HERITAGE IMPACT ASSESSMENT

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

PROPOSED DEVELOPMENT OF GEELSTERT 1 SOLAR PV FACILITY ON THE REMAINING EXTENT OF THE FARM BLOEMHOEK 61 NEAR AGGENEYS IN THE NORTHERN CAPE

SAHRA Case No: 15332

Prepared by CTS Heritage

CTS HERITAGE

For

Savannah

October 2020

CTS HERITAGE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Jenna Lavin, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

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Signature of the specialist

CTS Heritage
Name of company

October 2020
Date

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EXECUTIVE SUMMARY

1. Site Name:

Geelstert PV 1

2. Location:

Remaining Extent of the Farm Bloemhoek 61, (29°18'1.71"S, 18°56'39.80"E)

3. Locality Plan:

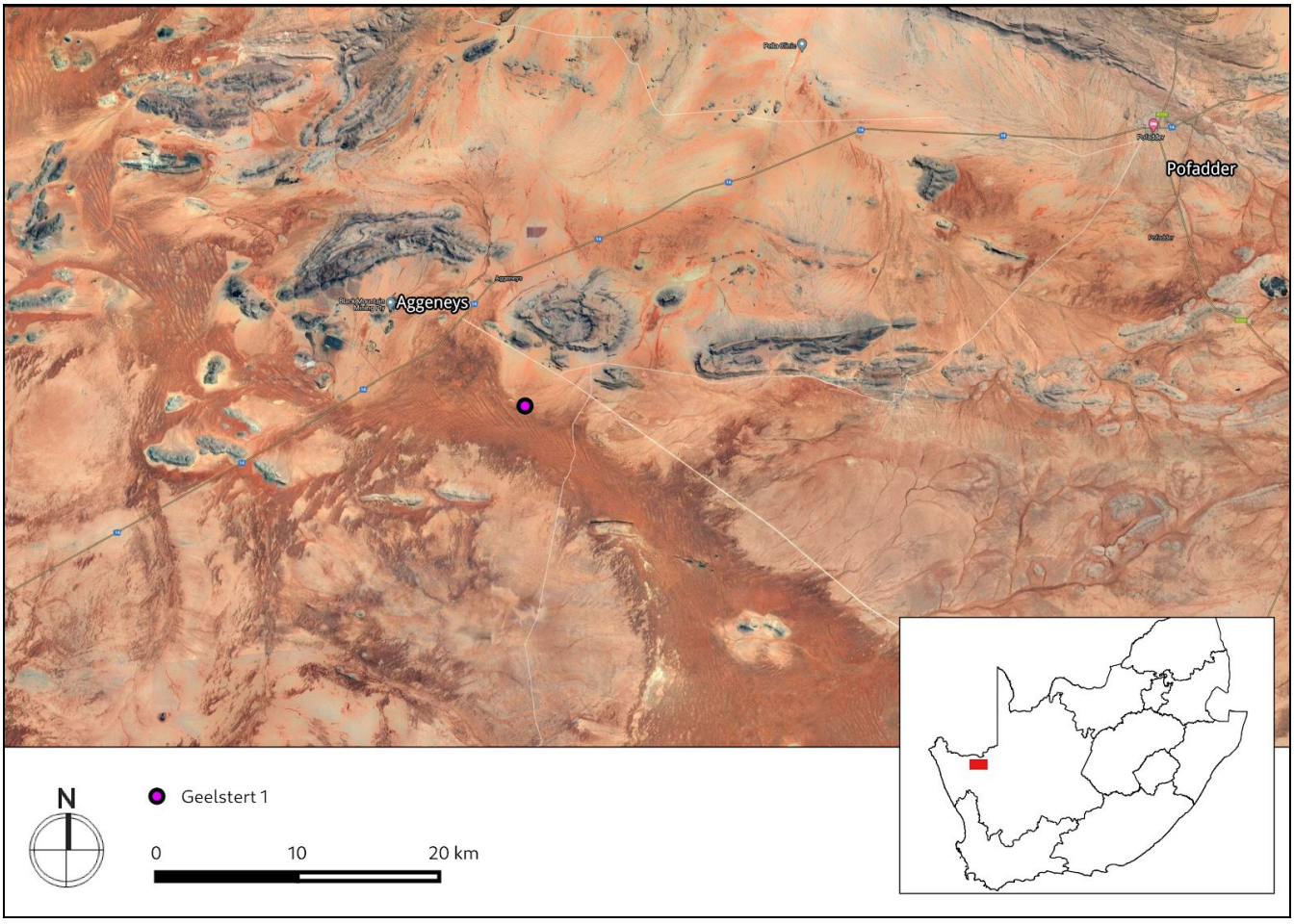

Figure 1: Location of the proposed development area

4. Description of Proposed Development:

Geelstert Solar Facility 1 (Pty) Ltd is proposing the development of a commercial solar PV facility and associated infrastructure, known as Geelstert 1, on a site located approximately 11km south-east of Aggeneys within the

Khâi-Ma Local Municipality and the Namakwa District Municipality in the Northern Cape Province. A development area (located within the study area and affected property, Remaining Extent of the Farm Bloemhoek 61) with an extent of ~578ha has been identified by Geelstert Solar Facility 1 (Pty) Ltd as a technically suitable site for the development of a solar PV facility with a contracted capacity of up to 125MW. The development footprint of Geelstert 1 will be located within the development area. The study area is located within Focus Area 8 of the Renewable Energy Development Zones (REDZ), which is known as the Springbok REDZ. Due to the location of the study area within a REDZ, a Basic Assessment (BA) process will be undertaken in accordance with GN R114 as formally gazetted on 16 February 2018.

The development area of Geelstert 1 is proposed to accommodate the following infrastructure, which will enable the solar PV facility to generate a contracted capacity of up to 125MW:

- Bifacial or monofacial PV panels, mounted on fixed-tilt or tracking mounting structures with a maximum height of 3.5m;
- Centralised inverter stations or string inverters;
- A temporary laydown area;
- Cabling between the panels, to be laid underground where practical;
- An on-site facility substation stepping up from 22kV or 33kV to 132kV or 220kV, with an extent of up to 1ha to facilitate the connection between the solar PV facility and the grid connection solution;
- An access road to the development with a maximum width of 8m;
- Internal access roads within the PV panel array area with a maximum width of 5m;
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses, a workshop and visitors centre.

It is the Developer's intention to bid the solar PV facility under the Department of Mineral Resources and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). Ultimately, the project is intended to be part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resources Plan (IRP). A separate Basic Assessment process will be undertaken for the Geelstert Grid Connection to connect Geelstert 1 to the Aggeneis Main Transmission Substation.

5. Heritage Resources Identified:

Area	Site Name	Description	Co-ordinates		Grading	Mitigation
Geelstert 1 PV	**BLOEM04**	Later Stone Age - Six microlithic retouched stone tool debris	29°17'59.4" S	18°55'48.3" E	NCW	None
Gamsberg	**Gamsberg**	the southern/south eastern side of Gamsberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region	29°14'44.67"S	18°58'39.28"E	IIIA	No direct impact anticipated
Namiesberg	**Namiesberg**	the southern/south eastern side of Namiesberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region	29°16'1.11"S	19° 6'37.34"E	IIIA	No direct impact anticipated

6. Anticipated Impacts on Heritage Resources:

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity and it is not foreseen that the proposed development will impact on significant archaeological heritage. The only archaeological site identified during the field assessment of the area proposed for development is associated with a seasonal pan. This site is determined to be not conservation-worthy and will not be impacted by the proposed development as it is located outside of the development footprint.

According to the VIA conducted for this project,the proposed development could be visible for up to 6.7km, however the array will be seen in profile as a dark line on the horizon which will start to visually blend with the background around 2.7km from the development. According to the supplementary letter drafted by the VIA Specialist (attached as Appendix 2), "Geelstert 1 Solar PV facility is unlikely to be visually obvious from the Namiesberg massacre site; Geelstert 1 Solar PV facility will be visible from the upper sections of the Gamsberg massacre site, however, it will be viewed in the context of other more major infrastructure. The Gamsberg has been mined for Zinc by the Black Mountain Mining Company and comprises an open pit mine and a dedicated processing plant which has resulted in disturbance of the area; Geelstert 1 Solar PV facility will be largely screened from the lower sections of the Gamsberg massacre site by other proposed solar PV projects; and Geelstert 1 Solar PV facility will not block or change views of either the Gamsberg or the Namiesberg massacre sites from accessible public view points along the adjacent un-surfaced roads known as the Loop 10 Road and the Gamoep Road."

7. Recommendations:

There is no objection to the proposed development on heritage grounds and the following is recommended:

- No mitigation is required prior to construction operations commencing.
- Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted.
- If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the project

8. Author/s and Date:

Jenna Lavin

October 2020

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.

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CONTENTS

1. INTRODUCTION

1.1 Background Information on Project

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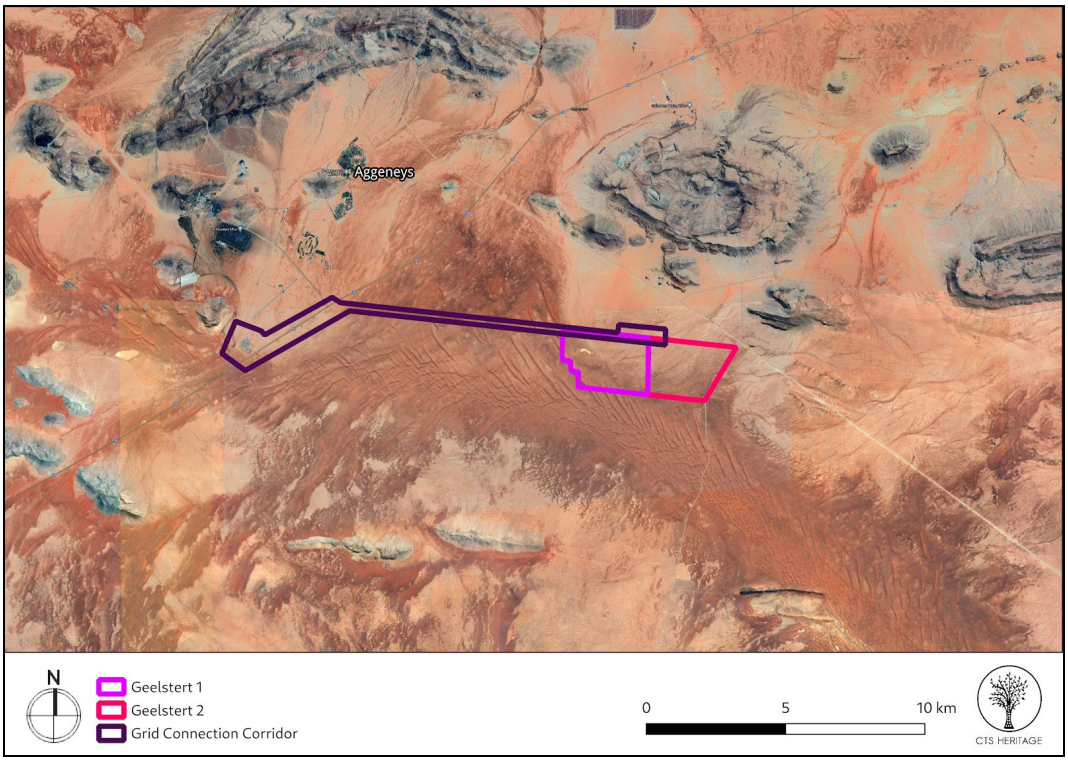
1.2 Description of Property and Affected Environment

The landscape of the study area is typical. Extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (Stipagrostis species) giving this vegetation type the character of semidesert 'steppe'. In places low shrubs of Salsola change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected. (Mucina & Rutherford 2006). Vegetation noted across the development footprint include Three Thorn/Driedoring (Rhigozum trichotomum), Skaapbossie (Aizoon schellenbergii), Shepherd tree (Boscia albitrunca), Suurgras (Enneapogon desvauxii), Kortbeen Boesmangras (Stipagrostis obtuse). The development footprint has dry waterways to the south and to the north, flowing from west to east. There is a small pan towards the north in Geelstert 1 development area, but is located. outside of the actual footprint for Geelstert 1. This pan had to be avoided by infrastructure from an ecological and freshwater perspective.

The development footprint is bounded in the west by the N14 National road, in the north by the Loop 10 gravel road and the Gamsberg, in the south by open fields and neighbouring farms and to the east it is bordered by the Gamoep gravel road.



Map 1a: The proposed development area including all proposed PV Facilities and associated infrastructure as part of the Geelstert PV Project

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999). In correspondence from SAHRA dated 13 October 2020, SAHRA noted:

"NHRA. In reference to the specific cases under discussion, the APM unit reviewed the submitted Heritage Screeners and noted that the information provided did not provide SAHRA with enough information to provide an informed comment on the potential impact to heritage resources. The proposed development areas are undisturbed and have a high likelihood of the presence of heritage resources. The reports noted that previous field surveys had been conducted in the proposed development area in 2013 and adjacent to the development area in 2019. As stated in the Interim Comment issued on the 02/10/2020, while these previous reports contribute to understanding what heritage resources may be present within the development area, they do not replace an application specific field survey to investigate what heritage are located within the development area. The survey conducted within the development area in 2013 is now over seven years old, and a new updated field assessment is required."

This assessment is submitted in response to SAHRA's request for an updated field assessment.

2.2 Summary of steps followed

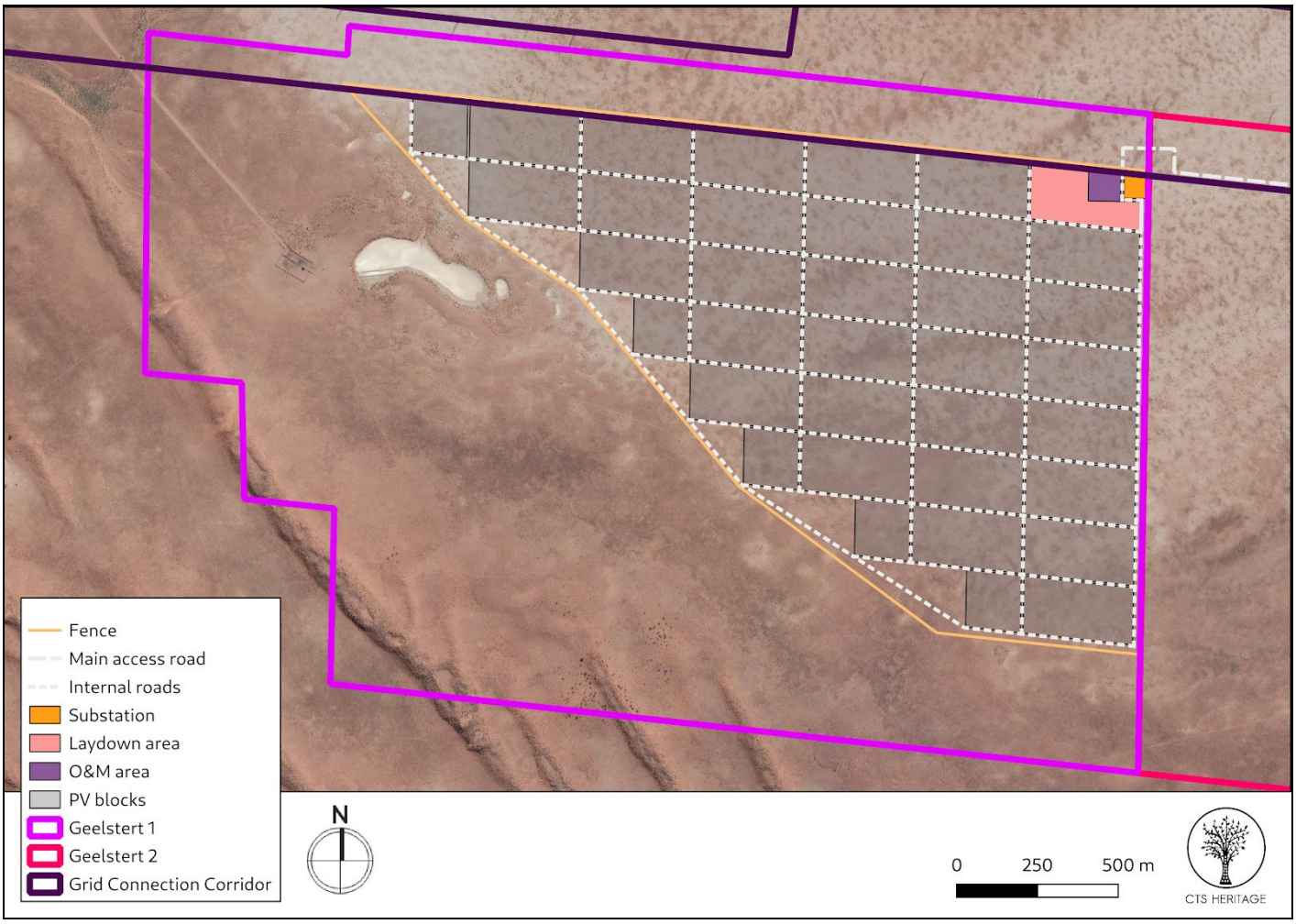
- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit from 17 to 19 October 2020
- The identified resources were assessed to evaluate their heritage significance
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.



Map 1b: The proposed development area including all proposed PV Facilities and associated infrastructure as part of the Geelstert 1 PV Facility

2.4 Constraints & Limitations

Access to one farm was impeded by a locked gate. Contact details provided for relevant landowners proved helpful and after liaison with the security manager of Black Mountain Mine, access was gained through locked gates on 19 October 2020. All effort has been made to cover as much ground as possible in the circumstances.

The experience of the heritage practitioner, the archaeological specialist as well as observations made during the study, allow us to predict with some accuracy the heritage sensitivity of the receiving environment.

2.5 Savannah Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Scoping study, as well as all other issues identified in the EIA phase were assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The duration, wherein it will be indicated whether:
    - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
    - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
    - Medium-term (5 – 15 years) – assigned a score of 3.
    - Long term (> 15 years) – assigned a score of 4.
    - Permanent – assigned a score of 5.
- The consequences (magnitude), quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1 – 5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S = (E + D + M) x P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- 30 – 60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

This application is for the proposed establishment of a PV facility just outside of Aggeneys, in an area that has previously been assessed for impacts to heritage resources. Aggeneys is a mining town established in 1976 on a farm of that name, situated between Pofadder and Springbok in the Northern Cape. The area proposed for development has previously been thoroughly assessed for impacts to heritage resources by Morris (2013; SAHRIS NID 155934) and this desktop assessment refers extensively to this work. The area proposed for development is described by Morris (2013) as “arid, comprising relatively flat drainage plains with inselbergs such as the Aggeneys Mountains, Black Mountain and Gamsberg rising above the plains in the wider landscape. In the immediate vicinity

of the proposed development the predominant topographic feature is the band of dunes running east to west defining the Koa Valley, a fossil relic of a major Miocene drainage line from the interior. The landscape is on the whole sparsely vegetated… (and) includes parts of dune fields and… the adjacent plains to the north and south…"

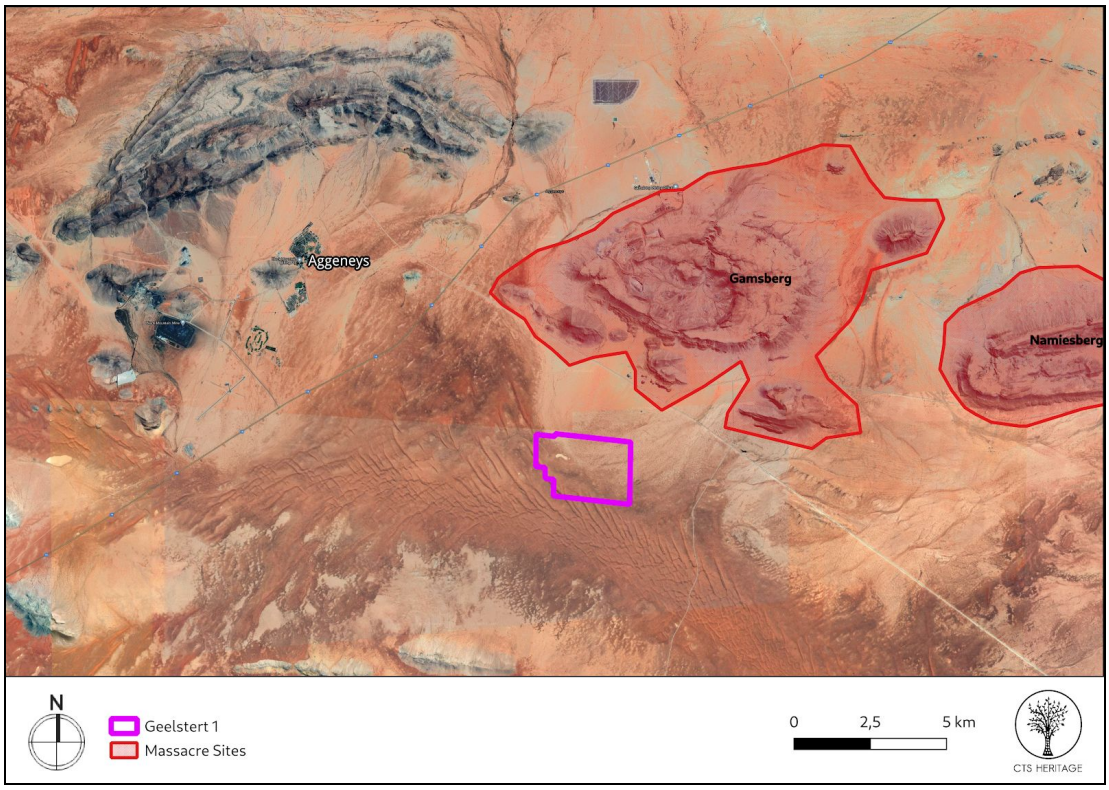
Cultural Landscape and Built Environment Heritage

The area in general is dominated by heritage associated with copper mining, including the adjacent Black Mountain Mine which is still mined for copper deposits. Prior to 1652, the indigenous peoples (the Khoisan or Nama) of the area extracted raw or "native copper" from the gneiss and granite hills that make up the surrounding Namaqualand Copper belt. This copper was beaten into decorative items, worn as bangles and neck adornments. Early settlers in the Cape Colony heard rumours of mountains in the north-west that were fabulously rich in copper. Governor Simon van der Stel was inclined to believe these tales when, in 1681, a group of Namas visited the Castle in Cape Town and brought along some pure copper. Van der Stel himself led a major expedition in 1685 and reached the fabled mountains on 21 October. Three shafts were sunk and revealed a rich lode of copper ore - the shafts exist to this day. For almost 200 years nothing was done about the discovery, largely because of its remote location. The explorer James Alexander was the first to follow up on van der Stel's discovery. In 1852 he examined the old shafts, discovered some other copper outcrops and started mining operations. Prospectors, miners and speculators rushed to the area, but many companies collapsed when the logistical difficulties became apparent. The first miners were Cornish, and brought with them the expertise of centuries of tin-mining in Cornwall. The ruins of the buildings they constructed as well as the stonework of the bridges and culverts of the railway built to transport the ore to Port Nolloth, can still be seen. The Namaqualand Railway started operating in 1876 and lasted for 68 years, carrying ore to Port Nolloth and returning with equipment and provisions. The historical built environment heritage resources associated with the Namaqualand Copper Mining Landscape form a significant part of the cultural landscape of this area.

Additional built environment heritage resources that are known from this area include corbelled buildings and built structures associated with the colonial frontier. Based on the information available, no such built environment or cultural landscape resources fall within the area proposed for development. However, Webley and Halkett (2012, SAHRIS NID 9110) note that appreciation has started emerging regarding the "genocide against the Bushmen in this area, with certain mountainous areas (like Gamsberg and Namiesberg located within very close proximity to the proposed development area - Figure 3d) being likely massacre sites". This has resulted in moves to include the Gamsberg in a potential /Xam and Khomani Heartland World Heritage Site. According to Morris (2013), "the southern/south eastern side of Gamsberg was the site of an incident in which a group of San were cornered and

shot – part of what historians now characterise as a genocide against the indigenous people of the region. Some evidence suggests that this most likely took place in the kloof known as 'Inkruip' ('Creep in')."

Figure 1: View of the Gamsberg taken from the development area for Geelstert 1 (AIA, Appendix 1)



Map 2a: The proposed development area relative to the estimated boundaries of the Gamsberg and Namiesberg Massacre sites

Archaeology

Prior to colonial settlement, this area was occupied by Khoe and San people, as evidenced by the number of Khoe and San names still evident in the landscape (such as Aggeneys). According to Morris (2013, SAHRIS NID 155934), Later Stone Age (LSA) resources are the predominant archaeological trace known from this broader area, with Early (ESA) and Middle Stone Age (MSA) resources occuring in much lower densities and all known archaeological resources associated with rocky outcrops and duns sands. A number of detailed archaeological assessments have been conducted in the broader area by Halkett and Webley (2012, SAHRIS NID 9110) for a proposed solar energy facility, Smith (2012, SAHRIS NID 334) and Morris (2011, SAHRIS NID 7871). Halkett and Webley (2012) noted that "Stone artefacts scatters from the Middle Stone Age are sparsely distributed across the study area and are found on gravel pavements between the vegetation; The absence of associated archaeological material, and lack of discrete individual sites reduces the significance of the material overall; Further mitigation of sites is considered unnecessary in this case. There are no buildings of heritage significance on the site." Smith (2012) noted that "Tracks, dry pans and sub-surface indications using spring-hare and aardvark holes all produced widely scattered material with no concentrations of note." Similar conclusions were reached by Morris (2011). The specific area proposed for development was assessed by Morris (2013; SAHRIS NID 155934). Morris (2013) found "extremely low to zero incidence of any form of artefact whatsoever, whether Stone Age or colonial in age, over most of the area". Significant heritage resources identified by Morris (2013) are all mapped in Figures 3a to 3c and include Later Stone Age artefact scatters including stone tools, pottery and ostrich eggshell flask fragments and LSA grinding grooves, possible unmarked burials, colonial era stone walling and glass and porcelain fragments

As per the findings of Morris (2013), it is predicted that "features such as rock outcrops or the immediate footslopes of hills might be places where Stone Age and probably also colonial era traces would occur, if present. Previous experience has shown that the flat plains away from such features are almost entirely bereft of heritage traces. The dunes may also have been a focus of past human activity." Furthermore, the area immediately adjacent to the area proposed for development in this application was assessed by Orton (2019, SAHRIS NID 523679, 522885 and 523680). Orton (2019) identified no heritage resources within the proposed footprint, although several isolated stone artefacts attributable to background scatter were noted. As such, based on the location of the proposed development area in the flat plains and the fact that no known heritage resources have been identified within the development footprint (despite the completion of a foot survey by Morris (2013)), it is very unlikely that the proposed development will impact on significant archaeological resources.

