

Northern Cape Province
DEPARTMENT OF
ENVIRONMENT & NATURE
CONSERVATION



Porofensi Ya Kapa Bokone
LEFAPHA LA TIKOLOGO LE
TSHOMARELO YA TLHAGO

BASIC ASSESSMENT REPORT

THE PROPOSED KALAHARI EAST (PHASE 1) BULK WATER SUPPLY PIPELINE AND RESERVOIR, ASKHAM AND RIETFONTEIN, NORTHERN CAPE

DEPARTMENT OF ENVIRONMENTAL AND NATURE CONSERVATION (DENC)
REF NO: *NC/BA/27/ZFM/MIE/ASK1/2014*

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(For official use only)

File Reference Number:

Application Number:

Date Received:

BASIC ASSESSMENT REPORT

Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2010.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided are not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
3. Where applicable **tick** the boxes that are applicable or **black out** the boxes that are not applicable in the report.
4. An incomplete report may be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
6. This report must be handed in at offices of the relevant competent authority as determined by each authority.
7. No faxed or e-mailed reports will be accepted.
8. The report must be compiled by an independent environmental assessment practitioner.
9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES

If YES, please complete form XX for each specialist thus appointed:

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail:

The National Environmental Management Act (NEMA, Act 107 of 1998), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). In the Northern Cape, these powers are delegated to the Department of Environmental & Nature Conservation (DE&NC). According to the regulations of Section 24(5) of NEMA, authorisation is required for the following:

Government Notice [R544](#) listed activities (Listing Notice 1):

11: The construction of:

- (i) Canals;
- (ii) Channels;
- (iii) Bridges;
- (iv) Dams;
- (v) Weirs;
- (vi) Bulk storm water outlet structures;
- (vii) Marinas;
- (viii) Jetties exceeding 50 square meters in size;
- (ix) Slipways exceeding 50 square meters in size;
- (x) Buildings exceeding 50 square meters in size; or
- (xi) Infrastructure or structures covering 50 square meters or more;**

Where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

12: The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic meters or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010;

18: The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from

- (i) a watercourse;**
- (ii) the sea;
- (iii) the seashore;
- (iv) the littoral active zone, an estuary or a distance of 100 meters inland of the high-water mark of the sea or an estuary, whichever distance is greater

37: The **expansion** of facilities or infrastructure for the bulk transportation of water, sewage or storm water where:

- (a) **The facility or infrastructure is expanded by more than 1000 meters in length;** or
- (b) Where the throughput capacity of the facility or infrastructure will be increased by 10% or more-

Excluding where such expansion:

- (i) Relates to transportation of water, sewage or storm water within a road reserve; or
- (ii) Where such expansion will occur within urban areas but further than 32 meters from a watercourse, measured from the edge of the watercourse.

40: The **expansion** of

- (i) Jetties by more than 50 square meters;
- (ii) Slipways by more than 50 square meters; or
- (iii) Buildings by more than 50 square meters
- (iv) **Infrastructure** by more than 50 square meters

Within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.

Government Notice [R546](#) listed activities (Listing Notice 3):

2: The construction of reservoirs for bulk water supply with a capacity of more than 250 cubic metres.

14: The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:

- (1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes;
- (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list;
- (3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.

Project description

It is proposed that the Kalahari East Bulk Water Scheme be extended between Askam and Philandersbron.

The proposed development includes the construction of an approximately 161km pipeline between the existing Kalahari East Bulk Water Supply pipeline (A-line), through Remainder Farm 201 and Portion 0 of Farm 202, via the R31 to Askham, along the R360 through Hakskeen Pan, via Rietfontein, along the Namibiaweg Road to Philandersbron.

The proposed activity will also include the construction of an earth reservoir with a floating roof at Haksteenpan on Portion 130 of Farm 585. The reservoir will have a footprint of approximately 3.3ha, with a 4m high maximum earth wall. The reservoir will allow for two week storage time.

The majority of the pipeline will be located within the road reserve of the R31, R360 and Namibiaweg Road.

The pipeline will be a 315mm diameter uPVC pipeline (first 70km), then a 200mm diameter pipeline to Philandersbron.

The Phase 1 pipeline will provide 27l/s of water to most towns in the Mier area, including Askham, Groot Mier, Loubos, Rietfontein and Philandersbron. This will be the initial supply

pipeline which will form part of future expansion (future phases) to provide water to farms to the north.

The pipeline also includes a connection between the main line along the R31 and Loubos. Although most towns along the pipeline will be connected to the main line, these connecting lines are relatively short and occur within disturbed/developed area. The pipeline which will connect Loubos is significantly longer (approximately 4km) and also crosses the seasonal Swartbas stream as it comes from the Katnael Dam.

Currently, it is envisaged that borrow pits which will be needed for bedding material for the pipeline, will be sourced from existing borrow pits and/or from the excavation/deepening of existing farm dams in the area. No new borrow pits are expected at this time.

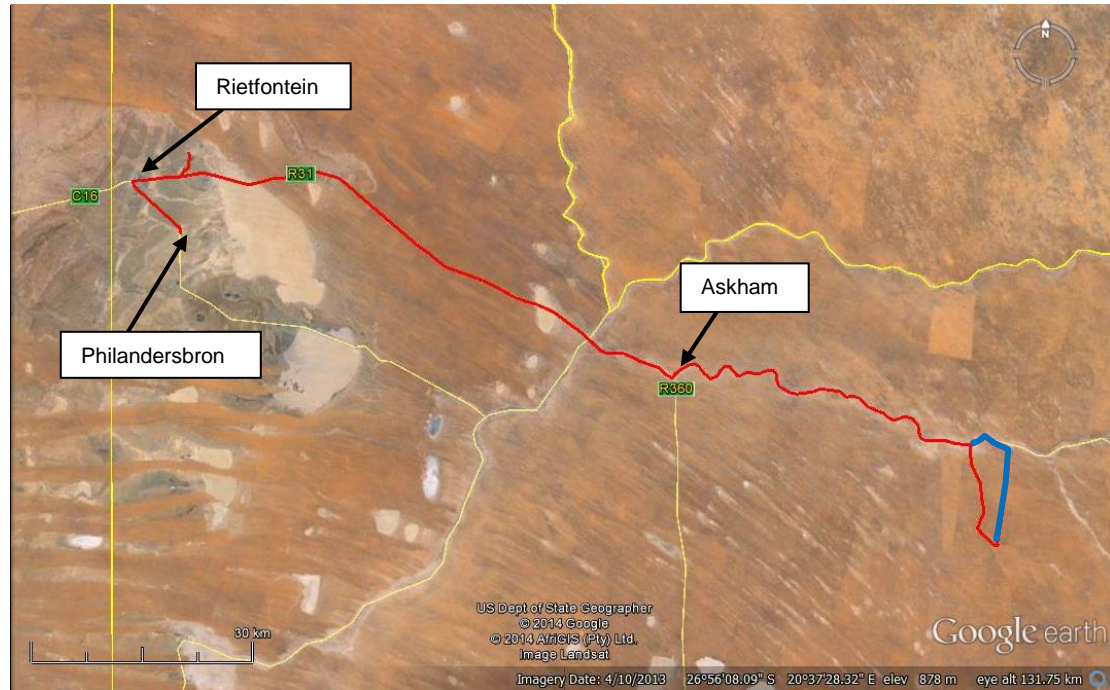


Figure 1: Google Earth view of the site. The proposed pipeline is depicted by the red line. The Alternative route is depicted by the blue line.

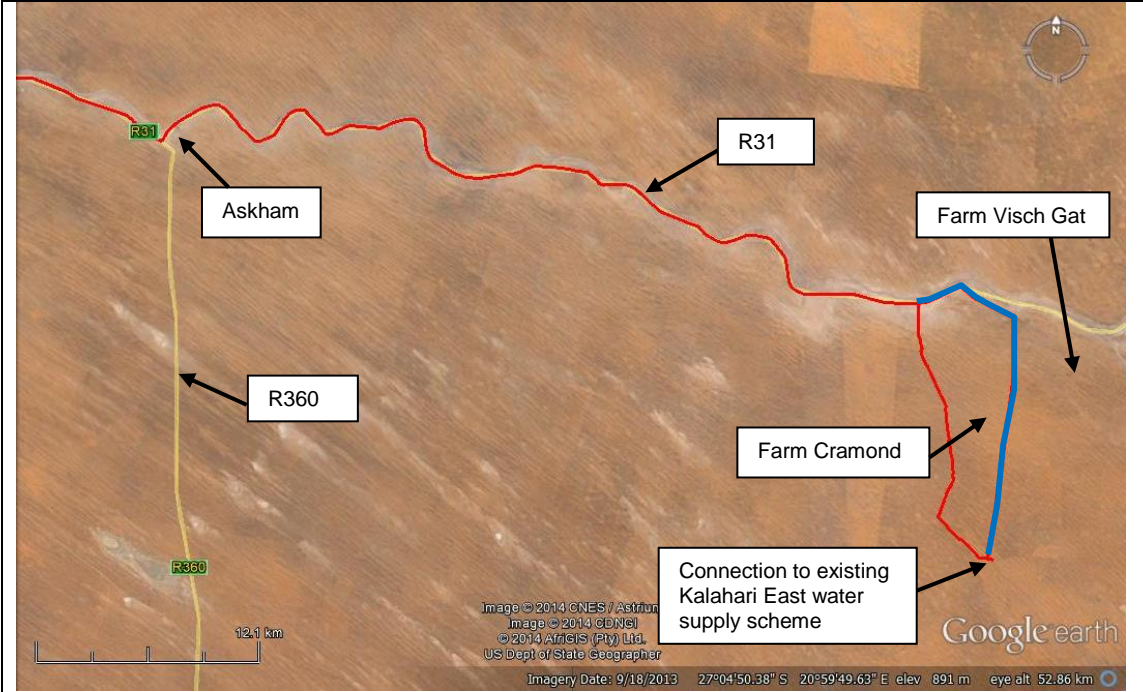


Figure 2: Google Earth view of the pipeline from the start (connection point with the existing Kalahari East Water supply scheme), along the R31 to Askham. The Alternative route is depicted by the blue line.

