

ADDENDUM 10.

1st phase H.I.A. of a proposed extension and upgrading,

also known as

THE SISHEN IRON ORE MINE EXPANSION PROJECT

For Sishen Mine

Project code: SIS-SIS-22-04-25

August 2022.





General bird-eyes view of the modern impact of the Sishen Iron Ore Mine over the last 70 years.

Project coordinator: - Shangoni management services.



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Declaration of independence.

This report has been compiled by Siegwalt Kūsel and Sidney M Miller. We declare that as independent consultants we have no business, financial, personal or other interest in the proposed development project, application or appeal in respect of which the appointment was made other than fair remuneration for work performed in connection with the activity or application.

Provisional indemnity.

We Siegwalt Kūsel and Sidney M Miller hereby declare that all reasonable steps were taken to identify the heritage resources on the property under investigation. For obvious reasons heritage remains that occurs/occurred underground cannot be vouched for. In the event of such remains being uncovered during the mining operations work should be stopped and a heritage practitioner or the heritage authorities must be informed. The cost of such new investigation will be for the account of the client.

	
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[Note that a copy of the report must be lodged with SAHRA as stipulated by the NHRA (Act No. 25 of 1999), Section 38 (particularly subsection 4).]

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Data regarding location of the research area/s.

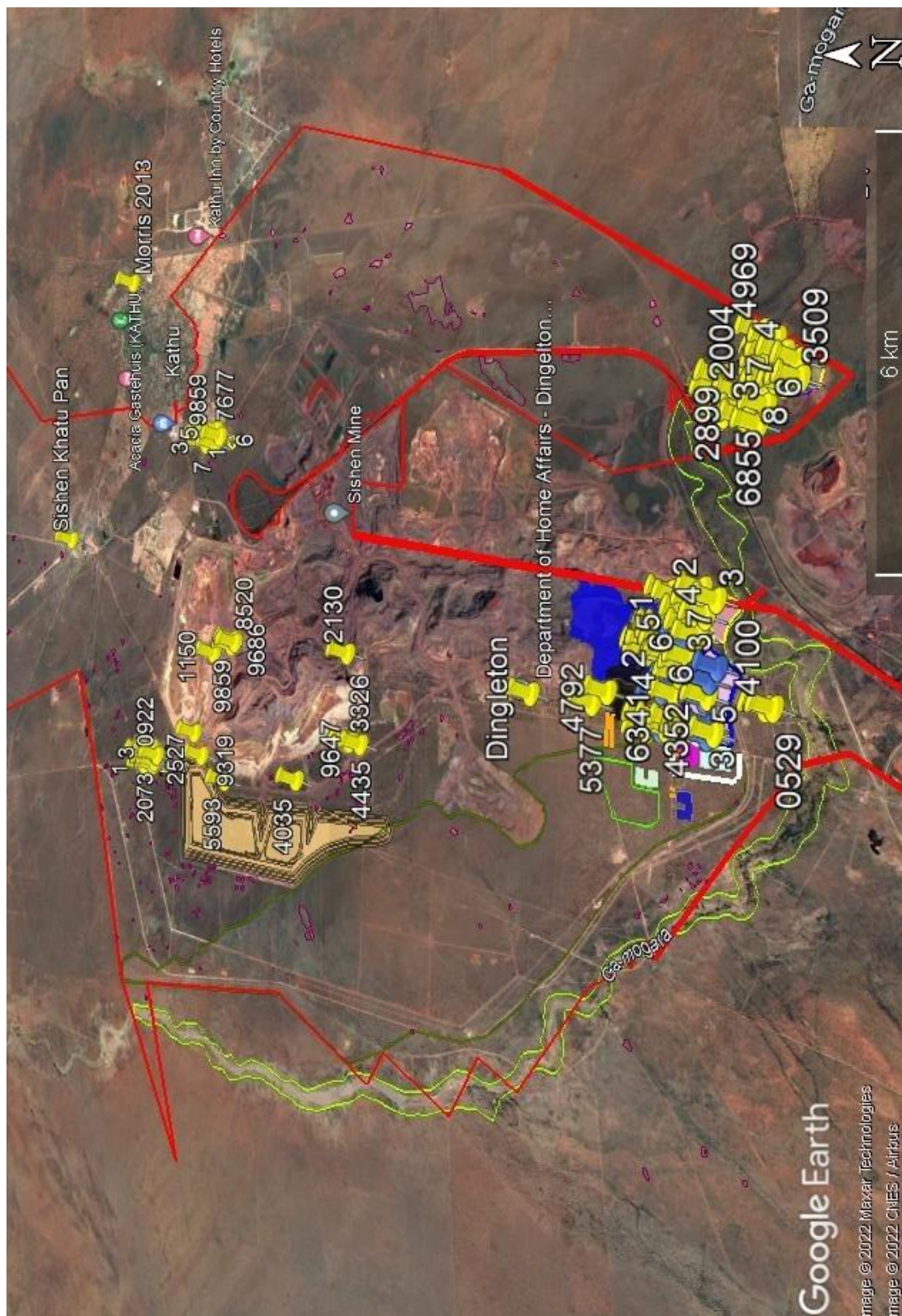


Figure 1. Location of the present research areas within the Mining Right Area (red line), also showing the 100-year Gamagara River flood line (light green lines) and the Thornfield limitation distribution. (Dark olive line.) (Google Earth 2022.)

1. North Region: -



Figure 2. Location of sites to be impacted on. **Top right**, the two alternatives for the extension of the Tyre Storage Facility, **top left**, the alterations proposed at the Moolman’s facility and **left** the existing rock dump and its proposed extension southwards. (Google Earth 2022.)

1.1. Extension of the tyre storage facility.



Figure 3. Location of the two alternatives for the proposed extension of the tyre storage facility. (Shangoni KMZ No 3, 5, 15 & 47 on Google Earth 2022.)

	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°42'56.65"S	23° 1'53.71"E	2	27°42'51.20"S	23° 1'48.40"E	3	27°42'56.02"S	23° 1'42.86"E
4	27°43'1.37"S	23° 1'47.96"E	5	27°43'6.55"S	23° 1'53.24"E	6	27°43'11.06"S	23° 1'48.01"E
7	27°43'5.85"S	23° 1'42.49"E						

Figure 4. GPS location of the possible extensions of the tyre storage yard. (Google Earth 2022.)

1.1.1. Track log in two alternatives of the extension of tyre storage yard.



Figure 5. Garmin e-Trex 30, datum WGS84. (S.U. Kūsel 2022.)

1.1.2. Typical views of the research area.



Figure 6. General view of the proposed new tyre storage area. (U.S. Kūsel, 2022.)

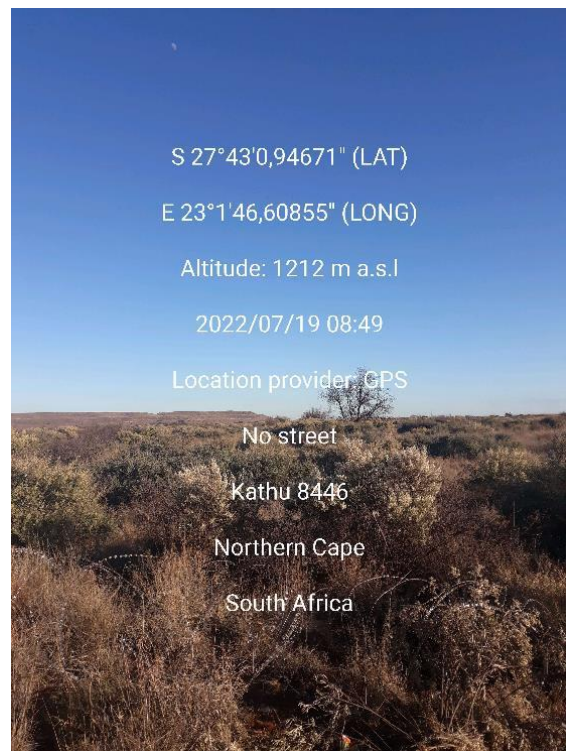
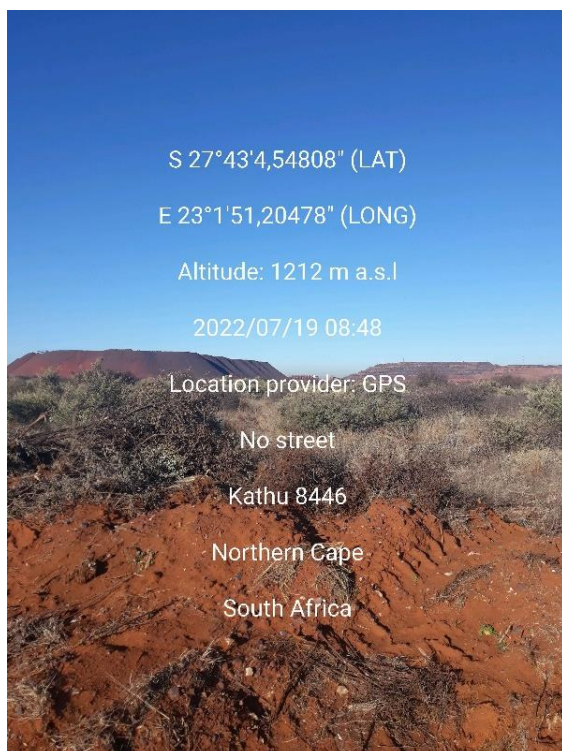
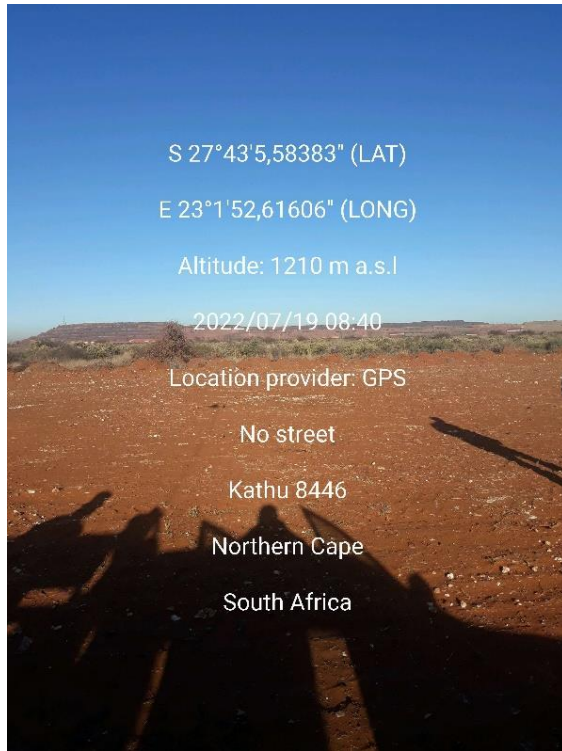


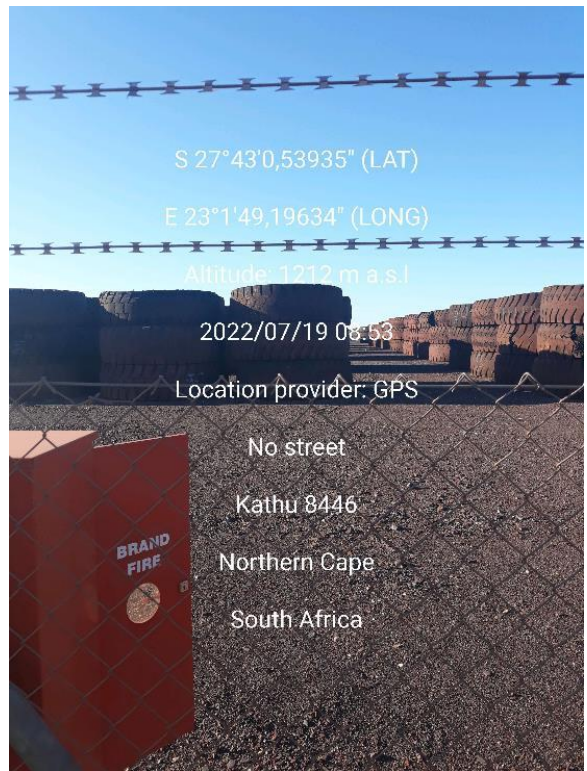
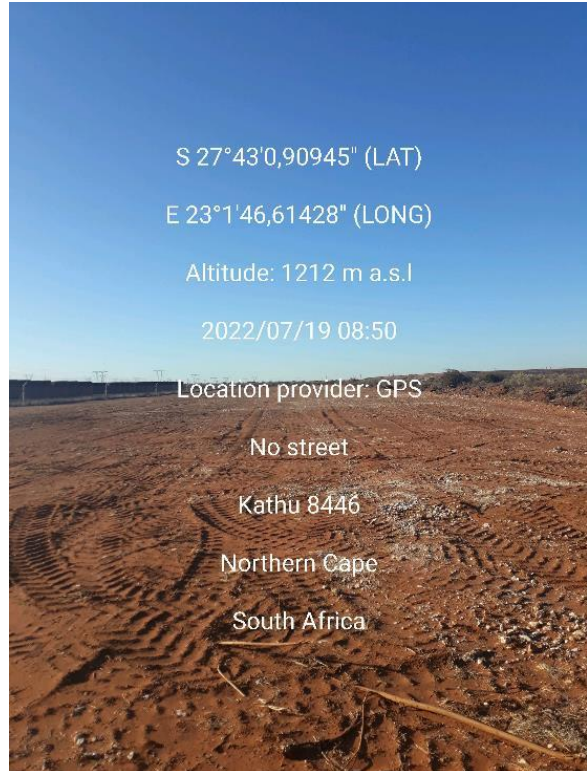
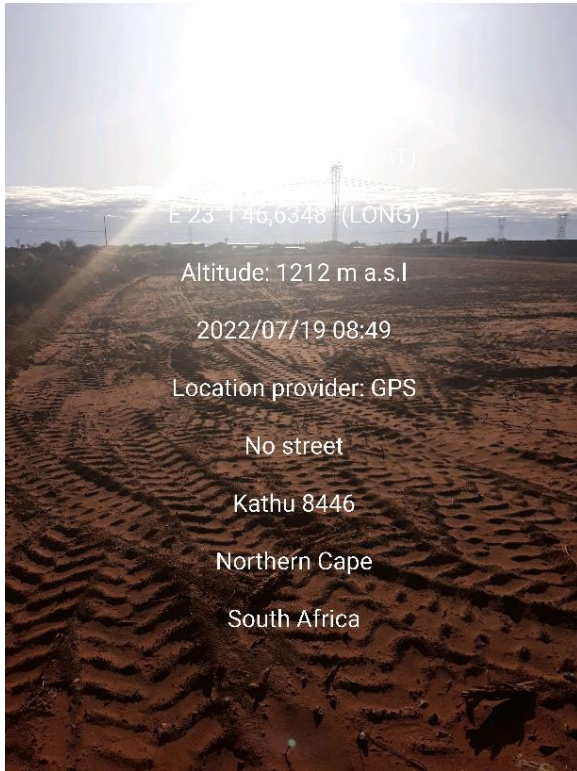
Figure 7. A scattering of modern materials, including glass metal and porcelain fragments. (U.S. Kūsel, 2022.)

1.1.3. Tyre yard GPS verified photos.

No.	Degree S.	Degree E.	No.	Degree S.	Degree E.			Comments.
7677	27°43'5.58"S	23° 1'52.61"E	3398	27°43'4.52"S	23° 1'51.40"E	2163	27°43'4.54"S	23° 1'51.20"E
6907	27°43'0.94"S	23° 1'46.60"E	2239	No reading	23° 1'46.63"E	6222	27°43'0.90"S	23° 1'46.61"E
1452	27°42'59.82"S	23° 1'48.07"E	1738	27°43'0.53"S	23° 1'49.19"E	9156	27°43'0.78"S	23° 1'49.03"E
9859	27°43'0.36"S	23° 1'49.64"E						

Figure 8. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)







1.1.4. Previously identified Heritage sites around the tyre storage facility.



Figure 9. The yellow squares represent previously identified low significance lithic sites. (SIOM heritage sites KMZ.)

1.1.5. Discussion of previous and present heritage investigation.

As predictable through ancient to present environmental conditions, Human settlement in this region centred around small mobile communities dependable on reliable water sources that left nearly no footprint in the open environment. During the ESA and MSA permanent bases that developed, such as Kathu pan and Wonderwerk Cave, are the only reliably significant Stone Age sites. LSA lithic scatterings only confirm the presence of such people in the region, rather than being able to add to time stratification.

