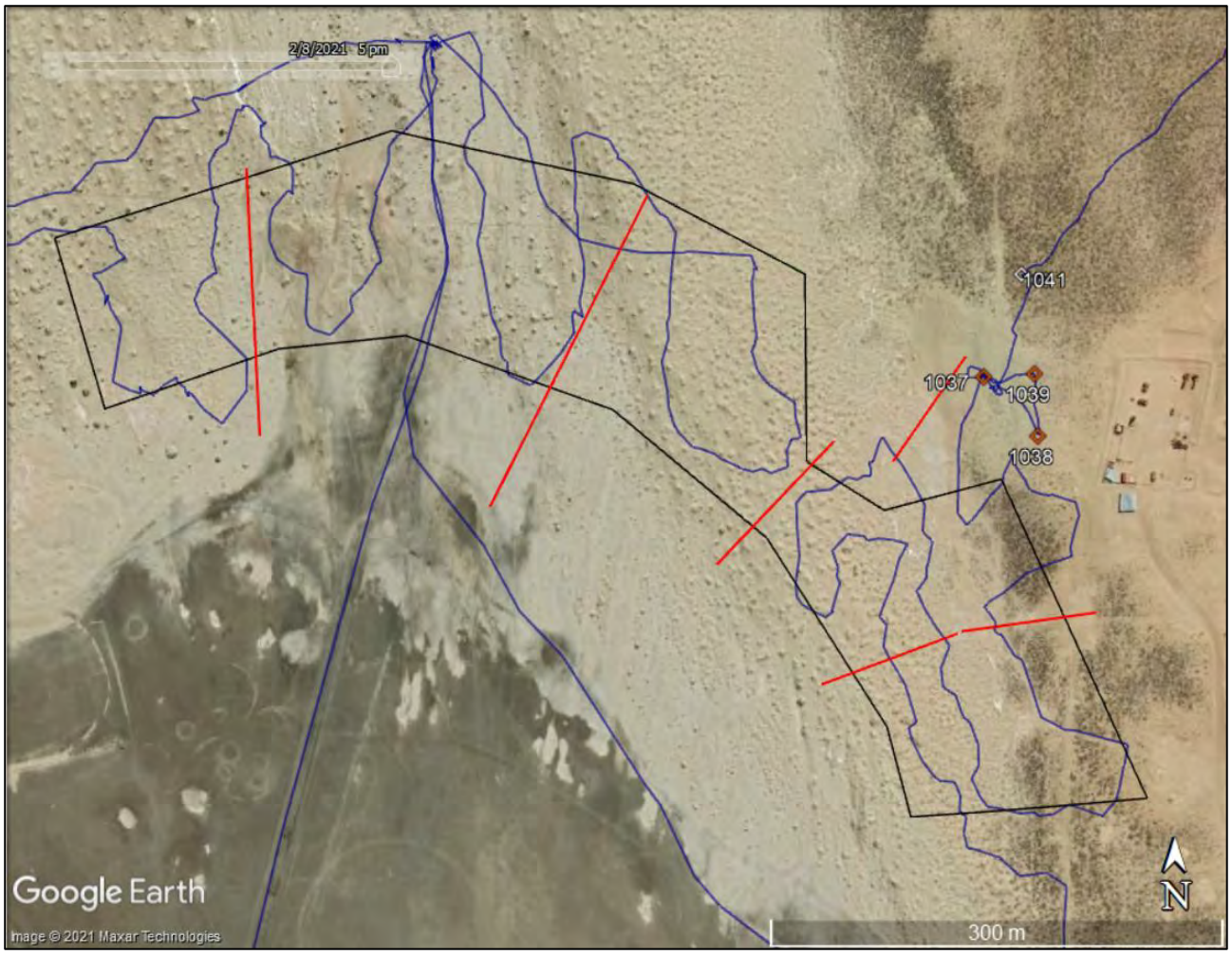

Figure A2.5: *Block N4.*

Figure A2.6: *Just outside Block N4 is a Grade GPA site (delimited by the waypoints 1037-1039) which has been exposed by deflation caused by driving over it. A track leads from the mine camp directly through the site.*