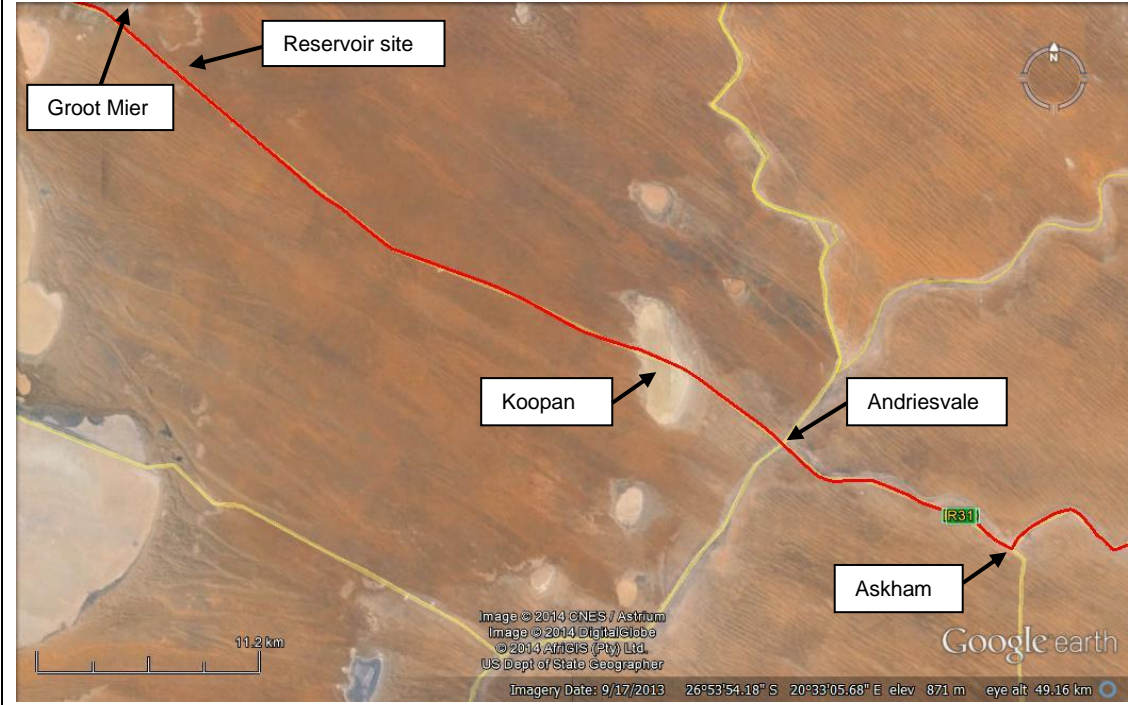


Figure 3: Google Earth view of the pipeline route, between Askham and Groot Mier.

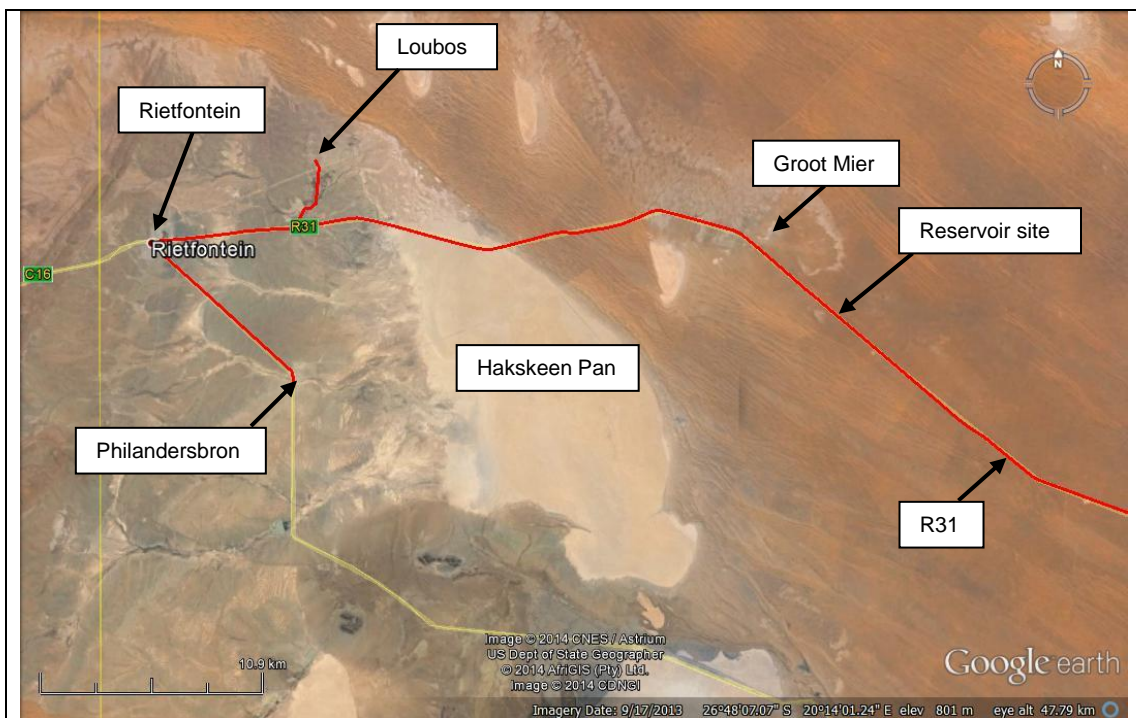


Figure 4: Google Earth view of the start of the pipeline between Groot Mier, through Hakskeen Pan and Rietfontein, to Philandersbron, including the section of pipeline between the main line and Loubos.

2. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

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Paragraphs 3 – 13 below should be completed for each alternative.

Preferred Alternative:

It is proposed that the Kalahari East Bulk Water Scheme be extended between Askam and Philandersbron.

The proposed development includes the construction of an approximately 161km pipeline between the existing Kalahari East Bulk Water Supply pipeline (A-line), through Remainder Farm 201 and Portion 0 of Farm 202, via the R31 to Askham, along the R360 through Hakskeen Pan, via Rietfontein, along the Namibiaweg Road to Philandersbron.

The proposed activity will also include the construction of an earth reservoir with a floating roof at Haksteenpan on Portion 130 of Farm 585. The reservoir will have a footprint of approximately 3.3ha, with a 4m high maximum earth wall. The reservoir will allow for two week storage time.

The majority of the pipeline will be located within the road reserve of the R31, R360 and Namibiaweg Road. The pipeline will mostly follow the southern road reserve of the R31 and R360, and will be adjusted (or cross over the road to the opposite, northern road reserve where required to avoid important vegetation, natural or heritage features)

The pipeline will be a 315mm diameter uPVC pipeline (first 70km), then a 200mm diameter pipeline to Philandersbron.

The Phase 1 pipeline will provide 27l/s of water to most towns in the Mier area, including Askham, Groot Mier, Loubos, Rietfontein and Philandersbron. This will be the initial supply pipeline which will form part of future expansion (future phases) to provide water to farms to the north.

The pipeline also includes a connection between the main line along the R31 and Loubos. Although most towns along the pipeline will be connected to the main line, these connecting lines are relatively short and occur within disturbed/developed area. The pipeline which will connect Loubos is significantly longer (approximately 4km) and also crosses the seasonal Swartbas stream as it comes from the Katnael Dam.

The pipeline will also be constructed within the existing servitudes of existing roads, minimising the impact on any biodiversity features. This is therefore the preferred alternative.

A number of alternatives have been investigated by the engineers. However, it must be noted that the proposed pipeline is the only viable option that will provide potable water of sufficient quality and quantity to the Mier area, and meets the criteria of being easily operated and maintained, maximising the use of current infrastructure and is relatively energy efficient.

Different pipeline routes:

Different pipeline routes were also considered:

Route 1 - Alternative route:

This route follows an existing farm road from where the pipeline crosses between Farm Vischgat and Farm Crammond, and runs parallel to the boundary fence between the two farms, until it reaches the R31.

However, this route was not preferred as the dune system is higher along this route, increasing the potential for wind erosion, and making construction more expensive and limited to certain vehicles and equipment. This route is also approximately 3.5km longer, further increasing the cost of construction.

Although this would decrease the pipeline length by almost 20km, the route would be going through more natural areas (as opposed to mostly in a road reserve or along an existing farm road) and could potentially increase the impact on natural vegetation.

The pipeline would also be more difficult to access during maintenance.

Route 2 - Preferred Alternative:

This route follows existing farm roads from where the pipeline crosses into Farm Crammond, and follows the main access road of the farm (please refer to Figure 5 below).

This route was preferred as it will be easier to access for construction vehicles and equipment due to the lower dune system along this route. The pipeline will also be approximately 3.5km shorter, and therefore cheaper to construct.

It was also preferred as the potential for wind erosion of the dune during and post construction is expected to be lower. According to the Biodiversity Assessment (**Appendix D2**), the first section of the pipeline will be placed within the dune straatens (lower potential wind erosion factor). The remainder of the line will run crossways to the dune system, but will be placed in an area where the dunes are much lower and access much easier. Thus the potential for wind erosion will be much less than for route option 1 (alternative route). In addition, since this is the main access route any potential issues will be much easier observed.

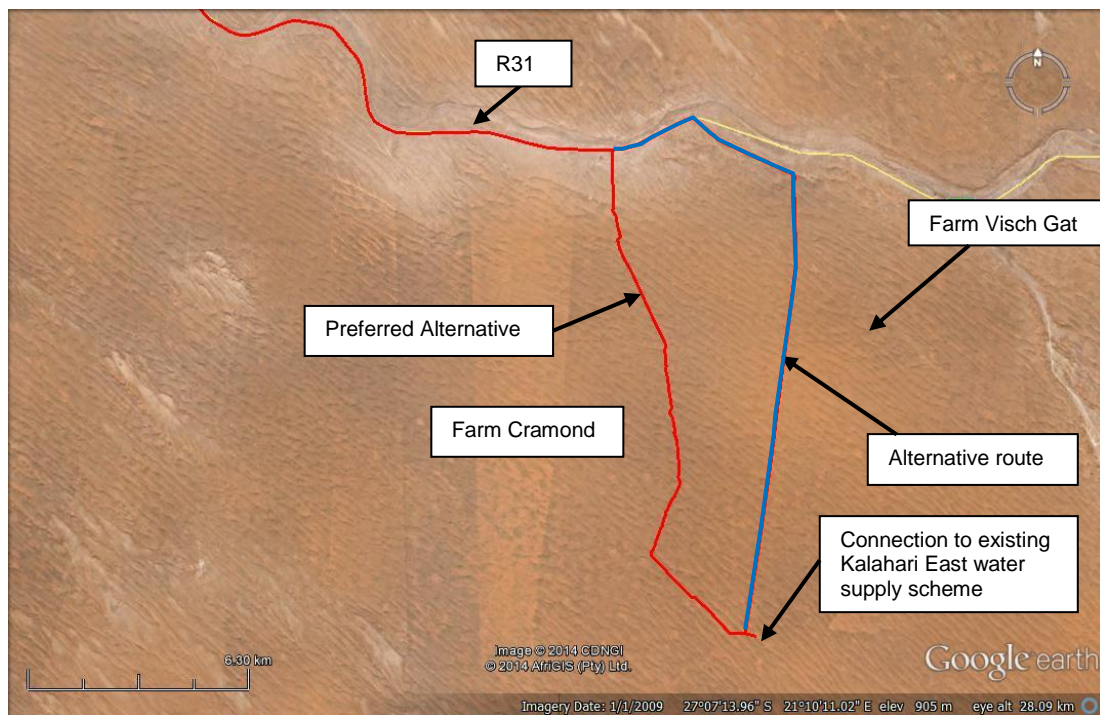


Figure 5: Google Earth view of the pipeline from the start (connection point with the existing Kalahari East Water supply scheme), along the R31 to Askham, showing the preferred route (red line) and the alternative route (blue line).

Different reservoir locations:

Various locations for the proposed reservoir were also considered. However, the position of the reservoir is determined by the elevation of the pipeline route. The reservoir needs to be constructed on the highest point to allow water to be fed back into the system (under gravity) when needed. If not, a pump station would be needed which would result in additional

operation and maintenance as well as electricity cost.