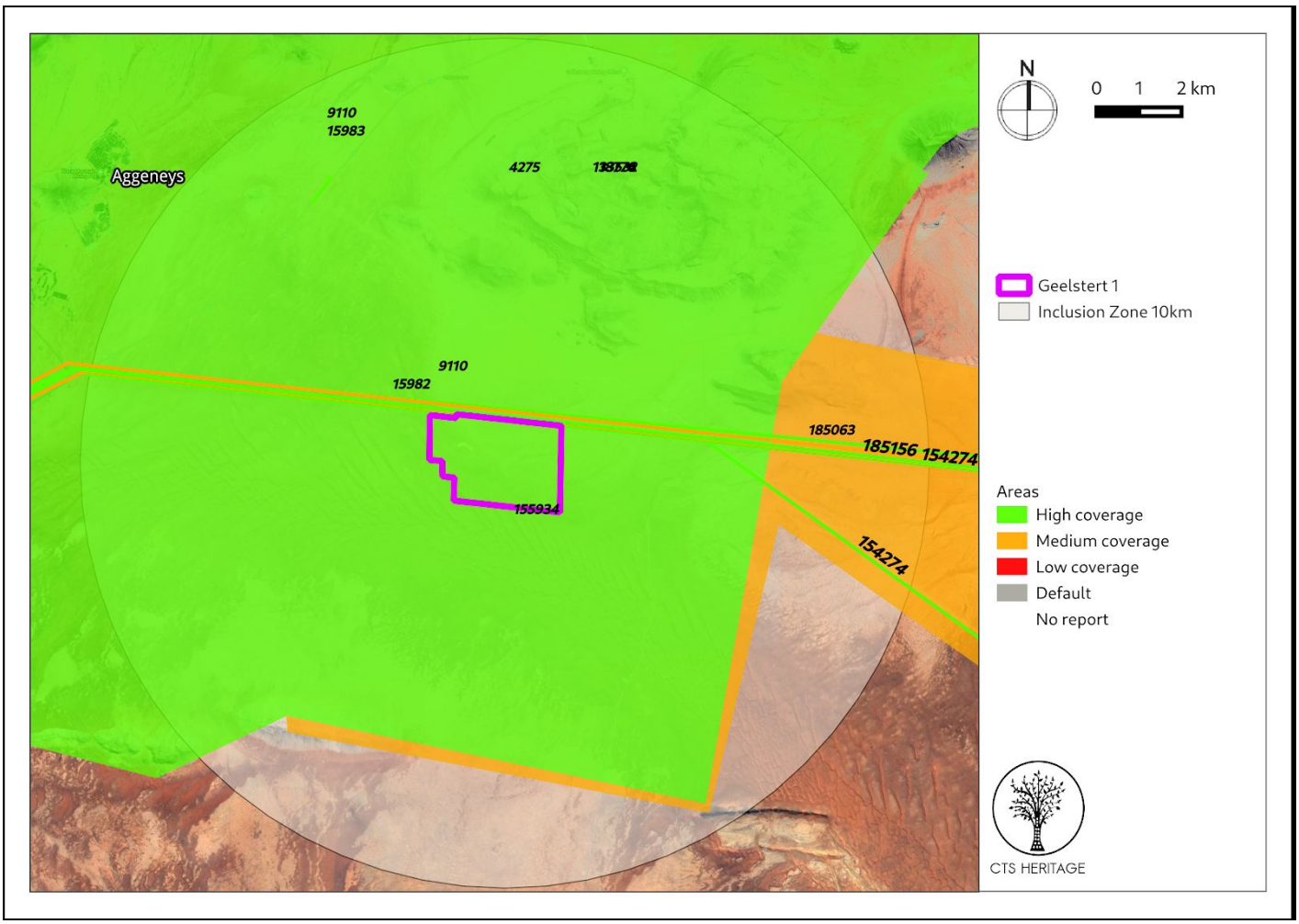


Figure 2b. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for full reference list.

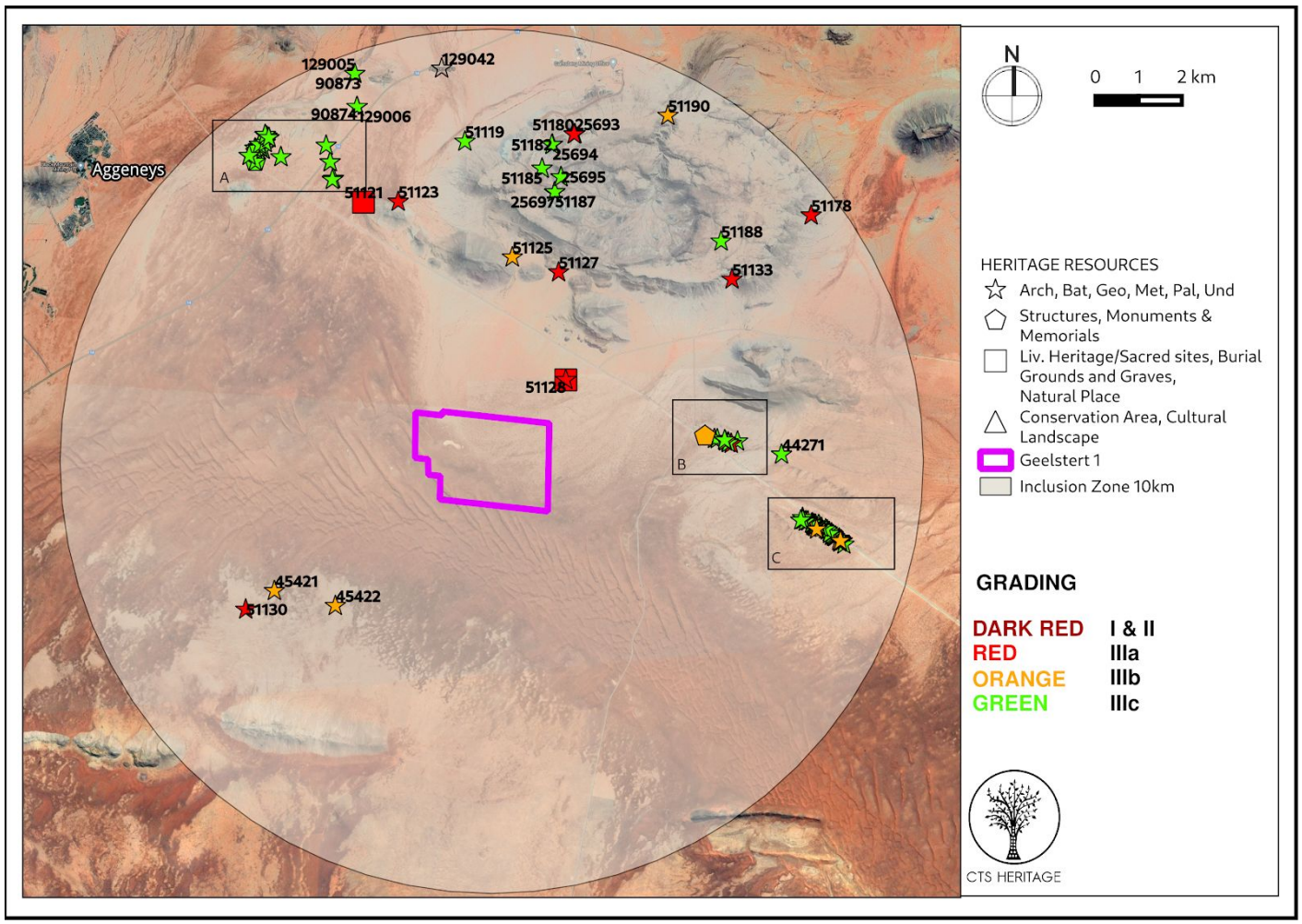
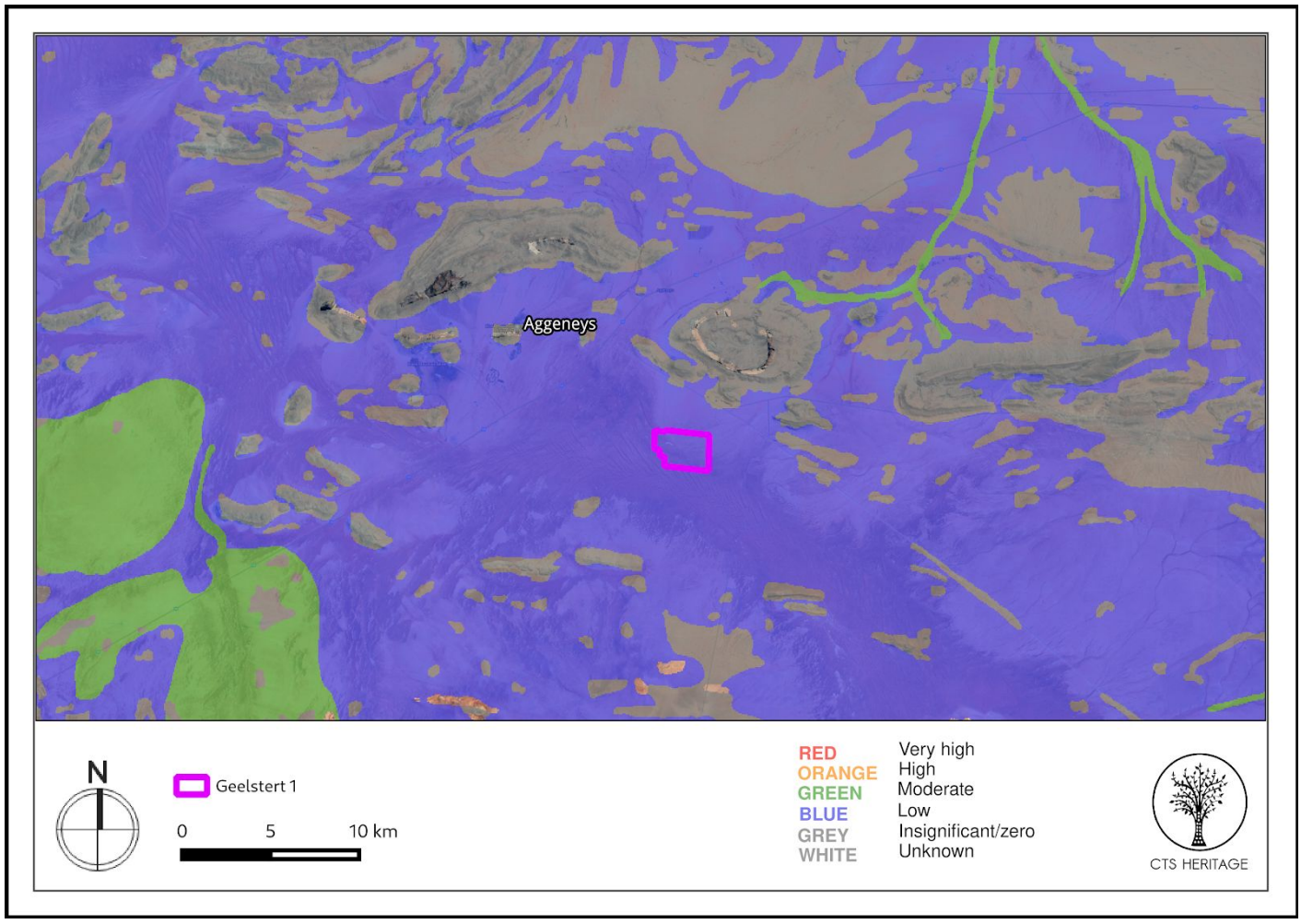


Figure 2c. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.

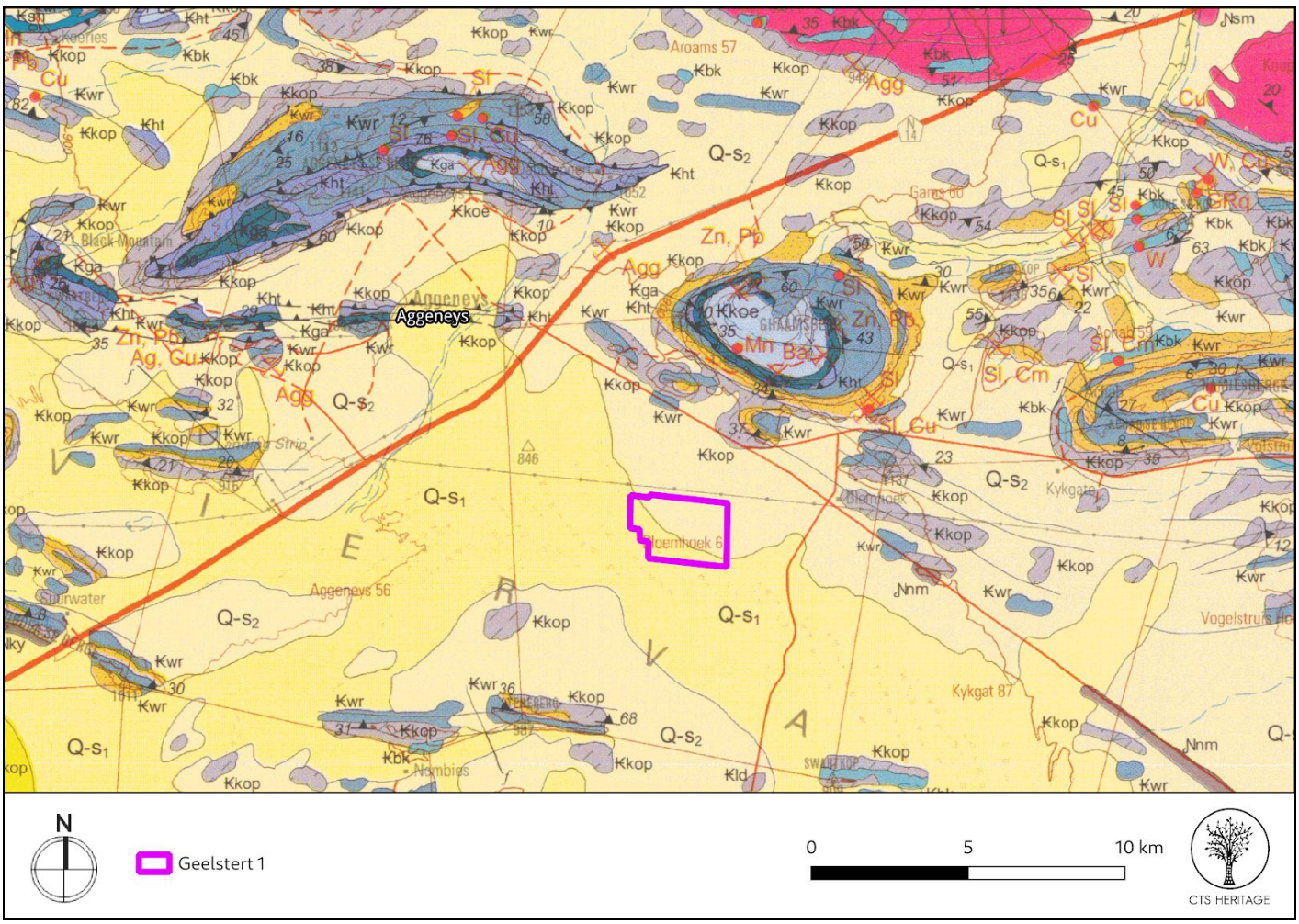
Palaeontology

The area proposed for development is overlain with Quaternary cover sands (of low palaeontological sensitivity), and is underlain by granites of the Koeipoort Formation and quartzite of the Wortel Formation (of zero palaeontological sensitivity). The general area has been subject to numerous palaeontological impact assessments. Butler (2016, SAHRIS NID 406396) notes that "The broader area near Aggeneys is underlain by the Mid-Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group) as well as Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed and their palaeontological sensitivity is similarly low. The low palaeontological sensitivity of the Cenozoic

superficial deposits can be attributed to the scarcity of fossil heritage in these deposits. In Palaeontological terms the significance is thus rated as LOW (negative). Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary." Pether reaches a similar conclusion in his assessment (2012, SAHRIS NID 15982) noting of the general area that the "bedrock underlying the property is unfossiliferous and of no palaeontological interest." As such, it is very unlikely that the proposed development will impact on significant palaeontological heritage resources. As such, the palaeontological sensitivity of the development area is not assessed further in this report.



Map 2d: Palaeontological sensitivity of the proposed development area (low sensitivity)



Map 2d. Geology Map. Extract from the CGS 2918 Pofadder Map indicating that the development area is underlain by sediments Q-s_1 and Q-s_2 (Quaternary Sands) with obvious granite intrusions that form part of the Aggeneys sub-group located outside of the project area

Table 1: Explanation of symbols for the geological map and approximate ages

Symbol	Colour	Group/Formation	Notes
Q-S1	**Pale Yellow**	Quaternary to Recent alluvium.	Located along river courses within the development area
Q-S2	**Paler Yellow**	Quaternary to Recent alluvium.	Located along river courses within the development area

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Cultural Landscape and Visual Impacts

As noted above, Webley and Halkett (2012, SAHRIS NID 9110) note that appreciation has started emerging regarding the "genocide against the Bushmen in this area, with certain mountainous areas (like Gamsberg and Namiesberg located within close proximity to the proposed development area - Figure 3d) being likely massacre sites". This has resulted in moves to include the Gamsberg and Namiesberg in a potential /Xam and Khomani Heartland World Heritage Site. According to Morris (2013), "the southern/south eastern side of Gamsberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region. Some evidence suggests that this most likely took place in the kloof known as 'Inkruip' ('Creep in')."

These significant sites of massacre have very high local or even Provincial significance and should be graded IIIA or even Grade II. However, due to continued mining of the Gamsberg for Iron Ore since the opening of Black Mountain Mine in 2014, the context of these significant massacre sites is all but completely eroded. Furthermore Aggeneys 1 and 2 PV Facilities (SAHRIS Cases 13728, 13729) are located in between the proposed Geelstert PV Facilities and the Gamsberg and Namiesberg massacre sites (Map 5). A VIA was conducted for the proposed development and is attached to each case as part of the BA documents submitted to SAHRA. The VIA states that:
"the proposed PV array could be visible intermittently over approximately 5.0km of the road at a distance of approximately 5.1km. The proposed array forming the bulk of the development is relatively low not exceeding 3.5m in height. Whilst this could be visible for up to 6.7km the array will be seen in profile as a dark line on the horizon which will start to visually blend with the background around 2.7km from the development. Taller electrical infrastructure is likely to be visible over a similar section of the road and at the same distance. It is however not likely to be highly obvious. No high level overview of the project is possible.

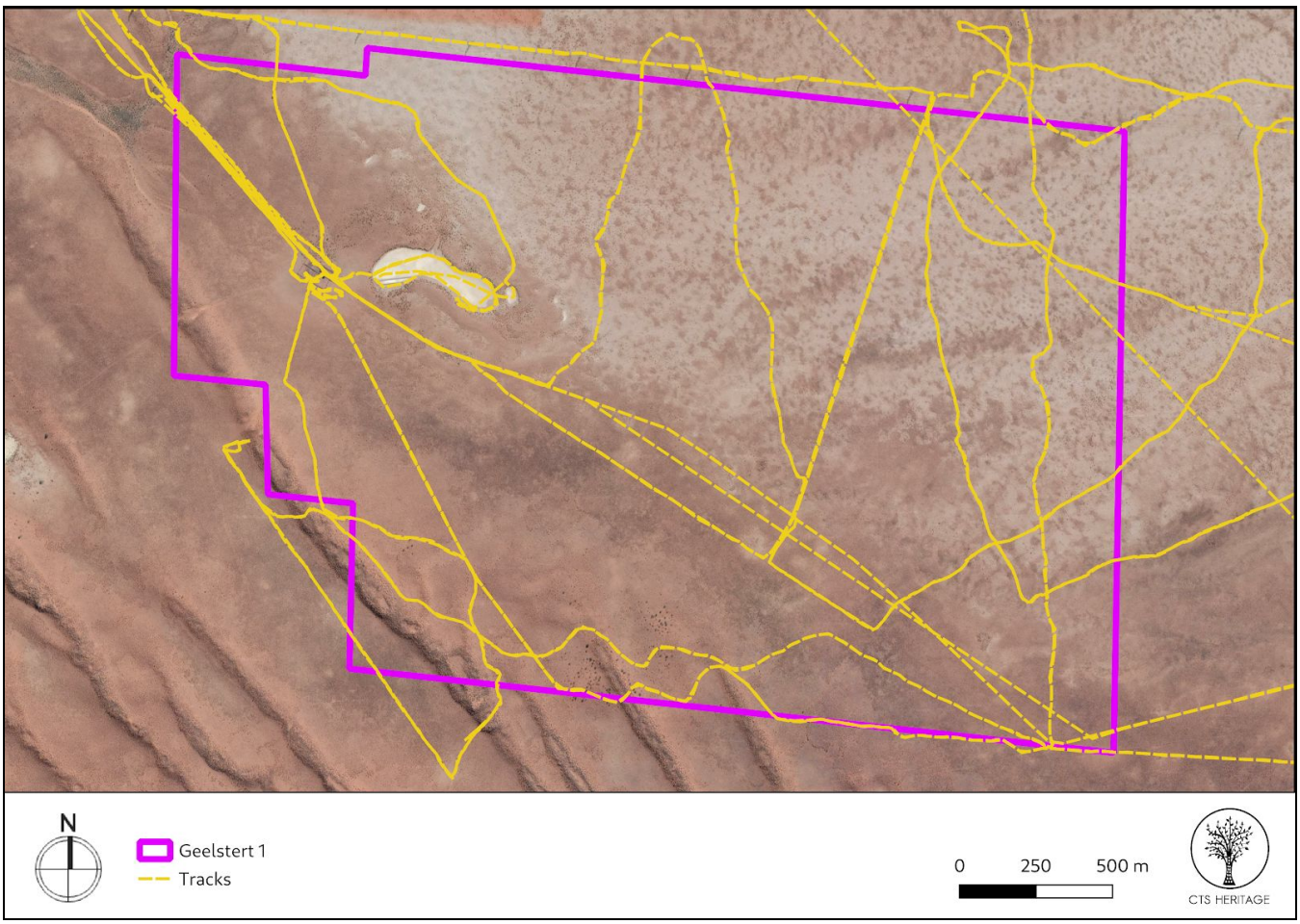
Therefore, whilst the development is likely to be visible from a short section of the N14, it is highly unlikely to be obvious. It also needs to be understood that the section of the N14 in question is located within an area where the landscape character is heavily influenced by development. This influence is likely to increase due to expanding mining operations and the possibility that other solar projects are likely to be obvious from this section of the road. An intermittent view of the proposed project that is unlikely to be obvious will therefore not change the character of the view from the road in any significant way." (emphasis added).

According to the supplementary letter drafted by the VIA Specialist (attached as Appendix 2), "Geelstert 1 Solar PV facility is unlikely to be visually obvious from the Namiesberg massacre site; Geelstert 1 Solar PV facility will be visible from the upper sections of the Gamsberg massacre site, however, it will be viewed in the context of other more major infrastructure. The Gamsberg has been mined for Zinc by the Black Mountain Mining Company and comprises an open pit mine and a dedicated processing plant which has resulted in disturbance of the area; Geelstert 1 Solar PV facility will be largely screened from the lower sections of the Gamsberg massacre site by other proposed solar PV projects; and Geelstert 1 Solar PV facility will not block or change views of either the Gamsberg or the Namiesberg massacre sites from accessible public view points along the adjacent un-surfaced roads known as the Loop 10 Road and the Gamoep Road."

Archaeology

An archaeologist conducted an assessment of the area proposed for development from 17 to 19 October 2020. The area proposed for Geelstert 1 PV Facility is dominated by Kalahari Sands which are sterile from archaeological resources. Only one archaeological occurrence was identified during the field assessment (BLOEM04). This site is located at the edge of an existing seasonal pan and is not located in its original context. This occurrence has been graded as Not Conservation-Worthy (NCW) based on its limited nature and lack of associated context.

This archaeological occurrence has been graded NCW and no further recording of this occurrence is recommended before destruction. However, this archaeological occurrence does not fall within the proposed development footprint and will not be impacted by the proposed development.



Map 3. Track paths of archaeologist during the field assessment

4.2 Heritage Resources identified

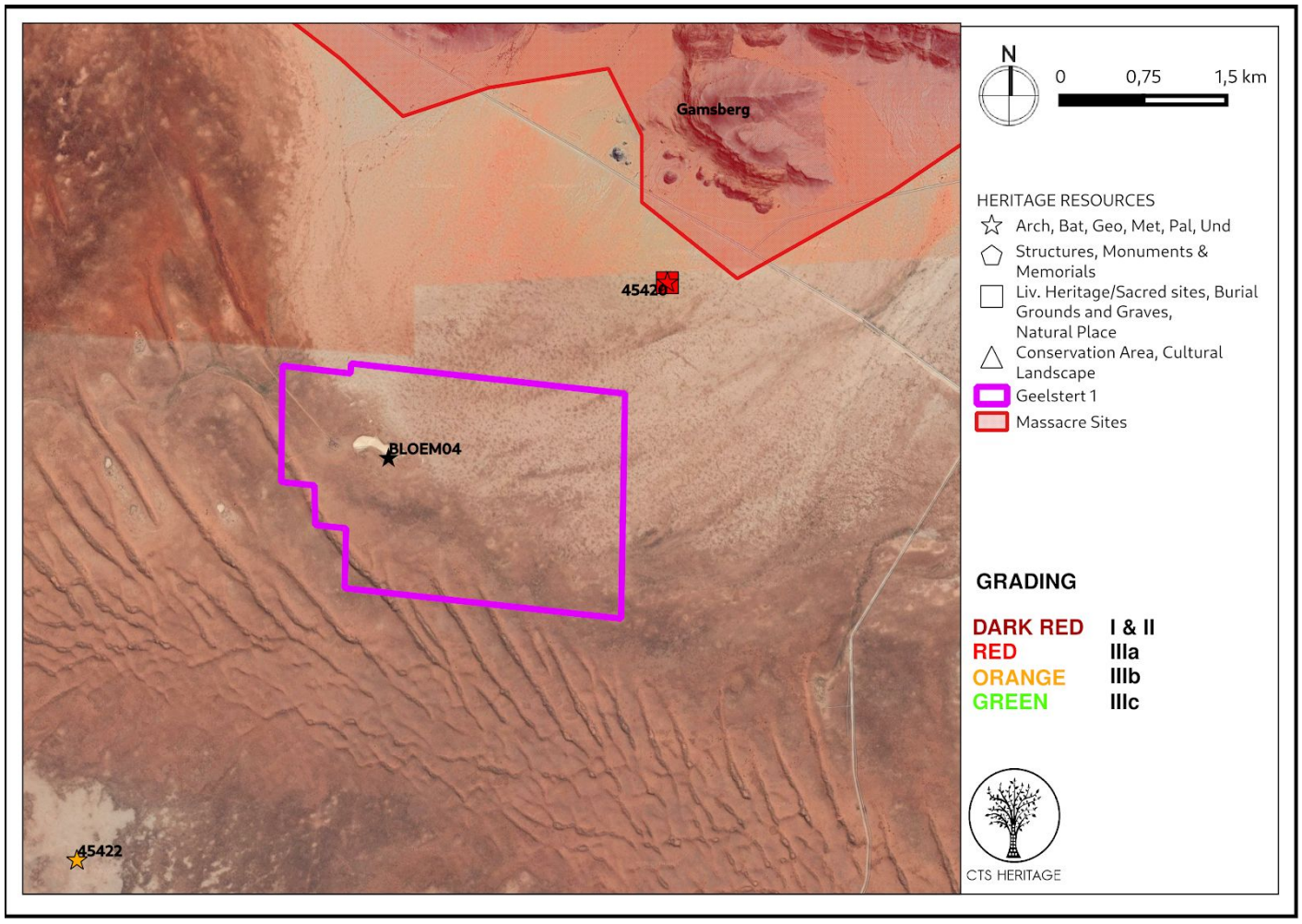
Only one archaeological occurrence was identified during the field assessment (BLOEM04). At BLOEM04 the presence of LSA debris was recorded on the shore of a small pan. The material had no context except for the pan as a possible water source during the recent LSA. Six microlithic retouched stone tool debris was located and consist of chips and chunks. The raw material used was Banded ironstone and Quartzite. The density of the scatter was approximately 5 per 500m^2. This find is rated as not conservation worthy and is of low significance.

