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Department:
Environment & Nature Conservation
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

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|-----------------------------|---------------------------|-------|--|
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| | (For official use only) |
| File Reference Number: | |
| Application Number: | |
| Date Received: | |

Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

- This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 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.
- This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
- The report must be typed within the spaces provided in the form. The size of the spaces provided is 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.
- Where applicable **tick** the boxes that are applicable in the report.
- An incomplete report may be returned to the applicant for revision.
- 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.
- This report must be handed in at offices of the relevant competent authority as determined by each authority.
- No faxed or e-mailed reports will be accepted.
- The signature of the EAP on the report must be an original signature.
- The report must be compiled by an independent environmental assessment practitioner.
- 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.
- A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
- Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

SECTION A: ACTIVITY INFORMATION

| | | |
|--|-----|----|
| Has a specialist been consulted to assist with the completion of this section? | YES | NO |
| If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I. | | |

PROPOSED UPGRADE AND EXPANSION OF THE CALVINIA BULK WATER SUPPLY, HANTAM LOCAL MUNICIPALITY NORTHERN CAPE

• ACTIVITY DESCRIPTION

a) Describe the project associated with the listed activities applied for

This project aims to augment the current supply of water to the community of Calvinia by means of groundwater, originating from two new well fields to be developed at the Kreitzberg Area along the Ceres-Karoo Road and the Northwest Area along the gravel road from Calvinia to Loeriesfontein. The purpose of the project is to provide a system for supplying water suitable for human consumption by sustainable means for a period of at least 15 to 20 years.

The existing bulk water supply to Calvinia consists of the following:

- Surface water source from the Karee Dam. This is currently Calvinia's primary source of surface water. The dam is a 15m high earth fill embankment dam with an impoundment of 900 000m³.
- Groundwater from 7 existing boreholes which can deliver an estimated maximum of 1 440m³/day or 60m³/h when the water levels are within normal operating conditions.

The proposed upgrade and expansion of the Calvinia bulk water supply includes, but is not limited to, the following:

- Equipping of 6 new boreholes at Calvinia
 - (Kreitzberg x 4 boreholes delivering 35.3 l/s)
 - (Northwest x 2 boreholes delivering 17 l/s)
- Refurbishment of 6 existing boreholes at Calvinia to ensure full potential is reached.
- Construction of a new 200mm diameter uPVC Gravity Main pipeline from Kreitzberg to the Calvinia Water Treatment Plant over a distance of 25.8km.
- Construction of a new 160mm diameter uPVC Rising Main from the Northwest boreholes to the Calvinia Water Treatment Plant over a distance of 40.1km.
- Construction of a new 90mm pipeline along the Klipwerf Road to the existing main along the R27 over a distance of 16.9km
- Construction of a booster pumpstation off the R355 to Loeriesfontein near Calvinia.
- Construction of a new 1.5 Megalitres concrete storage reservoir to maintain a 48hour reserve for the town of Calvinia.
- Construction of a 20 litres per second Activated Alumina fluoride removal facility at Calvinia to render the water quality safe for long-term future use.
- Construction of 3 x 1000m² evaporation ponds at the Calvinia Water Treatment Plant to discharge the waste product from the Fluoride Treatment Plant.
- Construction of a new 11kV mains power supply line to each of the wellfields with a total length of 60km in length.
- Supply and installation of a telemetry system to enable control of the boreholes and reservoir levels from the Calvinia municipal offices.

The majority of the pipelines will be located within existing road reserves, including the AP2286, R355 to Loeriesfontein, R355 to Ceres and the Klipwerf Road.

The new pipelines and boreholes will also be located on the following Farms: Farm Rietfontein 550/0, Portion 10 of Farm Spitskop 552, Farm 114, Farm Aurets Kloof No. 854, Farm 1459, Farm Ramskop 300, Farm 805, Farm 806 and Farm 420, and Erf 1447.

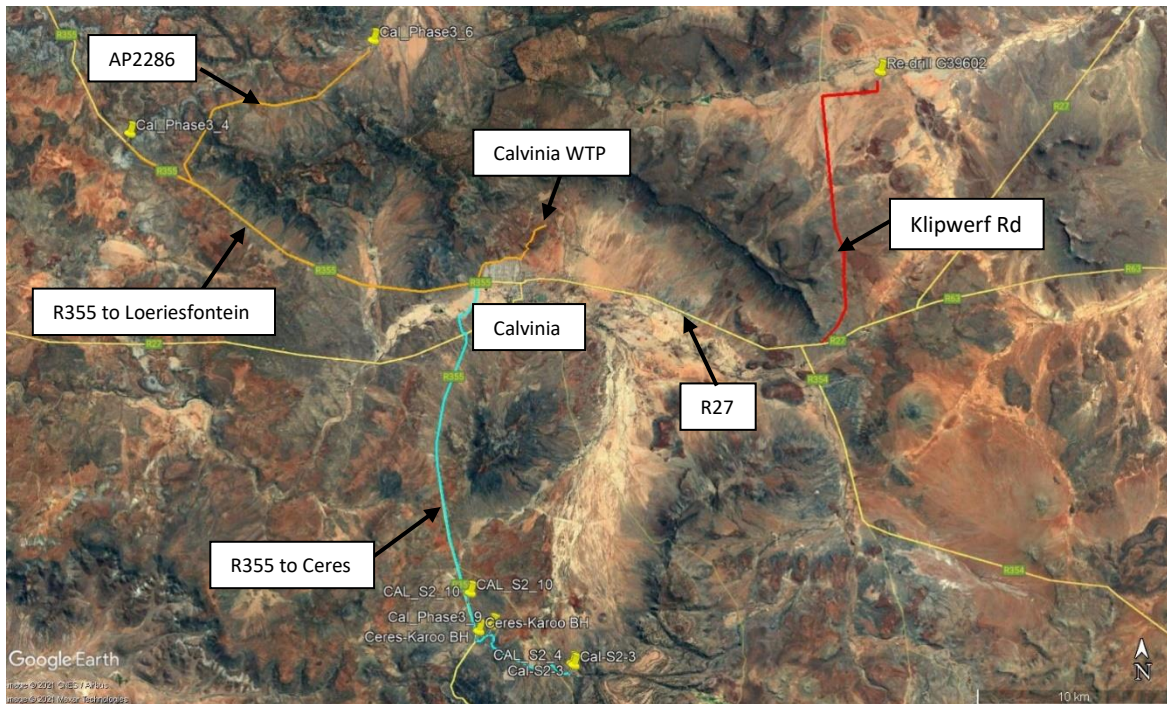


Figure 1: Google Earth Aerial view of the overall site.

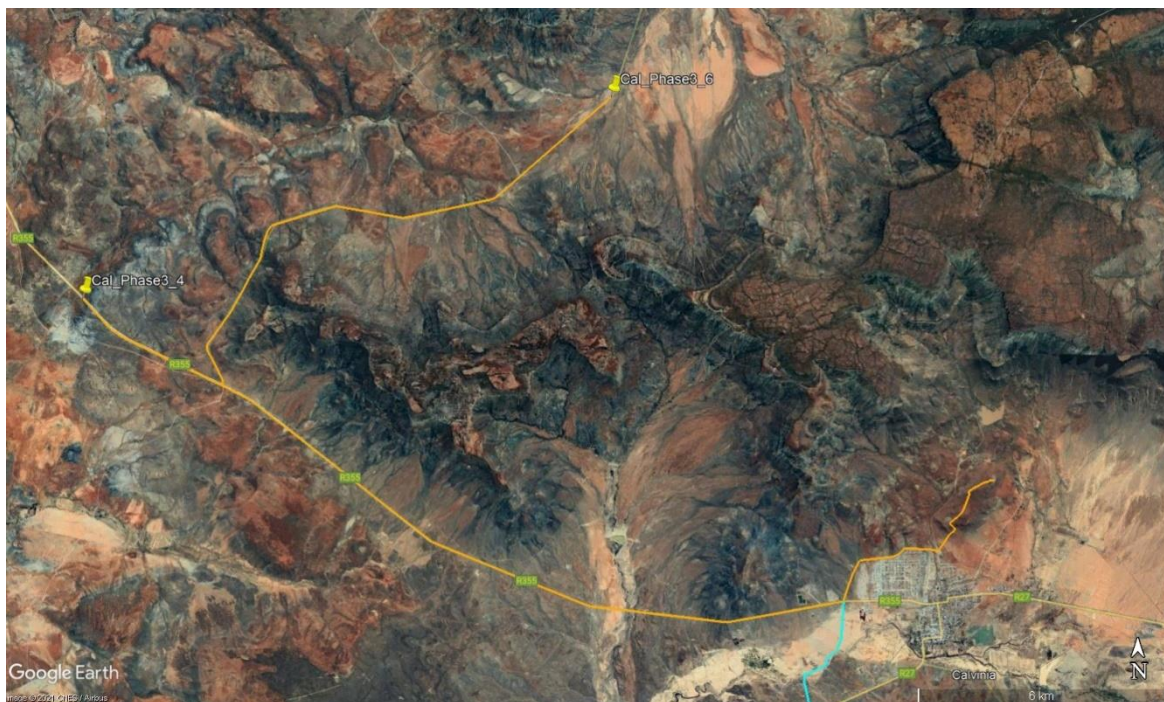


Figure 2: Google Earth Aerial close-up view of the pipeline route from the north-west boreholes, along the R355 road from Loeriesfontein to Calvinia and AP2286 (Toren Road) (orange line).



Figure 3: Google Earth Aerial close-up view of the pipeline route along the Klipwerf Road (red line).

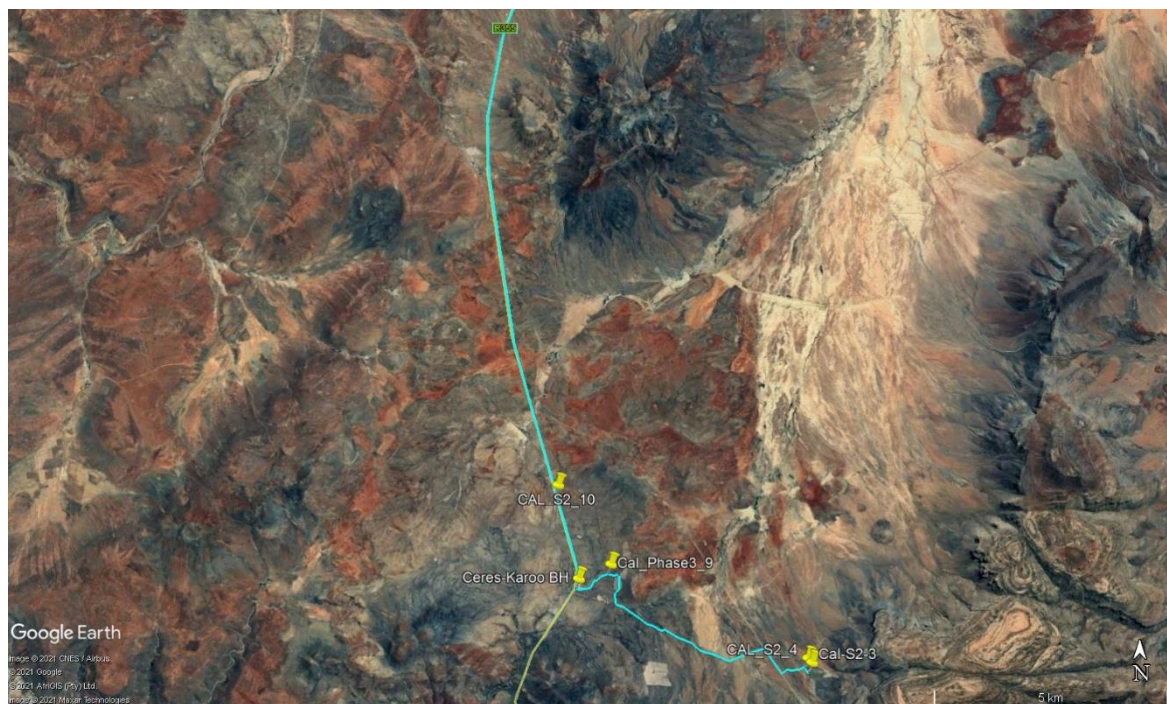


Figure 4: Google Earth Aerial close-up view of the southern pipeline route from Kreitzberg, along R355 to Ceres (blue line).



Figure 5: Google Earth Aerial close-up view of the pipeline routes through and around Calvinia

b) Provide a detailed description of the listed activities associated with the project as applied for

| Listed activity as described in GN 324, 325 and 327 | Description of project activity |
|--|---|
| Listing Notice 1 (GN327) | |
| <p><u>Activity 12:</u> The development of;</p> <ul style="list-style-type: none"> (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; (ii) infrastructure or structures with a physical footprint of 100 square metres or more; <p>where such development occurs;</p> <ul style="list-style-type: none"> (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;. | <p>The proposed development includes the development of new infrastructure (pipelines) which will exceed 100sqm, and is located less than 32m from a watercourse.</p> |

| | |
|---|---|
| <p><u>Activity 19:</u> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a <u>watercourse</u>;</p> <ul style="list-style-type: none"> (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies. | <p>The proposed development includes the installation of pipelines which will cross existing watercourses. The watercourse may be infilled and/or excavated during construction of the pipelines.</p> |
| <p><u>Activity 48:</u> The expansion of;</p> <ul style="list-style-type: none"> (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; <p>where such expansion occurs;</p> <ul style="list-style-type: none"> (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; | <p>The proposed development includes the expansion of existing infrastructure (additional pipelines) will exceed 100sqm, and is located less than 32m from a watercourse.</p> |
| <p>Listing Notice 3 (GN324)</p> | |
| <p><u>Activity 2:</u> The development of reservoirs with the capacity of more than 250m³ (g) Northern Cape (iii) Outside urban areas: (dd) CBA as identified in systematic biodiversity plans adopted by the competent authority</p> | <p>A new 1.5 MI Reservoir will be constructed</p> |
| <p><u>Activity 12:</u> The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> | <p>More than 300m² of vegetation will need to be cleared to construct the additional reservoir and pipelines.</p> |

| | |
|--|--|
| <p><u>Activity 14:</u> The development of;</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs;</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> | <p>The proposed development includes the development of infrastructure (pipelines) will exceed 10m², and is located less than 32m from a watercourse.</p> |
| <p><u>Activity 23:</u> The expansion of;</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such expansion occurs;</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>Excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> | <p>The proposed development includes the expansion of existing infrastructure (additional pipelines) will exceed 10sqm, and is located less than 32m from a watercourse.</p> |

• 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 as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need

of the proposed activity (NOT PROJECT) 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.