Therefore, the current reservoir location is the only viable alternative, as it is on the highest point available.

Boreholes:

Boreholes are an option to provide potable water. However, as per Section 4.6 of the Feasibility Study, the groundwater quality of the Mier area is very poor and only a small percentage of water is suitable for human consumption. The data also shows that the availability of the water is a major concern, with very low borehole yields being measured.

However, underground sources can be utilized as a permanent supplement to the pipeline during the summer. The only underground sources that can be utilized in terms of quality and quantity are located in the area of Rietfontein. This area is recharged on a regular basis. Boreholes currently utilized for water supply to all the towns in the Mier area and in Botswana can however be used as a replenishment to the Kalahari-East water supply. Mixing of the borehole water with Kalahari-East pipeline water during these months will increase the quality of the borehole water currently used. Water can even be mixed during colder months as well in order to save costs. This will ensure that underground water resources will be protected.

No – Go Alternative:

The no-go option would be the option of not constructing the pipeline. The current status quo will remain.

The socio-economic benefits of the proposed pipeline will therefore not be realized. This includes:

- More sustainable farming activities,
- Reducing the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.
- Provision of higher quality water to the towns and surrounding farm area
- Long term socio-economic sustainability, through tourism and jobs, as well as short term employment opportunities during the construction
- contribute to poverty reduction, increase levels of service, uplift and stimulate economic growth

According to the Biodiversity Assessment (**Appendix D2**), the “No-Go alternative” does not signify significant biodiversity gain or loss especially on a regional basis. However, it will ensure that none of the potential impacts above occur.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

List alternative sites if applicable. *N/A*

Alternative:

Alternative S1¹ (preferred or only site alternative) –

Reservoir site

Alternative S2 (if any)

Alternative S3 (if any)

In the case of linear activities:

Latitude (S):

Longitude (E):

26°	46' 39.50"	20°	21' 36.21"
°	'	°	'

¹ “Alternative S..” refer to site alternatives.

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Alternative:

Alternative S1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

27°	11' 25.12"	21°	13' 35.37"
26°	53' 48.96"	20°	35' 06.65"
26°	48' 36.01"	20°	05' 40.78"

Alternative S2 (if any)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

°	'	°	'
°	'	°	'
°	'	°	'

Alternative S3 (if any)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

°	'	°	'
°	'	°	'
°	'	°	'

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment. [Please refer to Appendix 1. Please note that due to the length of the pipeline and that majority of the pipeline being located within a road reserve, it was deemed unnecessary to give co-ordinates every 250m](#)

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:

Alternative A1² (preferred activity alternative)

Size of the activity:

Approximately 33 000m ² – earth reservoir
m ²

Alternative A2 (if any)

Alternative A3 (if any)

or, for linear activities:

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Length of the activity:

Approximately 161km

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the site/servitude:

m ²
m ²
m ²

5. SITE ACCESS

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

YES	

Describe the type of access road planned:

No access roads are planned. Existing farm roads will be used, and the pipeline will be constructed within the servitude of the R31, R360 and Namibiaweg Roads.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- 6.1 the scale of the plan which must be at least a scale of 1:500;
- 6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
- 6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;

² "Alternative A.." refer to activity, process, technology or other alternatives.

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- 6.4 the exact position of each element of the application as well as any other structures on the site;
- 6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 6.6 all trees and shrubs taller than 1.8 metres;
- 6.7 walls and fencing including details of the height and construction material;
- 6.8 servitudes indicating the purpose of the servitude;
- 6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers;
 - the 1:100 year flood line (where available or where it is required by DWA);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or invested with alien species);
- 6.9 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- 6.10 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form. It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

What is the expected yearly income that will be generated by or as a result of the activity?

Will the activity contribute to service infrastructure?

Is the activity a public amenity?

How many new employment opportunities will be created in the development phase of the activity?

What is the expected value of the employment opportunities during the development phase?

What percentage of this will accrue to previously disadvantaged individuals?

How many permanent new employment opportunities will be created during the operational phase of the activity?

What is the expected current value of the employment opportunities during the first 10 years?

What percentage of this will accrue to previously disadvantaged individuals?

	Approximately R125 000 000.00
	Unknown at this stage
	YES
	YES
	Approximately 98
	± R1,969,191.00 (local labour only)
	71%
	± 4
	Unknown at this stage
	Unknown at this stage

9(b) Need and desirability of the activity

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Motivate and explain the need and desirability of the activity (including demand for the activity):

The activity will provide additional potable water to the Mier area, including the towns of Askham, Loubos, Groot Mier, Rietfontein and Philandersbron, due to the difficulties in supplying sufficient potable water to these communities and for livestock.

The activity will also lead to more sustainable farming activities, and reduce the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.

The activity will also provide higher quality water to the towns and surrounding farm area.

Indicate any benefits that the activity will have for society in general:

The overall purpose of the application is to provide more potable water to the Mier area community and for livestock.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The activity will provide additional potable water to the Mier area, including the towns of Askham, Loubos, Groot Mier, Rietfontein and Philandersbron.

The activity will lead to more sustainable farming activities, and reduce the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.

The activity will also provide higher quality water to the towns and surrounding farm area.

The activity would also lead to long term socio-economic sustainability, through tourism and jobs, as well as short term employment opportunities during the construction phase.

DESIRABILITY:

1.	Does the proposed land use / development fit the surrounding area?	YES	
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES	
4.	<p>If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:</p> <p>N/A. However, it must be noted that according to the Implementation Ready Study (Appendix D4), the project is aligned to the priorities set in the municipalities Integrated Development Plan (IDP). The proposed development is set to support potable water to Haaksteen Pan ahead of the events associated with the Bloodhound Project world record land speed breaking attempt in 2015. So far, 300 people from local communities have been employed to clear the strip of stones and similar debris. This stone clearing project is nearing completion now and the expected handover of the Pan to the Bloodhound Project is due in September 2014. Thereafter, these individuals will be trained in the hospitality industry, by the Northern Cape government, to cater for the influx of tourists for the record attempt.</p> <p>According to the Implementation Ready Study (Appendix D4), a bulk infrastructure project must be aligned with and listed in the Integrated Development Plans (IDP) and Water Services Development Plans (WSDP) of the participating municipalities. The</p>		

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	number one development objective of the Mier Municipality's IDP of 2013-2014 and 2014-2015 is water. Water, sanitation and housing objectives of the IDP states that water supply is a number one objective of the municipality and the priority project is the Phase 1 feasibility study of the Kalahari East pipeline that needs to be completed by June 2015.		
5.	Will the proposed land use / development impact on the sense of place?	<input type="checkbox"/>	NO
6.	Will the proposed land use / development set a precedent?	<input checked="" type="checkbox"/>	YES
7.	Will any person's rights be affected by the proposed land use / development?	<input type="checkbox"/>	NO
8.	Will the proposed land use / development compromise the "urban edge"?	<input type="checkbox"/>	NO
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		
	The development can be considered to set a precedent as this Application is for Phase 1 of the extension of the Kalahari East Water Supply Scheme. Future phases will provide water to farming areas to the north of the Mier area.		

BENEFITS:

1.	Will the land use / development have any benefits for society in general?	<input checked="" type="checkbox"/>	YES
2.	<p>Explain: The activity will provide additional potable water to the Mier area, including the towns of Askham, Loubos, Groot Mier, Rietfontein and Philandersbron.</p> <p>The activity will lead to more sustainable farming activities, and reduce the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.</p> <p>The activity will also provide higher quality water to the towns and surrounding farm area. According to the Feasibility Study (Appendix D1), the ground water quality in the Mier area is very poor, and has some of the poorest water quality in South Africa.</p> <p>The activity would also lead to long term socio-economic sustainability, through tourism and jobs, as well as short term employment opportunities during the construction phase.</p> <p>According to the Implementation Ready Study (Appendix D4), backlogs in basic services are reliant on bulk water services provision. Housing developments in Mier, to cater for those living in informal dwellings, requires at least a basic level of water services. Although there are no households without a basic water service, should the municipality consider providing waterborne sanitation, extra water will be required by these households. Potability issues will be addressed by the project.</p> <p>This project will contribute to poverty reduction, increase levels of service, uplift and stimulate economic growth because it will have a significant stimulus on:</p> <ul style="list-style-type: none"> - The Water services providers business - Socio-economic benefits resulting from a quality water services and waste water quality that is compliant to standards. - Construction with impacts on spending, employment, and taxes and in its operational phase where there are multiplier effects <p>Large infrastructure projects are seen as generating significant benefits for local communities in terms of increased employment and expenditure within the region. The proposed project presents opportunities for low and semi-skilled local labour during construction. Such increasing employment, combined with increased income,</p>		

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	<p>will positively affect the local economy and have an effect on reducing poverty. Buying power in the area will be increased, and thus there will be the opportunity for new business establishments, which in turn will create more jobs.</p> <p>The proposed development is also required to improve the water service quality, which has a direct impact on the health of a population. Unsafe water supply causes childhood diarrheal diseases, which is a preventable cause of under-five mortality.</p>			
3.	<table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">Will the land use / development have any benefits for the local communities where it will be located?</td> <td style="width: 10%; text-align: center;">YES</td> <td style="width: 10%;"></td> </tr> </table>	Will the land use / development have any benefits for the local communities where it will be located?	YES	
Will the land use / development have any benefits for the local communities where it will be located?	YES			
4.	<p>Explain: The activity will provide additional potable water to the Mier area, including the towns of Askham, Loubos, Groot Mier, Rietfontein and Philandersbron.</p> <p>The activity will also lead to more sustainable farming activities, and reduce the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.</p> <p>The activity will also provide higher quality water to the towns and surrounding farm area.</p> <p>The activity would also lead to long term socio-economic sustainability, through tourism and jobs, as well as short term employment opportunities during the construction phase.</p> <p>According to the Implementation Ready Study (Appendix D4), nearly 54% of households in the Mier area are considered indigent households, which qualify for free water (6kl per month)</p>			

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
The National Heritage Resources Act, 1999 (Act 25 of 1999)	SAHRA – Northern Cape	Application to be submitted
National Water Act, 1998 (Act 36 of 1998)	Department of Water Affairs – Northern Cape	Application to be submitted
National Forests Act, 1998 (Act 84 of 1998) (as amended)	Department of Agriculture, Forestry and Fisheries – Northern Cape	Application to be submitted
Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009):	Department of Agriculture, Forestry and Fisheries – Northern Cape	Application to be submitted

BASIC ASSESSMENT REPORT

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?
If yes, what estimated quantity will be produced per month?

YES	<input type="checkbox"/>
Unknown at this stage	<input checked="" type="checkbox"/>

How will the construction solid waste be disposed of (describe)?

Construction solid waste will be disposed of at the nearest municipal landfill site.

Where will the construction solid waste be disposed of (describe)?

Construction waste will be consolidated on site and removed to the nearest registered landfill site as often as required.

Will the activity produce solid waste during its operational phase?
If yes, what estimated quantity will be produced per month?

<input type="checkbox"/>	NO
<input type="checkbox"/>	

How will the solid waste be disposed of (describe)?

Solid waste removal will be disposed of in the municipal waste stream.

