

HERITAGE IMPACT ASSESSMENT

**THE PROPOSED LOERIESFONTEIN BULK WATER
SUPPLY PIPELINE AND RESERVOIR,
LOERIESFONTEIN, NORTHERN CAPE**

Assessment conducted under Section 38 (8) of the
National Heritage Resources Act 25 of 1999

Prepared for:

ENVIROAFRICA

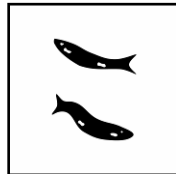
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Executive summary

ACRM was appointed to conduct a Heritage Impact Assessment (HIA) – specialist archaeological study - for the proposed Loeriesfontein Bulk Water Supply Pipeline and Reservoir in Loeriesfontein, in the Northern Cape Province.

It is proposed that a new pipeline and holding reservoirs, including associated infrastructure will be constructed to supply the town of Loeriesfontein with quality drinking water.

Most of the proposed 22km long pipeline will be located in the R355 (Loeriesfontein-Calvinia Road) road reserve, alongside gravel farm roads and twee-spoor tracks. The pipeline will be buried underground.

The HIA forms part of the EIA process that is being conducted by EnviroAfrica cc.

The aim of the study is to locate and map archaeological remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

A fairly detailed survey of the proposed pipeline route, including associated infrastructure (boreholes and reservoirs), was undertaken on the 5th and 6th June, 2014, in which the following observations were made:

- Isolated stone implements and dispersed scatters of tools (of low significance) of Middle Stone Age origin were encountered during the study, on the Farms Rheebofsfontein, De Brak and Hoek van Berg.

The findings are consistent with those encountered during previous studies in the Loeriesfontein region of southern Bushmanland, which indicate a paucity of archaeological traces on arid, eroded undulating surfaces and plains.

- The ruins of a shepherd's hut (veewagterhuis), or stock pen, and a few pieces of late 19th/early 20th Century English transfer ware were found alongside the pipeline route on the Farm Rheebofsfontein. The ruins have been rated as having low (3C) significance.
- There are no visible graves in the proposed pipeline route or associated infrastructure.
- There are no other old buildings, structures or features older than 60 years that will be impacted by proposed construction activities.

The results of the study indicate that the proposed Loeriesfontein Bulk Water Supply Pipeline will not impact on any significant archaeological heritage.

The receiving environment is not a sensitive or threatened archaeological landscape.

The following recommendations are made:

1. No archaeological mitigation is required.
2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Jenna Lavin at the South African Heritage Resources Agency (021 462 4502). Burials, etc must not be removed or disturbed until inspected by the archaeologist.

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1. INTRODUCTION

ACRM was commissioned by EnviroAfrica to conduct a Heritage Impact Assessment (HIA) – specialist archaeological study, for the proposed Loeriesfontein Bulk Water Supply Pipeline and Reservoir in Loeriesfontein (Hantam Municipality), in the Calvinia District of the Northern Cape Province (Figure 1).

It is proposed that a new pipeline, including associated infrastructure such as holding reservoirs, boreholes and booster pump stations will be constructed to supply the small town of Loeriesfontein with quality drinking water. The current supply of potable water (from existing boreholes) is inadequate and the quality of available ground water has also deteriorated. The project is part of a Municipal Income Grant (MIG).

The proposed new 22km long rising main (pipeline) will be constructed between the Farm Rheeboksfontein and Loeriesfontein. Connecting pipelines totalling about 9.5kms will be constructed from six new boreholes and two existing boreholes, on the Farms Rheeboksfontein, De Brak and Hoek van Berg. Three holding reservoirs will also be constructed on the above farms (Figure 2). Most of the pipeline will be located in the R355 (Loeriesfontein-Calvinia Road) road reserve, and alongside gravel farms roads and twee spoor tracks. The pipeline will be buried underground.

The HIA forms part of the EIA process that is being conducted by EnviroAfrica cc.