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, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

There are no feasible site alternatives.

| Alternative 1 (preferred alternative) | | |
|--|--------------|---------------|
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |
| Alternative 2 | | |
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |
| Alternative 3 | | |
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |

In the case of linear activities:

| Alternative: | Latitude (S): | Longitude (E): |
|---|----------------------|-----------------------|
| Alternative S1 (preferred) | | |
| • Starting point of the activity | | |
| • Middle/Additional point of the activity | | |
| • End point of the activity | | |
| Alternative S2 (if any) | | |
| • Starting point of the activity | | |
| • Middle/Additional 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.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

There are no feasible layout alternatives that were considered

| Alternative 1 (preferred alternative) | | |
|---------------------------------------|--------------|---------------|
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |

Only one alternative route was considered. The proposed pipeline from the R355 to Ceres would have then gone along the R27 towards Calvinia, then along the southern and eastern edge of the town, eventually north towards the water treatment works.

This option was not deemed feasible, as it would cross too many private properties. The pipeline would also be approximately 6km longer (between the R27 junction with the R355 Ceres road, and the water treatment works) than the preferred alternative that crosses the Oorlogkloof River and links with the proposed R355 Loeriesfontein pipeline, and therefore also more expensive to construct.

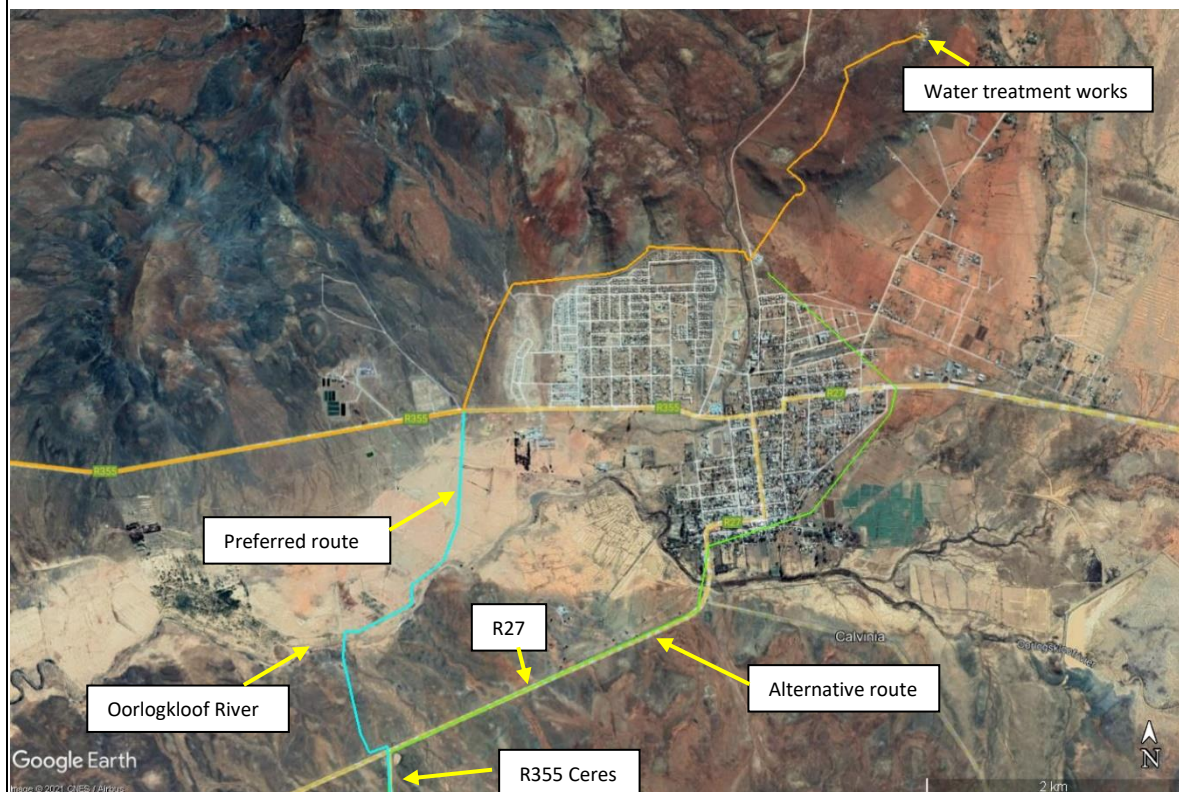


Figure 6: Google Earth Aerial close-up view of the pipeline routes through and around Calvinia, showing the preferred route (blue line) and the alternative route (green line).

| Alternative 2 | | |
|---------------|--------------|---------------|
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |
| Alternative 3 | | |
| Description | Lat (DDMMSS) | Long (DDMMSS) |
| | | |

c) Technology alternatives

No technology alternatives were considered.

| |
|--|
| Alternative 1 (preferred alternative) |
| |
| Alternative 2 |
| |
| Alternative 3 |
| |

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

| |
|--|
| Alternative 1 |
| <p><u>Abstraction of surface water from the Doring River at Botterkloof Bridge</u></p> <p>According to the Engineering Feasibility Study (Appendix D1), this option intends to provide water to Calvinia from the Doring River as a sustainable source of surface water. For this option, abstraction of water would take place at the Botterkloof Bridge (see Appendix C1). The study indicated that there is more than sufficient volume of water available from the Doring River to provide a long-term sustainable source as alternative.</p> <p>The following is a summary of the infrastructure required for this option:</p> <ul style="list-style-type: none"> • River Abstraction Pump Station on raft or ramp (2 x Pumps 60 litres/second @ 25m) • Pipeline from River Pump Station to Filtration Plant and Reservoir: 250m x 500mm dia CL9 • Filtration Plant: 200 m³/h capacity • Holding Reservoir 1: 800 kilolitre (Steel or Concrete) • Booster Pump Station 1: 2 x Pumps: 53 l/s @ 378m • Pipeline from Booster Pump Station 1 to Holding Reservoir 2: 17 000m x 350mm dia DIP CL60 • Holding Reservoir 2: 800 kilolitres (Steel or Concrete) • Booster Pump Station 2: 2 x Pumps: 53 l/s @ 577m • Pipeline from Booster Pump Station 2 to Holding Reservoir 3: 61 000m x 350mm dia DIP CL60 • Holding Reservoir 3: 800 kilolitres (Steel or Concrete) • Booster Pump Station 3: 2 x Pumps: 53 l/s @ 80m • Pipeline from Booster Pump Station 3 to Karee Dam: 23 000m x 350mm dia uPVC CL9 • Construction of 11kV Powerline x 84km • Telemetry System <p>A cost estimate of the capital requirement for this option was calculated at R340 889 081 – 09.</p> <p>The estimated unit cost of water (see breakdown in Section 8.5.5 of the Engineering Feasibility Study (Appendix D1) is estimated at R18.5802 per m³.</p> <p>Since this option is not deemed feasible, it has not been assessed.</p> |

| Alternative 2 |
|---|
| <p data-bbox="220 248 1067 275"><u>Abstraction of surface water from the Doring/Tankwa Rivers confluence</u></p> <p data-bbox="220 300 1398 470">According to the Engineering Feasibility Study (Appendix D1), this option intends to provide water to Calvinia from the Doring River as a sustainable source of surface water. For this option, abstraction of water would take place just downstream of the confluence of the Doring and Tankwa Rivers (see Appendix C2). The study indicated that there is more than sufficient volume of water available from the Doring River at this point to provide a long term sustainable source as alternative.</p> <p data-bbox="220 495 1064 521">The following is a summary of the infrastructure required for this option:</p> <ul data-bbox="268 528 1382 1232" style="list-style-type: none"> • River Abstraction Pump Station on raft or ramp (2 x Pumps 60 litres/second @ 25m) • Pipeline from River Pump Station to Filtration Plant and Reservoir: 500m x 500mm dia CL 9 • Filtration Plant: 200 m³/h capacity • Holding Reservoir 1: 800 kilolitres (Steel or Concrete) • Booster Pump Station 1: 2 x Pumps: 53 l/s @ 540m • Pipeline from Booster Pump Station 1 to Reservoir 2: 61 000m x 350mm dia DIP CL60 • Holding Reservoir 2: 800 kilolitres (Steel or Concrete) • Booster Pump Station 2: 2 x Pumps: 53 l/s @ 577m • Pipeline from Booster Pump Station 2 to Holding Reservoir 3: 61 000m x 350mm dia DIP CL60 • Holding Reservoir 3: 800 kilolitres (Steel or Concrete) • Booster Pump Station 3: 2 x Pumps: 53 l/s @ 450m • Pipeline from Booster Pump Station 3 to High-level Reservoir: 3 000m x 350mm dia DIP CL40 • High Level Reservoir: 10 Megalitres (concrete) to have 7 days storage • Gravity Main from High Level Reservoir to Break Pressure Tank: 59 000m x 250mm DIP CL60. • Concrete Break Pressure Tank: 400 kilolitres (Steel or Concrete) • Gravity Main from Break Pressure Tank to Karee Dam: 25 000m x 300mm dia. uPVC CL9 • Construction of 11kV Powerline x 70km • Telemetry System <p data-bbox="220 1299 1324 1326">A cost estimate of the capital requirement for this option was calculated at R 468 414 650.93.</p> <p data-bbox="220 1370 1398 1433">The estimated unit cost of water (see breakdown in Section 8.5.5 of the Engineering Feasibility Study (Appendix D1)) is estimated at R 21.2692 per m³.</p> <p data-bbox="220 1456 1011 1482">Since this option is not deemed feasible, it has not been assessed.</p> |
| Alternative 3 (preferred alternative) |
| <p data-bbox="220 1559 1093 1585"><u>Development of further groundwater sources at Kreitzberg and Northwest</u></p> <p data-bbox="220 1621 1388 1684">The proposed upgrade and expansion of the Calvinia bulk water supply includes, but is not limited to, the following (also see Appendix C2):</p> <ul data-bbox="268 1691 1388 1973" style="list-style-type: none"> • Equipping of 6 new boreholes at Calvinia <ul data-bbox="316 1727 898 1794" style="list-style-type: none"> - (Kreitzberg x 4 boreholes delivering 35.3 l/s) - (Northwest x 2 boreholes delivering 17 l/s) • Refurbishment of 6 existing boreholes at Calvinia to ensure full potential is reached. • Construction of a new 200mm diameter uPVC Gravity Main pipeline from Kreitzberg to the Calvinia Water Treatment Plant over a distance of 31km. • Construction of a new 160mm diameter uPVC Rising Main from the Northwest boreholes to the Calvinia Water Treatment Plant over a distance of 33km. |

- Construction of a new 1.5 Megalitres concrete storage reservoir to maintain a 48hour reserve for the town of Calvinia.
- Construction of a 20 litres per second Activated Alumina fluoride removal facility at Calvinia to render the water quality safe for long-term future use.
- Construction of 3 x 1000m² evaporation ponds at the Calvinia Water Treatment Plant to discharge the waste product from the Fluoride Treatment Plant.
- Construction of a new 11kV mains power supply line to each of the wellfields with a total length of 60km in length.
- Supply and installation of a telemetry system to enable control of the boreholes and reservoir levels from the Calvinia municipal offices.

According to the Engineering Feasibility Study (**Appendix D1**), this investment would provide a sustainable supply of water to Calvinia for at least a 20-year horizon. The fact that surplus water is available, allows the intermittent use of boreholes and also allows the existing boreholes to be used less frequently, thereby enhancing the chances of recharge and recovery, and the longer-term sustainability of the system.

A cost estimate of the capital requirement for this option was calculated at **R 178 956 388.63**.

The estimated unit cost of water (see breakdown in Section 8.5.5 of the Engineering Feasibility Study (**Appendix D1**)) is estimated at **R 6.5655 per m³**.

This is the preferred alternative, since it is also the most cost effective, and provides the most acceptable unit cost. The costs breakdown can be seen in Table 1 below.

Table 1: Summary of options

| NO. | OPTION INVESTIGATED | CAPITAL COST | UNIT COST (per m ³) | COMMENTS |
|-----|--|------------------|------------------------------------|--|
| 1 | Abstraction of surface water from the Doring River at Botterkloof Bridge | R 340 889 081.09 | R 18.5802 | Not sustainable, Unit Cost excessive due to elevation difference and distance from source. |
| 2 | Abstraction of surface water from the Doring/Tankwa Rivers confluence | R468 414 650.93 | R 21.2692 | Not sustainable, Unit Cost excessive due to elevation difference and distance from source |
| 3 | Development of further groundwater sources at Kreitzberg and Northwest | R184 257 391.21 | R 7.6779 | Unit cost acceptable and compares well with current tariffs for water. |

According to the Engineering Feasibility Study (**Appendix D1**), from the above, it is clear that the further development of groundwater and the development of the new wellfields at Kreitzberg, Northwest area and in the Akkerendam Nature Reserve is the most feasible and sustainable option from those investigated.

It must however be kept in mind that groundwater development is heavily dependent on rainfall and as such needs to be managed very carefully to ensure its sustainability. If this management is not done diligently, and the rainfall again stays away for 5 years, the town of Calvinia may end up in the same situation they are in now.

It is of utmost importance that a competent person collects and evaluates the borehole data such as the static water levels, the volumes abstracted, any changes in quality along with climatic data such as rainfall on at least a 3 monthly basis for the duration of this project's expected life to ensure its sustainability.

e) No-go alternative

This would mean that no-development would take place and the proposed site will remain as is. No expansion and upgrade to the existing bulk water system will take place for the town of Calvinia and the demand for additional water supply will not be met.

Additional positive impacts such as the provision of job opportunities during the construction and operational phases will not be met.