Figure A2.7: *Northern half of Block N5.*

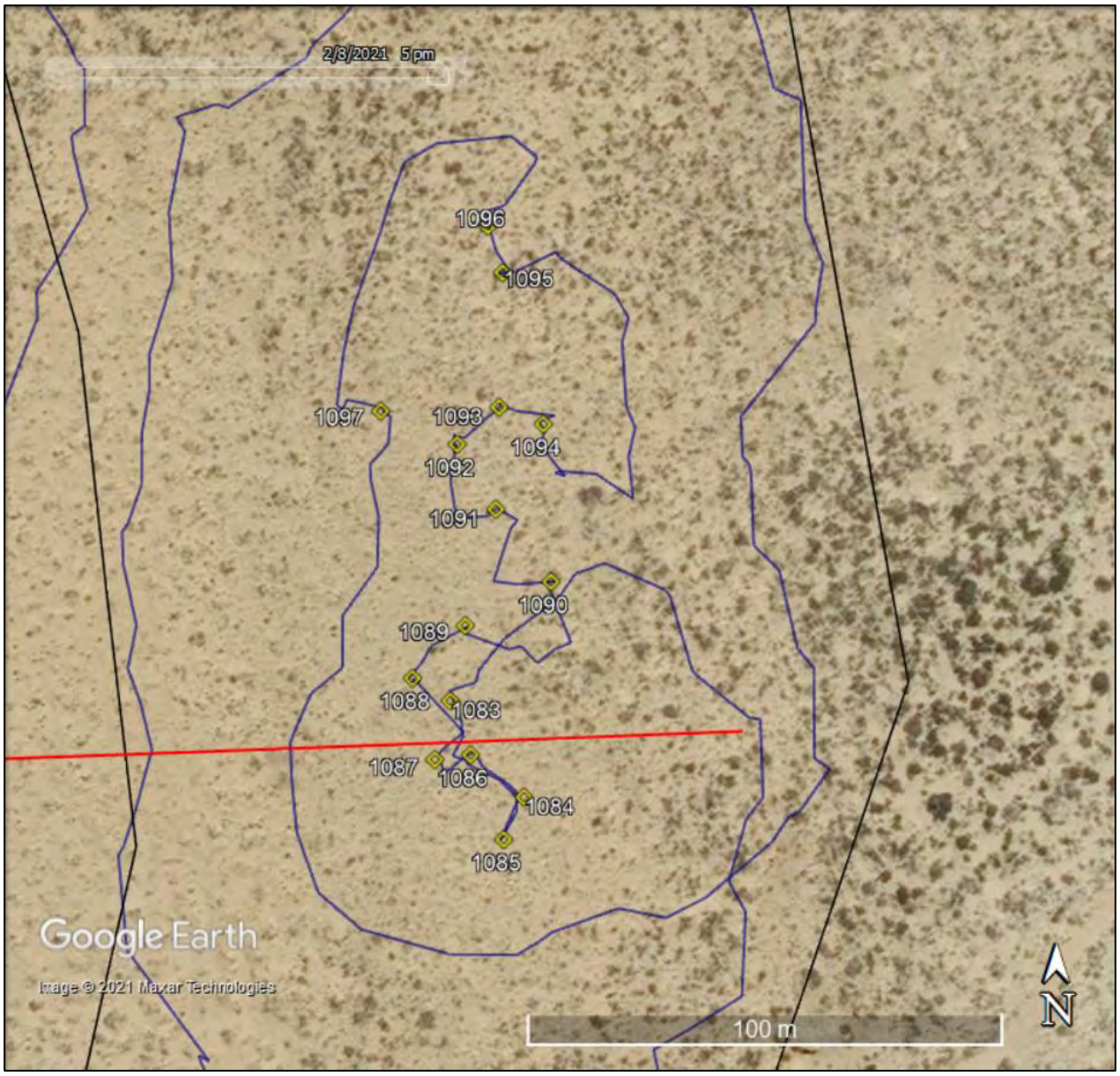

Figure A2.8: *Detail Block N5.*

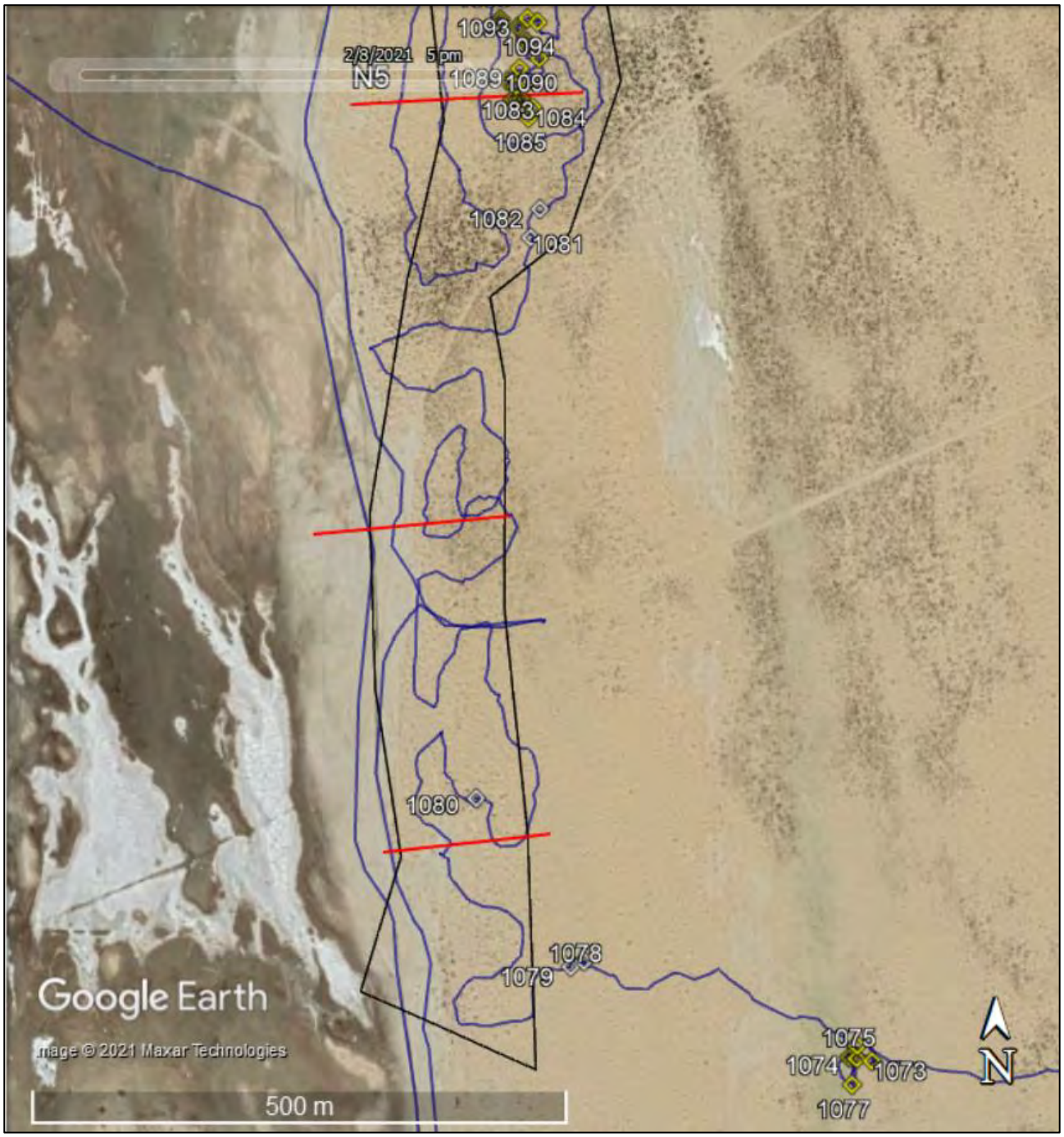

Figure A2.9: *Southern half of Block N5.*

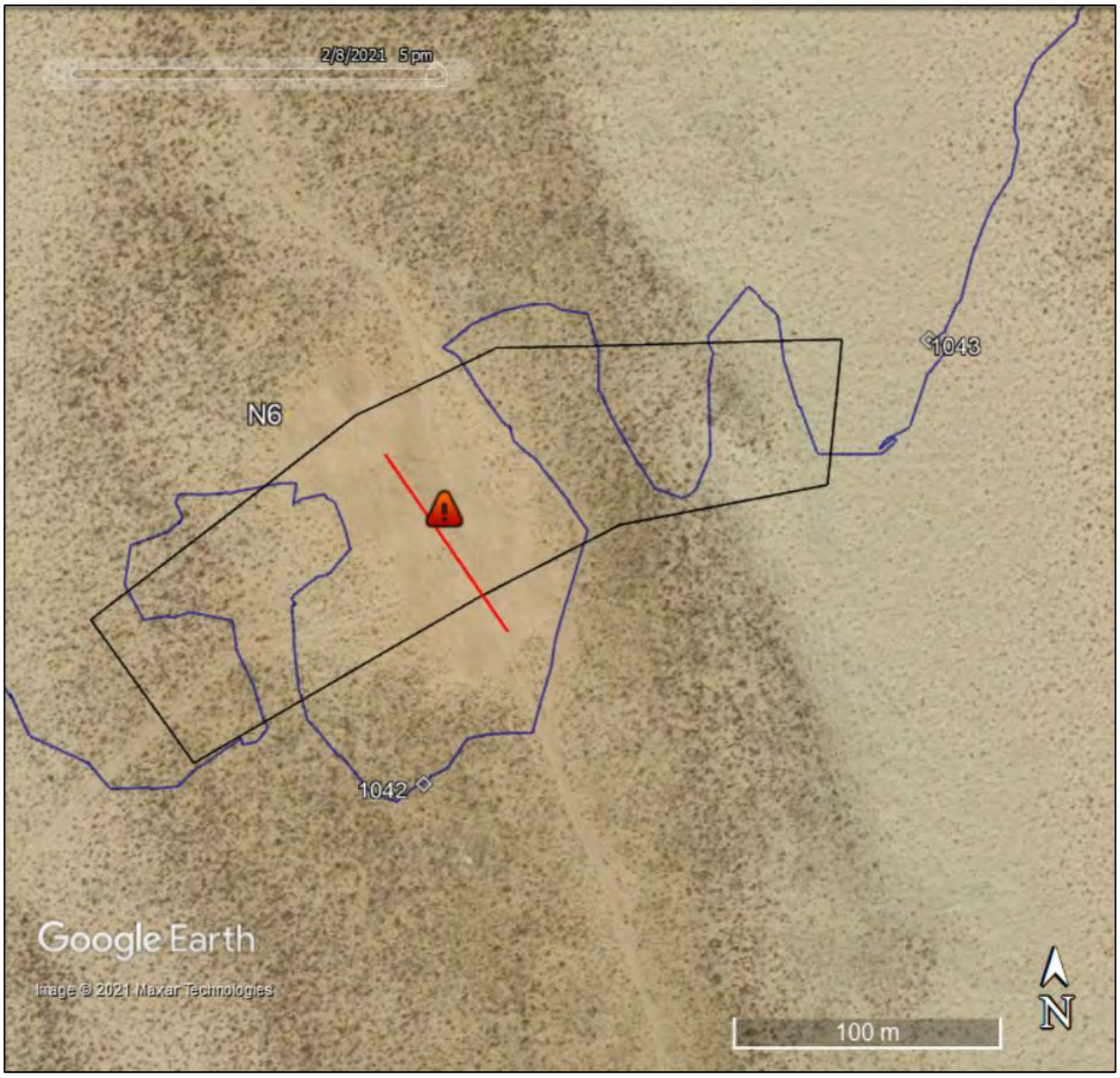

Figure A2.10: *Block N6*

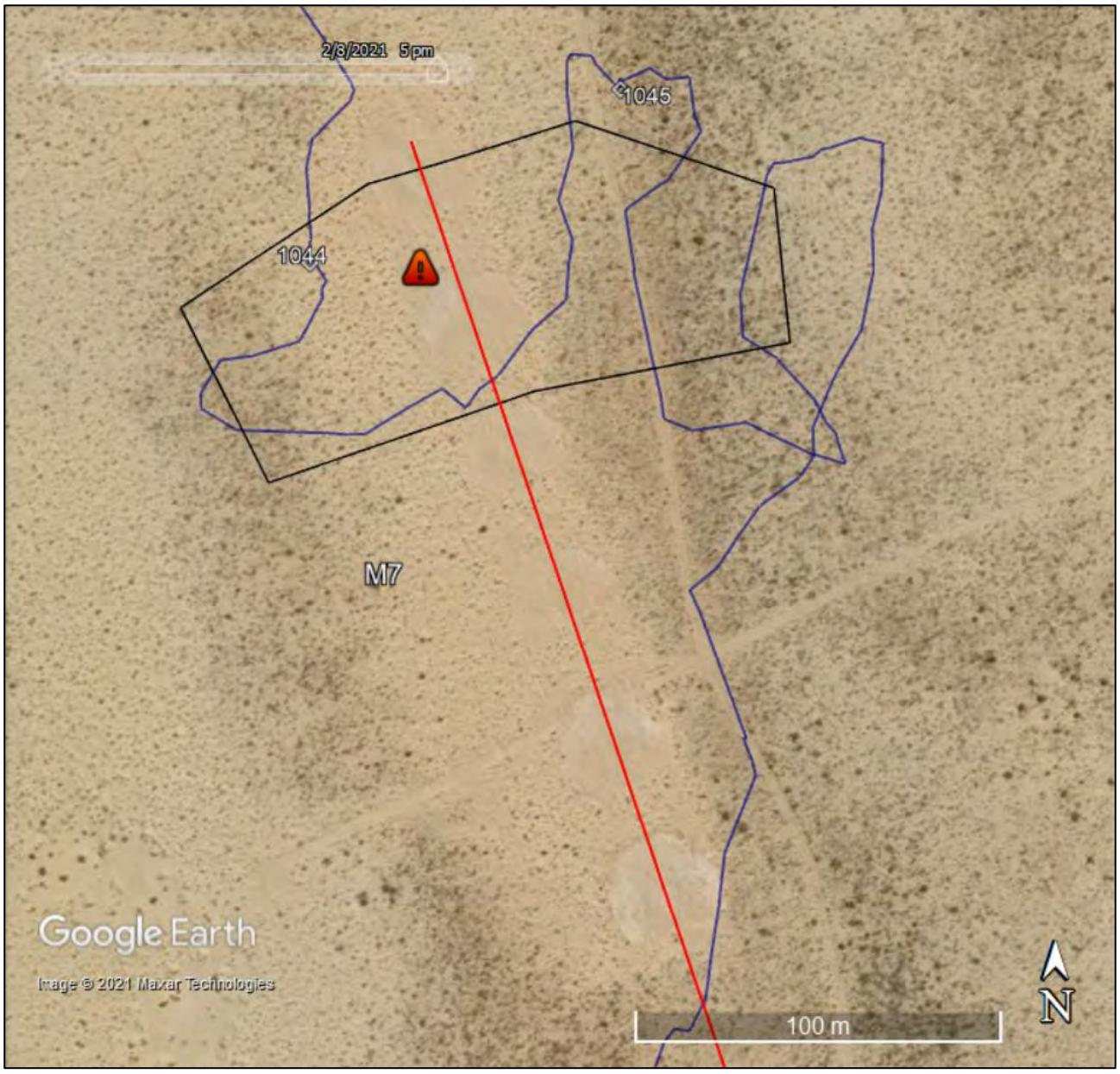

Figure A2.11: *Block M7.*

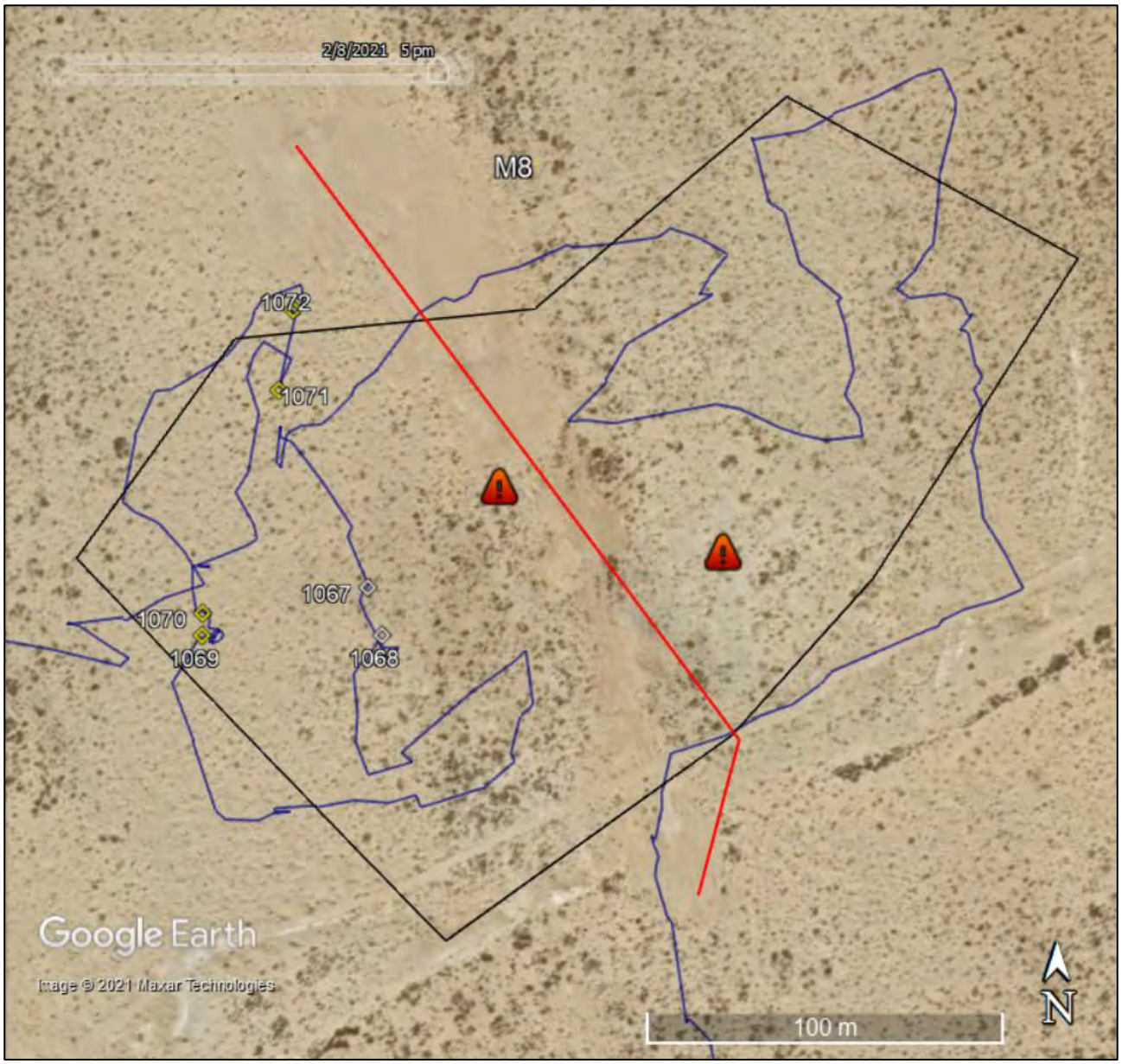