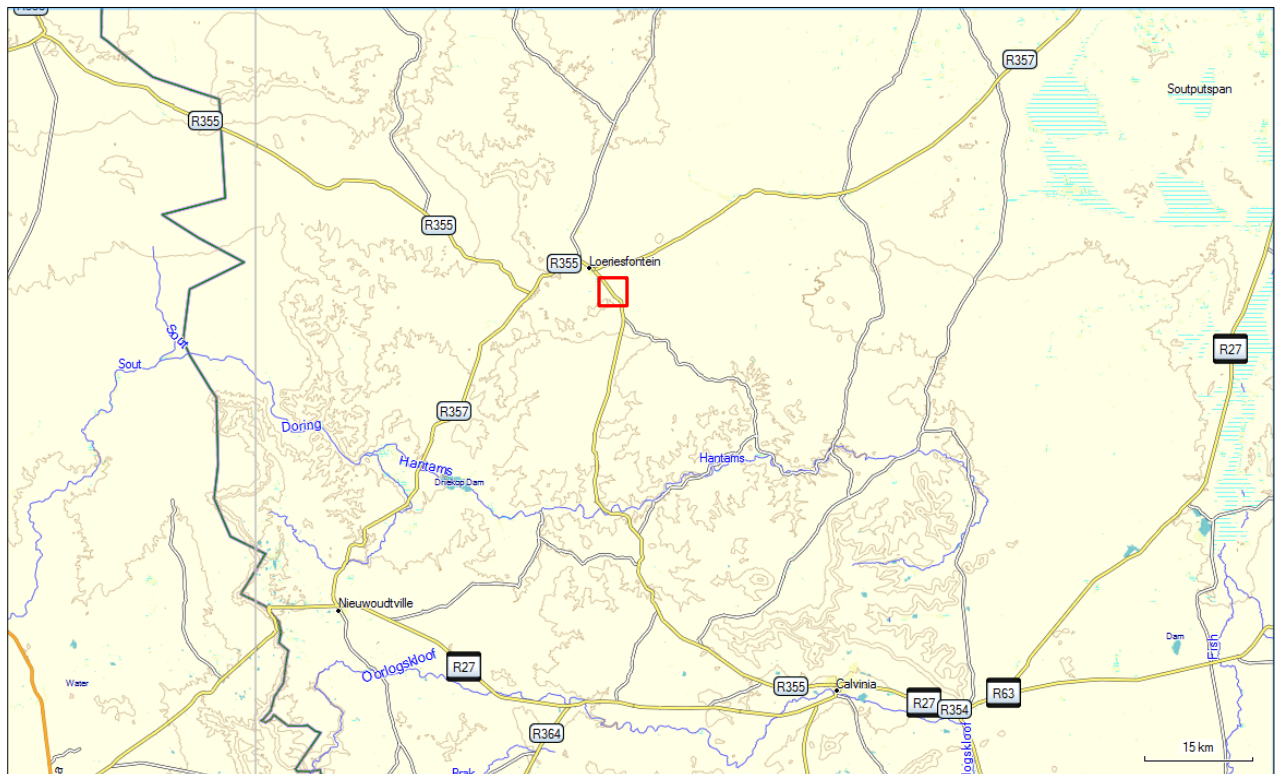


Figure 1. Locality map (red polygon illustrates the study area)



Figure 2. Google Aerial photograph indicating the proposed infrastructure for the Loeriesfontein Bulk Water Supply Pipeline and Reservoir. The main pipeline (rising main) is in green, while the feeder pipelines are in red. The blue polygons are the proposed new holding reservoirs, one of which is also planned at Hoek van Berg.

2. HERITAGE LEGISLATION

Section 38 (1) (a) of the National Heritage Resources Act (No. 25 of 1999) specifically indicates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);

- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

3. TERMS OF REFERENCE

The terms of reference for the study were to:

- Determine whether there are likely to be any important archaeological heritage that may be impacted by the proposed activities;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

Loeriesfontein is located 417 kms from Cape Town on the R27, and 60 kms north east of Niewoudtville on the R357, in the southern Bushmanland region of the Northern Cape.