The no-go option would only have been recommended if it were found that the construction of the proposed pipelines and powerlines on this site or in this area might potentially cause substantial detrimental harm to the environment.

According to the Biodiversity Assessment (**Appendix D1**), the No-Go option is not likely to result in a "no-impact" scenario, for it will have a negative socio-economic impact (and slow degradation may still continue). The status quo will be maintained, but veld will still be impacted by urban and agricultural related activities. Water is a basic right and all communities should have access to drinking water.

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

• **PHYSICAL SIZE OF THE ACTIVITY**

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

| Alternative: | | Size of the activity: |
|---|--|------------------------------|
| Alternative A1 (preferred activity alternative) | | ha |
| Alternative A2 (if any) | | m ² |
| Alternative A3 (if any) | | m ² |

or, for linear activities:

| Alternative: | | Length of the activity: |
|---|--|--------------------------------|
| Alternative A1 (preferred activity alternative) | | Approximately 82 800m |
| Alternative A2 (if any) | | m |
| Alternative A3 (if any) | | m |

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

| Alternative: | | Size of the site/servitude: |
|---|--|------------------------------------|
| Alternative A1 (preferred activity alternative) | | m ² |
| Alternative A2 (if any) | | m ² |
| Alternative A3 (if any) | | m ² |

• **SITE ACCESS**

| | | |
|--|-----|----|
| Does ready access to the site exist? | YES | NO |
| If NO, what is the distance over which a new access road will be built | N/A | |

Describe the type of access road planned:

No new access roads will be required.

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.

• **LOCALITY MAP**

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (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).

• **LAYOUT/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:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and

- a north arrow.

- **SENSITIVITY MAP**

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

- **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 report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

- **FACILITY ILLUSTRATION**

A detailed illustration of the activity must be provided at a scale of at least 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.

- **ACTIVITY MOTIVATION**

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

| | | | |
|--|-----|----|----------------|
| • Is the activity permitted in terms of the property's existing land use rights? | YES | NO | Please explain |
| The activity is the construction of a pipeline and powerline across a number of properties. | | | |
| • Will the activity be in line with the following? | | | |
| (a) Provincial Spatial Development Framework (PSDF) | YES | NO | Please explain |
| According to the Feasibility Study (Appendix D1), the provision of additional water to Calvinia is listed as a priority project in both the IDP and the WSDP. | | | |

| | | | |
|--|-----|----|----------------|
| (b) Urban edge / Edge of Built environment for the area | YES | NO | Please explain |
| The pipeline route and boreholes are located outside the developed area of Calvinia. | | | |
| (c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?). | YES | NO | Please explain |
| According to the Feasibility Study (Appendix D1), the provision of additional water to Calvinia is listed as a priority project in both the IDP and the WSDP. | | | |
| (d) Approved Structure Plan of the Municipality | YES | NO | Please explain |
| The Municipality is the Applicant. According to the Feasibility Study (Appendix D1), the provision of additional water to Calvinia is listed as a priority project in both the IDP and the WSDP. | | | |
| (e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?) | YES | NO | Please explain |
| No EMF was identified (see DEA Screening Tool). | | | |
| (f) Any other Plans (e.g. Guide Plan) | YES | NO | Please explain |
| | | | |
| • Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)? | YES | NO | Please explain |
| According to the Feasibility Study (Appendix D1), the provision of additional water to Calvinia is listed as a priority project in both the IDP and the WSDP. | | | |
| • Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.) | YES | NO | Please explain |
| This project aims to augment the current supply of water to the community of Calvinia by means of groundwater, originating from two new well fields to be developed at the Kreitzberg Area along the Ceres-Karoo Road and the Northwest Area along the gravel road from Calvinia to Loeriesfontein. The purpose of the project is to provide a system for supplying water suitable for human consumption by sustainable means for a period of at least 15 to 20 years. | | | |

Calvinia's current population has outgrown its existing water sources which were last upgraded and increased in 1996 when the existing wellfield to the east of the town was upgraded.

Since 2015, Calvinia has increasingly been experiencing water supply problems. These problems were primarily caused by the following:

- a. Extensions of the town due to the government drive to provide housing for indigent families. Number of households have increased from 2 020 in 2001 to 2 560 in 2018.
- b. Lack of sufficient winter rainfalls to fill the Karee Dam. Measured rainfall in the 2015/16 season amounted to only 30mm, and in 2016/17 only 42mm was measured in the Karee Dam catchment area. During the 2017/18 season, the Karee Dam filled up to only 65% of its total capacity. To date no winter rains of any significance has fallen since the winter commenced in May 2018. The dam is currently only 22% full.
- c. Deterioration of the existing sources. Currently only 4 of the existing 7 production boreholes are able to deliver their tested sustainable yield. This is also due to the lack of rainfall, as there has been no significant groundwater recharge since 2015, subsequently, the groundwater levels have dropped dramatically.)
- d. Dry climate with little rainfall to recharge the aquifers currently utilized as water source. Calvinia has an average rainfall of only 198mm per annum and an average evaporation rate of 1600mm per annum. The town is located on the edge between the winter and summer rainfall regions. Winter rainfall normally occurs due to cold fronts which move inland from the southwest, summer rainfall is usually in the form of thunderstorms if they do occur. The past 10 years, the summer rainfall has not contributed to any meaningful run-off to recharge the existing aquifers. The Calvinia area is seriously prone to drought conditions, and have been throughout their history. The occurrence of 4-to-5-year droughts is a regular pattern in this area.)

Without sufficient water, life is not possible. The lack of water and drought conditions over the past years has seen a significant decline in water consumption due to water restrictions imposed on the community. This has far reaching economic effects on both the town, as they cannot run any business dependent on a strong water supply, and in addition, the municipal budget is severely strained due to the significant decline in water sales and the resultant loss of income.

According to the Feasibility Study (**Appendix D1**), Calvinia currently has 2 509 households consuming water at a rate of 125 litres per capita per day. This returns an annual average daily demand of 1568 m³/day. Historical consumption figures are available for several years and indicated a growth of less than 1% per annum for the town.

If this data is used, a future demand of 1767m³/day is projected for 2040. The per capita consumption of the past 3 years has been significantly lower at 87 litres per capita per day due to stringent water restrictions imposed by the municipality.

From the calculation above, it is clear that the town has a current Annual Average Daily Demand of 18 litre per second which peaks in summer at around 40 litres per second. This equates to an annual demand in the order of 629 625 kiloliters per annum.

If a design horizon of 20 years and a population growth of 0.6% per annum are taken into account, the Annual Average Daily Demand required increases to 21 litres per second with a peak summer demand of 45 litres per second. The demand then increases to an annual figure of 709 560 kiloliters per annum.

The Karee Dam is able to supply 370 000 kiloliters per annum if it is at Full Supply Level after the winter, which is approximately half of the annual demand.

The balance, or approximately 339 560 kiloliters per annum shortfall, must be delivered from the groundwater sources. Theoretically, the current groundwater sources could deliver a volume of 419 428 kiloliters per annum, which should be sufficient. Unfortunately, due to the extensive drought experienced over the past 3 to 5 years, this is not being achieved. The current boreholes are only just

able to supply this demand. If any breakdown or interruption in the supply of electricity occurs, the existing water supply system fails to meet the demand.

According to the Feasibility Study (**Appendix D1**), when looking at current and future demand, from the historical data collected and analysed, the current demand equates to a figure of 473 000 m3 per annum. The projected future demand at a growth rate of 0.60% is calculated at 575 000m3 per annum by 2030 which is a pproximately11 years away.

Calvinia's water supply is highly dependent on sufficient winter rains to fill the Karee Dam. If the Karee Dam does not impound sufficient water, the existing wellfield struggles to meet the demand. Calculations by the engineers indicate that by 2022, the towns' demand and what the existing sources can supply will balance. From 2023 onwards, a deficit will be experienced. The fact that Calvinia is dependent on a single wellfield is also problematic. Subsequently, it will be strategically important to find additional sources for Calvinia other than the existing wellfield. If Calvinia were to run out of water, the towns' location and distance from other known sources of water, makes carting of water, even in an emergency, almost impossible due to the volumes required and vast distances for carting.

| | | | |
|---|-----|----|----------------|
| <ul style="list-style-type: none"> Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.) | YES | NO | Please explain |
|---|-----|----|----------------|

The proposed project is to provide additional water supply and capacity services for the community. The Municipality is the Applicant.

| | | | |
|---|-----|----|----------------|
| <ul style="list-style-type: none"> Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.) | YES | NO | Please explain |
|---|-----|----|----------------|

The Applicant is the municipality

| | | | |
|--|-----|----|----------------|
| <ul style="list-style-type: none"> Is this project part of a national programme to address an issue of national concern or importance? | YES | NO | Please explain |
|--|-----|----|----------------|

Sufficient and functioning basic services, including water provision, is a national concern.

| | | | |
|---|-----|----|----------------|
| <ul style="list-style-type: none"> Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.) | YES | NO | Please explain |
|---|-----|----|----------------|

The proposed location has been identified by the engineers as suitable for the proposed development. There are no significant negative environmental impacts that have been identified by the botanical or heritage specialists.

| | | | |
|--|----------------|----|----------------|
| <ul style="list-style-type: none"> Is the development the best practicable environmental option for this land/site? | YES | NO | Please explain |
| <p>The proposed development will result in the loss of some indigenous vegetation over the site, however, the vegetation is considered least threatened and the site slightly disturbed in places.</p> <p>it is also unlikely that any significant archaeological or palaeontological resources will be impacted.</p> <p>No significant environmental impacts associated with the proposed development have been identified.</p> | | | |
| <ul style="list-style-type: none"> Will the benefits of the proposed land use/development outweigh the negative impacts of it? | YES | NO | Please explain |
| <p>No significant negative environmental impacts are expected by the proposed development and the benefits of better water supply to the town and its residents will outweigh any negative impacts.</p> | | | |
| <ul style="list-style-type: none"> Will the proposed land use/development set a precedent for similar activities in the area (local municipality)? | YES | NO | Please explain |
| N/A | | | |
| <ul style="list-style-type: none"> Will any person's rights be negatively affected by the proposed activity/ies? | YES | NO | Please explain |
| <p>No person's rights are expected to be negatively affected by the proposed development. The activity is expected to have a general positive impact on the surrounding area.</p> | | | |
| <ul style="list-style-type: none"> Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality? | YES | NO | Please explain |
| <p>Unknown. The development is located outside the built up/urban area of Calvinia.</p> | | | |
| <ul style="list-style-type: none"> Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)? | YES | NO | Please explain |
| <p>The proposed bulk water supply system in Calvinia is considered to contribute to SIPS 18:</p> <p>SIP 18: Water and sanitation infrastructure</p> <p>A 10-year plan to address the estimated backlog of adequate water to supply 1.4m households and 2.1m households to basic sanitation.</p> | | | |
| <ul style="list-style-type: none"> What will the benefits be to society in general and to the local communities? | Please explain | | |
| <p>The project will provide job opportunities during the construction and the operational phase.</p> <p>This development has the potential to provide an economic injection in the local community, by means of creating employment opportunities.</p> <p>The proposed development will increase the income generated by the study area, which is currently non-existent.</p> <p>Most importantly, it will provide reliable and additional water capacity to the town of Calvinia.</p> | | | |

| | |
|---|----------------|
| <ul style="list-style-type: none"> Any other need and desirability considerations related to the proposed activity? | Please explain |
| N/A | |
| <ul style="list-style-type: none"> How does the project fit into the National Development Plan for 2030? | Please explain |
| N/A | |
| <ul style="list-style-type: none"> Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account. | |
| <p>The general objectives of Integrated Environmental Management have been taken into account through the following:</p> <ul style="list-style-type: none"> The actual and potential impacts of the activity on the environment, socio-economic conditions and cultural heritage have been identified, predicted and evaluated, as well as the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impact, maximizing benefits and promoting compliance with the principles of environmental management – <i>please refer to Section D below.</i> The effects of the activity on the environment have been considered before actions taken in connection with them – <i>alternatives have been considered and investigated (please refer to Section A below).</i> Adequate and appropriate opportunity for public participation was ensured through the public participation process – <i>please refer to Section C for the public participation information, including the list of identified Interested and Affected parties, as well as the methods for identifying and informing I&APs of the application and proposed activity.</i> The environmental attributes have been considered in the management and decision-making of the activity – <i>an EMP has been included (Appendix G) with the proposed activity and must adhere to the requirements of all applicable state Authorities.</i> | |
| <ul style="list-style-type: none"> Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account. | |
| <p>The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:</p> <ul style="list-style-type: none"> People and their needs have been placed at the forefront while serving their physical, psychological, developmental, cultural and social interests – <i>the proposed activity will have a beneficial impact on people, as it will provide much needed additional housing opportunities.</i> Development must be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. Where waste cannot be avoided, it is minimised and remedied through the implementation and adherence of EMP. The use of non-renewable natural resources is responsible and equitable – <i>no exploitation of non-renewable natural resources occurs with the proposed activity.</i> The negative impacts on the environment and on people's environmental rights have been anticipated and prevented, and where they cannot be prevented, are minimised and remedied - <i>refer to Section F below.</i> The interests, needs and values of all interested and affected parties have been taken into account in any decisions through the Public Participation Process – <i>please refer to Section C for the public participation information.</i> | |

- The social, economic and environmental impacts of the activity have been considered, assessed and evaluated, including the disadvantages and benefits – *refer to Section B below.*
- The effects of decisions on all aspects of the environment and all people in the environment have been taken into account, by pursuing what is considered the best practicable environmental option – *the proposed activity is expected to have minimal/negligible environmental impacts, especially after mitigation measures as described under Section D and E and in the EMP are implemented.*

• 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 | Applicability to the project | Administering authority | Date |
|--|---|--|---------|
| National Water Act | Water Use Licence (See Appendix J2) | Department of Water and Sanitation | Not yet |
| Northern Cape Nature Conservation Act, Act 9 of 2009 | NCNCA Protected plant species located on the site | Department of Environment and Nature Conservation (DENC) | Not yet |

• WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

| | | |
|--|----------------|----|
| Will the activity produce solid construction waste during the construction/initiation phase? | YES | NO |
| If YES, what estimated quantity will be produced per month? Unknown | m ³ | |

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

The general solid waste generated during construction will be consolidated on site during construction and disposed of at the nearest approved municipal landfill site.

