

**Phase 1 Heritage Impact Assessment of the 2.3 km long
40478 Vaal-Gamagara water pipe line alternative route
around Kathu Pan, NC Province.**



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Executive Summary

A Heritage Impact Assessment was carried out for a 2.3 km long alternative pipe line route around Kathu Pan, as part of the new 40478 Vaal-Gamagara water pipe line and associated infrastructure to be constructed between Sishen and Hotazel via Kathu in the Northern Cape Province. The footprint of the preferred pipe line deviation at Kathu Pan is located outside the periphery of the pan and its archaeologically sensitive doline features. The likelihood of impact upon aboveground archaeological remains and historical structures along the preferred pipe line deviation is considered low, but given the occasional capping and preservation of archaeological remains by calcareous sediments in the region, it is advised that a professional archaeologist is authorized to conduct a brief inspection of any freshly exposed sediments resulting from excavation activities that may be carried out along the 1 km long section that crosses the terrain north of Kathu Pan and south of the landing strip. This section of the footprint is assigned the rating of Generally Protected B (GP.B). The section of the pipe line deviation that follows the R380 road to the west of the pan is not considered archaeologically sensitive and is assigned the rating of Generally Protected C (GP. C).

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Introduction

A Heritage Impact Assessment was carried out for a 2.3 km long alternative pipe line route around Kathu Pan, as part of the new 40478 Vaal-Gamagara water pipe line and associated infrastructure to be constructed between Sishen and Hotazel via Kathu in the Northern Cape Province. The proposed 700 – 900 Ø underground pipe line covers 1:50 000 topographic maps 2722BB Hotazel, 2722BD Sutton, 2722DB Dibeng, 2722DD Sishen and 2723CA Kathu and will run from Sishen to Blackrock Mine, which is situated about 14 km northwest of Hotazel (**Fig. 1**). The pipe line will run between existing reservoirs at Kathu Pan, Hotazel and Black Rock Mine (**Fig. 2; Table 4**). Section A – B (farms Parson 564 and Gamagara 541) consist of a 7.2 km long, 900 Ø pipe line placed directly adjacent and parallel to an existing line that runs next to the R325 road. It joins up with an existing line (Section B – D) which is not part of this project (**Fig. 3 - 5**). Section D – F (farms Sacha 468, Marsh 467, Halliford 466, Chersley 430, Walton 390, Shirley 367, Moab 700, Adams 328, Goold 329, Rissik 330, Smart 314, Perth 276, Devon 277, York A 279 and Hotazel 280) is a 52 km long, 700 Ø segment beginning at Sacha 468 that runs via the Kathu reservoir to the Hotazel reservoir next to an existing pipe line between Kathu Pan and Black Rock. (**Fig. 3, 6 & 7**). Section F – G (farms Kipling 271, Gloria 266 and N' Chwaning 267) represents a 14.7 km long, 700 Ø pipe line segment between the Hotazel and Black Rock Mine reservoirs to be placed next to the existing line.

Legislative framework

The region's unique and non-renewable palaeontological heritage is generally protected in terms of the National Heritage Resources Act (Act No 25 of 1999). The Act identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves,

and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects. The Act identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories of development listed in Section 38 (1) of the NHR Act are:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site;
- Exceeding 5000 m² in extent;
- Involving three or more existing erven or subdivisions thereof;
- Involving three or more subdivisions thereof which have been consolidated within the past five years;
- Costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA).
- The rezoning of a site exceeding 10 000 m².
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

The significance or sensitivity of heritage resources within a particular area or region can inform the EIA process on potential impacts and whether or not the expertise of a heritage specialist is required. A range of contexts can be identified which typically have high or potential cultural significance and which would require some form of heritage specialist involvement (**Table 1**). This may include formally protected heritage sites or unprotected, but potentially significant sites or landscapes (**Table 2**). The involvement of the heritage specialist in such a process is usually necessary when a proposed development may affect a heritage resource, whether it is formally protected or unprotected, known or unknown. In many cases, the nature and degree of heritage significance is largely unknown pending further investigation (e.g. capped sites, assemblages or subsurface fossil remains). On the other hand, it is also possible that a site may contain heritage resources (e.g. structures older than 60 years), with little or no conservation value. In most cases it will be necessary to engage the

professional opinion of a heritage specialist in determining whether or not further heritage specialist input in an EIA process is required. This may involve site-significance classification standards as prescribed by SAHRA. Alternatively, useful sources of information on heritage resources in South Africa can also be obtained through SAHRA's national database of heritage resources, including existing heritage survey information as well as other published or secondary source material on the overall history of a particular area or site.

