

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed development of the Poortjie Renewable Energy Facility Solar PV Projects near Beaufort West in the Western Cape

Prepared by



CTS HERITAGE

In Association with

Savannah Environmental

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EXECUTIVE SUMMARY

Ziyanda Energy is proposing the development of 6 x solar energy facilities and associated grid connections on sites near Nelspoort, Western Cape. The applications are jointly known as the Poortjie Wes Cluster.

The project details are as follows:

6 x 115MWac/100MWac solar facilities with battery storage, namely -

- Brakpan 1 Solar Energy Facility (Pty) Ltd (Option A) on Poortje 76
- Belvedere Solar Energy Facility (Pty) Ltd (Option B) on portion 2 of Belvedere 73.
- Montana 3 Solar Energy Facility (Pty) Ltd (Option C) on portion 1 of Montana 73
- Montana 2 Solar Energy Facility (Pty) Ltd Option D) on remainder of portion 3 Montana 123
- Montana 1 Solar Energy Facility (Pty) Ltd (Option E) on portion 4 of Montana 123
- Brakpan 2 Solar Energy Facility (Pty) Ltd (Option F) on Louws Bakken 77

Grid connection

- a. One switching station and a loop-in loop-out into the Eskom 400kV OHL passing through the property.
- b. All the facilities will connect to the same switching station.

As the projects are within a REDZ, Basic Assessment processes is applicable.

Rossouw's 2007 (SAHRIS NID 8222) study of a pipeline route at Nelspoort outlines the geological context in which these solar PV applications are placed, "*alluvial sands and silts and strongly structured clayey, alkaline soils of up to five meters in thickness. Alluvial silts and clays and medium to fine terrace gravel deposits show clearly along the banks of the Kambro and Sout Rivers where sharp profiles occur. Colluvial deposits exposed by railway cuttings indicate calcrete-cemented clastic rubble deposits that occur as terrace remnants approximately 10 metres above the riverbed. The colluvium may include elements of sheet wash and alluvial-related deposits*". These calcrete deposits were found again in the eastern sites (options A and F) while options B, C, D and E tended to be covered in clays with open patches of erosional sheetwash spread across the area. Deflated MSA artefacts were more visible in these open patches but closer sampling of the artefact densities showed that material continued out of these areas in the vegetated zones, leaving no particular pattern other than an overall impression that the material is widespread on the surface. Rossouw also located a LSA rock engraving during his assessment.

Two areas containing dolerite boulders were located in options D and B but the overlay of option D is clipped on the southern boundary by this dolerite boulder field. The engravings identified fall just within the boundaries of option D and therefore a 100m buffer zone around each site graded (027 & 028) will suffice in protecting the area and avoiding any damage to more significant archaeological material. Option B is the most sensitive from a heritage perspective as a number of high quality engravings (074, 075 & 079), a stone kraal (071) and various artefact scatters in association with these sites were identified. The significant area has been outlined with a heritage zone of sensitivity.



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Ubiquitous scatters of Middle Stone Age material were found throughout all of the options with a lower component of Later Stone Age material. Some of the MSA artefacts appear to date to the earlier period of the MSA while most of the flakes probably date within the last 150 000 years. Local hornfels and siltstones almost exclusively feature and levels of retouch were low. High numbers of blade blanks and debitage were found which is consistent with the high availability of the raw materials sourced in flake production and the general spread of material across the area. Points, bladelets, scrapers and imported raw materials feature at the sites holding engravings.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development of the renewable energy facilities and its associated grid connection infrastructure will negatively impact on significant archaeological heritage on condition that::

- A 100m no-go development buffer is implemented around sites POORTJIE027 & POORTJIE028 (Figure 6.1 & 6.2)
- A heritage sensitivity zone is implemented incorporating the low ridgeline and sites POORTJIE071 (Figure 6.3), POORTJIE074 (Figure 6.4), POORTJIE075 (Figure 6.5) and POORTJIE079 (Figure 6.6)
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. 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, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.



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CONTENTS

1. INTRODUCTION	4
1.1 Background Information on Project	4
1.2 Description of Property and Affected Environment	4
2. METHODOLOGY	8
2.1 Purpose of Archaeological Study	8
2.2 Summary of steps followed	8
2.3 Constraints & Limitations	9
3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT	9
4. IDENTIFICATION OF HERITAGE RESOURCES	11
4.1 Field Assessment	11
4.2 Archaeological Resources identified	19
4.3 Selected photographic record	28
5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT	36
5.1 Assessment of impact to Archaeological Resources	36
6. CONCLUSION AND RECOMMENDATIONS	38
7. REFERENCES	42



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1. INTRODUCTION

1.1 Background Information on Project

Ziyanda Energy is proposing the development of 6 x solar energy facilities and associated grid connections on sites near Nelspoort, Western Cape. The applications are jointly known as the Poortjie Wes Cluster.

The project details are as follows:

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Grid connection

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As the projects are within a REDZ, Basic Assessment processes is applicable.

1.2 Description of Property and Affected Environment

The six solar PV facilities are all within 10-30km of the town of Nelspoort in the Western Cape. Nelspoort is about 55km northeast of Beaufort West and lies nestled in a valley along the Soutrivier about 15km east of the N1 highway linking Three Sisters and Beaufort West. Nelspoort used to lie along the main transport route between Cape Town and Johannesburg but has largely lost its prominence when the N1 highway bypassed the town. While one proposed facility lies southwest of Nelspoort, most of the solar farms lie to the east separated by a series of 300-400m high koppies and generally level, flat plains inbetween. Only one site (site B) has a low 40-50m high ridge dividing the area which is covered in dolerite boulders.

At the time of surveying these areas, heavy rains had recently fallen, breaking an extensive multi-year period of drought. This provided a window into the erosional patterns present here whilst recording the archaeological material. The vegetation consists of grasslands and succulent shrubs within the Gamka Karoo and Upper Karoo Hardeveld regions while acacia thorn trees line the various stream and river systems. In many areas the topsoil consists of dark orange aeolian sand dating to the Quaternary period and calcretes were found further east. All the farms that form part of the Poortjie Wes Cluster have been used for sheep and cattle grazing with no significant amounts of irrigated crop agriculture taking place other than small-scale plots along immediately along the main river systems. Windmills and small farm dams are dotted around the farms to provide water for the livestock and these are connected by jeep tracks.



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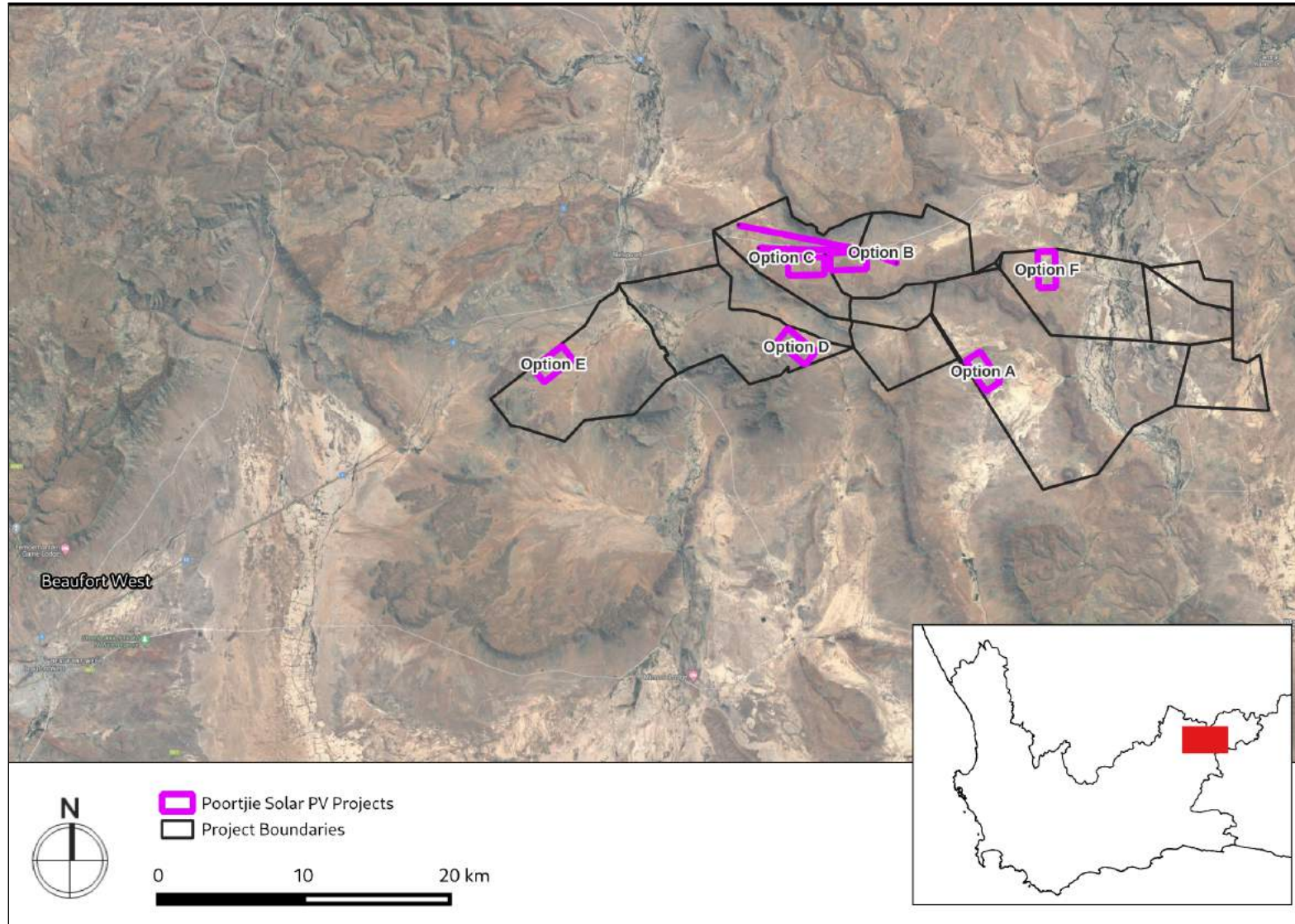


Figure 11: Satellite image indicating proposed location of development



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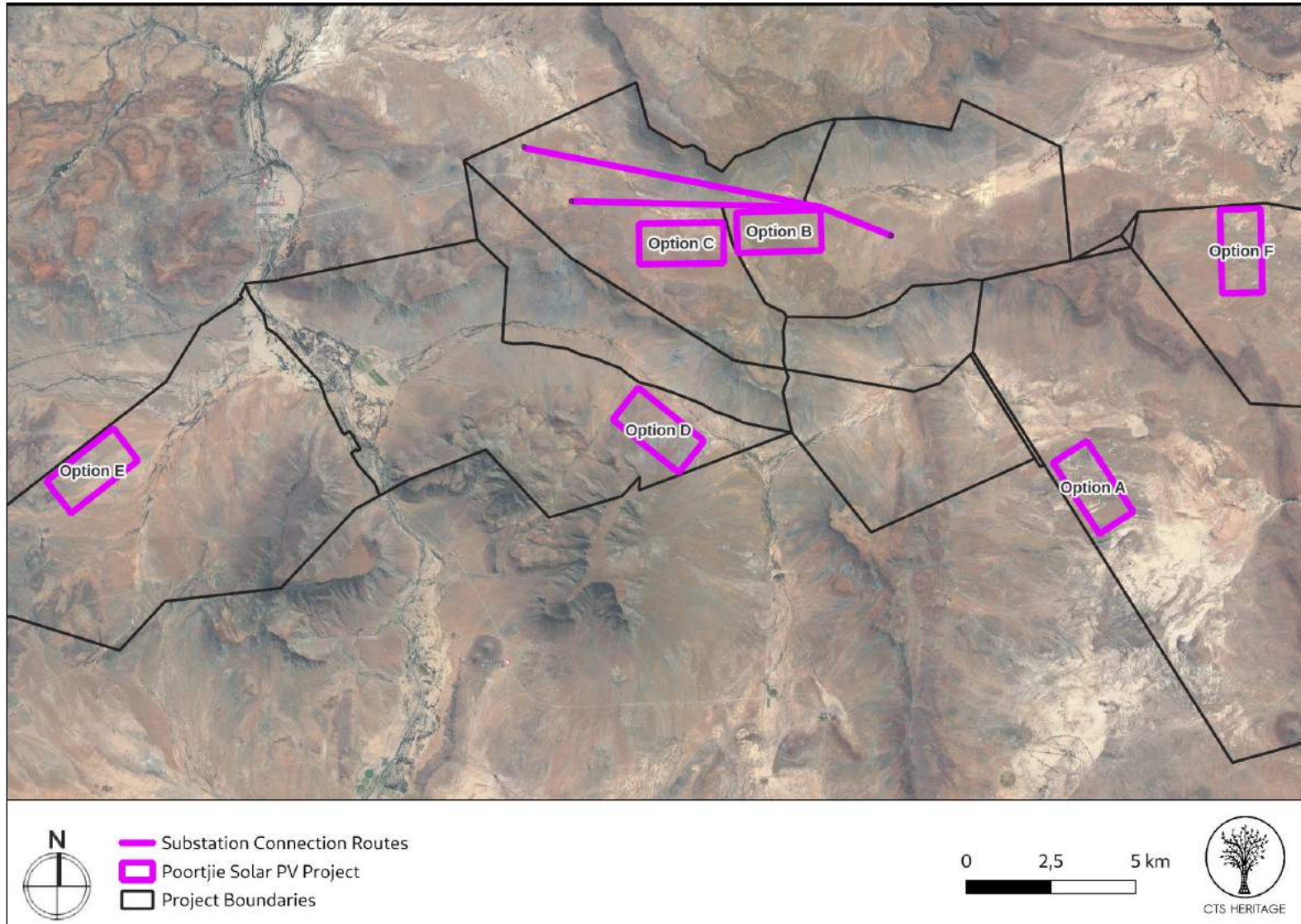