The study area is generally flat, but the proposed pipeline does cross several non-perennial streams and rivers. No drainage channels, springs or pans were noted along the route, or in the study area. Sheet erosion (following recent heavy rains) is quite extensive, and there are several erosion dongas on the flat arid plains between Rheebofsfontein and the R355. Steep hills on the Farm Rheebofsfontein are covered in gravels of mudstones but in general, the substrate along the route and around the proposed storage reservoirs is a combination of mudstones/backed shale, and soft red sand (Figures 3-20). Most of the landscape is covered in low scrubby succulent Karoo vegetation and bare patches of shale gravel and red sands. Surrounding land use is mainly small stock farming (goats & sheep) with some dry land agriculture taking place on Rheebofsfontein.

The receiving environment between the Loeriesfontein reservoir and the R355 is fairly severely degraded. The proposed route (nearly 3.5kms) follows an old erosion donga, sheet washed slopes, gravel farms roads, and a small twee spoor track before connecting with the R355. The surrounding hills and flatlands are covered in gravels of shale and low scrub. A short section of the proposed route crosses a red sandy patch of dry land agriculture with relatively large numbers of Acacias, which has been heavily overgrazed (Figures 21-28).

About 8kms of the proposed rising main will be located in the R355 road reserve (Figure 29 & 30), while most of the feeder or connecting pipelines on Rheebofsfontein, Hoek van Berg and De Brak follow existing gravel roads (refer to Figure 2). A short section (0.65km) of the pipeline on the farm De Brak crosses grazing land between a new borehole alongside a dry river and the access road to the farm werf (Figure 31).

The footprint area for the proposed holding reservoirs on Rheebofsfontein, Hoek van Berg and De Brak is illustrated in Figures 32-34. The footprint area for the reservoir at Hoek van Berg is an old borrow pit alongside the R355.

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Figure 3. Borehole at Rheeboksfontein



Figure 6 Pipeline route alongside Rheeboksfontein Road



Figure 4. Pipeline route from Rheeboksfontein borehole



Figure 7. Pipeline route alongside Rheeboksfontein road



Figure 5. Pipeline route alongside Rheeboksfontein road



Figure 8. Pipeline route on Rheeboksfontein

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Figure 9. Pipeline route across Rheeboksfontein



Figure 12. Pipeline route across Rheeboksfontein



Figure 10. Pipeline route across Rheeboksfontein



Figure 13. Pipeline route across Rheeboksfontein



Figure 11. Pipeline route across Rheeboksfontein



Figure 14. Pipeline route across Rheeboksfontein

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Figure 15. Pipeline route across Rheeboksfontein



Figure 18. Pipeline route across Rheeboksfontein



Figure 16 Pipeline across Rheeboksfontein



Figure 19. Pipeline route across Rheeboksfontein



Figure 17. Pipeline route across Rheeboksfontein



Figure 20 Pipeline route across Rheeboksfontein

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Figure 21. Route from Loeriesfontein Reservoir to R355



Figure 24. Route from Loeriesfontein Reservoir to R355



Figure 22. Route from Loeriesfontein Reservoir to R355



Figure 25. Route from Loeriesfontein Reservoir to R355



Figure 23. Route from Loeriesfontein Reservoir to R355



Figure 26. Route from Loeriesfontein Reservoir to R355

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Figure 27. Route from Loeriesfontein Reservoir to R355



Figure 30. Route alongside R355 to Loeriesfontein



Figure 28. Route from Loeriesfontein Reservoir to R355.



Figure 31. Proposed route on the Farm De Brak



Figure 29. Route alongside R355 to Loeriesfontein



Figure 32. Footprint area for the proposed Rheebofsfontein holding reservoir



Figure 33. Footprint area for the proposed De Brak holding reservoir



Figure 34. Footprint area for the proposed Hoek van Berg holding reservoir (old quarry)

5. STUDY APPROACH

5.1 Method of survey

The entire length of the proposed pipeline route, from the existing reservoir at Loeriesfontein till the R355, was surveyed on foot.

The proposed rising main from the Farm Rheebofsfontein, till the R355 was surveyed mostly on foot. The route has already been marked with painted white stones set about 250m apart.

The proposed pipeline route (rising mine) in the R355 road reserve was not surveyed, although the archaeologist did spend a little time searching the terrain alongside the road, that included an old borrow pit.