Methodology

The archaeological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment of the pipe line route by means of a pedestrian survey along undisturbed areas. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological literature, aerial photographs (Google Earth) and existing field data were consulted and integrated with data acquired during the on-site inspection.

The task also involved identification and assessment of possible archaeological heritage within the proposed project area, in accordance with section 9(8) and appendix 6 ("Specialist reports") of the NEMA EIA Regulations, 2014, whereby the specialist report takes into account the following terms of reference:

- Identify and map possible heritage sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

The study area is rated according to field rating categories as prescribed by SAHRA (**Table 3**) as well as a probability of impact methodology for assessing the Duration (time scale), Extent (spatial scale), and Irreplaceable loss of resources, Reversibility of the potential impacts, Negative and Positive impacts, the Probability of Archaeological impacts and Cumulative impact of activities (**Table 7**).

Locality data

A preferred alternative route is proposed for the section that traverses the Kathu Pan in order to avoid potential impact on archaeologically and palaeontologically sensitive deposits (**Fig. 8; Table 5**). The pan is relatively shallow and covers about 30 ha of mostly vegetated terrain. The preferred alternative will result in a deviation of about 2.3 km (**Fig. 9; Table 6**). It will run northwards next to the R380 road and then northeastwards along the northern boundary of the pan to join up with the existing pipe line that runs between Kathu Pan and Black Rock. (**Fig. 10 - 11**).

Background

The region has a rich and widespread archaeological footprint that is represented by a wide range of tangible and intangible heritage resources including palaeontological sites from tufa deposits and dolines, dense Stone Age surface occurrences and capped localities, Late Iron Age and historical structural remnants and rock engraving sites as well as cultural landscapes and places associated with social identity (**see References**). Several Early Stone Age (ESA) sites, containing Victoria West cores, handaxes and cleavers have been recorded along the Harts River, a tributary of the Vaal River, near Taung. In addition to the archaeologically significant dolines at Kathu Pan, abundant ESA and MSA stone tool assemblages are also known from several sites in the area, such as at the Kathu Townlands site and Bestwood (**Fig. 12 & 13**) Various archaeological investigations at the site demonstrated that Wonderwerk Cave contains *in situ*, ESA, Fauresmith and Middle Stone Age through Later Stone Age deposits, including rock art (**Fig. 14**). The cave deposits represent a long sequence of *in situ* ESA horizons which also cover the ESA/MSA transition, and have also yielded abundant and well preserved *in situ* micro- and macro-faunal and botanical remains. Dolomite terraces and exposed valley floors along the Kuruman River valley are at places decorated with rock engravings that reflect colonial and LSA/Iron Age frontier interactions. Rock art sites in the region, including rock engraving as well as paintings, are known from Wonderwerk Cave (paintings) and the Danielskuil Townlands (engravings). Sites found northwest of Kuruman, include Gamohaam, Maropeng, Batlharos and Mahakane.

Several prehistoric specularite and haematite mines are found around Postmasburg, including underground workings on the farms Paling M87, open mining pits at Gloucester 13 and Mount Huxley, as well as open mining pits next to the town

reservoir. The most famous mining site is Blinkklipkop (Gatkoppies), situated about 5 km northeast of Postmasburg on the townlands. Excavations conducted by Peter Beaumont yielded mining tools stone artefacts of various types of pottery, arrow heads made from bone, OES beads and faunal remains. The Blinkklipkop and Doornfontein sites provide evidence of LSA mining practices and the introduction in the region by 1200 BP, of domesticated ovicaprids and possibly cattle as well as pottery.

The archaeological footprint northeast of Hotazel is primarily represented by stone wall remnants of the early 19th century BaTlaping capital Dithakong, located near the modern village of Dithakong. Extensive stone wall enclosures are found on the adjacent hills and archaeological investigations during the 1980's have revealed that the ruins were built during the 15th century A.D. and possibly by sedentary Khoi groups. The area consists of primary and secondary enclosures and cover a total area of about 1 km² comprising hundreds of circles of varying size (**Fig. 15**).