Table 2: Occurrences identified during the field assessment

Area	Site Name	Description	Co-ordinates		Grading	Mitigation
Geelstert 1 PV	**BLOEM04**	Later Stone Age - Six microlithic retouched stone tool debris	29°17'59.4" S	18°55'48.3" E	NCW	None
Gamsberg	**Gamsberg**	the southern/south eastern side of Gamsberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region	29°14'44.67"S	18°58'39.28"E	IIIA	No direct impact anticipated
Namiesberg	**Namiesberg**	the southern/south eastern side of Namiesberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region	29°16'1.11"S	19° 6'37.34"E	IIIA	No direct impact anticipated

Figure 2: BLOEM04 from the AIA included as Appendix 1

4.3 Mapping and spatialisation of heritage resources



Map 4: Heritage resources in the vicinity of the proposed development

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity and it is not foreseen that the proposed development will impact on significant archaeological heritage. The only archaeological site identified during the field assessment of the area proposed for development is associated with a seasonal pan. This site is determined to be not conservation-worthy and will not be impacted by the proposed development.

According to the VIA conducted for this project, the proposed development could be visible for up to 6.7km, however the array will be seen in profile as a dark line on the horizon which will start to visually blend with the background around 2.7km from the development. According to the supplementary letter drafted by the VIA Specialist (attached as Appendix 2), "Geelstert 1 Solar PV facility is unlikely to be visually obvious from the Namiesberg massacre site; Geelstert 1 Solar PV facility will be visible from the upper sections of the Gamsberg massacre site, however, it will be viewed in the context of other more major infrastructure. The Gamsberg has been mined for Zinc by the Black Mountain Mining Company and comprises an open pit mine and a dedicated processing plant which has resulted in disturbance of the area; Geelstert 1 Solar PV facility will be largely screened from the lower sections of the Gamsberg massacre site by other proposed solar PV projects; and Geelstert 1 Solar PV facility will not block or change views of either the Gamsberg or the Namiesberg massacre sites from accessible public view points along the adjacent un-surfaced roads known as the Loop 10 Road and the Gamoep Road."

Table 3: Impacts of the proposed PV facility and associated infrastructure to heritage resources

NATURE: Direct and Indirect impacts to heritage resources		
		Archaeology
MAGNITUDE	**L (1)**	No significant archaeological resources were identified within the development area
DURATION	**H (5)**	Where manifest, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary
PROBABILITY	**L (1)**	It is extremely unlikely that any significant archaeological resources will be impacted
SIGNIFICANCE	**L**	(1+5+1)x1=7
STATUS		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**L**	Unlikely

CAN IMPACTS BE MITIGATED		NA
MITIGATION: None required		
RESIDUAL RISK: - Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. - If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA.		

5.2 Sustainable Social and Economic Benefit

A Social Impact Assessment was conducted for this project and it found that "No negative impacts with a high significance rating have been identified to be associated with the development of Geelstert 1. Only positive social impacts are considered to be of a high significance. All negative social impacts are within acceptable limits with no impacts considered as unacceptable from a social perspective.

The proposed project and associated infrastructure will create a number of potential socio-economic opportunities and benefits and are unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the project is acceptable subject to the implementation of the recommended mitigation and enhancement measures and management actions identified for the project. The project is also considered to be acceptable from a social perspective considering the location of the development area within the Springbok REDZ. Considering the findings of the report and potential for mitigation it is the reasoned opinion of the specialist that the project can be authorised from a social perspective."

There are no anticipated impacts to heritage resources and as such, the anticipated impacts do not outweigh the identified socio-economic benefits of the proposed development.

5.3 Proposed development alternatives

"Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- The property on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In terms of location, previously, fourteen solar PV facilities were authorised on the Remaining Extent of Farm Bloemhoek 61, however these Environmental Authorisations are no longer valid. In addition, two recently authorised 100MW solar energy facilities (i.e. Aggeneys 1 and Aggeneys 2) are located to the north of the Geelstert 1 development area on the Remaining Extent of the Farm Bloemhoek 61. As a result of the affected property being previously authorised for developments of a similar nature, the suitability of the land for the development of solar PV facilities has therefore been confirmed.

In terms of layout, based on the ecological, avifauna and freshwater sensitivities identified within the development area, the proponent was able to place the development footprint for the Geelstert 1 solar PV facility in order to ensure avoidance of sensitive environmental features (i.e. the Red Lark habitat and depression wetlands, etc.). In addition, this approach is in accordance with the mitigation hierarchy to ensure that avoidance is the first priority for development. Considering the process undertaken above, which includes the consideration of sensitive environmental features within the development area, a reduction in the on-ground impacts and the opportunity that the development area presents for the development of Geelstert 1, no layout alternative is proposed for assessment.

In terms of technology, no other technology alternatives are being assessed for the development of Geelstert 1. The development of the solar PV facility on the site is considered as the best option for the area considering the current proposed technology on the site, the ample solar resource available and the potential resource saving in terms of water requirements in an area experiencing extreme conditions.

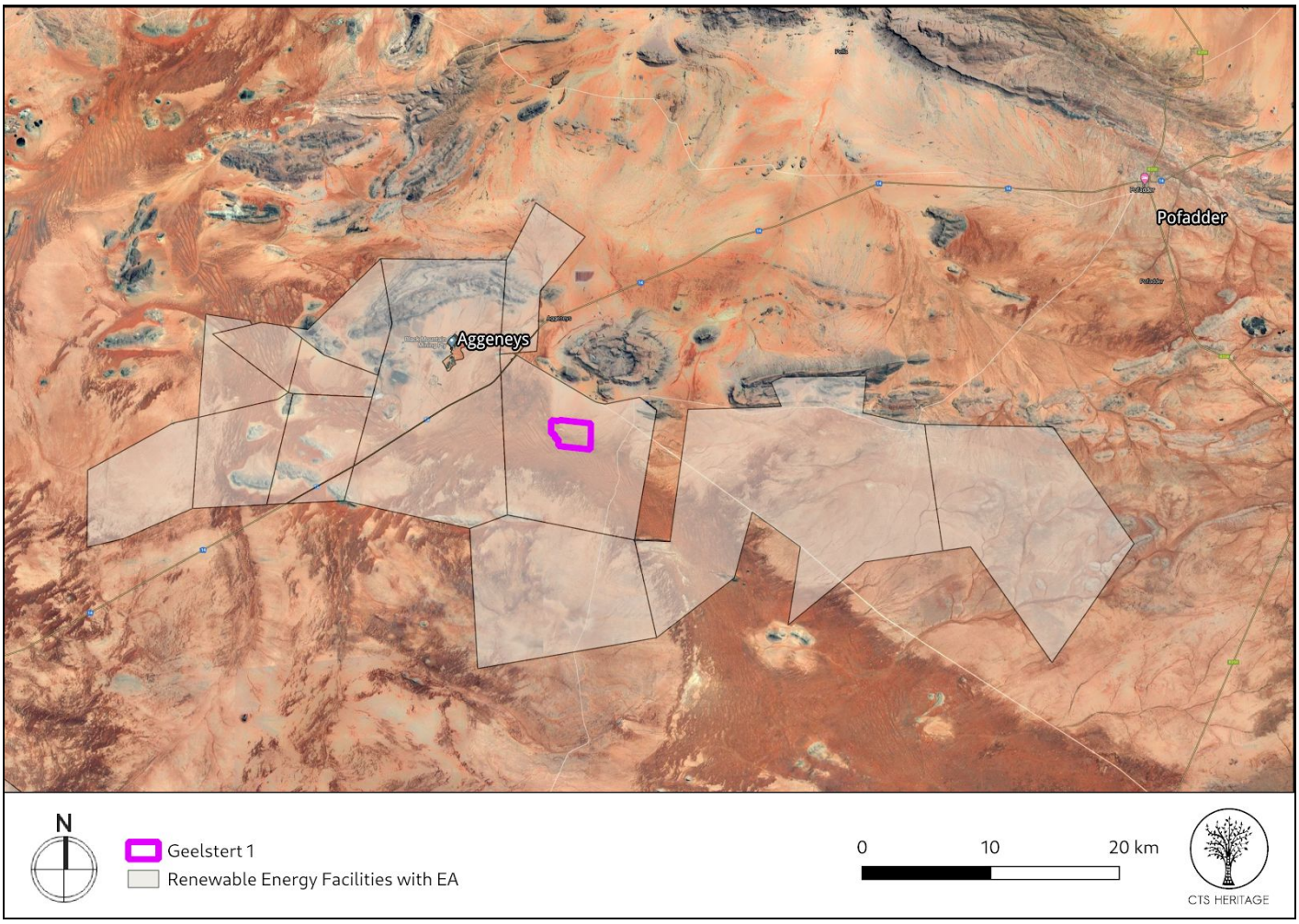
Furthermore, as the Alternative assessed in this HIA will have no impact to heritage resources, it is the preferred alternative in terms of heritage impacts.

5.4 Cumulative Impacts

Cumulative impact in terms of heritage was assessed by reviewing the renewable energy facilities that are proposed within 20km of the proposed development area and includes the previously assessed and authorised renewable energy facilities that fall within the development area assessed in this HIA. Furthermore, the area immediately adjacent to Aggeneys has been severely compromised through extensive ongoing mining activities which have come to characterise this landscape.

At this stage, there is the potential for the cumulative impact of proposed solar energy facilities to negatively

impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant. In addition, it is preferable to have renewable energy facility development focussed in an area such as a REDZ.



Map 5: Approved REF projects within 20km of the proposed development area

6. RESULTS OF PUBLIC CONSULTATION

The public consultation process will be undertaken by the EAP during the EIA. No heritage-related comments have been received to-date. SAHRA is required to comment on this HIA and make recommendations prior to the granting of the Environmental Authorisation.

7. CONCLUSION

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity and it is not foreseen that the proposed development will impact on significant archaeological heritage. The only archaeological site identified during the field assessment of the area proposed for development is associated with a seasonal pan. This site is determined to be not conservation-worthy and will not be impacted by the proposed development.

The area proposed for development is overlain with Quaternary cover sands (of low palaeontological sensitivity), and is underlain by granites of the Koeipoort Formation and quartzite of the Wortel Formation (of zero palaeontological sensitivity). Pether notes in his assessment (2012, SAHRIS NID 15982) that the "bedrock underlying the property is unfossiliferous and of no palaeontological interest." As such, it is very unlikely that the proposed development will impact on significant palaeontological heritage resources.

Significant massacre sites are located in close proximity to the proposed development - the Gamsberg and Namiesberg Massacre sites. These significant sites of massacre have very high local or even Provincial significance and should be graded IIIA or even Grade II. However, due to continued mining of the Gamsberg for Iron Ore since the opening of Black Mountain Mine in 2014, the context of these significant massacre sites is all but completely eroded. Furthermore Aggeneys 1 and 2 PV Facilities (SAHRIS Cases 13728, 13729) are located in between the proposed Geelstert PV Facilities and the Gamsberg and Namiesberg massacre sites (Map 5).

According to the VIA conducted for this project,the proposed development could be visible for up to 6.7km, however the array will be seen in profile as a dark line on the horizon which will start to visually blend with the background around 2.7km from the development. According to the supplementary letter drafted by the VIA Specialist (attached as Appendix 2), "Geelstert 1 Solar PV facility is unlikely to be visually obvious from the Namiesberg massacre site; Geelstert 1 Solar PV facility will be visible from the upper sections of the Gamsberg massacre site, however, it will be viewed in the context of other more major infrastructure. The Gamsberg has been mined for Zinc by the Black Mountain Mining Company and comprises an open pit mine and a dedicated

processing plant which has resulted in disturbance of the area; Geelstert 1 Solar PV facility will be largely screened from the lower sections of the Gamsberg massacre site by other proposed solar PV projects; and Geelstert 1 Solar PV facility will not block or change views of either the Gamsberg or the Namiesberg massacre sites from accessible public view points along the adjacent un-surfaced roads known as the Loop 10 Road and the Gamoep Road."

Therefore, whilst the development is likely to be visible from a short section of the N14, it is highly unlikely to be obvious. Furthermore, the section of the N14 in question is located within an area where the landscape character is heavily influenced by development. This influence is likely to increase due to expanding mining operations and the possibility that other solar projects are likely to be obvious from this section of the road. An intermittent view of the proposed project that is unlikely to be obvious will therefore not change the character of the view from the road in any significant way.

In addition, the proposed development is located within an identified REDZ and Strategic Transmission Corridor. Due to the REDZ, there are a number of similar existing and/or proposed PV facilities in the area and as such, there is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

No significant heritage resources were identified during this HIA. Therefore, no further mitigation is required, and from a heritage point of view, there is no objection to the proposed development in this area.

8. RECOMMENDATIONS

There is no objection to the proposed development on heritage grounds and the following is recommended:

- No mitigation is required prior to construction operations commencing.
- Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted.
- If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A

professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA.

- The above recommendations must be included in the Environmental Management Plan (EMP) for the project

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
15982	PIA Phase 1	John Pether	23/04/2012	BRIEF PALAEONTOLOGICAL IMPACT ASSESSMENT PROPOSED ORLIGHT SA DEVELOPMENT OF A SOLAR PHOTOVOLTAIC POWER PLANT NEAR AGGENEYS, NORTHERN CAPE PROVINCE Portion 1 of Farm Aroams 57 RD
9110	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province
9110	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province
4275	AIA Phase 1	Cobus Dreyer	11/07/2005	Archaeological Investigation of the Proposed Alterations to the Telkom Lattice Mast at Gamsberg (Ghaamsberg) near Aggeneys, Northern Cape
185063	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	23/11/2015	Heritage Impact Assessment for the Proposed Khai-Ma WEF on farm portions south of Pofadder in the NC Province
155934	HIA Phase 1	David Morris	01/04/2013	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS PHOTOVOLTAIC SOLAR ENERGY FACILITY AT BLOEMHOEK NEAR AGGENEYS, NORTHERN CAPE PROVINCE
133532	Heritage Statement	David Morris	01/01/2010	Cultural Heritage Assessment: Gamsberg - Supplementary observations to a previous specialist report on archaeological resources.
118776	PIA Desktop	John Pether	20/03/2013	Environmental and Social Impact Assessment [ESIA] for the Gamsberg Zinc Mine and Associated Infrastructure, Northern Cape Province PALAEONTOLOGICAL IMPACT ASSESSMENT Desktop Study
118774	HIA Phase 1	David Morris	01/03/2013	Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and Associated Infrastructure in Northern Cape, South Africa
15983	PIA Phase 1	John Pether	23/04/2012	BRIEF PALAEONTOLOGICAL IMPACT ASSESSMENT PROPOSED ORLIGHT SA DEVELOPMENT OF A SOLAR PHOTOVOLTAIC POWER PLANT NEAR AGGENEYS, NORTHERN CAPE PROVINCE Portion 1 of Farm Aroams 57 RD
154274	Heritage Impact Assessment Specialist Reports	Jayson Orton	23/01/2014	HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NAMIES WIND ENERGY FACILITY NEAR AGGENEYS, NORTHERN CAPE

45091	AIA Desktop	Lita Webley, Dave Halkett	14/06/2012	AIA: PROPOSED CONSTRUCTION OF A 66KV LINE LINKING THE PROPOSED AGGENEYS PHOTO-VOLTAIC SOLAR POWER PLANT WITH THE AGGENEIS SUBSTATION, NORTHERN CAPE
1974	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS PHOTO-VOLTAIC SOLAR POWER PLANT ON PORTION 1 OF THE FARM AROAMS 57, NORTHERN CAPE PROVINCE
185156	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	24/11/2014	Heritage Impact Assessment for the Proposed Korana Wind Energy Facility on Farm Portions Namies South 2/212 and Poortjies 1/209 South of Pofadder in the NC Province
185150	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	24/11/2014	Heritage Impact Assessment for the Proposed Poortjies Wind Energy Facility on Two Farm Portions South of Pofadder, NC Province
185063	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	23/11/2015	Heritage Impact Assessment for the Proposed Khai-Ma WEF on farm portions south of Pofadder in the NC Province
185047	Heritage Impact Assessment Specialist Reports	Lita Webley, Natalie Kendrick, Timothy Hart, Dave Halkett	24/11/2014	Heritage Impact Assessment for the Korana Solar Energy Facility on a Farm Namies South 212 / Portion2; Khai-Ma Municipality
518879	HIA	Piet de Bie	03/12/2018	Phase 1 Heritage Impact Assessment for the proposed construction of a 800m section of gravel road and associated infrastructure at the Black Mountain Decline on the Farm Zuurwater 62 , Khai-Ma Local Municipality, NC Province.
521207	Heritage Scoping Assessment	Jenna Lavin	22/02/2019	Proposed development of a new haul road at Black Mountain Mine, near Aggeneys in the Northern Cape Province
523679	HIA	Jayson Orton	16/05/2019	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS 1 – 100MW SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR AGGENEYS, NAMAKWALAND MAGISTERIAL DISTRICT, NORTHERN CAPE
522885	HIA	Jayson Orton	17/04/2019	Heritage Impact Assessment for the Proposed Aggeneys 2 - 100 MW Solar PV Facility and Associated Infrastructure Near Aggeneys, Namakwaland Magisterial District, Northern Cape
523680	HIA	Jayson Orton	16/05/2019	HERITAGE IMPACT ASSESSMENT: PROPOSED GRID CONNECTION INSFRASTRUCTURE FOR AGGENEYS 1 SOLAR PHOTOVOLTAIC FACILITY, NAMAKWALAND MAGISTERIAL DISTRICT, NORTHERN CAPE

CTS HERITAGE

APPENDICES

CTS HERITAGE

APPENDIX 1: Archaeological Assessment

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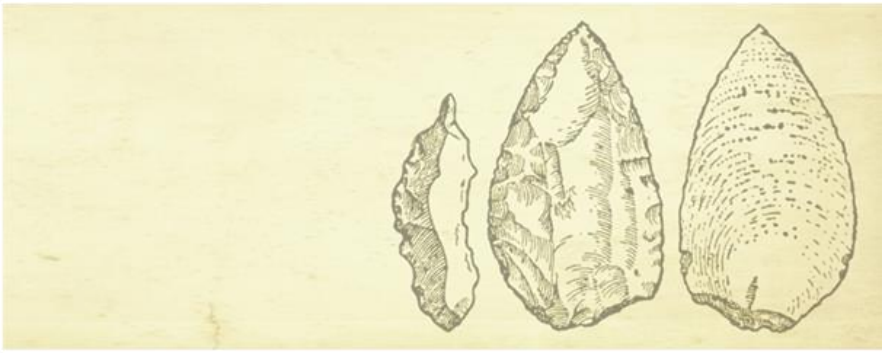

PHASE 1 AIA FIELD REPORT FOR THE PROPOSED DEVELOPMENT OF GEELSTERT 1 AND GEELSTERT 2 PV FACILITIES, INCLUDING GRID CONNECTION, AGGENEYS, NORTHERN CAPE PROVINCE.

PROPOSED DEVELOPMENT OF THE GEELSTERT 1 AND 2 SOLAR PV FACILITIES, AS WELL AS THE GEELSTERT GRID CONNECTION TO CONNECT TO THE ESKOM-AGGENEIS MAIN TRANSMISSION SUBSTATION ON THE REMAINING EXTENT OF THE FARM BLOEMHOEK 61 NEAR AGGENEYS IN THE KHAI-MA LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

PREPARED FOR:

CTS HERITAGE

PREPARED BY:

JAN ENGELBRECHT & HEIDI FIVAZ

UBIQUE HERITAGE CONSULTANTS

22 OCTOBER 2020

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For this project, Mr Engelbrecht was responsible for the field survey of the development footprint, identification of heritage resources, and recommendations. Ms Fivaz was responsible for report compilation.

Declaration of independence:

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- The work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.

Signed: **Date: 2020-10-22**

J.A.C. Engelbrecht & H. Fivaz

UBIQUE Heritage Consultants

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ABBREVIATIONS

AIA:	Archaeological Impact Assessment
ASAPA:	Association of South African Professional Archaeologists
BIA:	Basic Impact Assessment
CRM:	Cultural Resource Management
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment*
EIA:	Early Iron Age*
EMP:	Environmental Management Plan
ESA:	Earlier Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
LIA:	Late Iron Age
LSA:	Later Stone Age
MEC:	Member of the Executive Council
MIA:	Middle Iron Age
MPRDA:	Mineral and Petroleum Resources Development Act
MSA:	Middle Stone Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
OWC:	Orange River Wine Cellars
PRHA:	Provincial Heritage Resource Agency
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological: material remains, resulting from human activity, which is in a state of disuse and is in or on land and is older than 100 years, including artefacts, human and hominid remains and artificial features and structures;

- 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 is older than 100 years (as defined and protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the 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;
- Features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Earlier Stone Age: >2 000 000 - >200 000 years ago
Middle Stone Age: <300 000 - >20 000 years ago
Later Stone Age: <40 000 - until the historical period

Iron Age: (Early Farming Communities). The period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their iron tools, archaeologists call this the Iron Age.
Early Iron Age: AD 200 - AD 900
Middle Iron Age: AD 900 - AD 1300
Later Iron Age: AD 1300 - AD 1850

Historic: Period of the arrival of white settlers and colonial contact.
AD 1500 to 1950

Historic building: Structures 60 years and older.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (historic places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources: These mean any place or object of cultural significance, tangible or intangible.

Holocene: The most recent geological period that commenced 10 000 years ago.

Palaeontology: 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 that contains such fossilised remains or traces

Cumulative impacts: “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Mitigation: Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

A 'place': a site, area or region;

- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

'Public monuments and memorials': mean all monuments and memorials—

- 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
- 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;

'Structures': any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.

1. INTRODUCTION

UBIQUE Heritage Consultants were appointed by CTS Heritage as independent heritage specialists to conduct the Phase 1 field surveys for the Archaeological Impact Assessment of the proposed development of PV facilities on the Remainder of the Farm Bloemhoek 61 near Aggeneys in the Khai-Ma Local Municipality, Namakwa District Municipality, Northern Cape, as required by Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA).

The proposed project includes the construction and operation of grid connection infrastructure between the existing Eskom Aggeneis Main Transmission Substation (MTS) and the proposed Geelstert 1 and 2 PV facilities near the town of Aggeneys in the Northern Cape Province. The proposed infrastructure will entail the development of a collector substation, a double-circuit power line (up to 220kV in capacity) and a single-circuit power line (up to 220kV in capacity) to connect the proposed Geelstert 1 and Geelstert 2 solar PV facilities and the authorised Aggeneys 1 and Aggeneys 2 collector substations to the Aggeneis Main Transmission Substation (MTS). The assessed power line falls within a 17,5 km long and 1 km wide corridor (extending to 2 km at the Aggeneys Main Transmission Substation grid) which will allow for the optimisation of the infrastructure to be developed and to avoid identified environmental sensitivities.