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

The general solid waste generated during construction will be consolidated on site during construction and disposed of at the nearest approved municipal landfill site.

| | | |
|---|----------------|----|
| Will the activity produce solid waste during its operational phase? | YES | NO |
| If YES, what estimated quantity will be produced per month? | m ³ | |
| How will the solid waste be disposed of (describe)? | | |

| |
|---|
| No solid waste is expected to be generated during the operational phase. |
| If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used. |
| No solid waste is expected to be generated during the operational phase. |
| Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)? |
| N/A |
| <i>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.</i> |

| | | |
|---|----------------|----|
| Can any part of the solid waste be classified as hazardous in terms of the NEM:WA? | YES | NO |
| If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application. | | |

| | | |
|---|----------------|----|
| Is the activity that is being applied for a solid waste handling or treatment facility? | YES | 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. An application for a waste permit in terms of the NEM:WA must also be submitted with this application. | | |

b) Liquid effluent

| | | |
|--|----------------|---------------|
| Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? | YES | 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? | YES | NO |
| <i>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.</i> The proposed development includes the construction of 3 x 1000m ² evaporation ponds at the Calvinia Water Treatment Plant to discharge the waste product from the Fluoride Treatment Plant. | | |

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

c) Emissions into the atmosphere

| | | |
|---|-----|----|
| Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities? | YES | NO |
| If YES, is it controlled by any legislation of any sphere of government? | YES | NO |
| If YES, the applicant must 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: | | |
| | | |

d) Waste permit

| | | |
|--|-----|----|
| Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA? | YES | NO |
|--|-----|----|

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

| | | |
|---|-----|----|
| Will the activity generate noise? | YES | NO |
| If YES, is it controlled by any legislation of any sphere of government? | YES | NO |
| Describe the noise in terms of type and level: | | |
| The activity is not expected to produce significant noise that would be a nuisance to any nearby residents. | | |

• WATER USE

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

| | | | | | |
|------------------------------------|--------------------------------------|--------------------------------------|---|--------------------------------|--|
| <input type="checkbox"/> Municipal | <input type="checkbox"/> Water board | <input type="checkbox"/> Groundwater | <input type="checkbox"/> River, stream, dam or lake | <input type="checkbox"/> Other | <input type="checkbox"/> 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: | An additional 56.8l per second Approximately 75 686m ³ /month | |
| Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs? | YES | NO |
| If YES, please provide proof that the application has been submitted to the Department of Water Affairs. | | |

- **ENERGY EFFICIENCY**

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

| |
|-----|
| N/A |
|-----|

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.

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

- Paragraphs 1 - 6 below must be completed for each alternative.

| | | |
|---|-----|----|
| <ul style="list-style-type: none"> Has a specialist been consulted to assist with the completion of this section? | YES | NO |
| If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D. | | |

| | | |
|--|--|-------------------------------|
| Property description/physical address: | Province | Northern Cape |
| | District Municipality | Namakwa District Municipality |
| | Local Municipality | Hantam Municipality |
| | Ward Number(s) | |
| | Farm name and number | See Appendix J1 |
| | Portion number | |
| | SG Code | See Appendix J1 |
| Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above. | | |
| | | |
| Current land-use zoning as per local municipality IDP/records: | Agricultural | |
| | In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application. | |
| | | |
| Is a change of land-use or a consent use application required? | | YES NO |

- 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 |
|------|-------------|-------------|-------------|--------------|-------------|-----------------------------|

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 |
|------|-------------|-------------|-------------|--------------|-------------|------------------|

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 |
|------|-------------|-------------|-------------|--------------|-------------|------------------|

- LOCATION IN LANDSCAPE**

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

| | | | | | |
|---------------------------------|--|-------------------|---|----------------------------------|---|
| 2.1 Ridgeline | | 2.4 Closed valley | | 2.7 Undulating plain / low hills | x |
| 2.2 Plateau | | 2.5 Open valley | x | 2.8 Dune | |
| 2.3 Side slope of hill/mountain | | 2.6 Plain | | 2.9 Seafront | |
| 2.10 At sea | | | | | |

- GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE**

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

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

• **GROUND COVER**

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

| | | | | |
|--|---|--|--|-----------|
| 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.

• **SURFACE WATER**

Indicate the surface water present on and or adjacent to the site and alternative sites?

| | | | |
|------------------------------|-----|----|--------|
| Perennial River | YES | NO | UNSURE |
| Non-Perennial River | YES | NO | UNSURE |
| Permanent Wetland | YES | NO | UNSURE |
| Seasonal Wetland | YES | NO | UNSURE |
| Artificial Wetland | YES | NO | UNSURE |
| Estuarine / Lagoonal wetland | YES | NO | UNSURE |

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

According to the Freshwater Assessment (**Appendix D2**), the pipeline from Borehole 5 (along the AP2286) will cross the upper reaches of the Soetwatersfontein River, which together with the Klein Toring River flows into the Hantam River. Far away to the west, the Hantam River becomes the Sout River, which together with the Vars River forms the relatively short reach of the Hol River, which in turn flow into the Olifants River near Lutzville close to the Atlantic Ocean.

The south western face of the Hantam Mountain gives rise to the upper tributaries of the Tierpoort River, which runs to the south and into the Oorlogskloof River. The envisaged pipeline from Borehole 4 and 5 (north-western section) will cross the Tierpoort River.

Borehole Nr 6 (pipeline along Klipwerf Rd) is located in the sub-catchment of the Klein Vis River, which connects to the Vis River to the west. The Vis River heads in a northerly direction into a series of large pans in the central Bushmanland, where it becomes the Sak River. The overflow from the Sak River was named the Hartbees River to the north of the pans, to connect to the Orange River near Kakamas some 450km to the north of Calvinia.

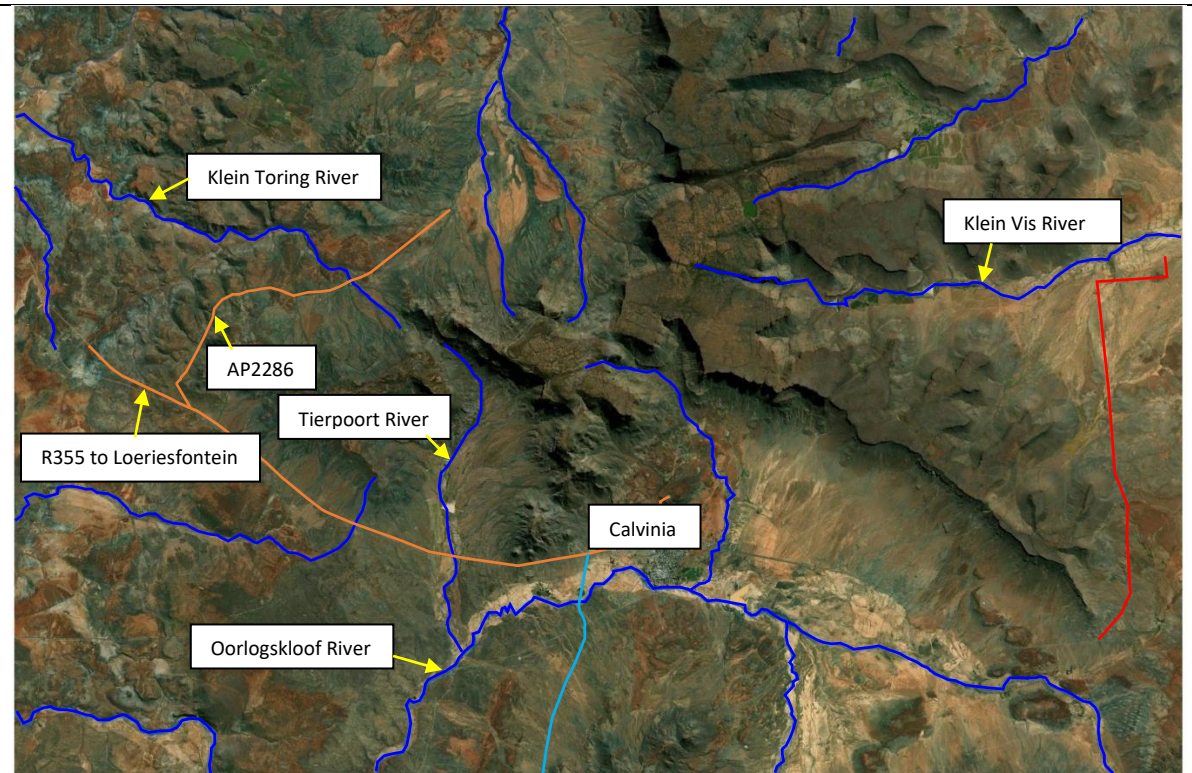


Figure 7: Google Earth showing major watercourses north of Calvinia

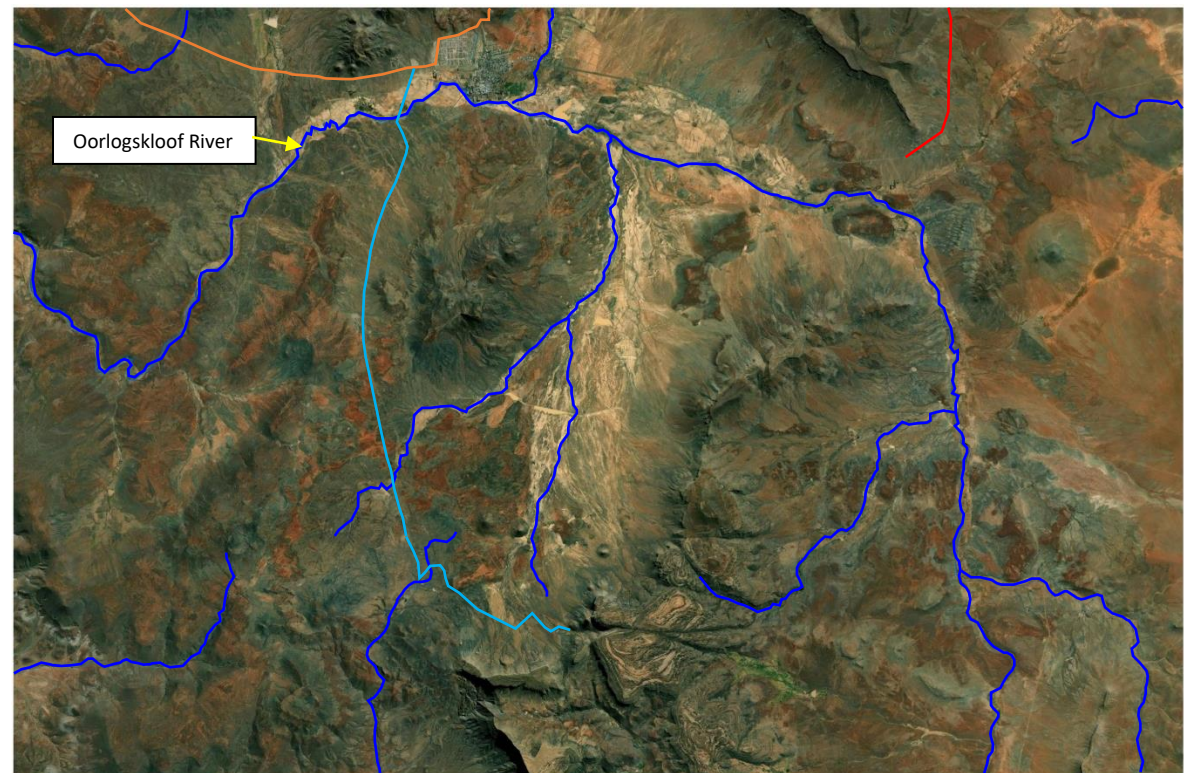


Figure 8: Google Earth showing major watercourses south of Calvinia

The envisaged Ceres Road pipeline from Borehole 1, 2 and 3 (Kreitzberg) is located in the Oorlogskloof River sub-catchment. The upper reaches are some 20 km south of Calvinia, from where the river stretches to the north towards Calvinia, where it angles to the west. To the west of the

escarpment it becomes the Kobee River, which joins up with the Doring River, the main tributary of the Olifants River.

According to the Freshwater Assessment (Appendix D2), Figure 7 and 8 are very much simplified explanation of the river reaches in and around Calvinia, to indicate the direction of the runoff from the ground on which the pipelines are to travel. In reality the district is covered with a dense network of drainage lines, like a bird's feather, with literally hundreds of secondary and tertiary sub-catchments and further sub-divisions thereof.

The sheer amount of drainage lines can be seen in Figure 9 below.