Figure A2.12: *Block M8.*

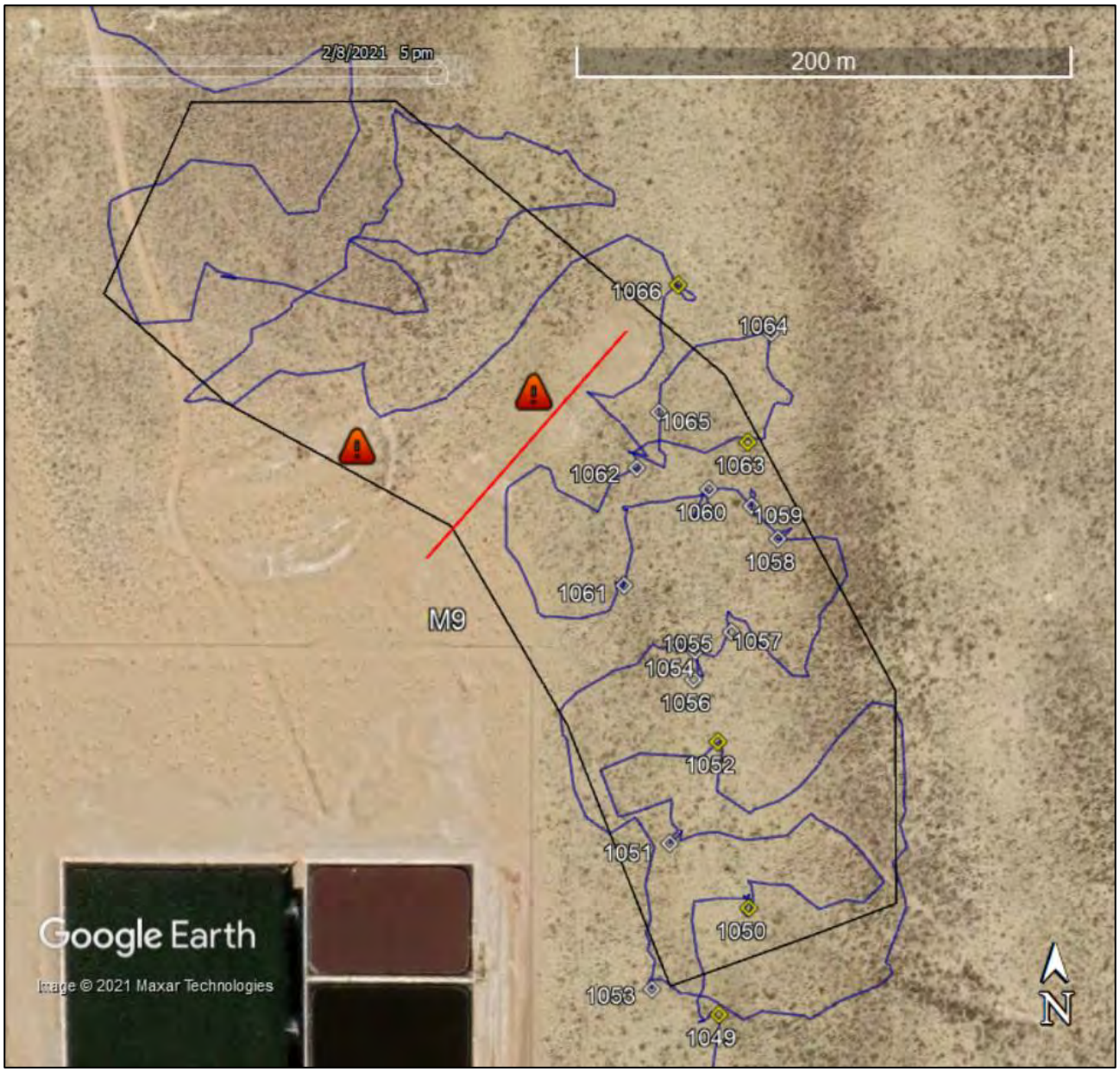

Figure A2.13: *Block M9.*

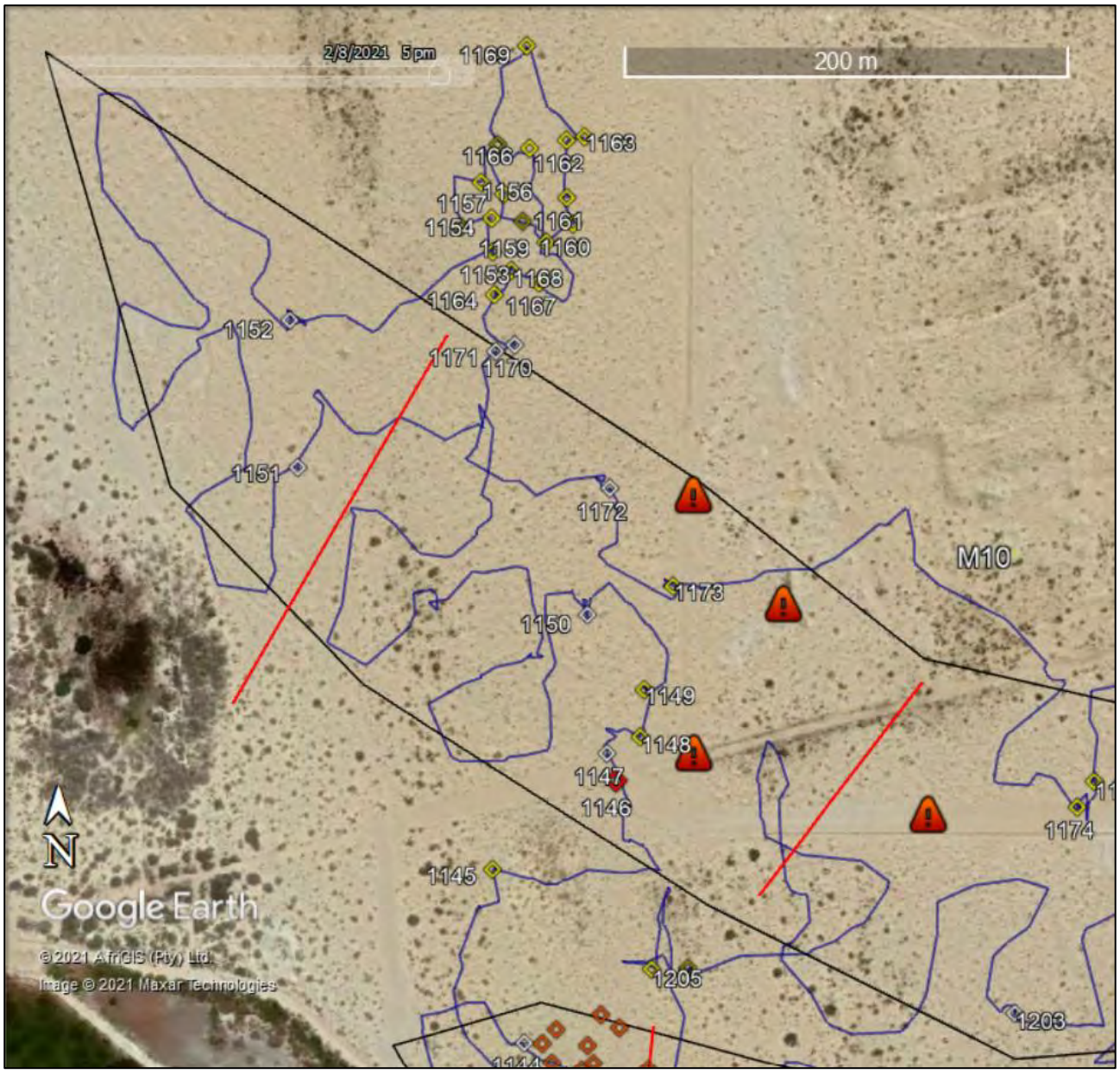

Figure A2.14: *Western end of Block M10.*

Figure A2.15: *Detail Block M10. This site cluster lies on a dune crest just outside the block but would be in danger from slumping and deflation after excavation of the trench into the dune.*