Later presence of husbandry people, that were also highly mobile and not dependable on formal crop production, led to formation of a sub-culture over the dry western region. This, with intermingling with the Dutch/Boer southern group of colonists, led to the diverse group of peoples known as Namaquas, Griekwas, Bastards, Bergenaars and others. They too generally left little archaeological evidence in the region, especially in areas of low dependable water sources. The later settlement in “towns” such as *Kok’s-stad* and *Griekwastad* were manly missionary driven.

No new sites were identified during this investigation.

1.2. Alterations and improvements of the Moolman’s facility.

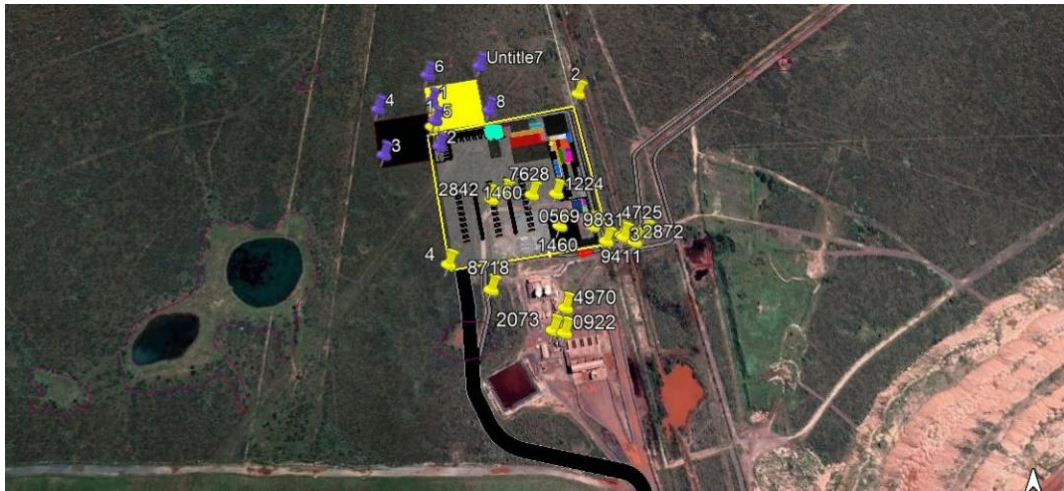


Figure 10. Location of the proposed alteration to the Moolman’s facility. (Shangoni KMZ No 25 to 34 on Google Earth 2022.)

	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°41'41.82"S	22°57'27.98"E	2	27°41'39.05"S	22°57'39.70"E	3	27°41'50.00"S	22°57'42.03"E
4	27°41'52.00"S	22°57'30.30"E	5	27°41'40.35"S	22°57'23.56"E	6	27°41'39.69"S	22°57'27.82"E
7	27°41'43.48"S	22°57'28.66"E	8	27°41'44.18"S	22°57'24.34"E	9	27°41'41.29"S	22°57'28.21"E
10	27°41'37.39"S	22°57'27.38"E	11	27°41'36.60"S	22°57'31.61"E	12	27°41'40.48"S	22°57'32.49"E

Figure 11. GPS locations of the proposed alteration to the Moolman’s facility. (Google Earth 2022.)

1.2.1. Track log in two alternatives of the extension of the Moolman’s facility.

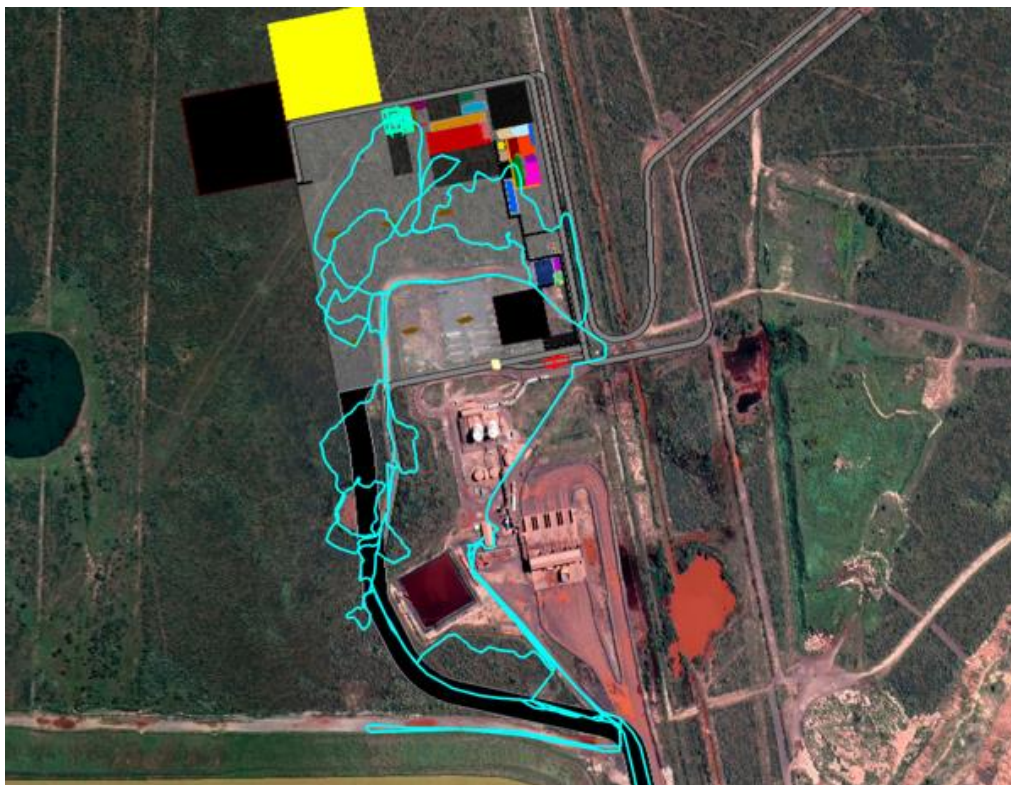


Figure 12. Garmin e-Trex 30, datum WGS84. (S.U. Küsel 2022.)

1.2.2. Typical views of the extension of the Moolman’s facility.

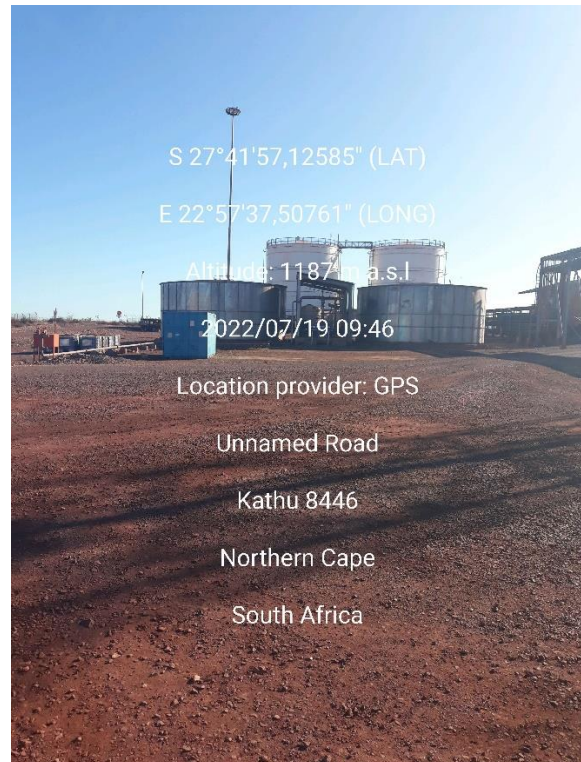
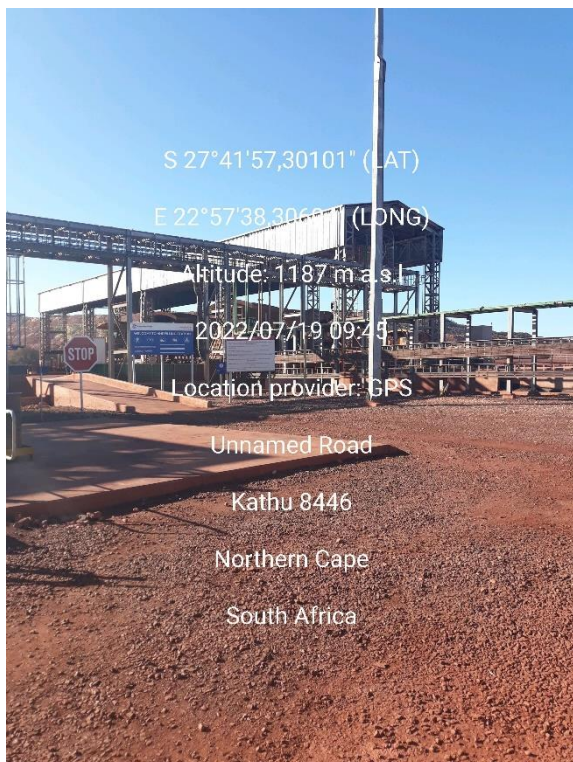


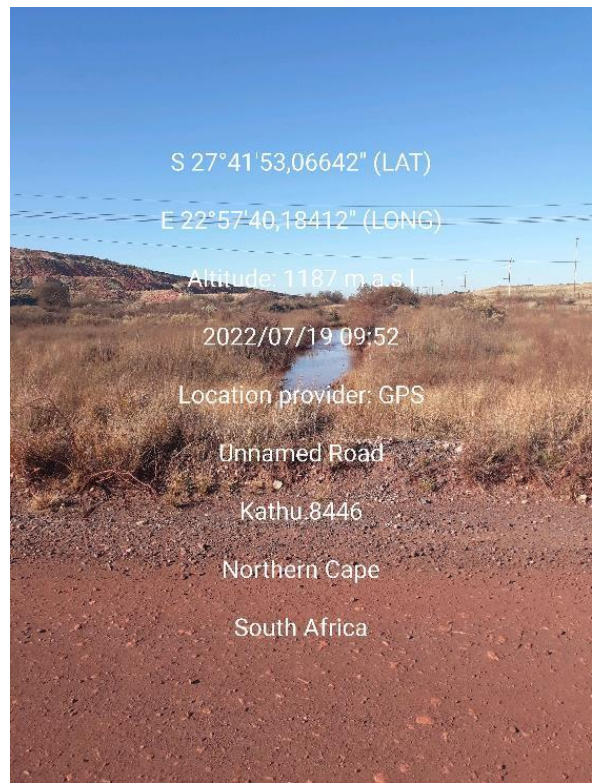
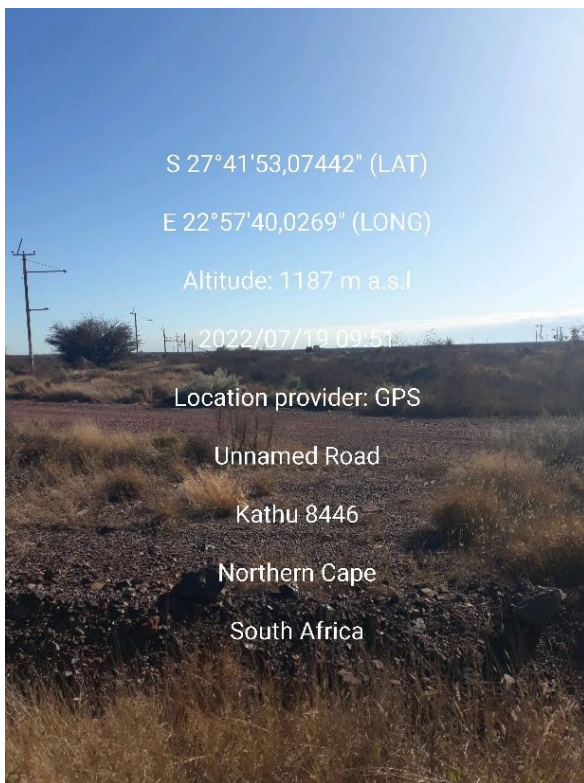
Figure 13. General view of the proposed new Moolman’s mechanical area. (U.S. Küsel, 2022.)

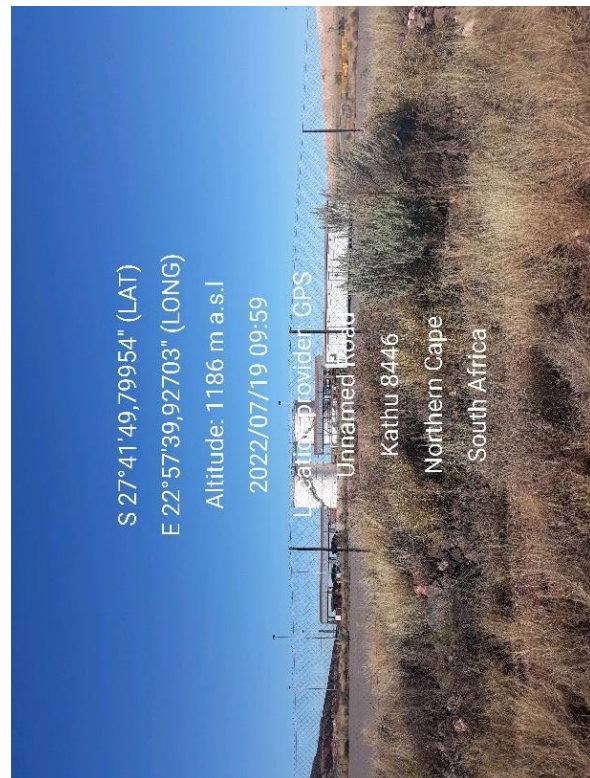
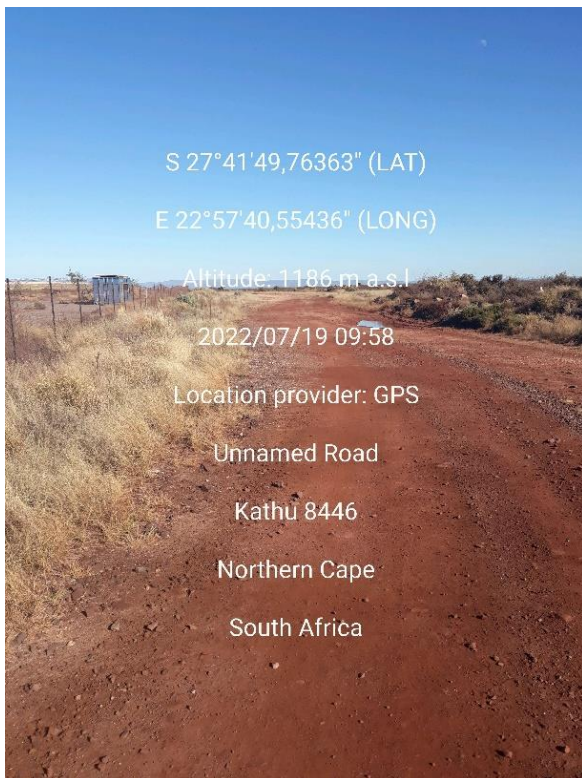
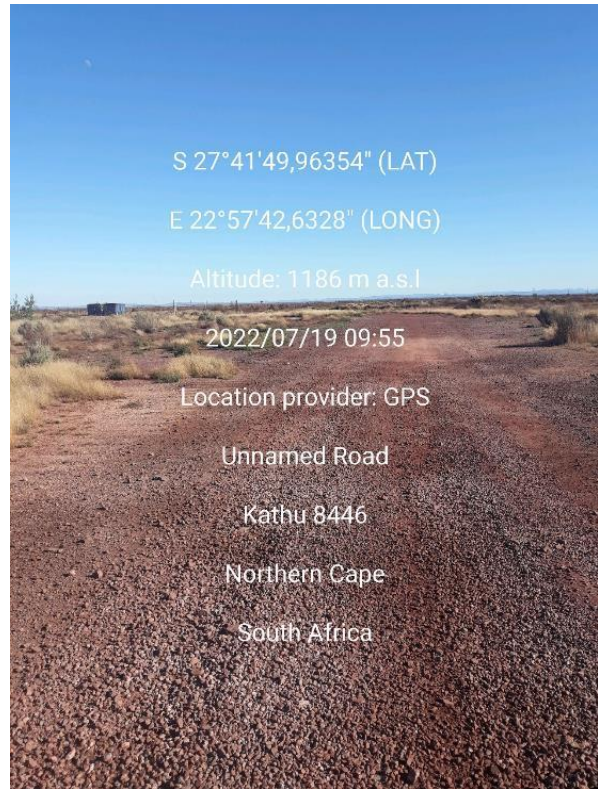
1.2.3. GPS verified photos of the extension of the Moolman’s facility