Figure 1.2: Proposed project boundary



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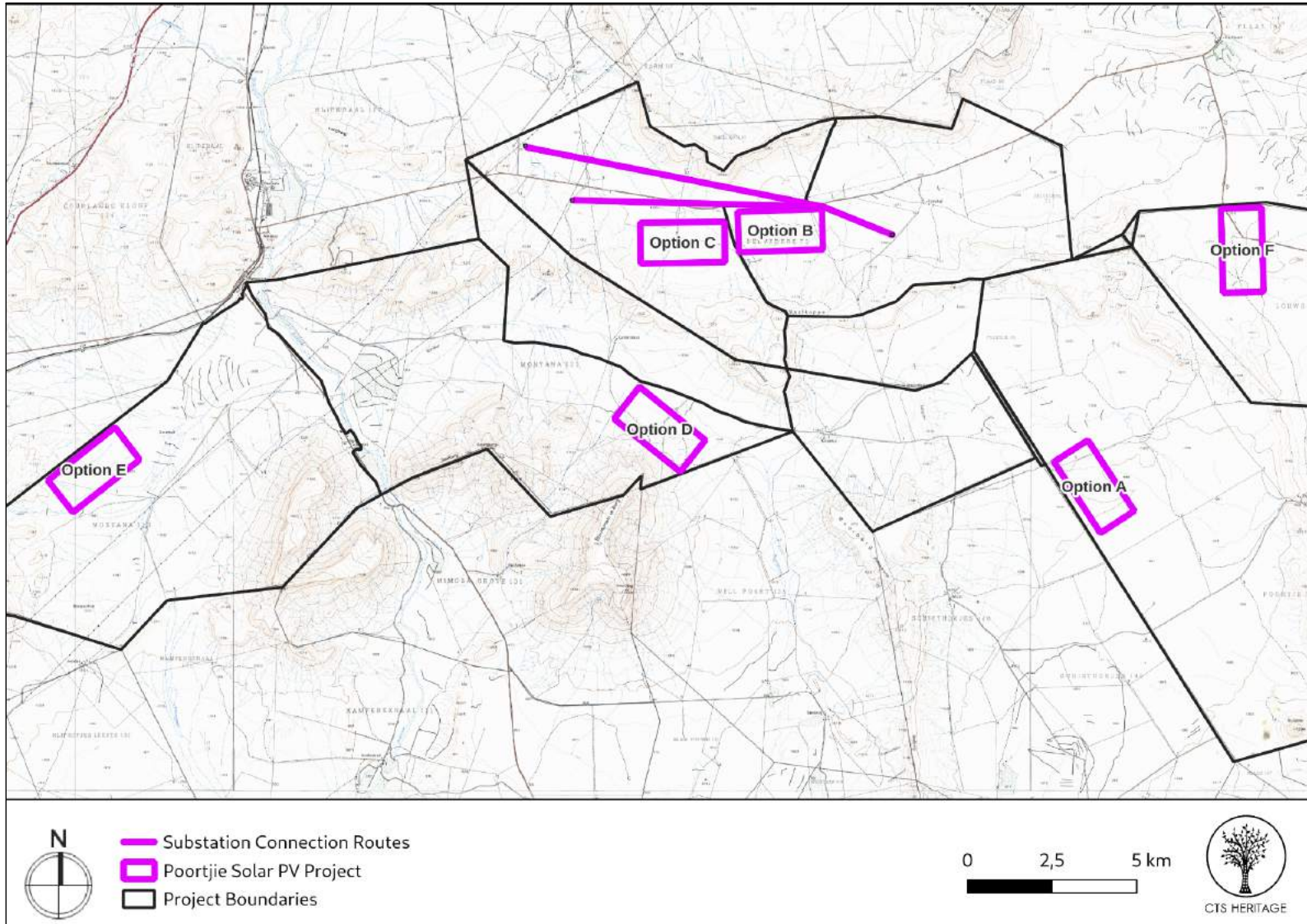


Figure 1.3: Proposed project boundary - Topo Map



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2. METHODOLOGY

2.1 Purpose of Archaeological Study

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

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs from 22 - 26 January and 18 March 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

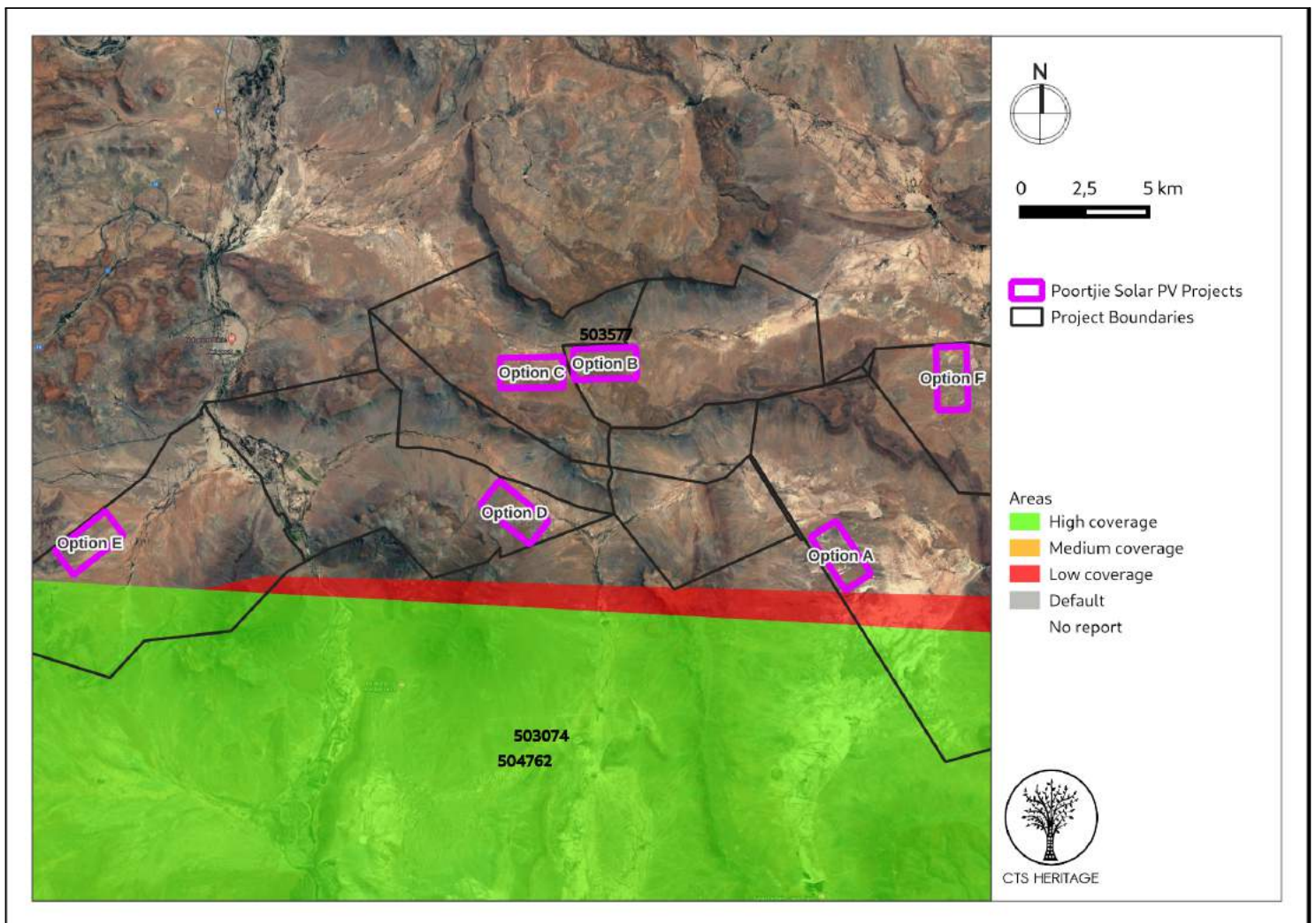


Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted



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2.3 Constraints & Limitations

The recent rains definitely increased the grass coverage in most areas quite significantly. However, the area is still within a semi-arid region of the Karoo and large areas of open ground could be inspected throughout without too much trouble. In particular, given the known sensitivity of dolerite outcrops containing rock engravings near Nelspoort, further outcrops of dolerite were inspected to record possible engravings and these were easy to reach in this context. The experience of the heritage practitioner, and observations made during the study, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Background:

The area proposed for the Poortjie Renewable Energy Facility Projects is located approximately 40km to 70km northeast of Beaufort West, just east of Nelspoort in the Western Cape, and is located within the identified Beaufort West REDZ (Figure 2c). The town of Nelspoort lies at the foot of the Nuweveld Mountains on an old section of the N1 highway. It is near a watercourse, the Salt River, which flows after rains, from the Nuweveld mountains to a seasonal wetland to the south.

Archaeology

Very few heritage assessments have been completed within close proximity to the area proposed for development (Figure 2a). According to Nilssen (2014, SAHRIS NID 504763), "The Karoo houses a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation (see Nilssen 2011 and references therein). Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials." According to ACO (2013, SAHRIS NID 503074), "Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape. Where definable scatters of Early and Middle Stone Age material occur, they are considered to be significant heritage sites.

More intensive occupation of the Karoo started around 13 000 years ago during the Later Stone Age, which is essentially the heritage of Khoisan groups who lived throughout the region. The legacy of the San includes numerous open sites while traces of their presence can also be found in most large rock shelters, often in the form of rock art. They frequently settled a short distance from permanent water sources (springs or waterholes) and made use of natural shelters such as rock outcrops or large boulders or even large bushes. In the Great Karoo, natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns" and as such, this broader area is renowned for its well-preserved rock art and other artefacts from this time, including rock engravings and rock gongs.



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There are currently 14 identified sites of archaeological interest with over 400 examples of rock engravings (petroglyphs) in the immediate Nelspoort area of the Klipkraal farm. All engravings are made on the flat surfaces of the dolerite rocks, with the dark outer layer scraped away leaving the image expressed in the lighter sub layer of the rock.

While the precise authorship of rock art is debated (Smith, Ouzman 2004), engravings fall broadly into three types described as follows:

- !xam San hunter-gatherer rock engravings: representations include elephant, giraffe, hartebeest, jackal, zebra and rhinoceros. Images also of human figures, bird-human figures and spirit world representations.
- Khoe herder geometric engravings: patterns such as lines radiating sun-like from a centre point, zig-zag patterns and concentric circles.
- Settler engravings: these include text, symbols and direction markers such as arrows and images including a windpump and animals.

In many sites these different types of rock art co-exist, along with other evidence of habitation over an extended period of time, such as stone tools, grinding patches on stones, arranged stones, and rock gongs (Ouzman 2003). Nelspoort is the site of several rock gong complexes. The rock gong, or lithophone percussion instrument, is formed by dolerite boulders, some cracked as a result of lightning strike or extreme temperature fluctuation, balanced on each other so that they resonate with a deep ringing sound when struck in a specific way. They are believed to have been intrinsic to spiritual practices of the !xam San people. Two rock gong groupings are located on small rises across the shallow Nelspoort valley, suggesting that the gong's sound may have been used for communication purposes (Rusch 2016).



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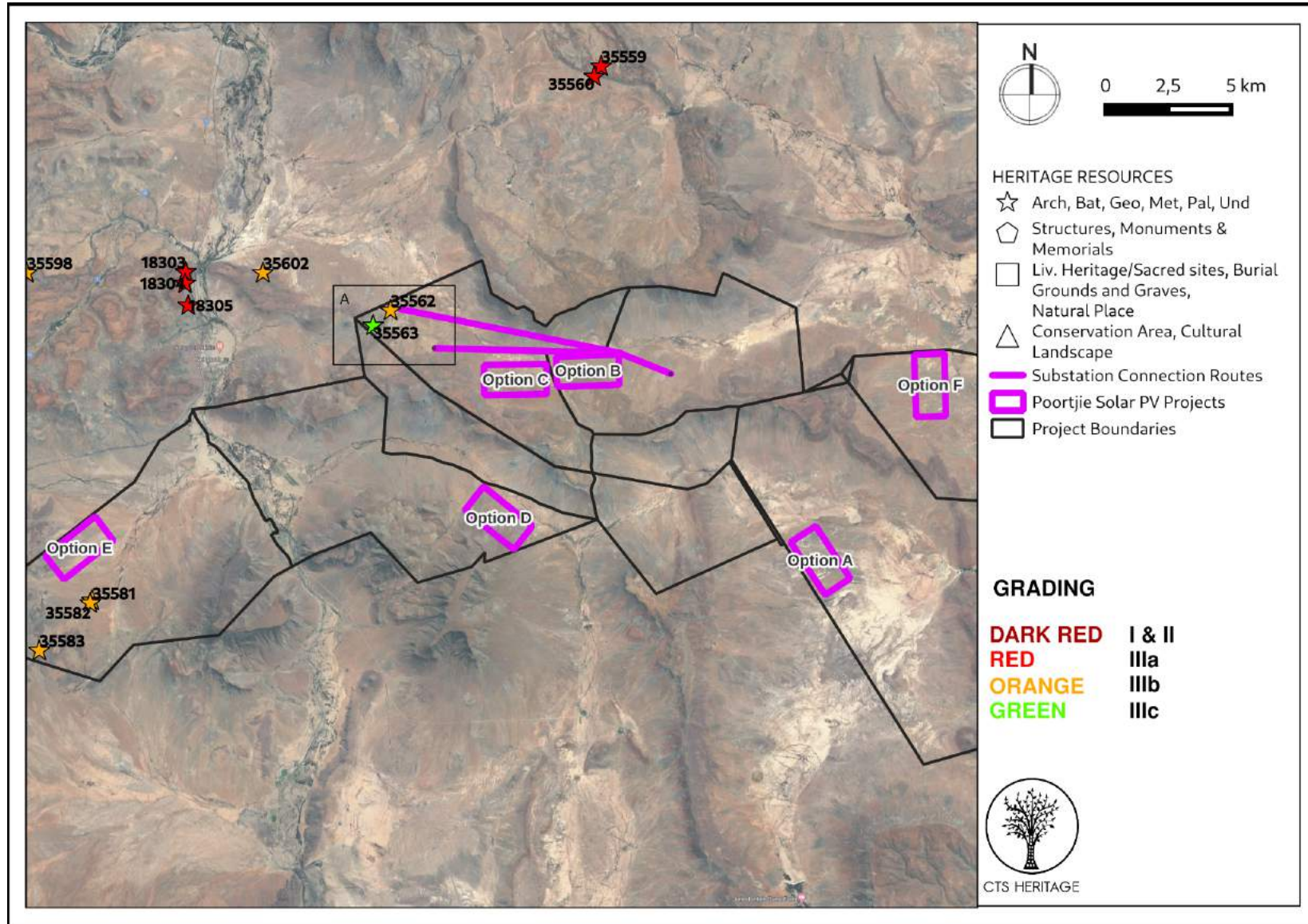


Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated



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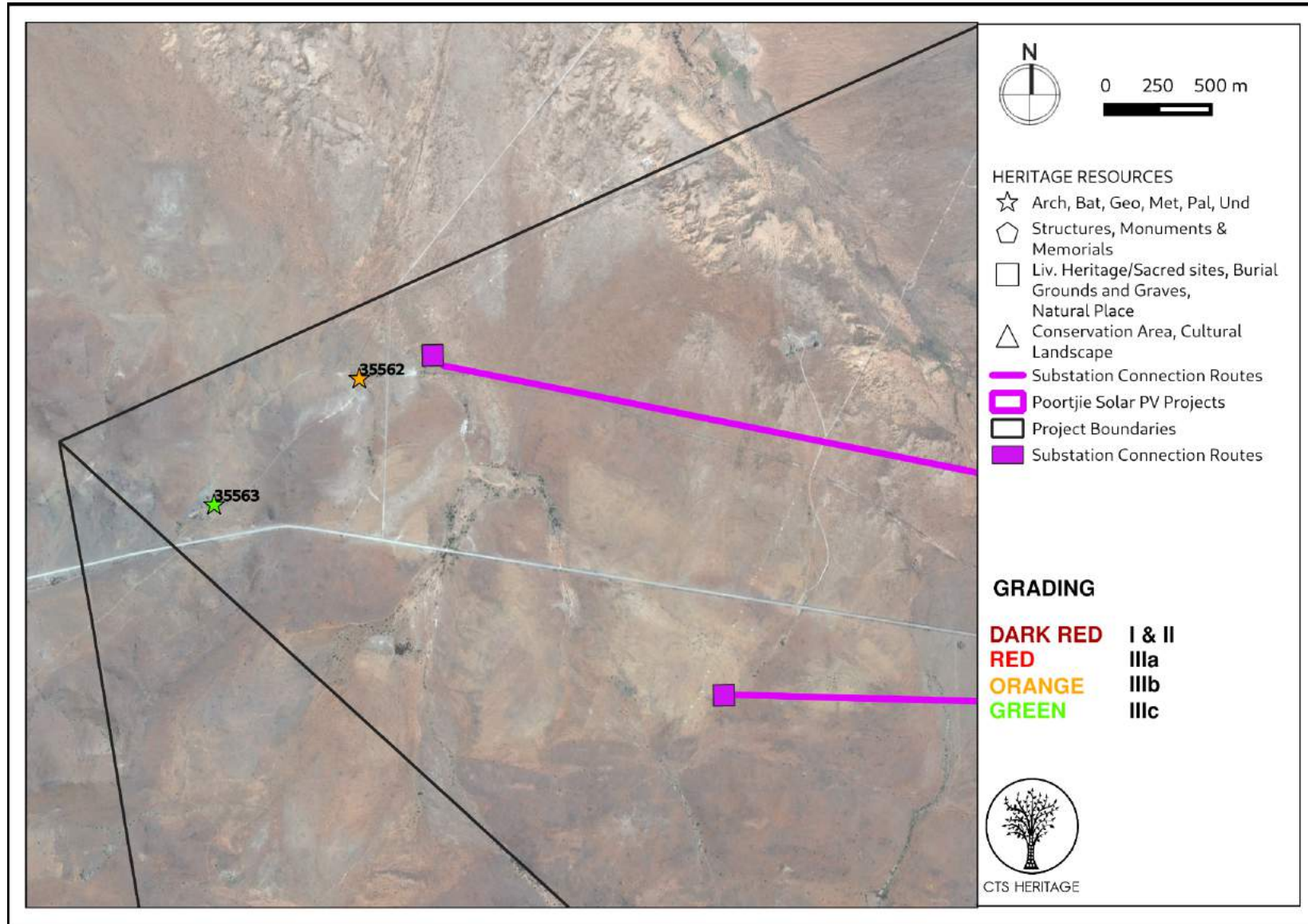


Figure 3a. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated - Inset A



4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

111 Observations were made during the field assessment and the bulk of these were open site scatters of Middle Stone Age cores, flakes and debitage. Local siltstones and hornfels rock cores had been used in the production of the flakes with very little introduction of exotic stone sourced in other regions. While only a handful of flakes were found dispersed across a very wide area, they form a constant backdrop to the landscape rather than being concentrated particularly in any one area. The MSA materials tended to be heavily patinated and weathered by water and mud runoff after storms with a high clay content. Typologically diagnostic artefacts included some radial cores and a fairly common spread of retouched blades and blade blanks. Earlier MSA material was also found such as bifacial points and larger flakes but we would deduce that most of this layer of occupation is buried on the floodplains.

A cluster of conservation-worthy sites were found in Option B such as Later Stone Age engravings on dolerite boulders and an historic ruined kraal. A large number of LSA and historical artefacts were found in association with these sites. Another area containing engraved dolerite boulders was found on the boundary of Option D up towards the slopes of koppie on the southern end. These were less significant than the sites at Option B but should also be avoided. We have therefore mapped out the area containing the most significant archaeological sites on Option B using a zone of higher sensitivity that corresponds with a section of elevated ground.

Most of the scatters recorded were graded as not conservation-worthy due to the ubiquity of these artefacts across the landscape and the lack of a particular focal point of landscape use. The development of solar PV facilities in these areas will have a very small impact on the archaeological record in the area as long as the sensitive areas containing engravings and their associated artefact assemblages are avoided.



Figure 4.1: Existing grid infrastructure lying to the east of option E.



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Figure 4.2: Existing grid infrastructure lying to the east of option E with views of koppies near Nelspoort.



Figure 4.3: View of flat ground at option B studded with succulent scrubland and grasses recovering from the drought. Low rideline in the background which holds the sensitive engravings.



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Figure 4.4: View of connecting powerline route from options B & C.



Figure 4.5: Contextual Images - flat nature of the topography (view of Option E)



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Figure 4.6: Flat topography of the area proposed for the PV development at option A.



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Figure 4.7: Contextual Images of landscape showing the koppies sloping down onto option D.



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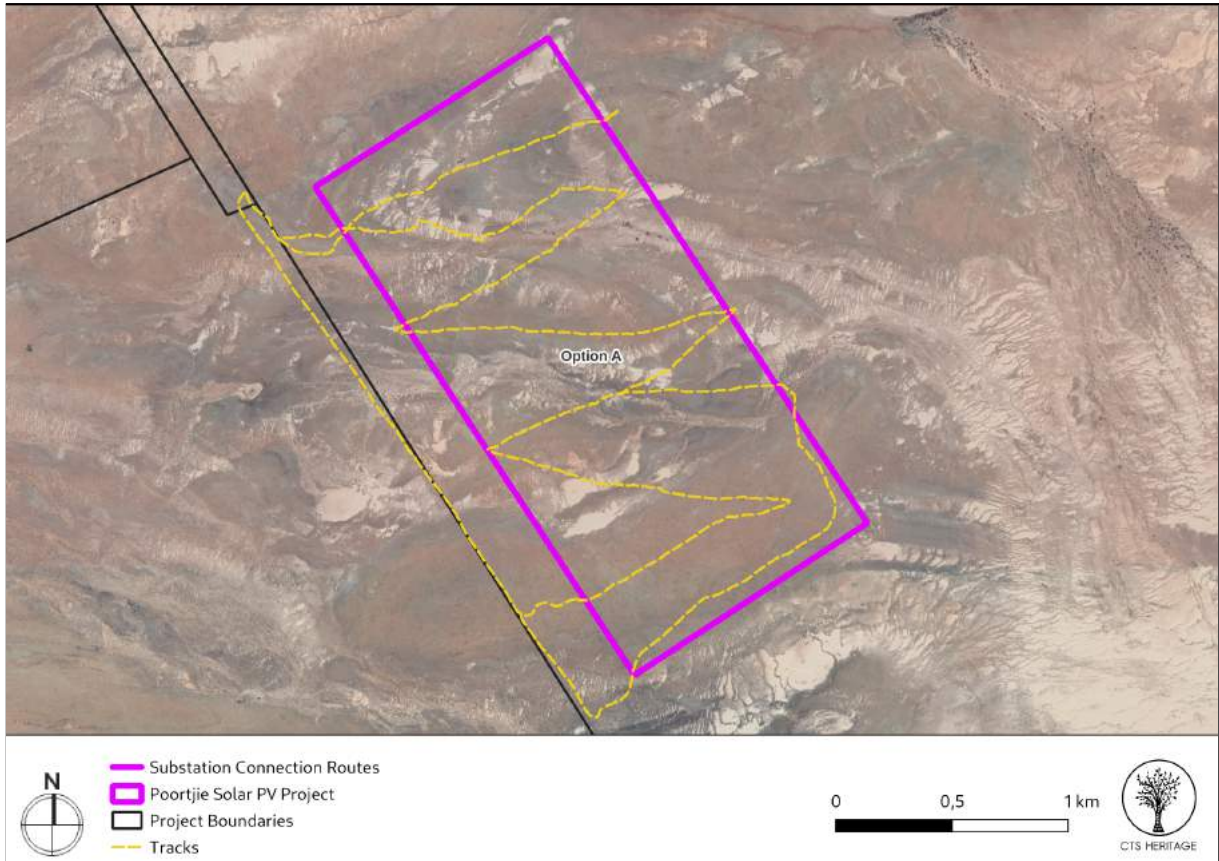


Figure 5.1: Trackpaths at Brakpan 1 Solar Energy Facility (Pty) Ltd (Option A)

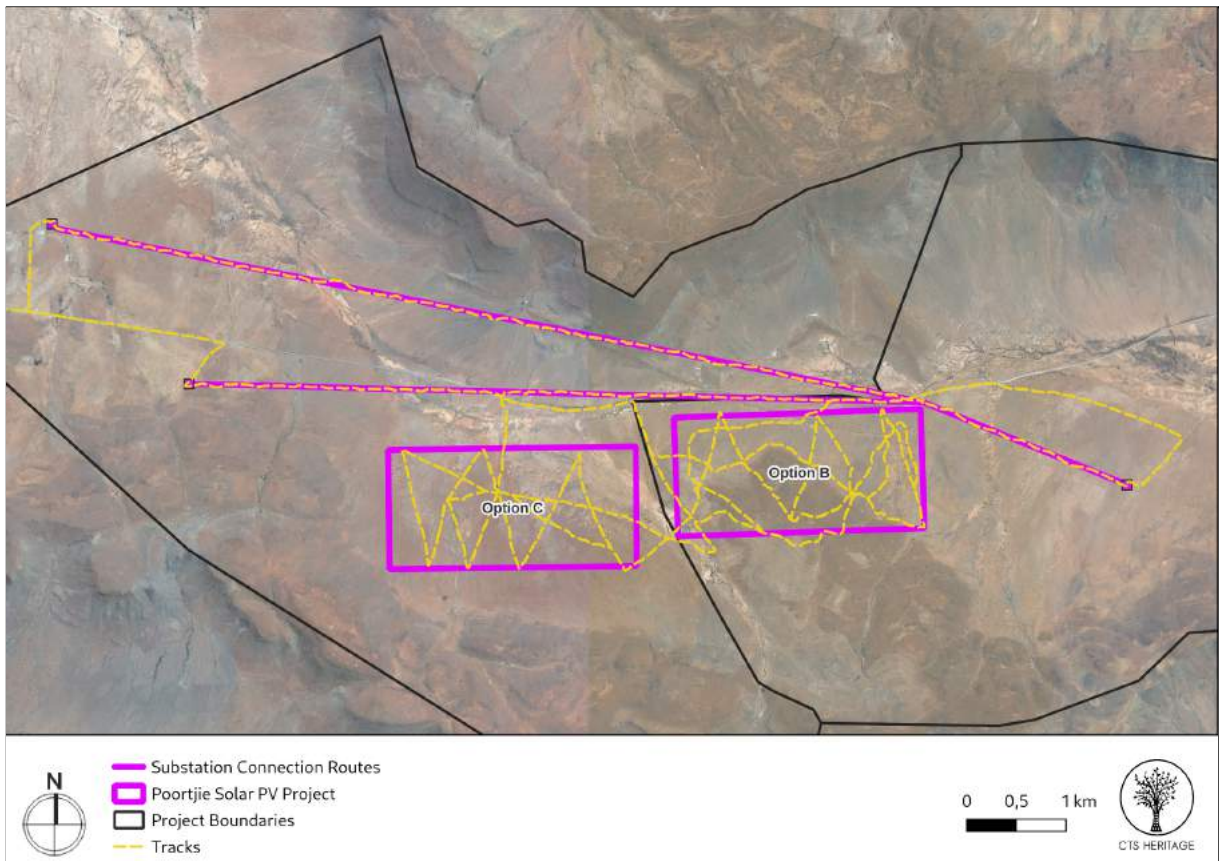


Figure 5.2: Trackpaths at Belvedere Solar Energy Facility (Pty) Ltd (Option B) & Montana 3 Solar Energy Facility (Pty) Ltd (Option C)