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

<input type="checkbox"/>	NO
--------------------------	----

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

<input type="checkbox"/>	NO
--------------------------	----

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

<input type="checkbox"/>	NO
--------------------------	----

If yes, what estimated quantity will be produced per month?

N/A	
-----	--

Will the activity produce any effluent that will be treated and/or disposed of on site?

<input type="checkbox"/>	NO
--------------------------	----

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

<input type="checkbox"/>	NO
--------------------------	----

If yes, provide the particulars of the facility:

Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

BASIC ASSESSMENT REPORT

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

	NO
YES	NO

If yes, is it controlled by any legislation of any sphere of government? **N/A**

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

N/A

11(d) Generation of noise

Will the activity generate noise?

	NO
YES	NO

If yes, is it controlled by any legislation of any sphere of government? **N/A**

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

N/A

12. WATER USE

N/A. The activity is the expansion of a bulk water supply pipeline and reservoir to provide potable water to the Mier area.

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

municipal	water board	groundwater	river, stream, dam or lake	other	the activity will not use water
-----------	-------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: **N/A**

litres	
	NO

Does the activity require a water use permit from the Department of Water Affairs?

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The proposed reservoir will be located on the highest point to allow water to be fed back into the system (under gravity) when needed, avoiding the need to construct and additional pump station which would result in additional operation and maintenance as well as electricity cost.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A

SECTION B : SITE/AREA/PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Due to the length of the pipeline, the below site descriptions will be for various sections of the pipeline route, as follows.

- Copy A – General site (entire pipeline route)
- Copy B – Section between the connection point and the R31 through farm Crammond
- Copy C – Section along the R31 from Farm Crammond to Andriesvale
- Copy D – Section between Andriesvale and Haakskeen Pan
- Copy E – The proposed reservoir site
- Copy F – Section between Haakskeen Pan and Philandersbron, including pipeline to Loubos

Section B Copy No. (e.g. A): A - Entire area

- Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**
- Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills -
- 2.8 Dune
- 2.9 Seafront

BASIC ASSESSMENT REPORT

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	NO	YES	NO	YES	NO
An area sensitive to erosion	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site: **The proposed pipeline will mostly follow existing road reserves. However, where the pipeline is outside the road reserve and crosses private property (from the connection with the existing line to the R31) the groundcover is considered 4.1 – Natural veld with scattered aliens**

- 4.1 Natural veld – good condition^E
- 4.2 Natural veld – scattered aliens^E
- 4.3 Natural veld with heavy alien infestation^E
- 4.4 Veld dominated by alien species^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). **Please refer to Table 4 and 5, and Section 5.10.1 of the Biodiversity Assessment (Appendix D2).**

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “^E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

According to the Biodiversity Assessment (**Appendix D2**), the almost 170 km of proposed pipeline will span two Biomes, most of which falls within the Savanna Biome (Kalahari Duneveld Bioregion), but the last portion of the pipeline near Rietfontein will also cross vegetation belonging to the Nama-Karoo Biome. Apart from the vegetation associated with these major biomes, the pipeline will also cross or intersect Inland Azonal Vegetation (along the Kuruman River). Azonal Vegetation is described by Mucina *et al* 2006 as locations where special substrate (e.g. special soil types or bedrock) and/or hydrogeological conditions (e.g. waterlogging, flooding) exert an overriding influence on floristic composition, structure and dynamics over macroclimate (e.g. riparian vegetation along river courses).

The Savanna Biome is the most widespread Biome in Africa and also occupies most of the far-northern part of the Northern Cape, including the Kalahari Duneveld. According to Rutherford *et al.* (2006), the Savanna in South Africa has a low species to area ratio, and become even lower in the southern Kalahari part of the biome (with a sharply decreasing diversity of trees from east to west). On the other hand, Savanna is well known for its diversity of mammals. Similarly Nama-Karoo flora is also not particularly species rich with very low local endemism, which might indicate a relatively youthful biome linked to the remarkable geological and environmental homogeneity of the Nama-Karoo (Mucina *et al.* 2006a). Rainfall seasonality and frequency are too unpredictable and winter temperatures too low to enable leaf succulents to dominate (like in the Succulent Karoo), while summers are too dry for dominance by perennial grasses alone, and the soils are generally too shallow and rainfall too low for trees.

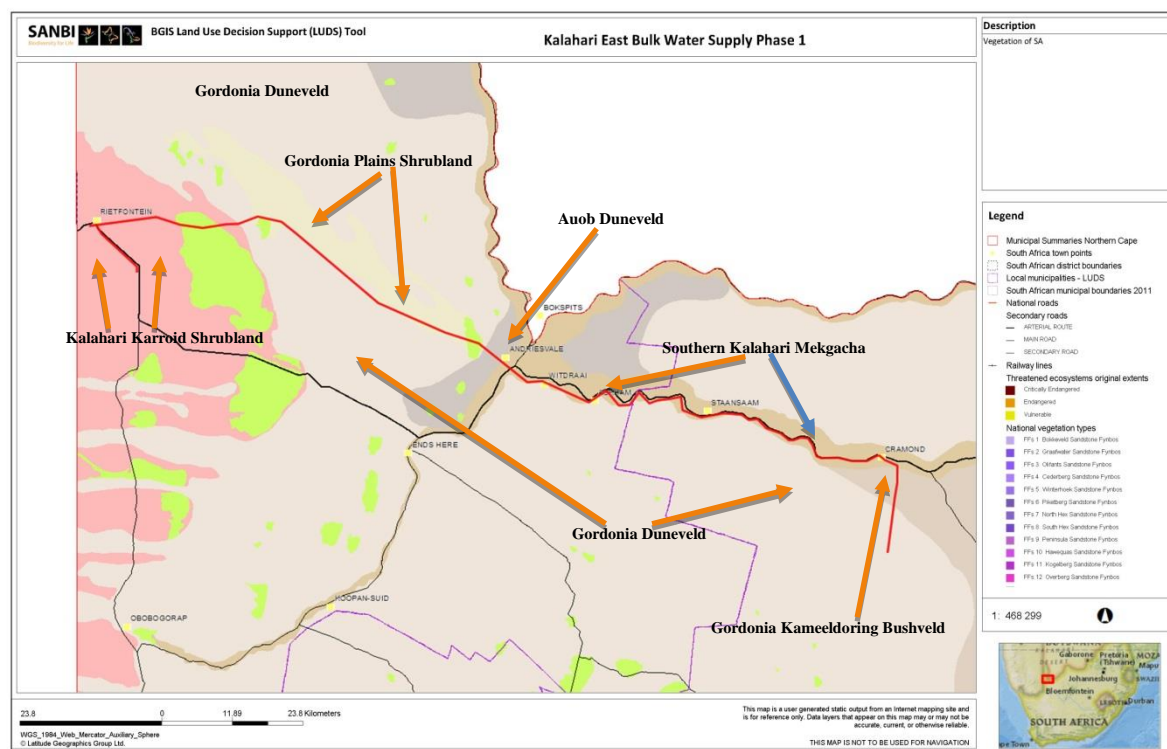


Figure 6: Vegetation map of SA, Lesotho and Swaziland (2006).

According to the Vegetation Map of South Africa (Mucina & Rutherford, 2006) four vegetation types within the Savanna Biome might be encountered along the pipeline route namely: Gordonia Duneveld, Gordonia Kameeldoring Bushveld, Auob Duneveld and Gordonia Plains Shrubland. Kalahari Karroid Shrubland (part of the Nama-Karoo Biome) is expected in the vicinity and surroundings of Rietfontein, while Southern Kalahari Mekgacha (part of the Azonal Vegetation) is expected along the Kuruman- and Molopo Rivers and Southern Kalahari Salt Pans were also encountered. The conservation status of each vegetation type according to the 2004 National Spatial Biodiversity Assessment and the 2011 National Spatial Assessment or National List of Threatened Ecosystems (GN 1002, December 2011) is Least Threatened. Please refer to Section 5.6 and Table 2 of the Biodiversity Assessment (**Appendix D2**) for more details.

No species of conservation concern was recorded in terms of the latest Red List of species for South Africa.

Three (3) species protected in terms of the National Forests Act (NFA) of 1998 (Act 84 of 1998) were encountered namely: *Acacia erioloba*, *Acacia haematoxylon* and *Boscia albitrunca*. Please refer to **Appendix G** for a list of trees and their co-ordinates that may require removal.

The proposed pipeline route will follow the dry riverbed of the Kuruman River from Farm Cramond to Andriesvale where it connects with the Molopo River. Near Andriesvale the route will also cross the dry riverbed of the Molopo River. It will also cross two Southern Kalahari Salt pans namely the Kooipan and Hakskeenpan as well as numerous ephemeral and also seasonal streams which drains the Mier, Rietfontein and Philandersbron area into the Hakskeenpan. However, the route will follow the existing R31 within the road reserve, an area already subjected to disturbance. The temporary nature of the construction phase should not add significantly to the impact on any of these streams in the long run, provided that the construction is done responsibly and with good environmental control. The route should have little impact on the Kuruman River as it will mostly run to the south of the already disturbed R31 corridor (away from the Kuruman River).

The Molopo crossing will also follow the existing road reserve as will all other ephemeral and stream crossings. In the vicinity of Mier the route will cross a number of small streams or ephemeral drainage lines, all of which drains the Mier area towards Hakskeenpan. Some of these streams are delineated by well-established riparian vegetation. However, this riparian vegetation is in most cases already disturbed within the road reserve. The same is true for the streams and ephemeral drainage lines found in the vicinity of Rietfontein and Philandersbron.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture – (game farms)
- 5.34 River, stream or wetland –
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site

BASIC ASSESSMENT REPORT

5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "A" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?

Uncertain

If YES, explain:

Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

According to Heritage Impact Assessment (**Appendix D3**), the following observations were made:

- A handful of Middle Stone Age (MSA) tools (mainly flakes & chunks) were found in a severely disturbed area between the existing concrete reservoir at Philandersbron and the Namibia Road, at the southern entrance to the town.
- A small number of MSA implements were encountered in the road reserve (NR) between Philandersbron and Rietfontein.
- Several MSA flakes were recorded on eroded gravels outside the road reserve (NR) near the entrance to the town of Rietfontein.
- A few MSA flakes and chunks were found near the intersection of the NR and the R360.
- A few MSA tools were recorded on an artificially raised gravel ridge in the road reserve (R360) between Rietfontein and Askham.
- A Christian grave/burial was documented in the road reserve (R360) near Andriesvale/Askham. Burials have a high local significance and are protected under Section 36 of the National Heritage Resources Act (Act No. 25 of 1999).
- A flaked chunk/minimal core was found in the road reserve (R31) between Askham and Crammond.
- No rock engravings were found alongside the road where several outcroppings of dolerite in the road reserve (R360) near Klein Mier were noted.
- No archaeological remains were encountered in the footprint area for the proposed earth dam/reservoir near Haksteenpan.
- Relatively large numbers of *in-situ* Early (ESA) and Middle Stone Age tools were recorded on extensive gravel deposits alongside the proposed Loubos pipeline. A few Later Stone Age flakes were also counted. No organic remains such as pottery or ostrich eggshell was found.