Field Assessment

The footprint for Section A – B is located adjacent and parallel to an existing line near previously disturbed overburden. A pedestrian survey revealed no evidence for *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years that will be impacted by the development.

There are no evidence for *in situ* Stone Age archaeological material, rock art, prehistoric structures, graves or historically significant structures older than 60 years that will be impacted by the development along the first 5 km of Section D – E, starting at the Sacha farm boundary. Part of the pipe line deviation at Kathu Pan that runs along a disturbed section parallel to the R380 road are not considered archaeologically sensitive. The section of the deviation between the R380 road and the existing pipe line to the north of Kathu Pan (and south of the landing strip) is underlain by well-developed calcretes and surface limestones with no aboveground indication of *in situ* Stone Age archaeological material, rock art, prehistoric structures, graves or historically significant structures older than 60 years that may be impacted by the development.

Further north along Section E – G the footprint between Marsh 467 and Halliford 466 is located along a track on previously disturbed overburden that is adjacent and parallel to the existing pipe line that joins and borders the R380 road about 12 m to the left of the tar surface. Near Devon 277 (at coordinates 27°15'17.04"S 22°58'20.36"E) the footprint diverges from the road in a northerly direction until it reaches the Hotazel reservoir (at coordinates 27°12'30.40"S 22°57'41.33"E) and the Black Rock reservoir about 14 km to the northwest (at coordinates 27° 8'6.11"S 22°50'24.12"E).

Impact Statement and Recommendations

Significance of impacts is summarized in **Table 7**. The 40478 Vaal-Gamagara water pipe line footprint is not regarded as archaeologically sensitive due to its position near disturbed overburden next to an existing water pipe line.

The footprint of the preferred pipe line deviation at Kathu Pan is located outside the periphery of the pan and its archaeologically sensitive doline features. The likelihood of impact upon aboveground archaeological remains and historical structures along the preferred pipe line deviation is considered low, but given the occasional capping and preservation of archaeological remains by calcareous sediments in the region, it is advised that a professional archaeologist is authorized to conduct a brief inspection of any freshly exposed sediments resulting from excavation activities that may be carried out along the 1 km long section that crosses the terrain north of Kathu Pan and south of the landing strip. This section of the footprint is assigned the rating of Generally Protected B (GP.B). The section of the pipe line deviation that follows the R380 road to the west of the pan is not considered archaeologically sensitive and is assigned the rating of Generally Protected C (GP. C).

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Tables and Figures

Table 1: Relationship between different heritage contexts, heritage resources likely to occur within these contexts, and likely sources of heritage impacts in the central interior of South Africa.

Heritage Context	Heritage Resources	Impact
Palaeontology	Precambrian shallow marine and lacustrine stromatolites, organic-walled microfossils, Ghaap Plateau (Transvaal Supergroup) Palaeozoic and Mesozoic fossil remains, e.g. Karoo Supergroup Neogene regolith	Road cuttings Quarry excavation Bridge and pipeline construction (Quaternary alluvial deposits)
Archaeology Early Stone Age Middle Stone Age LSA - Herder Historical	Types of sites that could occur in the Free State include: Localized Stone Age sites containing artifacts, animal and human remains found near <i>inter alia</i> the following: River courses/springs Stone tool making sites Cave sites and rock shelters Freshwater shell middens Ancient, kraals and stonewalled complexes Abandoned areas of past human settlement Burials over 100 years old Historical dumps Structural remains Objects including industrial machinery and aircraft	Subsurface excavations including ground levelling, landscaping, foundation preparation, road building, bridge building, pipeline construction, construction of electrical infrastructure and alternative energy facilities, township development.
History	Historical townscapes Historical structures, i.e. older than 60 years Historical burial sites Places associated with social identity/displacement, e.g. Witsieshoek Cave Historical mission settlements, e.g. Bethulie, Beersheba	Demolition or alteration work. New development.
Natural Landscapes	Formally proclaimed nature reserves Evidence of pre-colonial occupation Scenic resources, e.g. view corridors, viewing sites, Historical structures/settlements older than 60 years Geological sites of cultural significance.	Demolition or alteration work. New development.
Relic Landscape Context	Battle and military sites, e.g. Magersfontein Precolonial settlement and burial sites Historical graves (marked or unmarked, known or unknown) Human remains (older than 100 years) Associated burial goods (older than 100 years) Burial architecture (older than 60 years)	Demolition or alteration work. New development.