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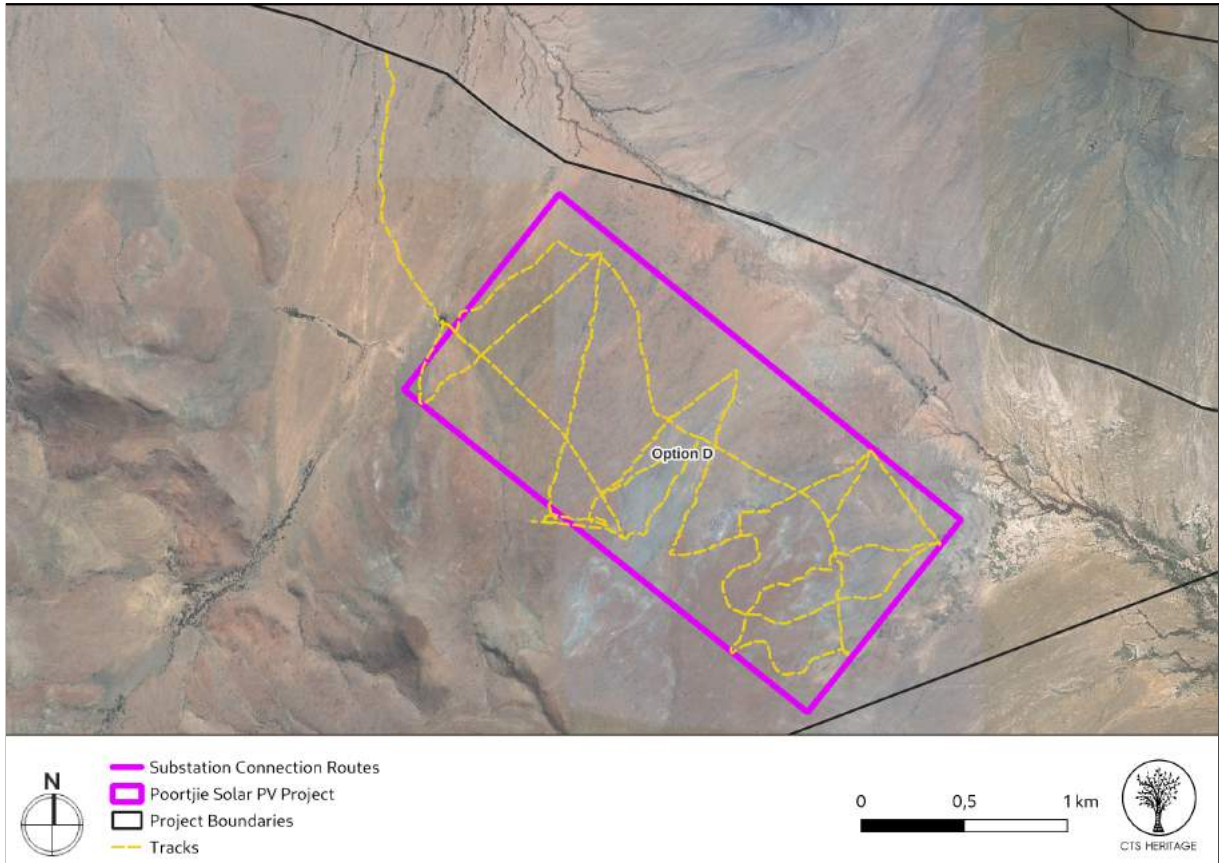


Figure 5.4: Trackpaths at Montana 2 Solar Energy Facility (Pty) Ltd Option D)



Figure 5.5: Trackpaths at Montana 1 Solar Energy Facility (Pty) Ltd (Option E)



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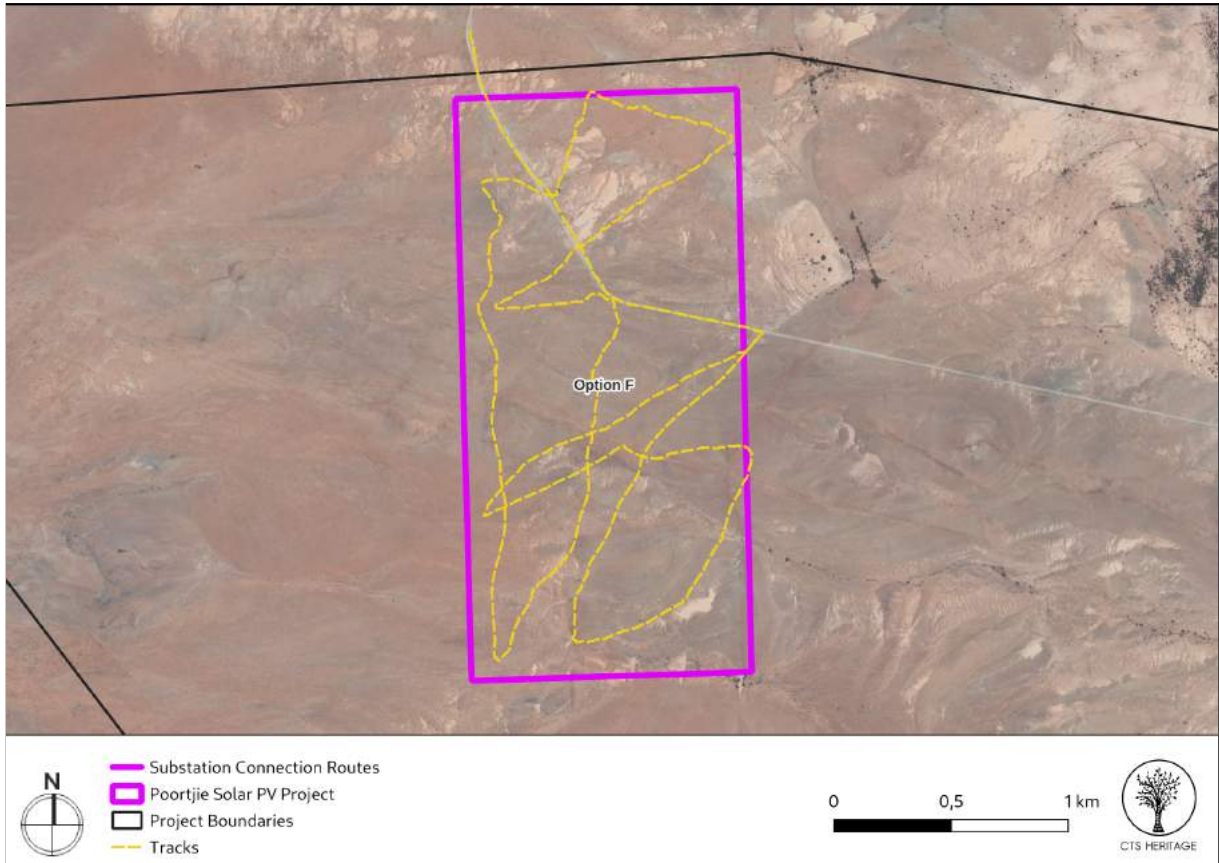


Figure 5.6: Trackpaths at Brakpan 2 Solar Energy Facility (Pty) Ltd (Option F)



4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Site Name	Description	Period	Co-ordinates		Grading	Density	Mitigation
001	POORTJIE001	Hornfels and siltstone points, cores, flakes in slope washed area	MSA	-32.17578	22.95082	NCW	10 to 30	NA
002	POORTJIE002	Hornfels and siltstone flakes	MSA	-32.17351	22.9492	NCW	0 to 5	NA
003	POORTJIE003	Concrete water tank	Modern	-32.16934	22.94745	NCW	n/a	NA
004	POORTJIE004	Siltstone flakes	MSA	-32.16693	22.94662	NCW	0 to 5	NA
005	POORTJIE005	Very thin siltstone flake and large core	MSA	-32.16786	22.95063	NCW	0 to 5	NA
006	POORTJIE006	Siltstone flakes and cores	MSA	-32.16869	22.95375	NCW	0 to 5	NA
007	POORTJIE007	Siltstone blade	MSA	-32.16942	22.95606	NCW	0 to 5	NA
008	POORTJIE008	Siltstone flakes	LSA+MS A	-32.16797	22.95657	NCW	0 to 5	NA
009	POORTJIE009	Hornfels bladelet and flake	LSA	-32.16643	22.95575	NCW	0 to 5	NA
010	POORTJIE010	Early Msa siltstone flake large, pointed	MSA	-32.16397	22.95475	NCW	0 to 5	NA
011	POORTJIE011	Early Msa biface patinated siltstone	MSA	-32.16048	22.95388	NCW	0 to 5	NA
012	POORTJIE012	Fine grained hornfels blade and thin core	MSA	-32.16128	22.95568	NCW	0 to 5	NA
013	POORTJIE013	Early Msa siltstone core	MSA	-32.16272	22.95854	NCW	0 to 5	NA
014	POORTJIE014	Lsa hornfels core, siltstone msa flakes, early msa	MSA	-32.16321	22.95993	NCW	0 to 5	NA
015	POORTJIE015	Siltstone flakes, one heavily patinated earlier msa	MSA	-32.16424	22.9623	NCW	0 to 5	NA
016	POORTJIE016	Early Msa siltstone flake	MSA	-32.165	22.96386	NCW	0 to 5	NA
017	POORTJIE017	Siltstone flakes	MSA	-32.16554	22.96498	NCW	5 to 10	NA
018	POORTJIE018	Siltstone flakes, cores, early to late MSA	MSA	-32.16395	22.96455	NCW	0 to 5	NA
019	POORTJIE019	Siltstone flakes, cores, early to late MSA	MSA	-32.16214	22.96414	NCW	0 to 5	NA
020	POORTJIE020	Hornfels core flakes	MSA	-32.1596	22.96325	NCW	0 to 5	NA
021	POORTJIE021	Windmill and tank	Modern	-32.15414	22.96223	NCW	n/a	NA
022	POORTJIE022	Tanks	Modern	-32.14867	23.12078	NCW	n/a	NA
023	POORTJIE023	Hornfels point retouched for hafting, siltstone flake	MSA	-32.14937	23.1285	NCW	0 to 5	NA
024	POORTJIE024	Siltstone flake with hinge terminations	MSA	-32.15065	23.12805	NCW	0 to 5	NA
025	POORTJIE025	Siltstone flake	MSA	-32.15292	23.12741	NCW	0 to 5	NA
026	POORTJIE026	Siltstone flake no retouch	MSA	-32.15427	23.12699	NCW	0 to 5	NA
027	POORTJIE027	Dolerite boulder engraved with BOES MAN	Historic	-32.15739	23.12596	IIB	n/a	100m buffer
028	POORTJIE028	Cluster of dolerite boulders, some with scratched engravings of	LSA+MS A	-32.15734	23.12851	IIB	0 to 5	100m buffer



		geometric designs, patinated. Msa hornfels point						
029	POORTJIE029	Siltstone core	MSA	-32.15373	23.13167	NCW	0 to 5	NA
030	POORTJIE030	Siltstone flakes worth a couple of larger manuports	MSA	-32.15364	23.13493	NCW	5 to 10	NA
031	POORTJIE031	Retouched hornfels flake and siltstone flakes. Next to dolerite boulders	MSA	-32.15843	23.13469	NCW	0 to 5	NA
032	POORTJIE032	Lateral retouch siltstone flake	MSA	-32.1581	23.13568	NCW	0 to 5	NA
033	POORTJIE033	Siltstone flakes and core	MSA	-32.15698	23.13612	NCW	0 to 5	NA
034	POORTJIE034	Patinated siltstone flakes, early MSA	MSA	-32.15427	23.14285	NCW	0 to 5	NA
035	POORTJIE035	Siltstone flake and core	MSA	-32.15545	23.14218	NCW	0 to 5	NA
036	POORTJIE036	Siltstone flakes, some quite small with thin flakes	MSA	-32.15733	23.14072	NCW	10 to 30	NA
037	POORTJIE037	Hornfels point	MSA	-32.16507	23.25517	NCW	0 to 5	NA
038	POORTJIE038	Siltstone flakes and cores	MSA	-32.16503	23.25729	NCW	0 to 5	NA
039	POORTJIE039	Hornfels and siltstone flakes, cores on dry pan	MSA	-32.16513	23.26442	NCW	5 to 10	NA
040	POORTJIE040	Chert blade, flake, patinated, hornfels flake	MSA	-32.16311	23.26794	NCW	0 to 5	NA
041	POORTJIE041	Fine grained hornfels point	MSA	-32.16308	23.26941	NCW	0 to 5	NA
042	POORTJIE042	Hornfels flakes	MSA	-32.16531	23.26777	NCW	0 to 5	NA
043	POORTJIE043	Patinated hornfels flake	MSA	-32.16761	23.26293	NCW	0 to 5	NA
044	POORTJIE044	Early Msa siltstone flake retouched	MSA	-32.16852	23.26599	NCW	0 to 5	NA
045	POORTJIE045	Fine grained siltstone flake	MSA	-32.17145	23.26942	NCW	0 to 5	NA
046	POORTJIE046	Hornfels flake worth secondary flake scars	MSA	-32.17414	23.26822	NCW	0 to 5	NA
047	POORTJIE047	Early Msa siltstone flake	MSA	-32.17458	23.27104	NCW	0 to 5	NA
048	POORTJIE048	Patinated hornfels flake	MSA	-32.17512	23.2752	NCW	0 to 5	NA
049	POORTJIE049	Hornfels flakes, curved bladelet	MSA	-32.17511	23.27654	NCW	0 to 5	NA
050	POORTJIE050	Patinated hornfels flake	MSA	-32.17609	23.27501	NCW	0 to 5	NA
051	POORTJIE051	Dolerite flake	MSA	-32.10231	23.13836	NCW	0 to 5	NA
052	POORTJIE052	Prepared platform siltstone flake	MSA	-32.09947	23.13726	NCW	0 to 5	NA
053	POORTJIE053	Patinated hornfels flake	MSA	-32.10172	23.13529	NCW	0 to 5	NA
054	POORTJIE054	Hornfels blade flake	MSA	-32.1086	23.13203	NCW	0 to 5	NA
055	POORTJIE055	Siltstone core flake, secondary flake scars	MSA	-32.1038	23.12964	NCW	0 to 5	NA
056	POORTJIE056	Siltstone flake, longitudinal scars	MSA	-32.10066	23.12885	NCW	0 to 5	NA
057	POORTJIE057	Hornfels core lsa, siltstone flake	LSA+MS A	-32.10347	23.13853	NCW	0 to 5	NA