The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline have been rated as having moderate to high (3B) local significance.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline are threatened by construction activities. Measures must be implemented to avoid, and not damage or disturb these potentially significant (Grade 3B) archaeological remains.

The grave alongside the road (R360) near Andriesvale is protected under Section 36 of the National Heritage Resources Act (NHRA), and has been rated as having high local significance.

BASIC ASSESSMENT REPORT

Recommendations:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- With regard to the proposed Loubos pipeline, construction of the pipeline must not extend beyond 3 m from the fence line, as this will impact negatively on potentially significant (Grade 3B) archaeological heritage.
- The Environmental Control Officer (ECO) must ensure that no plant equipment, water pipes, or any infrastructure associated with the project (for example portable toilets, diesel, cement, & tools), are stored, mixed or located on the gravels between the fence and the access road. A single, suitable, already disturbed, area should be identified by the ECO prior to the project commencing, where infrastructure can be safely stored.
- Any sand or material required for backfilling and compaction must not be stockpiled on the gravels between the access road and the fence. A suitable area should be identified by the ECO prior to the project commencing.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The grave in the R360 road reserve near Andriesvale/Askham must be avoided during construction of the pipeline. The grave must be taped off and clearly demarcated prior to construction work commencing, and should not be disturbed in any way. The Environmental Control Officer must be responsible for ensuring the grave is protected during the entire construction phase of the project.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

	NO
YES	

BASIC ASSESSMENT REPORT

Section B Copy No. (e.g. A): B

4. Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**

5. Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)		NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas		NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)		NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)		NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		NO	YES	NO	YES	NO
Any other unstable soil or geological feature		NO	YES	NO	YES	NO
An area sensitive to erosion		NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

- 4.1 Natural veld – good condition ^E
- 4.2 Natural veld – scattered aliens ^E
- 4.3 Natural veld with heavy alien infestation ^E
- 4.4 Veld dominated by alien species ^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). Please refer to Table 4 and 5 of the Biodiversity Assessment (**Appendix D2**).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

According to the Biodiversity Assessment (**Appendix D2**), the farm Cramond was characterised by continuous linear dunes and inter dune straaten, which give way to the dry Kuruman riverbed next to the R31. Originally it was proposed that the route will follow the eastern fence of the farm Cramond, right next to an existing twee-spoor track (Route option 1 – Alternative route)(please refer to Section A.2 and Figure 5 above). This route will have difficulties in that it will run over the crests of numerous high dunes (4x4 vehicle access only) which will also be prone to wind erosion should adequate rehabilitation and protective measures not be implemented. No new roads will have to be established, but the existing roads will have to be enlarged / formalised in order to accommodate construction vehicle access. It is also likely that some *Acacia haematoxylon* and possibly some *Boscia* individuals may be impacted by the proposed route (even though slight route alterations will enable the protection of the major portion of these protected trees).

Because of the anticipated difficulty with vehicle access as well as the significant wind erosion potential a second route option (Route option 2 – Preferred Alternative) was proposed by the engineers in consultation with the land owners. Route 2 will follow the main access road on the farm, which is established in an area where the dunes are lower (much easier access) and will also follow the interdune straaten where-ever possible (which will have a positive impact on wind erosion protection). Erosion protection along this route should be easier to implement and access will be much easier (minimising the need for heavy specialised 4 x 4 construction vehicles and should result in a much lower impact).



Figure 7: Typical view of the section along the main access road of Farm Cramond. The pipeline will follow the existing farm roads as far as possible.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture – (game farm)
- 5.34 River, stream or wetland
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge

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- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "A" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? Uncertain

If YES, explain: Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

No archaeological findings on Farm Crammond.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

Recommendations:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

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Will any building or structure older than 60 years be affected in any way?
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999
(Act 25 of 1999)?

	NO
YES	

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

BASIC ASSESSMENT REPORT

Section B Copy No. (e.g. A): C

6. Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**

7. Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO	YES NO	YES NO
Dolomite, sinkhole or doline areas	NO	YES NO	YES NO
Seasonally wet soils (often close to water bodies)	NO	YES NO	YES NO
Unstable rocky slopes or steep slopes with loose soil	NO	YES NO	YES NO
Dispersive soils (soils that dissolve in water)	NO	YES NO	YES NO
Soils with high clay content (clay fraction more than 40%)	NO	YES NO	YES NO
Any other unstable soil or geological feature	NO	YES NO	YES NO
An area sensitive to erosion	NO	YES NO	YES NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUND COVER

Indicate the types of groundcover present on the site: The proposed pipeline will mostly follow existing road reserves. However, where the pipeline is outside the road reserve and crosses private property (from the connection with the existing line to the R31) the groundcover is considered 4.1 – Natural veld in good condition.

- 4.1 Natural veld – good condition ^E
- 4.2 Natural veld – scattered aliens ^E
- 4.3 Natural veld with heavy alien infestation ^E
- 4.4 Veld dominated by alien species ^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). Please refer to Table 4 and 5, and Section 5.10.1 of the Biodiversity Assessment (Appendix D2).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

According to the Biodiversity Assessment (Appendix D2), Camelthorn trees (*Acacia erioloba*) are particularly common and even dominant in this portion of the route. False Camel Thorns (*Acacia haematoxylon*) and Shepherds Tree/ Witgat (*Boscia albitrunca*) were also relatively commonly encountered within this section. The vegetation along the road reserve conforms to typical Southern Kalahari Mekgacha, dominated by *Acacia erioloba* and dry grasses with low shrubs also common. The vegetation had been subjected to disturbance as a result of continual impact (works along the route) and the imported road material used for hardening the roads surface (mostly calcrete mixtures).

Of special concern along this portion of the proposed pipeline route, however, is the presence of a great number of *Acacia erioloba* as well the occasional *Acacia haematoxylon* and *Boscia* individuals along this almost 70 km portion of the route.

From Farm Cramond the pipeline route will follow the road reserve of the R31. However, the R31 does not follow the middle of the road reserve in all instances, the southern reserve being mostly wider of at least as wide as the northern road reserve, but at bends in the road, the southern road reserve was sometimes relegated to a very narrow strip, while the northern boundary then becomes much wider.

The proposed pipeline route will follow the southern road reserve wherever possible, which will place the pipeline away from the Kuruman River corridor and which for the most part was also the broader road reserve. However, it was also proposed that in areas where the southern road reserve are too narrow or too congested (protected species) the pipeline route may jump the R31 to follow the northern boundary for short stretches. Two such crossing will be necessitated as a result of very narrow southern boundaries.

Within the first 10 – 15 km section from Cramond to Askham the vegetation is more open with large trees less common. Further along the route towards Askham, Camelthorn becomes much more common, also within the road reserve, sometimes forming clusters of young trees or individual large trees. Shepard’s trees were also frequently encountered, while False

Camelthorn seems to be more frequent towards the east of the pipeline route.

According to the Biodiversity Assessment (**Appendix D2**), most of the indigenous trees (90-95%) that might be impacted by the proposed route can be protected by small route adjustments within the road reserve. In some instances there is no alternative except re-directing the route either to private property (adjacent to the road reserve) or by jumping the road. The number of road crossing would be limited as it may lead to higher installation costs (longer length) but especially maintenance costs (as a result of number of bends – which are also normally a weak point). However, where limiting factors necessitate such crossings it will be entertained.

From Askham towards Andriesvale (14 km), Camelthorn trees are still numerous in portions, but should be more easily averted. A few individuals of the alien *Prosopis* tree were also encountered along this section.



Figure 8: General view of the section of R31 between Farm Cramond and Askham looking east. The proposed pipeline will mostly be constructed on the southern side of the road. Most of the Camelthorn trees can be avoided by minor route deviations around the trees, or crossing the road.



Figure 9. View of the southern side of the R31 road reserve looking east.

7. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture – (game farm)
- 5.34 River, stream or wetland –
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum

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- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe) – [Tourist lodging](#)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "AN" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	The proposed pipeline will have no direct impact on the filing station in Askham
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6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?

Uncertain

If YES, explain:

Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

<p>According to Heritage Impact Assessment (Appendix D3), the following observations were made:</p> <ul style="list-style-type: none"> - A flaked chunk/minimal core was found in the road reserve (R31) between Askham and Crammond. <p>The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.</p> <p>The Heritage Impact Assessment (Appendix D3) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.</p> <p>Recommendations:</p> <p>With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:</p> <ul style="list-style-type: none"> - With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context. - No archaeological remains may be removed, damaged or disturbed as
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this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).

- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

	NO
YES	

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Section B Copy No. (e.g. A): D

8. Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**

9. Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills -
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO	YES NO	YES NO
Dolomite, sinkhole or doline areas	NO	YES NO	YES NO
Seasonally wet soils (often close to water bodies)	NO	YES NO	YES NO
Unstable rocky slopes or steep slopes with loose soil	NO	YES NO	YES NO
Dispersive soils (soils that dissolve in water)	NO	YES NO	YES NO
Soils with high clay content (clay fraction more than 40%)	NO	YES NO	YES NO
Any other unstable soil or geological feature	NO	YES NO	YES NO
An area sensitive to erosion	NO	YES NO	YES NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site: The proposed pipeline will be located within the existing road reserve of the R31. The groundcover is considered 4.1 – Natural veld with scattered aliens.

- 4.1 Natural veld – good condition^E
- 4.2 Natural veld – scattered aliens^E
- 4.3 Natural veld with heavy alien infestation^E
- 4.4 Veld dominated by alien species^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). Please refer to Table 4 and 5, and Section 5.10.1 of the Biodiversity Assessment (Appendix D2).

Natural veld – good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

According to the Biodiversity Assessment (Appendix D2), the vegetation changes from Southern Kalahari Mkgacha to Auob Duneveld, then the dry Southern Kalahari Salt Pans (Koopan), from Koopan the vegetation are mostly Gordonia Plains Shrubland up to Groot- en Klein Mier. The vegetation then reverts back to Gordonia Duneveld, before entering Kalahari Karroid Shrubland just before Hakskeenpan and Southern Kalahari Salt Pans encountered at Hakskeenpan.

The occurrence of larger trees and especially protected trees decreases dramatically, although *Acacia erioloba*, *A. haematoxylon*, *Boscia albitrunca* and *B. foetida* are still found along the proposed route. However, in most cases it will be relatively easy to negate impact to any of the indigenous trees encountered along the route by slight alterations during construction. Between Andriesvale and Koopan very few protected trees were encountered, all of which should be easy to avoid through small route alterations where required.

Plant species encountered within the Auob Duneveld included scattered individuals of *Acacia haematoxylon* and *A. mellifera*. After the recent good rains the vegetation was dominated by grass species with *Rhigozum trichotomum* prominent, while scattered individuals of *Acacia erioloba* and *Boscia albitrunca* was also present (but rarely close to the proposed footprint). The road reserve remains impacted as a result of the imported material used for road building (calcrete). Other species includes *Hermannia tomentosa* and *Hirpicium gazanioides*.

Koopan was characterised by the almost lack of plant species. Grasses are found along the road verges with a few Aizoaceae and Mesembryanthemum species also associated therewith. *Salsola* species as well as the herbs *Hirpicium gazanioides* were encountered.