Table 2. Examples of heritage resources located in the region.

Historically, archaeologically and palaeontologically significant heritage sites & landscapes	Examples
Landscapes with unique geological or palaeontological history	Karoo Basin/Beaufort Group sedimentary strata Vredefort Dome World Heritage Site. Taung World Heritage Site
Landscapes characterised by certain geomorphological attributes where a range of archaeological and palaeontological sites could be located.	Vaal, Modder and Riet River valleys Pans, pandunes and natural springs of the Free State panveld.
Relic landscapes with evidence of past, now discontinued human activities	Wonderwerk Cave Kathu Pan
Landscapes containing concentrations of historical structures.	Concentration camps & cemeteries from the South African War.
Historical towns, historically significant farmsteads, settlements & routes	Kimberley Mining heritage Moffet Mission, Kuruman
Battlefield Sites, burial grounds and grave sites older than 60 years.	Magersfontein

Table 3. Field rating categories as prescribed by SAHRA.

Field Rating	Grade	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

Table 4. General coordinates for the pipe line footprint.

#	Coordinates
A	27°53'40.09"S 22°57'47.35"E
B	27°49'48.29"S 22°58'45.38"E
C	27°46'36.38"S 22°55'17.64"E
D	27°41'51.85"S 22°55'28.98"E
E	27°39'59.29"S 23° 0'32.68"E
F	27°12'43.68"S 22°57'32.12"E
G	27° 8'4.60"S 22°50'24.50"E

Table 5. The GPS coordinates for the palaeontologically sensitive no-go area.

#	Coordinates
1	27°40'27.21"S 23° 0'27.64"E
2	27°39'40.67"S 23° 0'0.60"E
3	27°39'30.05"S 23° 0'29.61"E
4	27°39'38.61"S 23° 0'40.43"E
5	27°39'57.65"S 23° 0'47.15"E
6	27°40'21.33"S 23° 0'44.16"E

Table 6. The GPS coordinates of the pipe line deviation around Kathu Pan.

#	Coordinates
1	27°40'17.54"S 23° 0'22.61"E
2	27°39'39.84"S 22°59'59.71"E
3	27°39'28.62"S 23° 0'29.52"E

Table 7. Summary of potential impacts before and after the site visit.

Duration	Extent	Irreplaceability	Reversibility	Potential Negative Impact	Potential Positive Impact	Probability of Archaeological Impact	Cumulative Impact	Mitigation: 2.3 km long alternative route around Kathu Pan
Before site visit								
Permanent	Regional	High potential for loss of irreplaceable resources	Irreversible Impact cannot be reversed.	Low Footprint will <i>slightly</i> alter the environment due to previous damage/ disturbances	Very Low Footprint will <i>negligibly</i> enhance the environment	High	Medium The development is one of a few similar activities in the same geographical area	Desktop Study and Field Assessment
After site visit								
Permanent	Regional	Low potential for loss of irreplaceable resources.	Irreversible Impact cannot be reversed.	Low Footprint will <i>slightly</i> alter the environment due to previous damage /disturbances.	Very Low Footprint will <i>negligibly</i> enhance the environment	Low Deviation at Kathu Pan is feasible; Footprint is largely located next to an existing pipe line	Medium The development is one of a few similar activities in the same geographical area	Inspection of freshly exposed sediments resulting from excavations carried out along the 1 km long section that crosses the terrain north of Kathu Pan and south of the landing strip.