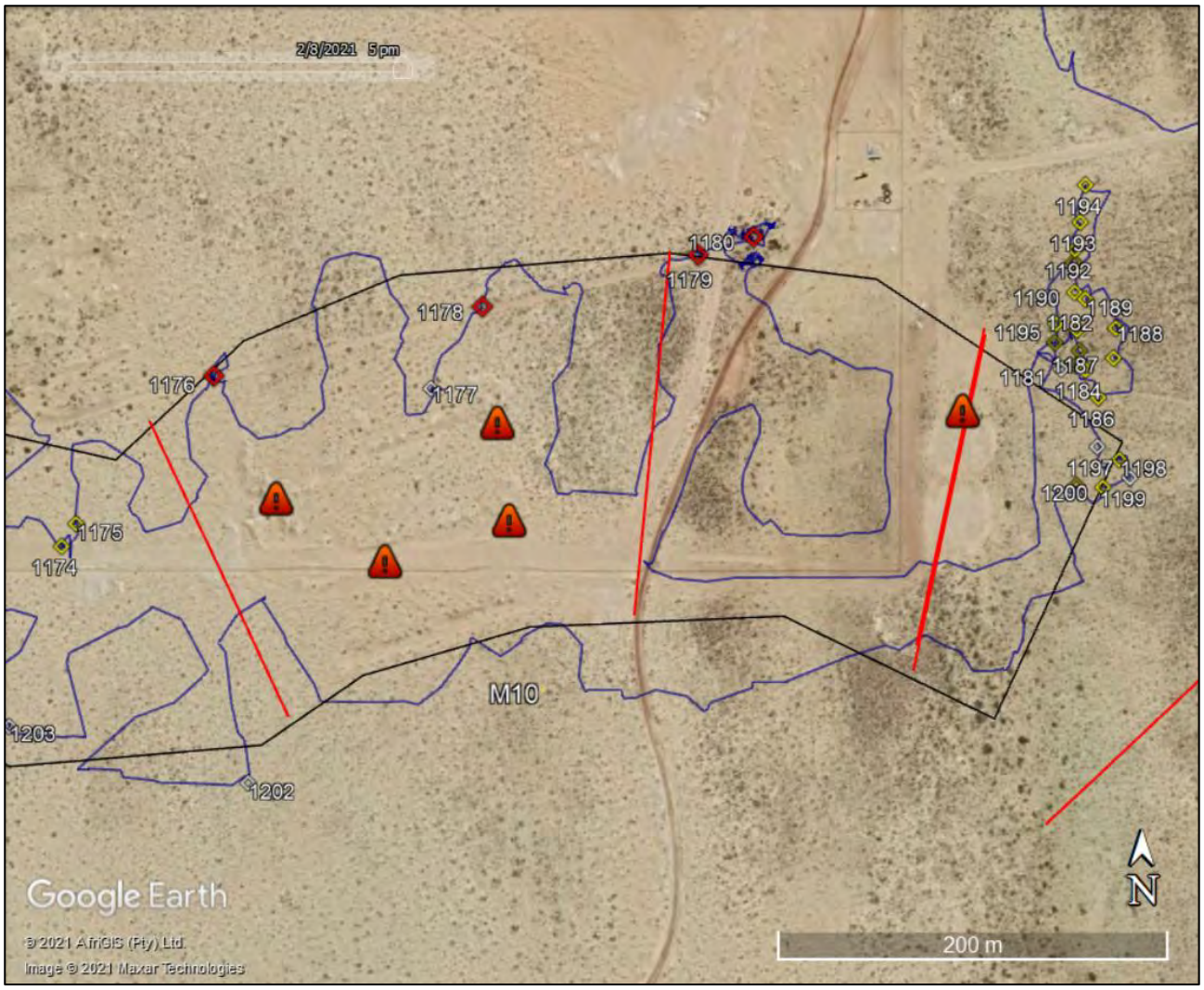

Figure A2.16: *Eastern end of Block M10.*

Figure A2.17: *Detail Block M10. 1179 and 1180 fall n he Copper Railway and the dark patch around 1180 is the dump (material lies on both sides of the road). The brown road leads to the newly built oxidation ponds.*

Figure A2.18: *Detail Block M10.*

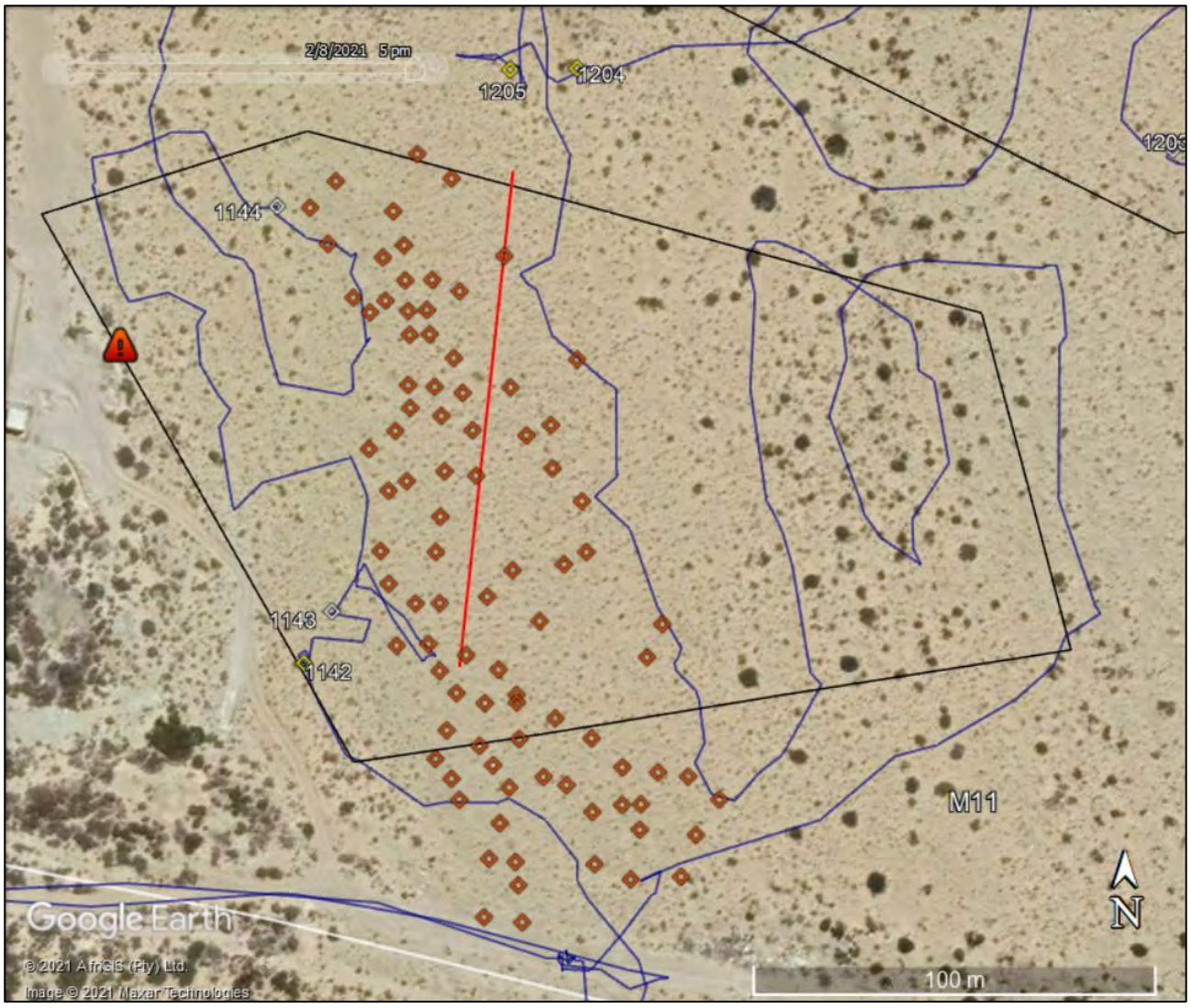

Figure A2.19: *Block M11. The un-numbered waypoints were recorded by Orton (2017) and form part of a massive site covering the top of a dune ridge.*

Figure A2.20: *Block M11. View of the entire documented site (named PN2016/001). Red outlined area recorded by Orton (2017) and yellow outlined area recorded during this survey. The entirety of both polygons is covered in shell scatter. The site ends in the north but the southern extent remains unknown.*