The feeder/connecting pipelines on Rheebofsfontein, De Brak and Hoek van Berg were surveyed on foot. Where the route runs alongside gravel farm roads, these were only randomly searched.

The footprint areas for the proposed holding reservoirs on Rheebofsfontein, Hoek van Berg and De Brak were also searched for archaeological heritage.

All archaeological occurrences documented during the survey were mapped using a hand held GPS device set on the map datum WGS 84.

A track path of the survey was also captured (refer to Figure 35 in Appendix II). A desk top study was done.

5.2 Constraints and limitations

There were no constraints or limitations associated with the study. The study area is covered in sparse, mainly succulent Karoo vegetation and archaeological visibility was very good.

5.3 Identification of potential risks

Based on the results of the study, there are no archaeological risks associated with the proposed Loeriesfontein Bulk Water Supply project.

Previous studies done in the area, where the same type of terrain was covered, produced similar results (Morris 2013, 2007; Orton 2014; Van der Walt 2012; Webley & Halkett 2010).

5.4 Assumptions

Most of the archaeological work done to date in the study area (i. e. around Loeriesfontein) indicates that the distribution of heritage sites is directly related to features in the landscape. For example scatters of LSA sites tend to cluster around small hilltops, near river banks and streams, while dispersed scatters of MSA lithics appear to be distributed fairly unevenly over the landscape. It was assumed, therefore, that a similar patterning of archaeological resources would occur during the current study.

5.4 Results of the desk top study

Very little archaeological work has been done in Loeriesfontein, but in recent years, with the development of an emerging alternative energy industry, several HIAs have been undertaken in the surrounding area.

Scatters of Middle and Later Stone Age (MSA & LSA) artefacts were first encountered in Loeriesfontein during an Archaeological Impact Assessment (AIA) for a proposed low cost housing project on the south western edge of the town (Kaplan 2010), while a few MSA and LSA implements were also found near the towns Waste Water Treatment Works (Kaplan 2008). Further afield, Webley & Halkett (2010) reported on weathered indurated shale MSA artefacts scattered over a wide area during an assessment for the proposed construction of a substation alongside the Sishen Saldanha railway some 60kms south west of Loeriesfontein. Weathered MSA artefacts were found randomly scattered across the landscape on the Farm Klein Rooiberg during an HIA for a proposed solar energy farm about 40kms to the north of Loeriesfontein by Webley & Halkett (2012). Scatters of LSA flake tools, ostrich eggshell and pottery were found on several hilltop sites on the same farm, while LSA lithics and portable grooved stones were found on the banks of a small stream during the same study. Scatters of LSA material were recorded on hilltops, and ephemeral scatters of highly weathered Middle Stone Age artefacts were encountered on the flat arid plains, during an HIA for a proposed power line for the Loeriesfontein 2 Wind Energy Facility about 50kms north of the town (Orton 2014). Open sites with surface scatters of MSA, and scatters of LSA material on hilltops were also encountered by Van Schalkwyk (2011) during an HIA for a proposed wind energy farm north of Loeriesfontein. Morris (2013) encountered very sparse scatters of MSA and LSA during an assessment of powerline options, access road and substation sites for the above wind energy farm, and only encountered sparse MSA remains about 40kms north east of Loeriesfontein during an assessment of the proposed upgrading of the Sishen-Saldanha railway line (Morris 2007). A few traces of MSA material was recorded by van der Walt (2010) during an HIA for a proposed solar energy farm on the farm Naronsies north of Loeriesfontein. A collection of ostrich eggshell water containers, bored stones and soapstone pipes are on display at the Loeriesfontein Museum.

6. FINDINGS

6.1 Archaeology

A few isolated implements were found along the proposed pipeline route on the Farm Rheebofsfontein (refer to Table 2 in Appendix I). These include three MSA flakes in weathered indurated shale (027, 030 & 070), one weathered ironstone (037) MSA flake, and one snapped LSA indurated shale flake (029). A quartzite minimal core/chunk (034) was also found in the pipeline route. No archaeological remains were found in the footprint area of the proposed Rheebofsfontein holding reservoir, which comprises mostly red sands and some shale gravel on the edges.