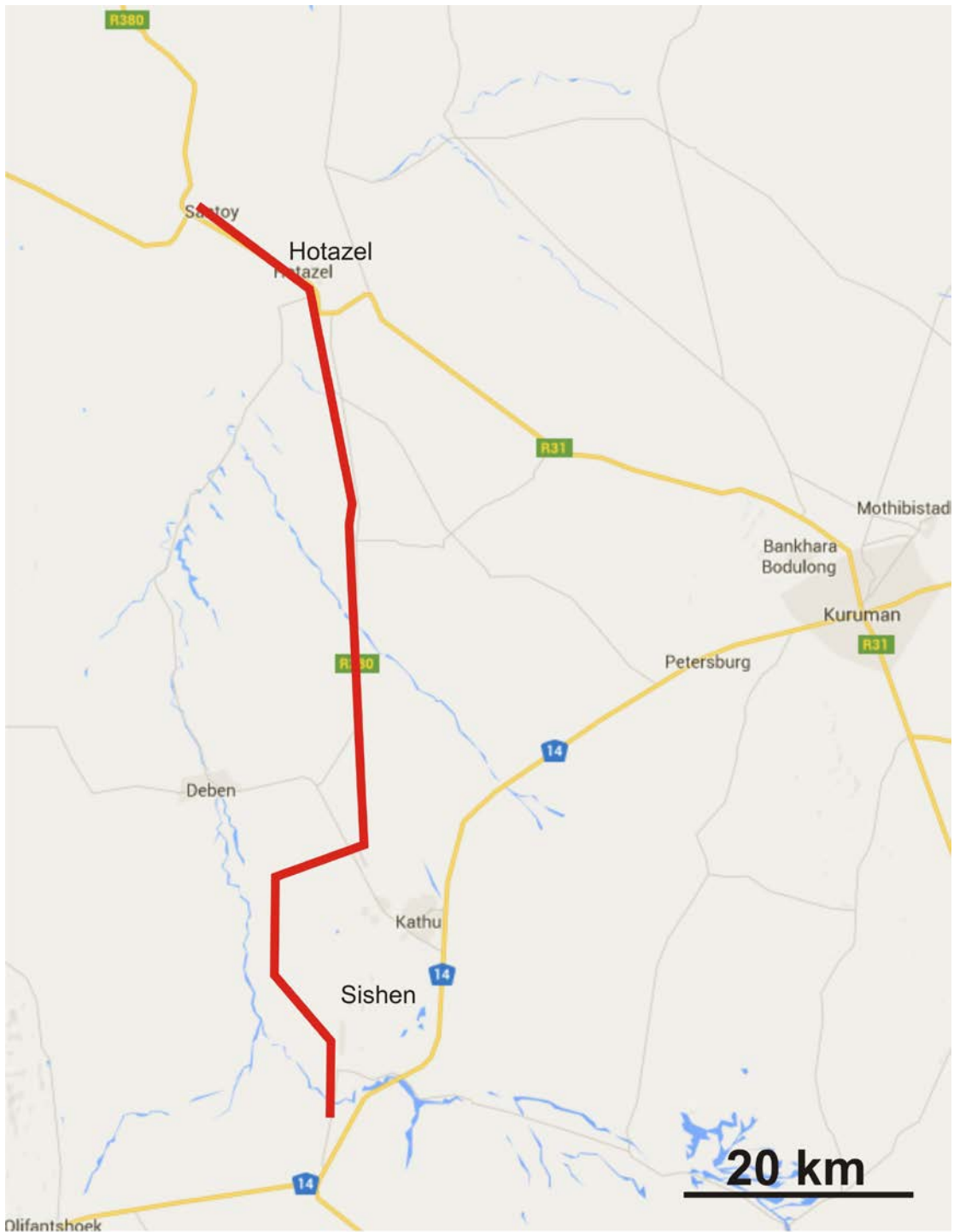


Figure 1. General map showing the position of the proposed new 40478 Vaal-Gamagara water pipe line near Kathu in the Northern Cape Province.