058	POORTJIE058	Windmill and tank	Modern	-32.1032	23.13869	NCW	n/a	NA
059	POORTJIE059	Hornfels core	MSA	-32.10793	23.14012	NCW	0 to 5	NA
060	POORTJIE060	Hornfels unifacial point, patinated	MSA	-32.10826	23.14256	NCW	0 to 5	NA
061	POORTJIE061	Retouched siltstone flake	MSA	-32.10542	23.14436	NCW	0 to 5	NA
062	POORTJIE062	Siltstone and hornfels flakes, cores	MSA	-32.10467	23.14488	NCW	5 to 10	NA
063	POORTJIE063	Quartzite, hornfels, siltstone flakes, points, retouch	MSA	-32.10366	23.14541	NCW	10 to 30	NA
064	POORTJIE064	Quartzite, hornfels, siltstone flakes, points, retouch, radial core	MSA	-32.10278	23.14585	NCW	10 to 30	NA
065	POORTJIE065	Another small cluster of artefacts, hornfels, siltstone flakes in slightly deflated area	MSA	-32.0999	23.14752	NCW	5 to 10	NA
066	POORTJIE066	Another small cluster of artefacts, hornfels, siltstone flakes in slightly deflated area	MSA	-32.102	23.14758	NCW	10 to 30	NA
067	POORTJIE067	Hornfels cores and flakes	MSA	-32.10657	23.14966	NCW	0 to 5	NA
068	POORTJIE068	Patinated hornfels flake	MSA	-32.11052	23.15235	NCW	0 to 5	NA
069	POORTJIE069	Patinated hornfels core	MSA	-32.10513	23.15964	NCW	0 to 5	NA
070	POORTJIE070	Hornfels core	MSA	-32.10414	23.16022	NCW	0 to 5	NA
071	POORTJIE071	Stone walled kraal, historical artefacts and MSA hornfels flakes	Historic	-32.10298	23.16	IIIB	30+	Falls within mapped sensitivity zone - see map
072	POORTJIE072	Siltstone flakes	MSA	-32.09768	23.16222	NCW	0 to 5	NA
073	POORTJIE073	Siltstone flake	MSA	-32.0961	23.16255	NCW	0 to 5	NA
074	POORTJIE074	Engravings, incised geometric lines, elephant, scribbles possible handwriting, elephant scraped technique	LSA	-32.10271	23.16722	IIIA	n/a	Falls within mapped sensitivity zone - see map
075	POORTJIE075	Engravings, some historical of structures in scratched lines, incised antelope, lines, group of eland very faded, rain cloud, rhino?	LSA	-32.10388	23.16873	IIIA	n/a	Falls within mapped sensitivity zone - see map
076	POORTJIE076	Siltstone flake	MSA	-32.10133	23.17197	NCW	0 to 5	NA
077	POORTJIE077	Hornfels and siltstone flakes in deflation	MSA	-32.09765	23.17272	NCW	5 to 10	NA
078	POORTJIE078	Hornfels point	LSA	-32.10128	23.17676	NCW	0 to 5	NA
079	POORTJIE079	Incised engravings, lines, siltstone flakes	LSA+MS A	-32.10371	23.1788	IIIB	0 to 5	Falls within mapped sensitivity zone - see map
080	POORTJIE080	Siltstone flake with prominent bulb of percussion	MSA	-32.10257	23.18015	NCW	0 to 5	NA
081	POORTJIE081	Siltstone flake core, high cortex %	MSA	-32.08093 29	23.100153 85	NCW	0 to 5	NA



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082	POORTJIE082	Hornfels point, slightly retouched edges, patinated	MSA	-32.08519 013	23.123962 59	NCW	0 to 5	NA
083	POORTJIE083	Hornfels flake discard and another retouched flake, early MSA	MSA	-32.08767	23.13905	NCW	0 to 5	NA
084	POORTJIE084	Siltstone flake, prominent prep. platform and flake scars on dorsal surface	MSA	-32.09069	23.15761	NCW	0 to 5	NA
085	POORTJIE085	Siltstone core	MSA	-32.09594	23.18719	NCW	0 to 5	NA
086	POORTJIE086	Siltstone flake and weathered hornfels flake	MSA	-32.10179	23.20346	NCW	0 to 5	NA
087	POORTJIE087	Siltstone flake unworked	MSA	-32.0944	23.147323	NCW	0 to 5	NA
088	POORTJIE088	Siltstone flake with weathered flake scars on dorsal	MSA	-32.0940	23.12536	NCW	0 to 5	NA
089	POORTJIE089	Hornfels core, possible LSA	LSA	-32.09399	23.12067	NCW	0 to 5	NA
090	POORTJIE090	Siltstone flake, large and thinned	MSA	-32.0937	23.11403	NCW	0 to 5	NA
091	POORTJIE091	Siltstone flaked core on one edge, early MSA	MSA	-32.09374	23.1059	NCW	0 to 5	NA
092	POORTJIE092	Kraal and windmill	Modern	-32.09937	23.3138	NCW	n/a	NA
093	POORTJIE093	Hornfels flakes, prominent bulbs of percussion	MSA	-32.09959	23.31372	NCW	0 to 5	NA
094	POORTJIE094	Siltstone flake with prepared platform, hornfels cores and flakes	MSA, LSA	-32.09613	23.31774	NCW	5 to 10	NA
095	POORTJIE095	Hornfels core	LSA	-32.09751	23.32162	NCW	0 to 5	NA
096	POORTJIE096	Hornfels core	LSA	-32.09992	23.31729	NCW	0 to 5	NA
097	POORTJIE097	Siltstone and hornfels flakes ; prominent bulb of percussion	MSA	-32.10312	23.31238	NCW	0 to 5	NA
098	POORTJIE098	Patinated hornfels flake	MSA	-32.10379	23.31101	NCW	0 to 5	NA
099	POORTJIE099	Hornfels curved blade flake retouched, siltstone flakes	MSA	-32.10351	23.31511	NCW	5 to 10	NA
100	POORTJIE100	Hornfels point	MSA	-32.10559	23.32203	NCW	0 to 5	NA
101	POORTJIE101	Siltstone radial core	MSA	-32.10659	23.3195	NCW	0 to 5	NA
102	POORTJIE102	Large siltstone triangular flake	MSA	-32.10861	23.31546	NCW	0 to 5	NA
103	POORTJIE103	Siltstone flakes with secondary scarring	MSA	-32.10976	23.31245	NCW	0 to 5	NA
104	POORTJIE104	Hafted siltstone flake and hornfels flake	MSA	-32.11067	23.31349	NCW	0 to 5	NA
105	POORTJIE105	Early MSA hornfels flake	MSA	-32.10917	23.3215	NCW	0 to 5	NA
106	POORTJIE106	Large siltstone flakes	MSA	-32.10947	23.32258	NCW	0 to 5	NA
107	POORTJIE107	Siltstone core and hornfels flakes	MSA	-32.11266	23.32127	NCW	0 to 5	NA
108	POORTJIE108	Siltstone core and hornfels flakes	MSA	-32.11517	23.31944	NCW	0 to 5	NA
109	POORTJIE109	Metal pot broken piece	Historic	-32.11656	23.31595	NCW	0 to 5	NA
110	POORTJIE110	Stone weir, vernacular	Historic	-32.11667	23.31453	NCW	n/a	NA
111	POORTJIE111	Kraal and windmill	Modern	-32.11433	23.31477	NCW	n/a	NA



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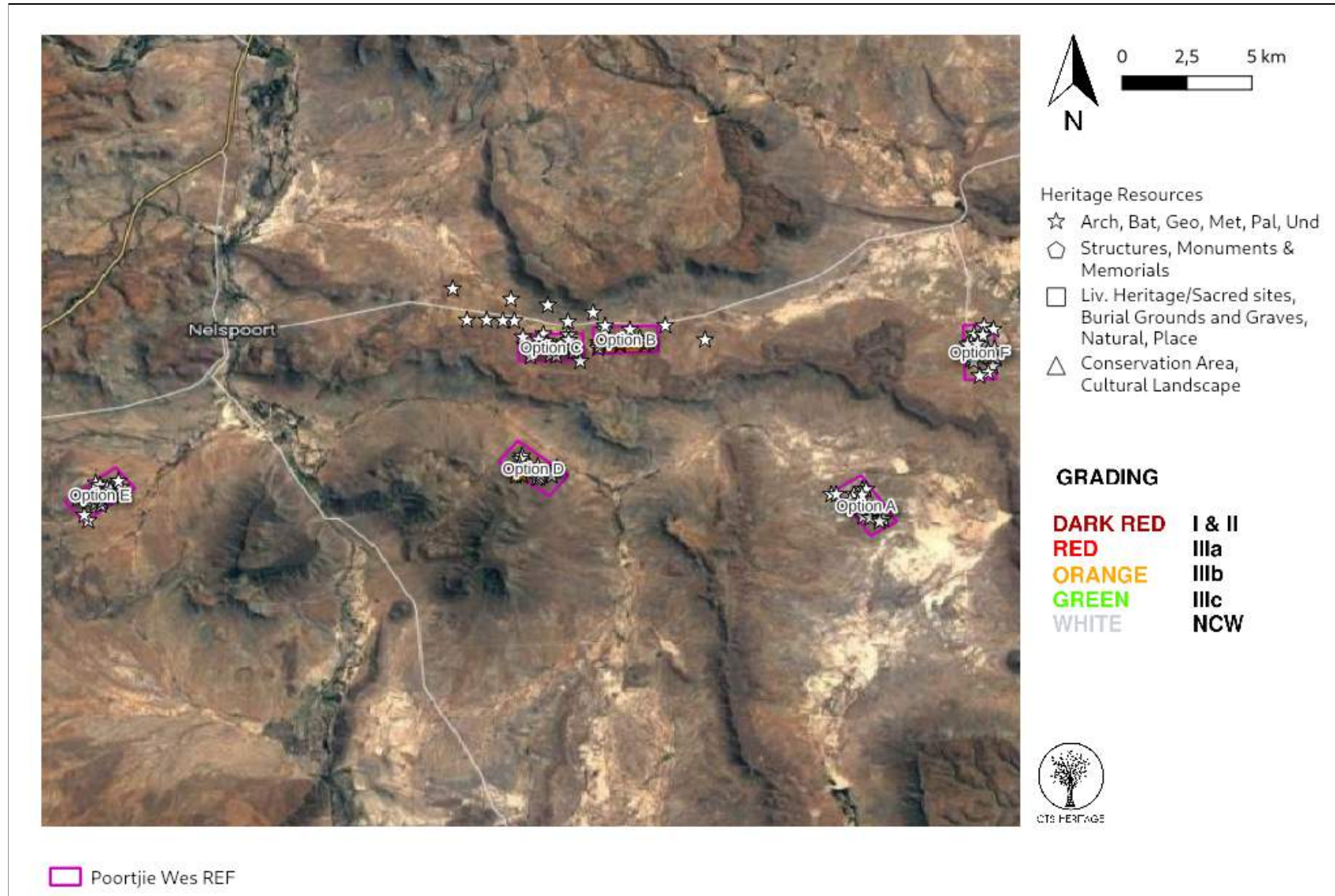


Figure 6: Map of heritage resources identified during the field assessment relative to the proposed development footprint for the Poortjie Wes REF



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4.3 Selected photographic record

(a full photographic record is available upon request)



Figure 7.1: Observation POORTJIE027 (Historic engravings)



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Figure 7.2: Observation POORTJIE028 (scratched LSA or older engravings)



Figure 7.3: Observation POORTJIE071 (stone kraal and LSA scatter)



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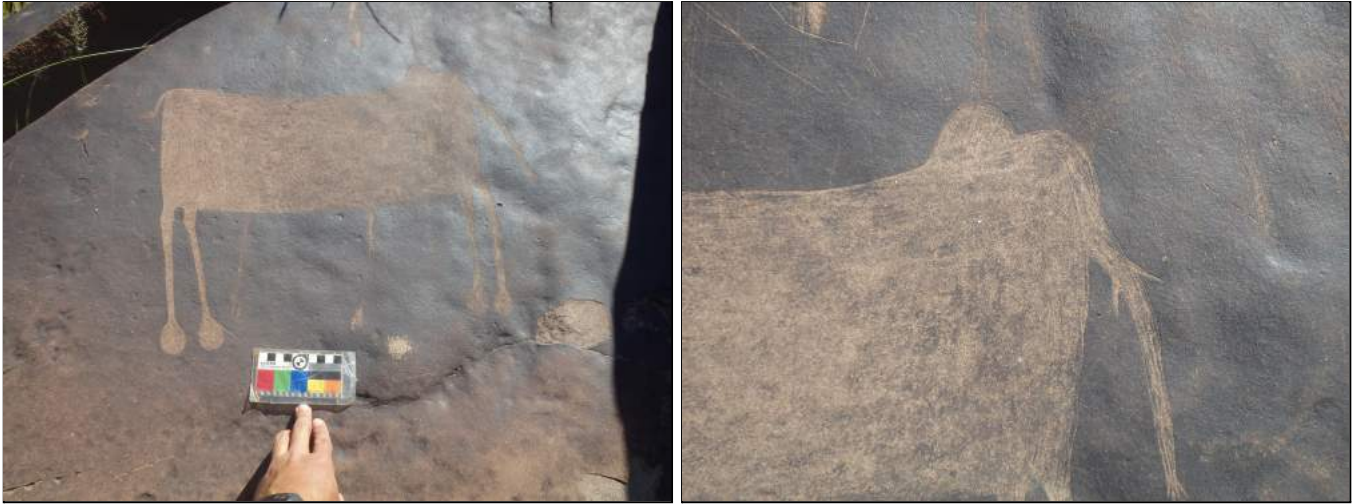


Figure 7.4: Observation POORTJIE074 (LSA engravings)



Figure 7.5 Observation POORTJIE075 (LSA engravings). Use of DStretch in 3rd and 4th images.



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Figure 7.6 Observation POORTJIE079 (LSA engravings)



Figure 7.7 Observation POORTJIE005, siltstone point within option E



Figure 7.8 Observation POORTJIE009



Figure 7.9: Observation POORTJIE020



Figure 7.10: Observation POORTJIE030



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Figure 7.11: Observation POORTJIE035



Figure 7.12: Observation POORTJIE040



Figures 7.13: Observation POORTJIE045



Figure 7.14: Observation POORTJIE050



Figure 7.15: Observation POORTJIE055



Figure 7.16: Observation POORTJIE060



Figure 7.17: Observation POORTJIE065



Figure 7.18: Observation POORTJIE070



Figure 7.19: Observation POORTJIE085 & POORTJIE098



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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

In five of the six proposed solar PV development areas, the impact on identified heritage resources will not be substantial and will have an overall negligible change on the archaeological sensitivity of the Nelspoort area. Similarly, the areas spanned by the proposed grid connections are also rated as having low heritage sensitivity. The majority of the lithic material identified is of low significance (not conservation-worthy), and even though the resources may be destroyed during construction, the impact is inconsequential. No mitigation is required for archaeological material recorded in the footprint areas of the proposed developments in options A, C, E and F. A small area on the southern boundary of option D holds two sites with historic and LSA engravings which can easily be avoided with a 100m buffer zone around these sites.

Option B has a high sensitivity zone on the elevated ridge containing the dolerite boulder engravings and the stone kraal. These sites falling in the sensitivity area have associated higher density and *in situ* artefact scatters. The engravings show a range of well-preserved imagery linking the ethnographic records of the San in the Bleek and Lloyd collection to these sites such as the scene depicted showing a cloudburst of rain, finely engraved eland and elephant. Accordingly, a sensitivity overlay zone has been developed where PV development should be avoided.