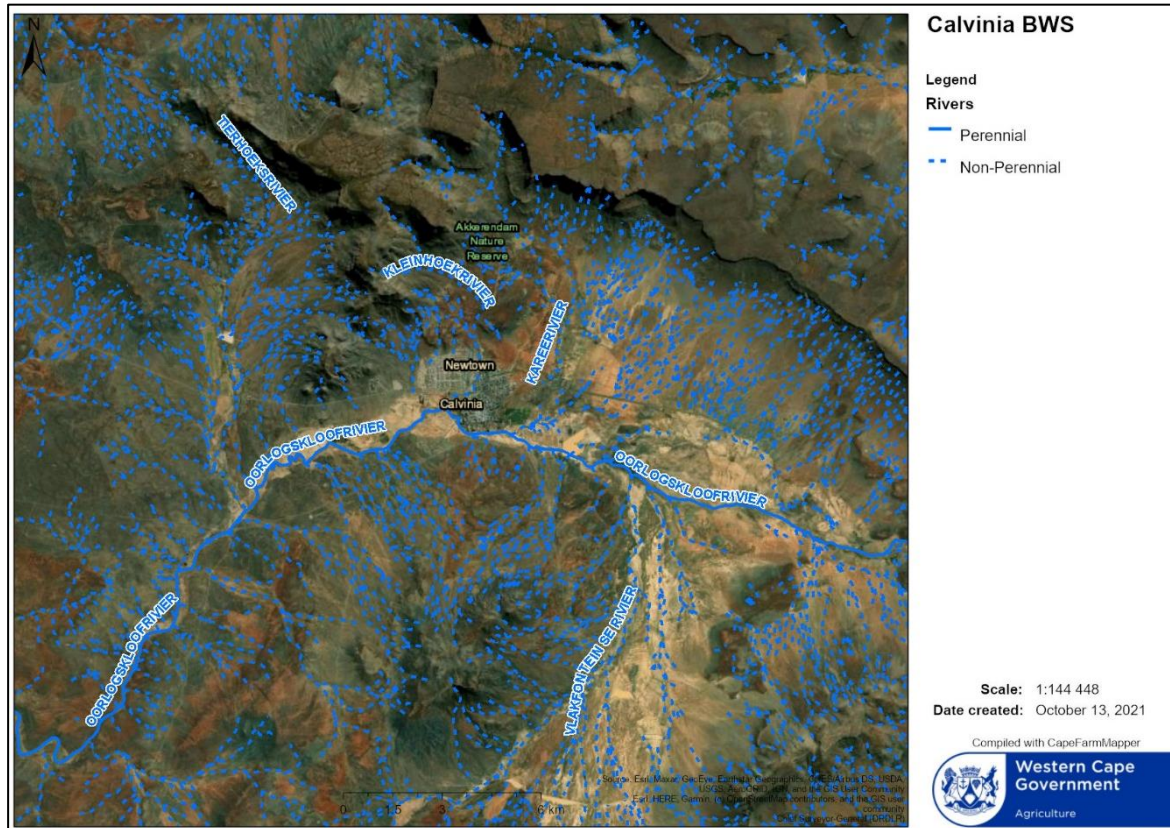


Figure 9: CapeFarmMapper image showing perennial and non-perennial rivers in and around Calvinia.

The Freshwater Assessment identified and classed the drainage lines along the pipeline routes. The classes are described in Table 2 below, including recommended mitigation measures

Table 2: Drainage Line Classes

| Class | Characteristics | Actions |
|---------|--|--|
| Class 1 | There is no discernible or visible drainage line. There is only a culvert. | No action is required |
| Class 2 | There is a drainage line. The drainage line is faint. | No action is required |
| Class 3 | There is a discernible drainage line. | No action is required, apart from that the trench must be 900mm deep |
| Class 4 | The drainage line is distinct. | Pipeline protection measures and erosion control measures must be implemented. |

| | | |
|---------|--|--|
| | There is an obvious, discernible drainage line, with clear signs of sediment transportation. | The pipeline must be covered with 900 to 1200mm of backfill. |
| Class 5 | Drainage lines resemble a river, more often than not incised, often with a wide river bed. | Pipelines protection measures must be implemented, such as gabions, reno mattresses and anchors. |

Table 3: Number of Drainage Lines

| Route | Class 1 | Class 2 | Class 3 | Class 4 | Class 5 |
|-----------------------|---------|---------|---------|---------|---------|
| Ceres Road | 0 | 5 | 10 | 4 | 6 |
| Loeriesfontein AP2286 | 37 | 33 | 24 | 13 | 4 |
| Klipwerf Road | 6 | 3 | 3 | 2 | 1 |
| Total | 43 | 41 | 37 | 19 | 11 |
| Grand Total | 151 | | | | |



Figure 10: Typical Class 4 drainage line

According to the Freshwater Assessment (**Appendix D2**), most of the drainage lines have little conservation value, but is still worthy of protection, with the exception of the Calvinia drainage lines, of which the lower reaches have been entirely altered. The envisaged pipelines are not about the change the classification of any of the drainage lines, provided that the ground is levelled and landscaped after the pipes have been covered. Likewise, the trenching of the pipeline through the Oorlogskloof River is not about to change the classification.

• **LAND USE CHARACTER OF SURROUNDING AREA**

Indicate land uses and/or prominent features that 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:

| | | |
|--|---|---|
| Natural area | Dam or reservoir | Polo fields |
| Low density residential | Hospital/medical centre | Filling station^H |
| Medium density residential | School | Landfill or waste treatment site |
| High density residential | Tertiary education facility | Plantation |
| Informal residential ^A | Church | Agriculture |
| Retail commercial & warehousing | Old age home | River, stream or wetland |
| Light industrial | Sewage treatment plant^A | Nature conservation area |
| Medium industrial ^{AN} | Train station or shunting yard ^N | Mountain, koppie or ridge |
| Heavy industrial ^{AN} | Railway line ^N | Museum |
| Power station | Major road (4 lanes or more) ^N | Historical building |
| Office/consulting room | Airport ^N | Protected Area |
| Military or police base/station/compound | Harbour | Graveyard |
| Spoil heap or slimes dam ^A | Sport facilities | Archaeological site |
| Quarry, sand or borrow pit | Golf course | 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? Specify and explain:

No impacts are expected.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

No impacts are expected.

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

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

| | | |
|--|-----|----|
| Critical Biodiversity Area (as per provincial conservation plan) | YES | NO |
| Core area of a protected area? | YES | NO |
| Buffer area of a protected area? | YES | NO |
| Planned expansion area of an existing protected area? | YES | NO |
| Existing offset area associated with a previous Environmental Authorisation? | YES | NO |
| Buffer area of the SKA? | YES | NO |

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A

• **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? If YES, explain: | YES | NO |
| | Uncertain | |
| <p>According to the Heritage Impact Assessment (Appendix D4), one isolated MSA core was recorded close to the development footprint of borehole BH3 (Cal_Phase3_9). The lithic material may be affected negatively by the proposed development, but due to the low significance of the material, the impact is negligible.</p> <p>Only two occurrences of historical-cultural material were found on the pipeline section crossing the Oorlogskloof River. At both locations, the surface scatters were small and without archaeological context and therefore deemed not conservation worthy.</p> <p>Twelve occurrences of historical features and material have been recorded on the Farm Aurets Kloof No. 854, in a 70-160m radius from BH 1 (Cal_S2_4) and BH2 (Cal_S2_3). A historical farmscape with graveyard, structural remains and middens, is situated close to the development footprints of the boreholes BH 1 (Cal_S2_4) and BH2 (Cal_S2_3) and the pipeline P1. These heritage resources are of medium to high cultural and historical significance. The probability of impact is low, but a buffer/safety zone to mitigate and negate any possibility of negative impact is nonetheless recommended.</p> <p>The development footprint is underlain by Quaternary Sediments; Jurassic dolerite, Tierberg and Whitehill Formation (Ecca Group; Karoo Supergroup). The Palaeontological Sensitivity of Quaternary sediments is low but locally high; the Jurassic dolerite is insignificant. At the same time, the Tierberg Formation has a Moderate and the Whitehill Formation a Very High Palaeontological Sensitivity. No fossiliferous outcrops were identified during the palaeontological field survey (Butler 2020: Appendix A). The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the development footprint will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological reserves of the area (Butler 2020).</p> | | |

| |
|--|
| If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist: |
| See above |

| | | |
|---|-----|----|
| Will any building or structure older than 60 years be affected in any way? | YES | NO |
| Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)? | YES | NO |
| <p>If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.</p> <p>Section 38 (1) (a) of the Act also stipulates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.</p> <p>The project is therefore subject to Section 38(1) of the NHRA. The project has been registered with SAHRA through SAHRIS.</p> | | |

- **SOCIO-ECONOMIC CHARACTER**

- a) **Local Municipality**

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

According to the Hantam Local Municipality Integrated Development Plan 2020 - 2021, the 2017 employment status of the working age population in the Namakwa district of 39.1% (or 29 212) formally employed is better than the situation in 2001 when 34.7% or 27 715 was formally employed but worse than in 2016 (39.3% or 29 317). However, and measured as a percentage, 10.3% of the working age population was unemployed in 2017, compared to 8.2% in 2001 and 10% in 2016. In the Hantam municipal area, 5 165 (or 38.2%) of the working age population was formally employed in 2017, compared to 5224 (or 39.3%) in 2016 and 5 614 (or 37.4%) in 2001, i.e. a relative improvement in overall formal employment since 2001 but worsening in recent years. These figures also represent a worsening trend if measured in number of persons employed. The number of unemployed persons (802) in the municipal area, in 2017, was more or less the same as in 2016 (746) and in 2001 (779). These trends must be seen in the light of the general depopulation of the municipality, i.e. a smaller working age population and the high percentage of persons not economically active.

Any unemployment figure, irrespective of how large, has serious repercussions on the ability of the population, at large, to uphold dignified living conditions and for the municipality to fulfil its revenue-raising mandate as the number of indigent households will increase. For the unemployed, pension/welfare payments are the only reliable source of income. The table below includes the employment status of the working age population in the Hantam and Namakwa District municipal areas in 2001, 2011, 2016 and 2017, respectively.

Economic profile of local municipality:

According to the Hantam Local Municipality Integrated Development Plan 2020 - 2021, the Hantam Municipality is a relatively small economy, making up about 13% of 2017 Gross Value Added (GVA) in the Namakwa district – up from 12% in 2016. These contributions are negligible proportions (for both years at 1.6%) of the provincial economy and are like the respective contributions in 2011. The percentage share contribution by the tertiary sector in 2017 to the total 'GVA' generated in the Hantam municipal area is about 69% or R1012 million compared to 70% or R928 million in 2016. The primary sector contributed 23.5% or R344 million and the secondary sector 7.5% or R111 million in 2017 – increased contributions from the year before. Between 2000 and 2015, every economic sector in the municipal area grew positively in terms of GVA contribution but manufacturing showed negative growth in recent years. Note that the subsectors do not have high levels of volatility that are typical for specifically the primary sector.

Level of education:

According to the Hantam Local Municipality Integrated Development Plan 2020 - 2021, there is a slight improvement in the number of persons with matric in the Hantam municipal area despite a very low population growth rate. The biggest success, however, is the substantially fewer persons with no schooling in 2011 and 2017 compared to 2001. The education levels in the municipal area are indicated in the table below:

Table 4: Education Levels

| Indicator | | 2001 | 2011 | 2017 | % change (2011 – 2017) |
|-----------|------------------|------|------|------|---------------------------|
| Education | No Schooling | 4515 | 3080 | 3068 | -32.1% |
| | Matric | 2367 | 2390 | 2451 | 3.6% |
| | Higher Education | 1035 | 997 | 1056 | 2.1% |

b) Socio-economic value of the activity

| | | |
|--|------------------------------------|----|
| What is the expected capital value of the activity on completion? | R184 257 391-21 | |
| What is the expected yearly income that will be generated by or as a result of the activity? | R4 million per annum | |
| Will the activity contribute to service infrastructure? | YES | NO |
| Is the activity a public amenity? | YES | NO |
| How many new employment opportunities will be created in the development and construction phase of the activity/ies? | 60 | |
| What is the expected value of the employment opportunities during the development and construction phase? | Construction: R1 526 020-00 | |
| What percentage of this will accrue to previously disadvantaged individuals? | 100% | |
| How many permanent new employment opportunities will be created during the operational phase of the activity? | 2 | |
| What is the expected current value of the employment opportunities during the first 10 years? | R5 200 000 (R520 000-00 /annum) | |
| What percentage of this will accrue to previously disadvantaged individuals? | 100% | |

• BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report

- a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

| Systematic Biodiversity Planning Category | | | | If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan |
|---|-------------------------------|--------------------------|---------------------------------|---|
| Critical Biodiversity Area (CBA) | Ecological Support Area (ESA) | Other Natural Area (ONA) | No Natural Area Remaining (NNR) | The site is located within a CBA identified on SANBI BGIS (refer to Figure 10 below and section 4.3 of the Botanical Assessment (Appendix D1). |
| | | | | |
| | | | | |

According to the Botanical Assessment (**Appendix D3**), according to the NCCBA (Figure 11 below), portions of the pipeline route will impact on both ESA's and CBA's. Fortunately, the pipeline will be located within the road reserve wherever possible. Road reserves can be very good ecological corridors, but can be also mostly slightly more disturbed as a result of road maintenance actions and the edge effect of the road itself (coupled with impacts from the road users). It was taken into account that the placement of the pipeline (underground) will only result in a short to medium term temporary impact, while locating it in the road reserve (rather than in the adjacent remaining natural veld), will also minimise the impact.