Figure 2. General views of the reservoirs at Kathu Pan (top left) Hotazel (right) and Black Rock (bottom left)

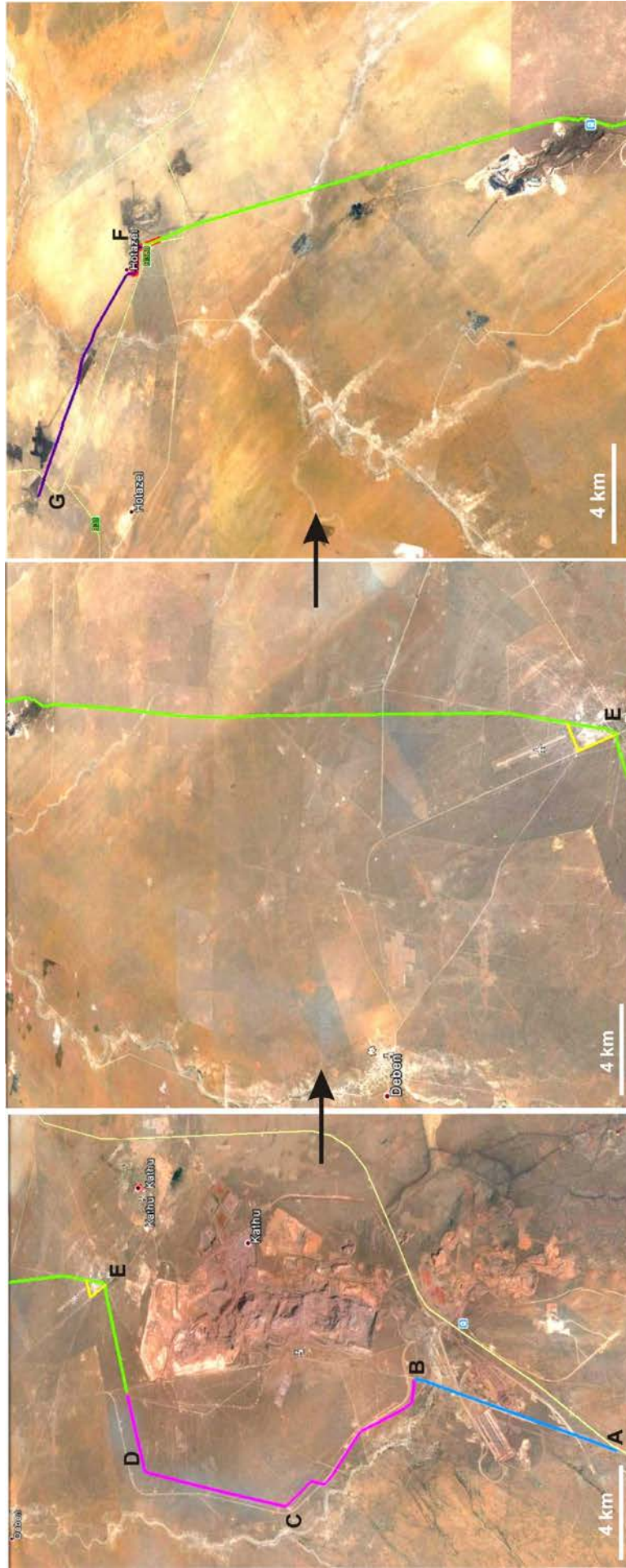


Figure 3. Aerial view and layout of the proposed 40478 Vaal-Gamagara water pipe line between Sishen and Black Rock Mine.



Figure 4. Section A - B, looking northwest towards the R325.



Figure 5. Section A - B, looking north. The 7.2 km long, 900 Ø pipe line is located next to an existing pipe line that follows R325 road about 12 m to the right of the tar surface.



Figure 6. The pipe line crossing on the R380 road at Sacha 468 near the reservoir at Kathu Pan, looking south.



Figure 7. Section E - F. The footprint is located next to an existing pipe line that runs from Kathu Pan and Black Rock.



Figure 8. Layout of the no-go area and position of the dolines at Kathu Pan.