Dispersed and mostly weathered, indurated shale MSA flakes, several large, flat, utilised/retouched pieces (045 & 046) and a large flat convex scraper (049) in indurated shale were encountered in the proposed pipeline route and alongside the dry river bank on the Farm De Brak. A worked out disc core (053) in indurated shale was also found, while a few indurated shale MSA flakes (054) were encountered on a slightly elevated rise overlooking a small, dry stream bed. A large, flat, edge nicked banded ironstone chunk (050) was also found. No remains were found in the footprint area of the proposed holding reservoir which is located on red sands alongside the gravel access road.

A large weathered, indurated shale core (063) and several weathered indurated shale MSA flakes (065 & 065) were found on the Farm Hoek van Berg alongside the R355. The two existing boreholes occur on this farm. All the tools were found among rubble alongside the proposed holding reservoir/old borrow pit.

One weathered, indurated shale MSA flake (061) was found alongside an erosion donga at the base of a steep hill near the Loeriesfontein reservoir.

Several weathered indurated shale MSA flakes, including two broken/snapped LSA flakes/blades (069) were encountered in the open veld alongside the R355.

A collection of tools found during the study is illustrated in Figures 35-38



Figure 35. Collection of tools from the Farm Rheebofsfontein. Scale is in cm



Figure 36. Collection of tools from the Farm Hoek van Berg. Scale is in cm



Figure 37. Tools (069) found in the open veld alongside the R357. Scale is in cm



Figure 38. Broken indurated shale LSA blade (069) alongside the R355. Scale is in cm

6.2 Graves

No visible graves or typical surface grave markers were found in the pipeline route or associated infrastructure.

6.3 Rock engravings

No rock engravings were found near or alongside the proposed pipeline or reservoirs. No dolerite exposures occur where rock engravings are mostly likely to be found.

6.4. Structures

The ruins of a small stone structure were found alongside the proposed pipeline route overlooking the gravel road on the Farm Rheeboksfontein (Figures 39 & 40). The ruins might be the remnants of a late 19th/early 20th Century shepherd's hut (veewagterhuis), or a small stock post. A few blocks of shale were found scattered, about including several pieces of English transfer ware.

A stock pen was also encountered in the area north of Loeriesfontein during a survey for a proposed solar energy farm on the Farm Klein Rooiberg (Webley & Halkett 2012). Because of the dry, arid nature of the region, many of the farms in Bushmanland were only allocated after the introduction of the wind pump to South Africa in the 1870s which then made the arid lands accessible and suitable for grazing (Webley & Halkett 2012).

Several old, dry packed, stone stock enclosures/kraals, farm buildings and farm labourer's cottages, were noted in the general area of the proposed pipeline route, but none of these structures will be impacted by proposed development activities.



Figure 39. Site 038. Remains of a small stock post. Note the blocks of shale lying about, likely sourced from a nearby river



Figure 40. Site 038. A few pieces of ceramic found lying scattered about. Scale is in cm

6.5 Significance of the archaeological remains

The very small numbers and isolated context in which they were found means that the pre-colonial archaeological remains recorded during the study are rated as having low (3C) local significance.

The ruins of the stock post/shepherd's hut have also been rated as having low (3C) local significance. Very little of the structure remains apart from a few scattered blocks of shale and some ceramics lying around.

7. ASSESSMENT OF IMPACTS

The overall impact of the proposed development on the archaeological heritage will be very low (Table 1).

Potential impacts on archaeological heritage	
Extent of impact:	Site specific
Duration of impact;	Permanent
Intensity	Low
Probability of occurrence:	Improbable
Significance without mitigation	Low
Significance with mitigation	Low
Confidence:	High

Table 1. Assessment of archaeological impacts

8. CONCLUSION

The results of the study indicate that the proposed Loeriesfontein Bulk Water Supply Pipeline will not impact on any significant archaeological heritage.

The findings of the study are consistent with those encountered during previous studies in the Loeriesfontein region of southern Bushmanland, which indicate a paucity of archaeological traces on arid, eroded undulating surfaces and plains.

The receiving environment is not a sensitive or threatened archaeological landscape.