From Koopan to just east of Mier the vegetation reverts to open grassland plains with the occasional tree and shrubs. Scattered individuals of *Acacia haematoxylon*, *A. erioloba* and *Boscia* were encountered.

As one closes on Mier, *Boscia albitrunca*, *B. foetida*, *Acacia erioloba* and *A. haematoxylon* again becomes more prominent, especially in the vicinity of the rocky outcrops (near Mier) and watercourses. The alien *Prosopis* tree was also occasionally found near watercourses.

Just before Hakskeenpan the road cuts through larger dunes, which will hamper the construction footprint. In this section a few *Acacia haematoxylon* and *Acacia erioloba* was encountered which might prove to be difficult to avoid.

At Hakskeenpan the vegetation was again almost only associated with the disturbed road verge which included Aizoaceae and Mesembryanthemum as well as Tetragonia, Salsola and some grass species.

No protected tree species were encountered within any of the dry salt pan areas. Please refer to section 5.8.3 of the Biodiversity Assessment (**Appendix D2**), for other plant species found on this section of the pipeline route.



Figure 10: R31 crossing Koopan



Figure 11. Southern part of R31 road reserve near Groot Mier.



Figure 12: R31 near Klein Mier.



Figure 13: R31 crossing Haakskeen Pan

8. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A

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- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture –
- 5.34 River, stream or wetland –
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "AN" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?

Uncertain

If YES, explain:

Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

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Briefly explain the findings of the specialist:

According to Heritage Impact Assessment (**Appendix D3**), the following observations were made:

- A few MSA tools were recorded on an artificially raised gravel ridge in the road reserve (R360) between Rietfontein and Askham.
- A Christian grave/burial was documented in the road reserve (R360) near Andriesvale/Askham. Burials have a high local significance and are protected under Section 36 of the National Heritage Resources Act (Act No. 25 of 1999).
- No rock engravings were found alongside the road where several outcroppings of dolerite in the road reserve (R360) near Klein Mier were noted.

The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

The grave alongside the road (R360) near Andriesvale is protected under Section 36 of the National Heritage Resources Act (NHRA), and has been rated as having high local significance.

Recommendations:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The grave in the R360 road reserve near Andriesvale/Askham must be avoided during construction of the pipeline. The grave must be taped off and clearly demarcated prior to construction work commencing, and should not be disturbed in any way. The Environmental Control Officer must be responsible for ensuring the grave is protected during the entire construction phase of the project.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Will any building or structure older than 60 years be affected in any way?
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

	NO
YES	

BASIC ASSESSMENT REPORT

Section B Copy No. (e.g. A): E

10. Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**

11. Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain

- 2.7 Undulating plain / low hills -

- 2.8 Dune

- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO	YES NO	YES NO
Dolomite, sinkhole or doline areas	NO	YES NO	YES NO
Seasonally wet soils (often close to water bodies)	NO	YES NO	YES NO
Unstable rocky slopes or steep slopes with loose soil	NO	YES NO	YES NO
Dispersive soils (soils that dissolve in water)	NO	YES NO	YES NO
Soils with high clay content (clay fraction more than 40%)	NO	YES NO	YES NO
Any other unstable soil or geological feature	NO	YES NO	YES NO
An area sensitive to erosion	NO	YES NO	YES NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

- 4.1 Natural veld – good condition^E
- 4.2 Natural veld – scattered aliens^E
- 4.3 Natural veld with heavy alien infestation^E
- 4.4 Veld dominated by alien species^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). Please refer to Table 4 and 5, and Section 5.10.1 of the Biodiversity Assessment (Appendix D2).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

According to the Biodiversity Assessment (Appendix D2), the location was chosen to coincide with the highest elevation along the pipeline (which was encountered just east of Mier) which will enable gravity feed to the remaining the downstream towns and farms. The vegetation on the proposed reservoir site conformed to *Gordonia duneveld* dominated by *Acacia mellifera*, *Rhigozum trichotomum*, *Parkinsonia africana* and *Lycium cf. bosciifolium* with a number of grass species also prominent. The main feature of note was the presence of large number of *Boscia foetida* (protected in terms of the NCNCA). A few individuals of *Boscia albitrunca* and *Acacia erioloba* was also encountered (protected in terms of the National Forest Act). What was also very interesting is the size of the *Boscia foetida* individuals encountered (with quite a number of them reaching well over 2 meters in height).

Just over 60 protected tree species were encountered in the immediate vicinity of the proposed reservoir site. The surrounding areas where also investigated in order to see if a slight layout change may result in better protection of tree species. Of the 62 trees encountered, 24 will be or are likely to be impacted by the current proposed site location. The following is a summary of the findings:

- Although a number of *Boscia albitrunca* trees were encountered, only 1 of them will be impacted by the proposed layout (while the remainder where encountered to the east of the current site location).
- Most of the *Acacia erioloba* trees encountered will not be impacted (located to the south of the dune which will be retained in order to visually screen the reservoir from the R31). In addition, only one of the *Acacia erioloba* trees is in close proximity of the actual reservoir location. However, a number of these trees might be impacted in the adjoining area that will be utilised for the cut and fill action. However, it is the opinion of the author that almost all *Acacia erioloba* trees can be protected through good environmental control during construction.
- Potentially approximately 30 *Boscia foetida* individuals (some of them magnificent specimen) may be impacted by the proposed construction. At present 14 *Boscia foetida* individuals will be impacted by the actual reservoir location (the remainder falling within the associated cut and fill area). In addition a great number of the larger trees could also be saved through good environmental control and protection during the construction period (by working around as many of the trees as possible).

Please refer to Table 4 of the Biodiversity Assessment (**Appendix D2**), for a list and location of protected tree species at the reservoir site



Figure 14: General view of the reservoir site.

9. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities

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- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture – (game farms)
- 5.34 River, stream or wetland –
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "AN" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?

Uncertain

If YES, explain:

Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

BASIC ASSESSMENT REPORT

Briefly explain the findings of the specialist:

According to Heritage Impact Assessment (**Appendix D3**), the following observations were made:

- No archaeological remains were encountered in the footprint area for the proposed earth dam/reservoir near Haksteenpan.

The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

Recommendations:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

	NO
YES	

BASIC ASSESSMENT REPORT

Section B Copy No. (e.g. A): F

12. Paragraphs 1 - 6 below must be completed for each alternative. **Paragraphs 1 - 6 will only be for the Preferred Alternative described below as this is the only viable option**

13. Has a specialist been consulted to assist with the completion of this section? YES XXXXXXXXXX

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills -
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)		NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas		NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)		NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)		NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		NO	YES	NO	YES	NO
Any other unstable soil or geological feature		NO	YES	NO	YES	NO
An area sensitive to erosion		NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site: [The proposed pipeline will mostly follow existing road reserves.](#)

- 4.1 Natural veld – good condition^E
- 4.2 Natural veld – scattered aliens^E
- 4.3 Natural veld with heavy alien infestation^E
- 4.4 Veld dominated by alien species^E
- 4.5 Gardens
- 4.6 Sport field
- 4.7 Cultivated land
- 4.8 Paved surface
- 4.9 Building or other structure
- 4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s). [Please refer to Table 4 and 5, and Section 5.10.1 of the Biodiversity Assessment \(Appendix D2\).](#)

Natural veld – good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an ^E is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

[According to the Biodiversity Assessment \(Appendix D2\), the vegetation encountered from Hakskeenpan to Philandersbron differs slightly in that it becomes Kalahari Karroid Shrubland. The route will remain within the disturbed road reserve \(lower impact\) but will cross a number of water courses in the vicinity of Rietfontein and Philandersbron.](#)

[The vegetation between Hakskeenpan and Philandersbron can be described as a low karroid shrubland on flat, gravel plains a transition from Karroo vegetation to the Kalahari region's sandy soils. Although trees were not common, *Acacia mellifera*, *Parkinsonia africana* and *Boscia foetida* were occasionally encountered. Taller shrubs like *Rhigozum trichotomum* are more common.](#)

[Between Hakskeenpan and Rietfontein the vegetation showed an open shrubland \(with grasses dominant due to recent good rains\). Very few protected tree species were encountered and the route should have little additional impact on the already relatively disturbed vegetation within the road reserve. A single individual of the alien invasive plant *Calotropis procera* was encountered. This was the first observation of this alien plant in the Northern Cape Province which up to now was only known in the Limpopo area \(Blouberg – Mapungupwe – Messina and Letaba Dam areas\). The presence of this plant was reported to the ARC-Plant Protection Research Institute and will be removed by the alien invader response team.](#)

[The section of pipeline between the main line and Loubos runs just west of the boundary of Portion 104 of the Farm Mier No. 585 on Municipal property. It follows the boundary between the farms, next to an existing road, till almost due south of Loubos from where it turns north, crosses the seasonal Swartbas River/Stream and then follows just east of a seasonal drainage area, crossing the minor gravel road leading to Loubos, towards the existing Loubos Reservoir. Note that the route is based on the route followed by the Eskom power lines supplying Loubos. From the R31 up to where it crosses the Swartbas River the vegetation is typically Kalahari Karroid Shrubland with species similar than that described in the previous section. The only botanical feature of interest was the presence of a few individuals of the NCNCA protected *Aloe hereroensis*, encountered along the ridges of the slight koppie over which the pipeline is routed, next to the R31. It is highly unlikely that construction will impact](#)

on these *Aloe* individuals.

Crossing the Swartbas River the pipeline will again follow just west of the existing power line. In this section the main botanical/biodiversity feature of significance is the Swartbas River and the fact that the riparian zone as well seasonal drainage area to the north of the Katnael dam is densely infested by the alien invader, *Prosopis*. When crossing the Swartbas River the same care will have to be taken as with all river crossings along the route. However, because it is seasonal the river crossing can be done with minimum long term impact so long as it is done with good environmental control.

Just south of Rietfontein the R31 cross a salty marsh area as well as two larger seasonal streams, which eventually flow towards Hakskeenpan. As expected the marshy area as well as the riparian vegetation showed a markedly different species composition from that of the surrounding karroid vegetation.

The following species were encountered in association within the marshy area just south of Rietfontein: *Tetragonia schenckii*, *Cryptolepis decidua*, *Galenia sarcophylla*, *Mesembryanthemum guerichianum*, *Psilocalon* spp., *Stoeberia* spp., together with one of the Cyperaceae (Sedges).

The two larger streams just south of Rietfontein showed a very definite riparian component dominated by *Acacia karroo*. *Prosopis* individuals were also observed within the riparian zone. Other species in close association with the riparian vegetation included *Acacia hebeclada*, *Tamarix usneoides* and *Lycium* species.

Going into Philandersbron the route again cross a seasonal stream, but the vegetation also showed quite clearly the impact of urban settlement. The weed *Gomphocarpus fruticosus* was encountered in association with the seasonal stream.



Figure 15: Typical area between R31 and Loubos



Figure 16: Ephemeral stream between Rietfontein and Philandersbron



Figure 17: Larger ephemeral stream between Rietfontein and Philandersbron



Figure 18: Second larger ephemeral stream between Rietfontein and Philandersbron



Figure 19: Typical view of pipeline route between Philandersbron and Rietfontein

10. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 Light industrial
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound

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- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture – (game farms)
- 5.34 River, stream or wetland –
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
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If any of the boxes marked with an "AN" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	N/A
------------------------------	-----

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?