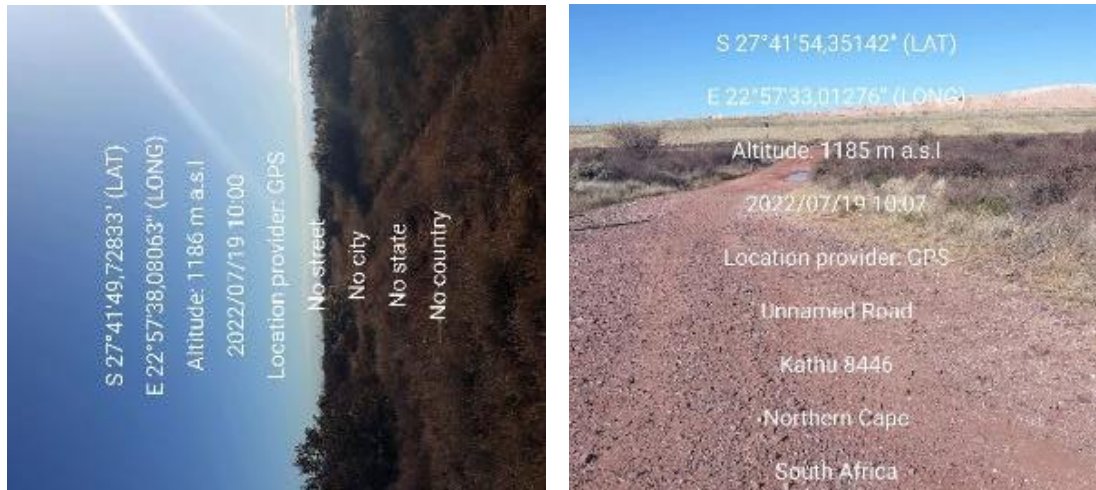
No.	Degree S.	Degree E.	No.	Degree S.	Degree E.			Comments.
0922	27°41'57.30"S	22°57'38.30"E	2073	27°41'57.12"S	22°57'37.50"E	4970	27°41'55.60"S	22°57'38.40"E
9831	27°41'50.88"S	22°57'41.53"E	2872	27°41'53.07"S	22°57'40.02"E	4725	27°41'53.06"S	22°57'40.18"E
9411	27°41'50.58"S	22°57'42.86"E	1224	27°41'49.96"S	22°57'42.63"E	0569	27°41'49.76"S	22°57'40.55"E
7628	27°41'49.79"S	22°57'39.92"E	1460	27°41'49.72"S	22°57'38.08"E	2842	27°41'49.83"S	22°57'37.19"E
8718	27°41'54.35"S	22°57'33.01"E						

Figure 14. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)









1.2.4. Previously identified Heritage sites around the Moolman's facility.

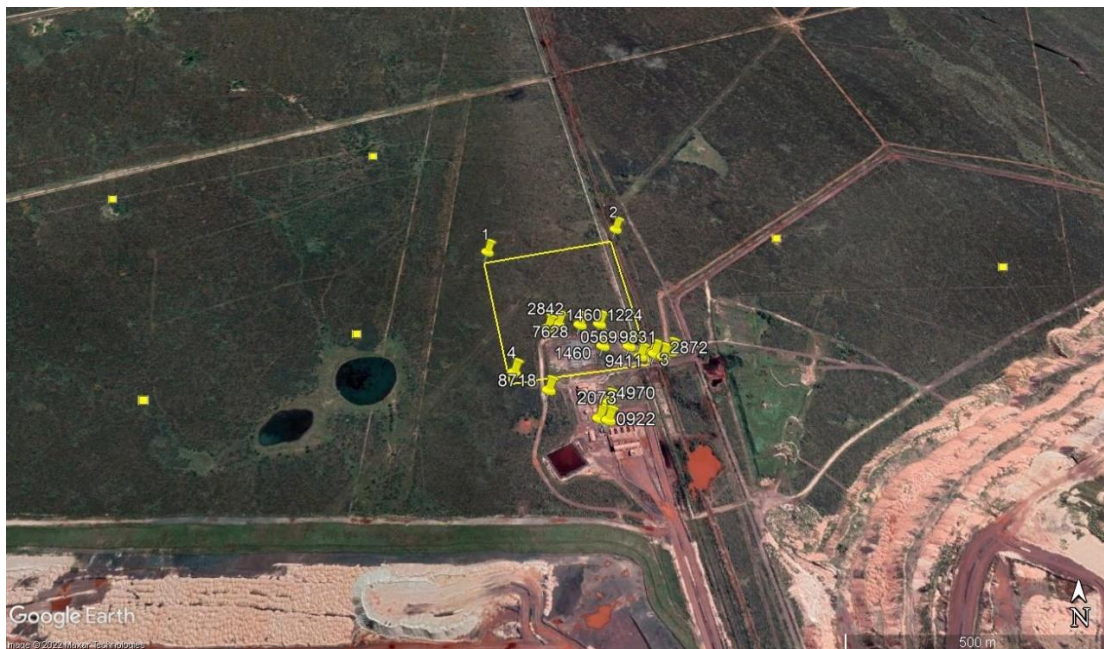


Figure 15. The yellow squares represent previously identified low significance lithic sites. (SIOM heritage sites KMZ.)

1.2.5. Discussion of previous and present heritage investigation.

(See general remarks regarding general heritage potential remains in the region in section 1.1.5.)

Although there are previously recorded scattered lytic remains in the area, it confirms to the hypothesis that such remains will be present near semi-permanent water sources such as the pans to the west of the study area.

No new sites were identified during this investigation.

1.3. Approved and Existing Western Waste Rock Dump.

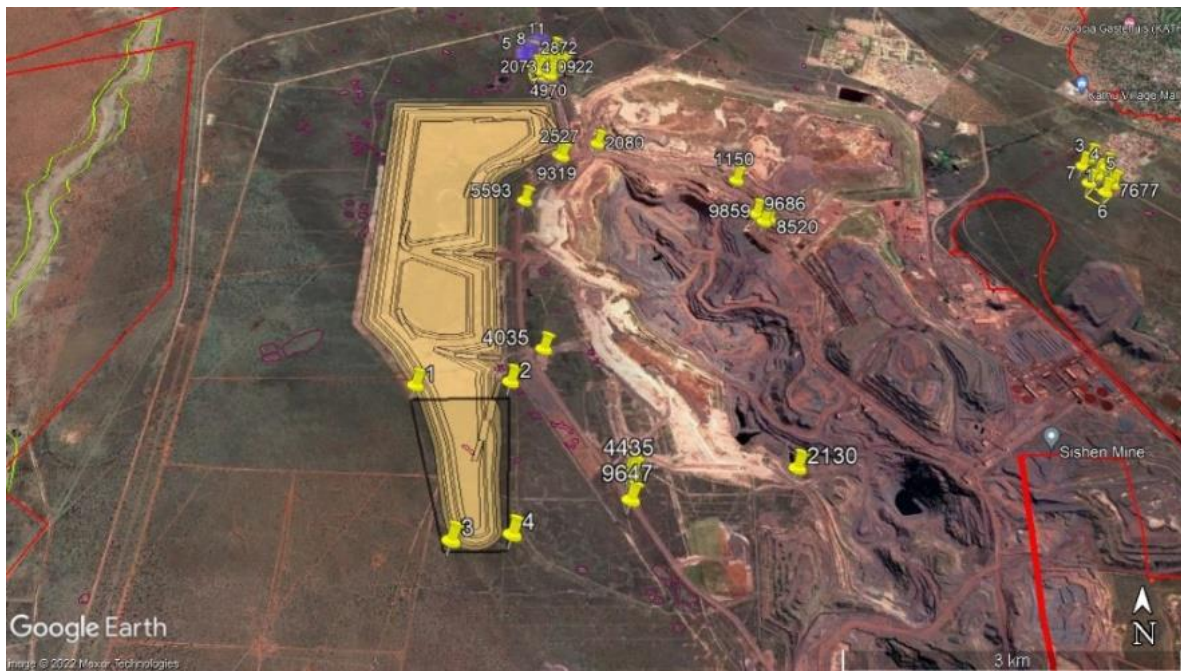


Figure 16. Existing Western Waste Rock Dump. (Shangoni KMZ No 6 on Google Earth 2022.)

	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°44'43.70"S	22°56'51.43"E	2	27°44'42.45"S	22°57'27.99"E	3	27°45'41.72"S	22°57'10.80"E
4	27°45'39.72"S	22°57'31.79"E						

Figure 17. GPS location of the Southern toe of the Approved and Existing Western Waste Rock Dump, that is a new proposal. (Google Earth 2022.)

1.3.1. Previously identified Heritage sites around the Existing Western Waste Rock Dump.

There are no previously identified sites in the area probably due to the thorn-veld limitation to the west of the area scientifically described in *Shangoni KMZ 53*.

1.3.2. Discussion of previous and present heritage investigation.

Owing to this facility being located within the “thorn-field” area of the study area, where access to both animals and humans have been limited to access, the chances to find heritage remains is very low. Further the continuous mining activities would have obliterated any possibilities to find any heritage remains of significance. So, the “toe” area was sanctioned without on-site investigation. The rules regarding underground heritage remains will stand.

2. Extension of the existing SIOM pit rim.

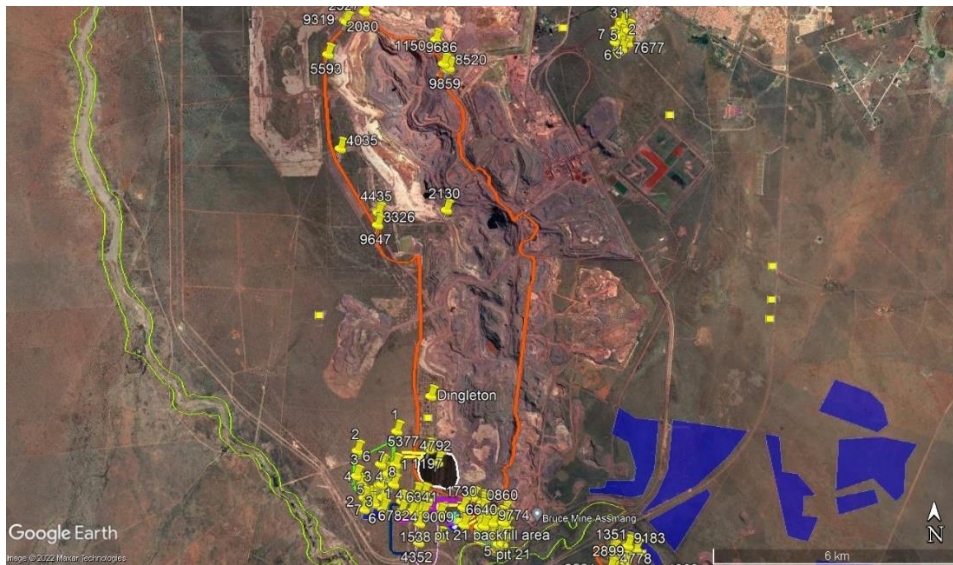


Figure 18. Proposed new limits of the SIOM pit rim. Heritage sites also indicated by yellow squares. (Shangoni KMZ on Google Earth 2022.)

2.1. Track log of the pit rim and PB Pit 19.

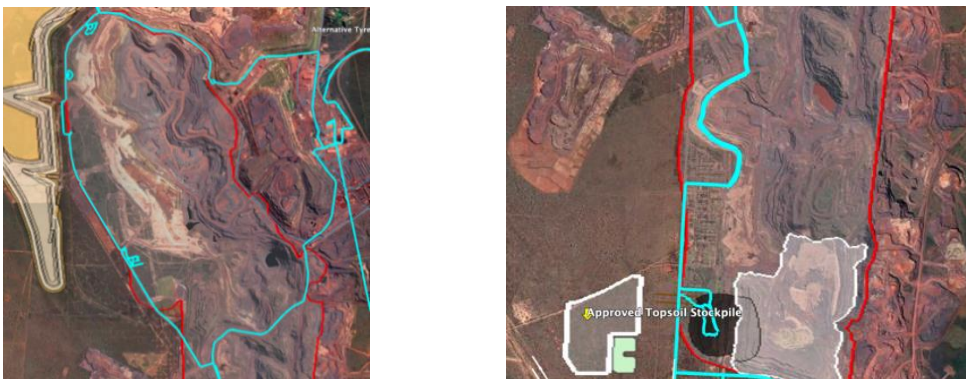


Figure 19. Garmin e-Trex 30, datum WGS84. (S.U. Kūsel 2022.)

2.2. Typical views of the research area.



Figure 20. General view of the extended pit rim area. (U.S. Kūsel, 2022.)

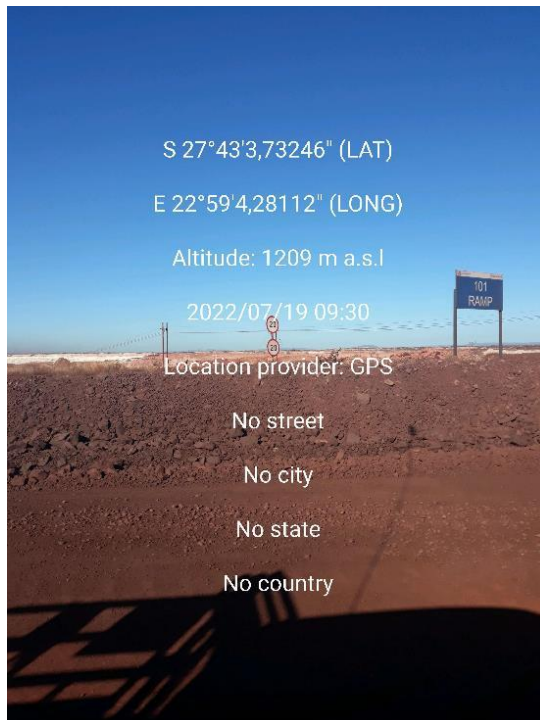
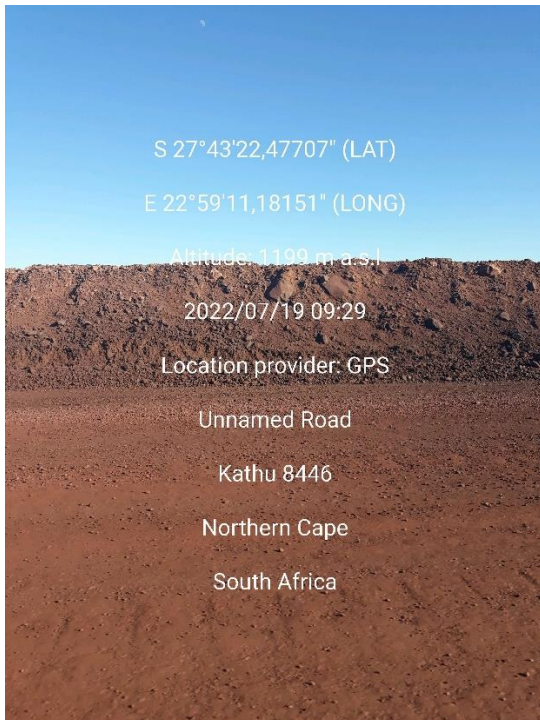
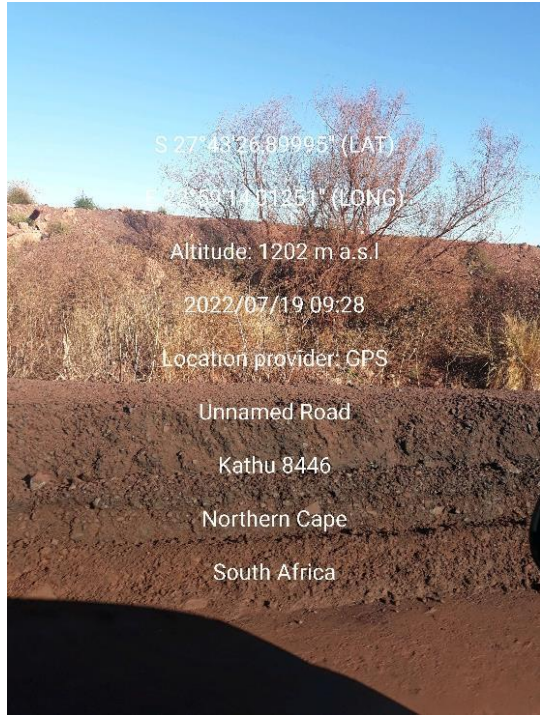
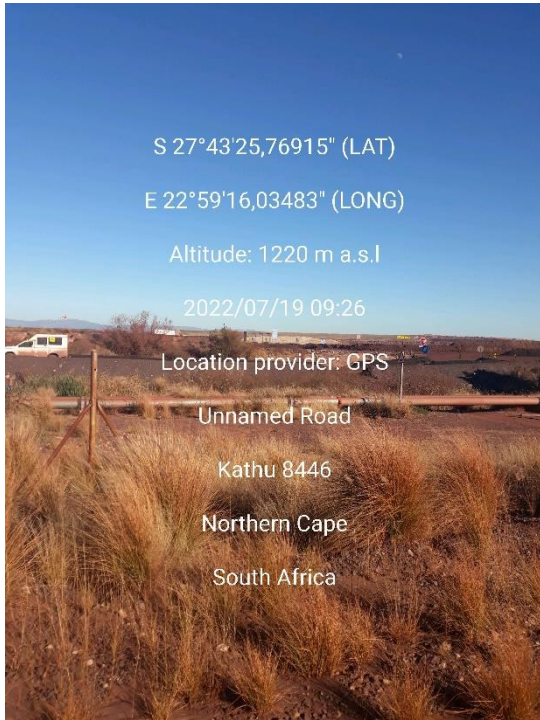