9. RECOMMENDATIONS

With regard to the proposed Loeriesfontein Bulk Water Supply Pipeline and Reservoir in Loeriesfontein, in the Northern Cape Province, the following recommendations are made:

1. No archaeological mitigation is required.
2. Should any unmarked human burials/remains or ostrich eggshell water flask caches for example be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Jenna Lavin at the South African Heritage Resources Agency (021 462 4502). Burials or caches of ostrich eggshell must not be removed or disturbed until inspected by the archaeologist.

10. REFERENCES

Kaplan, J. 2010. Archaeological Impact Assessment proposed Loeriesfontein low cost housing development (Remainder of Erf 675, Loeriesfontein), Loeriesfontein, Northern Cape. Report prepared for EnviroAfrica cc. ACRM Riebeek West

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Appendix I

Spreadsheet of waypoints

Archaeological study the proposed Loeriesfontein Bulk Water Supply Pipeline & Reservoir

Site	Name of Farm	Lat/Long	Description of finds	Grade	Mitigation
	Rheeboksfontein				
027		S31 04.782 E19 22.859	Weathered Indurated shale retouched MSA flake in old fields	3C	None required
029		S31 04.035 E19 23.308	Snapped indurated shale LSA flake	3C	None required
030		S31 04.111 E19 23.289	Chunky indurated shale MSA flake	3C	None required
033		S31 04.460 E19 24.364	Quartz chunk	3C	None required
034		S31 04.492 E19 24.483	Quartzite minimal core/chunk	3C	None required
037		S31 04.567 E19 25.002	Weathered, broken banded iron stone flake	3C	None required
038		S31 04.491 E19 25.024	Ruined remains of a shepherd's hut/stock post, with a few pieces of English transfer ware ceramics lying scattered about	3C	None required
039		S31 04.421 E19 25.171	Retouched weathered indurated shale chunk	3C	None required
069		S31 01.567 E19 29.143	Large, snapped indurated shale utilized LSA blade alongside R355	3C	None required
	De Brak				
043		S31 02.026 E19 30.317	Weathered indurated shale MSA flake	3C	None required
044		S31 01.916 E19 30.450	Weathered indurated shale chunk	3C	None required
045		S31 01.898 E19 30.471	Large, flat retouched indurated shale flake, & chunk	3C	None required
046		S31 01.884 E19 30.484	Flat, edge retouched weathered indurated shale flake	3C	None required
047		S31 01.876 E19 30.501	Banded ironstone chunk	3C	None required
048		S31 01.814 E19 30.641	Weathered indurated shale MSA flake	3C	None required
049		S31 01.719 E19 30.622	Large, flat weathered indurated shale scraper on river bank	3C	None required
051		S31 01.772 E19 30.513	Weathered, partially retouched, indurated shale MSA flake/blade	3C	None required
052		S31 01.808 E19 30.480	Weathered indurated shale nicked chunk	3C	None required
053		S31 01.823 E19 30.464	Weathered indurated shale MSA disc/prepared core	3C	None required
054		S31 01.840 E19 30.442	2-3 weathered indurated shale MSA flakes on slightly elevated rise overlooking small stream. Sandstone outcrops.	3C	None required
055		S31 01.854 E19 30.433	Bright orange, banded ironstone chunk, with slight edge nicked	3C	None required
056		S31 01.924 E19 30.374	Weathered Indurated shale chunk	3C	None required
057		S31 01.939 E19 30.364	Weathered indurated shale MSA flake	3C	None required
	Loeriesfontein reservoir				
061		S30 58.056 E19 26.819	Weathered indurated shale flake	3C	None required
	Hoek van Berg				

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063		S30 59.562 E19 29.069	Large weathered indurated shale blade core	3C	None required
065		S30 59.617 E19 29.147	Weathered indurated shale MSA flake	3C	None required
068		S30 59.587 E19 29.121	Partially retouched weathered indurated shale MSA flake	3C	None required
069		S31 01.567 E19 29.143	Large, snapped indurated shale utilized LSA blade, snapped LSA blade, and 3 weathered indurated shale MSA flakes alongside the R355	3C	None required