The identified heritage resources, as well as the anticipated and cumulative impacts that the proposed developments may have on the identified heritage resources, are presented objectively in this report. Alternatives, should any significant sites be impacted adversely by the proposed project, are offered. All effort will be made to ensure that all studies, assessments and results comply with the relevant legislation and the code of ethics and guidelines of the Association of South African Professional Archaeologists (ASAPA). The report aims to assist the developer in responsibly managing the documented heritage resources, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.1 Technical information

Project description	
Project name	PHASE 1 AIA Field Report for the Proposed Development of Geelstert 1 and Geelstert 2 PV Facilities, including Grid Connection, Aggeneys, Northern Cape Province.
Description	Proposed development of the Geelstert 1 and 2 Solar PV Facilities, as well as the Geelstert Grid Connection to connect to the Eskom- Aggeneis Main Transmission Substation, on the Remaining Extent of the Farm Bloemhoek 61 Near Aggeneys in the Khai-Ma Local Municipality, Namakwa District Municipality, Northern Cape Province.
Developer	
ABO Wind Renewable Energies (Pty) Ltd Geelstert Solar Facility 1 (Pty) Ltd Geelstert Solar Facility 2 (Pty) Ltd	

Development type	Electrical Infrastructure and Renewable Energy: Solar
Property details	
Province	Northern Cape
District municipality	Namakwa
Local municipality	Khai-Ma
Topo-cadastral map	1:50 000 2918BD
Farm name	Remaining Extent of the Farm Bloemhoek 61 Portion 1 of the Farm Aggeneys 56 Portion 2 of the Farm Aggeneys 56 Portion 12 of the Farm Aggeneys 56 Portion 13 of the Farm Aggeneys 56
Closest town	Aggeneys and Pofadder
GPS Co-ordinates	**Geelstert 1**: 29° 18' 07" **S** 18° 56' 11" **E** **Geelstert 2**: 29° 18' 25" **S** 18° 57' 53" **E** **Corridor eastern end:** 29° 17' 40" **S** 18° 57' 30" **E** **Corridor western end (MTS):** 29° 17' 49" **S** 18° 48' 10" **E**
Property size	12378,97ha
Development footprint	Geelstert 1: ~245ha Geelstert 2: ~285ha Geelstert Grid Connection corridor: 17.5km long and 1km wide (extending to 2km at the Aggeneis Main Transmission Substation (MTS)). However, the actual footprint of the power line will be much smaller.
Land use	
Previous	Agriculture
Current	Agriculture
Rezoning required	No
Sub-division of land	No

Development criteria in terms of Section 38(1) NHRA Yes/No	
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes
Construction of bridge or similar structure exceeding 50m in length.	No
Construction exceeding 5000m ^{2}.	Yes
Development involving three or more existing erven or subdivisions.	No
Development involving three or more erven or divisions that have been consolidated within the past five years.	No
Rezoning of site exceeding 10 000m ^{2}.	Yes
Any other development category, public open space, squares, parks, recreation grounds.	No

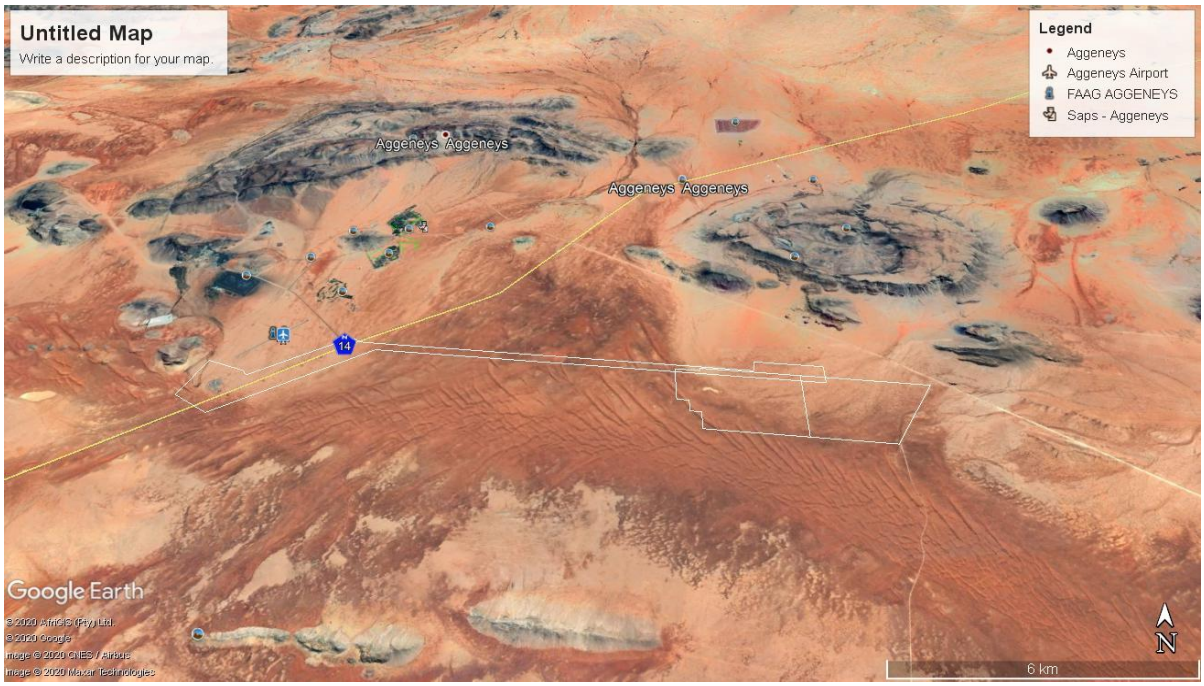


Figure 1 *Proposed Geelstert Development, Northern Cape Province, indicated on Google Earth Satellite Imagery.*

2. FIELD ASSESSMENT

2.1 Methodology

2.1.1 Systematic survey

A systematic survey of the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest, was completed.

UBIQUE Heritage Consultants inspected the proposed development corridor and areas as well as surrounding areas on the 17th, 18th and 19th October 2020. The areas surveyed for the impact assessment was dictated by the Google Earth maps of the development footprints provided by the client, as well as the Heritage Screener compiled by CTS Heritage. The entire area identified as Geelstert 1, Geelstert 2 and the Geelstert Grid Connection corridor were surveyed. The starting point for the survey was 29° 19' 11.8" S; 18° 58' 23.3" E. All the study areas were surveyed in transects of approximately 30 m to 100 m where possible. The development areas and the development corridor were surveyed on foot and by 4x4 vehicle.

We conducted an inspection of the surface of the ground, wherever the surface was visible. The archaeological survey was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

2.1.2 Recording significant areas

GPS points of identified significant areas were recorded with handheld Garmin global positioning units (Garmin eTrex 10) and Android Locus Maps application on a Samsung Galaxy A01 Smartphone. Photographs were taken with a Canon Ixus 190 20-megapixel camera. Detailed field notes were taken to describe observations (Appendix B).

2.1.3 Determining significance

Levels of the significance of the various types of heritage resources observed and recorded in the project area have been determined according to criteria set out in Appendix A.

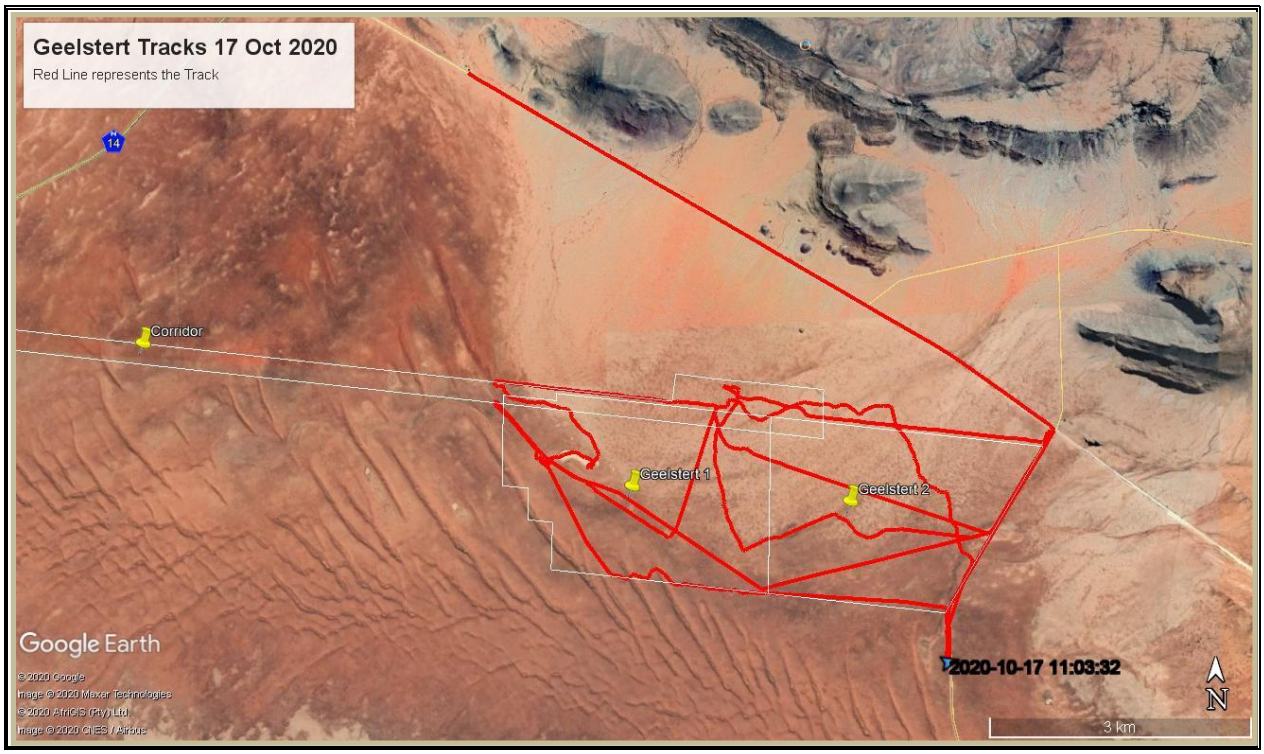
2.1.4 Assumptions and limitations

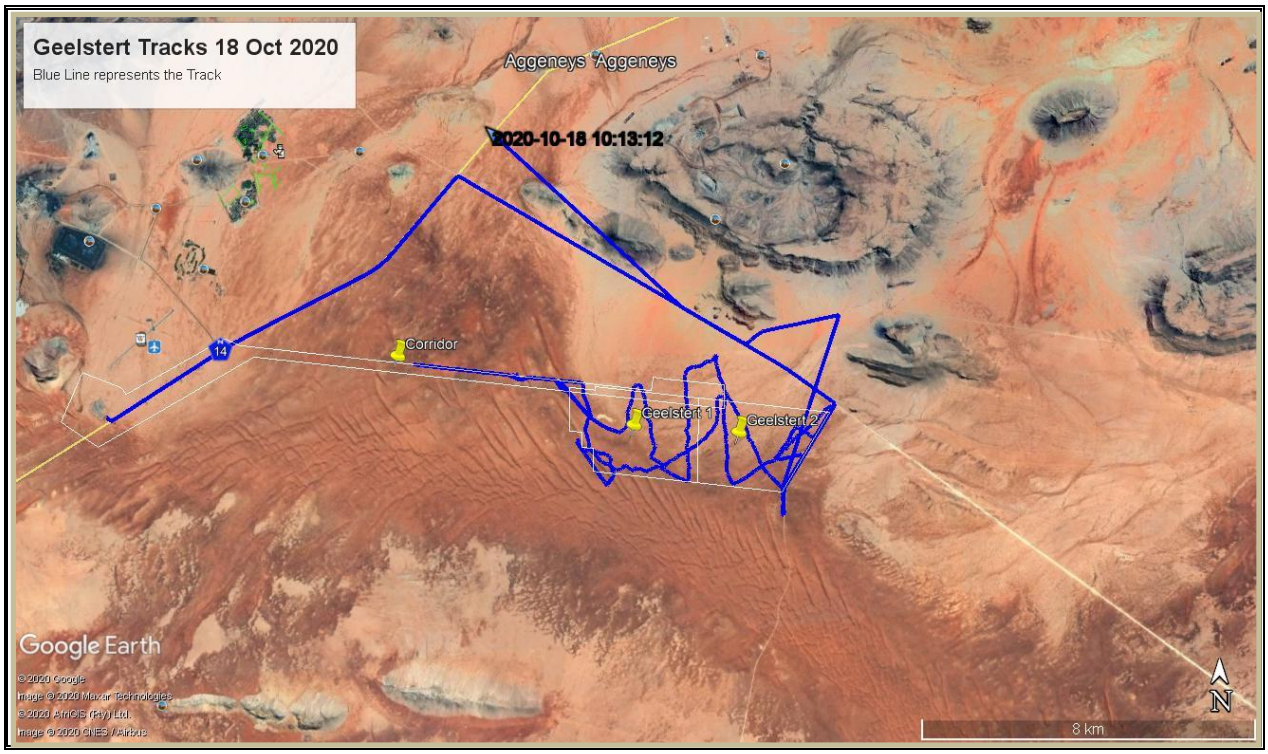
It is assumed that the description of the proposed project, as provided by the client, is accurate. Furthermore, it is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is comprehensive and does not have to be repeated as part of the heritage impact assessment.

The significance of the sites, structures and artefacts is determined through their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

All possible care has been taken during the comprehensive field survey and intensive desktop study to identify sites of cultural importance within the development footprints. However, it is essential to note that some heritage sites may have been missed due to their subterranean nature, or due to dense vegetation cover. No subsurface investigation (i.e. excavations or sampling) were undertaken since a permit from SAHRA is required for such activities. Furthermore, access to one farm was impeded by a locked gate. Contact details provided for relevant landowners proved helpful, and after liaison with the security manager of Black Mountain Mine, access was gained through locked gates on 19 October 2020. All effort has been made to cover as much ground as possible in the circumstances.

Therefore, should any heritage features and/or objects such as architectural features, stone tool scatters, artefacts, human remains, or fossils be uncovered or observed during construction, operations must be stopped, and a qualified archaeologist contacted for an assessment of the find. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to assess the significance of the site (or material) in question.


Geelstert Tracks 17 Oct 2020
Red Line represents the Track
14
Corridor
Geelstert 1
Geelstert 2
2020-10-17 11:03:32
Google Earth
3 km
N


Geelstert Tracks 18 Oct 2020
Blue Line represents the Track
Aggeneys Aggeneys
2020-10-18 10:13:12
14
Corridor
Geelstert 1
Geelstert 2
Google Earth
8 km
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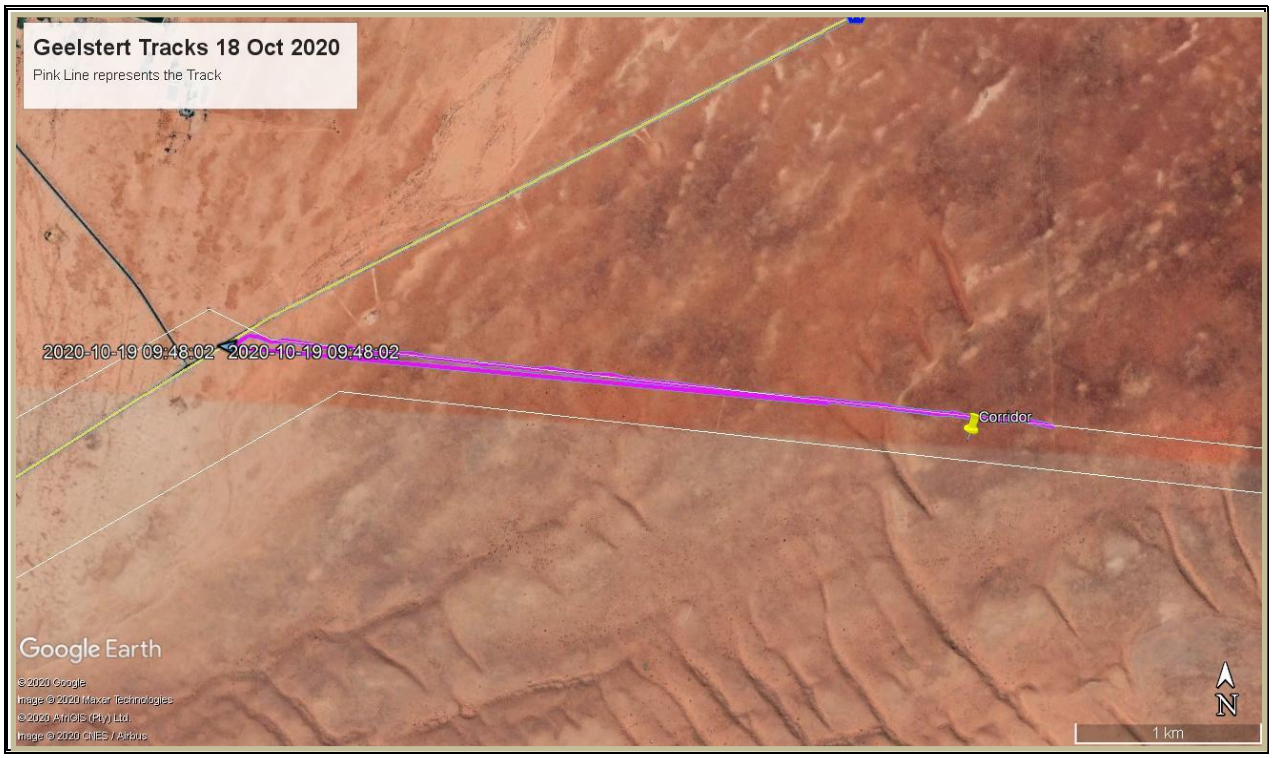


Figure 2 *Recorded tracks of the survey along the proposed development footprint: 17 to 19 October 2020.*

2.2 Description of the affected environment

The landscape of the study area is typical Bushmanland Sandy Grassland. It consists of extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (Stipagrostis species) giving this vegetation type the character of semidesert 'steppe'. In places, low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall, rich displays of annual herbs can be expected. (Mucina & Rutherford 2006). Vegetation noted across the development footprint include Three Thorn/Driedoring *(Rhigozum trichotomum*), Skaapbossie *(Aizoon schellenbergii)*, Shepherd tree *(Boscia albitrunca*), Suurgras (*Enneapogon desvauxii),* Kortbeen Boesmangras *(Stipagrostis obtuse).* The development footprint has dry waterways to the south and the north, flowing from west to east. There is a small pan towards the west within the Geelstert 1 development area, outside the development footprint.

The development area is bounded in the west by the N14 National road, in the north by the Loop 10 gravel road and the Gamsberg, in the south by open fields and neighbouring farms and to the east, it is bordered by the Gamoep gravel road.

Figure 3 *Panoramic view of the proposed Geelstert Site taken from the entry point adjacent to the Gamoep road.*

Figure 4 *Livestock Kraals, watering point and panorama view from the kraal.*

Figure 5 *Panorama view taken from east to west towards the Geelstert sites.*

Figure 6 *Panoramic view of the corridor with the existing power line.*

Figure 7 *Panoramic view of Aggeneys power station and corridor towards the southeast.*

Figure 8 *Panoramic view of Gamsberg taken from the Geelstert sites.*

Figure 9 *Panoramic view of the corridor area taken from the north towards the southwest.*

2.3 Archaeological resources identified

Point ID	Site No.	Site name	Description	Co-ordinates	Grading	Mitigation
Archaeological resources within the development area						
004	45423	BLOEM04 According to the EIA this location is excluded from the development footprint.	LSA Debris	29° 17' 59.4" S 18° 55' 48.3" E	NCW	Phase 1 is seen as sufficient recording.

Figure 10 *Location of recorded heritage resources across the development footprints.*

2.3.1 Heritage resources within the development corridor

Only one incidence of LSA debris was located on the edge of the small pan located towards the west-northwest of Geelstert 1 development area on the Remainder of the farm Bloemhoek 61 and identified as Site number 45423 and Site name BLOEM04.

2.3.1.1 Archaeological

At BLOEM04/45423 the presence of LSA debris was recorded on the shore of a small pan. The material had no context except for the pan as a possible water source during the recent LSA. Six microlithic retouched stone tool debris were located and consist of chips and chunks. The raw material used was Banded Ironstone Formation (BIF) and Quartzite. The density of the scatter was approximately 5 per 500m^2. This find is rated as not conservation worthy and is of low significance.

2.3.1.2 Graves

No graves were located on sites Geelstert 1, Geelstert 2 and the Geelstert Grid Connection corridor.

2.3.2 Other

The regional archaeology was extensively recorded in an HIA compiled by David Morris during 2013, including Gamsberg and Aggeneys.

2.3.3 Selected photographic record

Figure 11. *Heritage recorded within the development area.*

3. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

Description	Development Impact		Mitigation	Field rating/ Significance
1. BLOEM04	Nature	Negative	No mitigation required	NCW
	Extent	Low		
	Duration	High		
	Intensity	Low		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Medium		
	Significance	Low		

The proposed development, as outlined in this report, will not have a negative impact on the heritage resources recorded (BLOEM04/45423) within the development area. The small pan (wetland) has been excluded from the development footprint during the EIA. Therefore, the proposed development will have no impact on the recorded archaeological heritage resources. The cultural material has been graded with low significance and is not considered conservation worthy (NCW).

4. RECOMMENDATIONS AND CONCLUSIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. Archaeologically speaking, there are no objections to the proposed development on the developments footprints of Geelstert 1, Geelstert 2 and the Geelstert Grid Connection Corridor.

2. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA.

3. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to

be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

4. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such omissions.

5. REFERENCES

Mucina, L. & Rutherford, M.C. (eds) 2006. *The vegetation of South Africa,* Lesotho *and Swaziland.* Strelitzia 19. SANBI: Pretoria.

APPENDIX A

Determining significance and development impacts

Levels of the significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

Cultural significance:

- Low	A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium	Any site, structure or feature being regarded as less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High	Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorised as of high importance. Likewise, any principal object found within a specific context.

Heritage significance:

- Grade I	Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II	Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III	Other heritage resources of local importance and therefore worthy of Conservation

Field ratings:

i.	National Grade I	significance should be managed as part of the national estate
ii.	Provincial Grade II	significance should be managed as part of the provincial estate
iii.	Local Grade IIIA	should be included in the heritage register and not be mitigated (high significance)
iv.	Local Grade IIIB	should be included in the heritage register and may be mitigated (high/ medium significance)
v.	General protection A (IV A)	site should be mitigated before destruction (high/ medium significance)

vi.	General protection B (IV B)	site should be recorded before destruction (medium significance)
vii.	General protection C (IV C)	phase 1 is seen as sufficient recording, and it may be demolished (low significance)

Heritage value, statement of significance:

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 unique association with a particular community or cultural group for social, cultural or spiritual reasons;

h. its strong or unique 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.

Assessment of development impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are adverse and can include:

- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and/or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on possible identified heritage resources:

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource.
	Negative	
	Neutral	
Extent	Low	Site-specific affects only the development footprint.
	Medium	Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
	High	Regional (beyond a 10 km radius) to national.
Duration	Low	0-4 years (i.e. duration of construction phase).
	Medium	5-10 years.
	High	More than 10 years to permanent.
Intensity	Low	Where the impact affects the heritage resource in such a way that its significance and value are minimally affected.
	Medium	Where the heritage resource is altered, and its significance and value are measurably reduced.
	High	Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particularly vulnerable resource that will be impacted.
Consequence, (a combination of extent, duration, intensity, and the potential for impact on irreplaceable resources).	Low	A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium, and all three other criteria are rated low.
	Medium	Intensity is medium, and at least two of the other criteria are rated medium.
	High	Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all the other criteria being rated medium or higher.
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.

Criteria	Rating Scales	Notes
	High	It is more than 75 % certain that the impact will occur, or it is definite that the impact will occur.
Significance (all impacts including potential cumulative impacts)	Low	Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.
	Medium	Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.
	High	High consequence and medium probability. High consequence and high probability.

APPENDIX B

Fieldnotes

UBIQUE HERITAGE CONSULTANTS

FIELD NOTES

Phase 1 Archaeological/Heritage Impact Assessment

Site ID: **Remainder of the Farm Bloemhoek 61, Aggeneys, Northern Cape**:

GEELSTERT 1 AND 2 SOLAR PV FACILITIES, AS WELL AS THE GEELSTERT GRID CONNECTION

Phase 1 survey conducted				
CRM Archaeologist	Jan Engelbrecht		Date/s	2020-10-17 To 2020-10-19
Additional surveyors	None			
Type of survey	Pedestrian/Vehicular		Transects	30m to 100m where possible
Technical equipment	GPS	E tracks 10 Garmin Samsung Galaxy A01 Mobile Locus maps	Camera	Canon IXUS Digital Camera

Technical information

Project description	
Project name	PHASE 1 AIA Field Report for the Proposed Development of Geelstert 1 and Geelstert 2 Pv Facilities, including Grid Connection, Aggeneys, Northern Cape Province.
Description	Proposed development of the Geelstert 1 and 2 Solar Pv Facilities, as well as the Geelstert Grid Connection to connect to the Eskom- Aggeneis Main Transmission Substation, on the Remaining Extent of the Farm Bloemhoek 61 Near Aggeneys in the Khai-Ma Local Municipality, Namakwa District Municipality, Northern Cape Province.
Developer	
ABO Wind Renewable Energies (Pty) Ltd Geelstert Solar Facility 1 (Pty) Ltd Geelstert Solar Facility 2 (Pty) Ltd	
Contact information	
Development type	Electrical Infrastructure and Renewable Energy: Solar
Landowner	
Albertus Roux	
Contact information	0734609523
Consultants	
Environmental	Savannah Environmental and CTS Heritage
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	N/A
Property details	

Province	Northern Cape
District municipality	Namakwa
Local municipality	Khai-Ma
Topo-cadastral map	1:50 000 2918BD
Farm name	Remaining extent of the farm Bloemhoek 61 Portion 1 of the farm Aggeneys 56 Portion 2 of the farm Aggeneys 56, Portion 12 of the farm Aggeneys 56 Portion 13 of the farm Aggeneys 56.
Closest town	Aggeneys and Pofadder
GPS Co-ordinates	**Geelstert 1**: 29° 18′ 07" **S** 18° 56′ 11" **E** **Geelstert 2**: 29° 18′ 25" **S** 18° 57′ 53" **E** **Corridor eastern end:** 29° 17′ 40" **S** 18° 57′ 30" **E** **Corridor western end (MTS):** 29° 17′ 49" **S** 18° 48′ 10" **E**
Property size	12378,97ha
Development footprint size	Geelstert 1: ~245ha Geelstert 2: ~285ha Geelstert Grid Connection corridor: 17.5km long and 1km wide (extending to 2km at the Aggeneis Main Transmission Substation (MTS)).
Land use	
Previous	Agriculture
Current	Agriculture
Rezoning required	No
Sub-division of land	No

Development criteria in terms of Section 38(1) NHRA	Yes/No
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes
Construction of bridge or similar structure exceeding 50m in length.	No
Construction exceeding 5000m ^{2}.	Yes
Development involving three or more existing erven or subdivisions.	No
Development involving three or more erven or divisions that have been consolidated within the past five years.	No
Rezoning of site exceeding 10 000m ^{2}.	Yes
Any other development category, public open space, squares, parks, recreation grounds.	No

Site description

Description of the general area affected by development
Type of environment
Extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert 'steppe'. In places, low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall, rich displays of annual herbs can be expected.
Terrain description
Flat sandy plains with scattered dunes.

Geology
A third of the area is covered by recent (Quaternary) alluvium and calcrete. Superficial deposits of the Kalahari Group are also present in the east. The extensive Palaeozoic diamictites of the Dwyka Group also outcrop in the area as do gneisses and metasediments of Mokolian age. The soils of most of the area are red-yellow apedal soils, freely drained, with a high base status and <300 mm deep, with about one-fifth of the area deeper than 300 mm, typical of Ag and Ae land types.
Vegetation
Dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert 'steppe'. In places, low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall, rich displays of annual herbs can be expected. Other vegetation: Vegetation noted across the development footprint include: Three Thorn/Driedoring *(Rhigozum trichotomum*), Skaapbossie *(Aizoon schellenbergii)*, Shepherd tree *(Boscia albitrunca*), Suurgras (*Enneapogon desvauxii),* Kortbeen Boesmangras *(Stipagrostis obtuse).*
Waterways/sources
Two dry waterways were identified towards the southeast and northwest of the entire development footprint (Geelstert 1, Geelstert2 and the Geelstert Grid Connection corridor). These waterways flow from west to east.
Site boundaries
The development area is bounded in the west by the N14 National road, in the north by the Loop 10 gravel road and the Gamsberg, in the south by open fields and neighbouring farms and to the east, it is bordered by the Gamoep gravel road.