Uncertain

If YES, explain:

Please see below

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

According to Heritage Impact Assessment (**Appendix D3**), the following observations were made:

- A handful of Middle Stone Age (MSA) tools (mainly flakes & chunks) were found in a severely disturbed area between the existing concrete reservoir at Philandersbron and the Namibia Road, at the southern entrance to the town.
- A small number of MSA implements were encountered in the road reserve (NR) between Philandersbron and Rietfontein.
- Several MSA flakes were recorded on eroded gravels outside the road reserve (NR) near the entrance to the town of Rietfontein.
- A few MSA flakes and chunks were found near the intersection of the Namibia Road and the R360.
- A few MSA tools were recorded on an artificially raised gravel ridge in the road reserve (R360) between Rietfontein and Askham.
- No rock engravings were found alongside the road where several outcroppings of dolerite in the road reserve (R360) near Klein Mier were noted.
- Relatively large numbers of *in-situ* Early (ESA) and Middle Stone Age tools were recorded on extensive gravel deposits alongside the proposed Loubos pipeline. A few Later Stone Age flakes were also counted. No organic remains such as pottery or ostrich eggshell was found.

The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline have been rated as having moderate to high (3B) local significance.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline are threatened by construction activities. Measures must be implemented to avoid, and not damage or disturb these potentially significant (Grade 3B) archaeological remains.

BASIC ASSESSMENT REPORT

Recommendations:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- With regard to the proposed Loubos pipeline, construction of the pipeline must not extend beyond 3 m from the fence line, as this will impact negatively on potentially significant (Grade 3B) archaeological heritage.
- The Environmental Control Officer (ECO) must ensure that no plant equipment, water pipes, or any infrastructure associated with the project (for example portable toilets, diesel, cement, & tools), are stored, mixed or located on the gravels between the fence and the access road. A single, suitable, already disturbed, area should be identified by the ECO prior to the project commencing, where infrastructure can be safely stored.
- Any sand or material required for backfilling and compaction must not be stockpiled on the gravels between the access road and the fence. A suitable area should be identified by the ECO prior to the project commencing.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The grave in the R360 road reserve near Andriesvale/Askham must be avoided during construction of the pipeline. The grave must be taped off and clearly demarcated prior to construction work commencing, and should not be disturbed in any way. The Environmental Control Officer must be responsible for ensuring the grave is protected during the entire construction phase of the project.

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

Will any building or structure older than 60 years be affected in any way?
 Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

	NO
YES	

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT (Please refer to Appendix E2 for proof of Advertisements and Site notices)

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
 - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
 - (iii) the nature and location of the activity to which the application relates;
 - (iv) where further information on the application or activity can be obtained; and
 - (v) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

BASIC ASSESSMENT REPORT

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

6. AUTHORITY PARTICIPATION

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least 30 (thirty) calendar days before the submission of the application.

List of authorities informed:

The following authorities were notified of the application.

- SAHRA Northern Cape
- Northern Cape Department of Agriculture and Land Reform
- Department of Water Affairs – Northern Cape
- Department of Roads and Public Works
- Department of Agriculture, Forestry and Fisheries
- ZF Mgcawu (Siyanda) District Municipality
- John Taolo Gaetsewe District Municipality
- Mier Local Municipality

Please refer to **Appendix E5** for the I&AP list and proof of notifications.

List of authorities from whom comments have been received:

No comments were received during the initial round of public participation from the authorities.

No comments were received for the Draft Basic Assessment Report.

BASIC ASSESSMENT REPORT

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub regulation to the extent and in the manner as may be agreed to by the competent authority.

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application at least 30 (thirty) calendar days before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Two comments were received during the initial Public Participation round, one requesting registration as an Interested and Affected Party, and the second pledging full support for the project as it will address the water crisis in the area (please refer to **Appendix E4** for the Comments and Response Report for the Draft Basic Assessment Report).

No comments were received for the Draft Basic Assessment Report.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

No issues or areas of concern have been raised by Interested and Affected Parties thus far.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report):

Please refer to Appendix E4 for the Comments and Response Report for the Draft Basic Assessment Report.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

Alternative (preferred alternative)

Direct impacts:

Archaeological heritage

Findings:

According to Heritage Impact Assessment (**Appendix D3**), The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains recorded (in the road reserve) between Philandersbron and Crammond are rated as having low (3C) local significance.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline have been rated as having moderate to high (3B) local significance.

The Heritage Impact Assessment (**Appendix D3**) concluded that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1A Askham to Philandersbron will not impact on significant archaeological heritage.

In-situ scatters of ESA and MSA tools on gravels alongside the proposed Loubos pipeline are threatened by construction activities. Measures must be implemented to avoid, and not damage or disturb these potentially significant (Grade 3B) archaeological remains.

The grave alongside the road (R360) near Andriesvale is protected under Section 36 of the National Heritage Resources Act (NHRA), and has been rated as having high local significance.

No rock engravings were found alongside the road (R360) where several outcroppings of dolerite occur in the road reserve near Klein Mier.

No ruins, old buildings or structures occur within the proposed route alignment.

The results of the study indicate that the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, will not impact on significant archaeological heritage.

Impact Mitigation:

The following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- With regard to the proposed Loubos pipeline, construction of the pipeline must not extend beyond 3 m from the fence line, as this will impact negatively on potentially significant (Grade 3B) archaeological heritage.
- The Environmental Control Officer (ECO) must ensure that no plant equipment, water pipes, or any infrastructure associated with the project (for example portable toilets, diesel, cement, & tools), are stored, mixed or located on the gravels between the fence and the access road. A single, suitable, already disturbed, area should be identified by the ECO prior to the project commencing, where infrastructure can be safely stored.
- Any sand or material required for backfilling and compaction must not be stockpiled on the gravels between the access road and the fence. A suitable area should be identified by the ECO prior to the project commencing.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The grave in the R360 road reserve near Andriesvale/Askham must be avoided during construction of the pipeline. The grave must be taped off and clearly demarcated prior to construction work commencing, and should not be disturbed in any way. The Environmental Control Officer must be responsible for ensuring the grave is protected during the entire construction phase of the project.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Biodiversity

According to the Botanical Impact Assessment (**Appendix D2**), the placement of the proposed pipeline is fortunate in that the road reserve is already impacted to a degree and no new disturbance footprint will result. It will also not be necessary to construct any additional service roads since the proposed route follows existing roads all the way.

However, the route will follow the dry Kuruman River, will cross the Molopo River as well as a number of smaller seasonal streams and ephemeral drainage lines (which drains the Mier and Rietfontein area into the Hakskeen Pan). It is also almost certain to impact on a number of well-established indigenous trees, including a number of protected tree species (e.g. *Acacia erioloba*, *A. haematoxylon* and *Boscia albitrunca*). It will also impact on various species protected in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009), most notably *Boscia foetida*.

Direct impacts will be associated with the relative short construction period (months) and are considered temporary, since the pipeline will be located underground. However, even though the impact will be localised and temporary in nature it will have (even though temporary) direct impacts on remaining natural vegetation and small ephemeral streams. Some alien vegetation (mostly *Prosopis* trees) was encountered and if not handled correctly can lead to

further infestation.

The vegetation types encountered are all considered Least Threatened (thus not under any immediate threat in terms of extinction) but not all are well protected and will require further conservation efforts. It is important to understand that these vegetation types are not particularly rich in plant species and does not contain any centre of endemism. Unlike some biomes of South Africa, local endemism is also very low. Meaning that the vegetation type is fairly similar over extended areas and it would be unlikely that small localised impacts will have any significant impact on any specific species or the vegetation type as a whole. The vegetation is also not fragmented in any way with extended areas of excellent connectivity remaining throughout.

Even though 8 species protected in terms of the NCNCA was encountered, and the likelihood is high that individuals of these species may be impacted during the construction phase, it is considered unlikely that the construction activities will have any significant impact on these populations. Especially since none of the identified species are listed in the South African Red data list (all classified as of Least Concern).

The possible impact on the water courses and ephemeral streams are also considered to be short term and very localised and should not constitute a significant impact.

Direct loss of vegetation type and associated habitat due to construction and operational activities:

- Impact on vegetation types

Seven vegetation types were encountered. All vegetation types are classified as “Least threatened” but not all are well protected. However, the proposed footprint follows existing road reserves. Associated infrastructure (e.g. additional roads) will not be required. In addition the impact will be short term and temporary of nature and is therefore not considered significant.

Mitigation will entail staying within the road reserve and minimising footprint.

The impact on vegetation types is rated as Insignificant (after mitigation).

- Impact on corridors and conservation priority areas

According to the Biodiversity Assessment (**Appendix D2**), the Siyanda District Draft EMF lists Kalahari Karroid Shrubland has a high conservation priority, while Southern Kalahari Salt Pans vegetation has a medium/low sensitivity index due to both not being adequately protected. However, the proposed footprint follows existing road reserves. Associated infrastructure (e.g. additional roads) will not be required. The impact on river and wetland corridors will similarly fall within already disturbed areas within the road reserve. In addition the impact will be short term and temporary of nature.

Mitigation will entail staying within the road reserve and minimising the footprint especially when crossing water courses. It will be especially important to minimise the impact on riparian vegetation and to ensure erosion control through good rehabilitation. Correct alien eradication will also be important.

The impact on corridors and conservation priority areas is thus rated as low negative (after mitigation).

- Protected plant species

According to the Biodiversity Assessment (**Appendix D2**), a great number of trees listed in terms of the NFA, most notably Camelthorn and Sheppard's trees were encountered along the proposed route. More than 400 trees can potentially be impacted by the proposed pipeline route (even though it is located within the disturbed road reserve). However, with good mitigation between 90 – 95% of these trees can be conserved. Previous experience showed that both Camelthorn and Sheppard's tree have deep root systems, which mean excavation can be done quite close to the tree without impacting on the root system.

In addition at least eight species protected in terms of the NCNCA are likely to be impacted by the proposed development. Again good topsoil conservation and rehabilitation can negate this impact to a large degree.

Mitigation will entail excellent environmental control, slight route alterations to avoid as many mature indigenous tree species as possible; good topsoil conservation and rehabilitation practices; and application for permits in terms of the NFA and the NCNCA.

The impact on protected plant species is thus rated as Medium – low negative (after mitigation).

- Fauna and avi-fauna

Because of the temporary and localised nature of the activity it is considered highly unlikely that it will have any significant impact on fauna or avi-fauna.

Mitigation will entail staying within the road reserve and minimising footprint and the impact on mature indigenous tree species.

The impact is thus rated as Insignificant (after mitigation).

- Invasive alien infestation

According to the Biodiversity Assessment (**Appendix D2**), *Prosopis*, *Calotropis* and *Gomphocarpus* species was observed along the route.

All listed invasive alien species must be removed during the construction. However, incorrect alien control methods used for especially *Prosopis* species may aggravate the situation and result in spreading in place of control of these species.

Mitigation will entail correct alien control methods coupled with follow up work after rehabilitation.

The impact is thus rated as Positive (after mitigation).