Table 2. Spreadsheet of waypoints and description of archaeological finds

Appendix II

Track paths

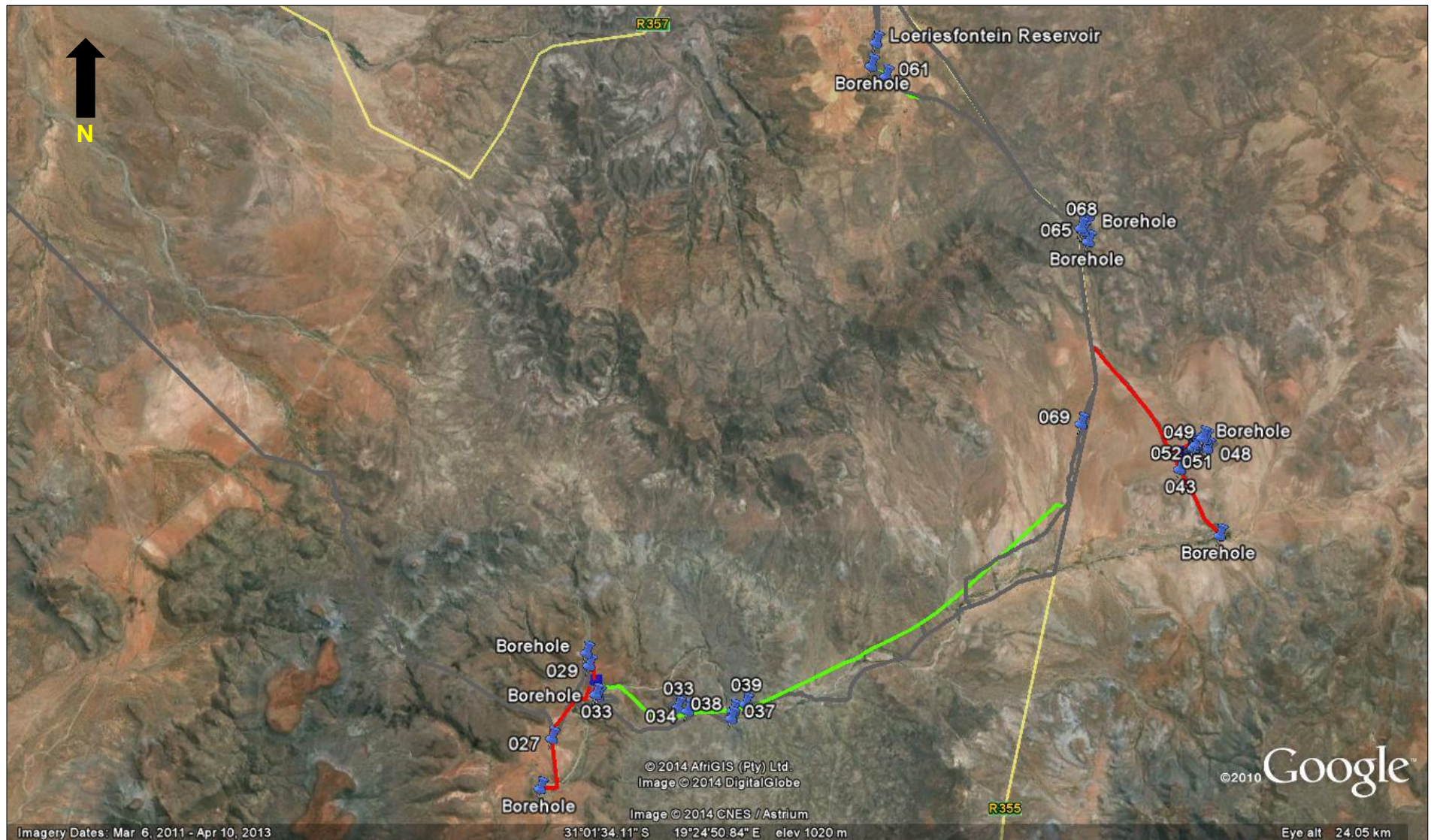


Figure 41. Track paths & waypoints. The green line is the rising main (pipeline), the red line is the feeder/connecting pipelines & the grey line are the track paths.