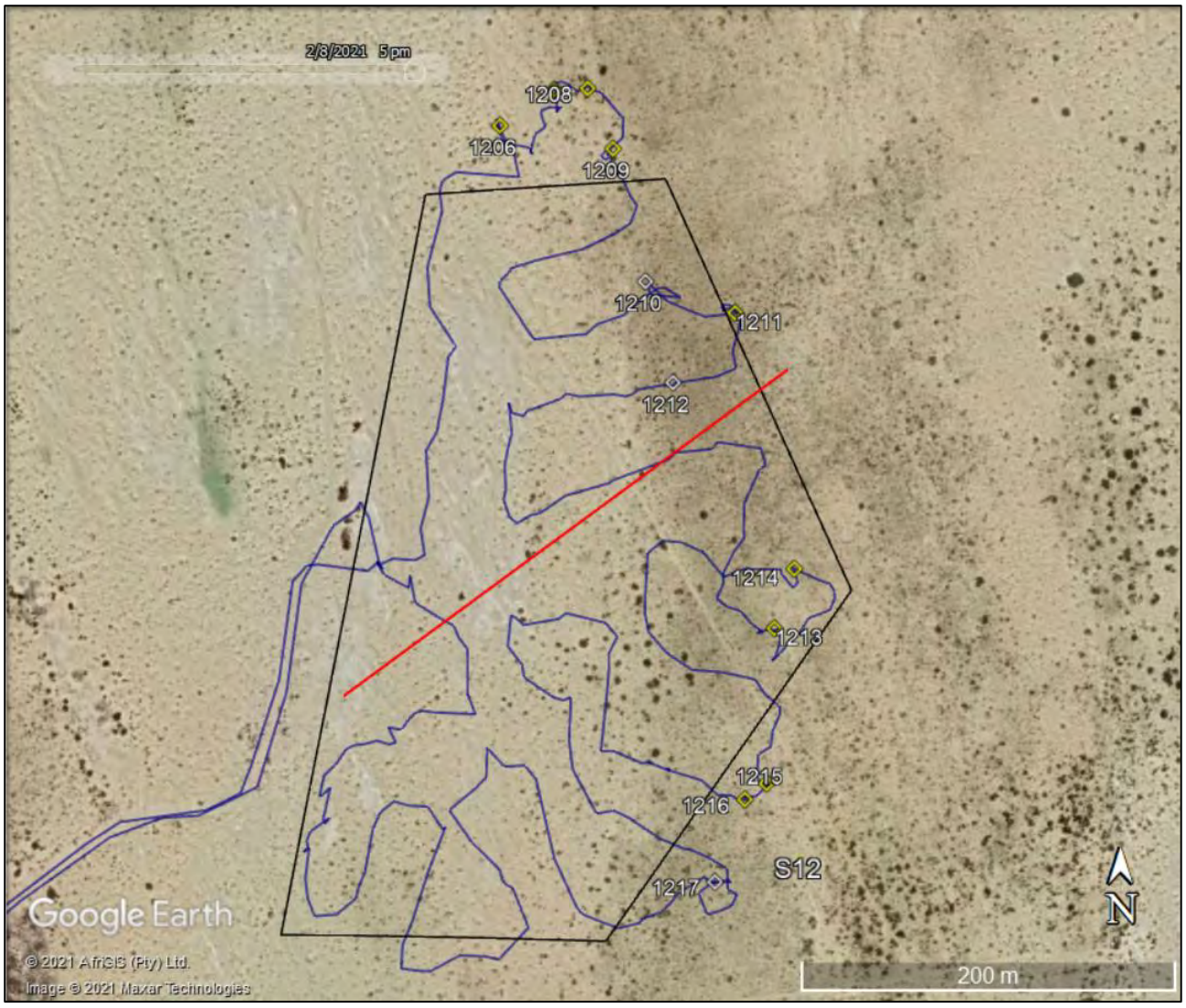

Figure A2.21: *Block S12. The waypoints fall on the extension of the PN2016/001 dune ridge.*