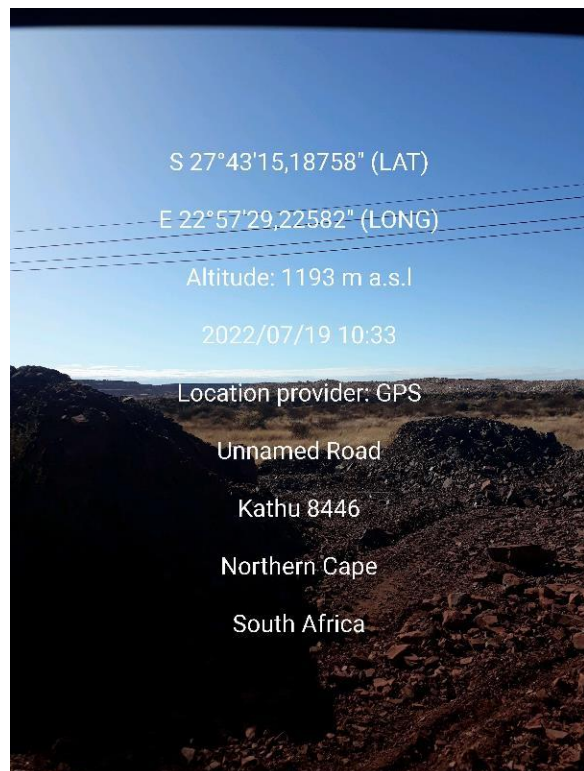
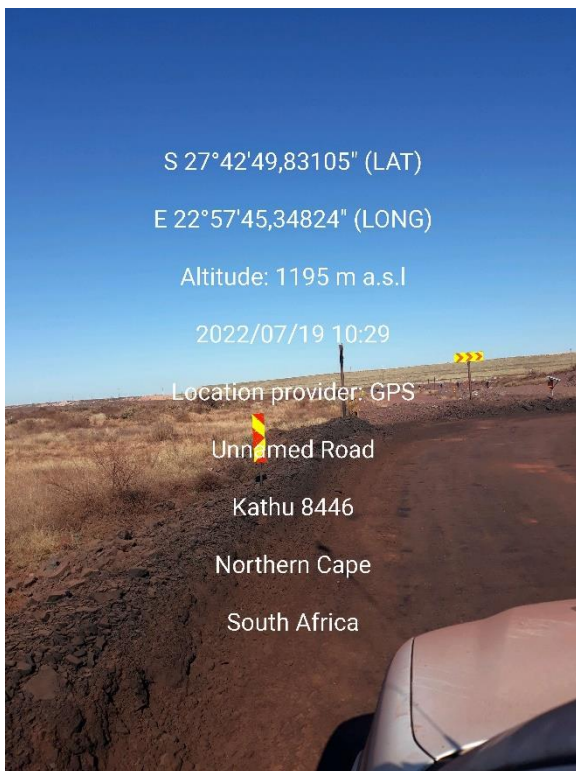
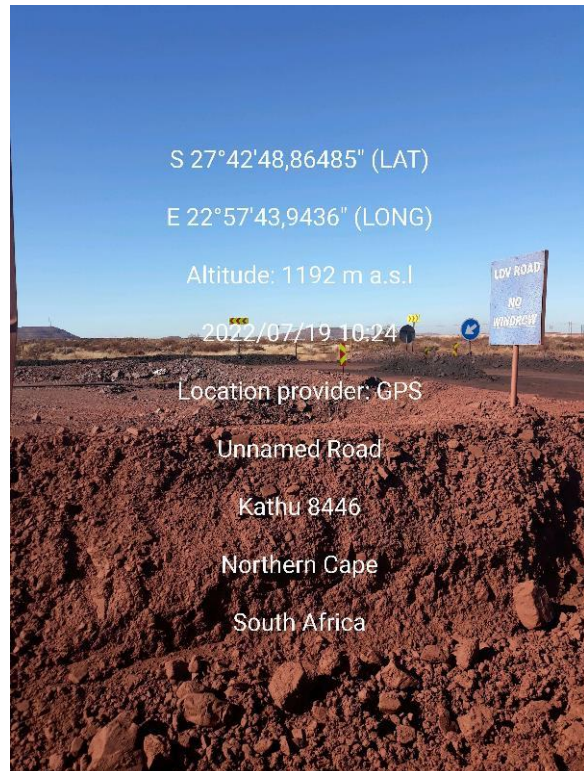
Figure 21. General views of the extended pit rim area. (U.S. Küsel, 2022.)

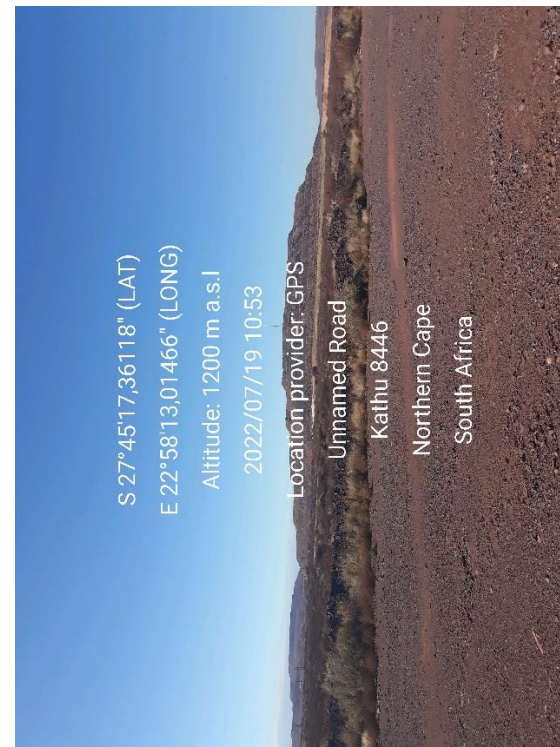
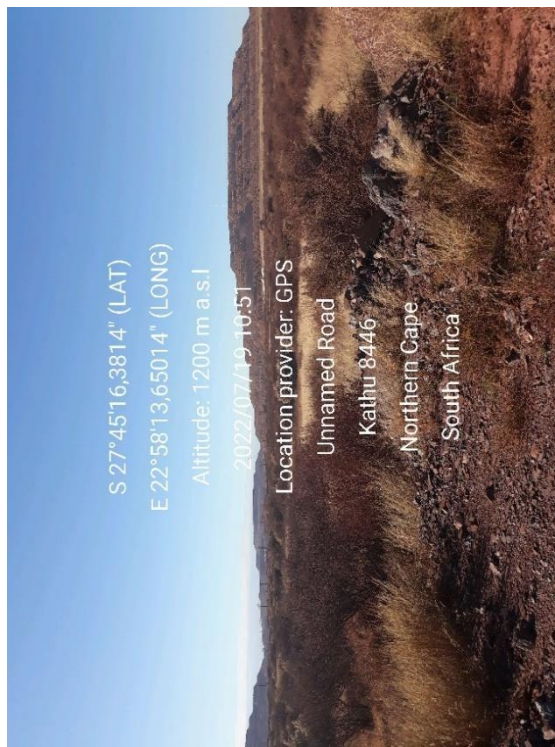
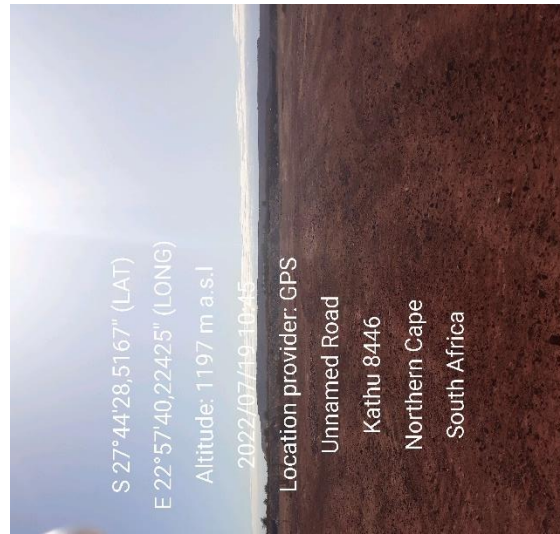
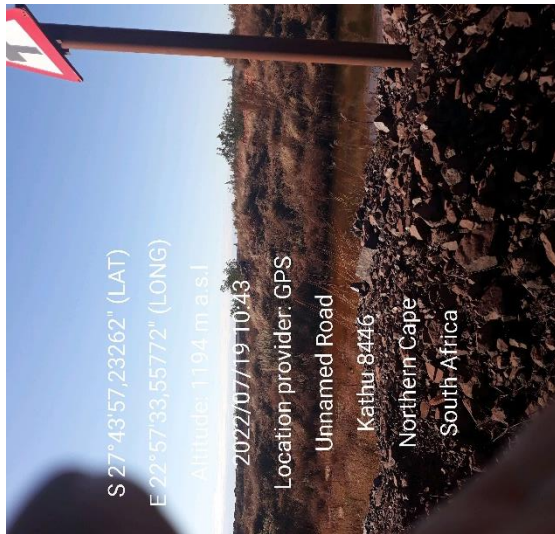
2.3. Pit rim GPS verified photos.

No.	Degree S.	Degree E.	No.	Degree S.	Degree E.			Comments.
8520	27°43'25.76"S	22°59'16.03"E	5947	27°43'26.89"S	22°59'14.01"E	9686	27°43'22.47"S	22°59'11.18"E
1150	27°43'03.73"S	22°59'4.28"E	2080	27°42'42.19"S	22°58'1.60"E	9319	27°42'48.86"S	22°57'43.94"E
2527	27°42'49.83"S	22°57'45.34"E	5593	27°43'15.18"S	22°57'29.22"E	4035	27°44'28.51"S	22°57'40.22"E
2130	27°45'16.38"S	22°58'13.65"E	3326	27°45'17.27"S	22°58'12.97"E	9657	27°45'17.75"E	22°58'13.08"E
4435	27°45'18.58"S	22°58'13.73"E	4792	27°48'32.57"S	22°59'5.95"E			

Figure 22. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)







2.4. Previously identified Heritage sites around the Pit rim.

There are no previously identified heritage site in this area.

2.5. Discussion of previous and present heritage investigation.

As the only technically unaffected areas is located on the western side of the pit rim, only these areas were investigated. However, the continuous mining impact in the area is obvious in the general views attached.

No new sites were identified during this investigation.

3. Central Region: -



Figure 23. The Vliegveldt Waste Rock Dump (blue area) and the proposed PB Pit 19 (black area), the Cemetery (Maltese cross), the Far South Substation (pink area), and the Caravan Park Area (yellow area). (Shangoni KMZ No 44, 54, 9 & 10, 18 and 8 on Google Earth 2022.)

3.1. The Proposed PB Pit 19.

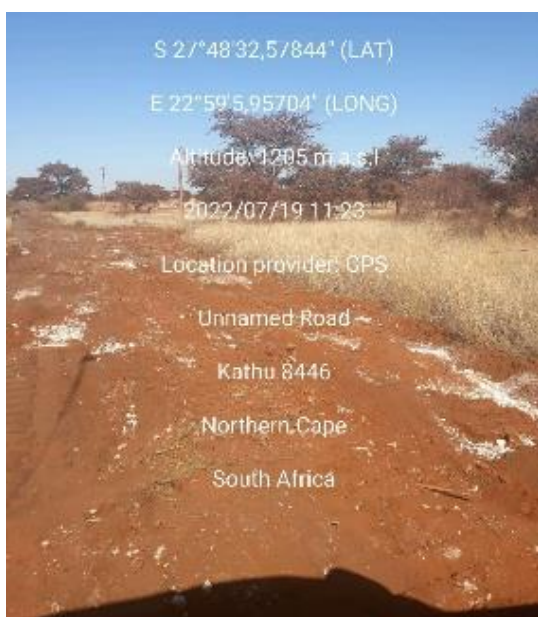
	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°48'12.59"S	22°58'49.52"E	2	27°48'16.87"S	22°59'29.12"E	3	27°48'45.89"S	22°59'25.65"E
4	27°48'41.27"S	22°58'48.04"E						

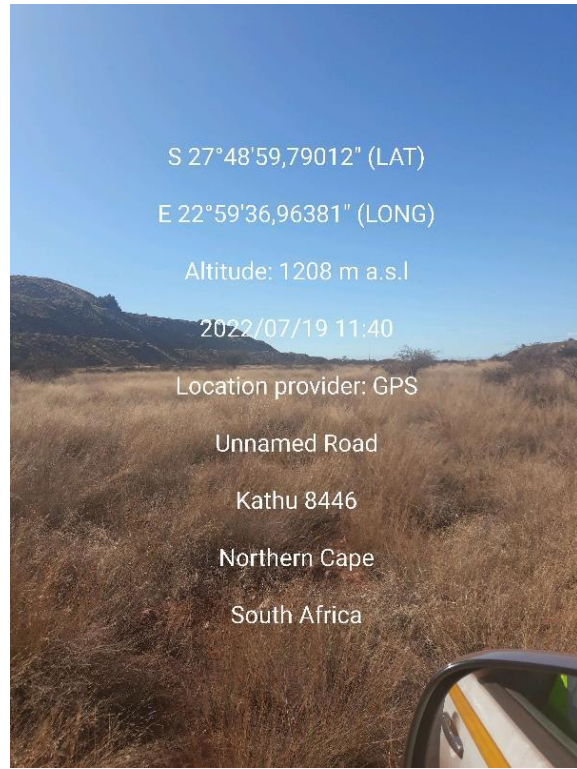
Figure 24. Location of the Proposed PB Pit 19. (Google Earth 2022.)

3.1.1. PB Pit 19 GPS verified photos.

No.	Degree S.	Degree E.	No.	Degree S.	Degree E.			Comments.
4792	27°48'32.57"S	22°59'5.95"E	1197	27°48'22.38"S	22°58'58.56"E	5377	27°48'22.50"S	22° 58'58.47"E
0205	27°48'59.79"S	22°59'36.96"E						

Figure 25. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)





3.1.2. Previously identified Heritage sites around the PB Pit 19.

There are no previously identified heritage site in this area.

3.1.3. Discussion of previous and present heritage investigation.

No new sites were identified during this investigation.

3.2. The Vliegveldt Waste Dump.

No research was undertaken on this existing facility.

4. Developments in the South-east region.

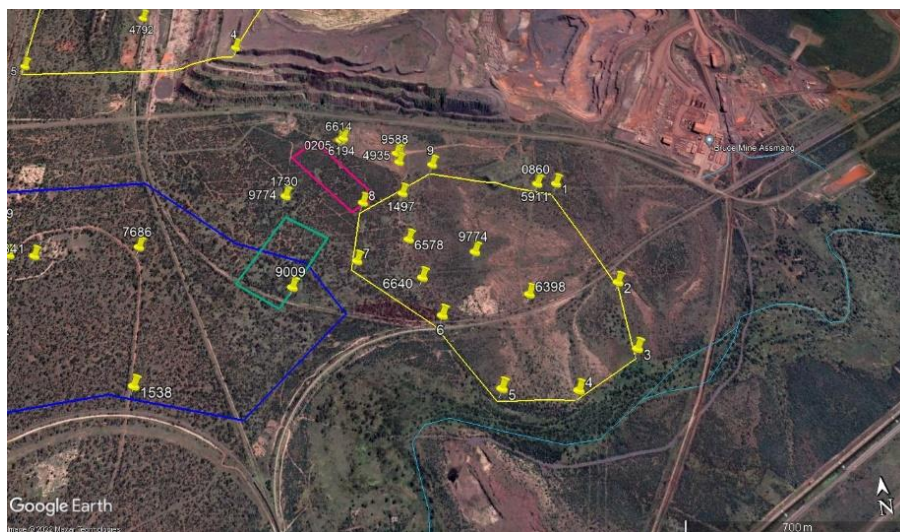


Figure 26. The Southeast region showing the maximum impact of the proposed developments. Therefore, the total area was investigated for heritage remains. (Google Earth 2022.)