Freshwater ecosystems

According to the Biodiversity Assessment (**Appendix D2**), the proposed route will follow the Kuruman River and will cross the Molopo River. It will also cross two Southern Kalahari Salt pans as well as numerous ephemeral and also seasonal streams which drain the Mier, Rietfontein and Philandersbron area into the Hakskeenpan.

The preparation and installation of the pipeline has the potential to impact on both the riparian and in stream zones of these water courses. The disturbance of habitat during and after the construction activities also provides an opportunity for further invasive alien plants to establish

in the area and might leave erosion potential.

Mitigation will entail excellent environmental control in order to minimise the impact on riparian zones, to ensure good rehabilitation and re-vegetation with suitable indigenous vegetation to reduce the risk of erosion in the stream channels. Follow up work should be carried out after rehabilitation to ensure that no invasive alien plants re-establish itself.

The impact on freshwater ecosystems is thus rated as Low (after mitigation).

Visual and noise impacts

The activity is not expected to impact on the visual character of the area as the pipeline will be buried. The presence of construction plant during the construction phase will have a visual impact, but this will only be during the construction phase and is expected to have a **low to negligible** impact.

The proposed reservoir, although being located near the R31 and having a 4m high earthen wall, is expected to have a **low** impact due to the topography.

The activity will create some noise during the construction phase of the development. Noise mitigation measures will be dealt with in the EMP. With the mitigation measures, as described in the EMP (**Appendix F**), the potential noise impacts are also expected to be **negligible**.

Indirect impacts:

According to the Biodiversity Assessment (**Appendix D2**), it is very likely that the proposed project will have indirect impacts like the establishment of temporary lay-down areas, quarry sites for bedding and blanket material, temporary construction sites and concrete mixing areas. However, with good environmental control it will be possible to minimise the impact of such indirect impacts.

Mitigation will entail excellent environmental control, placement of temporary lay-down areas or construction sites within areas that are not environmentally sensitive and will not impact on protected plant species. It will also entail good waste and wastewater control.

The impact is considered to be low (with mitigation).

Cumulative impacts:

According to the Biodiversity Assessment (**Appendix D2**), the proposed project will have a temporary and localised impact, which should not result in significant additional permanent impacts (apart from the new). Overall it is not considered likely that the cumulative impact will result in any significant additional impact on regional biodiversity targets, but it is likely that the project will impact on protected plant species and watercourses.

Mitigation will entail excellent environmental control and all of the mitigation measures addressed above

On the whole the cumulative impact is considered to be Medium-low (with mitigation).

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

The following is a summary of the potential impacts, and their ratings after mitigation, and probability of occurrence:

Construction phase.

Potential impacts on heritage resources – **Low (negative), Likely.**

Impact on threatened or protected ecosystems (vegetation types) – **Insignificant, definite.**

Corridors and/or conservation networks - **Low (negative), probable.**

Protected plant species – **Medium- Low (negative), definite.**

Freshwater ecosystems – **Low (negative), probable.**

Fauna and avi-fauna – **Insignificant, probable**

Job creation – **Low (Positive), definite.**

Noise impact - **Negligible, definite, only during construction phase.**

Visual impact – **Low (negative), definite, during construction**

Operational Phase

Potential impacts on archaeological heritage – **No impact expected**

Loss of vegetation and associated habitat - **No impact expected**

Impact on threatened vegetation - **No impact expected**

Freshwater ecosystems – **No impact expected**

Socio-economic (job creation, sustainable farming activities, higher quality water etc – **Medium (Positive), Highly likely**

Noise impact - **No impact expected**

Visual impact – **Negligible, definite, permanent**

Decommissioning

The project as proposed does not require 'decommissioning' or 'closure', as such the potential impacts thereof is considered irrelevant.

No-go alternative (compulsory)

The no-go option would be the option of not constructing the pipeline. The current status quo will remain.

The socio-economic benefits of the proposed pipeline will therefore not be realized. This includes:

- More sustainable farming activities,
- Reducing the pressure/use on underground water resources in the area, leading to long term protection and sustainability of these water resources.
- Provision of higher quality water to the towns and surrounding farm area
- Long term socio-economic sustainability, through tourism and jobs, as well as short term employment opportunities during the construction
- contribute to poverty reduction, increase levels of service, uplift and stimulate economic growth

According to the Biodiversity Assessment (**Appendix D2**), the “No-Go alternative” does not signify significant biodiversity gain or loss especially on a regional basis. However, it will ensure that none of the potential impacts above occur.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

Is an EMPr attached?

YES

The EMPr must be attached as Appendix F.

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

The following is a list of recommended conditions and mitigation measures from a heritage and biodiversity perspective:

Heritage:

With regard to the proposed Kalahari-East Bulk Water Supply Pipeline Phase 1 Askham till Philandersbron, the following recommendations are made:

- With regard to the proposed pipeline from Philandersbron to Crammond (i.e. the NR, R360 & R31), no archaeological mitigation is required, as the samples are small and occur in a disturbed context.
- With regard to the proposed Loubos pipeline, construction of the pipeline must not extend beyond 3 m from the fence line, as this will impact negatively on potentially significant (Grade 3B) archaeological heritage.
- The Environmental Control Officer (ECO) must ensure that no plant equipment, water pipes, or any infrastructure associated with the project (for example portable toilets, diesel, cement, & tools), are stored, mixed or located on the gravels between the fence and the access road. A single, suitable, already disturbed, area should be identified by the ECO prior to the project commencing, where infrastructure can be safely stored.
- Any sand or material required for backfilling and compaction must not be stockpiled on the gravels between the access road and the fence. A suitable area should be identified by the ECO prior to the project commencing.
- No archaeological remains may be removed, damaged or disturbed as this constitutes an offence under the National Heritage Resources Act (Act 25 of 1999).
- Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered during excavations for the pipelines, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Mariagrazia Galimberti at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.
- The grave in the R360 road reserve near Andriesvale/Askham must be avoided during construction of the pipeline. The grave must be taped off and clearly demarcated prior to construction work commencing, and should not be disturbed in any way. The Environmental Control Officer must be responsible for ensuring the grave is protected during the entire construction phase of the project.
- The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed project.

Biodiversity:

The following mitigation measures are recommended:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and the Biodiversity study recommendations as well as any other conditions pertaining to other specialist studies and requirements of the DENC or DAFF.
- The ECO should give onsite advice with regards to final route layout with the main aim of minimising the impact on protected plant species.
- On the farm Cramond, route option 2 (preferred route alternative) is the preferred option since it will have lower wind erosion potential (the dunes being lower and easier to rehabilitate).
- The protection of the grassy and herbaceous ground cover layer is of great importance, since it is this vegetation cover which is mainly responsible for binding the sand of the dunes (and thus the main protection feature of the dune systems). It is thus of great importance to minimise the actual disturbance footprint.
- In order to achieve this, it is suggested that topsoil removal is not done within the Kalahari dune areas on the farm Cramond and that disturbance is minimised to the actual trench line. In other words, only the trench line itself should be opened (which must be closed and rehabilitated immediately after placement of the pipeline – a “one go action”) as opposed to the general recommendation of topsoil being removed for the whole of the construction footprint. Vehicles should minimise the impact on the surrounding vegetation, but should be allowed to “drive” over the existing vegetation cover (during excavation).
- The exposed trench line over the dunes must be further protected by the placement of shrub on the exposed sands. Both *Acacia mellifera* and *Rhigozum trichotomum* branches have been used with great success on similar projects in the Kalahari.
- The construction footprint must stay within the already degraded road reserve with the overall aim of minimising additional disturbance.
- The final pipeline route must be adjusted on site *via* ECO approval, with the aim of minimising permanent impact on mature indigenous tree species (especially protected tree species), through slight route alterations.
- Additional lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- Indiscriminate clearing of areas must be avoided.
- Topsoil, the top 10-20 cm layer of soil, which should contain 80-90% of the seed bearing material and bulbs, must be protected throughout the project (removal and separately storage).
- The topsoil and vegetation must be replaced over the disturbed soil to provide a source of seed and a seed bed to encourage re-growth of plant species.
- Calcrete gravel should be used to stabilise steep exposed dunes which were disturbed during the construction phase (as is the general practice used along the roads of the Kalahari area).
- When working within or near water courses the impact on riparian vegetation must be minimised through excellent environmental control with the aim of minimising the impact on riparian zones; ensuring good rehabilitation and re-vegetation with suitable indigenous vegetation to reduce the risk of erosion in the stream channels.
- River crossing should only be done when they are not in flow (dry season) and

wherever possible, the crossings should be diagonally to the river banks (the shortest route possible).

- Where possible all river crossing should aim at utilising already disturbed areas (e.g. road verges) thus minimising any additional footprint within the river corridor.
- All alien vegetation must be removed from within the construction footprint (the road reserve) and immediate surroundings (especially river corridors).
- It is imperative that the correct alien eradication methods are employed (especially with regards to Prosopis control) as incorrect methods will aggravate the infestation.
- Follow up work must be carried out after rehabilitation to ensure that no invasive alien plant re-establishes itself.
- An integrated waste management approach must be implemented during construction.
- Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
- Spoil from excavation work should be used to fill or rehabilitate old quarry sites or new ones established for sand mining (if applicable).

In terms of other legislation:

- An application must be made for a permit in terms of the NFA with regards to the potential impact on protected tree species.
- An application for a flora permit must be submitted for the temporary disturbance of listed species identified in terms of Schedule 1 and 2 of the NCNCA.
- Should borrow pits be required for the excavation of bedding or blanket material a sand mining permit must be obtained from the Department of Mineral Resources.
- With regards to the applicability of a Water Use Authorization in terms of the NWA (National Water Act). In terms of the replacement General Authorization promulgated in terms of the NWA, on 18 December 2009 (GG No. 32805) with regards to the impeding or diverting the flow of water in a watercourse (Section 21(c)) and altering the bed, course or characteristics of a watercourse (Section 21(i)), NWA (National Water Act), a General Authorization or a License are required for the crossing of rivers / seasonal streams. Since numerous small and medium seasonal streams will have to be crossed as part of this project a water use authorization will be applicable. However, because of the following, it is very likely that the proposed activities will fall within the ambit of being Generally Authorized (GA). However, please be advised that although application for a GA in terms of the NWA is not required as long as compliance can be proved, it is recommended that the DWA confirms, in writing, the applicability or not of the General Authorization. In terms of Government Notice 32805 the following:
 - Section 4: None of the rivers /streams falls within an excluded area.
 - Section 6: None of the crossings take place within 500 m radius of any wetland.
 - Section 6: The pipeline will transport fresh water (no sewerage or hazardous material).
 - Section 6: No impeding or diverting the flow or altering the bed, banks, course or characteristics of a watercourse (temporary excavation and immediate rehabilitation).
 - Section 7(2): No detrimental impact on another lawful water use.
 - Section 7(3): No structures or hardened surfaces will be installed.
 - Section 7(4): With good environmental control (ECO), the activity will not have detrimental impact on riparian vegetation.
 - Section 7(5): Activity will not change quantity, velocity pattern etc. of flow in the watercourse.

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- Section 7(6): Will not result in detrimental change in water quality.
- Section 7(7): Will not result in detrimental change in biota.

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Other information