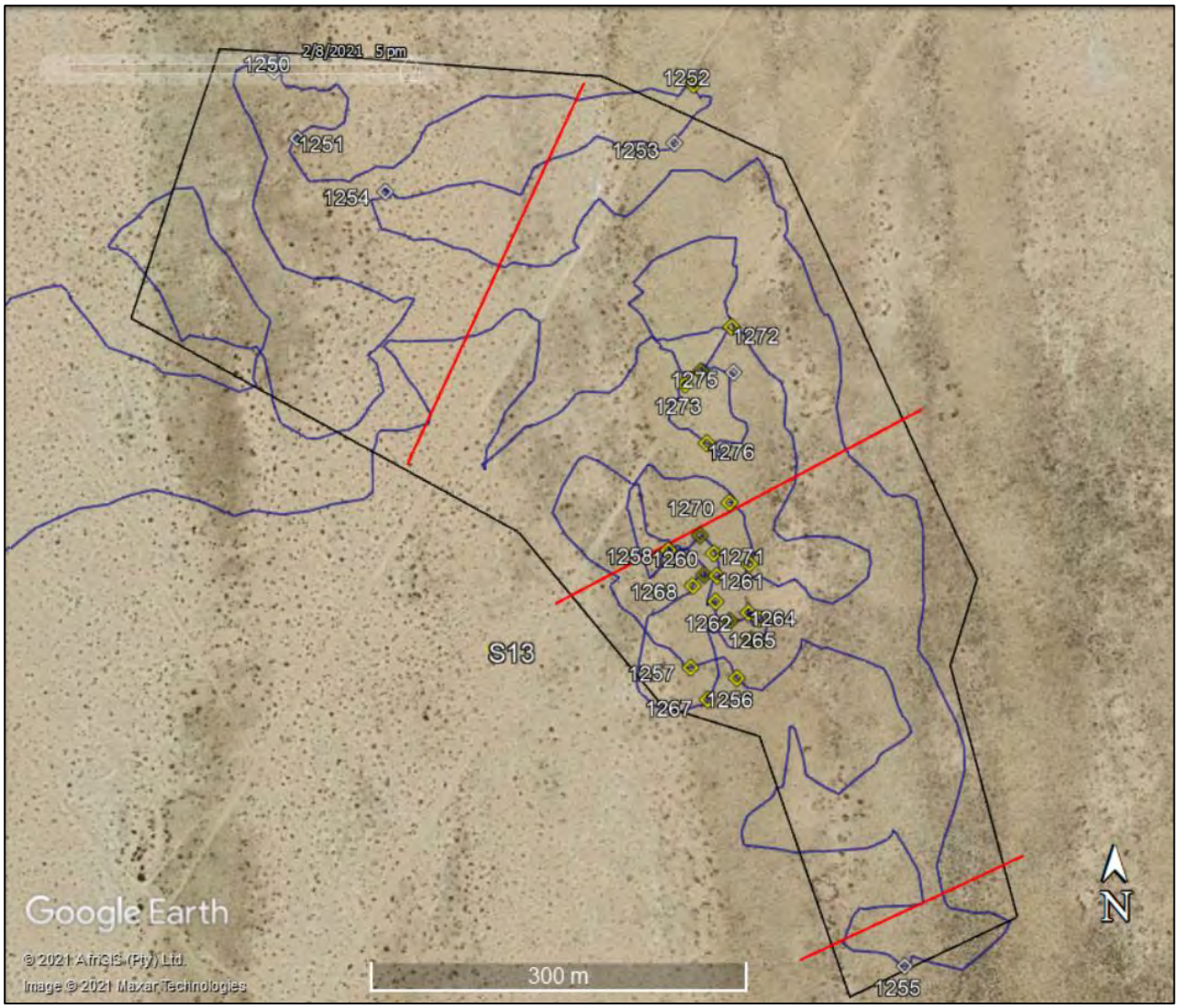

Figure A2.22: *Block S13.*

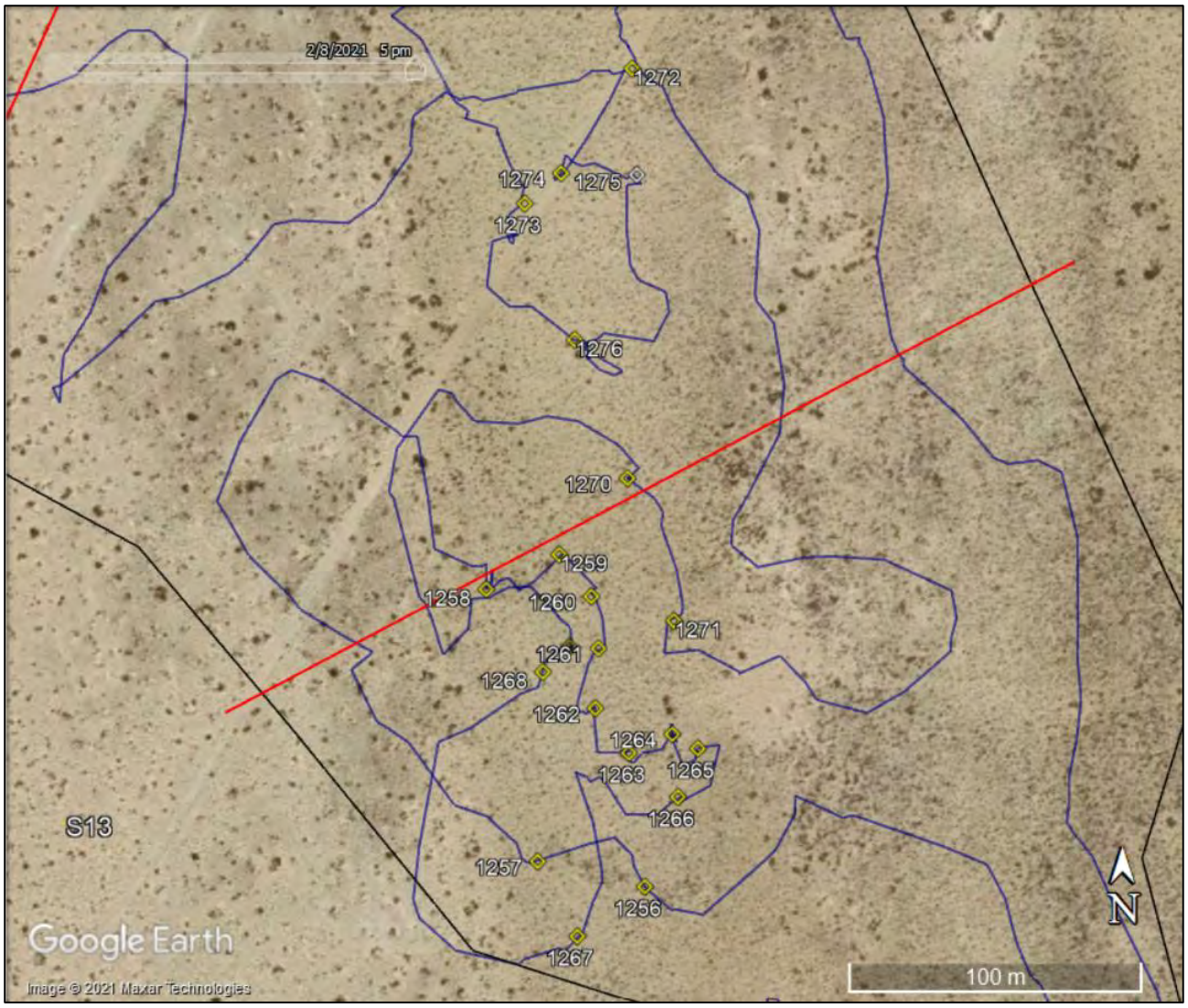

Figure A2.23: *Detail Block S13.*

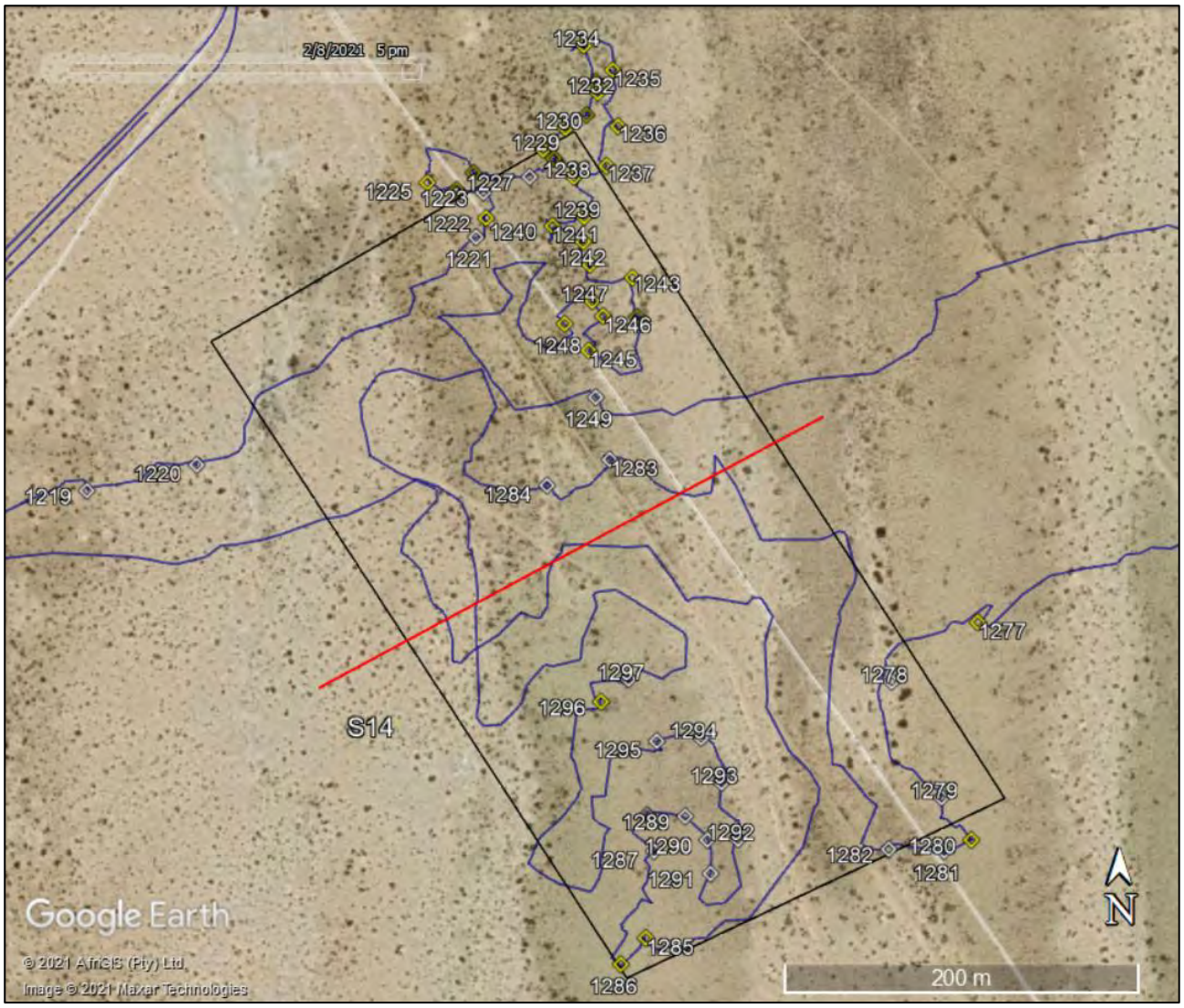

Figure A2.24: *Block S14.*

Figure A2.25: *Detail Block S14.*

Figure A2.26: *Block S15.*