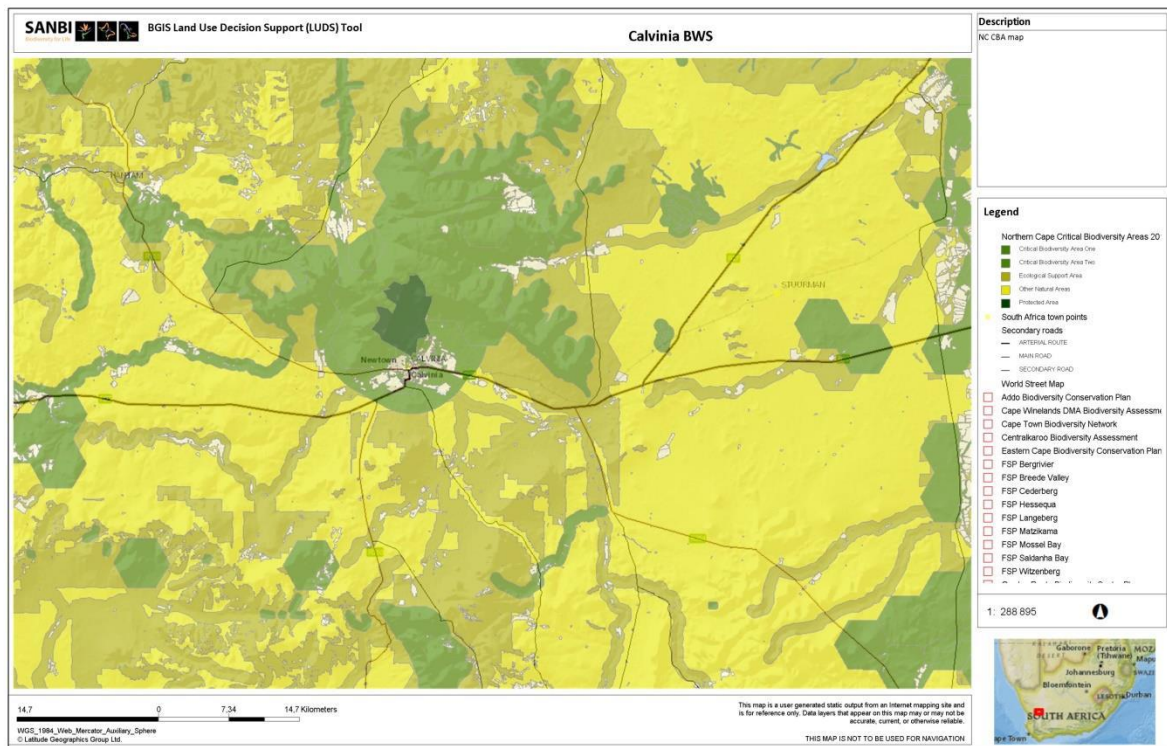


Figure 11: SANBI BGIS image of the CBAs in and around Calvinia site.

b) Indicate and describe the habitat condition on site

| Habitat Condition | Percentage of habitat condition class (adding up to 100%) | Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc). |
|--|---|---|
| Natural | 5% | Small sections (<5%) will be through natural areas, with little to no disturbance |
| Near Natural (includes areas with low to moderate level of alien invasive plants) | | |
| Degraded (includes areas heavily invaded by alien plants) | 9% | According to the Botanical Assessment (Appendix D3), 95% of the approximate 100 km pipeline will be located within existing road reserves. About 5.5 km will be located on active livestock farms. |
| Transformed (includes cultivation, dams, urban, plantation, roads, etc) | | |

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

| Terrestrial Ecosystems | | Aquatic Ecosystems | | | | | | | |
|---|------------------|--|----|--------|---------|----|-----------|----|--|
| Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) | Critical | Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands) | | | Estuary | | Coastline | | |
| | Endangered | | | | | | | | |
| | Vulnerable | | | | | | | | |
| | Least Threatened | YES | NO | UNSURE | YES | NO | YES | NO | |

- d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

According to the Biodiversity Assessment (**Appendix D1**), in accordance with the 2018 Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006), the proposed footprint(s) will only impact on one broad vegetation type, namely **Hantam Karoo** (Figure 12), a vegetation type classified as “Least Threatened” in terms of the NEM: BA “*national list of ecosystems that are threatened and in need of protection*” (GN 1002, December 2011).

More recently the 2018 National Biodiversity Assessment (NBA) was published (Skowno *et al.*, 2019a & Skowno *et al.*, 2019b). Although the findings of the 2018 NBA it is not yet formally adopted by NEM: BA in terms of regulations it is important to consider these findings. However, Hantam Karoo vegetation remains classified as “Least Threatened” in terms of the 2018 NBA.

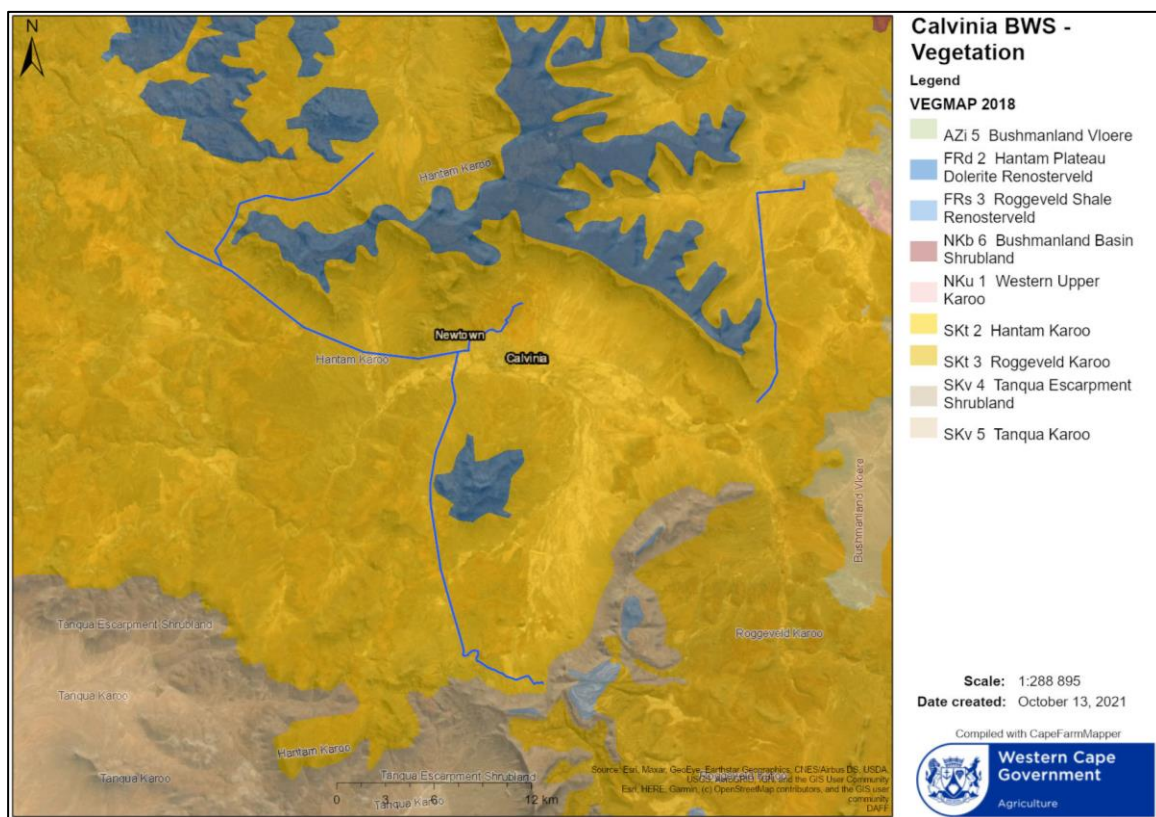


Figure 12: Vegetation Map of South Africa (2018).

According to the Biodiversity Assessment (**Appendix D3**), at the time of the study the area was still in the grips of a severe dry spell, which had lasted almost seven years at that stage. The Kreitzberg area seems to have had some recent rains, but the rest of the area was still dry to very dry. This reflected in the species composition and the condition of the plants (e.g. very few annual-, herbaceous- or bulbaceous plants were observed). The vegetation was relatively similar over most of the study area, but differences in soil, variation in altitude and rainfall (drier areas) influenced species composition. The vegetation to the north of Calvinia (Loeriesfontein-, Toren and Klipwerf roads) were generally much drier. The soils in the lower lying areas at Calvinia and its surrounds were generally more clayey and probably more prone to being waterlogged. Historic and on-going agricultural practices and urban associated disturbances near the town of Calvinia meant that the vegetation surrounding the town was generally in poor condition and most often dominated by hardy pioneer and weedy species.

For discussion purposes the following broad distinctions were made:

- The southern pipeline and boreholes (Kreitzberg area);
- The dryer vegetation north-west of Calvinia (along the foothills of the Hantam Mountains);
- The vegetation to the north-east of Calvinia (Klipwerf road & Farm Rietfontein).
- The disturbed vegetation around Calvinia;
- Pipeline route between R27 and R355 crossing the Oorlogskloof River

The southern pipeline and boreholes (Kreitzberg area)

The southern boreholes (CAL-S2-3 and CAL-S2-4) are found on the remainder of Farm Aurets Kloof No. 854 (located in the Kreitzberg Area), which is located on the plateau just north of the Tanqua escarpment (just north of the Bloukrans Pass). The boreholes are also located near to the interface between the Hantam Karoo and the Tanqua Escarpment Shrubland vegetation types and next to a small seasonal stream. However, the vegetation itself was dominated by hardy low-growing small-leaved perennial shrubs (<0.5 m), which conformed to the Hantam Karoo vegetation type. Even though this area was slightly wetter than the rest of the study area, very few herbaceous-, annuals and geophytic plants were observed because of the on-going severe draught.

The shrubland encountered near the boreholes on the Farm Aurets Kloof and that encountered along the road reserve from Aurets Kloof to CAL-Phase3 and further north to CAL-S2-10, as well as the vegetation on the Vlakke Fontein itself was very similar, with the only differences being the vegetation encountered next to seasonal drainage lines and streams.

On Aurets Kloof, the veld was slightly more disturbed as the boreholes were located next to an existing watering point for domestic animals. Because of the regular (and more intensive grazing) of the area near the watering holes, the vegetation was dominated by the disturbance indicator *Galenia africana*. The remainder of the veld (including the road reserves) was usually dominated by a combination of *Galenia africana*, *Ruschia intricata* (very common), *Mesembryanthemum noctiflorum* (very common), *Dicerotheramnus rhinocerotis* (Renosterbos), *Eriocephalus africanus*, *E. ericoides*, the reddish *Mesembryanthemum dinteri* (Kraalbossie), *Osteospermum sinuatum*, *Pentzia incana*, *Pteronia glauca* and *Pteronia incana*. In between these shrubs species like *Anisodonteia triloba*, *Asparagus capensis*, the tall dried out remains of *Bulbinella* cf. *elegans*, the grass *Ehrharta calycina* (occasionally), *Cheiridopsis namaquensis* (only observed at Vlakke Fontein), *Crassula subaphylla*, *Drosanthemum* cf. *framesii*, *Euryops lateriflorus*, *Euryops multifidus*, *Euryops nodosus*, *Euryops* species, the kukumakranka *Gethyllis lanuginosa*, *Hirpicium alienatum*, *Mesembryanthemum guerichianum*, the prostrate *Mesembryanthemum fastigiatum*, the bulb *Moraea pritzeliana*, the beautiful *Pelargonium rapaceum* (only at Vlakke Fontein), *Tylecodon wallichii* and *Ursinia nana* were often observed.

The seasonal streams were usually demarcated by a riparian zone of slightly larger shrubs, although riparian vegetation was not always as conspicuous or obvious as one might have expected. Near

the permanent surface water patches (the drinking hole and boreholes) on farm Aurets Kloof, sedges and restios such as *Afroscirpoides dioeca*, *Typha capensis* and *Willdenowia incurvata* were observed, which was not observed elsewhere near seasonal streams. One individual of the Natal bottlebrush (*Greyia sutherlandii*) was also observed (a tree normally found in the rocky ridges of the Eastern Cape). It is expected that this tree was planted as a shade- or decorative tree (it was observed next to the stream but also near to the ruins of old buildings). Normally the vegetation associated with seasonal streams included small to medium trees like *Searsia undulata* (the parasitic plant *Viscum cf. hoolei* observed within one of these trees), *Searsia lancea* and *Diospyros austro-africana*, while larger shrubs like, *Lycium amoenum*, *Nenax microphylla* and the herbs *Ballota africana* and *Berkheya heterophylla* was normally only associated with these streams. A few of the alien invasive *Prosopis* trees was also observed near the boreholes on Farm Aurets Kloof.

Following the Kreitzberg- and Nooiensfontein roads, the vegetation remains basically the same as described above, although *Berkheya cf. fruticosa*, *Pteronia camphorata* and *Bromus pectinatus* was also observed. The pipeline will then follow the road reserve of the upper parts of the R355 or the Ceres – Calvinia road (Refer to Figure 10). Along the R355, the road reserve showed more signs of disturbances and the veld itself was also generally more disturbed than the neighbouring farmlands. The vegetation still remains the same, although *Ruschia intricata* was much more dominant in patches, while *Galenia africana* would dominate disturbed areas. The attractive Kankerbossie (*Lessertia frutescens*) was occasionally observed as well as the invasive alien plant *Opuntia ficus-indica* (occasionally).

Nearer to Calvinia the soils becomes more clayey and dry and the vegetation composition changes slightly with *Galenia africana*, the weed *Salsola kali*, *Ursinia nana*, *Mesembryanthemum dinteri* (most of them also disturbance indicators) and *Eriocephalus ericoides* becoming more dominant.

North-west of Calvinia

Two new proposed boreholes will be developed to the north-west of Calvinia. Both these boreholes are located within existing road reserves, one about 35 km north of Calvinia next to the Calvinia-Loeriesfontein road (R355 north) and one 14 km east on the Toren road. It is proposed that the new connecting pipelines (and power supply lines) are located within the road reserves of these roads (the eastern reserve of the Loeriesfontein road) and either the northern or southern reserve of the Toren road (depending on specialist studies).

Almost the first observation made, when initially driving from Calvinia along the Loeriesfontein road (the R355 north) is that the vegetation, although very similar, is a much drier version of the vegetation encountered along the R355 south towards Kreitzberg. The road reserve itself is also in general much wider (sometimes 50 – 70 m wide) along this section of the road.

Again the observations of annual plants, herbaceous plants and geophytes were limited as a result of the on-going drought. Along the road reserve, portions of the road reserve did show physical disturbances, but in general the vegetation was still very much natural (although typically along road reserves, weedy species were commonly observed).

The vegetation can be described as dominated by low growing (<0.5 m high) small-leaved perennial shrubs, with succulents scattered in between. *Eriocephalus ericoides* were more dominant in combination with *Pentzia incana*, *Galenia africana*, *Mesembryanthemum dinteri* (=Psilocaulon), *Osteospermum sinuatum*, *Mesembryanthemum noctiflorum* (=Aridaria), *Euryops lateriflorus*, *Pteronia incana*, *Dicerotheramnus rhinocerotis*, *Ruschia intricata*, *Lycium cinereum*, *Hirpicium alienatum*, *Anisodonteia triloba* and the grass *Ehrharta calycina*. The herb *Tetragonia fruticosa*, the climbers *Microloma sagittatum* (in seed) and *Asparagus* species as well as *Euphorbia mauritanica*, *Roepera flexuosa* (=Zygophyllum), the weed *Salsola aphylla* and the succulents

Mesembryanthemum amplexans and *Mesembryanthemum* cf. *nitidum* were observed for the first time.

In disturbed areas and road verges species like *Galenia africana*, *Mesembryanthemum guerichianum*, *Salsola kali*, *Oncosiphon piluliferus*, *Ursinia nana* and *Mesembryanthemum dinteri* were more prominent.