4.1. The cemetery (?) and the proposed substation and caravan site.

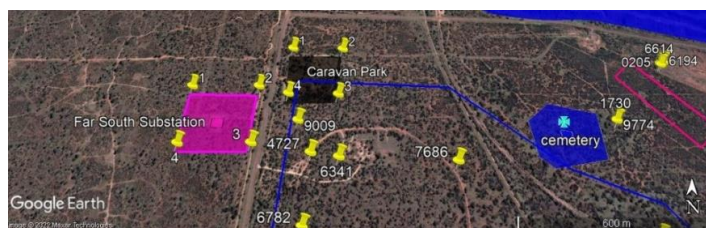


Figure 27. Location of the cemetery and cemetery exclusion site, the far south substation and the proposed caravan area. (Shangoni KMZ No 9 & 10, 18 and 8 on Google Earth 2022.)

2.3. Grave site. (Blue Maltese Cross.)								
	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°49'7.36"S	22°59'22.47"E						
2.4. Far South Substation. (Pink square)								
1	27°49'2.98"S	22°58'34.40"E	2	27°49'3.00"S	22°58'43.16"E	3	27°49'10.80"S	22°58'43.17"E
4	27°49'10.80"S	22°58'34.20"E						
2.5. Location of the Caravan Park.								
1	27°48'57.14"S	22°58'47.15"E	2	27°48'57.29"S	22°58'54.02"E	3	27°49'4.28"S	22°58'53.62"E
4	27°49'4.11"S	22°58'47.11"E						

Figure 28. GPS locations of grave site, Substation and caravan park. (Google Earth 2022.)

4.2. Proposed HME Park Up, 4.3. the Alternative HME Park Up and 4.4. the re-routing of road, power and pipes and 4.5. the Exclusion area for the lithics site.

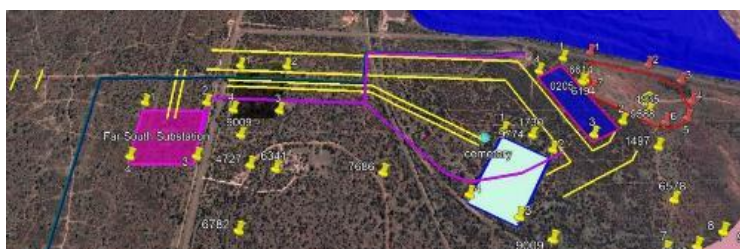


Figure 29. Location of the Proposed Alternatives 1 & 2 for the HME Park Up, the re-routing of road, power and pipes and the newly found lithics exclusion site of the 2022 HIA outlined in red. (Shangoni KMZ No 43 & 1, and collectively No 2, 11, 12, 13, 14, 40, 46, 49 & 50 on Google Earth 2022.)

Proposed HME Park Up. (Purple outline blue infill square.)								
	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°48'56.02"S	22°59'34.95"E	2	27°49'6.00"S	22°59'41.36"E	3	27°49'7.94"S	22°59'36.96"E
4	27°48'58.20"S	22°59'31.03"E						
Proposed Alternative HME Park Up. (Green outline light blue infill square.)								
1	27°49'7.22"S	22°59'24.70"E	2	27°49'10.01"S	22°59'30.72"E	3	27°49'18.83"S	22°59'25.31"E
4	27°49'15.91"S	22°59'19.27"E						
Proposed re-routing of roads, pipelines, power lines and telephone lines								
See roads (yellow lines), pipelines (blue lines), power lines (purple lines) and telephone lines (dark blue) in figure 13.								
Lithics exclusion site from the 2022 HIA. (Outlined in red.)								
1	27°48'55.11"S	22°59'39.15"E	2	27°48'57.32"S	22°59'47.23"E	3	27°48'59.87"S	22°59'51.25"E
4	27°49'3.07"S	22°59'51.83"E	5	27°49'5.58"S	22°59'50.41"E	6	27°49'6.13"S	22°59'47.26"E
7	27°49'1.00"S	22°59'38.25"E						

Figure 30. GPS locations of the Alternatives for the HME Park Up, the re-routing of road, power and pipes and the newly found lithics exclusion site of the 2022 HIA. (Google Earth 2022.)

4.6. Proposed PB Pit 21 and 4.7. the PB Pit 21 Proposed Backfill Area.



Figure 31. Location of the Proposed PB Pit 21 and the PB Pit 21 Proposed Backfill Area. (Shangoni KMZ No 45 and 48 on Google Earth 2022.)

Location of the Proposed PB Pit 21. (Yellow outline filled in green.)								
1	27°49'22.77"S	23° 0'6.04"E	2	27°49'30.74"S	23° 0'6.17"E	3	27°49'36.18"S	23° 0'3.29"E
4	27°49'36.28"S	22°59'59.22"E	5	27°49'30.48"S	22°59'51.86"E	6	27°49'27.65"S	22°59'41.98"E
7	27°49'22.67"S	22°59'42.55"E						
Proposed Backfill Area.								
Pink area under the proposed PB Pit 21 indicated as "Proposed Backfill Area".								
1	27°49'22.77"S	23° 0'6.04"E	2	27°49'30.74"S	23° 0'6.17"E	3	27°49'36.18"S	23° 0'3.29"E
4	27°49'36.28"S	22°59'59.22"E	5	27°49'30.48"S	22°59'51.86"E	6	27°49'27.65"S	22°59'41.98"E
7	27°49'22.67"S	22°59'42.55"E	8	27°49'20.60"S	22°59'50.20"E	9	27°49'16.66"S	22°59'56.66"E
10	27°49'15.06"S	23° 0'1.59"E	11	27°49'19.33"S	23° 0'4.02"E			

Figure 32. GPS locations of PB Pit 21 and the PB Pit 21 backfill area. (Google Earth 2022.)

4.8. Waste Dump with backfill, and 4.9. the Alternative 2 Waste Dump without backfill.

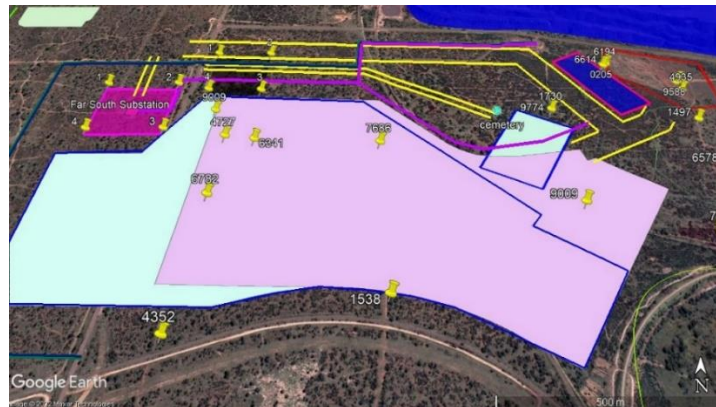


Figure 33. Location of the Proposed Waste Dump (pink area), and the Alternative 2 Waste Dump without backfill. (Light blue area underneath). (Shangoni KMZ No 48 and 4 on Google Earth 2022.)

Location of the Proposed Waste Dump without Backfill. Large pink area in figure 17.								
Location of the Alternative 2 Waste Dump without Backfill.								
	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°49'27.28"S	22°59'32.92"E	2	27°49'4.71"S	22°59'5.97"E	3	27°49'4.29"S	22°58'47.51"E
4	27°49'13.88"S	22°58'31.99"E	5	27°49'31.70"S	22°58'32.27"E	6	27°49'32.07"S	22°58'52.88"E
7	27°49'30.39"S	22°59'4.92"E	8	27°49'33.17"S	22°59'17.21"E			
10	27°49'8.85"S	22°59'34.54"E	11	27°49'21.78"S	22°59'26.31"E			

Figure 34. GPS locations of the alternatives for the proposed Waste Dump. (Google Earth 2022.)

4.9. Track log of the Southeast Region.

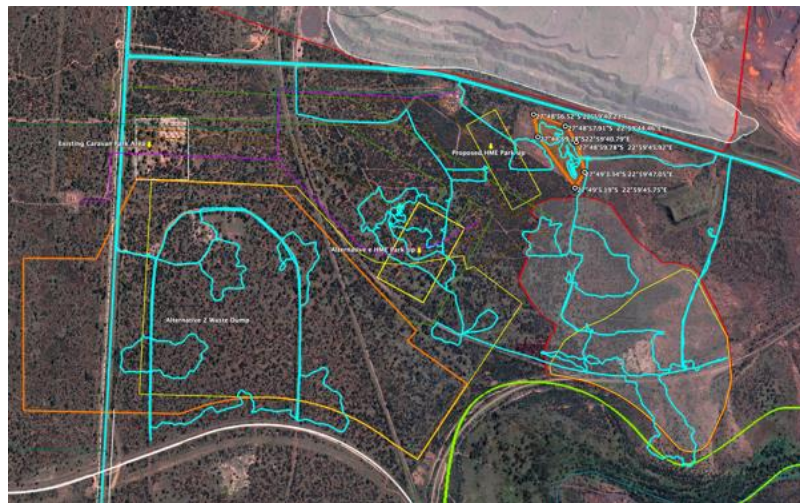


Figure 35. Garmin e-Trex 30, datum WGS84. (S.U. Küsel 2022.)



Figure 36. Remains of what appears to have been some type of "Racetrack" south of Dingleton. There is no official record of this. (Google Earth 2022.)

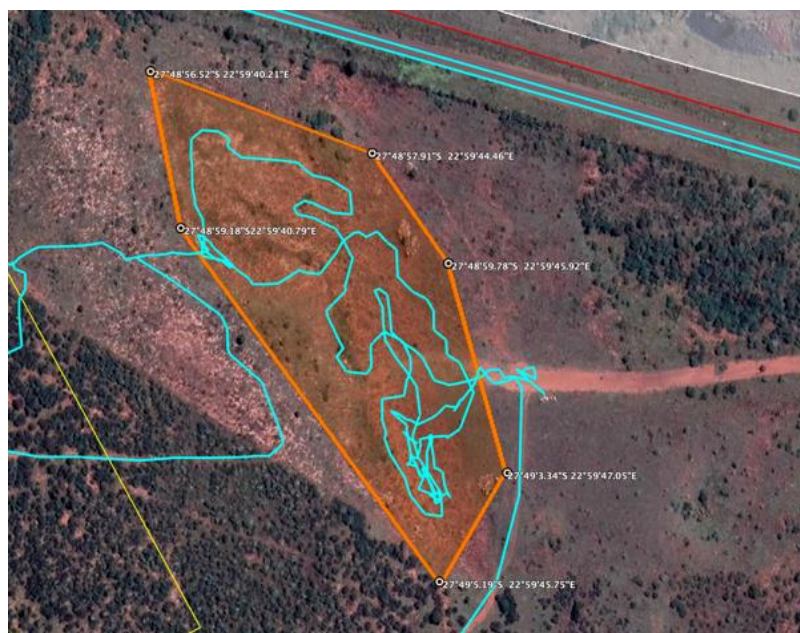


Figure 37. Detail of on-foot investigation in the quarry site where the lithics described below were identified. (S.U. Küsel 2022.)

4.10. General views of the South-east region.



Figure 38. Vegetation of the sandier part of the area in the proposed HME Park-Up. (S.U. Küsel 2022.)

Figure 39. General view of the quarry area where the lithics were identified. (S.U. Küsel 2022.)



Figure 40. MSA broken blades, blades, cortical blades, a burin and an end-scraper. (S.U. Küsel 2022.)



Figure 41. Several examples of MSA/LSA flakes, chunks and possibly cores. The material is known as crypto crystalline material (CCS.) It is also known as brown jasperlite. (S.U. Küsel 2022.)



Figure 42. Several examples of MSA/LSA flakes, chunks and chips. (S.U. Küsel 2022.)



Figure 43. Top and bottom views of two scrapers and an ESA/MSA partially formed/worked hand axe of banded ironstone. (S.U. Küsel 2022.)



Figure 44. ESA/MSA bi-facially worked hand axe. (S.U. Küsel 2022.)



Figure 45. Rocky exposure towards the Gamagara River, far south back-fill area. (S.U. Küsel 2022.)

Figure 46. Large areas of historical dumping of quartzite rock are present in the far south backfill area, possibly relating to the building of the rail line. (S.U. Küsel 2022.)



Figure 47. Rocky outcrops towards the Gamagara River. (S.U. Küsel 2022.)

Figure 48. Isolated fragments of LSA lithics are present over a wide area adjacent to the Gamagara floodplain inside the 100y flood-line. (S.U. Küsel 2022.)