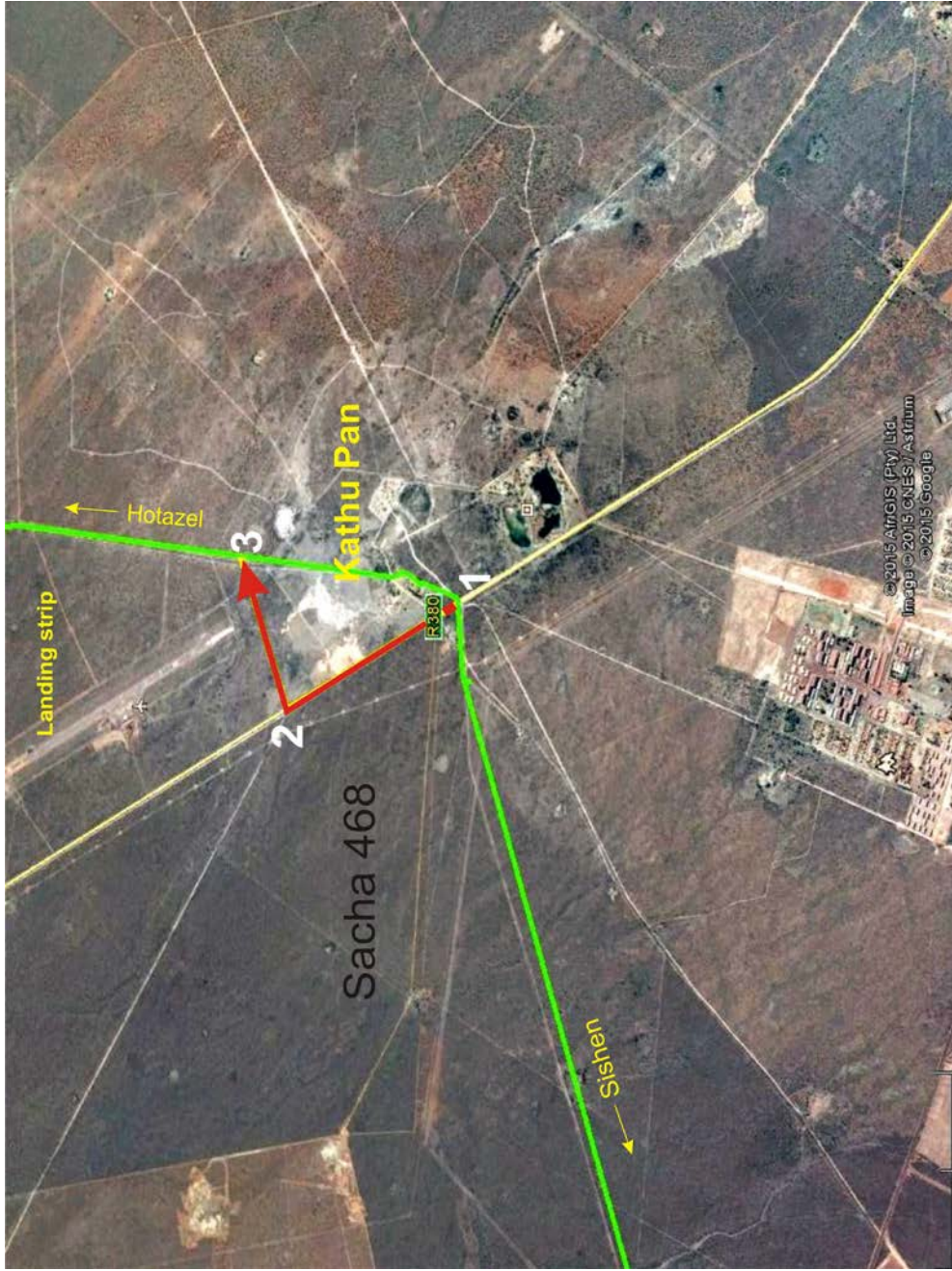


Figure 9. The proposed alternative route around Kathu Pan will result in a deviation of about 2.3 km. The deviation will follow the R380 road northwards and will then cross northeastwards along the northern boundary of the pan to join up with the existing pipe line that runs between Kathu Pan and Hotazel (green line).



Figure 10. The preferred pipeline deviation will follow the R380 along the left side of the tar surface going north.



Figure 11. Looking south along the northwestern boundary of Kathu Pan at recent earth moving activities (top) and east along the northeastern section of the pipe line deviation north of Kathu Pan (bottom). The section is largely undisturbed and underlain by surface limestones.



Figure 12. Looking at the southwestern wall of the Kathu 1 locality (top) and an excavation showing an *in situ* stone tool assemblage (below).



Figure 13. Dense concentrations of Early Stone Age artefacts at the Kathu Townlands site.



Figure 14. The cave entrance at Wonderwerk Cave (top) and archaeological excavations inside the cave.



Figure 15. Widespread stone wall enclosures at Dithakong.