The vegetation along the 14 km Toren road is very much the same as that found along the Loeriesfontein road (especially the lower lying areas). It remains a dry low shrubland, generally in good condition, although patch disturbances within the road reserve were also common. *Eriocephalus ericoides*, *Ruschia intricata*, *Pentzia incana*, *Galenia africana*, *Lycium cinereum* and *Hirpicium alienatum* were still very common. *Euphorbia mauritanica* becomes more dominant in areas where the road runs over the foothills of the Hantam Mountains, while a number of small seasonal streams cross the road from south to north down into the valley bottom.

Searsia lancea and *Searsia undulata* usually dominates the upper canopy of the vegetation along these seasonal streams. The only new plants observed were a patch *Montinia caryophyllacea* (next to one of these water courses) and *Phragmites australis* (within the stream) while the climber *Cysticapnos vesicaria* was observed in one of the larger *Searsia lancea* trees. In the area the main objective should be to minimise the impact on larger indigenous trees (next to the water courses). They are mostly on the downslope (or northern side of the road verge). Unfortunately, the southern or upper slope is in places very narrow and steep, which might result in future erosion problems. The location of the pipeline should thus be a careful consideration between the protection of larger indigenous trees and the minimisation of future erosion problems.

North-east of Calvinia (Klipwerf road & Farm Rietfontein).

The last proposed borehole is located to the north-east of Calvinia, on the remainder of the farm Rietfontein no. 550, about 4 km east of the Klipwerf road. The proposed pipeline (and power supply line) will follow the shortest route from the borehole south, to link up and then follow an existing twee-spoor road on the farm west towards the Klipwerf road. On its way it will cross portion 10 of the farm Spitskop no. 552 (both properties belonging to the same land owner). The proposed pipeline will then be placed within the road reserve of the Klipwerf road to link up with an existing pipeline next to the R26 (Calvinia – Brandvlei road).

The vegetation along the Klipwerf road is similar to the vegetation found along the R355 south (Calvinia – Ceres road), although a slightly drier version. It is again dominated by hardy low-growing small-leaved perennial shrubs (<0.5 m), but with succulent species equally common. Species diversity of both the shrub and succulent components was not very high (the same species being dominant for most of the way). The road reserve along the Klipwerf road is already disturbed by a cut-off (erosion prevention) trench running between the road verge and the fence delineating the road reserve.

In general the vegetation along the Klipwerf road was dominated by *Eriocephalus ericoides*, *Ruschia intricata* and *Pentzia incana* with individuals of *Euphorbia mauritanica* dotted throughout the first section (going over the small hills which rises from the R27). *Cotyledon orbiculata* was also commonly observed along this first section of the road as well as *Atriplex lindleyi*.

Going over the first hills into the valley behind, the soils became more clayey. *Eriocephalus* and *Ruschia* still dominated the vegetation, but the *Euphorbia* – and *Cotyledon* plants were replaced by a *Mesembryanthemum* species, most notably *M. noctiflorum* and *M. dinteri*. The dried out remains of *Moraea* cf. *bifida* were found throughout and would have made a spectacular show when in flower. Disturbed areas along the road were almost always dominated by *Mesembryanthemum fastigiatum*, *Galenia africana* and *Mesembryanthemum dinteri*. Seasonal streams were associated with slightly

larger bush clumps formed by a combination of species like *Lycium cinereum*, *Asparagus capensis*, *Galenia fruticosa* and *Melianthus comosus*.

From the Klipwerf road the proposed pipeline will turn east for the last 14 km to the borehole on Rietfontein. Turning onto the farm Spitskop the vegetation changes almost immediately to a very sparse Gannabos veld (*Salsola tuberculata*) as one enters one of the typical brackish lower lying areas or “vloere” of the Northern Cape (with its salty and clayey soils). The pipeline will follow an existing twee-spoor pad over Skipskop onto Rietfontein up until it is level with the borehole. It will then follow the shortest route north, partially still following an existing twee-spoor road.

On Skipskop the vegetation is especially sparse with only a few individuals of *Salsola tuberculata*, *Mesembryanthemum junceum* and *Mesembryanthemum fastigiatum* plants encountered. The farm Rietfontein is on a slightly higher elevation as Skipskop and as a result the vegetation becomes slightly denser. The veld was very uniform in species composition and remains dominated by *Salsola tuberculata* in combination with *Mesembryanthemum noctiflorum*, *M. amplexans*, *M. fastigiatum*, *Rosenia cf. glandulosa*, *Lycium cinereum* and *Mesembryanthemum junceum*. Scattered within this veld individuals of *Galenia fruticosa*, *Atriplex lindleyi*, *A. semibaccata*, *Oncosiphon piluliferus* and *Ursinia nana* were also encountered.

Disturbed vegetation around Calvinia

In terms of infrastructure, new pipelines will have to be constructed to the south (from the Calvinia – Ceres) road, from the east (the Loeriesfontein road), which will run to the south and north of Calvinia to be connected to the existing water treatment works (WTW), which is located to the north of town (just east of the Akkerendam Nature Reserve). Please note that the access road to the WTW runs through this Nature Reserve, however, the pipeline will follow existing tracks within the nature reserve.

The vegetation encountered just east of the water treatment works described by Van der Merwe & Hoffman (2019) as falling into the *Galenia africana* – *Eriocephalus ericoides* community of the Hantam Karoo vegetation type in their excellent work on the vegetation of Akkerendam Nature Reserve. According to this study species expected includes *Amphiglossa triflora*, *Aristida vestita*, *Chrysocoma ciliata*, *Ehrharta calycina*, *Eriocephalus ericoides*, *E. spinescens*, *Galenia africana*, *Hermannia cuneifolia*, *Pteronia incana* and *Ruschia intricata*.

The proposed route will run along the existing entrance route to the WTW through the Akkerendam NR (for about 3.5 km). This will mean the pipeline will have an impact on remaining natural veld for almost the whole of the 3.5 km, which is not preferable, especially within a Nature Reserve in a semi-desert region where rehabilitation will be very slow.

Pipeline route between R27 and R355 crossing the Oorlogskloof River

At the time of the site visit the area had experienced some rain since the original site visit was done. As a result, several annuals (mostly weedy pioneer species) and succulent were observed, which were not noticeable during the original site visit. The vegetation to the south of the Oorlogskloof river was in relatively good condition (although the impact of the prolonged drought can still be seen). North of the Oorlogskloof River the pipeline will overlap the disturbed old agricultural areas for most of the way, before crossing a small patch of remaining natural veld just south of the R355. However, in this area the vegetation showed signs of grazing and were generally not in as good shape as that to the south of the river.

The vegetation encountered to the south of the Oorlogskloof River was very similar that encountered along the southern portions of the R355 and the Kreitzberg areas and mostly dominated by a combination of *Ruschia intricata*, *Mesembryanthemum noctiflorum*, *Eriocephalus africanus*, *E.*

ericoides, *Osteospermum sinuatum*, *Pentzia incana*, *Pteronia glauca* and *Pteronia incana*. For a full description of this vegetation refer to Heading 4.2.1 of the Botanical Assessment (Appendix D3).

Because of the recent rains, several annual and geophytic plants were also visible. Annuals included: "Wildemagriet" (*Dimorphotheca nudicaulis*), "Hongerblom" (*Senecio* species), "Botterblom" (*Gazania* species),

Geophytic plants included: *Bulbine praemorsa* (blougif), *Lapeirousia* species (no flowers), *Gethyllis* species (no flowers), *Homeria* cf. *vallisbelli*, *Wurmbea variabilis*.

Other species observed included *Astridia longifolia*, *Cephalophyllum* cf. *rigidum*, *Drosanthemum* cf. *framesii*, *Euphorbia mauritanica*, *Hermannia* cf. *cuneifolia*, *Oncosiphon piluliferus* and *Pentzia incana*.

The longest section of this alternative pipeline route will cross old agricultural land (which seems to be old floodplain areas associated with the river. The soils are markedly more clayey. Most of these areas are still used for agriculture or for grazing by game. Indigenous antelope and several Ostrich were observed in these camps. Large areas had been planted to grazing and are still irrigated. Other intensive agriculture seems also still be practiced in places (potentially on a rational basis).

Most of the areas associated with the pipeline route through the agricultural area (old floodplain area) shows signs of historic cultivation or existing cultivation. Remaining natural veld is found in small patches or along the edges of the agricultural areas. The vegetation is mostly dominated by a mixture of *Salsola* and *Atriplex* ("Soutbos") plants.

Other species observed along the edges of the floodplain includes: *Atriplex semibaccata*, *A. lindleyi*, *Drosanthemum* cf. *hispidum*, *Lycium cinereum*, *Manochlamys albicans* ("Seepbos"), *Mesembryanthemum guerichianum*, *Mesembryanthemum noctiflorum*, *Salsola aphylla*, *S. kali*, *Salvia disermas*. The invasive alien *Prosopis* tree was also often observed scattered throughout this area.

The vegetation encountered in the remaining natural veld south of the Loeriesfontein road (the R355 north), between the road and the agricultural area seems to be a dryer version of that described under the above and like the vegetation described under Heading 4.2.2 of the Botanical Assessment (Appendix D3).

The veld was usually dominated by *Eriocephalus ericoides* in combination with *Pentzia incana*, *Galenia africana*, *Mesembryanthemum dinteri* (= *Psilocaulon*), *Osteospermum sinuatum*, *Mesembryanthemum noctiflorum* (= *Aridaria*), *Pteronia incana*, *Ruschia intricata* and *Lycium cinereum*. The herb *Tetragonia fruticosa*, *Asparagus* species as well as *Euphorbia mauritanica*, the weed *Salsola aphylla* and the succulents *Mesembryanthemum amplexans* were again observed.

In disturbed areas species like *Galenia africana*, *Mesembryanthemum guerichianum*, *Salsola kali*, *Oncosiphon piluliferus*, *Ursinia nana* and *Mesembryanthemum dinteri* were prominent.

For more details, please refer to Section 4.2 of the Botanical Impact Assessment (Appendix D3).

According to the Biodiversity Assessment (**Appendix D1**), the main impacts associated with the proposed development will be:

- The impact on NCNCA protected plant species (a definite, but temporary impact);
- The impact on CBA and ESA areas (a definite, but temporary impact);
- The impact on remaining natural vegetation (a definite, but temporary impact on vegetation classified as of Least Concern);

The No-Go option is not likely to result in a “no-impact” scenario, for it will have a negative socio-economic impact (and slow degradation may still continue).

The cumulative impact (without mitigation) is expected to be **Medium**, mainly as a result of the potential impact on protected plant species and CBA and ESA's, but can be reduced to **Low** through simple and very viable mitigation options.

Table 5: Plant species protected in terms of the NCNCA encountered within the study area (Botanical Impact Assessment (Appendix D3, Table 4)

| NO. | SPECIES NAME | COMMENTS | RECOMMENDATIONS |
|-----|---|--|---|
| 1. | <i>Bulbinella cf. elegans</i> Schedule 2 protected | Common bulb, especially along the Klipwerf road. | This plant was not restricted to the road reserve (very common in the adjacent veld). No search & rescue required. Topsoil conservation (top 15 – 20 cm of soils) and re-use for rehabilitation should |
| 2. | <i>Cheiridopsis namaquensis</i> Schedule 2 protected | A very small plant, occasionally encountered on the remainder of Farm Vlakke Fontein no. 766 | Search & rescue all plants, and replant to adjacent veld, if the pipeline over the Farm Vlakke Fontein is <u>installed underground</u> ; If the pipeline is installed <u>above ground</u> , the impact will be minimal and <u>no search & rescue required</u> . |
| 3. | <i>Cotyledon orbiculata</i> Schedule 2 protected | Occasionally observed along the Klipwerf road. | Search & rescue all plants. Replant to adjacent veld. |
| 4. | <i>Crassula subaphylla</i> Schedule 2 protected | Occasionally observed in the Kreitzberg area (the farms Aurets kloof and Vlakke Fontein) | Search & rescue all plants, and replant to adjacent veld, where the pipeline is <u>installed underground</u> ; If the pipeline is installed <u>above ground</u> , the impact will be minimal and <u>no search & rescue required</u> . |
| 5. | <i>Drosanthemum cf. framesii</i> Schedule 2 protected | Occasionally observed in the Kreitzberg area (the farms Aurets kloof and Vlakke Fontein) | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 6. | <i>Euphorbia mauritanica</i> Schedule 2 protected | Common along the foothills of the Hantam Mountains | No search & rescue required. Larger plants does not transplant successfully. |
| 7. | <i>Galenia africana</i> Schedule 2 protected | Common throughout | No search & rescue required. A weedy pioneer species. |
| 8. | <i>Galenia fruticosa</i> Schedule 2 protected | Occasionally found along the Klipwerf road. | No search & rescue required. Impact will be insignificant on this population. |
| 9. | <i>Gethyllis lanuginosa</i> Schedule 2 protected | Occasionally observed (only 2 individuals) on the farm Vlakke Fontein, but should be expected in the whole of the Kreitzberg area. | No Search & rescue required as it will be difficult to observe them out of season. Must be protected through topsoil conservation where pipelines are installed underground. |