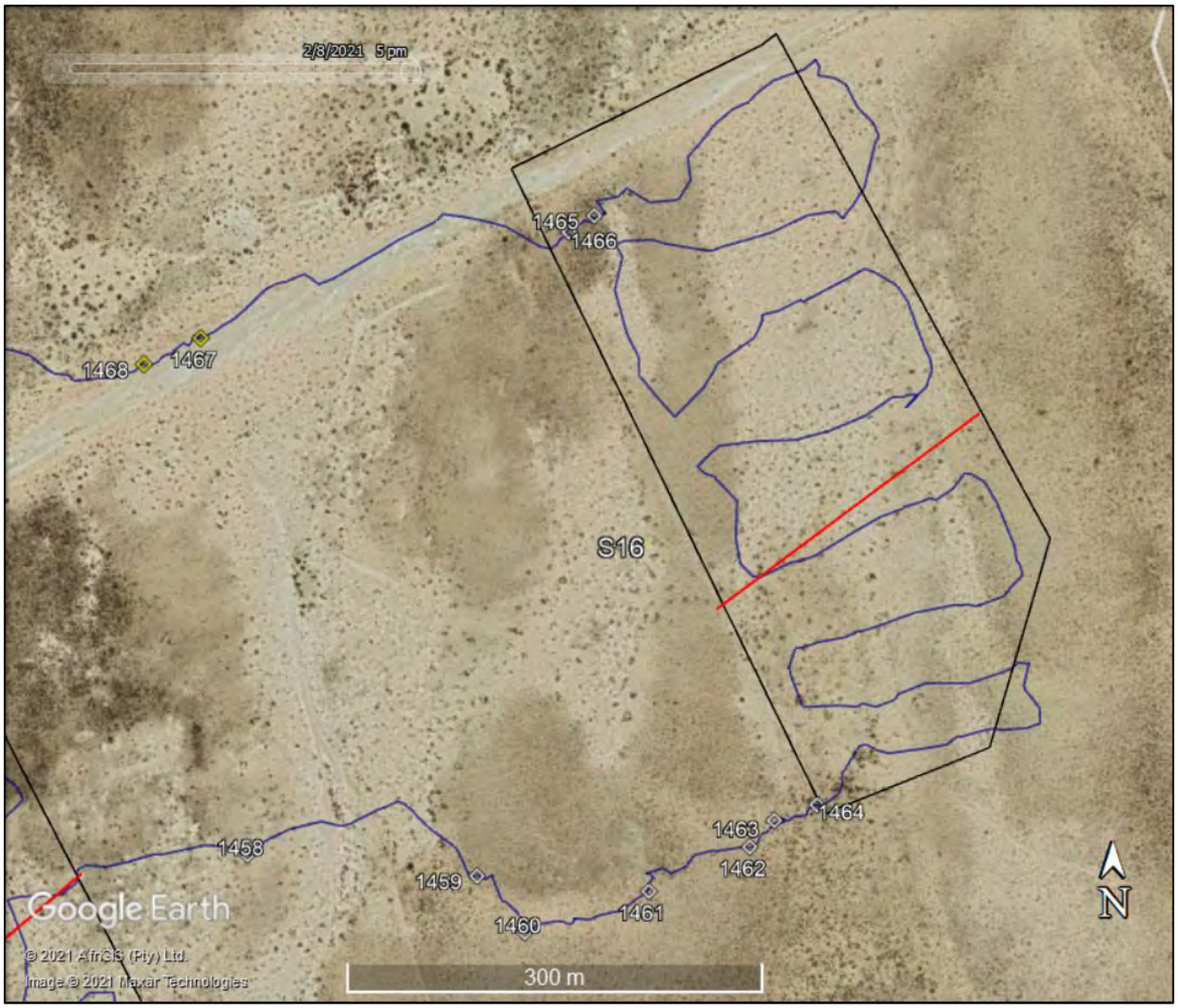

Figure A2.27: *Block S16.*

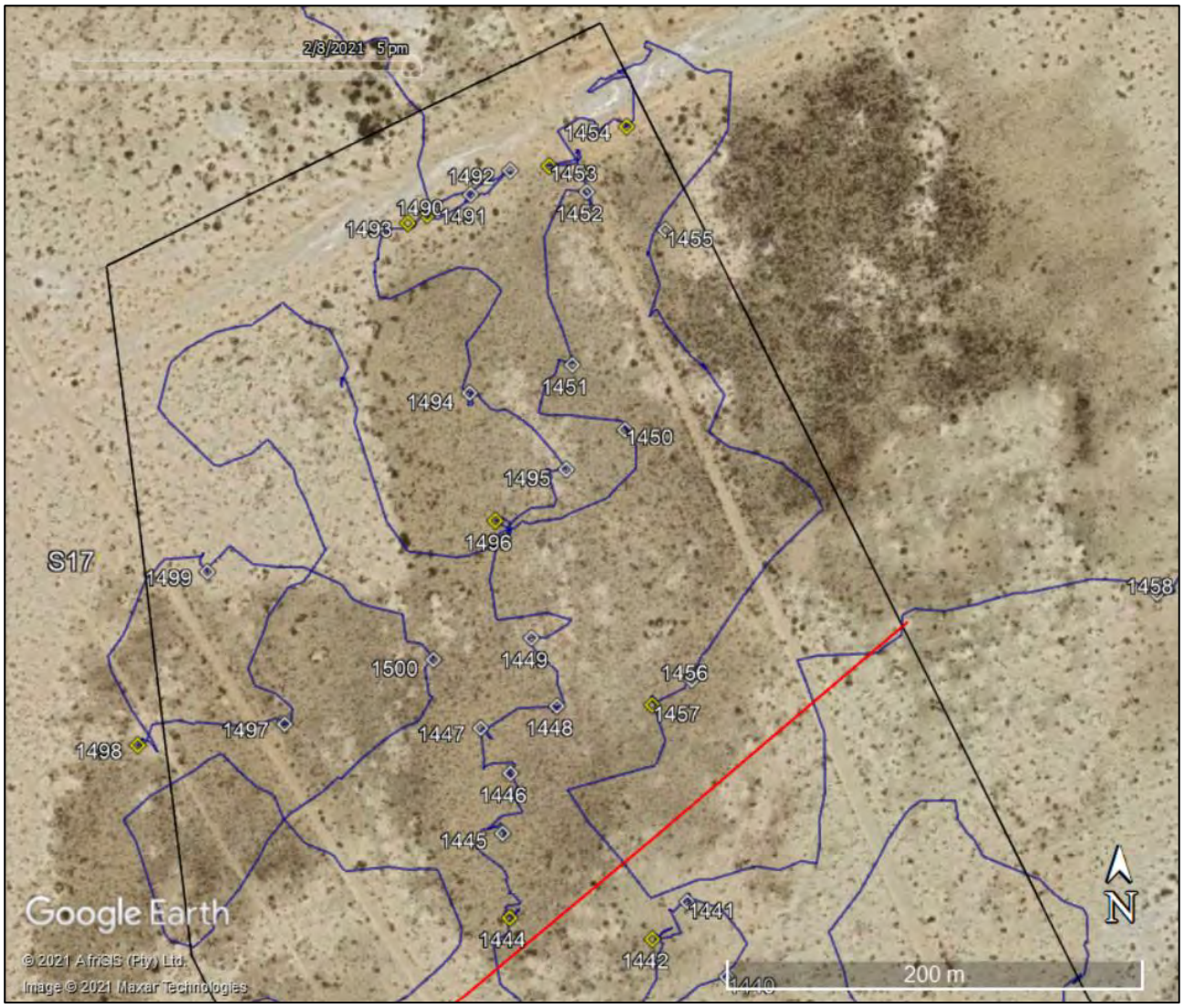

Figure A2.28: *North end of Block S17.*

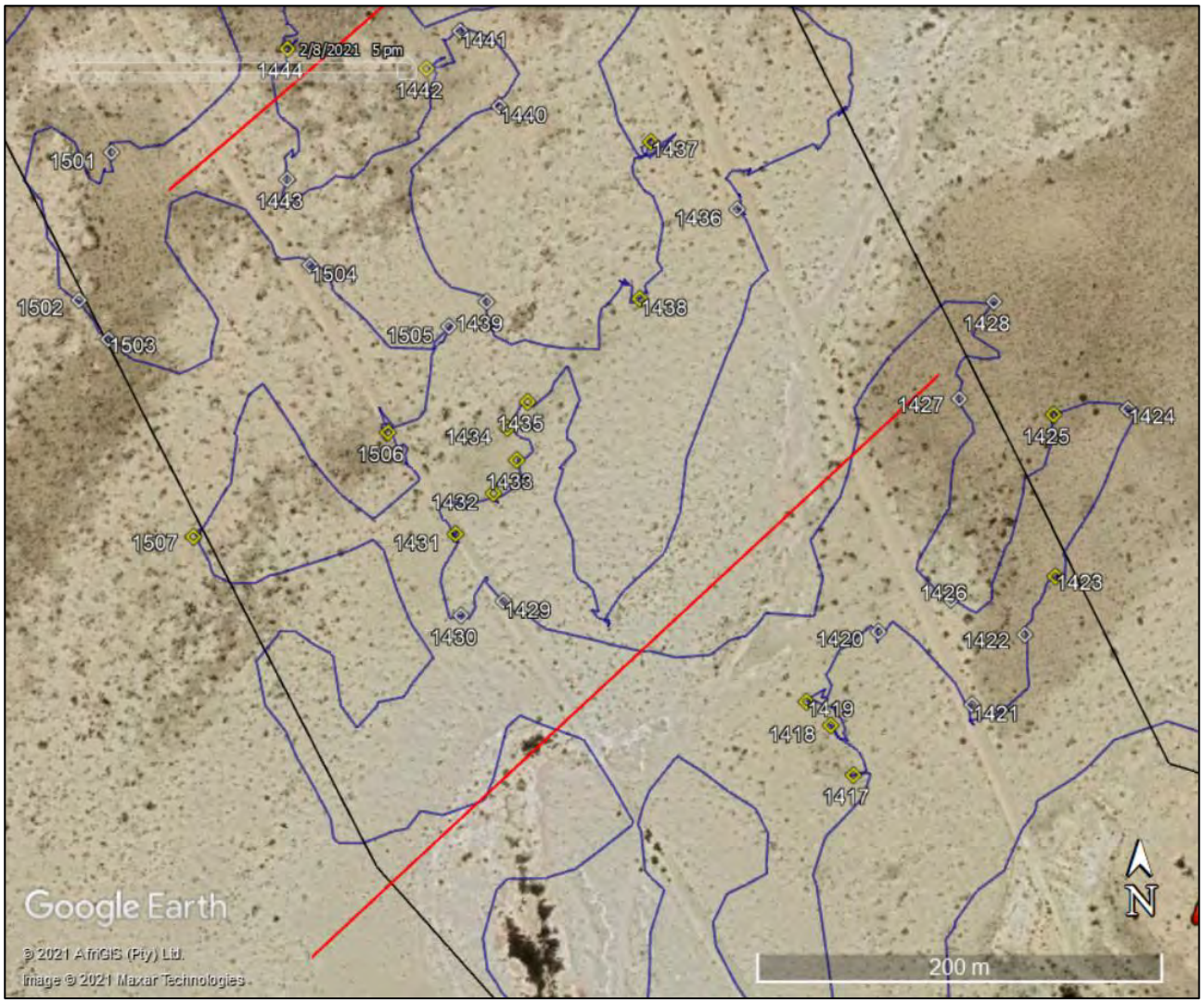

Figure A2.29: *Centre of Block S17.*

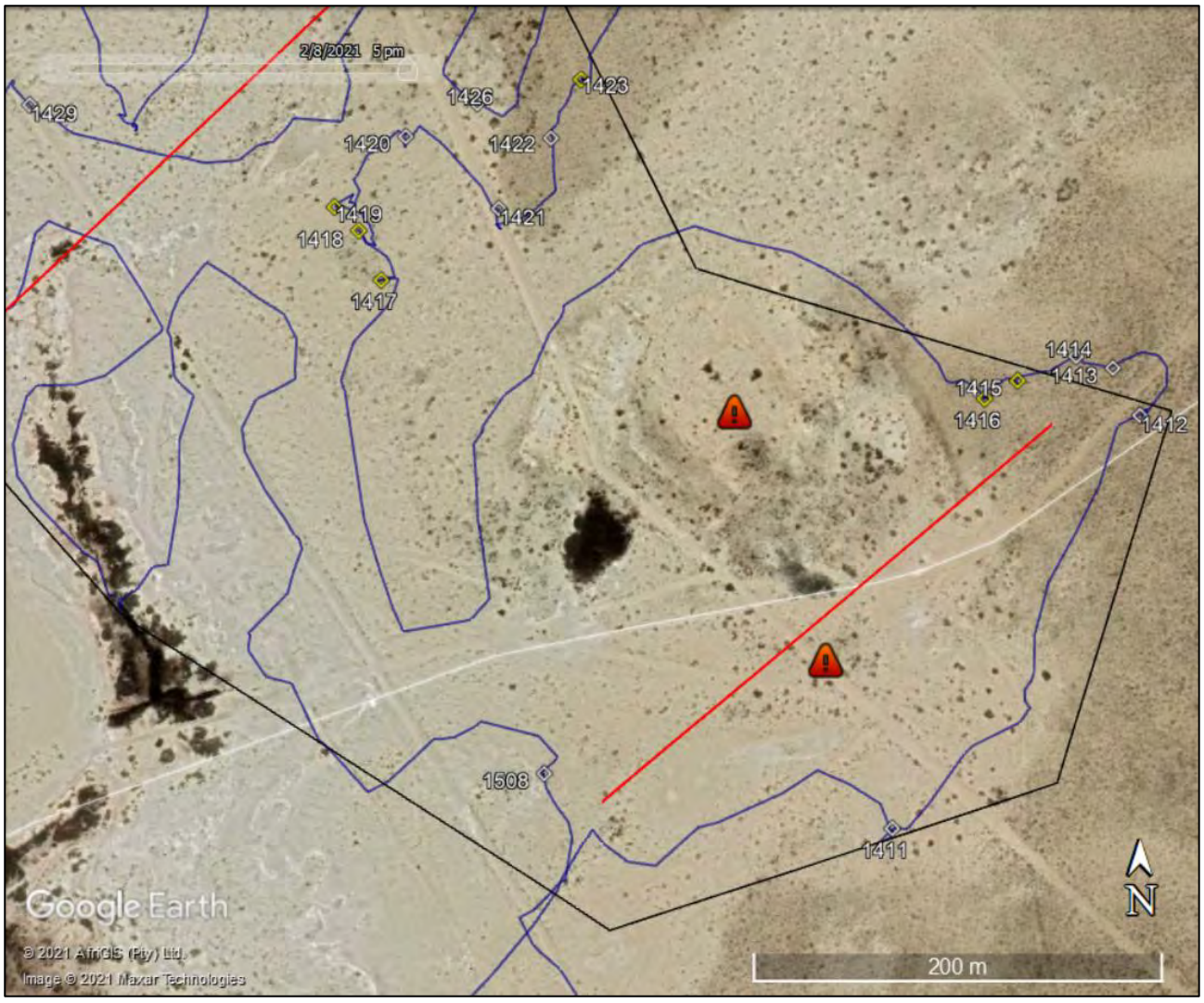