Despite the high number of observations of artefacts, these resources are common and representative of similar scatters across widespread areas of the Karoo. Despite the very high numbers of observations made, the archaeological material is ubiquitous across the entire area and in general, the results of this assessment indicate that the archaeological sensitivity of the development area is low in options A, C, D, E and F.



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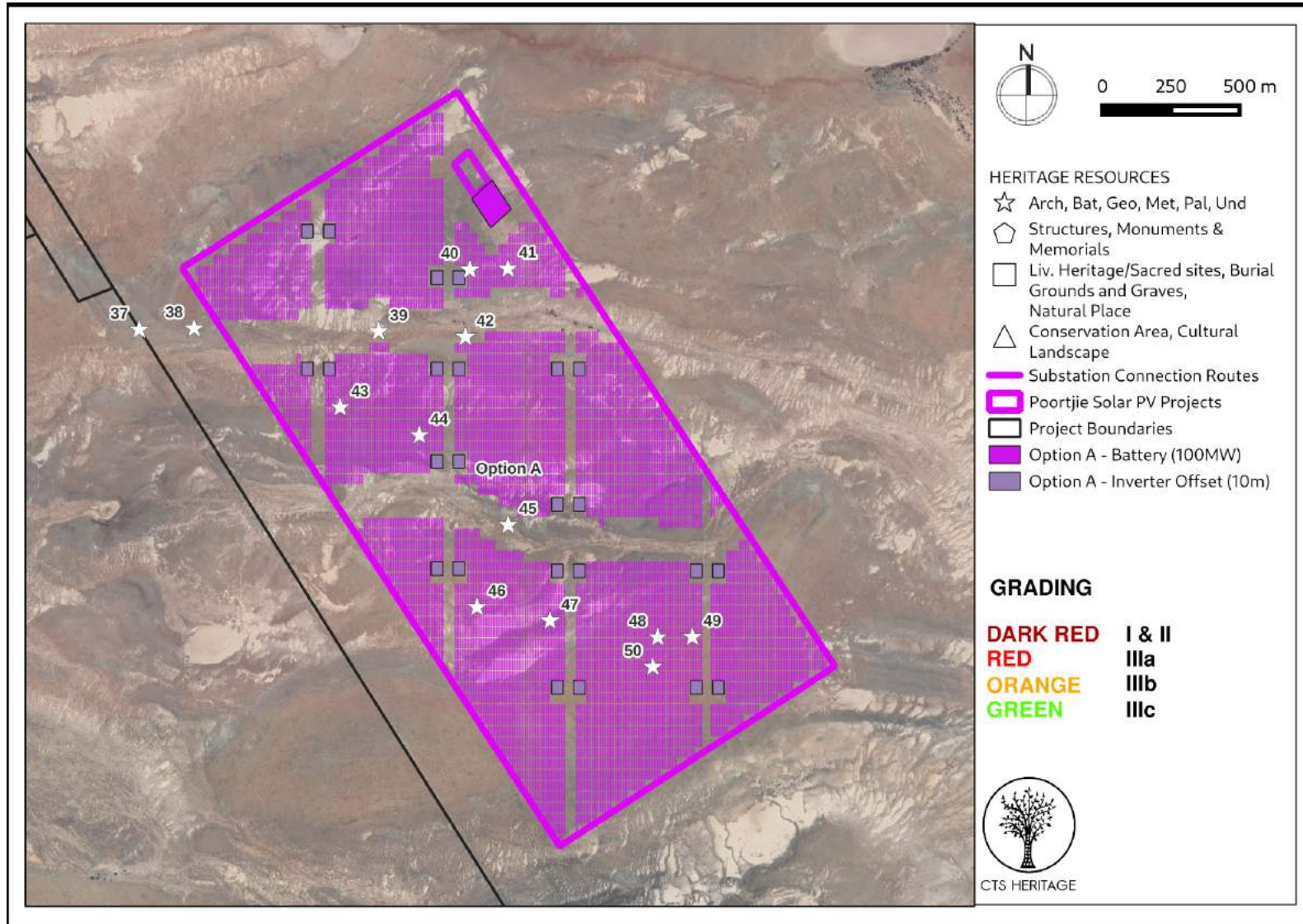


Figure 8.1: Map of all sites and observations noted within Brakpan 1 Solar Energy Facility (Pty) Ltd (Option A)



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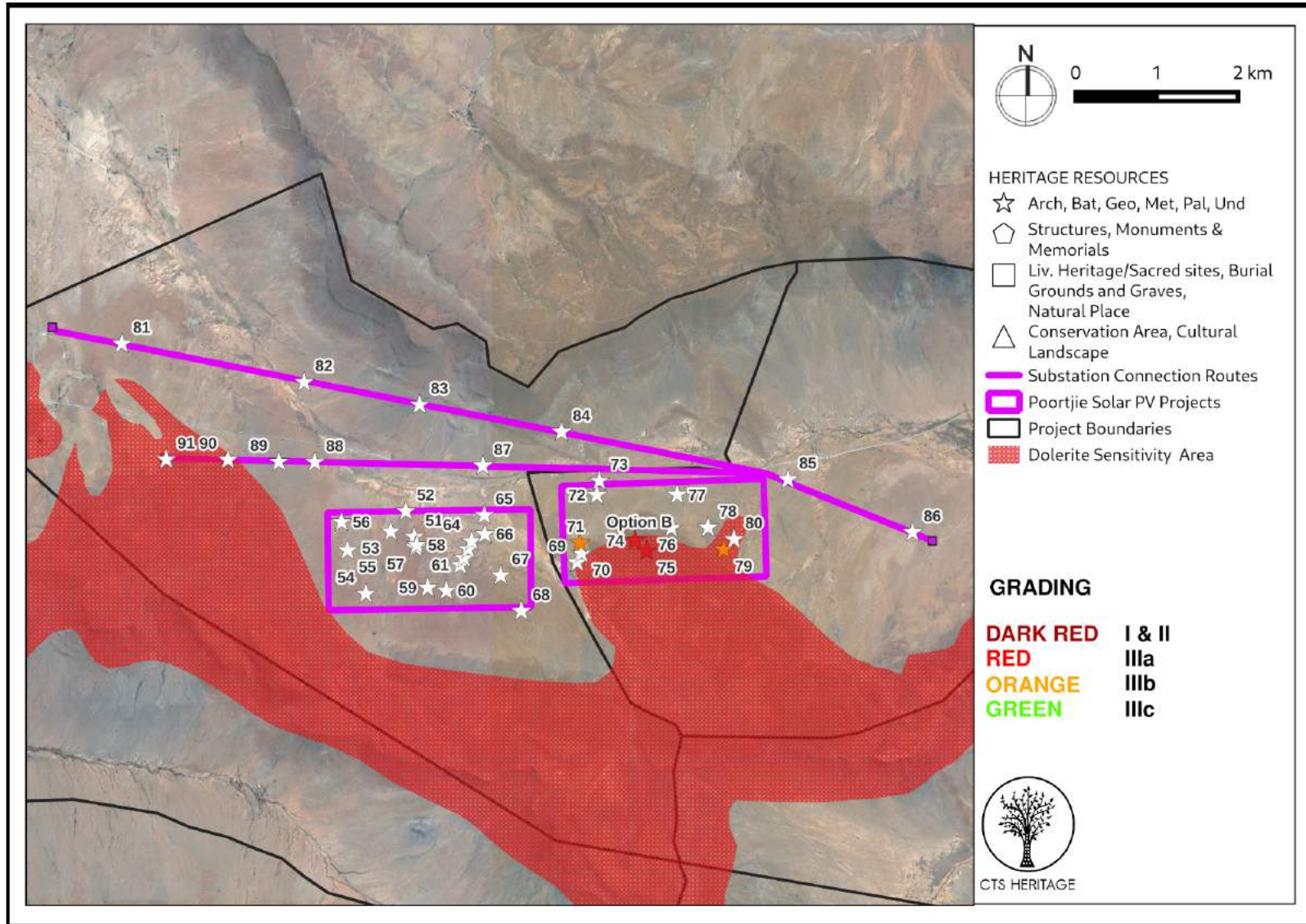


Figure 8.2: Map of all sites and observations noted within Belvedere Solar Energy Facility (Pty) Ltd (Option B) & Montana 3 Solar Energy Facility (Pty) Ltd (Option C)



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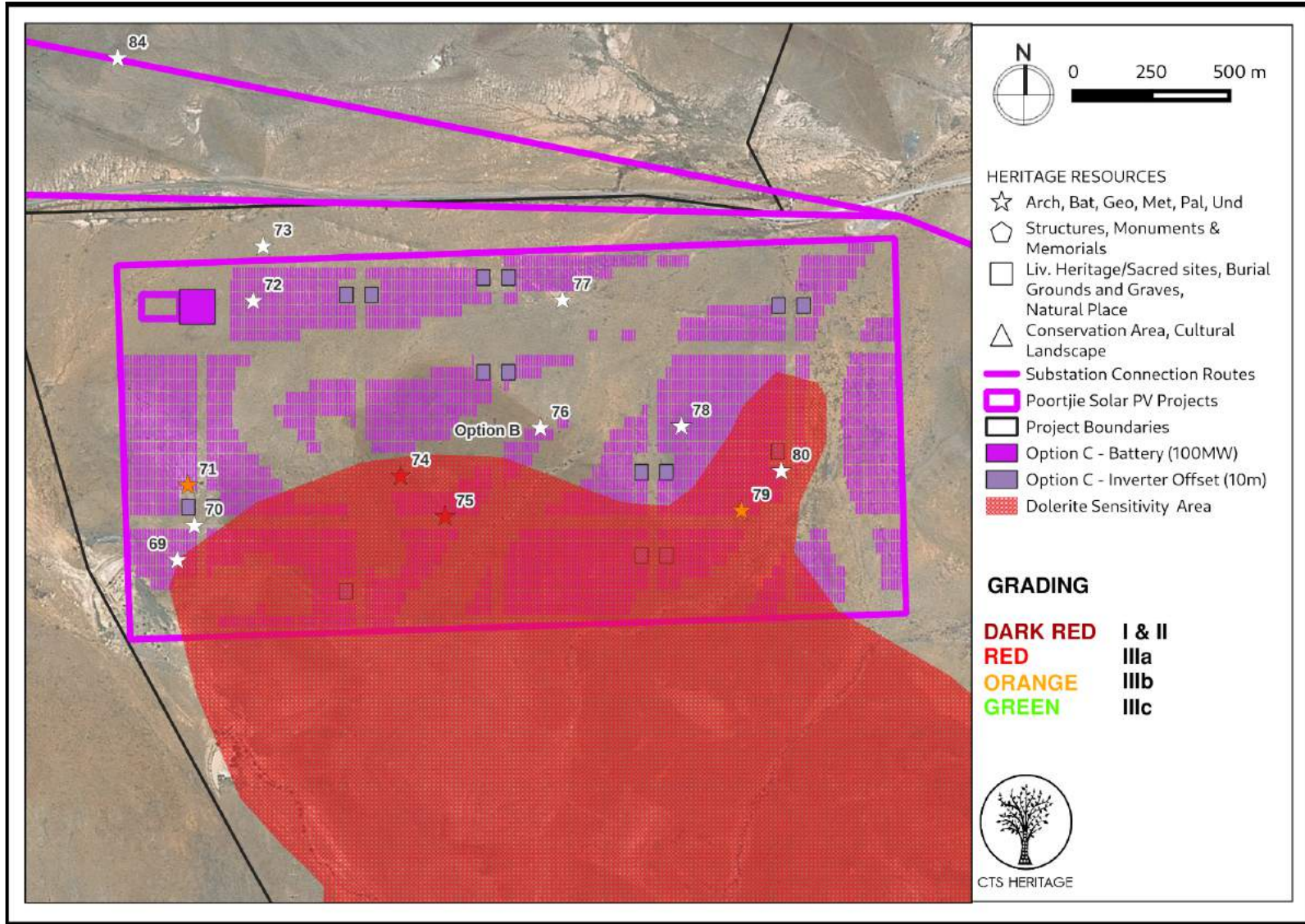


Figure 8.3: Map of all sites and observations noted within Belvedere Solar Energy Facility (Pty) Ltd Option B)



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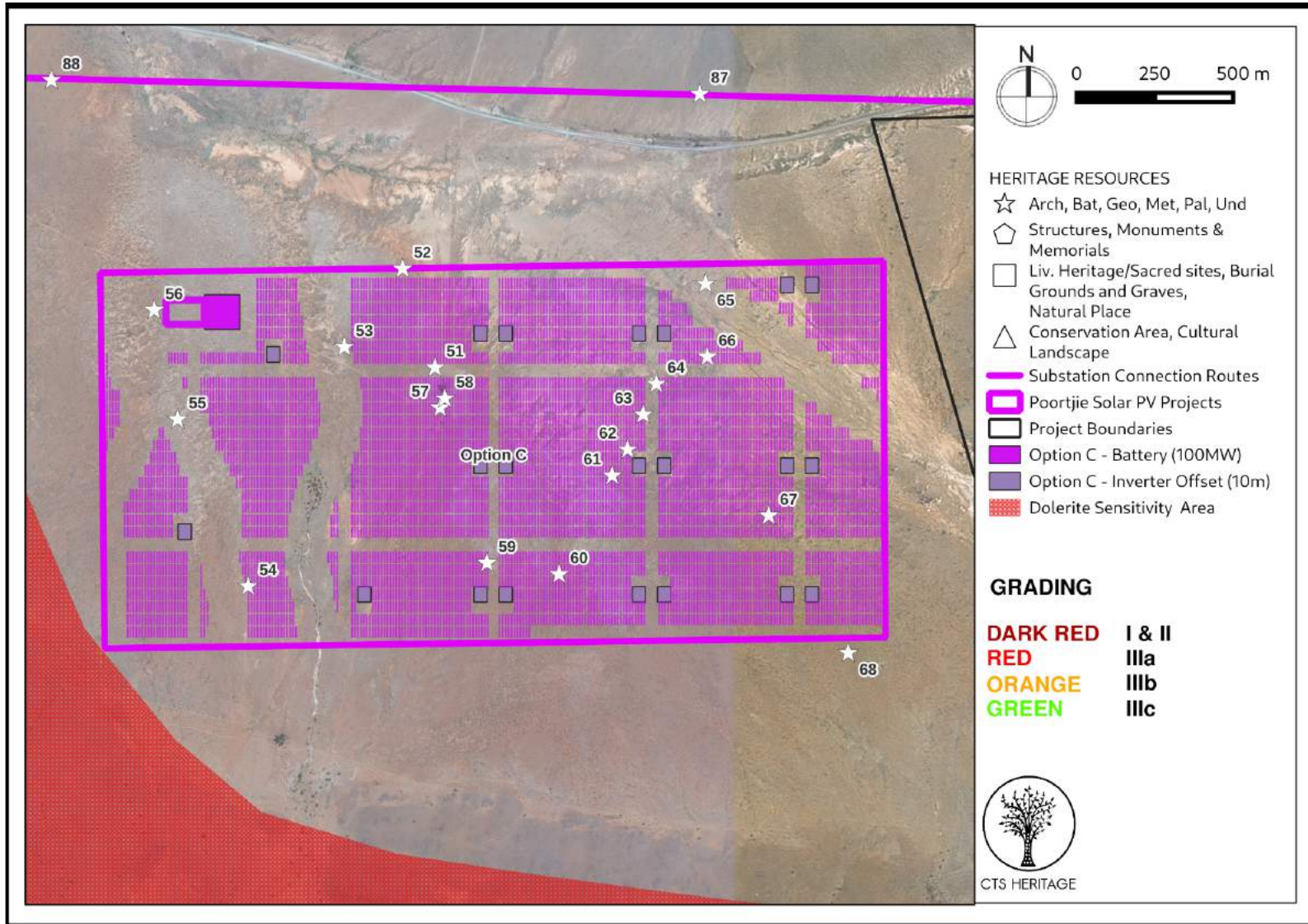