| | | | |
|-----|---|--|---|
| 10. | <i>Lachenalia cf. carnosa</i> Schedule 2 protected | Occasionally observed just east of Calvinia. | No Search & rescue required as it will be difficult to observe them out of season. Must be protected through topsoil conservation where pipelines are installed underground. |
| 11. | <i>Lessertia frutescens</i> Schedule 1 protected | Occasionally observed within the road reserves. | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 12. | <i>Mesembryanthemum amplexens</i> Schedule 2 protected | Relative common throughout. | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 13. | <i>Mesembryanthemum cf. nitidum</i> Schedule 2 protected | Occasionally observed. | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 14. | <i>Mesembryanthemum dinteri</i> Schedule 2 protected | Common almost throughout (common in disturbed areas) | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 15. | <i>Mesembryanthemum fastigiatum</i> Schedule 2 protected | Common throughout – a disturbance indicator. | No search & rescue required. A weedy pioneer species. |
| 16. | <i>Mesembryanthemum guerichianum</i> Schedule 2 protected | Common throughout – a disturbance indicator. | No search & rescue required. A weedy pioneer species. |
| 17. | <i>Mesembryanthemum junceum</i> Schedule 2 protected | Common almost throughout (common in disturbed areas) | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 18. | <i>Mesembryanthemum noctiflorum</i> Schedule 2 protected | Common almost throughout (common in disturbed areas) | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 19. | <i>Mesembryanthemum subnodosum</i> Schedule 2 protected | Common almost throughout (common in disturbed areas) | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 20. | <i>Microlooma sagittatum</i> Schedule 2 protected | Relative common herbaceous climber. | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 21. | <i>Moraea cf. bifida</i> Schedule 2 protected | Occasionally observed. | No Search & rescue required as it will be difficult to observe them out of season. Must be protected through topsoil conservation where pipelines are installed underground. |
| 22. | <i>Moraea cf. pritzeliana</i> Schedule 2 protected | Occasionally observed near Calvinia. | No Search & rescue required as it will be difficult to observe them out of season. Must be protected through topsoil conservation where pipelines are installed underground. |

| | | | |
|-----|--|--|--|
| 23. | <i>Pelargonium rapaceum</i> Schedule 1 protected | A very small plant, occasionally encountered on the remainder of Farm Vlakke Fontein no. 766 | Search & rescue all plants, and replant to adjacent veld, if the pipeline over the Farm Vlakke Fontein is <u>installed underground</u> ; If the pipeline is installed <u>above ground</u> , the impact will be minimal and <u>no search & rescue required</u> . |
| 24. | <i>Ruschia intricata</i> Schedule 2 protected | Very common plant in most Karoo veld | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 25. | <i>Tetragonia fruticosa</i> Schedule 2 protected | A common plant | No search & rescue required. Will be protected through topsoil conservation (propagate by seed) where pipelines are installed underground. |
| 26. | <i>Tylecodon wallichii</i> Schedule 2 protected | Relative common (poisonous to livestock) | No search & rescue required. Will be protected through topsoil conservation where pipelines are installed underground. |
| 27. | <i>Willdenowia incurvata</i> Schedule 2 protected | Only observed at Aurets Kloof next to water course. | No search & rescue required. |
| 28. | <i>Astridia longifolia</i> Schedule 2 protected | Small to medium succulent plant with bright red flowers. | Search & rescue all plants. Replant to adjacent veld. Fortunately, only observed well away from the proposed footprint on the interface between the natural veld just north of the Oorlogskloof River and the floodplain area. |
| 29. | <i>Cephalophyllum cf. rigidum</i> Schedule 2 protected | A smallish succulent, occasionally observed in the same area as the plant above. | Search & rescue all plants, and replant to adjacent veld. |

SECTION C: PUBLIC PARTICIPATION

• ADVERTISEMENT AND NOTICE

| | | |
|-----------------------------|------------------|------------------|
| Publication name | Noordwester | |
| Date published | 20 November 2020 | |
| Site notice position | Latitude | Longitude |
| | | |
| Date placed | See Appendix E1 | |

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

• DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

| Title, Name and Surname | Affiliation/ status | key stakeholder | Contact details (tel number or e-mail address) |
|--------------------------------|----------------------------|------------------------|---|
| | | | |
| | | | |
| | | | |

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

• ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

| Summary of main issues raised by I&APs | Summary of response from EAP |
|---|-------------------------------------|
| No comments were received during the initial PPP period | |

• COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR 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 the Final BAR as Appendix E3.

- **AUTHORITY PARTICIPATION**

Authorities and organs of state identified as key stakeholders:

| Authority/Organ of State | Contact person (Title, Name and Surname) | Tel No | Fax No | e-mail | Postal address |
|--|---|---------------|---------------|---------------|---|
| NC Department of Agriculture & Land Reform | W. Mothibi (HOD) | (053)838 9102 | | | Private Bag X5018, Kimberley, 8300 |
| Department of Cooperative Governance, Human Settlements and Traditional Affairs (NC) | Gladys Botha | 053 830 9513 | | | Private bag X5005, Kimberley, 8300 |
| Department of Roads and Public Works | K. Nogwili (HOD) | (053)839 2241 | | | P O Box 3132, Kimberley, 8300 |
| Department: Forestry, Fisheries and the Environment: NFA Regulations | J. Mans | 060 9731660 | | | 26 Olien Street, Louisvale Road, Upington, 8801 |
| Department of Water and Sanitation | Vhonani Ramugondo | | | | 28 Central Road, Beaconsfield, Kimberley, 8301 |
| Department of Water and Sanitation | Glen Steenkamp | | | | 28 Central Road, Beaconsfield, Kimberley, 8301 |
| SAHRA | Natasha Higgitt | | | | P.O. Box 4637, Cape Town, 8000 |
| Department of Health | Steven Jonkers | | | | Private Bag X5049, Kimberley, 8300 |

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

- **CONSULTATION WITH OTHER STAKEHOLDERS**

Note that, for any activities (linear or other) 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.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 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.

• 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

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts 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. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

| Activity | Impact summary | Significance | Proposed mitigation |
|--|--|---|--|
| Alternative 1 (preferred alternative) | | | |
| | <p>Direct impacts:</p> <p>Potential impact on freshwater ecosystems:</p> <p>Loosening of soil during construction phase, washing of soil down the drainage line and into the Oorlogskloof River during a storm event</p> <p>Building material, rubble and litter washing down the drainage line and into the Oorlogskloof River</p> <p>Construction of Reno mattresses and gabions, further downstream erosion.</p> <p>Leaks in pipeline, formation of wetlands where it should be naturally dry</p> | <p>Low Negative (with mitigation) -</p> <p>Low Negative (with mitigation) -</p> <p>Low Negative (with mitigation) -</p> <p>Low Negative (with mitigation) -</p> | <ul style="list-style-type: none"> • Compact back-fill. • Use suitable back-fill material. • Construction only during the dry season. • Best industry practices, due diligence, • cleaning up of site following construction • Construct flood-calming structures downstream of culverts • Maintain infrastructure, preventative maintenance • Regular inspection of infrastructure • Immediately repair pipeline |
| | | | |

| | | | |
|--|---|--|--|
| | <p>Biodiversity impacts:</p> <p>Land-use and Cover: Possible impact on socio-economic activities</p> <p>Vegetation Status: Possible loss of vulnerable or endangered vegetation and associated habitat.</p> <p>Conservation Priority Areas: Possible impact on Protected areas, CBA, ESA or centres of endemism.</p> <p>Connectivity: Possible loss of ecological corridors.</p> <p>Protected & endangered plant species: Potential impact on threatened or protected plant species.</p> <p>Invasive Alien Species: Possible alien infestation as a result of activities.</p> <p>Veld Fire: The risk of veld fires as a result of the proposed activities.</p> | <p>Insignificant (with mitigation)</p> <p>Low (Negative) (with mitigation)</p> <p>Low (Negative) (with mitigation)</p> <p>Low (Negative) (with mitigation)</p> <p>Low (Negative) (with mitigation)</p> <p>Insignificant (with mitigation)</p> <p>Insignificant (with mitigation)</p> | <p>The following mitigation actions should be implemented to ensure that the proposed development does not pose a significant threat to the environment:</p> <ul style="list-style-type: none"> - All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report. - A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies. - The layout of the development footprint should take the sensitivity map (see Figure 16 of the Botanical Impact Assessment (Appendix D3)) into account. - Search & rescue as described in Table 4, must be done before construction may commence; - Lay-down areas or construction sites must be located on areas already disturbed; - No unnecessary clearing of any area outside of the construction footprint may be allowed. - An integrated waste management approach must be implemented during construction. • Construction related general and hazardous waste may only be disposed of at suitably approved waste disposal sites. |
| | <p>The loss of palaeontological resources</p> | <p>Low (Negative)</p> | <ul style="list-style-type: none"> • If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor, which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager |

| | | | |
|--|--|--|--|
| | | | <p>must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.</p> <ul style="list-style-type: none"> • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more, the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. <p>Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.</p> <ul style="list-style-type: none"> • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilised and covered by a plastic sheet or sandbags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • In the event that the fossil cannot be stabilised the fossil may be collected with extreme care by the ESO or site manager. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once Heritage Agency has issued the written authorisation, the developer may continue with the development of the affected area. |
|--|--|--|--|

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| | The loss of archaeological resources | Low – High (negative) | <p>No significant heritage sites or features were identified within the surveyed sections of the BH4-7 borehole developments, and P2-4 pipeline trajectories. The isolated Middle Stone Age cultural material identified at BH3 (Cal_Phase3_9) is not conservation worthy. No further mitigation is recommended with regards to these resources. Therefore, from a heritage point of view, we recommend that the proposed development can continue at BH3-7, P2-4.</p> <p>The historical farmscape situated close to BH 1 (Cal_S2_4) to BH2 (Cal_S2_3) borehole developments and the first section of the P1 pipeline is of medium to high heritage significance (sites AUK002-013). These resources would require costly mitigation before destruction. It is, therefore, our recommendation that a buffer/safety zone should be implemented and that development should not exceed a 20m radius from the boreholes BH1 and BH2. Including all development activities and vehicle use associated with the development phase.</p> <p>The small graveyard (AUK001) situated close to the BH1 borehole development and the first section of the P1 pipeline is graded as IIIB and is of High Local Significance. These resources would require costly mitigation before destruction. It is, therefore, our recommendation that a buffer/safety zone should be implemented and that development should not exceed a 20m radius from the borehole BH1. This includes all development activities and vehicle use associated with the development phase.</p> |
| | Indirect impacts: Temporary jobs will be created in the construction industry during the construction phase. | Low - positive | <p>No mitigation measures are required.</p> <p>Temporary jobs will be created during the construction phase</p> |
| | Cumulative impacts: Biodiversity: | Insignificant | |

| | | | |
|----------------------|---|---------------|-----|
| | Accumulative impact associated with the proposed activity. | | |
| | Direct impacts: | | |
| | Indirect impacts: | | |
| | Cumulative impacts: | | |
| Alternative 2 | | | |
| | Direct impacts: | | |
| | Indirect impacts: | | |
| | Cumulative impacts: | | |
| | Direct impacts: | | |
| | Indirect impacts: | | |
| | Cumulative impacts: | | |
| Alternative 3 | | | |
| | Direct impacts: | | |
| | Indirect impacts: | | |
| | Cumulative impacts: | | |
| | Direct impacts: | | |
| | Indirect impacts: | | |
| | Cumulative impacts: | | |
| No-go option | | | |
| | Direct impacts: This would mean that no-development would take place and the proposed site will remain as is. No expansion and upgrade to the existing bulk water system will take place for the town of Calvinia and the demand for additional water supply will not be met. Additional positive impacts such as the provision of job | Insignificant | N/A |

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|--|--|--|--|
| | <p>opportunities during the construction and operational phases will not be met.</p> <p>The no-go option would only have been recommended if it were found that the construction of the proposed pipelines and powerlines on this site or in this area might potentially cause substantial detrimental harm to the environment.</p> <p>According to the Biodiversity Assessment (Appendix D1), the No-Go option is not likely to result in a “no-impact” scenario, for it will have a negative socio-economic impact (and slow degradation may still continue). The status quo will be maintained, but veld will still be impacted by urban and agricultural related activities. Water is a basic right and all communities should have access to drinking water.</p> | | |
| | <i>Indirect impacts:</i> | | |
| | <i>Cumulative impacts:</i> | | |

A complete impact assessment in terms of Regulation 19(3) of GN 326 must be included as Appendix F.

• **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.

Freshwater ecosystems:

Loosening of soil during construction phase, washing of soil down the drainage line and into the Oorlogskloof River during a storm event – **Low - Negative**

Building material, rubble and litter washing down the drainage line and into the Oorlogskloof River – **Low - Negative**

Construction of Reno mattresses and gabions, further downstream erosion. – **Low - Negative**

Leaks in pipeline, formation of wetlands where it should be naturally dry – **Low - Negative**

Loss of vegetation:

Land-use and Cover – **Insignificant.**

Vegetation Status – **Low - Negative**

Conservation Priority Areas – **Low - Negative**

Connectivity – **Low - Negative**

Threatened or protected plant species. – **Low - Negative**

Invasive Alien Species – **Insignificant.**

Potential impacts on archaeological resources – **Low – High (Negative).**

Potential impacts on palaeontological resources – **Low (Negative).**

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

Noise impact - **Low (negative), definite, during construction phase.**

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

Operational Phase

Geographical and/or physical aspects - **No impact expected**

Freshwater ecosystems – **Low, Possible**

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

| |
|---|
| <p>Socio-economic (additional job opportunities) – Low (Positive), Definite</p> <p>Nuisances –Low, Possible</p> <p>Visual impact – Low, Probable</p> <p><u>Decommissioning</u></p> <p>The project as proposed does not require ‘decommissioning’ or ‘closure’, as such the potential impacts thereof is considered irrelevant.</p> |
| Alternative B |
| |
| Alternative C |
| |
| No-go alternative (compulsory) |
| <p>This would mean that no-development would take place and the proposed site will remain as is. No expansion and upgrade to the existing bulk water system will take place for the town of Calvinia and the demand for additional water supply will not be met.</p> <p>Additional positive impacts such as the provision of job opportunities during the construction and operational phases will not be met.</p> <p>The no-go option would only have been recommended if it were found that the construction of the proposed pipelines and powerlines on this site or in this area might potentially cause substantial detrimental harm to the environment.</p> <p>According to the Biodiversity Assessment (Appendix D1), the No-Go option is not likely to result in a “no-impact” scenario, for it will have a negative socio-economic impact (and slow degradation may still continue). The status quo will be maintained, but veld will still be impacted by urban and agricultural related activities. Water is a basic right an all communities should have access to drinking water.</p> |

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 | NO |
|--|-----|----|

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.

Compliance with the EMP and recommendations of the specialists and appointment of an ECO during the construction phase.

| | | |
|----------------------|-----|----|
| Is an EMPr attached? | YES | NO |
|----------------------|-----|----|

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information