Site access	GPS Co-ordinates
The proposed power line and the PV development areas approached from the Gamoep road through a farm gate.	29° 19' 11.8" South 18° 58' 23.3" East

Disturbances
Natural erosion
The only natural disturbances detected were the minor dry waterways.
Human-made
Existing roads two-track roads cross the site footprints and along the edge of the proposed corridor.
Notes
None

Environmental recording/Panorama

Way point	Site Name	Description	Location	Field rating/ Significance	Photo No.
Site-specific points of interest/ natural significance					
001	N/A	Entry Point	29° 19' 11.8" South 18° 58' 23.3" East	N/A	1894-1898
N/A	N/A	Panorama images taken from the dune range in the west towards the east/Gamsberg	N/A	N/A	1899-1905
002	N/A	Panorama view of the livestock kraal and watering point in Geelstert 1	29° 17' 55.9" South 18° 55' 29.605.4" East	N/A	1906-1911
003	N/A	Dry waterway flowing east to west to east and existing power lines	29° 17' 36.6" South 18° 55' 09.7" East	N/A	1912-1916
005	N/A	Corridor area with the existing power line and two-track sand road running on the edge of the proposed corridor. Direction: NNW	29° 17' 27.2" South 18° 55' 08.8" East	N/A	1922-1932

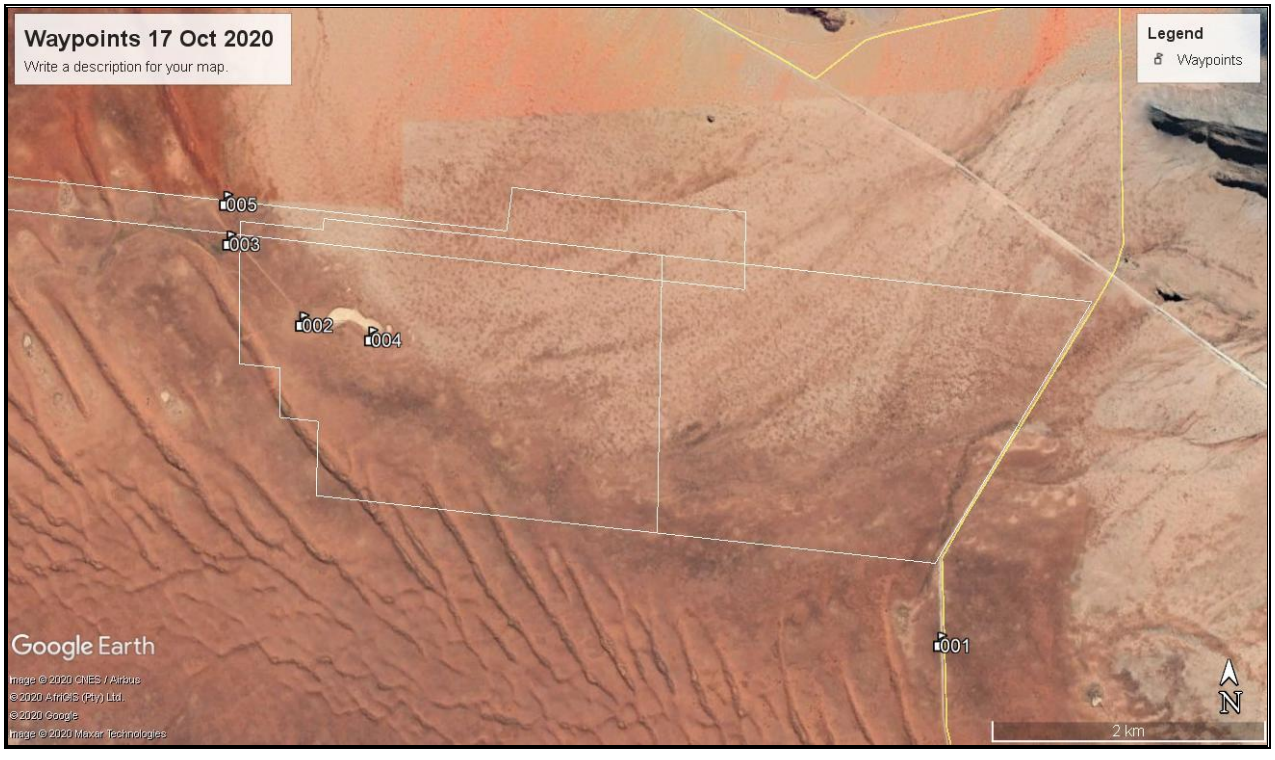
		to SSE.			
006	N/A	Aggeneys Eskom Sub Station adjacent to the N14 National road where the proposed power line will link up with the grid.	29° 17' 55.7" South 18° 48' 18.8" East	N/A	1933-1937
007	GS 01	Reference point registered used as base to take photos towards the Southern and South-eastern slope of Gamsberg, towards "Inkruip" (Morris 2013). Also used as a base to take photos towards the Geelstert 1, 2 and corridor footprints.	29° 16' 35.7" South 18° 59' 12.7" East	N/A	1938-1945
008	GS 02	Reference point registered to photograph the visual impact on the Gamsberg southern and south-eastern slopes heritage sites (massacre sites included). This reference point consisted of a single lone standing rocky Quartzite outcrop. Photos were taken from this base towards Gamsberg and towards Geelstert 1, 2 and the grid connection corridor.	29° 17' 07.7" South 18° 57' 20.9" East	No visual impact on massacre sites nor any heritage sites on the southern and south-western slope of Gamsberg	**GS02- Towards Gamsberg:** Images 1946-1951 **GS02- Towards Proposed development sites:** Images 1952-1961
N/A	N/A	Images of reference point GS01 registered as waypoint 008 above. Lone standing Quartzite outcrop NE of the Geelstert sites.	29° 17' 07.7" South 18° 57' 20.9" East (WP008)	N/A	1962-1963
N/A	N/A	Panorama images taken in the dune field in the NW of the site footprint Geelstert 1. Taken towards various directions.	N/A	N/A	1964-1976
009	N/A	Eskom Locked gate inside corridor area	29° 17' 26.8" South 18° 55' 04.5" East	N/A	None
010	N/A	Corridor area with existing power line and two-track sand road.	29° 17' 26.8" South 18° 54' 59.8" East	N/A	1977
011		Locked gate within the corridor section	29° 17' 14.4" South 18° 52' 53.2" East	N/A	1978-1983
N/A	N/A	Panorama view towards various directions of footprint Geelstert 2	N/A	N/A	1984-1995
N/A	N/A	Panorama view towards various directions of footprint Geelstert 1	N/A	N/A	1996-2010
N/A	N/A	Bakoor Jakkalase	N/A	N/A	2011-2016
012	GS 03	Reference point registered as GS03 located in the Loop10/Namies road. Took photographs towards the south and the south-eastern slope of Gamsberg towards the heritage sites recorded by Morris. As well as towards the Geelstert proposed development sites.	29° 16' 29.9" South 18° 56' 52.1" East	Proposed development will have no visual impact on existing heritage sites on slopes of Gamsberg.	**GS03 towards Gamsberg:** Image 2017-2022 **GS03 towards Geelstert sites:** Image 2023-2031
013	N/A	Entry point towards corridor area approached from the N14 towards the south within the	29° 17' 00.9" South 18° 50' 08.7" East	Conservation area	2032-2038

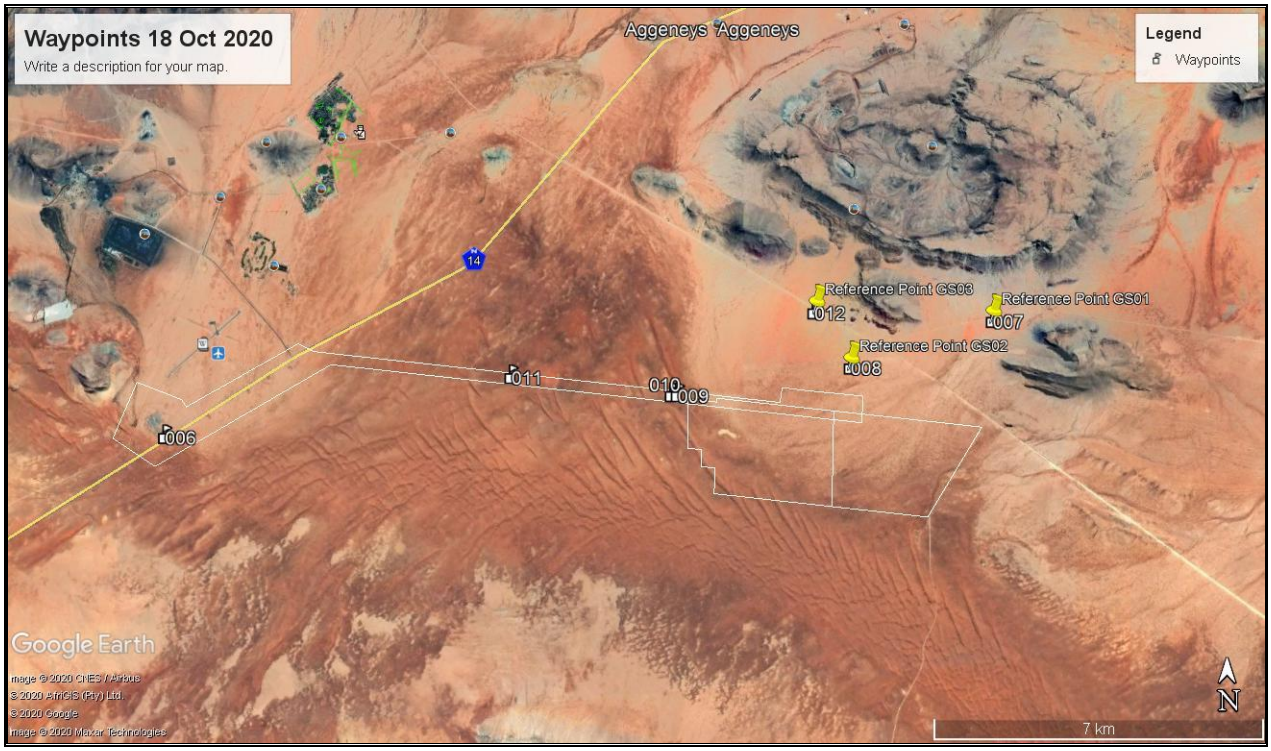
		Black Mountain Conservation area. Access gained with the assistance of Security manager at Black Mountain Mine Mr Johan Coetzer.			
014	N/A	A random point within corridor area entered from the N14—Corridor area with the existing power line and two-track sand road.	29° 17' 10.2" South 18° 52' 08.1" East	Conservation area	2039-2053

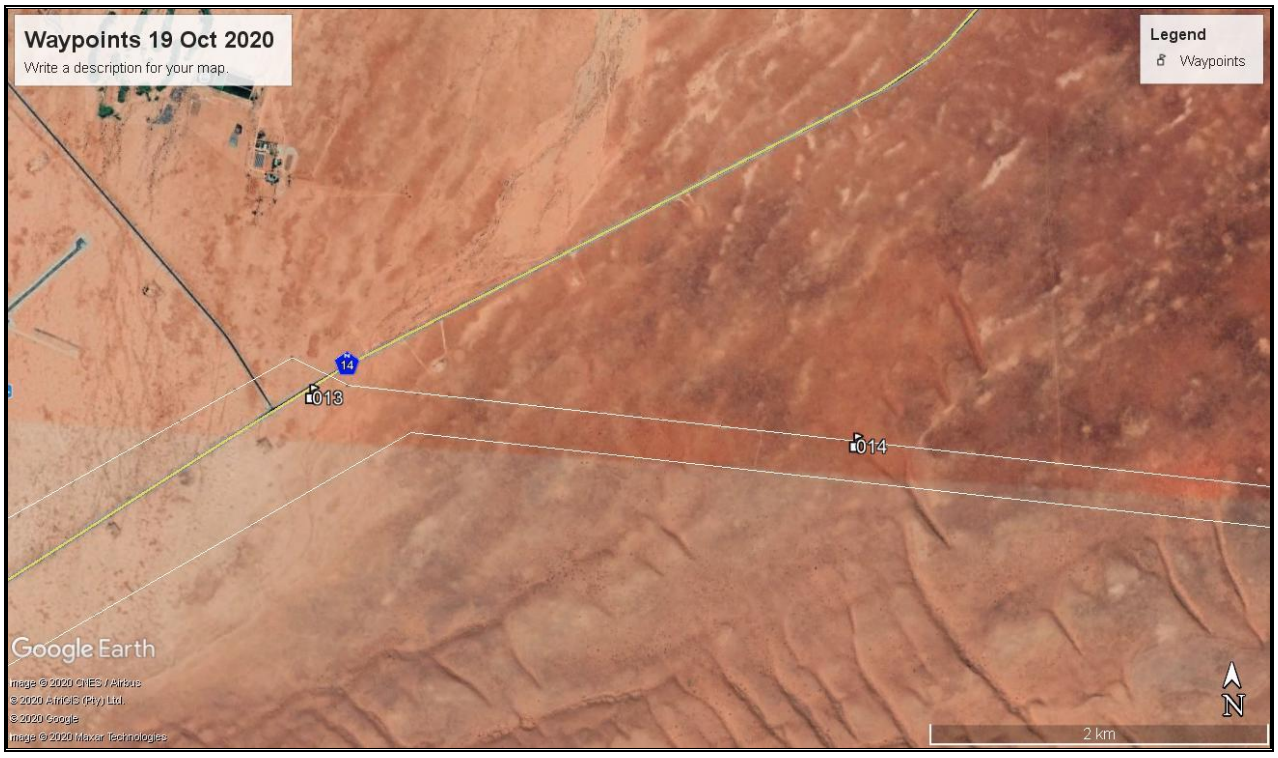
Heritage recording

STONE AGE

Way Point Site No.	Photo No.	Description		Period	Location	Field rating/ Significance
HERITAGE FINDS ON THE DEVELOPMENT AREA						
004 45423 and BLOEM04	Photo: 1917-1921	Type lithic/s	Chips and chunks	LSA	29° 17' 59.4" South 18° 55' 48.3" East	NCW. The find is located within the development area, but outside the development footprint, as determined by the EIA and NEMA
		Raw material	BIF and Quartzite			
		N in m².	5/ 500sqm			
		Context	Small dry pan			
		Additional	LSA debris			







Discussion

Stone Age finds
Only one LSA find on the edge of a small pan. Late Holocene within the more recent period of the Late Stone Age. Microliths/debris. The specific dry pan (wetland) is environmentally sensitive and is therefore included within the development area, but excluded from the development footprint where the actual development will

take place. This is also determined by the completed EIA in compliance with NEMA. There will be no impact on such heritage resources by the proposed development.
Historical finds
None on the proposed development footprint.
Identified graves
None on the proposed development footprint.

Recommendation

Stone Age finds
The project can continue. Only one find of field rating Grade NCW. Low significance. Sufficiently recorded during Phase 1. No further action.
Historical finds
The project can continue. No further action.
Identified graves
The project can continue. No further action.
Other
None

Additional notes

There will be no visual impact on the Gamsberg massacre sites or any other sites located in the Gamsberg region. The distance between the Geelstert sites and Gamsberg is quite extensive, and the spatial relationship between the sites is of such a nature that impacts in all dimensions (1D, 2D, 3D and 4D) will be almost irrelevant. The proposed development will, however, be visible from the southern and south-eastern slopes of Gamsberg when gazing towards the south, southwest and southeast. **See images recorded at Reference points GS 01, 02 and 03.** From a heritage perspective, we are convinced that the heritage sites recorded by Dr David Morris during 2013 are well mitigated and conserved at this stage. It is also located within the Gamsberg conservation area which is under the direct management of the Gamsberg/Black Mountain Environmental Officer located at Aggeneys. There are currently no developments close to the southern slopes, except for the existing Gamsberg Zink mine. The visual impacts of the proposed development on the Gamsberg Heritage sites should be temporary and low significance.

The following finds and recommendations were also made in the Environmental Basic Assessment Report submitted during August 2020 (Geelstert Grid Connection, Northern Cape Province Basic Assessment Report 2020: 184):

> "The fact that the terrain is relatively flat will mean that the grid connection infrastructure is likely to be viewed in profile by all identified receptors within the area. Due to the grid connection corridor running parallel to an existing power line servitude (i.e. Aries/Aggeneis 400kV Power Line) for majority of its length, the development of the Geelstert Grid Connection will likely have a low impact in terms of intensifying the visual influence of grid connection infrastructure within the developed landscape character area.

Due to its tourism importance, the N14 is likely to be one of the most sensitive visual receptors. The grid connection corridor only affects the N14 for 8km from the connection point at the Aggeneis MTS, and because views from this section of the road are already impacted by existing power lines (i.e. Aries/Aggeneis 400kV Power Line) and the Black Mountain Mine operations, the visual impact is of a low significance. The Loop 10 road runs parallel to the northern boundary of the grid connection corridor. From this road, the Geelstert Collector Substation will be viewed behind the authorised Aggeneys 1 and Aggeneys 2 solar PV facilities and collector substation, as well as other grid connection infrastructure (i.e. Aries/Aggeneis 400kV Power Line, etc.). The Geelstert Grid Connection will be viewed at a distance of approximately 1.5km from this road and will be partly screened by the solar PV panel arrays of the authorised Aggeneys 1 and Aggeneys 2 solar PV facilities. There is only one homestead that could potentially be affected by the views of the Geelstert Grid Connection within the surrounding area. The homestead is located 2.7km to the north-east of the grid connection corridor and north of the Loop 10 Road. From this distance, views of the Geelstert Grid Connection (including the collector substation) will be possible; however the grid connection infrastructure will be viewed in the context of the Aggeneys 1 and Aggeneys 2 solar PV projects, as well as the existing Aries/Aggeneis 400kV Power Line which at its closest is located 200m south of homestead and is highly obvious. Howdver, the homestead appeared to be vacant. Aggeneys is the only settlement in the vicinity of the gird connection corridor, and the power line is likely to be visible from this area. However, the Geelstert Collector Substation is located in excess of 10km from the town of Aggeneys and is highly unlikely to be visible." (Geelstert Grid Connection, Northern Cape Province Basic Assessment Report 2020:142 and 143)

"The Visual Impact Assessment (**Appendix I**) is based on the findings of a field assessment undertaken in January 2019. The duration of the construction phase impacts will be short-term and local in extent. The operation phase impacts will be local in extent, with a long-term duration for the lifetime of the grid Connection infrastructure. The Visual Impact Assessment identified negative impacts on visual receptors for the construction and the operation phases of the Geelstert Grid Connection. The impacts include a change in the character of the general landscape in the Aggeneys area; a change in the character of the landscape as seen from theN14, the Loop 10 and Gamoep roads; the local homestead located to the north-east of the grid connection corridor; and the residents of Aggeneys. The significance of the impacts will be low with the implementation of the recommended mitigation measures. No impacts of a high or medium significance and fatal flaws are expected to occur following the implementation of the recommended mitigation measures. From the findings of the Visual Impact Assessment, it is concluded that the development of the Geelstert Grid Connection will largely impact visually on an area where there is currently a strong visual influence of existing grid connection infrastructure (i.e. power lines and substations, etc.) and mining developments (i.e. Gamsberg and Black Mountain Mine), and therefore changes to the landscape as a result of the Geelstert Grid Connection are unlikely to be visually intrusive. As a result, no fatal flaws are anticipated from a visual perspective. In conclusion, the specialist has indicated that the development of the Geelstert Grid Connection is considered acceptable from a visual perspective and can be authorised." (Geelstert Grid Connection, Northern Cape Province Basic Assessment Report 2020: 184)

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HERITAGE CONSULTANTS

JAN ENGELBRECHT
ARCHAEOLOGIST
HERITAGE SPECIALIST

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Declaration of independence:

I, Jan Engelbrecht, hereby confirm my independence as a heritage specialist and declare that:

- I am suitably qualified and accredited to act as an independent specialist in this application;
- I do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- The work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.

Signed:
J.A.C. Engelbrecht

Date: 2020-10-22
UBIQUE Heritage Consultants

CTS HERITAGE

APPENDIX 2: Visual Impact Statement (October 2020)

ENVIRONMENTAL PLANNING AND DESIGN

Our Ref: 2011/JM 2nd November 2020

To whom this may concern,

Confirmation of the visual implications that Geelstert 1 Solar PV facility is likely to have regarding the Gamsberg and Namiesberg Massacres Sites (DEA Reference Number: 14/12/16/3/3/1/2221)

The location of the Gamsberg and Namiesberg Massacres Sites is detailed on page 14 of the Heritage Screening Report that accompanied the Basic Assessment report for this proposed project. The following points are relevant to the visual impact of the proposed Geelstert 1 solar PV facility to the Gamsberg and Namiesberg massacre sites.

- Geelstert 1 Solar PV facility will not physically change the nature of the Gamsberg or Namiesberg massacre sites;
- Geelstert 1 Solar PV facility is unlikely to be visually obvious from the Namiesberg massacre site;
- Geelstert 1 Solar PV facility will be visible from the upper sections of the Gamsberg massacre site, however, it will be viewed in the context of other more major infrastructure. The Gamsberg has been mined for Zinc by the Black Mountain Mining Company and comprises an open pit mine and a dedicated processing plant which has resulted in disturbance of the area;
- Geelstert 1 Solar PV facility will be largely screened from the lower sections of the Gamsberg massacre site by other proposed solar PV projects; and
- Geelstert 1 Solar PV facility will not block or change views of either the Gamsberg or the Namiesberg massacre sites from accessible public view points along the adjacent un-surfaced roads known as the Loop 10 Road and the Gamoep Road.

Due to the above points it is not anticipated that the proposed Geelstert 1 Solar PV facility will have a significant visual impact on either the Gamsberg or the Namiesberg massacres sites.

Should you have any queries, please do not hesitate to contact the undersigned using the contact details below.

Kind regards

Jon Marshall
ENVIRONMENTAL PLANNING AND DESIGN

Telephone: 083 203 2995
Email: jon@enviroconsult.co.za

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APPENDIX 3: Heritage Screening Assessment

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS20_050_Geelstert 1**
SAHRIS Reference:	
Client:	**Savannah Environmental (Pty) Ltd**
Date:	**August 2020**
Title:	**PROPOSED DEVELOPMENT OF GEELSTERT 1 SOLAR PV FACILITY ON THE REMAINING EXTENT OF THE FARM BLOEMHOEK 61 NEAR AGGENEYS IN THE NORTHERN CAPE**

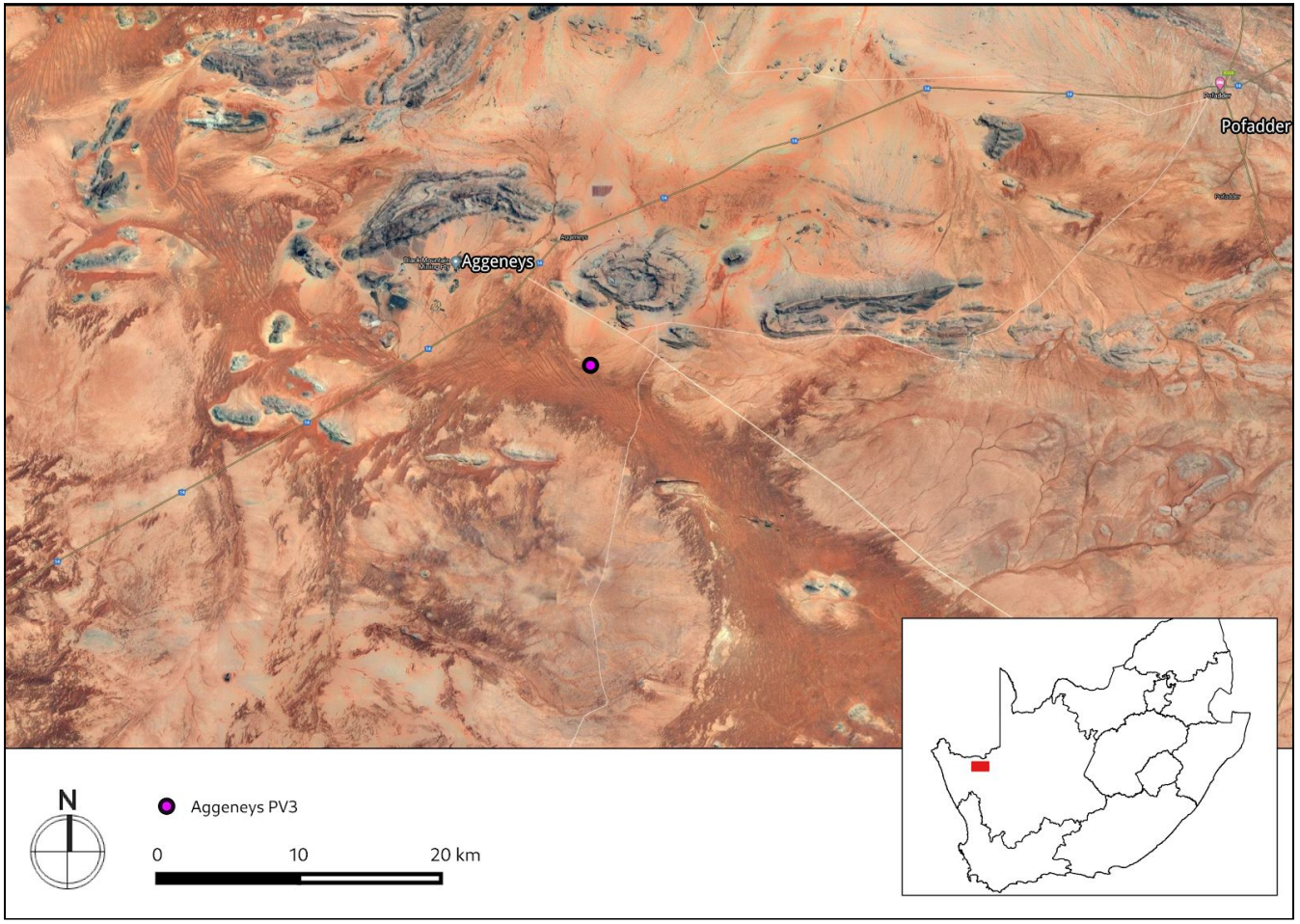

Figure 1a. Satellite map indicating the location of the proposed development in the Northern Cape

RECOMMENDATION

The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

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1. Proposed Development Summary

Geelstert Solar Facility 1 (Pty) Ltd is proposing the development of a commercial solar PV facility and associated infrastructure, known as Geelstert 1, on a site located approximately 11km south-east of Aggeneys within the Khâi-Ma Local Municipality and the Namakwa District Municipality in the Northern Cape Province. A development area (located within the study area and affected property, Remaining Extent of the Farm Bloemhoek 61) with an extent of ~578ha has been identified by Geelstert Solar Facility 1 (Pty) Ltd as a technically suitable site for the development of a solar PV facility with a contracted capacity of up to 125MW. The development footprint of Geelstert 1 will be located within the development area. The study area is located within Focus Area 8 of the Renewable Energy Development Zones (REDZ), which is known as the Springbok REDZ. Due to the location of the study area within a REDZ, a Basic Assessment (BA) process will be undertaken in accordance with GN R114 as formally gazetted on 16 February 2018.

The development area of Geelstert 1 is proposed to accommodate the following infrastructure, which will enable the solar PV facility to generate a contracted capacity of up to 125MW:

- Bifacial or monofacial PV panels, mounted on fixed-tilt or tracking mounting structures with a maximum height of 3.5m;
- Centralised inverter stations or string inverters;
- A temporary laydown area;
- Cabling between the panels, to be laid underground where practical;
- An on-site facility substation stepping up from 22kV or 33kV to 132kV or 220kV, with an extent of up to 1ha to facilitate the connection between the solar PV facility and the grid connection solution;
- An access road to the development with a maximum width of 8m;
- Internal access roads within the PV panel array area with a maximum width of 5m;
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses, a workshop and visitors centre.

It is the Developer's intention to bid the solar PV facility under the Department of Mineral Resources and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). Ultimately, the project is intended to be part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resources Plan (IRP). A separate Basic Assessment process will be undertaken for the Geelstert Grid Connection to connect Geelstert 1 to the Aggeneis Main Transmission Substation.

2. Application References

Name of relevant heritage authority(s)	SAHRA
Name of decision making authority(s)	DEA

CTS HERITAGE

3. Property Information

Latitude / Longitude	29°18'16.46"S 18°56'5.84"E
Erf number / Farm number	Remaining Extent of the Farm Bloemhoek 61
Local Municipality	Khai-ma
District Municipality	Namakwa
Previous Magisterial District	Namakwaland
Province	Northern Cape
Current Use	Agriculture
Current Zoning	Agriculture
Total Area	578ha

4. Nature of the Proposed Development

Total Area of development	240ha
Depth of excavation (m)	Foundations (typically rammed pilled foundations) will vary according to soil profiles, but are generally between 2 and 3m deep.
Height of development (m)	Bifacial or monofacial PV panels, mounted on fixed-tilt or tracking mounting structures with a maximum height of 3.5m;

5. Category of Development

x	**Triggers: Section 38(8) of the National Heritage Resources Act**
	Triggers: Section 38(1) of the National Heritage Resources Act
	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.
	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-
x	a) exceeding 5 000m^2 in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m^2
	5. Other (state):

7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

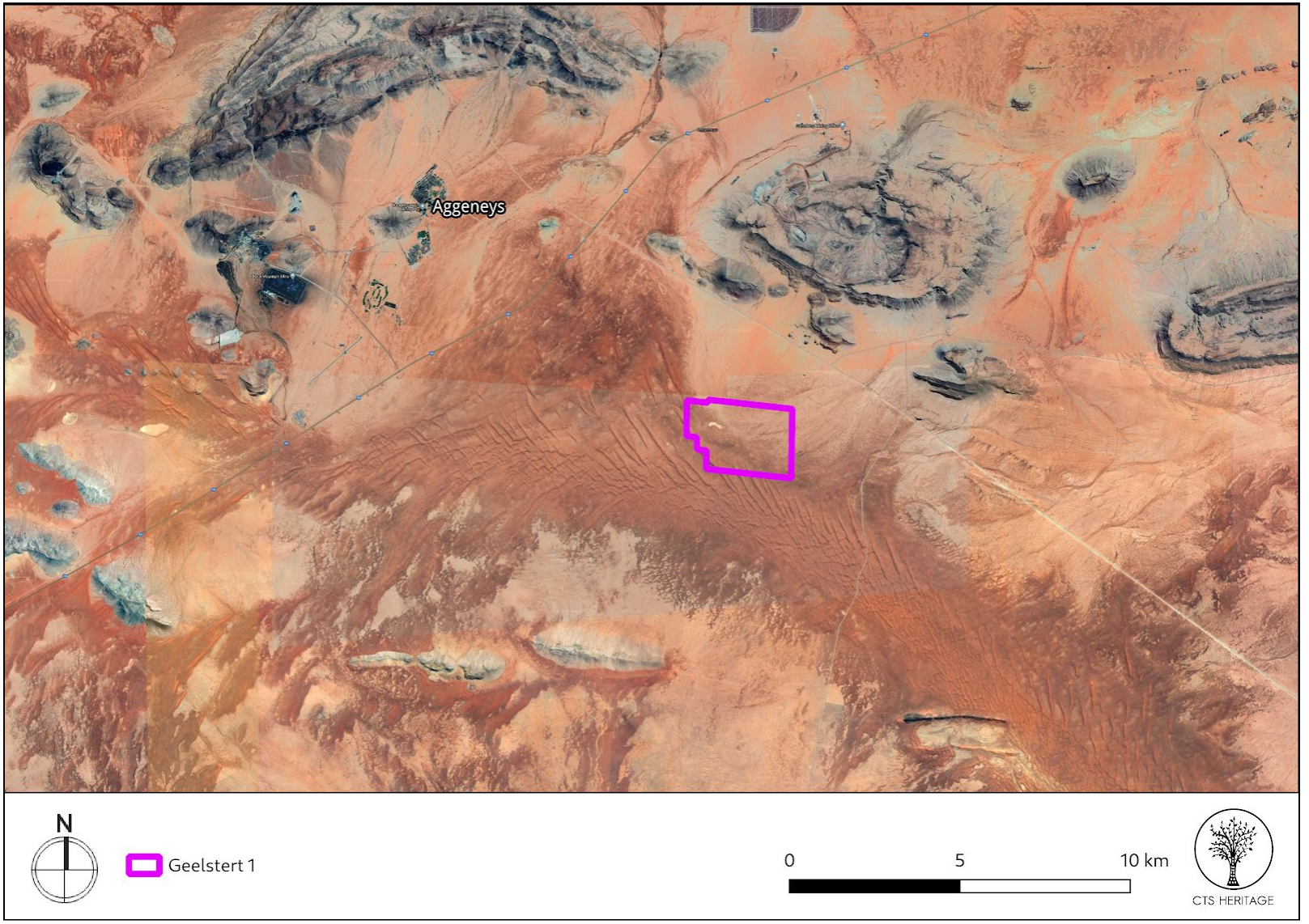

Figure 1b. Overview Map. Satellite image (2020) indicating the proposed development area

Figure 1c. Overview Map. Satellite image (2020) indicating the proposed development area

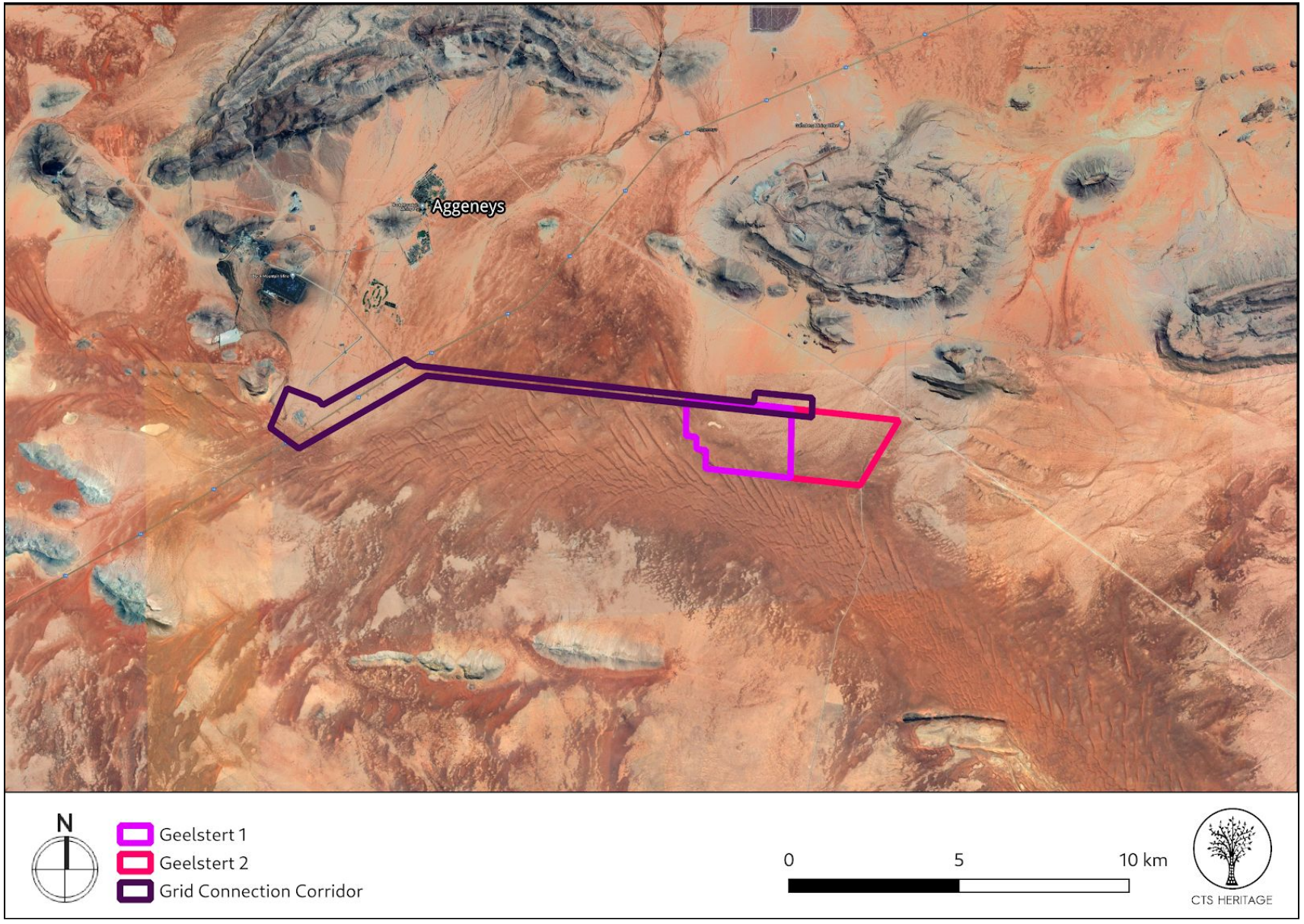

Figure 1d. Overview Map. Satellite image (2020) indicating the proposed development area with related proposed developments

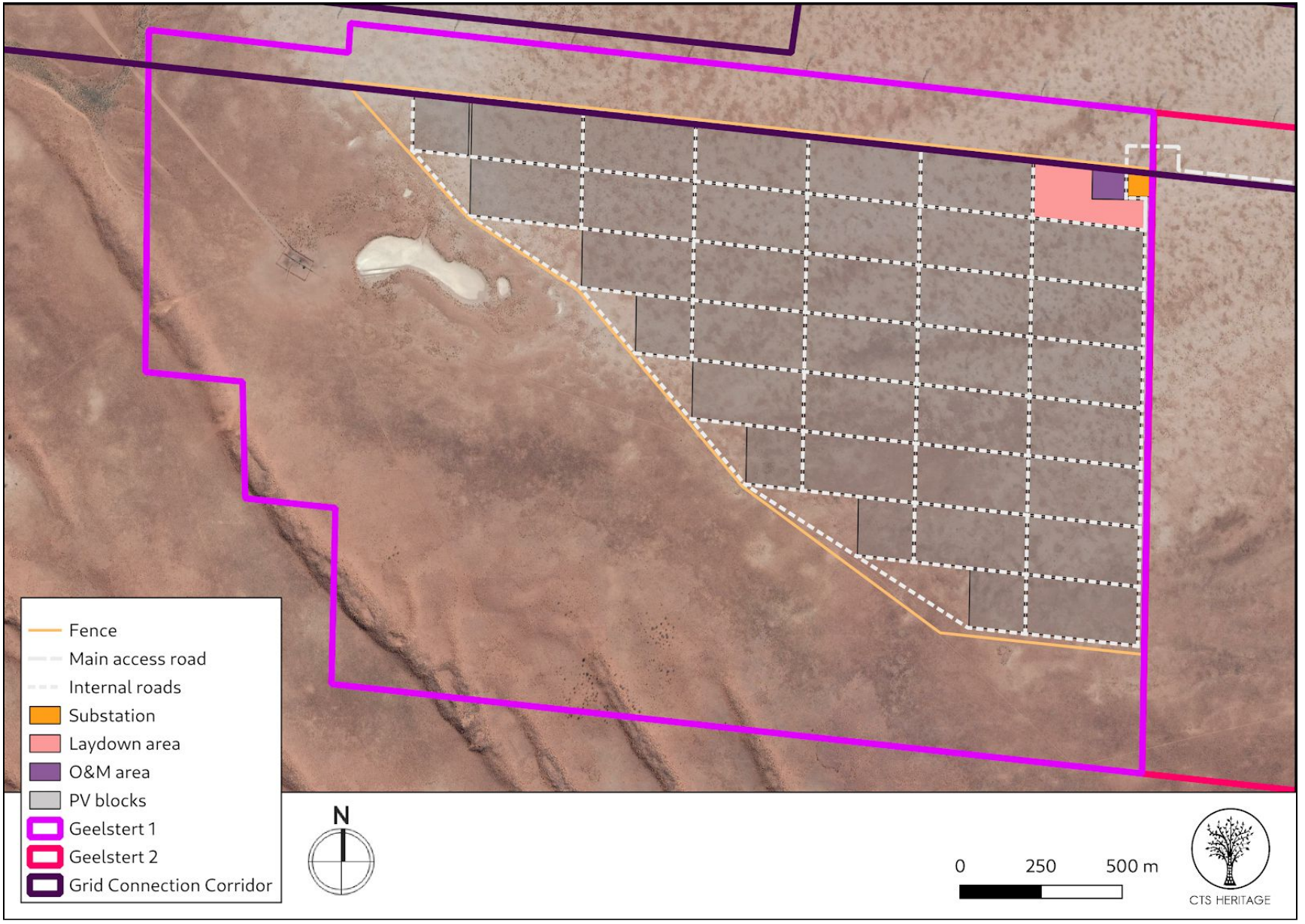

Figure 1e. Overview Map. Satellite image (2020) indicating the proposed development layout

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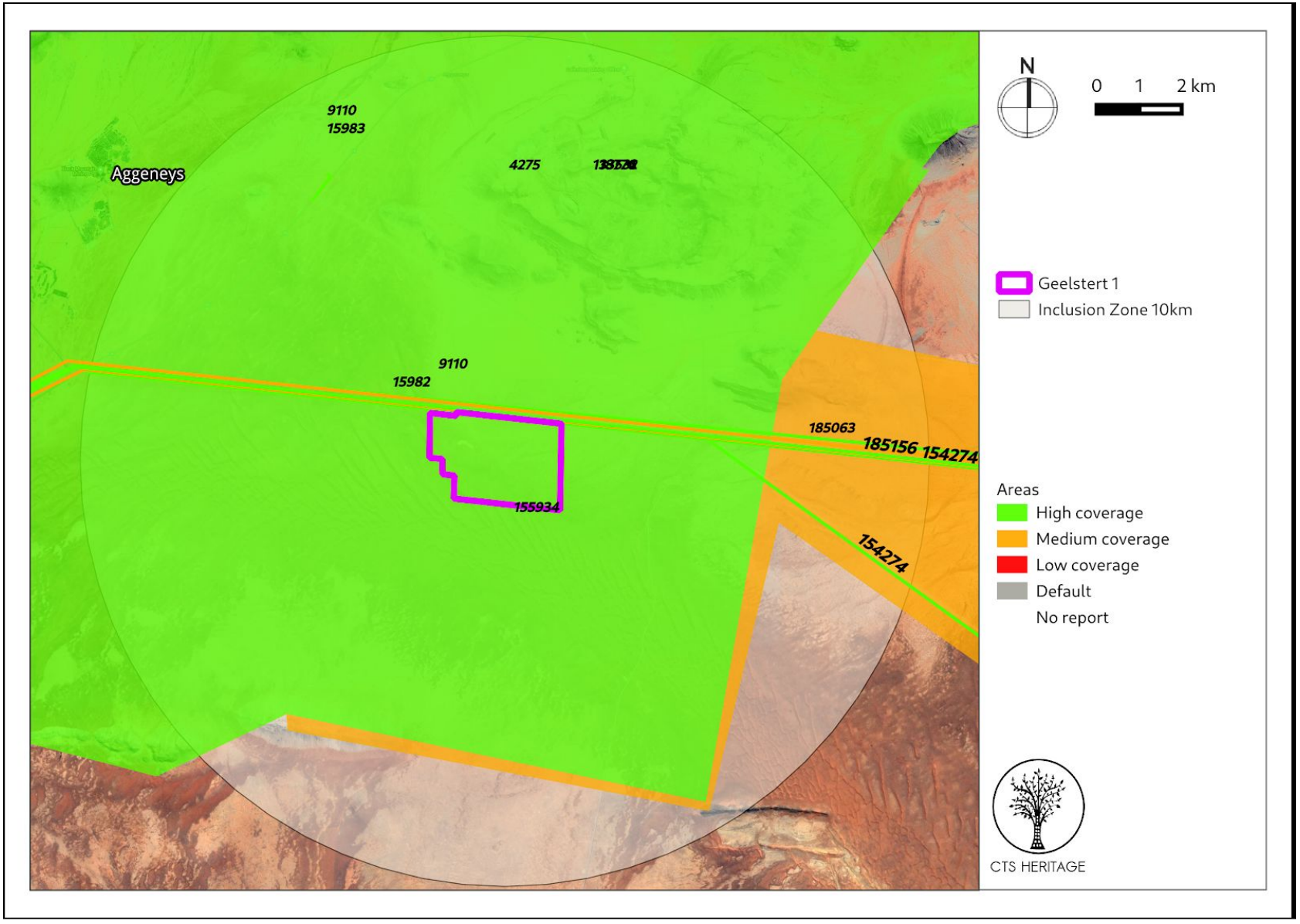

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for full reference list.

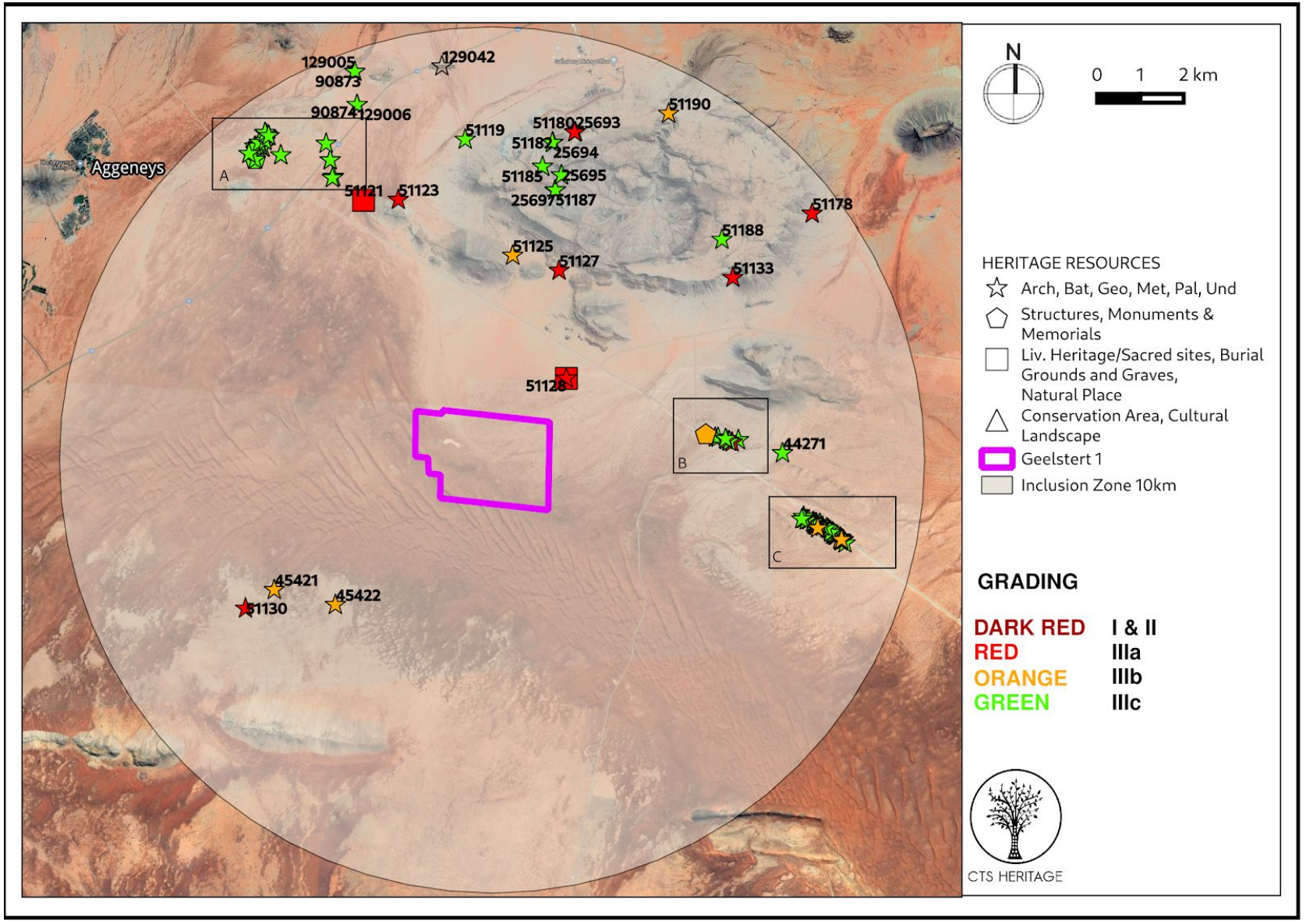

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.

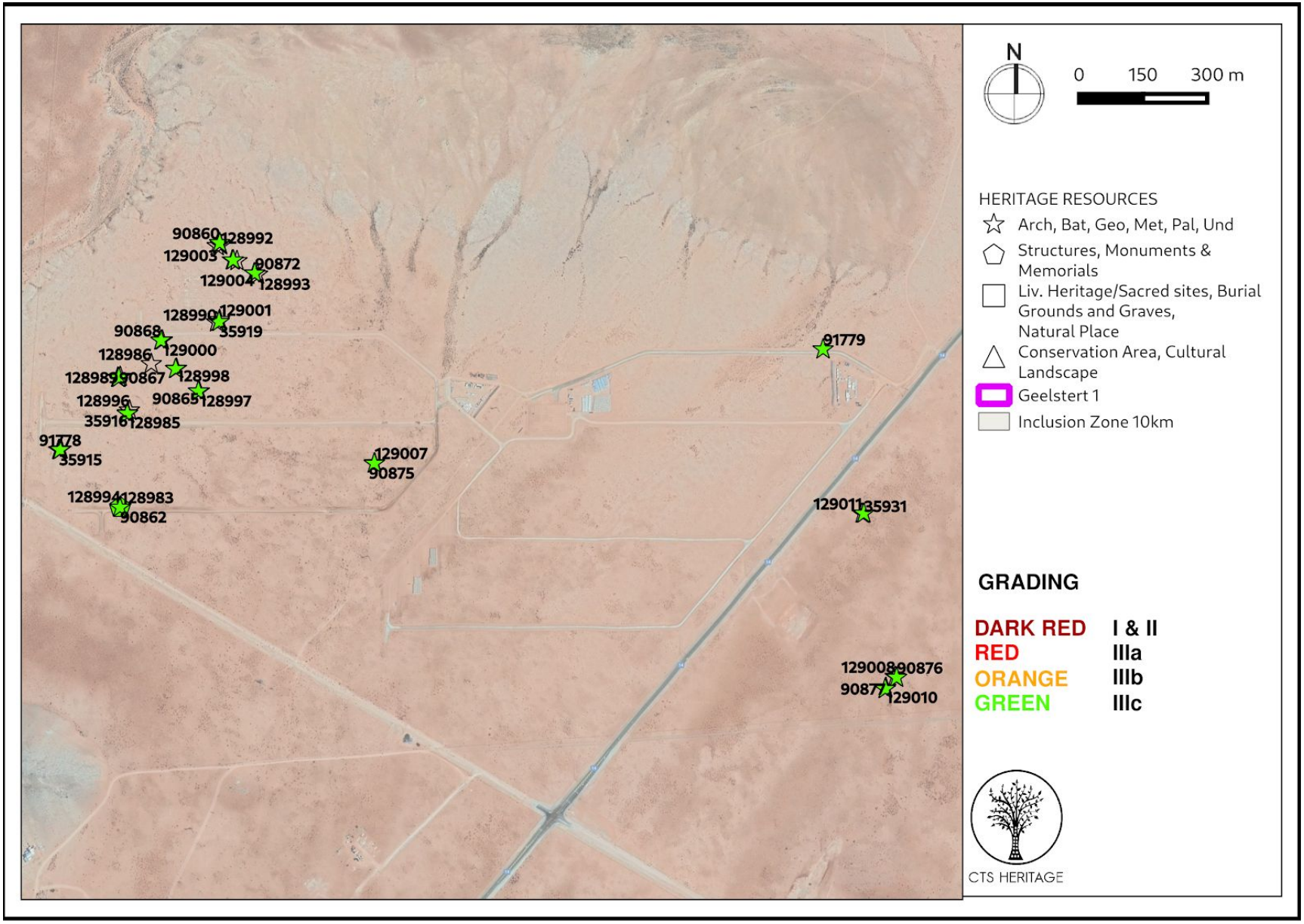

Figure 3a. Heritage Resources Map showing Inset A

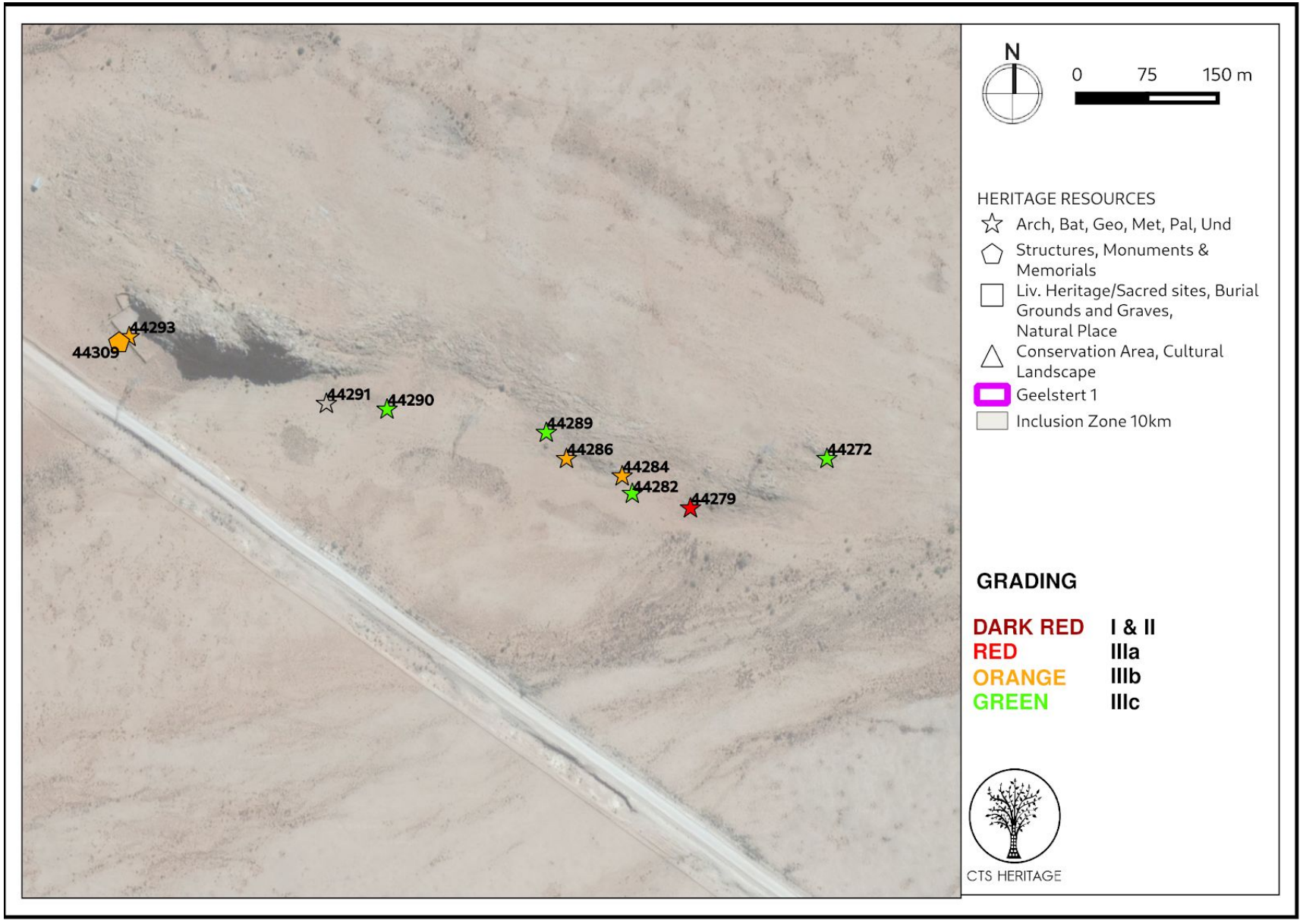

Figure 3b. Heritage Resources Map showing Inset B

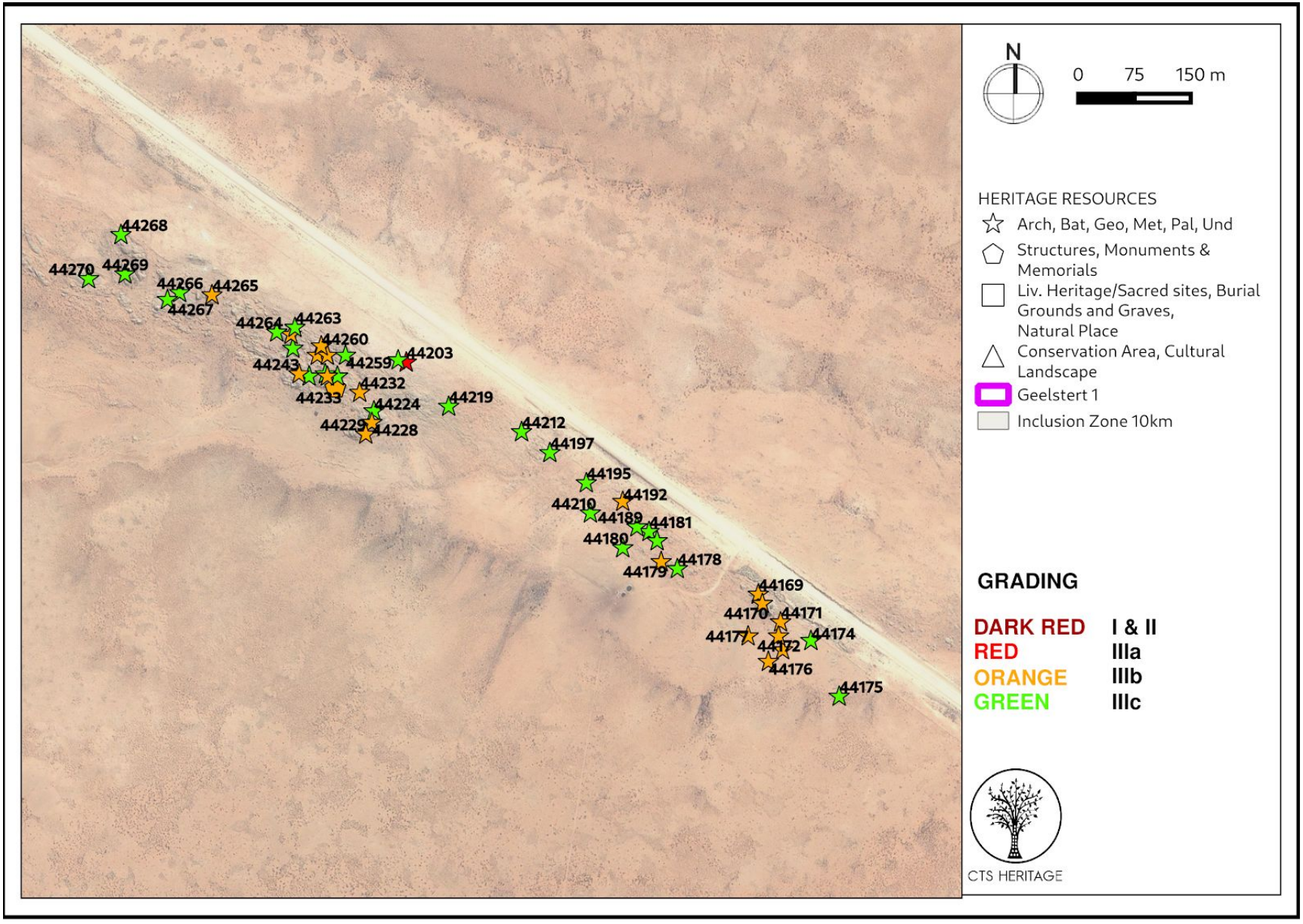

Figure 3c. Heritage Resources Map showing Inset C

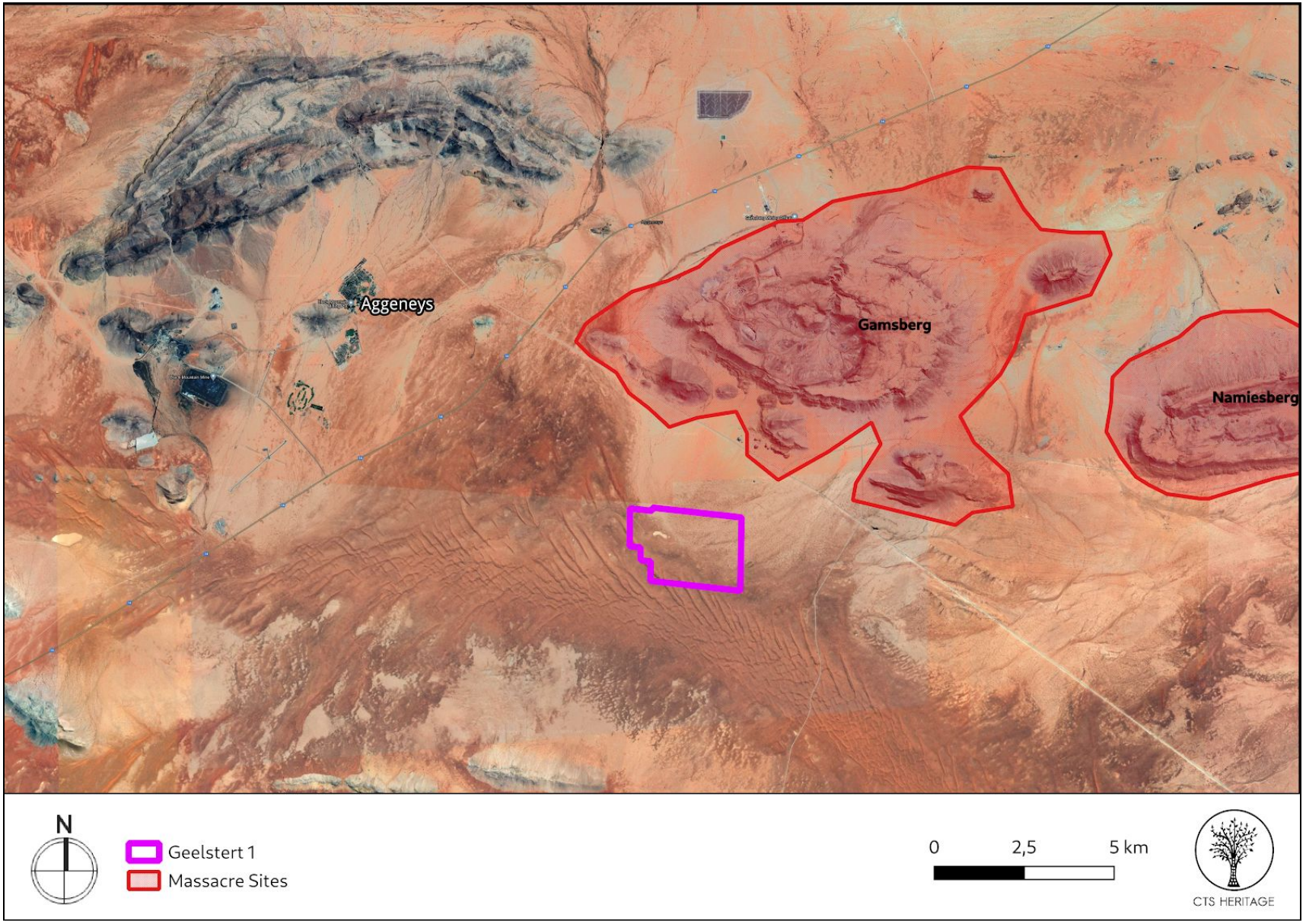

Figure 3d. Heritage Resources Map showing the Gamsberg and Namiesberg Massacre sites

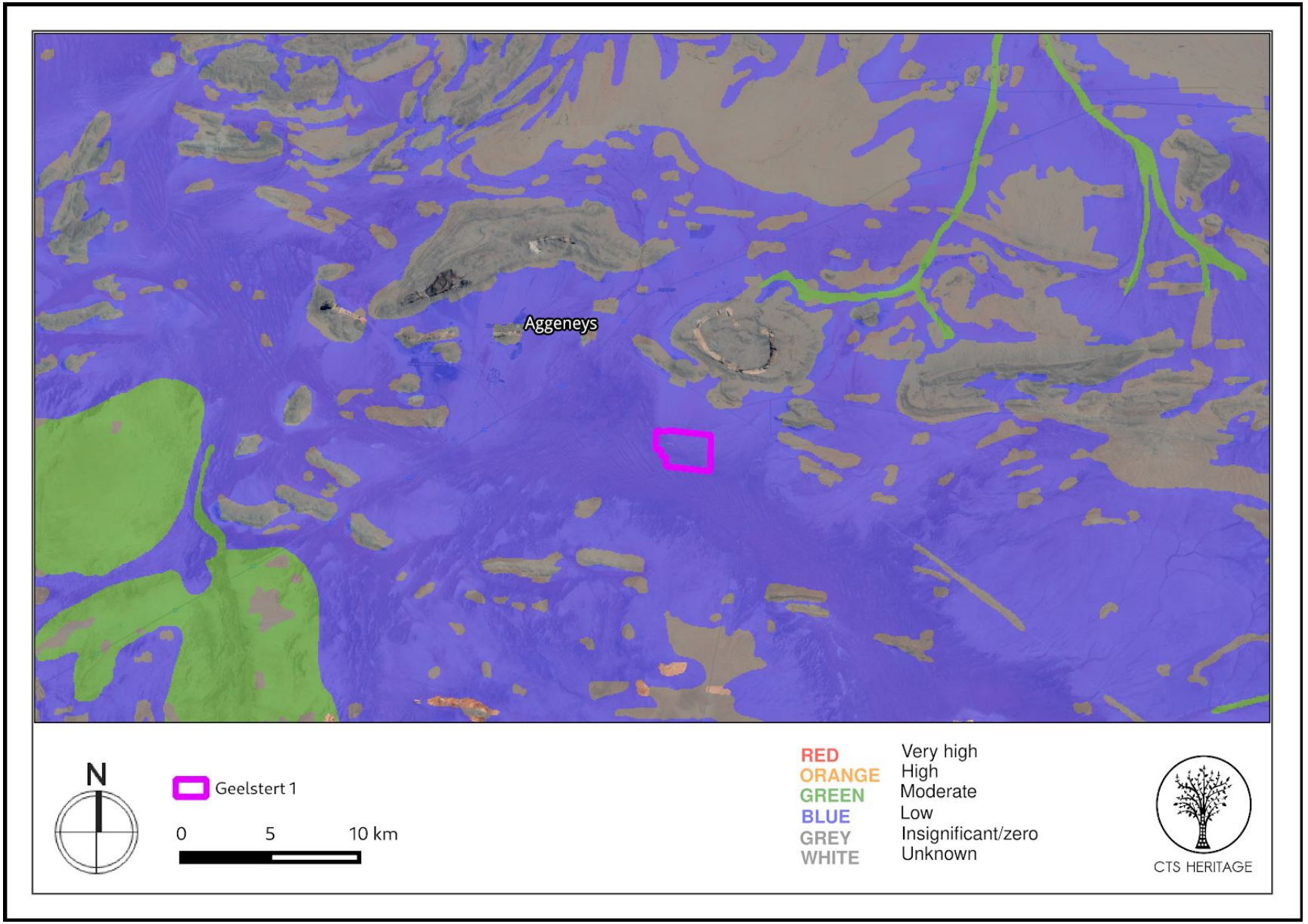

Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

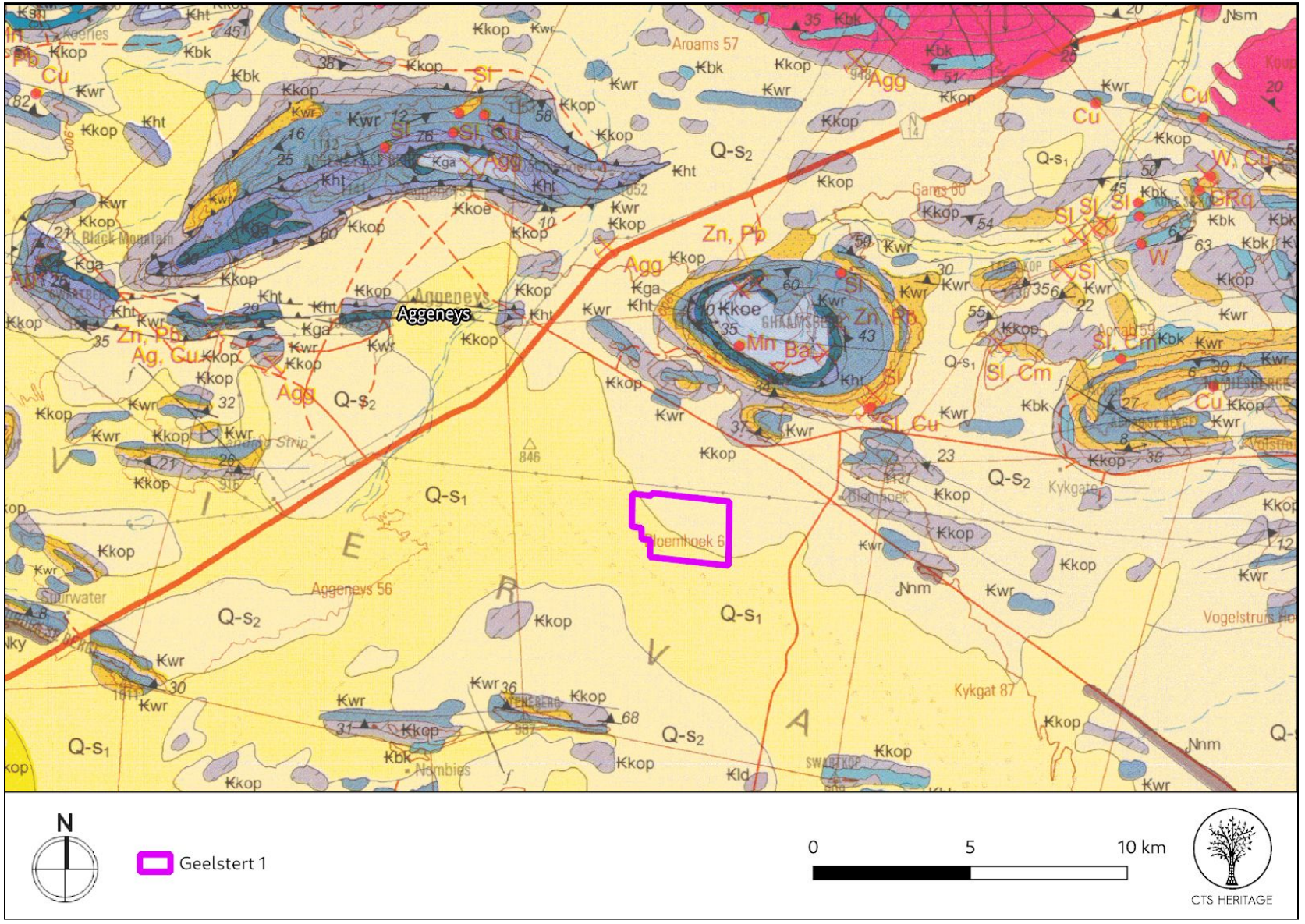

Figure 4b. Geology Map. Extract from the CGS 2918 Pofadder Map indicating that the development area is underlain by sediments Q-s_1 and Q-s_2 (Quaternary Sands) with obvious granite intrusions that form part of the Aggeneys sub-group located outside of the project area

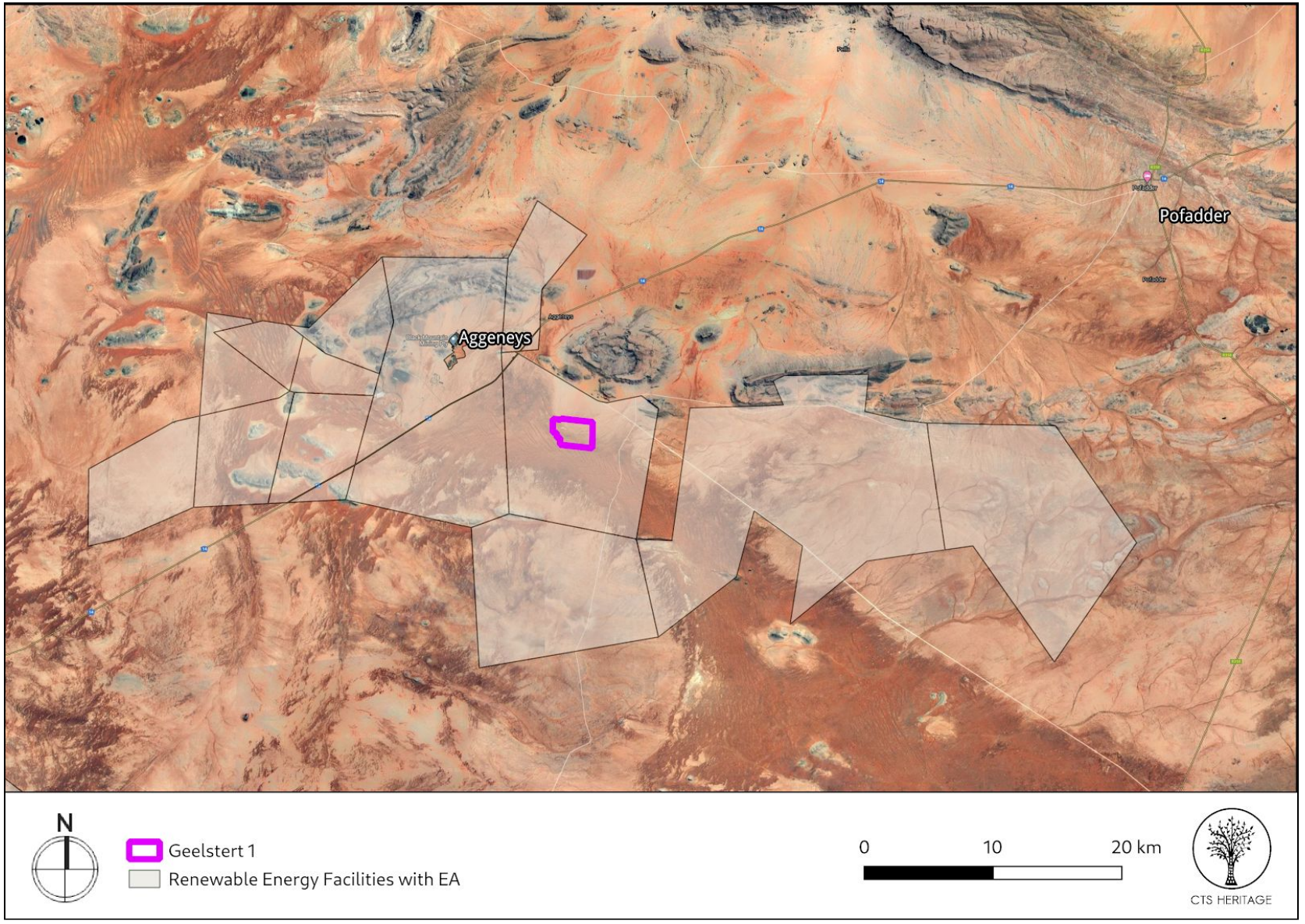

Figure 5. Cumulative Impact Map. Indicating other Renewable Energy projects that have been granted Environmental Authorisation (EA). Each project will have associated OHL infrastructure.

Figure 6. Image of Site. From the N14 facing south east towards the development area (GoogleStreet View - 2010)

8. Heritage Assessment

Background

This application is for the proposed establishment of a PV facility just outside of Aggeneys, in an area that has previously been assessed for impacts to heritage resources. Aggeneys is a mining town established in 1976 on a farm of that name, situated between Pofadder and Springbok in the Northern Cape. The area proposed for development has previously been thoroughly assessed for impacts to heritage resources by Morris (2013; SAHRIS NID 155934) and this desktop assessment refers extensively to this work. The area proposed for development is described by Morris (2013) as “arid, comprising relatively flat drainage plains with inselbergs such as the Aggeneys Mountains, Black Mountain and Gamsberg rising above the plains in the wider landscape. In the immediate vicinity of the proposed development the predominant topographic feature is the band of dunes running east to west defining the Koa Valley, a fossil relic of a major Miocene drainage line from the interior. The landscape is on the whole sparsely vegetated… (and) includes parts of dune fields and… the adjacent plains to the north and south…”

Cultural Landscape and Built Environment Heritage

The area in general is dominated by heritage associated with copper mining, including the adjacent Black Mountain Mine which is still mined for copper deposits. Prior to 1652, the indigenous peoples (the Khoisan or Nama) of the area extracted raw or "native copper" from the gneiss and granite hills that make up the surrounding Namaqualand Copper belt. This copper was beaten into decorative items, worn as bangles and neck adornments. Early settlers in the Cape Colony heard rumours of mountains in the north-west that were fabulously rich in copper. Governor Simon van der Stel was inclined to believe these tales when, in 1681, a group of Namas visited the Castle in Cape Town and brought along some pure copper. Van der Stel himself led a major expedition in 1685 and reached the fabled mountains on 21 October. Three shafts were sunk and revealed a rich lode of copper ore - the shafts exist to this day. For almost 200 years nothing was done about the discovery, largely because of its remote location. The explorer James Alexander was the first to follow up on van der Stel's discovery. In 1852 he examined the old shafts, discovered some other copper outcrops and started mining operations. Prospectors, miners and speculators rushed to the area, but many companies collapsed when the logistical difficulties became apparent. The first miners were Cornish, and brought with them the expertise of centuries of tin-mining in Cornwall. The ruins of the buildings they constructed as well as the stonework of the bridges and culverts of the railway built to transport the ore to Port Nolloth, can still be seen. The Namaqualand Railway started operating in 1876 and lasted for 68 years, carrying ore to Port Nolloth and returning with equipment and provisions. The historical built environment heritage resources associated with the Namaqualand Copper Mining Landscape form a significant part of the cultural landscape of this area.

Additional built environment heritage resources that are known from this area include corbelled buildings and built structures associated with the colonial frontier. Based on the information available, no such built environment or cultural landscape resources fall within the area proposed for development. However, Webley and Halkett (2012, SAHRIS NID 9110) note that appreciation has started emerging regarding the “genocide against the Bushmen in this area, with certain mountainous areas (like Gamsberg and Namiesberg located

within very close proximity to the proposed development area - Figure 3d) being likely massacre sites". This has resulted in moves to include the Gamsberg in a potential /Xam and Khomani Heartland World Heritage Site. According to Morris (2013), "the southern/south eastern side of Gamsberg was the site of an incident in which a group of San were cornered and shot – part of what historians now characterise as a genocide against the indigenous people of the region. Some evidence suggests that this most likely took place in the kloof known as 'Inkruip' ('Creep in')."

Archaeology

Prior to colonial settlement, this area was occupied by Khoe and San people, as evidenced by the number of Khoe and San names still evident in the landscape (such as Aggeneys). According to Morris (2013, SAHRIS NID 155934), Later Stone Age (LSA) resources are the predominant archaeological trace known from this broader area, with Early (ESA) and Middle Stone Age (MSA) resources occuring in much lower densities and all known archaeological resources associated with rocky outcrops and duns sands. A number of detailed archaeological assessments have been conducted in the broader area by Halkett and Webley (2012, SAHRIS NID 9110) for a proposed solar energy facility, Smith (2012, SAHRIS NID 334) and Morris (2011, SAHRIS NID 7871). Halkett and Webley (2012) noted that "Stone artefacts scatters from the Middle Stone Age are sparsely distributed across the study area and are found on gravel pavements between the vegetation; The absence of associated archaeological material, and lack of discrete individual sites reduces the significance of the material overall; Further mitigation of sites is considered unnecessary in this case. There are no buildings of heritage significance on the site." Smith (2012) noted that "Tracks, dry pans and sub-surface indications using spring-hare and aardvark holes all produced widely scattered material with no concentrations of note." Similar conclusions were reached by Morris (2011). The specific area proposed for development was assessed by Morris (2013; SAHRIS NID 155934). Morris (2013) found "extremely low to zero incidence of any form of artefact whatsoever, whether Stone Age or colonial in age, over most of the area". Significant heritage resources identified by Morris (2013) are all mapped in Figures 3a to 3c and include Later Stone Age artefact scatters including stone tools, pottery and ostrich eggshell flask fragments and LSA grinding grooves, possible unmarked burials, colonial era stone walling and glass and porcelain fragments

As per the findings of Morris (2013), it is predicted that "features such as rock outcrops or the immediate footslopes of hills might be places where Stone Age and probably also colonial era traces would occur, if present. Previous experience has shown that the flat plains away from such features are almost entirely bereft of heritage traces. The dunes may also have been a focus of past human activity." Furthermore, the area immediately adjacent to the area proposed for development in this application was assessed by Orton (2019, SAHRIS NID 523679, 522885 and 523680). Orton (2019) identified no heritage resources within the proposed footprint, although several isolated stone artefacts attributable to background scatter were noted. As such, based on the location of the proposed development area in the flat plains and the fact that no known heritage resources have been identified within the development footprint (despite the completion of a foot survey by Morris (2013)), it is very unlikely that the proposed development will impact on significant archaeological resources.

Palaeontology

The area proposed for development is overlain with Quaternary cover sands (of low palaeontological sensitivity), and is underlain by granites of the Koeipoort Formation and quartzite of the Wortel Formation (of zero palaeontological sensitivity). The general area has been subject to numerous palaeontological impact assessments. Butler (2016, SAHRIS NID 406396) notes that “The broader area near Aggeneys is underlain by the Mid-Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group) as well as Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed and their palaeontological sensitivity is similarly low. The low palaeontological sensitivity of the Cenozoic superficial deposits can be attributed to the scarcity of fossil heritage in these deposits. In Palaeontological terms the significance is thus rated as LOW (negative). Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.” Pether reaches a similar conclusion in his assessment (2012, SAHRIS NID 15982) noting of the general area that the “bedrock underlying the property is unfossiliferous and of no palaeontological interest.” As such, it is very unlikely that the proposed development will impact on significant palaeontological heritage resources.

Conclusion

Based on the existing heritage information available for the proposed development in addition to the fieldwork conducted by Morris (2013), it is unlikely that the proposed PV facility will negatively impact on significant heritage resources. There is no heritage objection to the proposed development. Furthermore, due to the number of Renewable Energy Facility projects in the immediate vicinity of this development that have already been granted Environmental Authorisation (EA, Figure 5), it is likely that this project will have low levels of cumulative impact significance for Heritage (archaeology, palaeontology and cultural landscape). That being said, due to the general heritage sensitivity of the broader context, it is recommended that:

- If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work in the vicinity must cease immediately and be reported to the South African Heritage Resources Agency (SAHRA) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue.
- A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

- Should substantial fossil remains such as vertebrate bones and teeth, plant-rich fossil lenses, fossil wood or dense fossil burrow assemblages be exposed during construction, the responsible ECO/EO/Environmental Representative should safeguard these, preferably in situ, and alert SAHRA, i.e. The South African Heritage Resources Authority, as soon as possible (Contact details: Mr P. Hine P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: phine@sahra.org.za) so that appropriate action can be taken by a professional palaeontologist, at the Proponent's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a suitably qualified palaeontologist.

RECOMMENDATION

The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

Table 2: Impact Assessment Table

NATURE: Significant archaeological, built environment and palaeontological heritage resources may be impacted by the construction phase of the proposed development				
		Archaeology		**Palaeontology**
MAGNITUDE	**L (1)**	A number of archaeological sites are known from the broader area, however these sites are located well-outside of the footprint of the development and as such, the likelihood of impact is low.	**L (1)**	Various palaeontological assessments have noted of the general area that the "bedrock underlying the property is unfossiliferous and of no palaeontological interest." The palaeontological sensitivity of the area is LOW according to the SAHRIS Palaeosensitivity Map
DURATION	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary.
PROBABILITY	**L (1)**	Probability is low	**L (1)**	Probability is low
SIGNIFICANCE	**L**	(1+5+1)x1=7	**L**	(1+5+1)x1=7
STATUS		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**L**	Possible	**L**	Possible
CAN IMPACTS BE MITIGATED		Yes		Yes

MITIGATION:

- A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
- Any substantial fossil remains (e.g. vertebrate bones and teeth, shells) encountered during excavation should be reported to SAHRA for possible mitigation by a professional palaeontologist (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za).

RESIDUAL RISK:

- If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to the South African Heritage Resources Agency (SAHRA) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue
- Should substantial fossil remains such as vertebrate bones and teeth, plant-rich fossil lenses, fossil wood or dense fossil burrow assemblages be exposed during construction, the responsible ECO/EO/Environmental Representative should safeguard these, preferably in situ, and alert SAHRA, i.e. The South African Heritage Resources Authority, as soon as possible (Contact details: Mr P. Hine P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: cscheermeyer@sahra.org.za) so that appropriate action can be taken by a professional palaeontologist, at the Proponent's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a suitably qualified palaeontologist.

CTS HERITAGE

APPENDIX 1

List of heritage resources within 10km of the development area

Site ID	Site no	Full Site Name	Site Type	Grading
44272	212/0-88/1 AGG 138	Farm 212/0 & 88/1 Aggeneys 138	Artefacts	Grade IIIc
44271	212/0-88/1 AGG 137	Farm 212/0 & 88/1 Aggeneys 137	Artefacts	Grade IIIc
44270	212/0-88/1 AGG 136	Farm 212/0 & 88/1 Aggeneys 136	Archaeological	Grade IIIc
44269	212/0-88/1 AGG 135	Farm 212/0 & 88/1 Aggeneys 135	Archaeological	Grade IIIc
44268	212/0-88/1 AGG 134	Farm 212/0 & 88/1 Aggeneys 134	Archaeological	Grade IIIc
44267	212/0-88/1 AGG 133	Farm 212/0 & 88/1 Aggeneys 133	Archaeological	Grade IIIc
44266	212/0-88/1 AGG 132	Farm 212/0 & 88/1 Aggeneys 132	Archaeological	Grade IIIc
44265	212/0-88/1 AGG 131	Farm 212/0 & 88/1 Aggeneys 131	Archaeological	Grade IIIb
44264	212/0-88/1 AGG 130	Farm 212/0 & 88/1 Aggeneys 130	Archaeological	Grade IIIc
44263	212/0-88/1 AGG 129	Farm 212/0 & 88/1 Aggeneys 129	Archaeological	Grade IIIc
44262	212/0-88/1 AGG 128	Farm 212/0 & 88/1 Aggeneys 128	Archaeological	Grade IIIb
44261	212/0-88/1 AGG 127	Farm 212/0 & 88/1 Aggeneys 127	Archaeological	Grade IIIc
44260	212/0-88/1 AGG 126	Farm 212/0 & 88/1 Aggeneys 126	Archaeological	Grade IIIb
44259	212/0-88/1 AGG 125	Farm 212/0 & 88/1 Aggeneys 125	Archaeological	Grade IIIc
44258	212/0-88/1 AGG 124	Farm 212/0 & 88/1 Aggeneys 124	Archaeological	Grade IIIb
44247	212/0-88/1 AGG 123	Farm 212/0 & 88/1 Aggeneys 123	Artefacts	Grade IIIb
44246	212/0-88/1 AGG 118	Farm 212/0 & 88/1 Aggeneys 118	Archaeological	Grade IIIb
44243	212/0-88/1 AGG 122	Farm 212/0 & 88/1 Aggeneys 122	Archaeological	Grade IIIb
44241	212/0-88/1 AGG 121	Farm 212/0 & 88/1 Aggeneys 121	Archaeological	Grade IIIc
44240	212/0-88/1 AGG 120	Farm 212/0 & 88/1 Aggeneys 120	Archaeological	Grade IIIc
44238	212/0-88/1 AGG 119	Farm 212/0 & 88/1 Aggeneys 119	Archaeological	Grade IIIc
44233	212/0-88/1 AGG 117	Farm 212/0 & 88/1 Aggeneys 117	Structures	Grade IIIb

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Site ID	Site no	Full Site Name	Site Type	Grading
44232	212/0-88/1 AGG 116	Farm 212/0 & 88/1 Aggeneys 116	Artefacts	Grade IIIb
44228	212/0-88/1 AGG 114	Farm 212/0 & 88/1 Aggeneys 114	Archaeological	Grade IIIb
44224	212/0-88/1 AGG 113	Farm 212/0 & 88/1 Aggeneys 113	Archaeological	Grade IIIc
128984	2918BB/70MWSF/2012/L02	70MW Solar Facility-SIte L02	Artefacts	Ungraded
128983	2918BB/70MWSF/2012/L01	70MW Solar Facility-SIte L01	Artefacts	Ungraded
129042	2918BC/SI3PF/2016/014	Sol Invictus 3 Pv Facility- Site 014	Artefacts	Ungraded
90878	AROA028	Aroams 57/ 028	Archaeological	Grade IIIc
90877	AROA027	Aroams 57/ 027	Artefacts	Grade IIIc
90876	AROA026	Aroams 57/ 026	Artefacts	Grade IIIc
90875	AROA025	Aroams 57/ 025	Artefacts	Grade IIIc
90874	AROA024	Aroams 57/ 024	Artefacts	Grade IIIc
90873	AROA023	Aroams 57/ 023	Artefacts	Grade IIIc
90872	AROA022	Aroams 57/ 022	Artefacts	Grade IIIc
90871	AROA021	Aroams 57/ 021	Artefacts	Grade IIIc
90870	AROA020	Aroams 57/ 020	Artefacts	Grade IIIc
90869	AROA019	Aroams 57/ 019	Artefacts	Grade IIIc
90868	AROA018	Aroams 57/ 018	Artefacts	Grade IIIc
90867	AROA017	Aroams 57/ 017	Artefacts	Grade IIIc
90866	AROA016	Aroams 57/ 016	Artefacts	Grade IIIc
90865	AROA015	Aroams 57/ 015	Artefacts	Grade IIIc
90861	AROA011	Aroams 57/ 011	Artefacts	Grade IIIc
90851	AROA001	Aroams 57/ 001	Artefacts	Grade IIIc
90864	AROA014	Aroams 57/ 014	Artefacts	Grade IIIc
90863	AROA013	Aroams 57/ 013	Artefacts	Grade IIIc

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Site ID	Site no	Full Site Name	Site Type	Grading
90862	AROA012	Aroams 57/ 012	Artefacts	Grade IIIc
90860	AROA010	Aroams 57/ 010	Artefacts	Grade IIIc
90859	AROA009	Aroams 57/ 009	Artefacts	Grade IIIc
90858	AROA008	Aroams 57/ 008	Artefacts	Grade IIIc
90856	AROA006	Aroams 57/ 006	Artefacts	Grade IIIc
90854	AROA004	Aroams 57/ 004	Artefacts	Grade IIIc
90853	AROA003	Aroams 57/ 003	Artefacts	Grade IIIc
90852	AROA002	Aroams 57/ 002	Artefacts	Grade IIIc
91779	ASEF002	Aggeneys Solar Energy Facility 002	Artefacts	Grade IIIc
91778	ASEF001	Aggeneys Solar Energy Facility 001	Artefacts	Grade IIIc
45422	BLOEM03	Bloemhoek 03	Artefacts	Grade IIIb
51128	GAMS08	Gamsberg 08	Artefacts	Grade IIIa
35930	ARO018	Aggeneys Orlight 018	Artefacts	Grade IIIc
35929	ARO017	Aggeneys Orlight 017	Artefacts	Grade IIIc
51127	GAMS07	Gamsberg 07	Artefacts	Grade IIIa
35928	ARO016	Aggeneys Orlight 016	Artefacts	Grade IIIc
35927	ARO015	Aggeneys Orlight 015	Artefacts	Grade IIIc
35926	ARO014	Aggeneys Orlight 014	Artefacts	Grade IIIc
51125	GAMS06	Gamsberg 06	Artefacts	Grade IIIb
35925	ARO013	Aggeneys Orlight 013	Artefacts	Grade IIIc
51123	GAMS05	Gamsberg 05	Artefacts	Grade IIIa
51121	GAMS04	Gamsberg 04	Burial Grounds & Graves	Grade IIIa
35919	ARO012	Aggeneys Orlight 012	Artefacts	Grade IIIc
35918	ARO011	Aggeneys Orlight 011	Artefacts	Grade IIIc

CTS HERITAGE

Site ID	Site no	Full Site Name	Site Type	Grading
51119	GAMS03	Gamsberg 03	Artefacts	Grade IIIc
35917	ARO010	Aggeneys Orlight 010	Artefacts	Grade IIIc
35916	ARO009	Aggeneys Orlight 009	Artefacts	Grade IIIc
35915	ARO008	Aggeneys Orlight 008	Artefacts	Grade IIIc
35914	ARO007	Aggeneys Orlight 007	Structures	Grade IIIc
35913	ARO006	Aggeneys Orlight 006	Artefacts	Grade IIIc
25697	GI5	Gamsberg Inselberg 5	Archaeological, Artefacts	Grade IIIb
25696	GI4	Gamsberg Inselberg 4	Archaeological, Artefacts	Grade IIIb
25695	GI3	Gamsberg Inselberg 3	Archaeological, Artefacts	Grade IIIb
25694	GI2	Gamsberg Inselberg 2	Archaeological, Artefacts	Grade IIIb
25693	GI1	Gamsberg Inselberg 1	Archaeological, Artefacts	Grade IIIb
45196	212/0-88/1 AGG 147	Farm 212/0 & 88/1 Aggeneys 147	Structures, Artefacts	Grade IIIb
44289	212/0-88/1 AGG 143	Farm 212/0 & 88/1 Aggeneys 143	Artefacts	Grade IIIc
44286	212/0-88/1 AGG 142	Farm 212/0 & 88/1 Aggeneys 142	Artefacts	Grade IIIb
44282	212/0-88/1 AGG 140	Farm 212/0 & 88/1 Aggeneys 140	Artefacts	Grade IIIc
44279	212/0-88/1 AGG 139	Farm 212/0 & 88/1 Aggeneys 139	Artefacts	Grade IIIa
44229	212/0-88/1 AGG 115	Farm 212/0 & 88/1 Aggeneys 115	Artefacts	Grade IIIb
44172	212/0-88/1 AGG 093	Farm 212/0 & 88/1 Aggeneys 093	Artefacts	Grade IIIb
44284	212/0-88/1 AGG 141	Farm 212/0 & 88/1 Aggeneys 141	Artefacts	Grade IIIb
44223	212/0-88/1 AGG 112	Farm 212/0 & 88/1 Aggeneys 112	Artefacts	Grade IIIc
44219	212/0-88/1 AGG 110	Farm 212/0 & 88/1 Aggeneys 110	Artefacts	Grade IIIc
44212	212/0-88/1 AGG 109	Farm 212/0 & 88/1 Aggeneys 109	Artefacts	Grade IIIc
44210	212/0-88/1 AGG 106	Farm 212/0 & 88/1 Aggeneys 106	Artefacts	Grade IIIc
44203	212/0-88/1 AGG 111	Farm 212/0 & 88/1 Aggeneys 111	Artefacts	Grade IIIa

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Site ID	Site no	Full Site Name	Site Type	Grading
44197	212/0-88/1 AGG 108	Farm 212/0 & 88/1 Aggeneys 108	Artefacts	Grade IIIc
44195	212/0-88/1 AGG 107	Farm 212/0 & 88/1 Aggeneys 107	Artefacts	Grade IIIc
51190	GAMS18	Gamsberg 18	Rock Art	Grade IIIb
44192	212/0-88/1 AGG 105	Farm 212/0 & 88/1 Aggeneys 105	Artefacts	Grade IIIb
44189	212/0-88/1 AGG 104	Farm 212/0 & 88/1 Aggeneys 104	Artefacts	Grade IIIc
51188	GAMS17	Gamsberg 17	Artefacts	Grade IIIc
51187	GAMS16	Gamsberg 16	Artefacts	Grade IIIc
51185	GAMS15	Gamsberg 15	Artefacts	Grade IIIc
44182	212/0-88/1 AGG 103	Farm 212/0 & 88/1 Aggeneys 103	Artefacts	Grade IIIc
44181	212/0-88/1 AGG 102	Farm 212/0 & 88/1 Aggeneys 102	Artefacts	Grade IIIc
44180	212/0-88/1 AGG 101	Farm 212/0 & 88/1 Aggeneys 101	Artefacts	Grade IIIc
44179	212/0-88/1 AGG 100	Farm 212/0 & 88/1 Aggeneys 100	Artefacts	Grade IIIb
44178	212/0-88/1 AGG 099	Farm 212/0 & 88/1 Aggeneys 099	Artefacts	Grade IIIc
44177	212/0-88/1 AGG 098	Farm 212/0 & 88/1 Aggeneys 098	Artefacts	Grade IIIb
51182	GAMS13	Gamsberg 13	Artefacts	Grade IIIc
44176	212/0-88/1 AGG 097	Farm 212/0 & 88/1 Aggeneys 097	Artefacts	Grade IIIb
44175	212/0-88/1 AGG 096	Farm 212/0 & 88/1 Aggeneys 096	Archaeological	Grade IIIc
51180	GAMS12	Gamsberg 12	Artefacts	Grade IIIa
44174	212/0-88/1 AGG 095	Farm 212/0 & 88/1 Aggeneys 095	Artefacts	Grade IIIc
44173	212/0-88/1 AGG 094	Farm 212/0 & 88/1 Aggeneys 094	Artefacts	Grade IIIb
51178	GAMS11	Gamsberg 11	Stone walling	Grade IIIa
44171	212/0-88/1 AGG 092	Farm 212/0 & 88/1 Aggeneys 092	Artefacts	Grade IIIb
44170	212/0-88/1 AGG 091	Farm 212/0 & 88/1 Aggeneys 091	Stone walling	Grade IIIb
44169	212/0-88/1 AGG 090	Farm 212/0 & 88/1 Aggeneys 090	Artefacts	Grade IIIb

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Site ID	Site no	Full Site Name	Site Type	Grading
51133	GAMS10	Gamsberg 10	Archaeological	Grade IIIa
51130	GAMS09	Gamsberg 09	Artefacts	Grade IIIa
35931	ARO019	Aggeneys Orlight 019	Archaeological	Grade IIIc
129011	2918BB/70MWSF/2012/017	70MW Solar Facility-SIte 017	Artefacts	Ungraded
129010	2918BB/70MWSF/2012/016	70MW Solar Facility-SIte 016	Artefacts	Ungraded
129008	2918BB/70MWSF/2012/015	70MW Solar Facility-SIte 015	Artefacts	Ungraded
129007	2918BB/70MWSF/2012/014	70MW Solar Facility-SIte 014	Artefacts	Ungraded
129006	2918BB/70MWSF/2012/013	70MW Solar Facility-SIte 013	Artefacts	Ungraded
129005	2918BB/70MWSF/2012/012	70MW Solar Facility-SIte 012	Artefacts	Ungraded
129004	2918BB/70MWSF/2012/011	70MW Solar Facility-SIte 011	Artefacts	Ungraded
129003	2918BB/70MWSF/2012/010	70MW Solar Facility-SIte 010	Artefacts	Ungraded
129002	2918BB/70MWSF/2012/009	70MW Solar Facility-SIte 009	Artefacts	Ungraded
129001	2918BB/70MWSF/2012/008	70MW Solar Facility-SIte 008	Artefacts	Ungraded
129000	2918BB/70MWSF/2012/007	70MW Solar Facility-SIte 007	Artefacts	Ungraded
128999	2918BB/70MWSF/2012/006	70MW Solar Facility-SIte 006	Artefacts	Ungraded
128998	2918BB/70MWSF/2012/005	70MW Solar Facility-SIte 005	Artefacts	Ungraded
128997	2918BB/70MWSF/2012/004	70MW Solar Facility-SIte 004	Artefacts	Ungraded
128996	2918BB/70MWSF/2012/003	70MW Solar Facility-SIte 003	Artefacts	Ungraded
128995	2918BB/70MWSF/2012/002	70MW Solar Facility-SIte 002	Artefacts	Ungraded
128994	2918BB/70MWSF/2012/001	70MW Solar Facility-SIte 001	Artefacts	Ungraded
128993	2918BB/70MWSF/2012/L011	70MW Solar Facility-SIte L011	Artefacts	Ungraded
128992	2918BB/70MWSF/2012/L010	70MW Solar Facility-SIte L010	Artefacts	Ungraded
128991	2918BB/70MWSF/2012/L09	70MW Solar Facility-SIte L09	Artefacts	Ungraded
128990	2918BB/70MWSF/2012/L08	70MW Solar Facility-SIte L08	Artefacts	Ungraded

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Site ID	Site no	Full Site Name	Site Type	Grading
128989	2918BB/70MWSF/2012/L06	70MW Solar Facility-SIte L06	Artefacts	Ungraded
128986	2918BB/70MWSF/2012/L04	70MW Solar Facility-SIte L04	Artefacts	Ungraded
128985	2918BB/70MWSF/2012/L03	70MW Solar Facility-SIte L03	Artefacts	Ungraded
45421	BLOEM02	Bloemhoek 02	Artefacts	Grade IIIb
45420	BLOEM01	Bloemhoek 01	Artefacts, Stone walling, Burial Grounds & Graves	Grade IIIa
51183	GAMS14	Gamsberg 14	Artefacts	Grade IIIc
44309	212/0-88/1 AGG 073	Farm 212/0 & 88/1 Aggeneys 073	Stone walling	Grade IIIb
44293	212/0-88/1 AGG 146	Farm 212/0 & 88/1 Aggeneys 146	Stone walling	Grade IIIb
44291	212/0-88/1 AGG 145	Farm 212/0 & 88/1 Aggeneys 145	Artefacts	Ungraded
44290	212/0-88/1 AGG 144	Farm 212/0 & 88/1 Aggeneys 144	Artefacts	Grade IIIc

CTS HERITAGE

APPENDIX 2

Reference List with relevant AIAs and PIAs within 10km of the development area

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
15982	PIA Phase 1	John Pether	23/04/2012	BRIEF PALAEONTOLOGICAL IMPACT ASSESSMENT PROPOSED ORLIGHT SA DEVELOPMENT OF A SOLAR PHOTOVOLTAIC POWER PLANT NEAR AGGENEYS, NORTHERN CAPE PROVINCE Portion 1 of Farm Aroams 57 RD
9110	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province
9110	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	Heritage Impact Assessment: Proposed Aggeneys Photo-voltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province
4275	AIA Phase 1	Cobus Dreyer	11/07/2005	Archaeological Investigation of the Proposed Alterations to the Telkom Lattice Mast at Gamsberg (Ghaamsberg) near Aggeneys, Northern Cape
185063	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	23/11/2015	Heritage Impact Assessment for the Proposed Khai-Ma WEF on farm portions south of Pofadder in the NC Province
155934	HIA Phase 1	David Morris	01/04/2013	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS PHOTOVOLTAIC SOLAR ENERGY FACILITY AT BLOEMHOEK NEAR AGGENEYS, NORTHERN CAPE PROVINCE
133532	Heritage Statement	David Morris	01/01/2010	Cultural Heritage Assessment: Gamsberg - Supplementary observations to a previous specialist report on archaeological resources.
118776	PIA Desktop	John Pether	20/03/2013	Environmental and Social Impact Assessment [ESIA] for the Gamsberg Zinc Mine and Associated Infrastructure, Northern Cape Province PALAEONTOLOGICAL IMPACT ASSESSMENT Desktop Study
118774	HIA Phase 1	David Morris	01/03/2013	Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and Associated Infrastructure in Northern Cape, South Africa
15983	PIA Phase 1	John Pether	23/04/2012	BRIEF PALAEONTOLOGICAL IMPACT ASSESSMENT PROPOSED ORLIGHT SA DEVELOPMENT OF A SOLAR PHOTOVOLTAIC POWER PLANT NEAR AGGENEYS, NORTHERN CAPE PROVINCE

				Portion 1 of Farm Aroams 57 RD
154274	Heritage Impact Assessment Specialist Reports	Jayson Orton	23/01/2014	HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NAMIES WIND ENERGY FACILITY NEAR AGGENEYS, NORTHERN CAPE
45091	AIA Desktop	Lita Webley, Dave Halkett	14/06/2012	AIA: PROPOSED CONSTRUCTION OF A 66KV LINE LINKING THE PROPOSED AGGENEYS PHOTO-VOLTAIC SOLAR POWER PLANT WITH THE AGGENEIS SUBSTATION, NORTHERN CAPE
1974	HIA Phase 1	Lita Webley, Dave Halkett	01/04/2012	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS PHOTO-VOLTAIC SOLAR POWER PLANT ON PORTION 1 OF THE FARM AROAMS 57, NORTHERN CAPE PROVINCE
185156	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	24/11/2014	Heritage Impact Assessment for the Proposed Korana Wind Energy Facility on Farm Portions Namies South 2/212 and Poortjies 1/209 South of Pofadder in the NC Province
185150	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	24/11/2014	Heritage Impact Assessment for the Proposed Poortjies Wind Energy Facility on Two Farm Portions South of Pofadder, NC Province
185063	Heritage Impact Assessment Specialist Reports	Timothy Hart, Lita Webley, Dave Halkett, Natalie Kendrick	23/11/2015	Heritage Impact Assessment for the Proposed Khai-Ma WEF on farm portions south of Pofadder in the NC Province
185047	Heritage Impact Assessment Specialist Reports	Lita Webley, Natalie Kendrick, Timothy Hart, Dave Halkett	24/11/2014	Heritage Impact Assessment for the Korana Solar Energy Facility on a Farm Namies South 212 / Portion2; Khai-Ma Municipality
518879	HIA	Piet de Bie	03/12/2018	Phase 1 Heritage Impact Assessment for the proposed construction of a 800m section of gravel road and associated infrastructure at the Black Mountain Decline on the Farm Zuurwater 62 , Khai-Ma Local Municipality, NC Province.
521207	Heritage Scoping Assessment	Jenna Lavin	22/02/2019	Proposed development of a new haul road at Black Mountain Mine, near Aggeneys in the Northern Cape Province
523679	HIA	Jayson Orton	16/05/2019	HERITAGE IMPACT ASSESSMENT: PROPOSED AGGENEYS 1 – 100MW SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR AGGENEYS, NAMAKWALAND MAGISTERIAL DISTRICT,

				NORTHERN CAPE
522885	HIA	Jayson Orton	17/04/2019	Heritage Impact Assessment for the Proposed Aggeneys 2 - 100 MW Solar PV Facility and Associated Infrastructure Near Aggeneys, Namakwaland Magisterial District, Northern Cape
523680	HIA	Jayson Orton	16/05/2019	HERITAGE IMPACT ASSESSMENT: PROPOSED GRID CONNECTION INSFRASTRUCTURE FOR AGGENEYS 1 SOLAR PHOTOVOLTAIC FACILITY, NAMAKWALAND MAGISTERIAL DISTRICT, NORTHERN CAPE

CTS HERITAGE

APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

CTS HERITAGE

APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.

Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area

- undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.

Note:
The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

APPENDIX 5 -Summary of Specialist Expertise

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.