Figure 8.4: Map of all sites and observations noted within Montana 3 Solar Energy Facility (Pty) Ltd (Option C)



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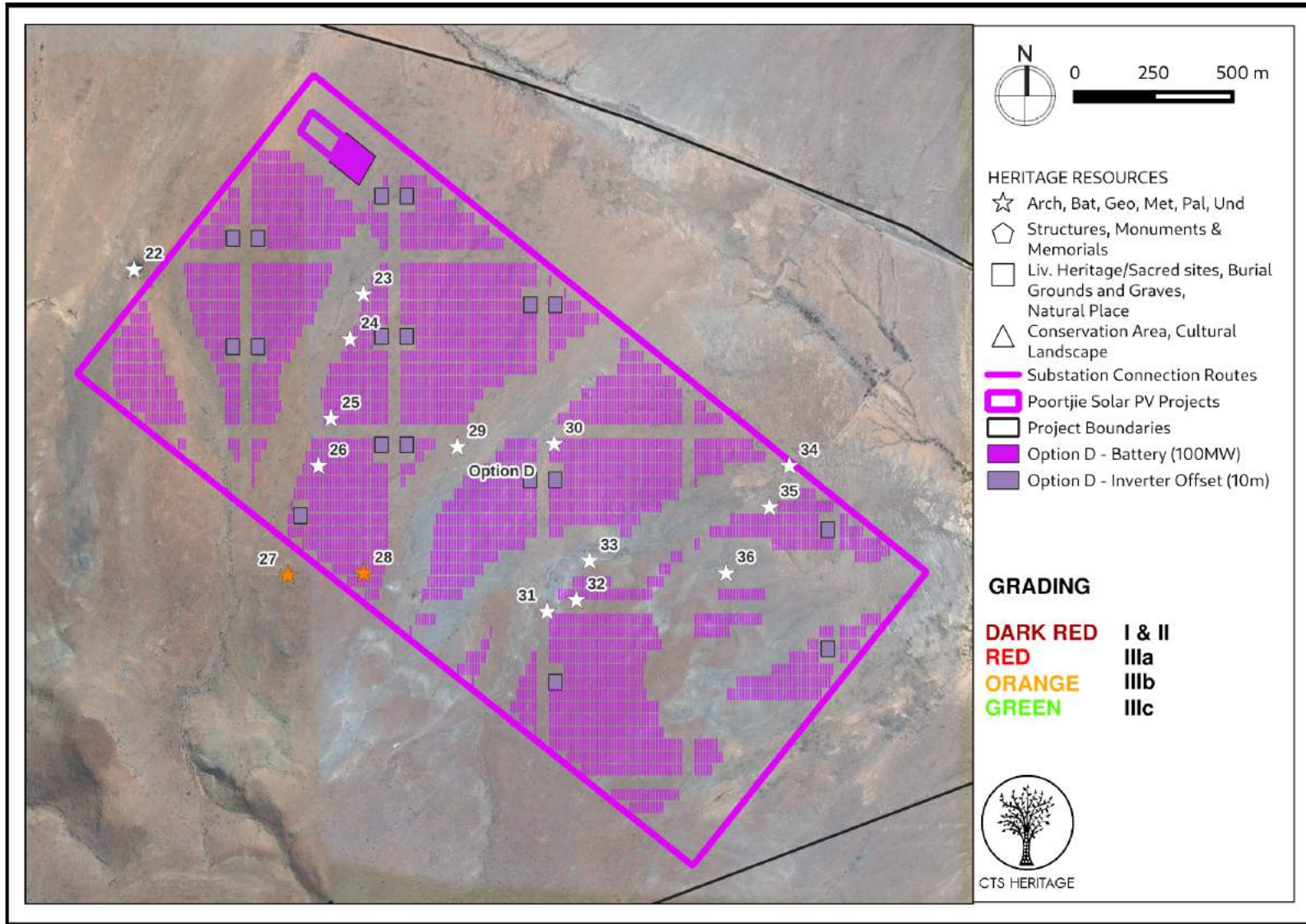


Figure 8.5: Map of all sites and observations noted within Montana 2 Solar Energy Facility (Pty) Ltd (Option D)

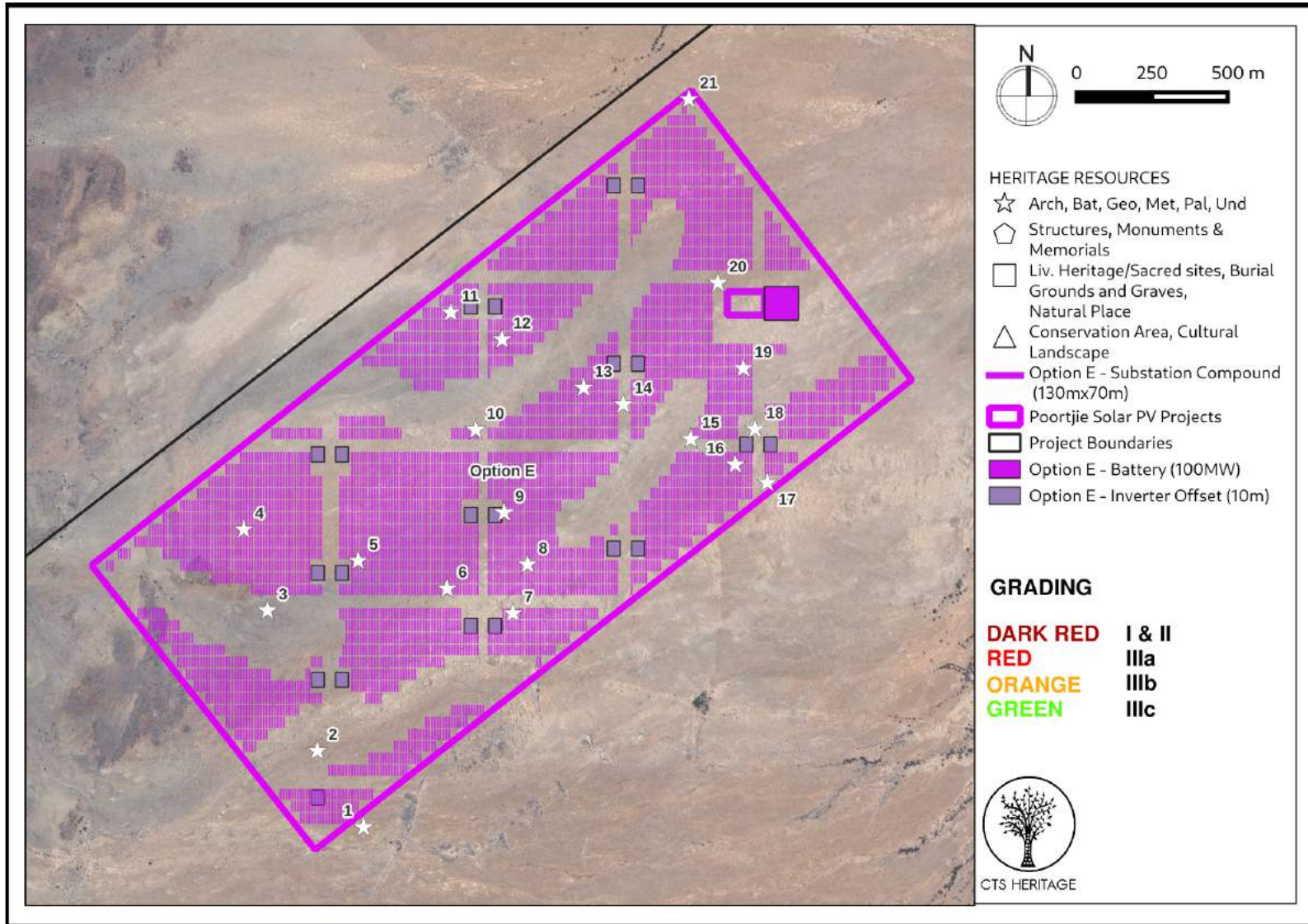


Figure 8.6: Map of all sites and observations noted within Montana 1 Solar Energy Facility (Pty) Ltd (Option E)



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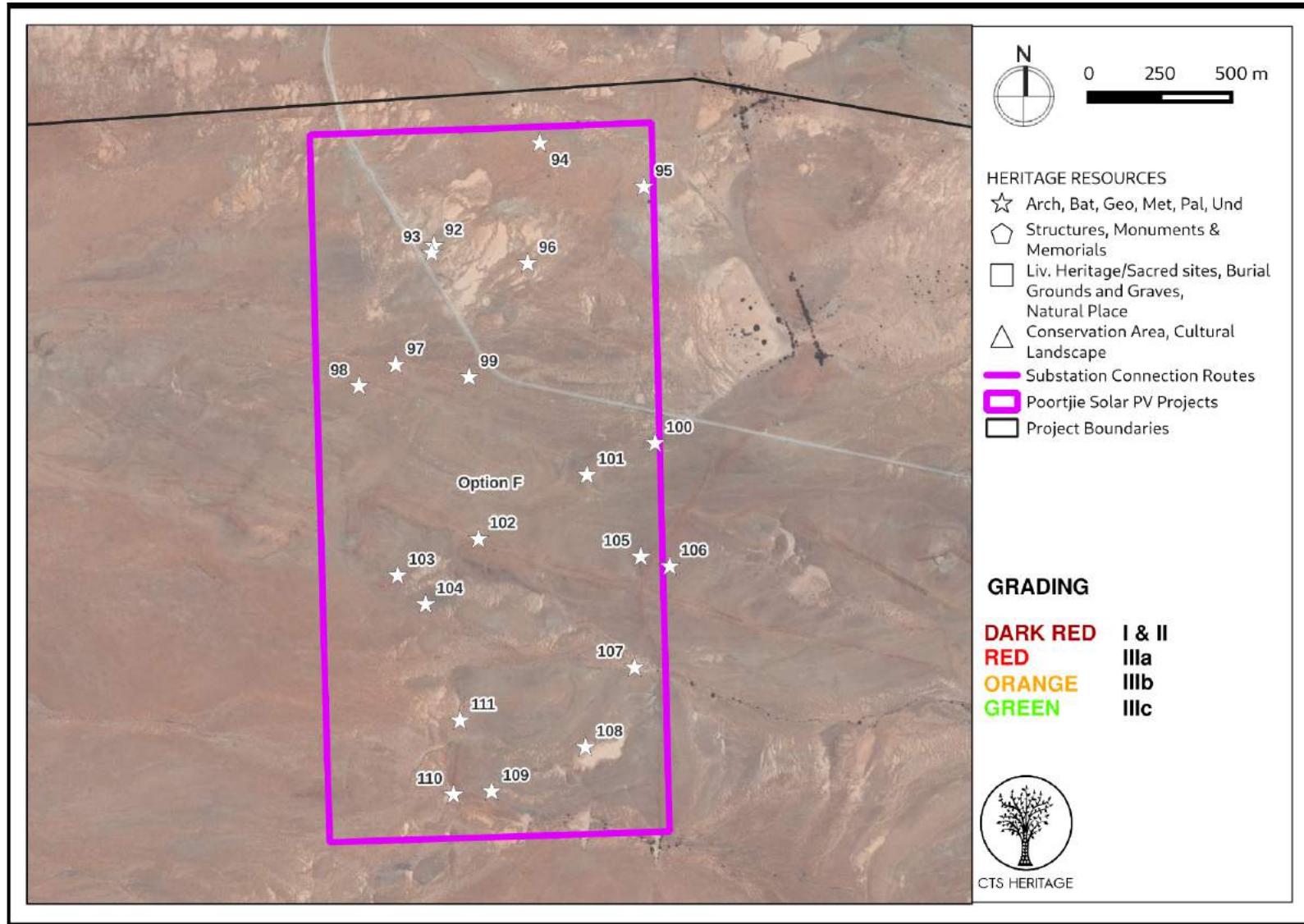


Figure 8.7: Map of all sites and observations noted within Brakpan 2 Solar Energy Facility (Pty) Ltd (Option F)



6. CONCLUSION AND RECOMMENDATIONS

Rossouw's 2007 (SAHRIS NID 8222) study of a pipeline route at Nelspoort outlines the geological context in which these solar PV applications are placed, "*alluvial sands and silts and strongly structured clayey, alkaline soils of up to five meters in thickness. Alluvial silts and clays and medium to fine terrace gravel deposits show clearly along the banks of the Kambro and Sout Rivers where sharp profiles occur. Colluvial deposits exposed by railway cuttings indicate calcrete-cemented clastic rubble deposits that occur as terrace remnants approximately 10 metres above the riverbed. The colluvium may include elements of sheet wash and alluvial-related deposits*". These calcrete deposits were found again in the eastern sites (options A and F) while options B, C, D and E tended to be covered in clays with open patches of erosional sheetwash spread across the area. Deflated MSA artefacts were more visible in these open patches but closer sampling of the artefact densities showed that material continued out of these areas in the vegetated zones, leaving no particular pattern other than an overall impression that the material is widespread on the surface. Rossouw also located a LSA rock engraving during his assessment.