Figure A2.30: *South end of Block S17.*

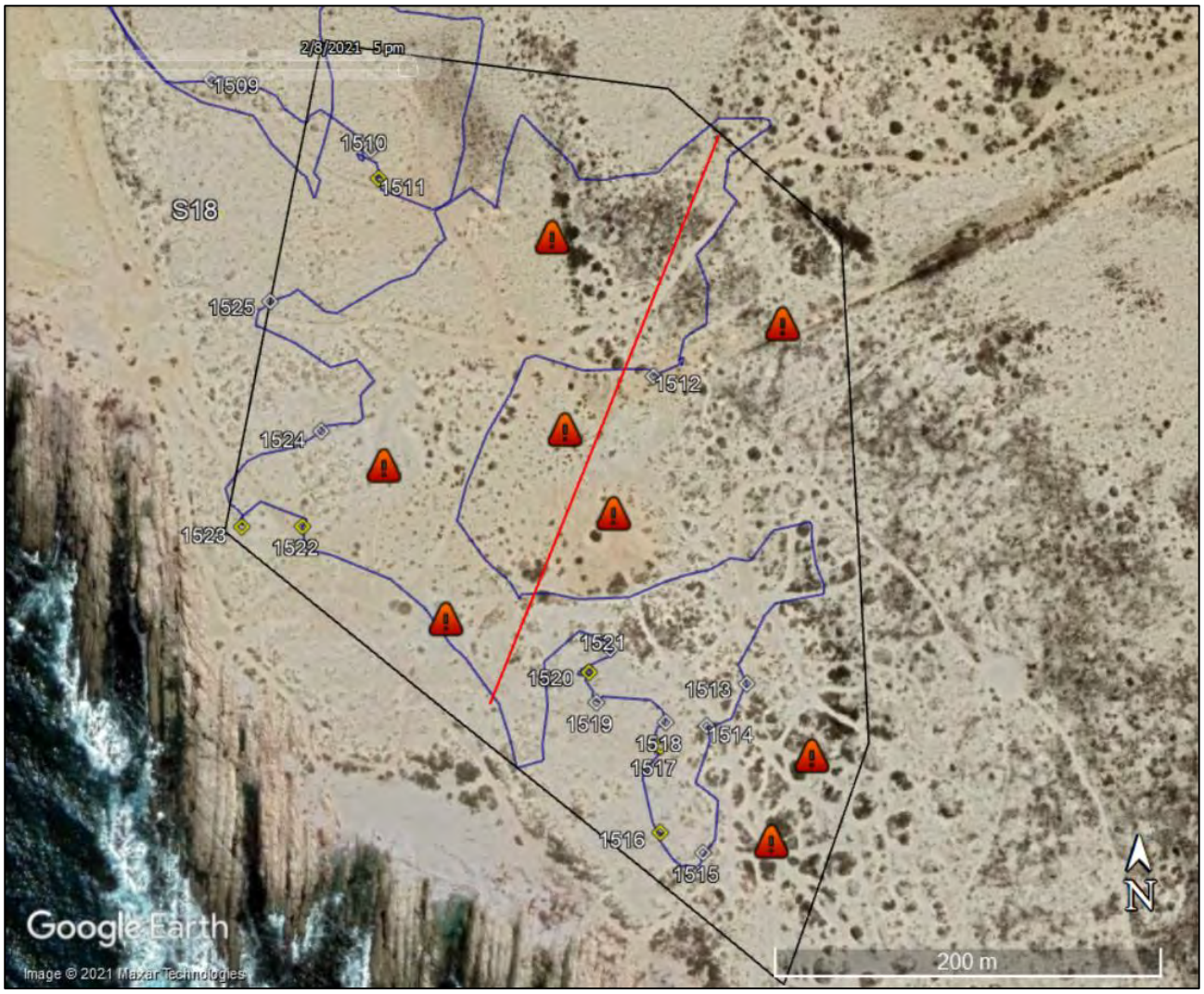

Figure A2.31: *Block S18.*

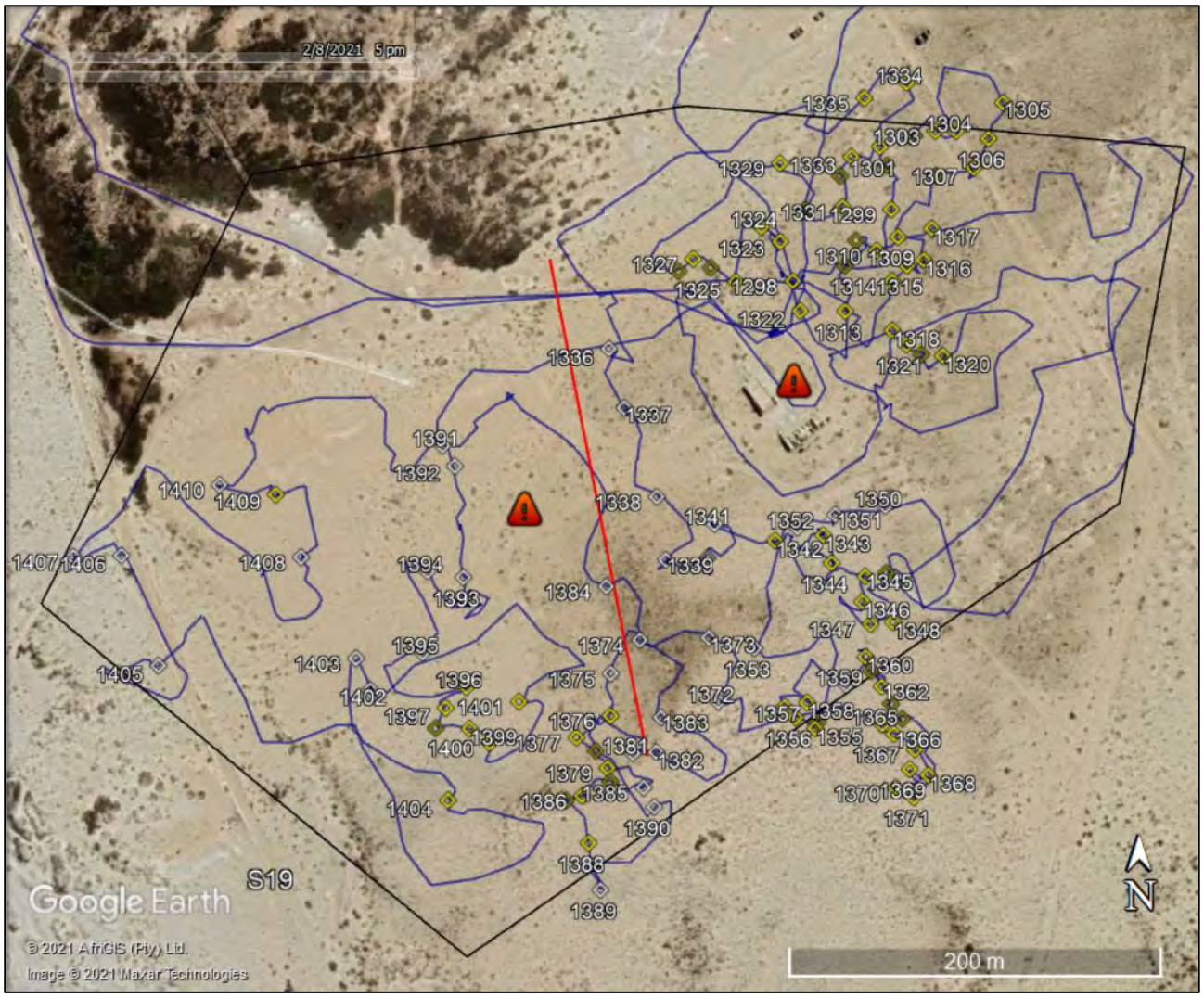

Figure A2.32: *Block S19.*

Figure A2.33: *Detail Block S19.*

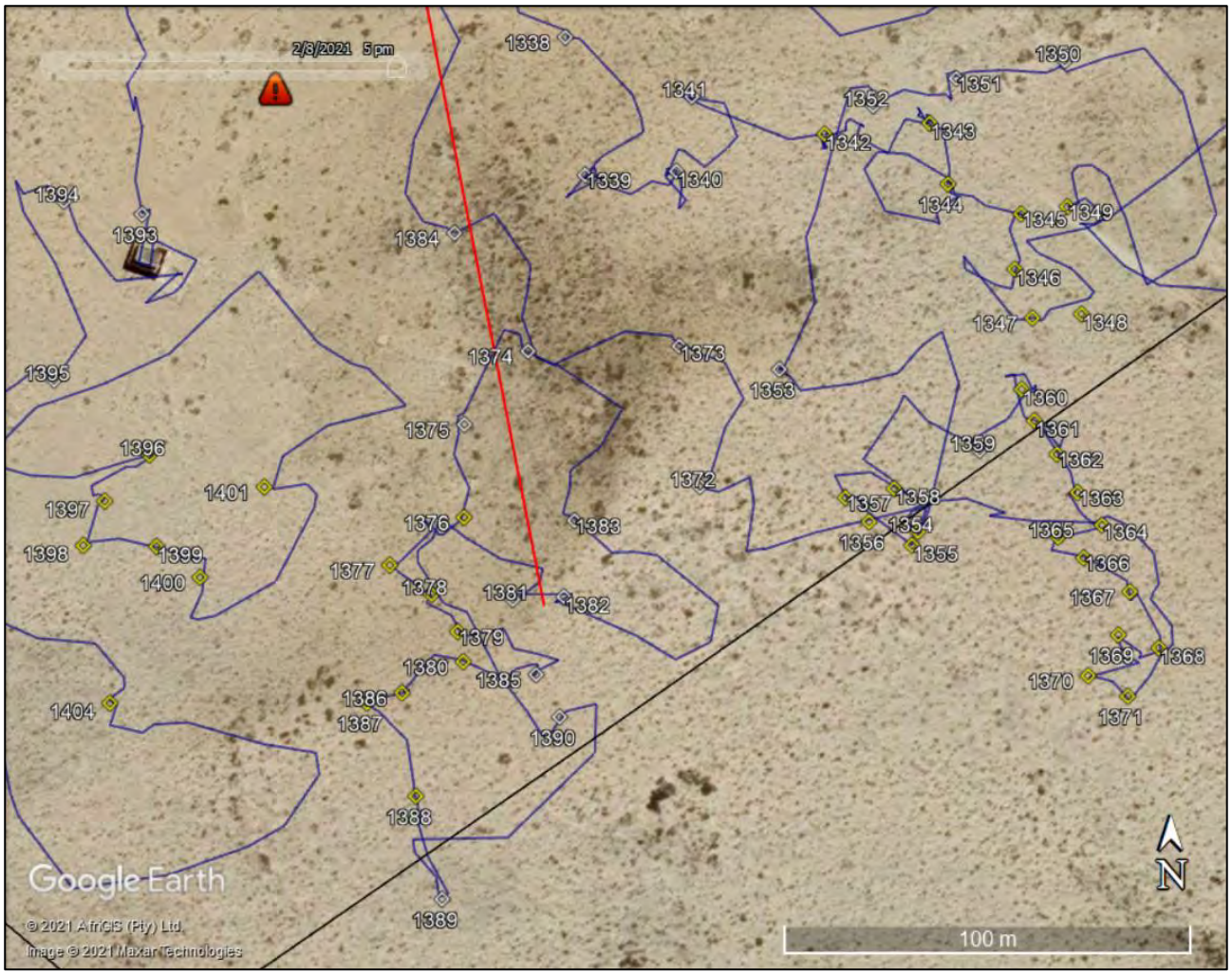

Figure A2.34: *Detail Block S19.*