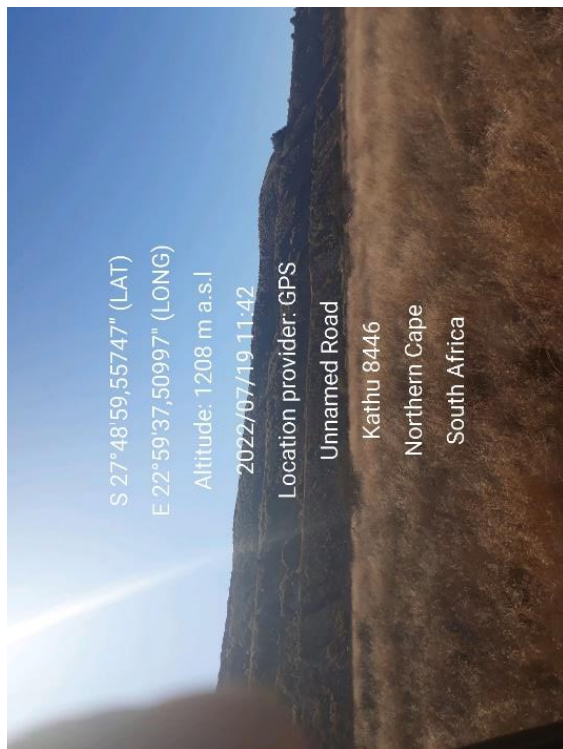


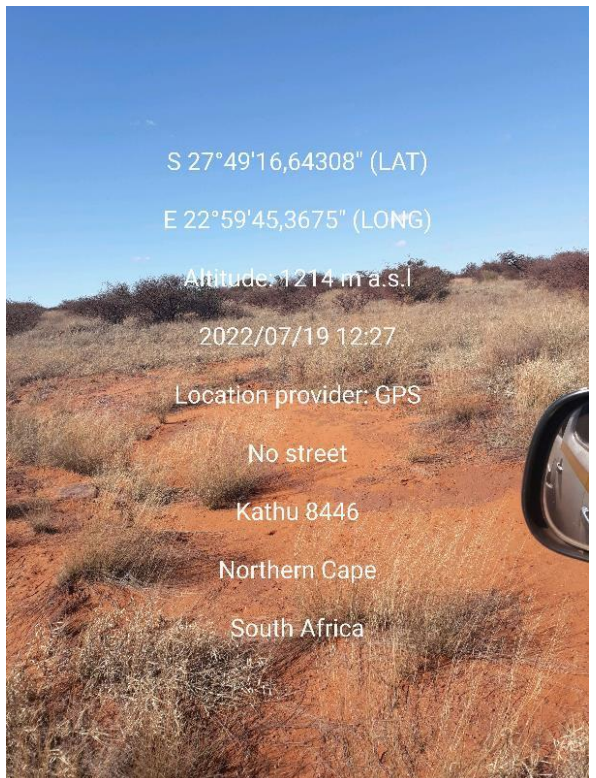
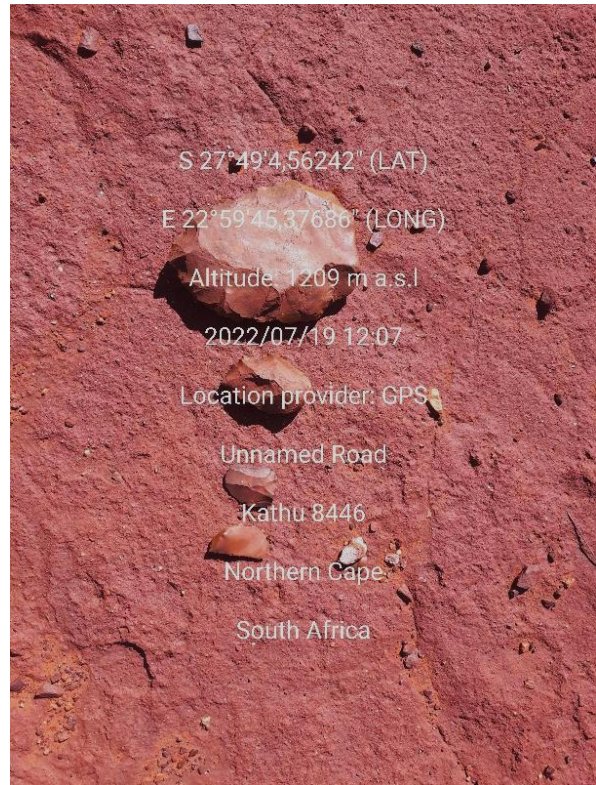
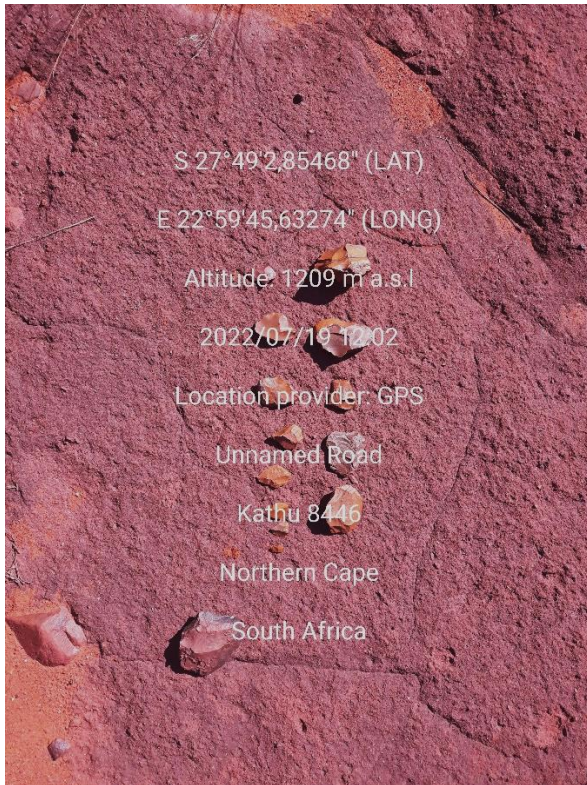
Figure 49. Typical view towards the Gamagara River. (S.U. Küsel 2022.)

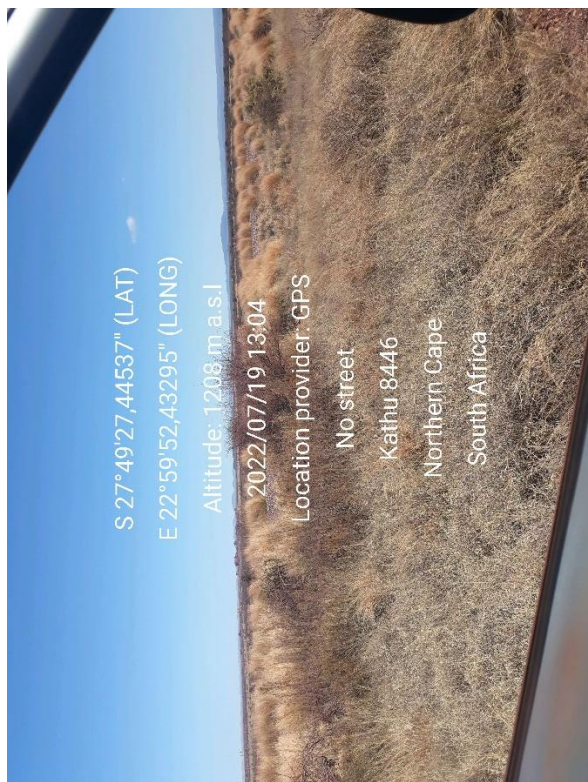
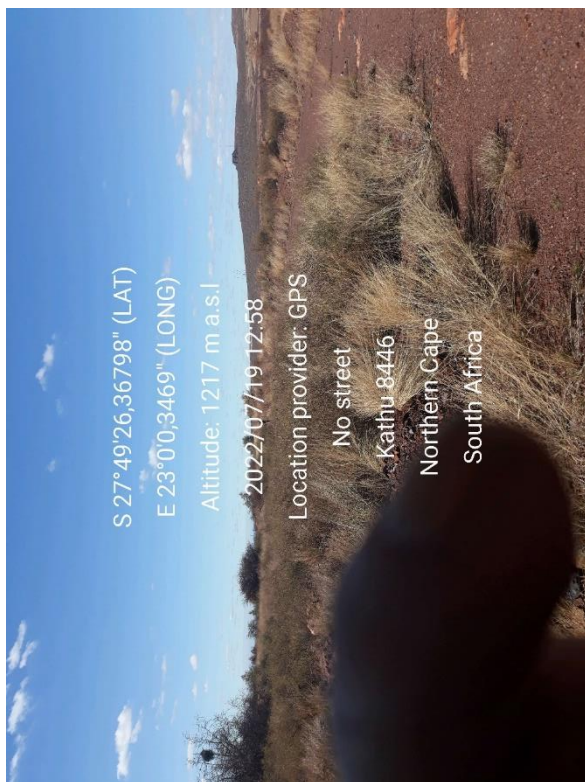
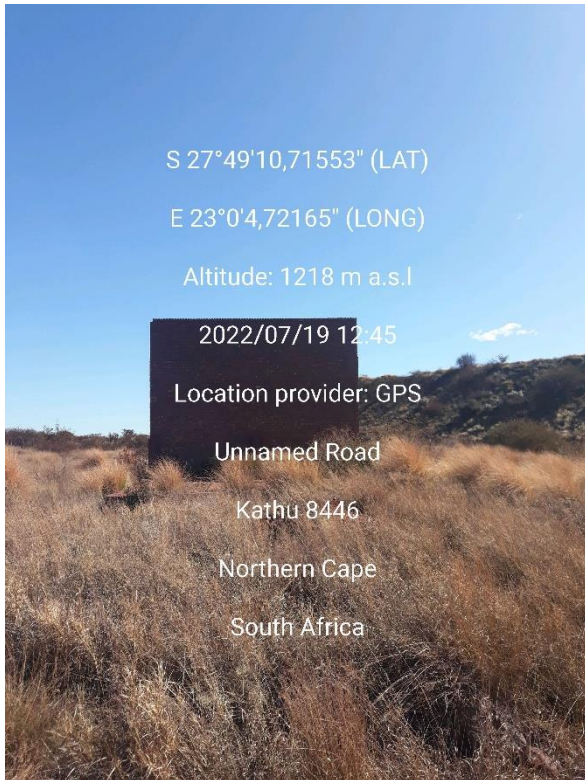
4.11. South-east region GPS verified photos.

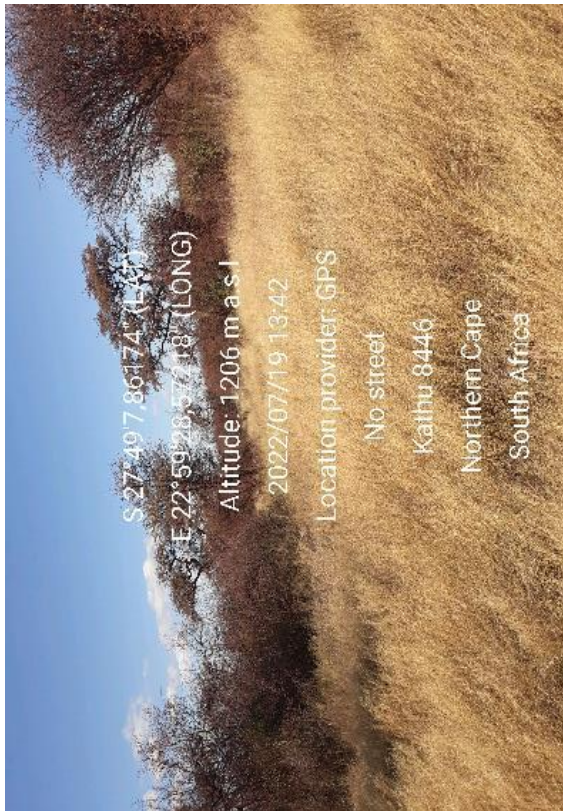
No.	Degree S.	Degree E.	No.	Degree S.	Degree E.			Comments.
6194	27°48'59.55"S	22°59'37.50"E	6614	27°48'59.91"S	22°59'37.06"E	8101	27°49'2.85"S	22°59'45.63"E
9588	27°49'3.07"S	22°59'45.15"E	4935	27°49'4.56"S	22°59'45.37"E	1497	27°49'9.64"S	22°59'45.29"E
6578	27°49'16.64"S	22°59'45.36"E	5911	27°49'10.71"S	23°0'4.72"E	0860	27°49'10.79"S	23°0'4.80"E
6398	27°49'26.38"S	23°0'0.34"E	1730	27°49'7.95"S	22°59'28.57"E	9774	27°49'19.72"S	22°59'54.15"E
9009	27°49'21.40"S	22°59'29.04"E	6640	27°49'22.23"S	22°59'46.53"E	6341	27°49'12.55"S	22°58'53.93"E
7686	27°49'13.04"S	22°59'8.15"E	1538	27°49'31.47"S	22°59'8.82"E	4727	27°49'12.02"S	22°58'50.50"E
6782	27°49'20.28"S	22°58'50.12"E	4352	27°49'35.17"S	22°58'49.21"E			

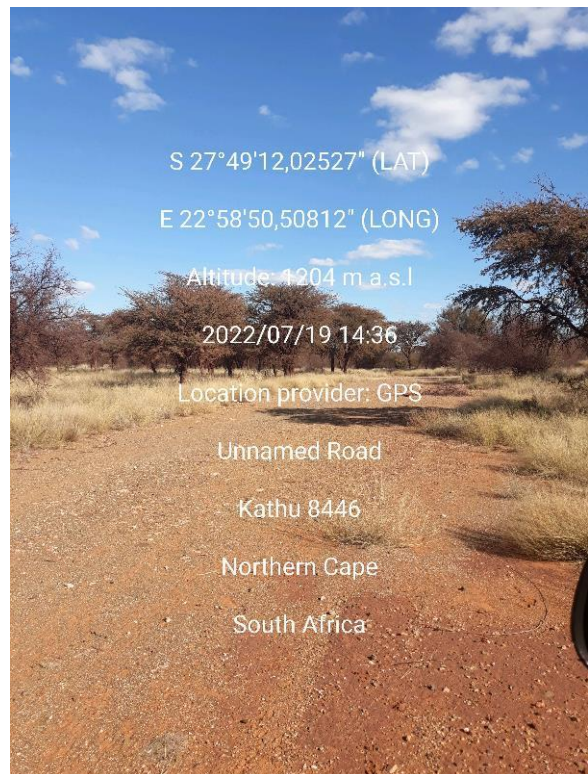
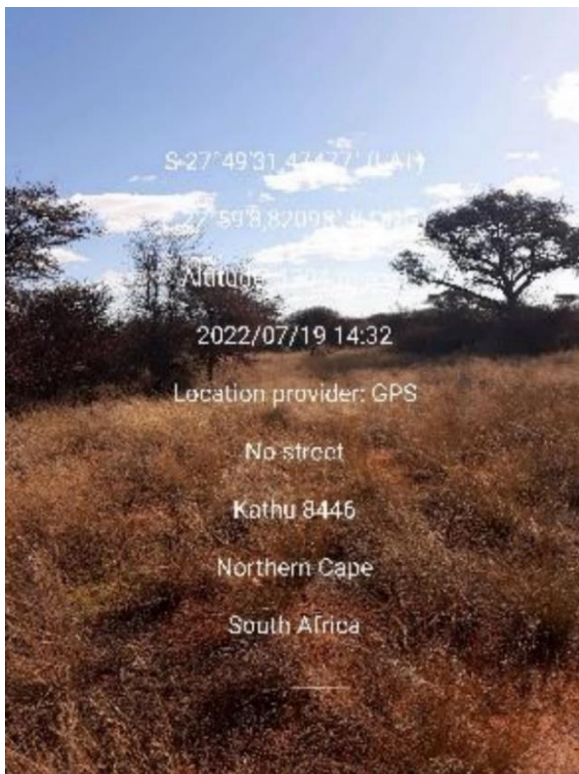
Figure 50. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)

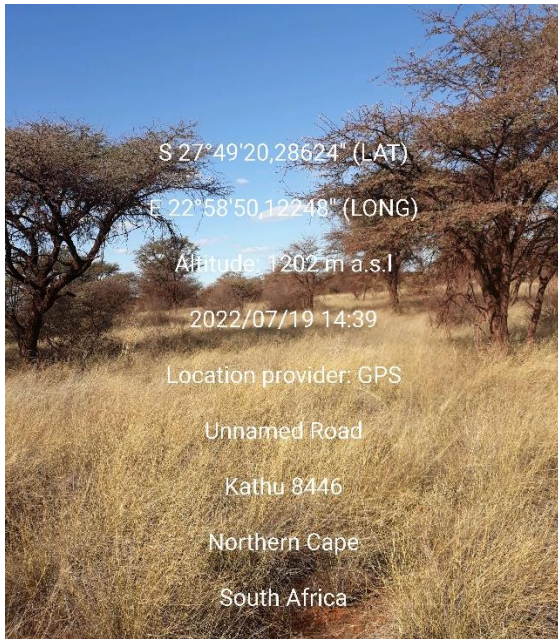












In general, the south-east region is very disturbed through mining activities, prospecting, borrow-pits and the impact of the Sishen/Dingleton town and its recent demolition. One of the remarkable disturbances/remains is that of an approximately 3km long metallised "racetrack" of which no records exist. It was probably a private concern of the miners living in Sishen Town.

4.11. Previously identified Heritage sites around the South-east region.

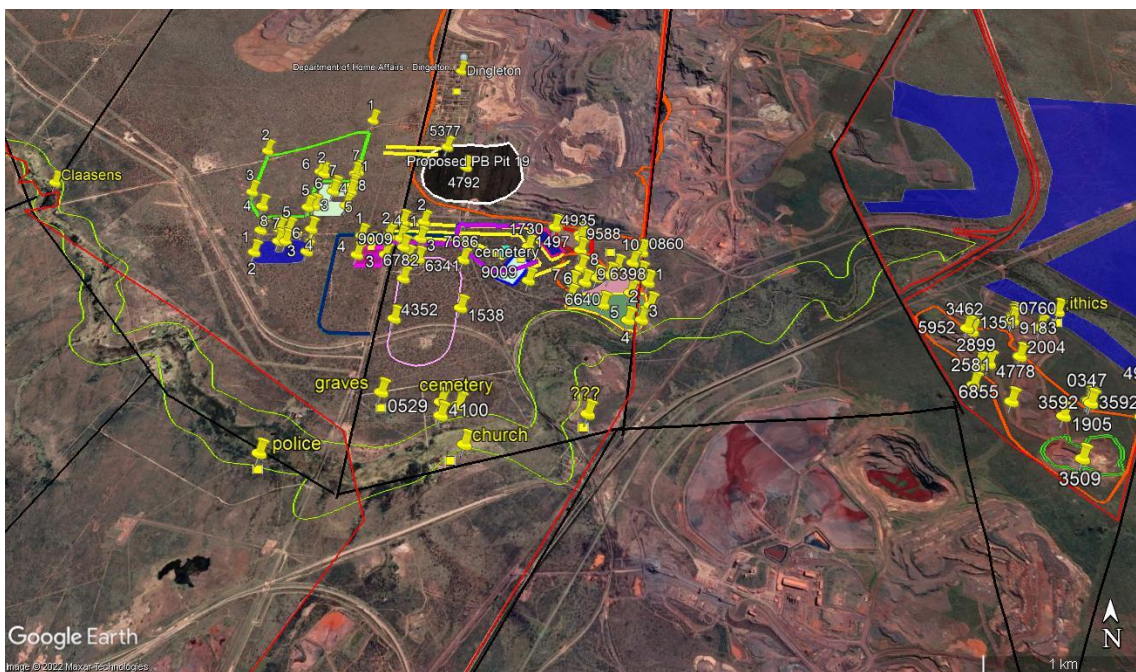


Figure 51. Relevant heritage information documented below in figure 52. (Google Earth 2022.)

no	Degrees S	Degrees E	Description	no	Degrees S	Degrees E	Description
1	27°48'44.52"S	22°56'47.31"E	Claassen's. Erf (1901) and wells. (Gamagara farm.)	2	27°50'17.79"S	22°58'18.61"E	Police Camp (1901) and wells. (Parson farm.)
3	27°49'59.86"S	22°58'48.82"E	Dump site graves under investigation. (Sishen farm.)	4	27°50'4.03"S	22°59'4.03"E	Sishen 150 (?) grave cemetery. (Sishen farm.)
5	27°50'15.64"S	22°59'13.40"E	1901 church (?) and wells. (Sishen farm.)	6	27°50'6.82"S	22°59'46.75"E	Gamagara River Lithics site (?) (Sishen farm.)
7	27°49'33.69"S	23° 2'8.74"E	Gamagara River Lithics site (?) (Lilyveld farm.)	8	27°49'31.47"S	22°59'8.82"E	Old racetrack.
9	27°49'31.47"S	22°59'8.82"E	Grave site. (Maltese cross.) (Sishen farm.)	10	27°48'58.87"S	22°59'43.13"E	New lithics site, HIA 2022. (Sishen farm.)

Figure 52. GPS location of relative heritage sites. (Google Earth 2022.)

4.12. Discussion of previous and present heritage investigation.

As predictable through ancient to present environmental conditions, Human settlement in this region centred around small mobile communities dependable on reliable water sources that left nearly no footprint in the open environment. During the ESA and MSA permanent bases that developed, such as Kathu pan and Wonderwerk Cave, are the only reliably significant Stone Age sites. LSA lithic scatterings only confirm the presence of such people in the region, rather than being able to add to time stratification.

The "cemetery" marked by the Maltese cross is a dubious identification of a burial. The area surrounding the GPS identification point was investigated in company with SIOM environmental officer Hannes Hager. No "burial" could be relocated. It is suggested that the source of this identification is revisited for clarification.

The "racetrack" is deemed to be part of the Dingleton demolition permit, and as such disregarded. Part of it will be preserved south of the railway line.

The lithics site identified during this HIA investigation has been awarded an "exclusion area" as demarcated in figure 29 on page 25. Unless further investigation is deemed necessary by the heritage authorities it has been awarded a field rating of Grade IIIC, Not Conservation Worthy (NCW) and has been adequately documented as part of this Phase I Assessment. It is recommended that the site be granted destruction authorisation at the discretion of the relevant heritage authority outside of the formal permitting process.

5. South-West Region: -

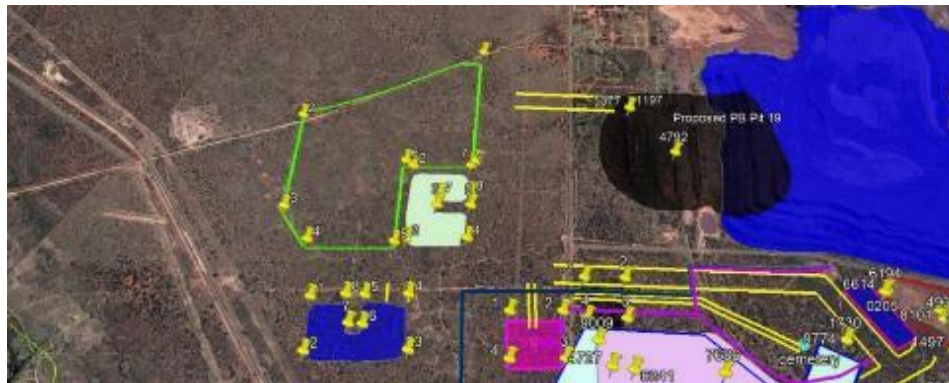


Figure 53. Location of the 2 Far Alternative C & G Stockpiles the Far South Sub Station and the Approved Topsoil Stockpile. (Shangoni KMZ No 16, 17 18 and 7.)

<i>Location of the Far South Proposed C & G Stockpile Alternative 2. (Light blue C shape).</i>								
	Degree south	Degree east		Degree south	Degree east	Degree south	Degree east	
1	27°48'35.30"S	22°58'27.83"E	2	27°48'35.21"S	22°58'17.14"E	3	27°48'49.88"S	22°58'16.55"E
4	27°48'49.83"S	22°58'27.23"E	5	27°48'43.48"S	22°58'27.76"E	6	27°48'43.34"S	22°58'21.76"E
7	27°48'40.97"S	22°58'21.72"E	8	27°48'41.01"S	22°58'27.73"E			
<i>Location of the Far South Proposed C & G Stockpile. (Purple U shape).</i>								
1	27°49'0.30"S	22°58'1.15"E	2	27°49'9.48"S	22°58'1.20"E	3	27°49'9.33"S	22°58'17.96"E
4	27°49'0.00"S	22°58'17.58"E	5	27°49'0.09"S	22°58'10.25"E	6	27°49'5.12"S	22°58'10.28"E
7	27°49'5.21"S	22°58'7.41"E	8	27°49'0.00"S	22°58'7.10"E			
<i>Location of the Approved Topsoil Stockpile. (Green outline).</i>								
1	27°48'8.58"S	22°58'30.13"E	2	27°48'23.80"S	22°57'55.20"E	3	27°48'43.46"S	22°57'54.38"E
4	27°48'50.74"S	22°57'59.55"E	5	27°48'50.49"S	22°58'14.54"E	6	27°48'34.14"S	22°58'15.70"E
7	27°48'34.32"S	22°58'28.81"E						

Figure 54. GPS Location of the 2 Far Alternative C & G Stockpiles the Far South Sub Station and the Approved Topsoil Stockpile. (Google Earth 2022.)

This area was cleared of heritage remains in the 2020 HIA.

6. Lilyveld Region: -

6.1. Lilyveld EIA application area.

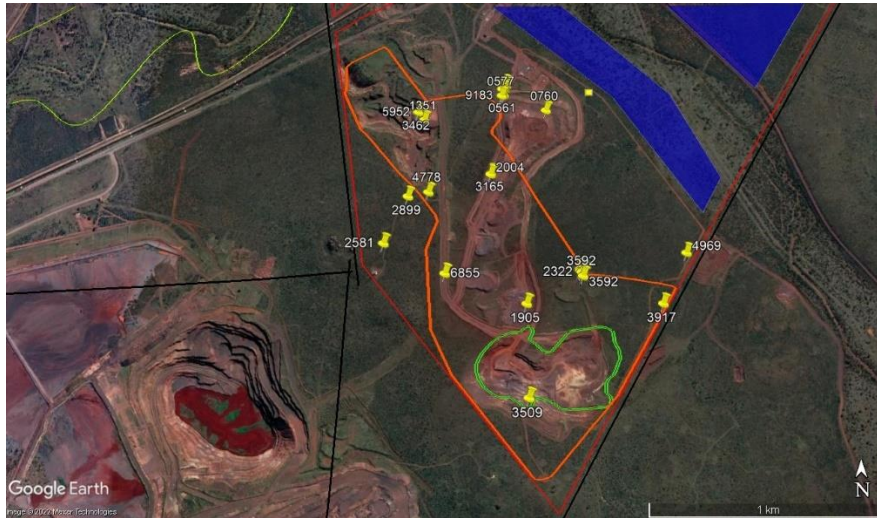


Figure 55. Location of the present EIA impact area application located (orange line) over existing pits in operation since 2013. Pits in northwest corner was already in existence in 2003 but no EIA information exist for it for HIA reference. (Shangoni e-mail 25 August 2022.)

6.3. Location of the Lylyfield Proposed and Alternative C & G Stockpile.

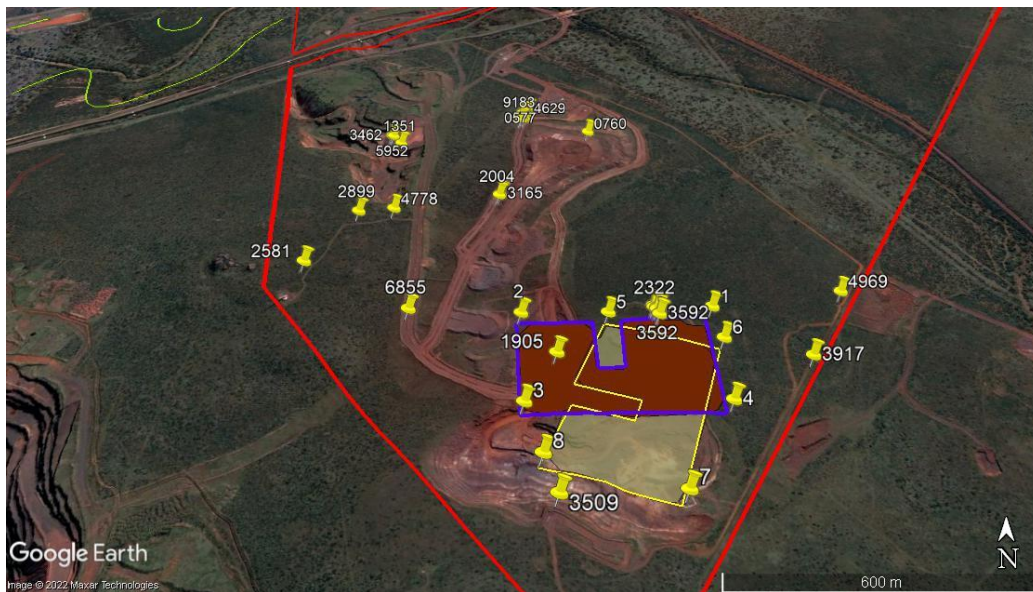


Figure 56. Alternative C & G Stockpile Areas. (Shangoni KMZ No 23, 24 on Google Earth 2022.)

Location of the Lylyfield Proposed C & G Stockpile.								
	Degree south	Degree east		Degree south	Degree east		Degree south	Degree east
1	27°50'4.42"S	23° 2'10.39"E	2	27°50'4.81"S	23° 1'53.55"E	3	27°50'14.23"S	23° 1'53.83"E
4	27°50'13.75"S	23° 2'10.57"E						
Location of the Lylyfield Proposed C & G Stockpile Alternative 2.								
5	27°50'4.94"S	23° 2'1.21"E	6	27°50'7.82"S	23° 2'10.83"E	7	27°50'21.15"S	23° 2'5.93"E
8	27°50'18.82"S	23° 1'55.26"E						

Figure 57. GPS Location of alternative Lylyfield C & G Stockpile. (Google Earth 2022.)

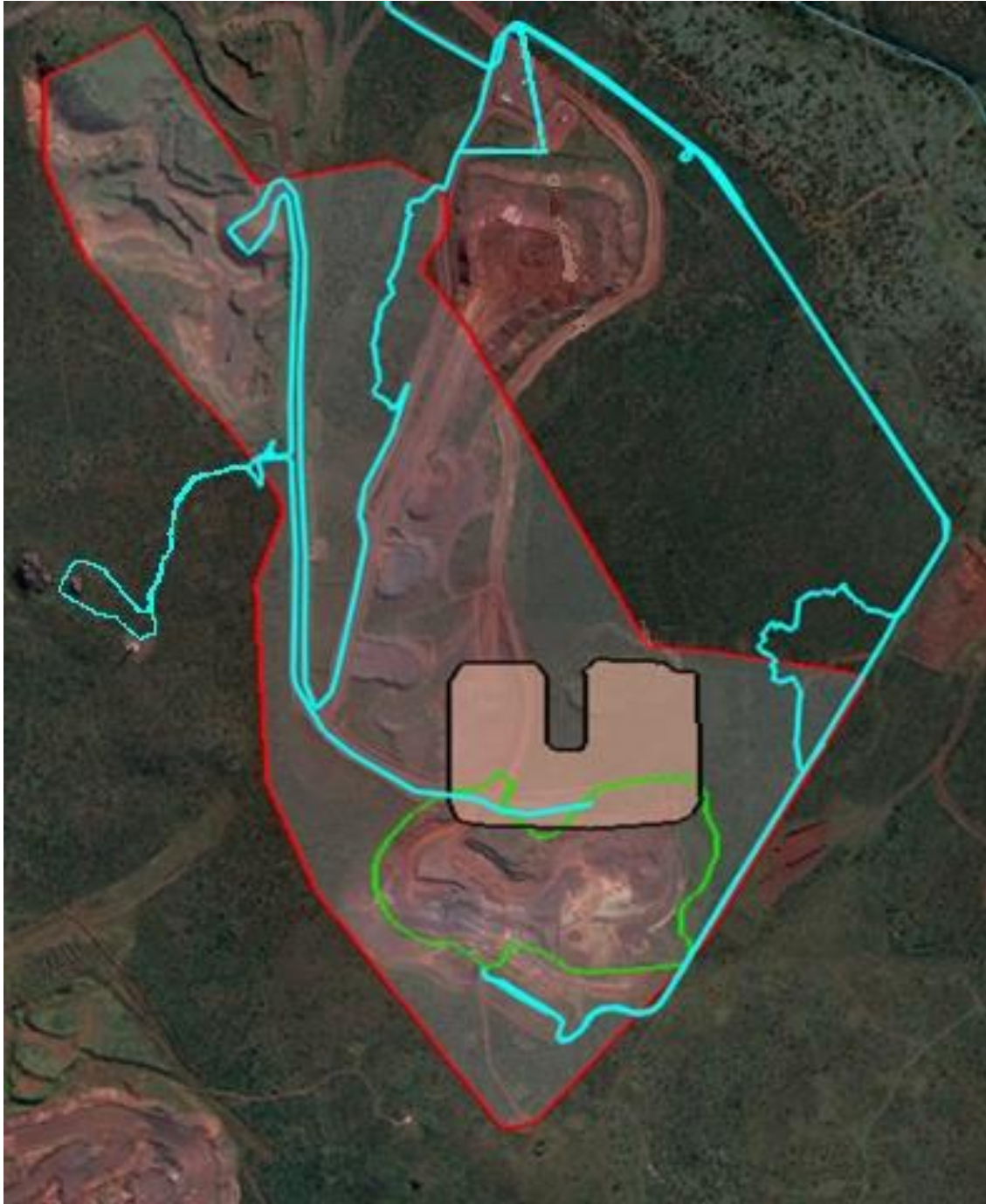


Figure 58. Garmin e-Trex 30, datum WGS84. (S.U. Küsel 2022.)

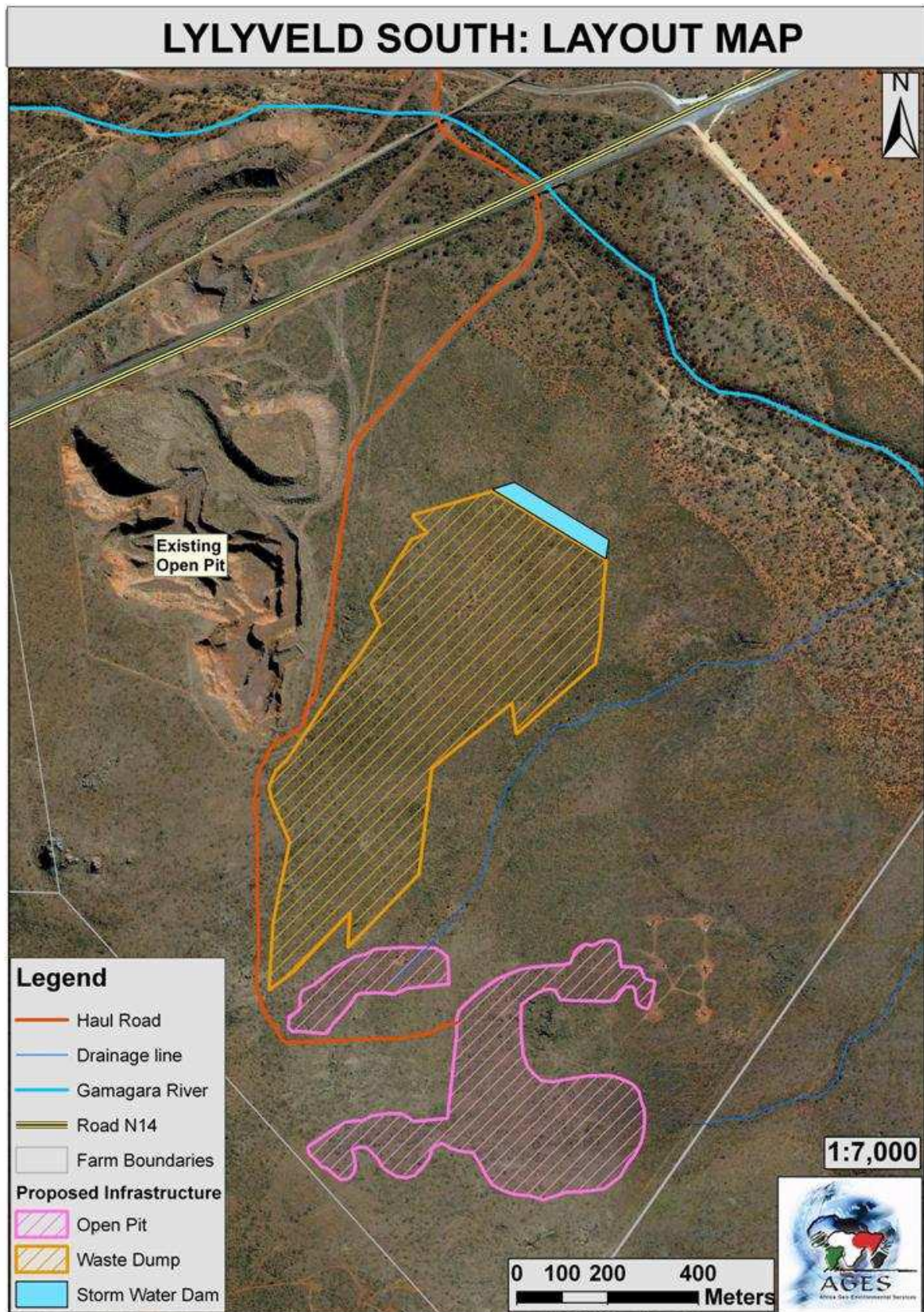


Figure 59. 2010 AGES EIA application for mining and dumping on the Southern Satellite mining Area. (Now Lilyfield.)

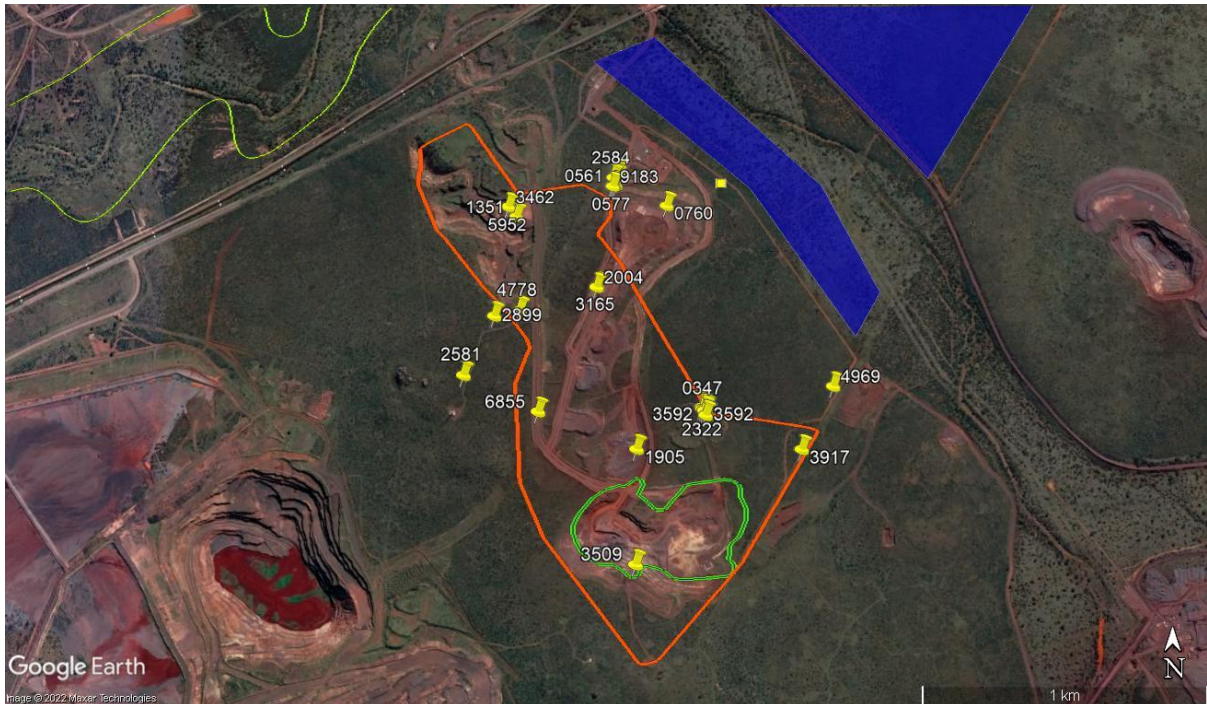


Figure 60. The yellow square represents previously identified low significance lithic sites. (SIOM heritage sites KMZ.)

5.13 Heritage Resources

A foot survey by Dr Peter Beaumont during November 2009 from the McGregor Museum (Specialist Report included as Appendix N) revealed no important archaeological sites, Palaeontological bones, or structures (buildings or graves) of any age. Eleven jasper artefacts were found (**Figure 18**). These artefacts have lightly smoothed surfaces, including a core with some peripheral preparation, that are, on typological grounds, ascribed to the Fauresmith – Acheulean timespan. The artefacts are of no scientific or heritage value.

No important archaeological sites, Palaeontological bones, or structures / graves) of any age were found. The study revealed that the proposed mining will have no significant impact on the heritage resources of the Northern Cape.



Figure 61. Jasper artefacts found on the proposed satellite opencast development site

6.5. General views of the Lilyveld area. (Photos (S.U. Küsel 2022.))

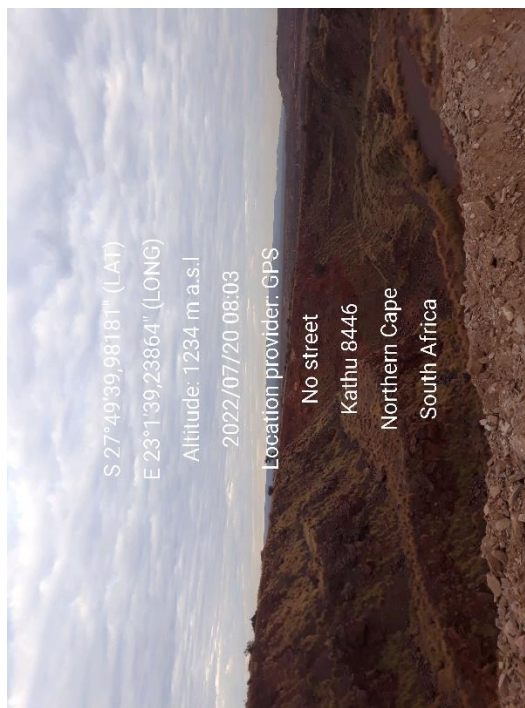
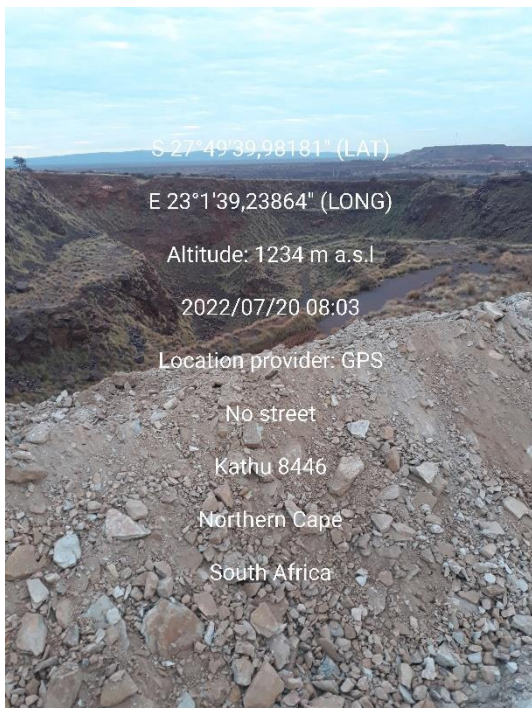
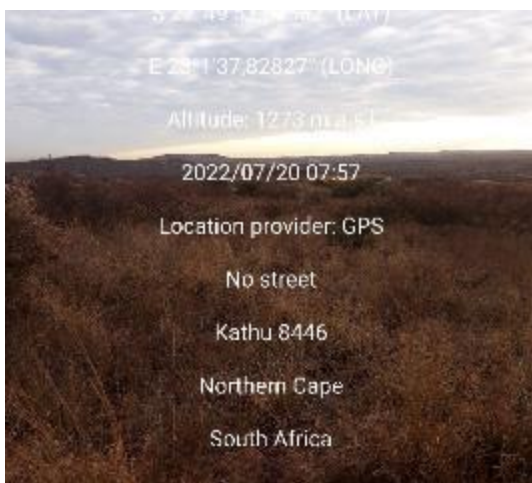


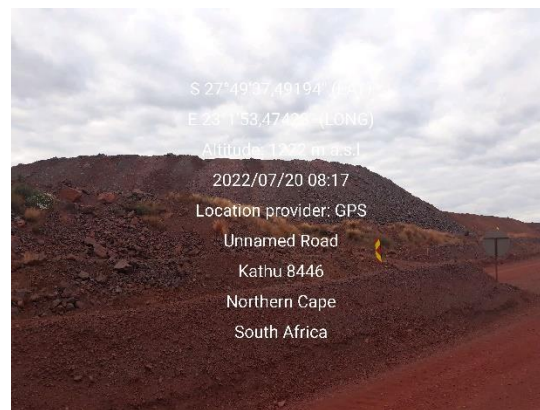
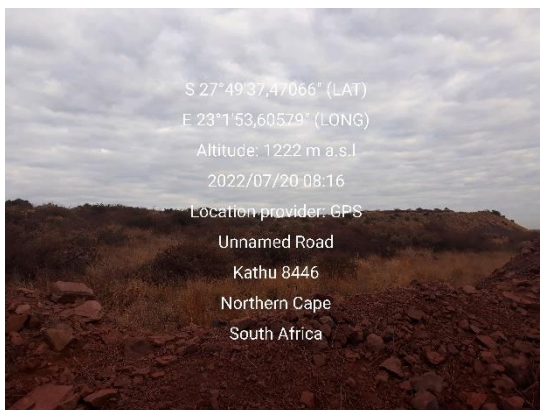
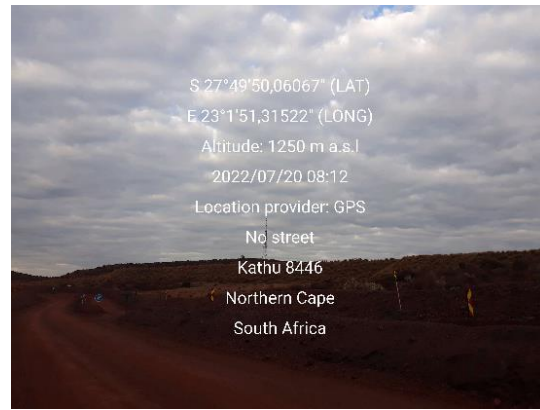
6.6. GPS verified photos of the extension of the Moolman’s facility.

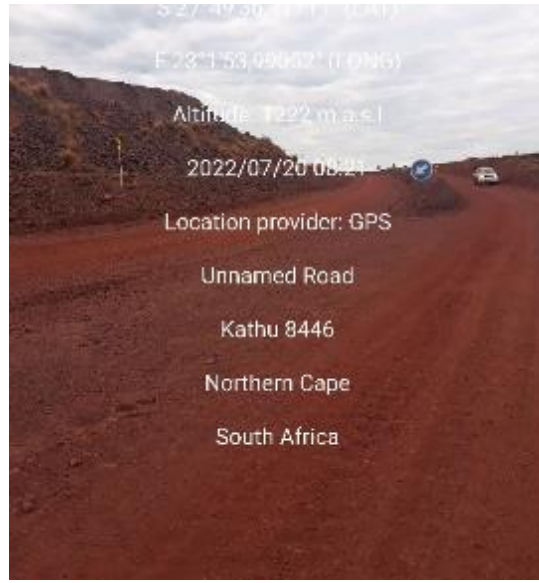
No.	Degree S.	Degree E.	No.	Degree S.	Degree E.	Comments
3592	27°50'5.33"S	23°2'5.63"E	0101	27°50'4.38"S	23°2'5.19"E	Lilyveld
5027	27°50'4.58"S	23°2'5.23"E	0347	27°50'4.60"S	23°2'5.54"E	
2322	27°50'4.79"S	23°2'5.47"E	6855	27°50'4.95"S	23°1'43.70"E	
4778	27°49'53.07"S	23°1'41.11"E	2581	27°50'0.88"S	23°1'34.03"E	
2899	27°49'53.80"S	23°1'37.82"E	1351	27°49'41.19"S	23°1'40.37"E	
0760	27°49'39.98"S	23°1'39.23"E	3462	27°49'39.98"S	23°1'39.23"E	
5952	27°49'39.96"S	23°1'39.39"E	2004	27°49'50.06"S	23°1'51.31"E	
3165	27°49'49.91"S	23°1'51.42"E	0577	27°49'37.47"S	23°1'53.60"E	?
9183	27°49'37.49"S	23°1'53.47"E	0561	27°49'37.36"S	23°1'53.86"E	
2584	27°49'36.38"S	23°1'53.58"E	7314	27°49'36.41"S	23°1'53.99"E	
4629	27°49'35.55"S	23°1'54.26"E	4969	27°50'1.81"S	23°2'22.70"E	
3917	27°50'9.25"S	23°2'18.15"E	1905	27°50'9.25"S	23°1'56.57"E	?
3509	27°50'22.24"S	23°1'56.33"E				

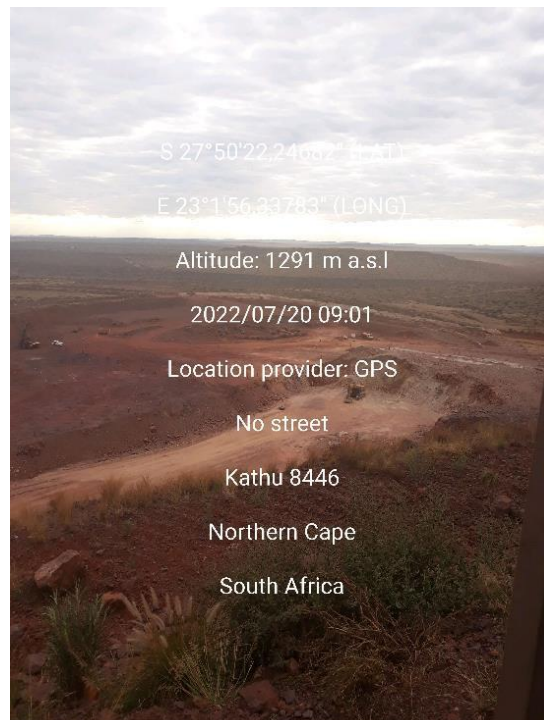
Figure 62. Above is the location of the GPS verified photos posted below. (S.M. Miller 2022.)











6.7. Discussion of previous and present heritage investigation.

(See general remarks regarding general heritage potential remains in the region in section 1.1.5.)

Although there are previously recorded scattered lytic remains in the area, it confirms to the hypothesis that such remains will be present near semi-permanent water sources such as the Gamagara River to the east of the study area.

No new sites were identified during this investigation.

7. Areas not affected in the HIA.

- 7.1. Gamagara 100Y flood line. *(Shangoni KMZ No 19.)*
- 7.2. Kumani Mining Right Area. *(Shangoni KMZ No 20.)*
- 7.3. Sishen Mining Right Area. *(Shangoni KMZ No 35.)*
- 7.4. Pans. *(Shangoni KMZ No 36.)*
- 7.5. PB 19 Blast Radius 500m. *(Shangoni KMZ No 38.)*
- 7.6. PB 19 Blast Radius 1000m. *(Shangoni KMZ No 39.)*
- 7.7. Potential Irrigation Areas. *(Shangoni KMZ No 41.)*
- 7.8. Proposed EIA Application. *(Shangoni KMZ No 42.)*
- 7.9. Rivers and Canals. *(Shangoni KMZ No 51.)*
- 7.10. Sishen Wetlands. *(Shangoni KMZ No 52.)*
- 7.11. Thorn Vegetation Line. *(Shangoni KMZ No 53.)*
- 7.12. Existing railway. *(Shangoni KMZ No 13.)*

8. Potential Irrigation Areas. *None of these were investigated.*



Figure 63. Location of Potential Irrigation Areas. (Shangoni KMZ No 41 on Google Earth 2022.)

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