Two areas containing dolerite boulders were located in options D and B but the overlay of option D is clipped on the southern boundary by this dolerite boulder field. The engravings identified fall just within the boundaries of option D and therefore a 100m buffer zone around each site graded (027 & 028) will suffice in protecting the area and avoiding any damage to more significant archaeological material. Option B is the most sensitive from a heritage perspective as a number of high quality engravings (074, 075 & 079), a stone kraal (071) and various artefact scatters in association with these sites were identified. The significant area has been outlined with a heritage zone of sensitivity.

Ubiquitous scatters of Middle Stone Age material were found throughout all of the options with a lower component of Later Stone Age material. Some of the MSA artefacts appear to date to the earlier period of the MSA while most of the flakes probably date within the last 150 000 years. Local hornfels and siltstones almost exclusively feature and levels of retouch were low. High numbers of blade blanks and debitage were found which is consistent with the high availability of the raw materials sourced in flake production and the general spread of material across the area. Points, bladelets, scrapers and imported raw materials feature at the sites holding engravings.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development of the renewable energy facilities and its associated grid connection infrastructure will negatively impact on significant archaeological heritage on condition that::

- A 100m no-go development buffer is implemented around sites POORTJIE027 & POORTJIE028 (Figure 6.1 & 6.2)
- A heritage sensitivity zone is implemented incorporating the low ridgeline and sites POORTJIE071 (Figure 6.3), POORTJIE074 (Figure 6.4), POORTJIE075 (Figure 6.5) and POORTJIE079 (Figure 6.6)
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. 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, burials or other



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



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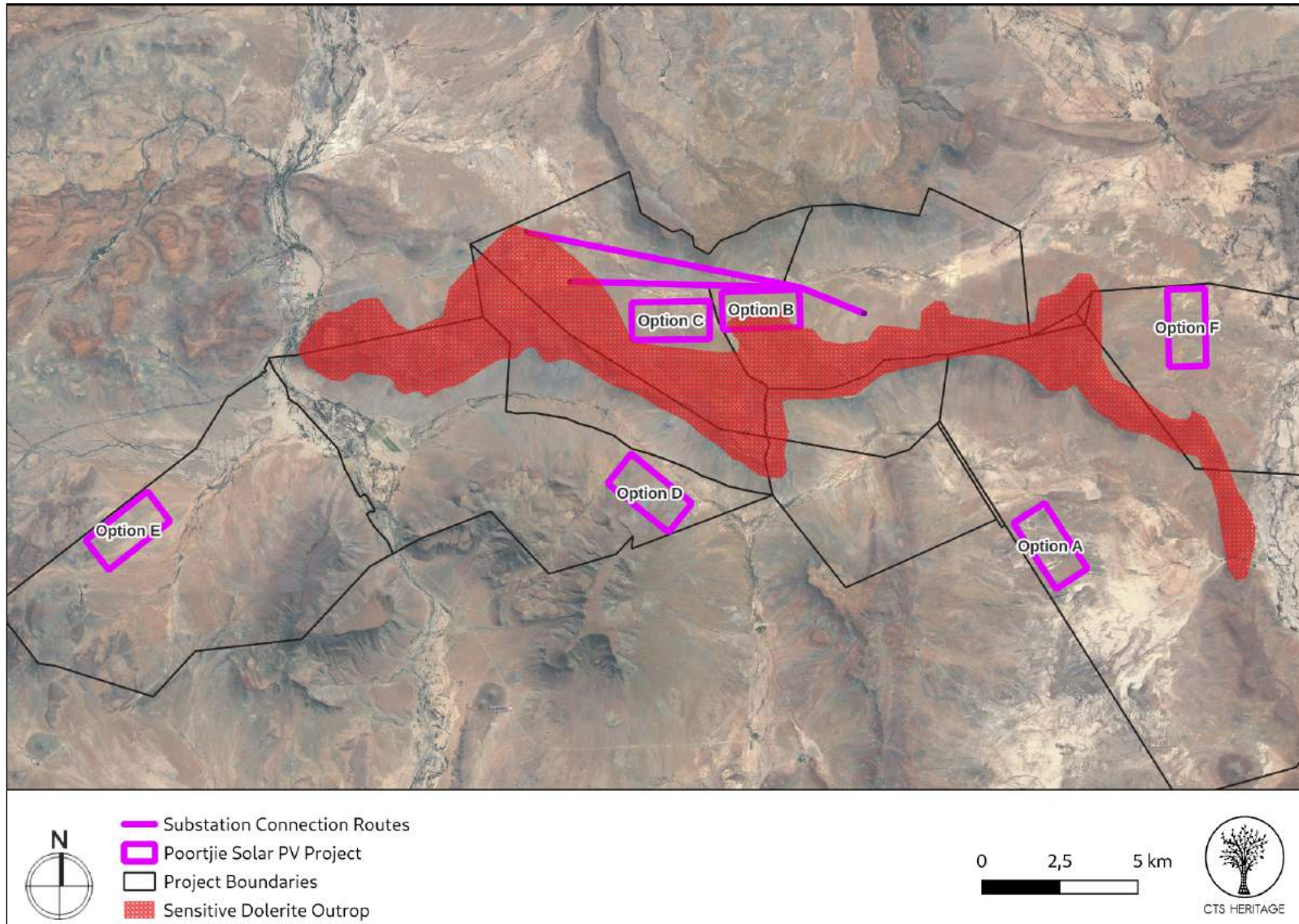


Figure 9.1: Map of dolerite sensitive area based on findings in the field and Google Satellite Imagery and the geology maps for the area



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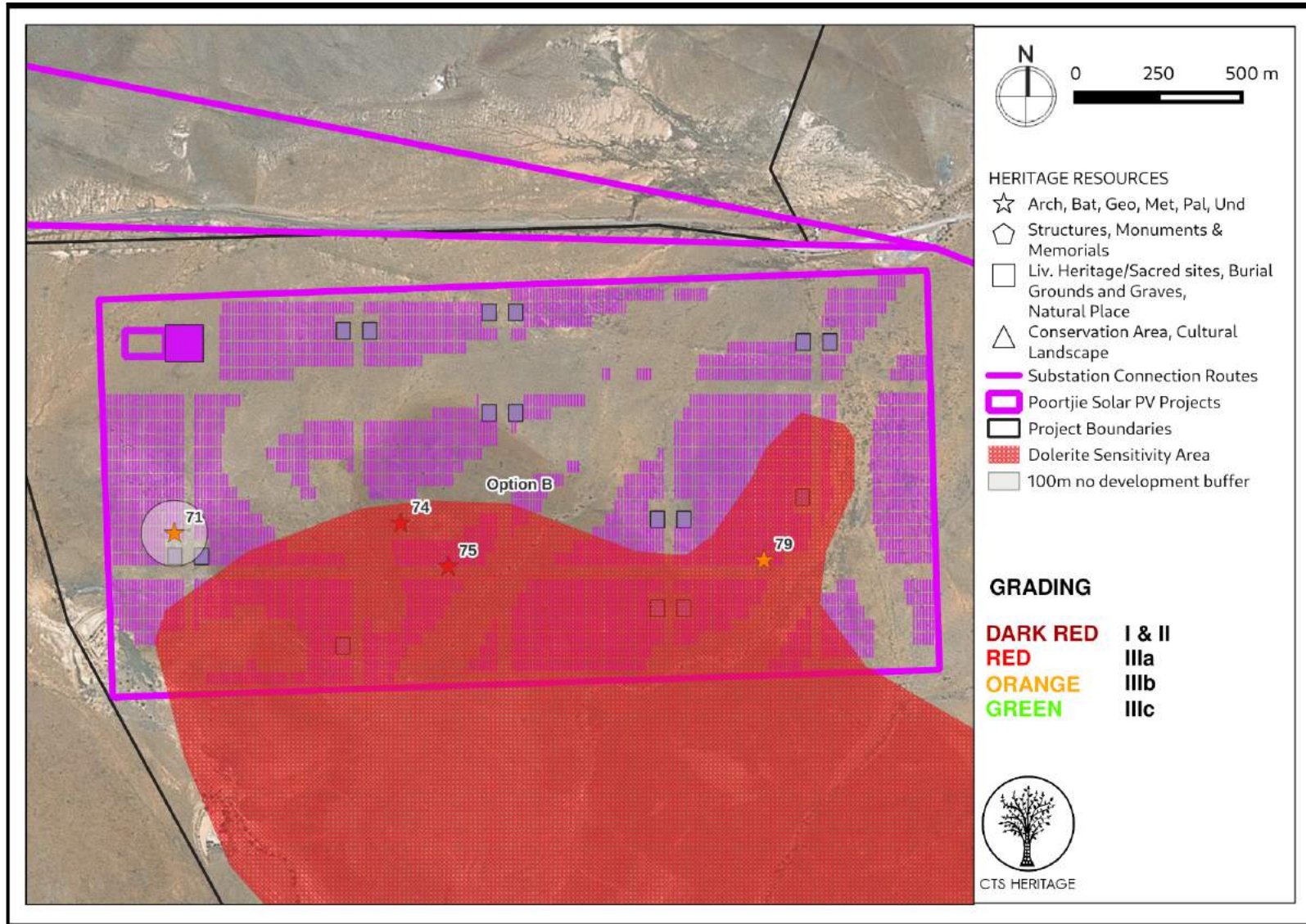


Figure 9.2: Recommended heritage sensitivity zone for Belvedere Solar Energy Facility (Pty) Ltd (Option B)



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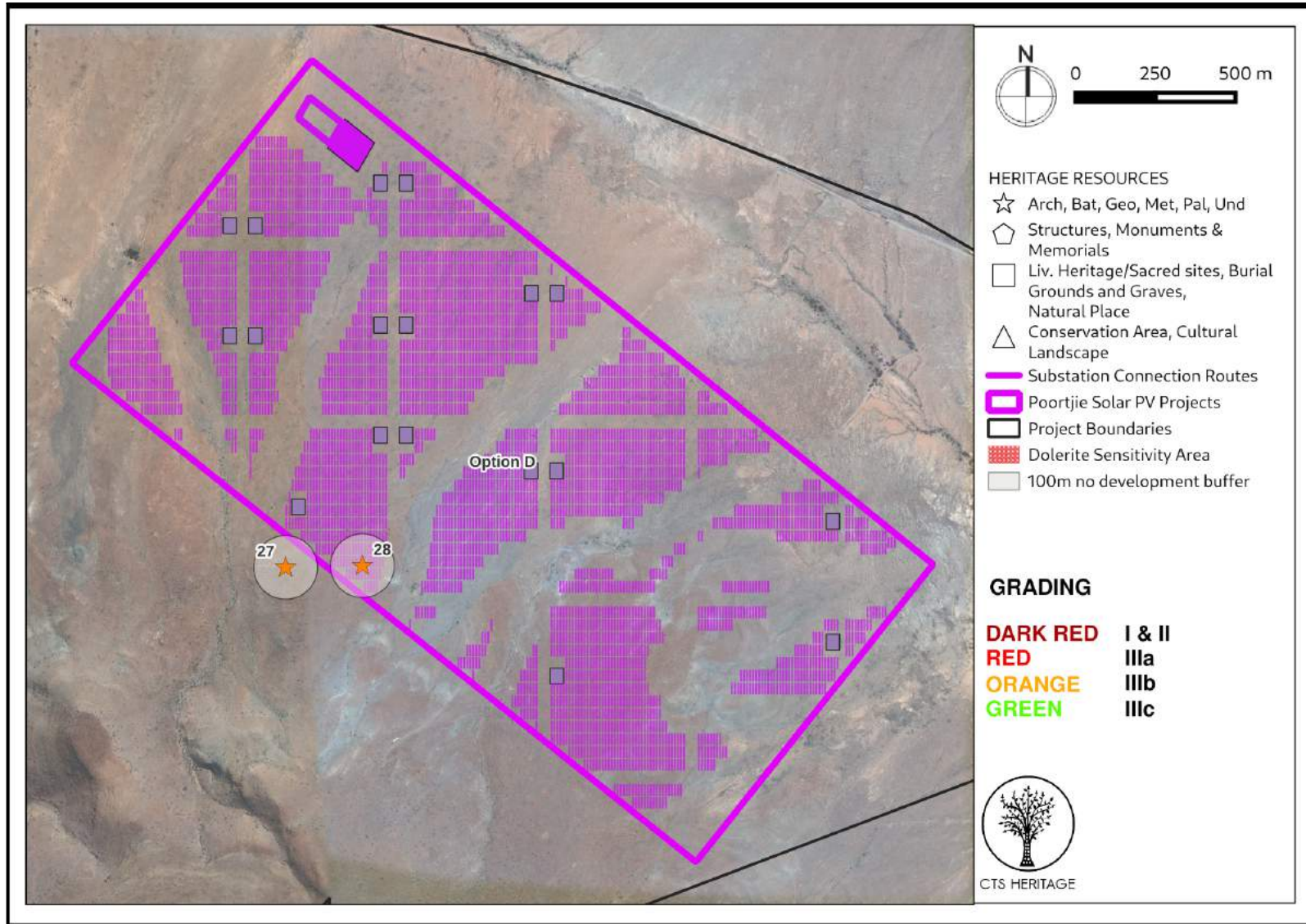


Figure 9.3: Recommended 100m buffer areas for Montana 2 Solar Energy Facility (Pty) Ltd (Option D)



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7. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
8222	HIA Phase 1	Lloyd Rossouw	01/02/2009	Phase 1 Palaeontological Impact Assessment of a Proposed Water Pipeline near Nelspoort, Beaufort West District, Western Cape Province
120317	AIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
360840	HIA Phase 1	Wouter Fourie	05/03/2016	Environmental Impact Assessment of the proposed amendments to the Environmental Authorisation for the Mainstream Renewable Power South Africa Wind Energy Project near Victoria West in the Northern Cape – Specialist Heritage Opinion
354681	AIA Phase 1	Lita Webley	30/11/2015	Archaeological Impact Assessment: Proposed uranium mining and associated infrastructure on portions of the farms Quaggasfontein and Ryst Kuil near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape