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# FINAL BASIC ASSESSMENT

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## The proposed construction of the Ganspan WWTW and related bulk sewer infrastructure

**Applicant:** Phokwane Local Municipality  
**MDA Ref No:** 40738  
**Date:** August 2017



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**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:**

1. 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.
2. 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
3. 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.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. 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.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. 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.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. 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	
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If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

### 1. ACTIVITY DESCRIPTION

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

The proposed project entails the construction of a WWTW and related infrastructure (including pipeline) at Ganspan, Northern Cape Province.

Sewer is to be collected at 831 low income, and 583 middle income households. The total average dry weather flow is 594 075 l/hh/day while the average sewage inflow is 420 l/hh/day, with a peak factor of 2.67. In addition, a 15% storm water inflow was allowed to determine the peak wet weather flow (1 585 457 l/day, or 21.10 l/s).

#### 1. Outfall Sewer Line

Sewage will gravitate to a low point on the north western side of Ganspan in accordance to the preliminary planning and design of the network as per topography. Outfall sewer lines will be routes to collect sewage influent collected at 1 414 households at strategic positions where sewer lines need to be greater than 160 mm diameter as a result of sewage volumes or hydraulic gradients.

The following will be constructed as part of this pipeline:

- 3 155 m of 200 mm diameter uPVC 400Kpa
- 571 m of 250 mm diameter uPVC 400Kpa
- 45 x 1 m diameter precast concrete manholes, at all changes in directions, intersections and / or at intervals not further than 100 m apart

Trench widths will be approximately 800 mm, laid on 100 mm properly graded material bed on the given levels and covered with 300 mm compacted blanked on top of the pipe followed by backfilling to normal ground level.

The pipe routes lead and meet at a low point north of north-west of Ganspan, adjacent to the R370 road. This low point will be the position of the proposed pump station.

#### 2. Sewer Pump Station

The pump station is designed to convey screened influent collected in a concrete sump by means of dry well pumps at a duty of 24 l/s to an inlet works structure at the proposed WWTW. The pump station shall host two pumps, each capable of handling the full duty, operating in alternation

meaning one duty pump and one standby for one pump cycling and vice versa for the other pump cycle. The pumps shall be controlled by a switch gear. Pump station suction pipe work (normally HPDE pipes) shall start in the wet sump and ends at the pump inlet. The discharge pipe work (normally galvanised mild steel) to the start at the pump outlet and ends at the start of the uPVC rising main.

### **3. Rising Main (Pump Line)**

The rising main will be a 200mm diameter uPVC class 9 pipe line to handle the flow (24 l/s) at the prescribe head with a flow velocity of not more than 1m/s. The rising main will also be able to handle double the flow (up to 50 l/s) if the flow velocity is increased to 1.6 m/s. The aforementioned allows for the upgrading of the pump station up to 50 l/s without the need to replace the rising main. The rising main shall convey pre-screened raw sewage from the proposed pump station to the proposed positions of the WWTW. The pump line to be fitted with a series of air valves for air control in and out of the pipe line and scour valves at low points for draining of the pump line if and when needed.

### **4. WWTW**

The general slope of the Ganspan area is very flat but falls slightly in a north-westerly direction. Careful consideration must be given to the positioning of the wastewater treatment works taking into account the topography and prevailing wind direction as well as land ownership at the impact on the environment at that specific position/s. Based on population figures it is calculated that Ganspan will generate influent of 594 075 l/day (Average dry weather flow). The hydraulic capacity of the waste treatment facility therefore has to be at least 600kl/day or 0.60 ML/day. The effluents from wastewater works have to comply with Gazetted Standards for Discharge as set by DWS. The General Authorisation limits apply to works of 2 MI/d and less.

#### **4.1. Oxidation Ponds**

The abovementioned capacity can be categorise as a small treatment facility and therefore an oxidation pond system will be the ideal process option for this works. Oxidation ponds are the most simplified and inexpensive method of wastewater treatment available and is sufficient to treat wastewater to an acceptable irrigation standard. The final effluent from the oxidation ponds is not acceptable to be released back into rivers. The oxidation pond effluent must, according to the legislation, either evaporates or use for irrigation. Oxidation ponds use oxygen to break down the organic material. These ponds are shallow and there is an abundance of algae growth as a result of the sunlight penetrating the water body. Algae have the means to release oxygen by means of photosynthesis. The oxygen is then available for the organisms to break down the organic material.

## **4.2. Preliminary Treatment**

The preliminary treatment process consists out of screening, grit removal and flow measurement. An inlet works is normally proposed to handle the above mentioned activities. The inlet works is a concrete structure consisting out of four components:

- Screen: For the removal of screenings, which includes rags, bags etc.
- Grit channels: For the removal of grit (sand)
- Flume: For flow measurement
- Division Boxes: to divide influent evenly and facilitates flow measurement

Screenings may cause blockages further down in the wastewater treatment works and should be removed. The screenings is made up of inorganic mater that cannot be broken down by the biological processes. After the screenings have been removed, grit should be removed by means of the grit channels. Usually there are two channels that are used on a rotational basis. Every second day a channel is isolated and the grit are removed that has collected at the bottom of the isolated channel. It is a further requirement from the Department of Water & Sanitation that the flow, which comes into the wastewater treatment works, must be measured. For this a measuring flume is provided normally in conjunction with ultrasonic level sensors and/or magnetic flow meters.

### **4.2.1. Screen**

The purpose of screening is to remove inorganic materials such as cans, pebbles, sticks rags and other coarse materials. There is a dual purpose for this, firstly the inorganic material cannot be broken down by the biological processes and secondly to avoid pipe blockages and damage to mechanical equipment downstream.

### **4.2.2. Grit Channels**

Raw sewage contains large quantities of fine grit that seeps into sewerage systems through cracks in the pipes, gullies and manholes. The grit can be removed by controlling the flow velocity in grit channels. By decreasing the velocity, the grit will sink to the bottom of the channels. Grit is then collected by isolating and emptying a channel and shovelling the grit out. The reason for the removal of grit is so prevent grit entering the oxidation ponds. Should the grit flow into the oxidation ponds silt up and ultimately reduce the treatment volume of the ponds hence reducing the treatment capacity of the wastewater treatment works. Grit removal from ponds is a very complex, time consuming and expensive process that should rather be avoided.

### **4.2.3. Flow Meter**

It is set out in the National Water Act that the flow that comes into a wastewater treatment works must be measured, and that records must be

kept of the readings. There is a dual purpose to the measuring of the incoming flow: firstly it is to determine if the existing works has enough capacity to handle the incoming flow and secondly for planning the future upgrades to the works.

#### **4.2.4. Anaerobic Pond**

Anaerobic ponds are deep treatment ponds that exclude oxygen and encourage the growth of bacteria, which break down the effluent. Sludge is deposited on the bottom and a crust forms on the surface. Anaerobic ponds are commonly 3 to 5 m deep and receive a high organic loading (usually  $> 100 \text{ g BOD/m}^3\cdot\text{d}$  for a depth of 3 m). At a loading rate of  $0,4 \text{ kg BOD/m}^3\cdot\text{d}$ , the required anaerobic pond volume is  $837.5 \text{ m}^3$  which computes to a hydraulic retention time of 11.2 hours at PDWF. If retention time of 12 hours at PDWF is desired the pond volume can be increased to  $900 \text{ m}^3$ . The treatment capacity is therefore  $335 \text{ kg BOD/d}$  ( $6\ 099$  persons per day at  $55 \text{ g BOD/p/d}$ ). The expected ADWF is  $600\text{KL/day}$  which calculates to a BOD concentration of  $560 \text{ mg/l}$  which can be classified as strong waste. Usually one day is sufficient for a BOD of up to  $300 \text{ mg/l}$ , at temperatures  $>20^\circ\text{C}$ . The two ponds with the combined volume of  $1\ 800 \text{ m}^3$  hosts 3 days retention time if use concurrently which will be sufficient to handle the  $560 \text{ mg/l}$  BOD Concentration. Anaerobic ponds operate satisfactorily and without risk of odour nuisance if loadings up to  $300 \text{ g BOD/m}^3\cdot\text{d}$  at  $20^\circ\text{C}$  are maintained. In this case the loading is almost twice the prescribed which necessitate the recycling of aerobic effluent to the head of the anaerobic ponds.

#### **4.3. Secondary Treatment**

Oxidation ponds use oxygen to break down the organic material. These ponds are shallow and there is an abundance of algae growth as a result of the sunlight penetrating the water body. Algae have the means to release oxygen by means of photosynthesis. The oxygen is then available for the organisms to break down the organic material. For an oxidation pond to function optimally there must be sufficient algae present.

##### **4.3.1. Primary Pond**

The primary pond is the first pond in the secondary treatment process and is also the start of the series of aerobic ponds. It has been assumed that 40% breakdown of BOD takes place in the anaerobic ponds. If this is the case the loading rate of the primary pond should be  $201 \text{ kg BOD/d}$ . The required pond area is  $1,489 \text{ ha}$  if no recycling takes place and  $0.893 \text{ ha}$  if recycling is implemented (Loading rates are  $135$  and  $225 \text{ kg BOD/ha/d}$  respectively). Recycling of aerobic effluent from tertiary pond/s should be done because of the concentration of sewage expected in the anaerobic process to ensure at least 40% breakdown of BOD and curtail odour nuisance. However the pond area with loading rate without recycling will be maintained and therefore the design capacity of the Primary pond will be  $15\ 000 \text{ m}^2$ . The primary pond is the critical facility in an oxidation pond

system and determines the capacity of the entire system. It is therefore recommended to design for the larger pond to mitigate the following risks:

- The climate during winter will not be as desirable for an oxidation ponds system as in summer which means lower BOD breakdown throughout the system. The larger primary pond can compensate for this scenario,
- If recycling does not take place the critical facility (primary pond) must still handle the expected loads. The larger primary pond can compensate for this scenario,
- Discharging of purified effluent to natural water course will not be allowed and the evaporation thereof will be undertaken.
- The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.
- The larger pond will also ensure retention time of at least 25 days.

#### **4.3.2. Secondary Pond**

The secondary pond is the second series of pond/s in the secondary treatment process and is also responsible for further breaking down of BOD to polish the already treated effluent. The secondary pond allows biological purification reactions to go further and is often about 10 to 15 day retention. In this case a 10 days' retention period is recommended which will require volume of at least 5 940 m<sup>3</sup>. One pond with a design capacity of 6 000 m<sup>3</sup> will be sufficient for this purpose.

#### **4.3.3. Tertiary Ponds**

The tertiary ponds are the third series of ponds in the secondary treatment process. These ponds are smaller ponds of about 5 days retention connected in series to assist bacterial (E. coli) die-off. Three ponds, in series, with the design capacity of 3 000 m<sup>3</sup> each is recommended which will have a total capacity of 9 000 m<sup>3</sup> and a retention time of 15 days. A total of 53 days retention should be accumulated by the time the effluent overflows the final tertiary pond.

#### **4.4. Tertiary Treatment**

Even after the best possible biological treatment high numbers of pathogenic micro-organisms will still remain in the treated wastewater. Some additional treatment is required to ensure that the effluent is safe for discharge. The most common process for tertiary treatment is disinfection. Chlorine has been the dominant disinfectant of wastewater. It is available in different forms (gas, liquid and solids). Chlorine disinfection is not instantaneous and can take several minutes or even hours depending on various factors such as pH and ammonia concentration. It is therefore normal when disinfecting with chlorine to provide contact tanks for the disinfection reactions to take place. The criteria range from 20 minutes contact at peak flow up to 24 hours storage. The chlorine dose that is used depends on the chlorine demand of the effluent. Preferable enough chlorine should be added to have a surplus concentration of 0,2mg/l of free



chlorine after 30 minutes of contact time. The chlorine demand for effluent can vary but is normally in the region of 4 to 8 mg/l for well treated final effluent. A 30 minute retention time for chlorine contact is recommended in this case. A concrete tank with channels with a capacity of 38 Kl is proposed. This tank will handle 30 minutes of peak flow (21.1 l/s) or 80 minutes at average dry weather flow (7.09 l/s).

#### 4.5. Sludge Handling

Sludge will be drawn from the bottom of the anaerobic ponds by mechanical means and dry in sludge dry beds. Dry sludge can be further processed for usage as soil conditioner for agricultural purposes.

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

Listed activity as described in GN 734, 735 and 736	Description of project activity
<p><b>Example:</b>  <b>GN 734 Item xx xx): The construction of a bridge where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</b></p>	<p><b>A bridge measuring 5 m in height and 10m in length, no wider than 8 meters will be built over the Orange river</b></p>
<p>Regulation 983, Listing Notice 1, Activity 27:</p> <p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan</p>	<p>The development footprint of the proposed WWTW will be approximately 4ha in extent.</p>

#### The following activities were also investigated as part of the project

Listed activity as described in GN 734, 735 and 736	Description of project activity
<p>Regulation 983, Listing Notice 1, Activity 25:</p> <p>The development and related</p>	<p><b>NOTE:</b>  The capacity of the proposed WWTW will not exceed 2000 kl/d (cubic meters/day) and therefore this listed</p>

operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.	activity is <b>not triggered as part of this application</b>
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**NOTE:****Background to the proposed project:**

Ganspan currently make use of dry sanitation and septic tanks and has no waste water treatment facilities. The Phokwane Municipality submitted a Business Plan to the COGHSTA in 2009 for the construction of 531 houses and associated infrastructure in Ganspan. The proposed project was approved in 2012 for town planning and land survey services. Town planning and land survey services were completed in 2013. The project has since stalled due to the lack of bulk sanitation infrastructure. The housing demand has since increased to 831. The proposed bulk sewer infrastructure project is therefore essential and the only solution to addressing the housing backlog in Ganspan.

The main objective of this project is to ensure that decent and suitable sanitation is provided in Ganspan. Decent infrastructure will in turn contribute towards improved living conditions, higher moral values and a platform for better local economic growth for the community of Ganspan. The objectives of the project are therefore:

- Address the sanitation backlog of Ganspan,
- Provide sanitation solutions for existing households and future household with a 2030 horizon,
- Provide bulk sanitation infrastructure to support the abovementioned,
- Provide temporary and permanent job opportunities for the local community,
- Boost local economic development,
- Transfer skills and provide training to the local community,
- Raise awareness and improve health and hygiene,
- Promote Environmental awareness and compliance,
- Enhance the green drop status of the local Municipality.

The proposed length and width of the pipelines to be constructed is as follows (see pg 19 of technical report):

- outfall sewer line: a length of 3 155 m 200mm diameter upvc 400kpa
- outfall sewer line: a length of 571 m 250mm diameter upvc 400kpa
- rising main pump pipeline: either 4 345 m or 2 755 m

A description of the alternatives investigated as part of the proposed expansion of the existing WWTW is provided below:

**Site / Locality**

The proposed project entails the construction of a WWTW. The topography of the area was taken into consideration. In addition, a wetland was also identified and this area was excluded from any possible development associated with the project. Refer to Appendix A for layout and locality plans.

**Type and Technology / Process Alternatives**

The overall mechanical, electrical and control design of the plant is aimed at reduced operational and maintenance complexity. Electrical power demand of the WWTW is expected to be in the order of 50 kW.

**Design and Layout**

Two pump line routes for the rising main have been investigated based on the positioning of the proposed wastewater treatment works.

Option A is the placing of the treatment works south of Ganspan. This position is the further from the proposed pump station location and is also situated on the higher topographical area of Ganspan. The advantage of this option is the fact that the prevailing wind direction is north which means the possible odours from the works will blow away from the settlement.

There are two disadvantages to this position:

- 1) The route of the rising main will be much longer at 4 345 meters away from the pump station which means higher capital cost.
- 2) Pump duties will be higher as it must pump longer and lift higher which means higher operational costs.

Option B is the placing of the treatment works north of Ganspan settlement. This option is nearer to the proposed pump station location with a lower height above sea level than the pump station location. However, pumping will still be necessary as sewage will not be able to gravitate to the WWTW.

There are two advantages to this position:

- 1) The route of the rising main will be shorter at 2 755 meters away from the pump station which means lower capital cost than Option A.
- 2) Pump duties will be lower as it should pump shorter and lift lower which means lower operational costs than Option A.

The one disadvantage to this option is that the prevailing wind direction is north which means the community of Ganspan may be exposed to odour nuisance.

**Current and Estimated Sewage Flows / Demand**

The long term waste water treatment flows estimates are based on the estimated flows from the current stands, and the estimated flows that will be generated from the current as well as anticipated stands (formalised and informal) that will be serviced by the Municipality. The anticipated growth of the community was thus also considered and factored in.

## 2. FEASIBLE AND REASONABLE ALTERNATIVES

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

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

Describe alternatives that are considered in this application 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

<b>Alternative 1 Preferred</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
The preferred project entails the construction of a pipeline, as well as the construction of a WWTW. Refer to Appendixes A and C for more information on the locality and layout of the proposed project.	27°58'46.95"S	24°46'15.12"E
<b>Alternative 2 Site / Locality</b>		
Option A: Pump station and rising main to Jan Kempdorp WWTW Option A is the proposal of a main pump station and a rising main capable of transferring the total potential sewage influent from Ganspan to Jan Kempdorp WWTW. However, past experience and feedback from the municipality confirms that Jan Kempdorp WWTW does not have the additional capacity and such an upgrade will be too costly. Thus, this option		

is not feasible.

#### Option B: Conservancy Tanks and Honey Sucker

Option B is the proposal of conservancy tanks and honey suckers capable of storing and transferring the total potential sewage influent from Ganspan to Jan Kempdorp waste water treatment works. However, past experience and feedback from the municipality confirms that Jan Kempdorp WWTW does not have the additional capacity and such an upgrade will be too costly. Thus, this option is not feasible.

Information on the proposed pipeline is as follows:

#### Alternative:

#### Alternative 1 Preferred

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

#### Latitude (S):

#### Longitude (E):

27°58'55.30"S	24°46'14.71"E
27°58'35.87"S	24°45'11.85"E
27°57'29.05"S	24°45'21.04"E

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.

Point 250 m	Latitude (S):	Longitude (E):
A	27°58'55.30"S	24°46'14.71"E
B	27°58'49.75"S	24°46'8.98"E
C	27°58'43.97"S	24°46'4.00"E
D	27°58'40.48"S	24°45'56.35"E
E	27°58'39.55"S	24°45'47.28"E
F	27°58'38.63"S	24°45'38.24"E
G	27°58'37.81"S	24°45'28.99"E
H	27°58'36.31"S	24°45'19.17"E
I	27°58'35.87"S	24°45'11.85"E
J	27°58'27.23"S	24°45'12.21"E
K	27°58'17.56"S	24°45'14.62"E
L	27°58'6.98"S	24°45'16.20"E
M	27°57'55.31"S	24°45'18.84"E
N	27°57'43.57"S	24°45'21.87"E
O	27°57'34.08"S	24°45'23.13"E
P	27°57'29.05"S	24°45'21.04"E

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

Alternative 1 Preferred		
Description	Lat (DDMMSS)	Long (DDMMSS)
The proposed project entails the construction	27°58'46.95"S	24°46'15.12"E

of a WWTW as well as a pipeline.		
<b>Alternative 3 Layout</b>		
The topography of the area was taken into consideration. In addition, a wetland was also identified and this area was excluded from any possible development associated with the project. Refer to Appendix A for layout and locality plans.		

**c) Technology alternatives**

<b>Alternative 1 Preferred</b>
The overall mechanical, electrical and control design of the plant is aimed at reduced operational and maintenance complexity. Electrical power demand of the WWTW is expected to be in the order of 50 kW.
<b>Alternative 4 Technology</b>
No type and technology alternatives were investigated.

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

<b>Alternative 1 Preferred</b>
The long term waste water treatment flows estimates are based on the estimated flows from the current stands, and the estimated flows that will be generated from the current as well as anticipated stands (formalised and informal) that will be serviced by the Municipality. The anticipated growth of the community was thus also considered and factored in.
<b>Alternative 5 Demand</b>
The current average volume of water utilised by the serviced households could have been used to determine the required volume of water in future. Therefore, no alternative option was not seen as a feasible / reasonable alternative and will not be discussed in the BAR.

**e) No-go alternative**

The no-go option means retaining the <i>status quo</i> , i.e. not constructing the required pipeline and WWTW. This option is not recommended as the additional infrastructure is required for the treatment of waste water at Ganspan. The proposed project also forms part of bulk service infrastructure within the municipal boundaries. The no-go option also means a potential threat of groundwater and surrounding watercourses due to contamination as the existing infrastructure is not capable of handling the volume of waste water to be treated on site. Therefore, the no-go alternative is not seen as a reasonable and / or feasible alternative.
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**Paragraphs 3 – 13 below should be completed for each alternative.**

### 3. PHYSICAL SIZE OF THE ACTIVITY

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

**WWTW:**

Alternative 1 Preferred

**Size of the activity:**

37 000 m <sup>2</sup>
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**Pipeline Sections:**

Alternative 1 Preferred

**Length of the activity:**

3 155 + 571 = 3726 m
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- b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

**Alternative:**

Alternative 1 Preferred WWTW  
Alternative 1 Preferred Pipeline

**Size of the site/servitude:**

37 000m <sup>2</sup>
(3 726 + 4 200) x 5 (corridor width) = 39 630 m <sup>2</sup>

### 4. SITE ACCESS

Does ready access to the site exist?

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

YES	
	150 m

Describe the type of access road planned:

Existing roads will be used to gain access to the site. However, roads will be upgraded where necessary. A new link road with a total length of 150 m will be constructed as part of the proposed project for access to the works. The new road will only be utilised by vehicles visiting the WWTW / maintenance of the pipeline. A portion of the new road will be a dirt road, while another portion will be paved. Roads inside the erf boundaries of the works will be constructed for access to all facilities.

Name	Description	Length	Width of road	Corridor width
New access road	Dirt road	15m	6.2m	8m
New road inside erf	Dirt road	162.5m	4.0m	6.0m
New road inside erf boundaries	Paved	90m	4.0m	6.0m

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.

## 5. 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).

## 6. 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.

## 7. 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.

## 8. 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.

## 9. 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.

## 10. ACTIVITY MOTIVATION

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

<b>1. Is the activity permitted in terms of the property's existing land use rights?</b>	YES		
The proposed WWTW will be constructed on Municipal property.			
<b>2. Will the activity be in line with the following?</b>			
<b>(a) Provincial Spatial Development Framework (PSDF)</b>	YES		
See confirmation from the Municipality that the activity is in line with the PSDF (Appendix J <sub>1</sub> ). The proposed infrastructure required in order to improve service delivery regarding WWTW in the area.			
<b>(b) Urban edge / Edge of Built environment for the area</b>	YES		
The proposed activities will not have a negative effect on the edge of the built environment within the area.			

<p><b>(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?).</b></p>	YES		
<p>The proposed project is in line with the vision of the Municipality. Refer to Appendix J<sub>1</sub> for confirmation from the Municipality that the activity is in line with the IDP and SDF. The applicant (the Municipality) has implemented a significant Basic Sanitation Programme through which it will endeavour to provide potable water and water borne sanitation to all the stands (formal and informal) within the area. The proposed infrastructure should thus be constructed in order to deliver on the Municipality's mandate to deliver basic WWTW services to the residents.</p>			
<p><b>(d) Approved Structure Plan of the Municipality</b></p>	YES		
<p>The proposed project is in line with the municipal plans. See confirmation from the Municipality (Appendix J<sub>1</sub>).</p>			
<p><b>(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?)</b></p>	YES		
<p>Construction activities will take place within 32m of a watercourse, as well as within the 1:100 year floodline.</p> <p>The proposed project will not compromise the integrity of the existing environmental management priorities for the area, should the contractors adhere to the conditions stipulated in this report, additional specifications to be provided, the EMPr as well as best practices.</p> <p>Specific measures to be implemented will include, but not limited to:</p> <ul style="list-style-type: none"> <li>- Stormwater measures</li> <li>- Erosion control</li> <li>- The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.</li> <li>- Limiting the removal of vegetation</li> <li>- Limiting the formation of dust</li> <li>- Monitoring groundwater and surface water for possible contamination thereof due to operational activities at the WWTW</li> <li>- Etc.</li> </ul> <p>Refer to the EMPr for more information on measures to be implemented. See confirmation from the Municipality that the activity is in line with the EMF (Appendix J<sub>1</sub>).</p>			

<b>(f) Any other Plans (e.g. Guide Plan)</b>			Please explain
N/A			
<b>3. 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)?</b>	YES		
<p>The applicant (the Municipality) has implemented a significant Basic Sanitation Programme through which it will endeavour to provide potable water and water borne sanitation to all the stands (formal and informal) within the area. The proposed infrastructure should thus be constructed in order to deliver on the Municipality's mandate to deliver basic WWTW services to the residents. See confirmation from the Municipality that the activity is in line with the IDP (Appendix J<sub>1</sub>).</p>			
<b>4. 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.)</b>	YES		
<p>The bulk water infrastructure upgrades that were done in 2013 are sufficient for the current needs of Ganspan. However, with the spatial foresight up to 2030 and the related demands upgrades will be needed, especially low level storage capacity upgrades. The proposed bulk sewer infrastructure project is therefore essential and the only solution to addressing the housing backlog in Ganspan.</p> <p>A need was thus identified based in the increase in demand, as a result of the growth of the community. This is required to enable the municipal goals of basic service delivery regarding the WWTWs in the municipal area and to protect the environment, as potential groundwater and soil contamination will be minimised by the implementation of the proposed new infrastructure.</p>			
<b>5. 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.)</b>	YES		
<p>The bulk water infrastructure upgrades that were done in 2013 are sufficient for the current needs of Ganspan. However, with the spatial foresight up to 2030 and the related demands upgrades will be needed, especially low level storage capacity upgrades. The proposed bulk sewer infrastructure project is therefore essential and the only solution to addressing the housing backlog in Ganspan. See confirmation from the Municipality attached hereto (Appendix J<sub>1</sub>).</p>			

<p><b>6. 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.)</b></p>	YES		
<p>The applicant for the proposed project is the Municipality itself. The proposed project is provided for in the infrastructure planning of the municipality. Refer to Appendix J<sub>1</sub> for proof of comments by the Municipality in this regard.</p>			
<p><b>7. Is this project part of a national programme to address an issue of national concern or importance?</b></p>	YES		
<p>The provision of basic services is part of a national programme. The proposed project entails construction of a WWTW, associated pipeline and additional infrastructure in order to deliver on the Municipality's mandate to deliver basic WWTW services to the residents.</p>			
<p><b>8. 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.)</b></p>	YES		
<p>The proposed project is to be located in close proximity of the Ganspan community – therefore location factors favour the proposed land use.</p>			

<b>9. Is the development the best practicable environmental option for this land/site?</b>	YES		
<p>Two alternatives were considered:</p> <p>Option A: Pump station and rising main to Jan Kempdorp WWTW  Option A is the proposal of a main pump station and a rising main capable of transferring the total potential sewage influent from Ganspan to Jan Kempdorp WWTW. However, past experience and feedback from the municipality confirms that Jan Kempdorp WWTW does not have the additional capacity and such an upgrade will be too costly. Thus, this option is not feasible.</p> <p>Option B: Conservancy Tanks and Honey Sucker  Option B is the proposal of conservancy tanks and honey suckers capable of storing and transferring the total potential sewage influent from Ganspan to Jan Kempdorp waste water treatment works. However, past experience and feedback from the municipality confirms that Jan Kempdorp WWTW does not have the additional capacity and such an upgrade will be too costly. Thus, this option is not feasible.</p> <p>The above mentioned alternatives are costly, and the environmental impacts will be similar or greater than those associated with the proposed project. Therefore, the proposed project is seen as the best practicable environmental option.</p>			
<b>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</b>	YES		
<p><b>Negative impacts:</b></p> <ul style="list-style-type: none"> <li>• Vegetated areas will be disturbed during the construction phase</li> <li>• Erosion may occur during the construction phase</li> <li>• Possible soil, groundwater and surface water contamination during the construction as well as operational phase</li> </ul> <p><b>Positive impacts:</b></p> <ul style="list-style-type: none"> <li>• The proposed project is considered essential to enable the municipality to provide basic WWTW services to residents in the area</li> <li>• This in turn will have a positive impact on the social, economic as well as environmental impacts of the area</li> </ul> <p>The negative impacts expected during the construction phase of the proposed project can be minimised through the recommended mitigation measures as stipulated in this report, the EMPr as well as best practices.</p>			

<b>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</b>		NO	
It is suggested that future WWTW activities will also consider the utilisation of existing WWTW, as well as the distance between the existing WWTWs and the area it should serve before a decision is made on the best environmental option.			
<b>12. Will any person's rights be negatively affected by the proposed activity/ies?</b>		NO	
Residents will be positively affected as the proposed project will enable the municipality with the opportunity to provide basic WWTW services to the area. The WWTW will be fenced off and therefore the proposed activities will not have a noteworthy negative effect on the community members that utilise the surrounding open veld for livestock farming activities.			
<b>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</b>		NO	
It is not anticipated that the proposed activity itself will have an effect on the 'urban edge'.			
<b>14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?</b>	YES		
<p>SIP 6 can be summarised as follows:  Integrated municipal infrastructure project</p> <ul style="list-style-type: none"> <li>The Development of the national capacity to assist the 23 least resourced districts (accommodating 19 million people) to address all the maintenance backlogs and upgrades required in water, electricity and sanitation bulk infrastructure. The road maintenance programme will enhance service delivery capacity thereby impacting positively on the population.</li> </ul> <p>Therefore, the proposed project contributes to SIP 6.</p>			
<b>15. What will the benefits be to society in general and to the local communities?</b>	Please explain		
As the project is described as a basic service entity, the lack thereof will lead to major social impacts that will indirectly cause severe environmental concerns.			
<b>16. Any other need and desirability considerations related to the proposed activity?</b>	Please explain		
The proposed project will provide the much needed sanitation bulk infrastructure during the operational phase thereof. This will have a positive impact on the socio-economics of the area.			

<b>17. How does the project fit into the National Development Plan for 2030?</b>	Please explain
The proposed project will provide the much needed sanitation bulk infrastructure during the operational phase thereof. This will have a positive impact on the socio-economics of the area.	

**18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.**

Section 23 of NEMA (Act 107, 27 November 1998) reads as follows:

'23. (1) The purpose of this Chapter is to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities,

(2) The general objective of integrated environmental management is to -

- (a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;
- (b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits and promoting compliance with the principles of environmental management set out in section 2;
- (c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
- (d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;
- (e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and
- (f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.

(3) The Director-General must coordinate the activities of organs of state referred to in section 24(1) and assist them in giving effect to the objectives of this section and such assistance may include training, the publication of manuals and guidelines and the co-ordination of procedures.'

With the above in mind, the following objectives were taken into consideration:

1. An application for environmental authorisation was submitted to NC DENC
2. Integration of various principles of environmental management were implemented in order to make decisions regarding the significant effect of the proposed project on the environment
3. Identified, predicted and evaluated the actual potential impact of the proposed project on the environment, the socio-economic conditions and heritage, as well as the consequences and alternatives and options for mitigation of activities. This was done to minimize the possible negative impacts on the environment and maximizing benefits to mankind.
4. Taken the effects of activities on the environment into consideration before actions are to be taken in connection with them.
5. A public participation process was followed.
6. Considered the environmental attributes in management and decision-making with reference to the environment.
7. Mitigation and management activities best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management were investigated.
8. The report follows the laws to identify, predict and evaluate the actual and potential impacts associated with the development.
9. Specialists investigated the site to determine baseline and to predict the impacts associated with the proposed project. The preferred alternative has been identified as the one that will have the least negative impact on the environment, as sensitive areas will be avoided as far as possible. In addition, already disturbed areas will be utilized as far as possible.
10. A public participation process was followed. Consideration of the 2014 EIA Regulations has been applied in this regards.
11. An EMPr is included, with mitigation measures that should be implemented during the planning, construction, operation and possible decommissioning of the proposed project. These mitigation measures are in line with the environmental requirements and Best Practise Principles.
12. Relevant guidelines and procedures were used to produce this document. Therefore, relevant information is reflected, for sufficient co-governance to be implemented.
13. The proposed project provides for the needs of the applicant while ensure compliance with environmental management principles.

**19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.**

Section 2 of NEMA (Act 107, 27 November 1998) reads as follows:

(1) The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—

- (a) shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in



particular the basic needs of categories of persons disadvantaged by unfair discrimination;

- (b) serve as the general framework within which environmental management and implementation plans must be formulated;
- (c) serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;
- (d) serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and
- (e) guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection or management of the environment.

(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

(3) Development must be socially, environmentally and economically sustainable.

(4) (a) Sustainable development requires the consideration of all relevant factors including the following:

- (i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- (ii) into account the limits of current knowledge about the consequences of decisions and actions; and
- (iii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.
- (iv) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- (v) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- (vi) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- (vii) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;

- (viii) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
  - (ix) that a risk-averse and cautious approach is applied, which takes
- (b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.
  - (c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.
  - (d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.
  - (e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
  - (f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.
  - (g) Decisions must take into account the interest, needs and values of all the interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.
  - (h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.
  - (i) The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.
  - (j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.

- (k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.
- (l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.
- (m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.
- (n) Global and international responsibilities relating to the environment must be discharged in the national interest.
- (o) The environment is held in public trust for the people. The beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.
- (p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.
- (q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted.
- (r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

The applicant of the proposed project took the following into consideration:

1. That the disturbance of ecosystems and loss of biological diversity are minimised and remedied by implementing the mitigation measures in this document, the EMPr as well as best practices.
2. Environmental management must be integrated
3. Adverse environmental impacts (if any) shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.
4. The participation of all interested and affected parties in environmental governance must be promoted by means of the public participation process that forms part of the basic assessment process.
5. Community wellbeing and empowerment must be promoted by providing employment opportunities during the construction as well as operational phase.
6. The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers will be respected and protected.

**11. 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:

<b>Title of legislation, policy or guideline</b>	<b>Applicability to the project</b>	<b>Administering authority</b>	<b>Date</b>
National Environmental Management Act, 1998 (Act 107 of 1998)	Proposed development of 4 ha in size	NC DENC	1998
National Water Act, 1998 (Act 36 of 1998)	Proposed development of 4 ha in size	DWS	1998
National Heritage Resources Act (Act No 25 of 1999)	Proposed development of 4 ha in size	SAHRA	1999
Environmental Conservation Act (Act 73 of 1989)	Proposed development of 4 ha in size	NC DENC	1989
National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004)	Proposed development of 4 ha in size	NC DENC	2004
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	Applications for the removal / transplantation / cutting of protected flora species should be submitted after a positive EA is issued	NFA	2009

**12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT****a) Solid waste management**

Will the activity produce solid construction waste during the construction/initiation phase?

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

YES	
Unknown m <sup>3</sup>	

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

The contractor will be responsible for the disposal of waste generated during the construction phase. The contractor will remove the construction waste and dispose thereof at an authorized landfill site.

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

Construction solid waste will be disposed of at an authorised solid waste disposal site in Ganspan. Hazardous waste (if any) should be disposed of at an authorized hazardous landfill site such as Holfontein.

Will the activity produce solid waste during its operational phase?

YES  
**NOTE:** Solid waste in this regard refers to the composted sludge

105 m<sup>3</sup>

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

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

The preliminary treatment process consists out of screening, grit removal and flow measurement. An inlet works is normally proposed to handle the above mentioned activities. The inlet works is a concrete structure consisting out of four components:

- Screen: For the removal of screenings, which includes rags, bags etc.
- Grit channels: For the removal of grit (sand)
- Flume: For flow measurement
- Division Boxes: to divide influent evenly and facilitates flow measurement

Screenings may cause blockages further down in the wastewater treatment works and should be removed. The screenings is made up of inorganic mater that cannot be broken down by the biological processes. After the screenings have been removed, grit should be removed by means of the grit channels. Usually there are two channels that are used on a rotational basis. Every second day a channel is isolated and the grit are removed that has collected at the bottom of the isolated channel. It is a further requirement from the Department of Water & Sanitation that the flow, which comes into the wastewater treatment works, must be measured. For this a measuring flume is provided normally in conjunction with ultrasonic level sensors and/or magnetic flow meters.

#### 4.5.1. Screen

The purpose of screening is to remove inorganic materials such as cans, pebbles, sticks rags and other coarse materials. There is a dual purpose for this, firstly the inorganic material cannot be broken down by the biological

processes and secondly to avoid pipe blockages and damage to mechanical equipment downstream.

#### **4.5.2. Grit Channels**

Raw sewage contains large quantities of fine grit that seeps into sewerage systems through cracks in the pipes, gullies and manholes. The grit can be removed by controlling the flow velocity in grit channels. By decreasing the velocity, the grit will sink to the bottom of the channels. Grit is then collected by isolating and emptying a channel and shovelling the grit out. The reason for the removal of grit is so prevent grit entering the oxidation ponds. Should the grit flow into the oxidation ponds silt up and ultimately reduce the treatment volume of the ponds hence reducing the treatment capacity of the wastewater treatment works. Grit removal from ponds is a very complex, time consuming and expensive process that should rather be avoided.

#### **4.5.3. Flow Meter**

It is set out in the National Water Act that the flow that comes into a wastewater treatment works must be measured, and that records must be kept of the readings. There is a dual purpose to the measuring of the incoming flow: firstly it is to determine if the existing works has enough capacity to handle the incoming flow and secondly for planning the future upgrades to the works.

#### **4.5.4. Anaerobic Pond**

Anaerobic ponds are deep treatment ponds that exclude oxygen and encourage the growth of bacteria, which break down the effluent. Sludge is deposited on the bottom and a crust forms on the surface. Anaerobic ponds are commonly 3 to 5 m deep and receive a high organic loading (usually > 100 g BOD/m<sup>3</sup>.d for a depth of 3 m). At a loading rate of 0,4 kg BOD/m<sup>3</sup>.d, the required anaerobic pond volume is 837.5 m<sup>3</sup> which computes to a hydraulic retention time of 11.2 hours at PDWF. If retention time of 12 hours at PDWF is desired the pond volume can be increased to 900 m<sup>3</sup>. The treatment capacity is therefore 335 kg BOD/d (6 099 persons per day at 55 g BOD/p/d). The expected ADWF is 600KL/day which calculates to a BOD concentration of 560 mg/l which can be classified as strong waste. Usually one day is sufficient for a BOD of up to 300 mg/l, at temperatures >20°C. The two ponds with the combined volume of 1 800 m<sup>3</sup> hosts 3 days retention time if use concurrently which will be sufficient to handle the 560 mg/l BOD Concentration. Anaerobic ponds operate satisfactorily and without risk of odour nuisance if loadings up to 300 g BOD/m<sup>3</sup>.d at 20°C are maintained. In this case the loading is almost twice the prescribed which necessitate the recycling of aerobic effluent to the head of the anaerobic ponds.

#### **4.6. Secondary Treatment**

Oxidation ponds use oxygen to break down the organic material. These ponds are shallow and there is an abundance of algae growth as a result of the sunlight penetrating the water body. Algae have the means to release

oxygen by means of photosynthesis. The oxygen is then available for the organisms to break down the organic material. For an oxidation pond to function optimally there must be sufficient algae present.

#### **4.6.1. Primary Pond**

The primary pond is the first pond in the secondary treatment process and is also the start of the series of aerobic ponds. It has been assumed that 40% breakdown of BOD takes place in the anaerobic ponds. If this is the case the loading rate of the primary pond should be 201 kg BOD/d. The required pond area is 1,489 ha if no recycling takes place and 0.893 ha if recycling is implemented (Loading rates are 135 and 225 kg BOD/ha/d respectively). Recycling of aerobic effluent from tertiary pond/s should be done because of the concentration of sewage expected in the anaerobic process to ensure at least 40% breakdown of BOD and curtail odour nuisance. However the pond area with loading rate without recycling will be maintained and therefore the design capacity of the Primary pond will be 15 000 m<sup>2</sup>. The primary pond is the critical facility in an oxidation pond system and determines the capacity of the entire system. It is therefore recommended to design for the larger pond to mitigate the following risks:

\_ The climate during winter will not be as desirable for an oxidation ponds system as in summer which means lower BOD breakdown throughout the system. The larger primary pond can compensate for this scenario,

- If recycling does not take place the critical facility (primary pond) must still handle the expected loads. The larger primary pond can compensate for this scenario,
- Discharging of purified effluent to natural water course will not be allowed and the evaporation thereof will be undertaken.
- The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.
- The larger pond will also ensure retention time of at least 25 days.

#### **4.6.2. Secondary Pond**

The secondary pond is the second series of pond/s in the secondary treatment process and is also responsible for further breaking down of BOD to polish the already treated effluent. The secondary pond allows biological purification reactions to go further and is often about 10 to 15 day retention. In this case a 10 days' retention period is recommended which will require volume of at least 5 940 m<sup>3</sup>. One pond with a design capacity of 6 000 m<sup>3</sup> will be sufficient for this purpose.

#### **4.6.3. Tertiary Ponds**

The tertiary ponds are the third series of ponds in the secondary treatment process. These ponds are smaller ponds of about 5 days retention connected in series to assist bacterial (E. coli) die-off. Three ponds, in series, with the design capacity of 3 000 m<sup>3</sup> each is recommended which will have a total capacity of 9 000 m<sup>3</sup> and a retention time of 15 days. A total of 53 days

retention should be accumulated by the time the effluent overflows the final tertiary pond.

#### 4.7. Tertiary Treatment

Even after the best possible biological treatment high numbers of pathogenic micro-organisms will still remain in the treated wastewater. Some additional treatment is required to ensure that the effluent is safe for discharge. The most common process for tertiary treatment is disinfection. Chlorine has been the dominant disinfectant of wastewater. It is available in different forms (gas, liquid and solids). Chlorine disinfection is not instantaneous and can take several minutes or even hours depending on various factors such as pH and ammonia concentration. It is therefore normal when disinfecting with chlorine to provide contact tanks for the disinfection reactions to take place. The criteria range from 20 minutes contact at peak flow up to 24 hours storage. The chlorine dose that is used depends on the chlorine demand of the effluent. Preferable enough chlorine should be added to have a surplus concentration of 0,2mg/l of free chlorine after 30 minutes of contact time. The chlorine demand for effluent can vary but is normally in the region of 4 to 8 mg/l for well treated final effluent. A 30 minute retention time for chlorine contact is recommended in this case. A concrete tank with channels with a capacity of 38 Kl is proposed. This tank will handle 30 minutes of peak flow (21.1 l/s) or 80 minutes at average dry weather flow (7.09 l/s).

#### 4.8. Sludge Handling

Sludge will be drawn from the bottom of the anaerobic ponds by mechanical means and dry in sludge dry beds. Dry sludge can be further processed for usage as soil conditioner for agricultural purposes.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

N/A
-----

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

N/A
-----

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

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

<input type="checkbox"/>	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.

#### NOTE:

No solid waste to be removed from site
--



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

	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**

**NOTE:**

The proposed project entails the construction of a WWTW and associated pipelines. Therefore, only normal sewage that is found within the normal municipal sewage system will be treated on site. Treated wastewater will be either:

- used for wash water at the inlet works and sludge treatments
- firefighting purposes (if required)
- transferred to evaporation ponds
- The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.

Note that the discharging of treated effluent will not be allowed into any natural water resources.

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

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

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

	NO
m <sup>3</sup>	
NO <b>NOTE:</b> The activity itself will not produce effluent, but will treat effluent that originates from the Ganspan area	

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

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

	NO
--	----

**NOTE:**

The proposed project entails the construction of a WWTW and associated pipelines. Therefore, only normal sewage that is found within the normal municipal sewage system will be treated on site. Treated wastewater will be either:

- used for wash water at the inlet works and sludge treatments
  - firefighting purposes (if required)
  - transferred to evaporation ponds
  - The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.
- Note that the discharging of treated effluent will not be allowed into any natural water resources.

If YES, provide the particulars of the facility:

<b>Facility name:</b>			
<b>Contact person:</b>			
<b>Postal address:</b>			
<b>Postal code:</b>			
<b>Telephone:</b>		<b>Cell:</b>	
<b>E-mail:</b>		<b>Fax:</b>	

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

Treated wastewater will be either:

- used for wash water at the inlet works and sludge treatments
- firefighting purposes (if required)
- transferred to evaporation ponds
- The possibility to use treated effluent for irrigation purposes will be investigated. Note that the required applications to DWS will be submitted prior to any irrigation with treated effluent.

Note that the discharging of treated effluent will not be allowed into any natural water resources.

**c) Emissions into the atmosphere**

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities? 

	NO
--	----

If YES, is it controlled by any legislation of any sphere of government? 

	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:

The emissions associated with the project during the construction phase will mostly be exhaust emission and dust. Dust will be controlled during the construction phase, when necessary. The vehicles travelling to and from the site for monitoring purposes will contribute to the emissions released into the atmosphere during the operational phase of the proposed project. However, these emissions are not controlled by any legislation.

Note that the screening and degritting facilities may have to be enclosed within a specialist building should odour control be required, where the air is scrubbed before being discharged to the atmosphere.

#### d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

	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?

Describe the noise in terms of type and level:

Nuisance noise may be generated during the construction period. However, the significance thereof will be low and limited to areas under construction.

Noise levels outside of the WWTW boundaries will be limited to under 80dB during the operational phase.

### 13. WATER USE

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

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
-----------	-------------	-------------	----------------------------	-------	---------------------------------

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

N/A	
YES	

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

**NOTE:**

The applicant will submit the required application (irrigation with treated water) to DWS, should it be decided to use treated water for irrigational purposes.

**14. ENERGY EFFICIENCY**

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

The overall mechanical, electrical and control design of the plant is aimed at reduced operational and maintenance complexity. Electrical power demand of the WWTW is expected to be in the order of 50 kW. A 50KVA three phase electrical connection to be provided for this purpose.

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

Standby power generators are allowed for to ensure minimum process interruptions during power failures.

**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.

- 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:**

<b>Province</b>		Northern Cape
<b>District Municipality</b>		Frances Baard District Municipality
<b>Local Municipality</b>		Phokwane Local Municipality
<b>WWTW &amp; Pipeline</b>	<b>Ward Number(s)</b>	8
	<b>Farm name and number</b>	Remainder or Erf 775
	<b>Portion number</b>	Remainder
	<b>SG Code</b>	C 007 000 700 000 775 000 00

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:**

Municipal

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

**1. GRADIENT OF THE SITE**

Indicate the general gradient of the site.

**Alternative 1 Preferred:**

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
------	-------------	-------------	-------------	--------------	-------------	------------------

**2. LOCATION IN LANDSCAPE**

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

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input checked="" type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input checked="" type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>
2.10 At sea	<input type="checkbox"/>				

**3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE**

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

Shallow water table (less than 1.5m deep)  
 Dolomite, sinkhole or doline areas  
 Seasonally wet soils (often close to water bodies)

Unstable rocky slopes or steep slopes with loose soil  
 Dispersive soils (soils that dissolve in water)  
 Soils with high clay content (clay fraction more than 40%)  
 Any other unstable soil or geological feature  
 An area sensitive to erosion

**Alternative 1 Preferred:**

	NO
	NO
YES (at water bodies)	
	NO
	NO
	NO
	NO
YES (at water bodies)	

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

**4. GROUNDCOVER**

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

Natural veld - good condition <sup>E</sup>	Natural veld with scattered aliens <sup>E</sup>	Natural veld with heavy alien infestation <sup>E</sup>	Veld dominated by alien species <sup>E</sup>	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.

**NOTE: Summary of ecological report:**

The site proposed for the Waste Water Treatment Works (WWTW) has been rated as being acceptable for the development. The vegetation in the area consists of Kimberley Thornveld (SVk 4). The vegetation type is currently listed as being of Least Concern under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced development pressures. The topography of the site consists of a low hill with a moderate slope to the surrounding plains areas. A small water treatment facility is also located on top of the low hill. A drainage area is located to the south of the hill and dense woodland areas to the east. Agricultural small holdings and crop fields are also situated to the north east and west of the site. The vegetation on the site consists of short grassland with scattered shrubs. The species composition is still considered as largely natural although overgrazing has altered the vegetation structure to some degree. The site will be situated on top of the low hill with a portion along the slope of the hill and the adjacent plain area. A large drainage area occurs to the south of the hill. This area also contains earthen berms which act as an artificial impoundment. Water drains from this impoundment in a north eastern direction. The drainage area does not form a distinct channel and drains in a diffuse surface pattern. This drainage area has been transformed by the earthen berms causing an alteration to the flow regime of the area. However, it still remains sensitive and construction of WWTW in this area should be avoided. The construction of the WWTW on top of the low hill is however unlikely to affect this system. Dense woodland vegetation occurs to the east of the site. It is dominated by large specimens of *Vachellia erioloba* (Camel Thorn) and *Vachellia tortilis* (Umbrella Thorn). *V. erioloba* is a protected species and is also listed as a Declining species in the National Red List. As a result these large specimens are of conservation significance. The site proposed for the WWTW will however be situated on top of the low hill and will not require the removal of any large specimens. It is still likely that small specimens occur on the site and for these permits will have to be obtained to remove them. The top of the hill consists of shallow soils and vegetation consisting of a short grass layer with scattered shrubs and small trees. Grass species were not easily identifiable due to overgrazing and the drought at

the time of the site visit. As mentioned previously *V. erioloba* is a protected species and where specimens will be affected by construction permits must be obtained to remove them. Several small succulents and herbs occur on top of the hill. Of these species the succulents *Crassula capitella*, *Aloe grandidentata* and *Anacampseros filamentosa* are listed as protected species in the Northern Cape Province. They are all relatively widespread and common and therefore not of high conservation significance. However, they are protected and transplant easily and permits can be obtained to transplant them to areas adjacent to the site.

The site is situated adjacent to the agricultural small holdings of Ganspan and the land use on the site is primarily associated with these agricultural areas. As a result the site is subjected to significant levels of overgrazing. This is notable in the grazing of grasses on the site and the stunting of shrubs. Several indicators of overgrazing are also abundant. This impact leads to some degradation of the vegetation layer. Observations on the site were also likely exacerbated by the current drought which has further decreased the percentage vegetation cover. The cutting of trees on the site for use as firewood is also common and likely to have a significant impact. Large stumps and resprouting stumps are common on the site and indicate significant tree cutting occurring. In conclusion, the drainage area to the south of the site is transformed to a large degree but should still be considered as sensitive. This area is excluded from the development and is therefore unlikely to be affected by the proposed WWTW. The woodland area to the east of the site contains dense and large stands of the protected Camel Thorn (*V. erioloba*) and is therefore considered as undesirable for the development as impacts on these trees will be high. This area is however also excluded from the development. The hilltop, slope and plain portion which is proposed for the site does not contain such sensitive landscape elements as discussed above, the diversity of habitat and species are not significant and is not considered to have a high conservation value. The site does however still contain several protected species which although they are widespread still retain a conservation value and the required mitigation should be implemented as discussed above.

## 5. SURFACE WATER

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

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



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

The drainage area to the south of the site is transformed to a large degree but should still be considered as sensitive. This area is excluded from the development and is therefore unlikely to be affected by the proposed WWTW.

A large drainage area occurs to the south of the hill. This area also contains earthen berms which act as an artificial impoundment. Water drains from this impoundment in a north eastern direction. The drainage area does not form a distinct channel and drains in a diffuse surface pattern. This drainage area has been transformed by the earthen berms causing an alteration to the flow regime of the area. However, it still remains sensitive and construction of WWTW in this area should be avoided. The construction of the WWTW on top of the low hill is however unlikely to affect this system.

## 6. 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 <sup>H</sup>
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential <sup>A</sup>	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant <sup>A</sup>	Nature conservation area
Medium industrial <sup>AN</sup>	Train station or shunting yard <sup>N</sup>	Mountain, koppie or ridge
Heavy industrial <sup>AN</sup>	Railway line <sup>N</sup>	Museum
Power station	Major road (4 lanes or more) <sup>N</sup>	Historical building
Office/consulting room	Airport <sup>N</sup>	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam <sup>A</sup>	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:

N/A

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:

N/A

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)		NO
Core area of a protected area?		NO
Buffer area of a protected area?		NO
Planned expansion area of an existing protected area?		NO
Existing offset area associated with a previous Environmental Authorisation?		NO
Buffer area of the SKA?		NO

**NOTE:**

Although the area itself is not classified as a protected area as per any provincial conservation plan etc., the area near to the water courses is seen an area worth protecting.

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

## 7. 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:

Uncertain

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:

**NOTE:**

A phase 1 Heritage Impact was carried out for the development of a new Waste Water Treatment Works next to an existing reservoir at the Ganspan Settlement near Jan Kempdorp in the North West Province. The study area is underlain by palaeontologically insignificant Ventersdorp Supergroup lavas that are capped by geologically recent (Quaternary) aeolian sand, alluvium and residual soils. A foot survey of the terrain revealed no evidence for the accumulation and preservation of intact fossil material within these superficial Quaternary sediments. The pedestrian survey revealed no indication of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art (engravings) or glacial striations, prehistoric structures, graves or historically significance buildings older than 60 years within the boundaries of the study area. Several concrete and small, stone-walled structures are located to the north of the study area but will not be affected by the development. It is highly unlikely that fossil remains will be encountered during excavation activities within the study area. There is also little chance of finding fossil material within the superficial overburden because of a lack of suitable Quaternary-aged alluvial deposits at the site. There are no major palaeontological grounds to suspend excavation activities within the proposed development footprint. There are no major archaeological grounds to suspend excavation activities within the proposed development footprint. The proposed development footprint is assigned a site rating of Generally Protected C (GP.C).

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

	NO
	NO

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

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

## 8. SOCIO-ECONOMIC CHARACTER

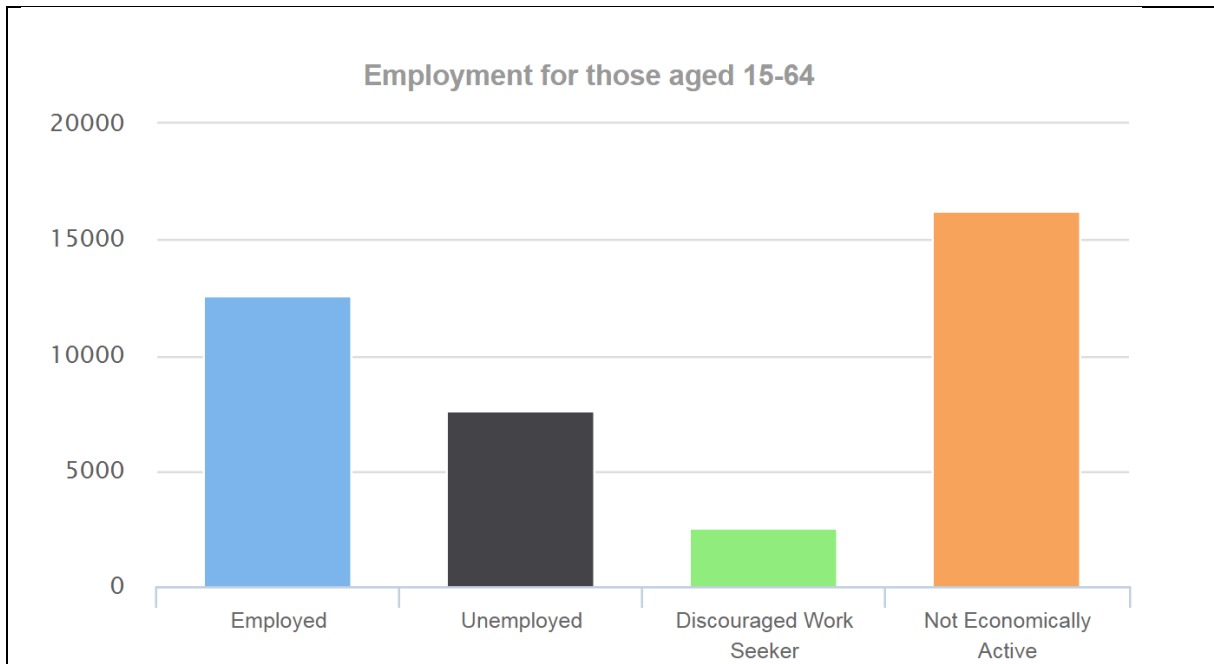
### a) Local Municipality

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

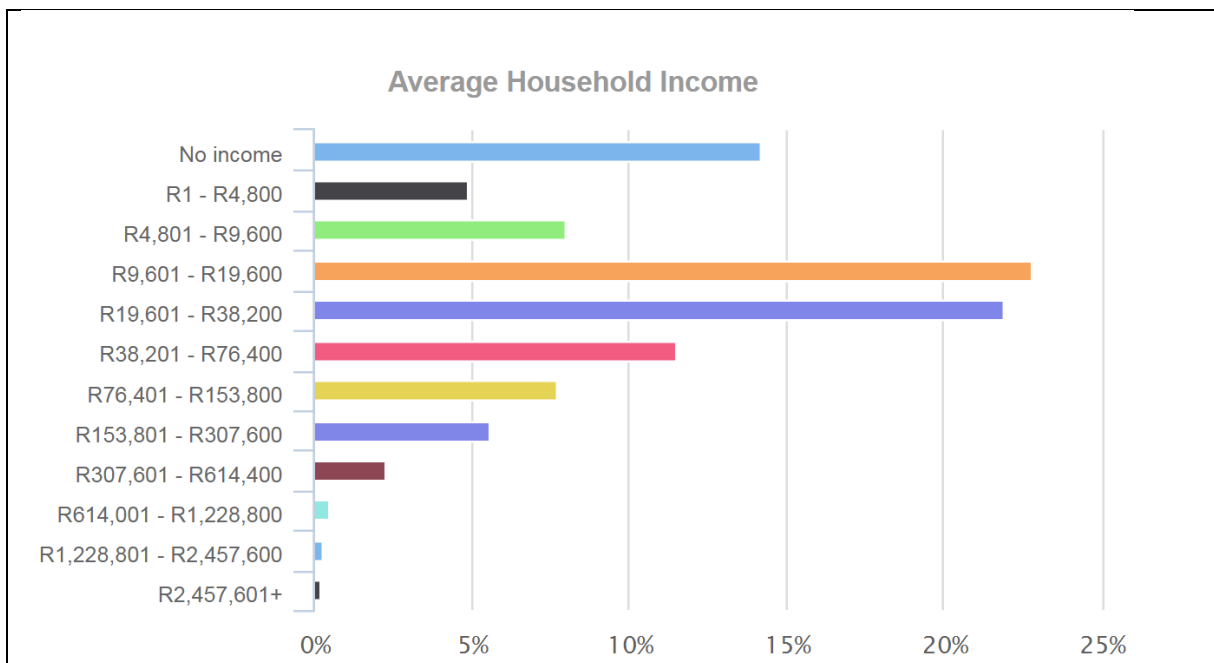
**NOTE:**

The information in this section was obtained from the following web address:  
[http://www.statssa.gov.za/?page\\_id=993&id=phokwane-municipality](http://www.statssa.gov.za/?page_id=993&id=phokwane-municipality)

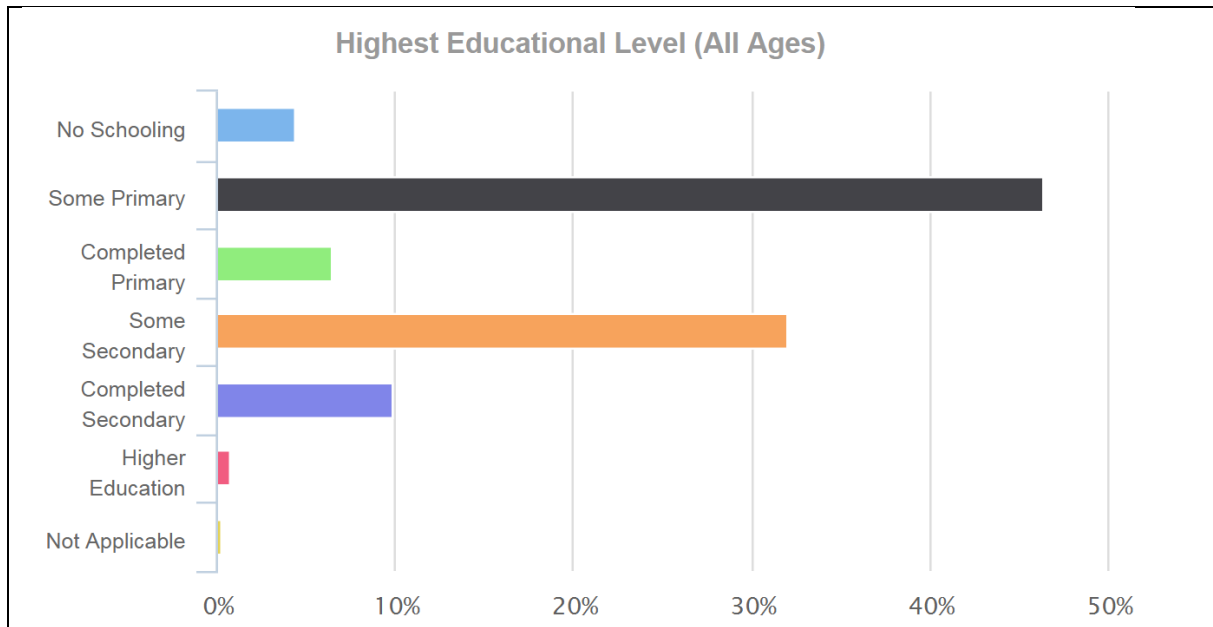
Level of unemployment:



Economic profile of local municipality:



Level of education:



**b) Socio-economic value of the activity**

What is the expected capital value of the activity on completion?	R 38 651 120
What is the expected yearly income that will be generated by or as a result of the activity?	Unknown. The proposed project is a service delivery project.
Will the activity contribute to service infrastructure?	YES
Is the activity a public amenity?	YES
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Unknown, depends on contractor
What is the expected value of the employment opportunities during the development and construction phase?	Unknown, depends on contractor
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 80%
How many permanent new employment opportunities will be created during the operational phase of the activity?	Unknown
What is the expected current value of the employment opportunities during the first 10 years?	Unknown
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 80%

## 9. 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](mailto: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 vegetation in the area consists of Kimberley Thornveld (SVk 4). The vegetation type is currently listed as being of Least Concern under the National List of Threatened Ecosystems (Notice 1477 of 2009)(National Environmental Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced development pressures.

- 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	%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	50%	The vegetation in the area consists of Kimberley Thornveld (SVk 4). The vegetation type is currently listed as being of Least Concern under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental

		Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced development pressures
Degraded (includes areas heavily invaded by alien plants)	50%	The site is situated adjacent to the agricultural small holdings of Ganspan and the land use on the site is primarily associated with these agricultural areas. As a result the site is subjected to significant levels of overgrazing. This is notable in the grazing of grasses on the site and the stunting of shrubs. Several indicators of overgrazing are also abundant. This impact leads to some degradation of the vegetation layer. Observations on the site were also likely exacerbated by the current drought which has further decreased the percentage vegetation cover. The cutting of trees on the site for use as firewood is also common and likely to have a significant impact. Large stumps and resprouting stumps are common on the site and indicate significant tree cutting occurring. In conclusion, the drainage area to the south of the site is transformed to a large degree but should still be considered as sensitive. This area is excluded from the development and is therefore unlikely to be affected by the proposed WWTW. The woodland area to the east of the site contains dense and large stands of the protected Camel Thorn ( <i>V. erioloba</i> ) and is therefore considered as undesirable for the development as impacts on these trees will be high. This area is however also excluded from the development. The hilltop, slope and plain portion which is proposed for the site does not contain such sensitive landscape elements as discussed above, the diversity of habitat and species are not significant and is not considered to have a high conservation value. The site does however still contain several protected species which although they are widespread still retain a conservation value and the required mitigation should be implemented as discussed above.
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								
<b>Ecosystem threat status as per the National Environmental Management Biodiversity Act (Act No. 10 of 2004)</b>	Critical	Wetland (including rivers, depressions, channelled and unchannelled 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)**

**NOTE: Summary of ecological report:**

The site proposed for the Waste Water Treatment Works (WWTW) has been rated as being acceptable for the development. The vegetation in the area consists of Kimberley Thornveld (SVk 4). The vegetation type is currently listed as being of Least Concern under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). The vegetation type is not currently subjected to any pronounced development pressures. The topography of the site consists of a low hill with a moderate slope to the surrounding plains areas. A small water treatment facility is also located on top of the low hill. A drainage area is located to the south of the hill and dense woodland areas to the east. Agricultural small holdings and crop fields are also situated to the north east and west of the site. The vegetation on the site consists of short grassland with scattered shrubs. The species composition is still considered as largely natural although overgrazing has altered the vegetation structure to some degree. The site will be situated on top of the low hill with a portion along the slope of the hill and the adjacent plain area. A large drainage area occurs to the south of the hill. This area also contains earthen berms which act as an artificial impoundment. Water drains from this impoundment in a north eastern direction. The drainage area does not form a distinct channel and drains in a diffuse surface pattern. This drainage area has been transformed by the earthen berms causing an alteration to the flow regime of the area. However, it still remains sensitive and construction of WWTW in this area should be avoided. The construction of the WWTW on top of the low hill is however unlikely to affect this system. Dense woodland vegetation occurs to the east of the site. It is dominated by large specimens of *Vachellia erioloba* (Camel



Thorn) and *Vachellia tortilis* (Umbrella Thorn). *V. erioloba* is a protected species and is also listed as a Declining species in the National Red List. As a result these large specimens are of conservation significance. The site proposed for the WWTW will however be situated on top of the low hill and will not require the removal of any large specimens. It is still likely that small specimens occur on the site and for these permits will have to be obtained to remove them. The top of the hill consists of shallow soils and vegetation consisting of a short grass layer with scattered shrubs and small trees. Grass species were not easily identifiable due to overgrazing and the drought at the time of the site visit. As mentioned previously *V. erioloba* is a protected species and where specimens will be affected by construction permits must be obtained to remove them. Several small succulents and herbs occur on top of the hill. Of these species the succulents *Crassula capitella*, *Aloe grandidentata* and *Anacampseros filamentosa* are listed as protected species in the Northern Cape Province. They are all relatively widespread and common and therefore not of high conservation significance. However, they are protected and transplant easily and permits can be obtained to transplant them to areas adjacent to the site.

The site is situated adjacent to the agricultural small holdings of Ganspan and the land use on the site is primarily associated with these agricultural areas. As a result the site is subjected to significant levels of overgrazing. This is notable in the grazing of grasses on the site and the stunting of shrubs. Several indicators of overgrazing are also abundant. This impact leads to some degradation of the vegetation layer. Observations on the site were also likely exacerbated by the current drought which has further decreased the percentage vegetation cover. The cutting of trees on the site for use as firewood is also common and likely to have a significant impact. Large stumps and resprouting stumps are common on the site and indicate significant tree cutting occurring. In conclusion, the drainage area to the south of the site is transformed to a large degree but should still be considered as sensitive. This area is excluded from the development and is therefore unlikely to be affected by the proposed WWTW. The woodland area to the east of the site contains dense and large stands of the protected Camel Thorn (*V. erioloba*) and is therefore considered as undesirable for the development as impacts on these trees will be high. This area is however also excluded from the development. The hilltop, slope and plain portion which is proposed for the site does not contain such sensitive landscape elements as discussed above, the diversity of habitat and species are not significant and is not considered to have a high conservation value. The site does however still contain several protected species which although they are widespread still retain a conservation value and the required mitigation should be implemented as discussed above.

## SECTION C: PUBLIC PARTICIPATION

### 1. ADVERTISEMENT AND NOTICE

<b>Publication name</b>	Noordkaap	
<b>Date published</b>	25 January 2017	
<b>Site notice position</b>	<b>Latitude</b>	<b>Longitude</b>
	27.979811°S	24.767162°E
<b>Date placed</b>	11 November 2016	

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

### 2. 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.

#### NOTE:

Identification of possible IAPs includes:

- District Municipality: Municipal Manager
- Local Municipality: Municipal Manager
- Ward Councillor: Ward 8
- Dept. of Agriculture
- Dept. of Water and Sanitation
- SAHRA
- Heritage: Northern Cape
- Adjacent landowners

Site notices were placed on site.

Adjacent landowners were notified by means of pamphlets.

Authorities were notified via registered post.

A legal notice was placed in Noordkaap.

A copy of the dBAR and fBAR will be provided to all the registered parties.

All registered parties will be given the opportunity to comment on the BAR documents.

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

<b>Title, Name and Surname</b>	<b>Affiliation/ key stakeholder status</b>	<b>Contact details (tel number or e-mail address)</b>
Please note that other stake holders were notified by means of two on-site notices as well as a notification in the Noordkaap.		

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.

### 3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Nr	Summary of main issues raised by I&APs	Summary of response from EAP
1.	<b>NC DENC</b>	
1.1	The length and width of pipelines	Pg. 19 of the Technical Report states that the pipelines will be constructed as follows: <ul style="list-style-type: none"> <li>• outfall sewer line: a length of 3 155 m 200mm diameter upvc 400kpa</li> <li>• outfall sewer line: a length of 571 m 250mm diameter upvc 400kpa</li> <li>• rising main pump pipeline: either 4 345m or 2755 m</li> </ul>
1.2	Geohydrology Report should be included in the fBAR	Geohydrology Report is attached as Annexure D <sub>4</sub> .
1.3	Removal of Activity 25 in the BAR	It is mentioned in the report that this activity is not triggered as part of this application.
2.	<b>DAFF</b>	
2.1	Protected flora on site includes: <ul style="list-style-type: none"> <li>• <i>Vachellia erioloba</i></li> <li>• <i>Aloe grandidentata</i></li> <li>• <i>Anacompseros filmentosa</i></li> </ul>	Noted.

	<p>These species are protected under the Northern Cape Nature Conservation Act (Act No. 9 of 2009) and applications for the removal / transplantation / cutting thereof should be submitted. Note that applications for the NFA licenses should only be submitted to DAFF after a positive EA was issued, but prior to disturbance of any protected plant species.</p>	
<p>2.2</p>	<p>As a need for a permit (NFA) is required for the removal of protected flora species is required, the applicable legislation should be reflected on Page 27</p>	<p>Please refer to pg. 28 of the fBAR.</p>

2.3	The width of the area to be cleared of vegetation to facilitate construction of the pipeline and access road should be provided. It is important to keep the vegetation clearance to a minimum, in order to minimise unavoidable impacts on protected plants species.	<p>According to the Technical Report (pg. 18) trench widths should be 800mm, laid on 100mm properly graded material bed on the given levels and covered with 300mm compacted blanket on top of the pipe followed by backfilling to normal ground level.</p> <p>Pg. 15 of the fBAR states that the corridor width is 5 m, although the actual trench widths will be limited to only 80 cm (Technical Report, pg. 18).</p> <p>Access roads:</p> <table border="1" data-bbox="611 680 1422 1413"> <thead> <tr> <th>Name</th> <th>Description</th> <th>Length</th> <th>Width of road</th> <th>Corridor width</th> </tr> </thead> <tbody> <tr> <td>New access road</td> <td>Dirt road</td> <td>15 m in length</td> <td>6.2m</td> <td>8m</td> </tr> <tr> <td>New road inside erf</td> <td>Dirt road</td> <td>162.5</td> <td>4.0m</td> <td>6.0m</td> </tr> <tr> <td>New road inside erf boundaries</td> <td>Paved Road</td> <td>90m</td> <td>4.0m</td> <td>6.0m</td> </tr> </tbody> </table>	Name	Description	Length	Width of road	Corridor width	New access road	Dirt road	15 m in length	6.2m	8m	New road inside erf	Dirt road	162.5	4.0m	6.0m	New road inside erf boundaries	Paved Road	90m	4.0m	6.0m
Name	Description	Length	Width of road	Corridor width																		
New access road	Dirt road	15 m in length	6.2m	8m																		
New road inside erf	Dirt road	162.5	4.0m	6.0m																		
New road inside erf boundaries	Paved Road	90m	4.0m	6.0m																		
2.4	Note that trees with active bird nests / any other significant biodiversity features may not be damaged or disturbed without a valid Fauna Permit from Nature Conservation.	Noted.																				
3	SAHRA																					

3.1	The Final BAR and all appendices must be submitted to the SAHRIS Case file upon final submission to the relevant competent authority.	The fBAR will be submitted to the SAHRIS Case File.
3.2	If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG)	Please refer to Section 3.9 of the EMPr.

	<p>Unit (Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;</p>	
3.3	<p>If the development receives an Environmental Authorisation (EA), SAHRA must be informed and all documents pertaining to the EA must be uploaded to the SAHRIS Case file.</p>	<p>Noted</p> <p>A copy of the EA (if received) will be uploaded to the SAHRIS Case File</p>

**4. 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.

**5. AUTHORITY PARTICIPATION**

Authorities and organs of state identified as key stakeholders:



Authority/Organ of State	Department of Agriculture, Forestry & Fisheries	DWS	Heritage Northern Cape	McGregor Museum	SAHRA	District Municipality	Local Municipality, including Municipal Manager and
Contact person	Ms Jacoline Mans	Lindiwe Franks Office of the Provincial Head: Northern Cape Region	Mr Timothy Ratha	Dr David Morris Head of Archaeology McGregor Museum		Ms Mamikie Bogatsu Contact: Fatima Ruiters (Personal Assistant)	The Municipal Manager: MC Mogale
Tel No	054 338 5909	Tel: 053 830 8804/00	053 831 2537 0790369295	053-8392707 082-2224777	0214624509	(053) 838 0998	053 474-9700 053 456-0111
Fax No	054 334 0030	Fax to email: 086 547 2792	053 8331435	0538421433	0214624502	053 861 1538	053 474-1768 053 456-0022
E-mail	JacolineMa@daff.gov.za	mokhoantleL@dws.gov.za	ratha.timothy@gmail.com	dmorrisby@gmail.com	online submission: <a href="http://www.sahra.org.za">http://www.sahra.org.za</a>	fatima.ruiters@fbdm.co.za	mogale@phokwane.gov.za alubbee@phokwane.org.za
Postal address	P.O. Box 2782 Upington 8800	28 Central Road Beaconsfield KIMBERLY 8301	1 Monridge Parl Cnr. Kekewich Drive & Memorial Road Kimberley 8300	P.O. Box 316 Kimberley 8300	111 Harrington Street CAPE TOWN 8001	Private Bag X6088, Kimberley, 8300 51 Drakensberg Avenue, Carfers Glen, Kimberley	Private Bag X 3 Hartswater 8570

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.

## **6. 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.

### **1. 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.

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
Planning and Design Phase	Planning and design  <b>NOTE:</b> Should the impacts not be taken into consideration during the Planning and Design Phase, the environmental impacts associated with the construction and operation phase will be of high significance as the environment will be negatively affected. Also note that, should the	<b>Direct impacts:</b> <ul style="list-style-type: none"> <li>• None</li> </ul>	Medium – High Negative	<ul style="list-style-type: none"> <li>• No environmental mitigation measures is required during the planning phase on the proposed site, as no mitigation measures are to be implemented on site during the planning phase.</li> <li>• However, the engineers, specialists and environmental consultants took the following into consideration, to be implemented during the construction / operational phase:                             <ul style="list-style-type: none"> <li>- Erosion control measures</li> <li>- Removal of vegetation</li> <li>- Protected vegetation</li> <li>- Removal of topsoil</li> <li>- Flooding</li> <li>- Pollution</li> <li>- Etc.</li> </ul> </li> </ul>	Low negative
		<b>Indirect impacts:</b> <ul style="list-style-type: none"> <li>• Potential soil and surface water pollution</li> </ul>	Medium – High Negative		Low negative
		<b>Cumulative impacts:</b> <ul style="list-style-type: none"> <li>• Potential groundwater pollution</li> </ul>	Medium – High Negative		Low negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
	<p>pipeline and WWTW not be constructed, the municipality will not be able to serve the community with sewer services and this may result in the potential contamination of soil, surface- as well as groundwater resources.</p>				
<p>Construction phase</p>	<p>General construction activities</p>	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>• Visual impact of rock and spoil material dumps from trench excavation, if required</li> <li>• Noise</li> </ul>	<p>Medium-High Negative</p>	<ul style="list-style-type: none"> <li>• Site will be kept neat and tidy</li> <li>• Appropriate area will be identified as a stockpiling area</li> <li>• Speed limit will be enforced on the construction vehicles and these vehicles will only make use of designated roads / pathways</li> <li>• Dust control measures will be implemented if nuisance dust generation occurs during the</li> </ul>	<p>Low negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		elevation due to construction activities <ul style="list-style-type: none"> <li>• Nuisance dust generation</li> </ul>		construction period	
		<b>Indirect impacts</b> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Establishment of alien / invader vegetation species</li> <li>• Possible impact on heritage artefacts</li> <li>• Loss of fauna on site</li> </ul>	Medium-High Negative	<ul style="list-style-type: none"> <li>• Stockpiled material will be stored in such a manner to limit the loss thereof. For example:               <ul style="list-style-type: none"> <li>- Bricks may be placed around the stockpiles, to limit the loss thereof due to rainy events.</li> <li>- Stockpiles will not be higher than 1.5 m</li> <li>- The gradient of stockpiles will not be greater than 1:1.5</li> </ul> </li> <li>• Establishment of alien / invader vegetation will be monitored and these species will be removed by hand or by an approved chemical before gestation thereof.</li> <li>• All archaeological findings (if any) should be recorded and reported to SAHRA. No construction activities in the</li> </ul>	Low negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
				<p>area may proceed without the authorisation from SAHRA.</p> <ul style="list-style-type: none"> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> <li>• Visual inspections for the occurrence of erosion should be undertaken on a weekly basis.</li> <li>• No animals may be captured / harmed / killed on site. Specialists should be appointed to remove / translocate species, if required. The necessary permits should also be obtained.</li> <li>• Any occurrences of harmed animals should be reported to the ECO, the required steps be taken and recorded as such.</li> </ul>	
		<p><b>Cumulative impacts</b></p> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Establishment of alien vegetation</li> </ul>	<p>Medium-High Negative</p>	<ul style="list-style-type: none"> <li>• Stockpiled material will be stored in such a manner to limit the loss thereof. For example: <ul style="list-style-type: none"> <li>- Bricks may be placed around the stockpiles, to limit the loss thereof due to rainy events.</li> <li>- Stockpiles will not be higher than</li> </ul> </li> </ul>	

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		species		<p>1.5 m</p> <ul style="list-style-type: none"> <li>- The gradient of stockpiles will not be greater than 1:1.5</li> <li>• Establishment of alien / invader vegetation will be monitored and these species will be removed by hand or by an approved chemical before gestation thereof.</li> <li>• All archaeological findings (if any) should be recorded and reported to SAHRA. No construction activities in the area may proceed without the authorisation from SAHRA.</li> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> <li>• Visual inspections for the occurrence of erosion should be undertaken on a weekly basis.</li> <li>• No animals may be captured / harmed / killed on site. Specialists should be appointed to remove / translocate species, if required. The necessary permits should also be obtained.</li> </ul>	



Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
				<ul style="list-style-type: none"> <li>Any occurrences of harmed animals should be reported to the ECO, the required steps taken and be recorded as such.</li> </ul>	
	Removal of vegetation and topsoil	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>Destruction of vegetation</li> <li>Loss of topsoil</li> <li>Possible loss of vegetative species of conservational concern</li> <li>Noise elevation due to construction activities</li> <li>Nuisance dust generation</li> <li>Visual impact of rock and spoil material</li> </ul>	Medium Negative	<ul style="list-style-type: none"> <li>Vegetation clearance will be limited to the required area.</li> <li>A permit for the removal of protected plant species will be obtained before the removal of these species (if any).</li> <li>Speed limit will be enforced on the construction vehicles and these vehicles will only make use of designated roads / pathways.</li> <li>Dust control measures will be implemented if nuisance dust generation occurs during the construction period.</li> <li>Stockpiled material will be stored in such a way to limit the loss thereof. For example:                             <ul style="list-style-type: none"> <li>Bricks may be placed around the stockpiles, to limit the loss thereof due to rainy events.</li> <li>Stockpiles should not be higher than 1.5 m.</li> <li>The gradient of stockpiles should</li> </ul> </li> </ul>	Low Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		dumps (if any)		not be greater than 1:1.5.	
		<p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Establishment of alien / invader vegetation species</li> <li>• Possible impact on heritage artefacts</li> <li>• Loss of fauna on site</li> </ul>	Medium Negative	<ul style="list-style-type: none"> <li>• Establishment of alien / invader vegetation will be monitored and these species will be removed by hand or by an approved chemical before gestation thereof.</li> <li>• All archaeological findings (if any) should be recorded and reported to SAHRA. No construction activities in the area may proceed without the authorisation from SAHRA.</li> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> <li>• A storm water management plan will be compiled and designed to: <ul style="list-style-type: none"> <li>- Reduce and / or prevent siltation, erosion and water pollution.</li> <li>- Improve the surface and ground water quality of the area and the lower lying areas within the catchment.</li> <li>- Ensure that no ponding and concentrated ingress of water takes</li> </ul> </li> </ul>	Low Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
				<p>place.</p> <ul style="list-style-type: none"> <li>• Visual inspections for the occurrence of erosion should be undertaken on a weekly basis.</li> <li>• No animals may be captured / harmed / killed on site.</li> <li>• Any occurrences of harmed animals should be reported to the ECO and recorded as such.</li> </ul>	
		<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Establishment of alien vegetation species</li> <li>• Possible impact on heritage artefacts</li> <li>• Loss of fauna on site</li> </ul>	<p>Medium Negative</p>	<ul style="list-style-type: none"> <li>• Establishment of alien / invader vegetation will be monitored and these species will be removed by hand or by an approved chemical before gestation thereof.</li> <li>• All archaeological findings (if any) should be recorded and reported to SAHRA. No construction activities in the area may proceed without the authorisation from SAHRA.</li> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> <li>• Visual inspections for the occurrence of erosion should be undertaken on a</li> </ul>	<p>Low Negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
				weekly basis. <ul style="list-style-type: none"> <li>• No animals may be captured / harmed / killed on site.</li> <li>• Any occurrences of harmed animals should be reported to the ECO and recorded as such.</li> </ul>	
	Workings within / near watercourses	<b>Direct impacts:</b> <ul style="list-style-type: none"> <li>• Temporary blockage of water</li> </ul>	Medium – High Negative	<ul style="list-style-type: none"> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> <li>• Any construction activities in waterways will be undertaken in such a manner that no ponding of water is required, where possible. 2/3 of the waterways may be diverted at a time, where required if the required authorisations were received from DWS.</li> <li>• The necessary authorisations (altering and / or impeding of beds / banks of water sources) should be obtained from DWS.</li> <li>• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.</li> </ul>	Low Negative
		<b>Indirect impacts</b>	Medium –	<ul style="list-style-type: none"> <li>• No ponding allowed on site and 2/3 of</li> </ul>	Low

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<ul style="list-style-type: none"> <li>• Ponding of water during construction activities at the waterways (due to blockage of waterways)</li> <li>• Impact the natural habitat of the area, soil disturbances and including pollution.</li> <li>• Spillage of material to be utilised during the construction phase as well as untreated sewage to the surrounding environment.</li> <li>• Possible</li> </ul>	High Negative	<p>the waterways may be diverted at a time, where required should the required, if the necessary DWS authorisations are in place.</p> <ul style="list-style-type: none"> <li>• Daily inspections for the possible occurrence of surface water and soil pollution are to be undertaken.</li> <li>• Best practices should be implemented in the case of spillages / pollution / erosion at the waterways.</li> </ul>	Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p>change of flow of water in water ways during the construction activities near / through waterways.</p> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Establishment of alien / invader vegetation species</li> <li>• Possible impact on heritage artefacts</li> <li>• Loss of fauna on site.</li> </ul>			
		<p><b>Cumulative impacts</b></p> <ul style="list-style-type: none"> <li>• Surface and groundwater pollution due</li> </ul>	<p>Medium – High Negative</p>	<ul style="list-style-type: none"> <li>• No ponding allowed on site and 2/3 of the waterways may be diverted at a time, where required, if the necessary DWS authorisations are in place.</li> <li>• Daily inspections for the occurrence of</li> </ul>	<p>Low Negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p>to spillage of potential hazardous substances such as hydraulic material and untreated sewage.</p> <ul style="list-style-type: none"> <li>• Scouring</li> <li>• Erosion</li> <li>• Loss of vegetation</li> </ul>		<p>surface water and soil pollution are to be undertaken.</p> <ul style="list-style-type: none"> <li>• Best practices should be implemented in the case of spillages / pollution / erosion at the waterways.</li> </ul>	
	Handling of waste	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>• Spillage of material to be utilised during the construction phase as well as untreated sewage to the surrounding environment</li> </ul>	Medium – High Negative	<ul style="list-style-type: none"> <li>• No waste (general / construction / potential hazardous / etc.) may be dumped in the veld / water features.</li> <li>• Waste classification should be undertaken.</li> <li>• Suitable waste bins etc. will be available on site for the temporary disposal of waste.</li> <li>• Waste will be removed from site and disposed of at an authorised landfill site.</li> <li>• Visual inspections for the occurrence of</li> </ul>	Low Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<ul style="list-style-type: none"> <li>• Dumping of construction rubble and general waste on site</li> </ul>		<p>pollution should be undertaken daily.</p>	
		<p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>• Surface and groundwater pollution due to spillage of potential hazardous substances such as hydraulic material and untreated sewage.</li> <li>• Impact on waterways (including the natural habitat of the area), including</li> </ul>	<p>Medium – High Negative</p>	<ul style="list-style-type: none"> <li>• Spills should be cleaned up immediately according to best practices</li> <li>• DWS should be notified of any spillage / pollution within 24 hours of occurrence</li> <li>• Record should be kept on site to indicate date of visual inspection, any spillages observed, and manner in which spill was treated.</li> </ul>	<p>Low Negative</p>



Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p>pollution.</p> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>Possible pollution of downstream watercourses</li> </ul>	<p>Medium – High Negative</p>	<ul style="list-style-type: none"> <li>Spills should be cleaned up immediately according to best practices</li> <li>DWS should be notified of any spillage / pollution within 24 hours of occurrence</li> <li>Record should be kept on site to indicate date of visual inspection, any spillages observed, and manner in which spill was treated.</li> </ul>	<p>Low Negative</p>
	<p>Health and Safety</p>	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>Road safety, especially at road crossings / workings near roads</li> <li>Health issues regarding contact with untreated</li> </ul>	<p>Medium Negative</p>	<ul style="list-style-type: none"> <li>The necessary precautions with regard to road safety will be implemented for construction work within road crossings.</li> <li>Speed limit will be enforced on the construction vehicles and these vehicles will only make use of designated roads / pathways.</li> <li>Health practitioner should be consulted should any health issues regarding contact with untreated sewage be suspected.</li> </ul>	<p>Low Negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		sewage			
		<p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>• Possible fire outbreaks</li> <li>• Injuries on site</li> <li>• Health issues on site</li> </ul>	Medium Negative	<ul style="list-style-type: none"> <li>• Fire extinguishers will be available, where required.</li> <li>• The correct PPE will be worn by all employees at all times.</li> <li>• Health practitioner should be consulted if any health issues regarding contact with untreated sewage be suspected.</li> </ul>	Low Negative
		<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>• Possible fire outbreaks</li> <li>• Injuries on site</li> </ul> <p>Health issues on site</p>	Medium Negative	<ul style="list-style-type: none"> <li>• Fire extinguishers will be available, where required.</li> <li>• The correct PPE will be worn by all employees at all times.</li> </ul> <p>Health practitioner should be consulted if any health issues regarding contact with untreated sewage be suspected.</p>	Low Negative
Operational phase	This phase consists of the use of the WWTW	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>• Deterioration</li> </ul>	Medium - Low Negative	<ul style="list-style-type: none"> <li>• Maintenance and repair will be undertaken on the WWTW infrastructure when necessary.</li> </ul>	Low Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
	<p>on completion of the proposed upgrading thereof. Maintenance and repair will be undertaken on the WWTW infrastructure when necessary.</p>	<p>of the WWTW infrastructure in the long term.</p>			
		<p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>• Establishment of alien / invader species due to previous disturbance will also be associated with this phase.</li> <li>• Increase in noise levels is possible.</li> <li>• Erosion</li> <li>• Possible</li> </ul>	<p>Medium – Low Negative</p>	<ul style="list-style-type: none"> <li>• Establishment of alien vegetation will be monitored and alien species will be removed by hand or by an approved chemical before gestation thereof.</li> <li>• Proper mitigation measures, such as monitoring of the water quality on a regular basis, should be applied.</li> <li>• Water treated at the WWTW and to be disposed of, should adhere to the DWS authorisation standards.</li> <li>• An emergency plan should be developed in case the water does not conform to the DWS authorisation standards.</li> <li>• Visual inspections should be undertaken at least every 6 months to investigate the occurrence of sedimentation and erosion.</li> </ul>	<p>Low Negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p>change in the morphology of the watercourses due to erosion of the banks</p> <ul style="list-style-type: none"> <li>• Odour</li> </ul>		<ul style="list-style-type: none"> <li>• Proper erosion mitigation measures should be implemented.</li> <li>• Stabilise the banks of the watercourses, where necessary.</li> <li>• Note that the screening station and degritting facilities may have to be enclosed within a specialist building should odour control be required, where the air is scrubbed before being discharged to the atmosphere.</li> </ul>	
		<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>• Establishment of alien / invader species due to previous disturbance will also be associated with this phase.</li> <li>• Increase in noise levels is</li> </ul>	<p>Medium – Low Negative</p>	<ul style="list-style-type: none"> <li>• Maintenance and repair will be undertaken on the infrastructure when necessary.</li> <li>• Note that the screening station and degritting facilities may have to be enclosed within a specialist building should odour control be required, where the air is scrubbed before being discharged to the atmosphere.</li> </ul>	<p>Low Negative</p>

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p>possible.</p> <ul style="list-style-type: none"> <li>• Erosion</li> <li>• Possible change in the morphology of the watercourses due to erosion of the banks</li> <li>• Odour</li> </ul>			
Decommissioning and Closure	Activities associated with the decommissioning phase will be limited to the rehabilitation of areas disturbed during the construction phase. All disturbed areas will be rehabilitated	<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>• Rehabilitation of disturbed area</li> <li>• Re-vegetation</li> <li>• Limit occurrence of erosion</li> <li>• Proper storm water control</li> <li>• No ponding</li> </ul>	Medium Positive	<ul style="list-style-type: none"> <li>• All temporary infrastructure related to the construction phase will be removed from site.</li> <li>• Temporary concrete surfaces (if any) will be removed and compacted areas ripped.</li> <li>• The establishment of natural occurring vegetation will be encouraged.</li> <li>• No waste will be dumped on site and any waste occurring on site will be removed and disposed of according to best practices.</li> <li>• Establishment of extensive alien species</li> </ul>	High Positive

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
	according to best practices. A rehabilitation plan will be developed, if it is decided to remove the proposed WWTW and associated infrastructure before the cessation of the operation aspects of the proposed project. The rehabilitation plan will include management and mitigation measures to be implemented during the decommissioning of the project.	on site <ul style="list-style-type: none"> <li>• Limit visual impact</li> </ul>		will be monitored.	
		<b>Indirect impacts:</b>  <ul style="list-style-type: none"> <li>• Rehabilitation of disturbed area</li> </ul>	Medium Positive	<ul style="list-style-type: none"> <li>• Temporary infrastructure related to the construction phase will be removed from site.</li> <li>• Temporary concrete surfaces (if any) will be removed and compacted areas ripped.</li> <li>• The establishment of natural occurring vegetation will be encouraged.</li> <li>• No waste will be dumped on site and any waste occurring on site will be removed and disposed of according to best practices.</li> <li>• Establishment of extensive alien species will be monitored.</li> </ul>	High Positive
		<b>Cumulative impacts:</b>  <ul style="list-style-type: none"> <li>• Rehabilitation of disturbed</li> </ul>	Medium Positive	<ul style="list-style-type: none"> <li>• The disturbed area will be hydro seeded to reinstate vegetation growth, where required.</li> <li>• Establishment of alien vegetation will be monitored and alien species will be</li> </ul>	High Positive

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		area		removed by hand or by an approved chemical before gestation thereof.	
No-go	Keeping the status quo	<b>Direct impacts:</b> <ul style="list-style-type: none"> <li>No direct environmental impacts.</li> </ul>	N/A	N/A	N/A
		<b>Indirect impacts:</b> <ul style="list-style-type: none"> <li>The Municipality will not be able to provide residents with adequate basic WWTW services.</li> </ul>	High Negative	<ul style="list-style-type: none"> <li>The Municipality will not be able to treat all the waste water that originates in Ganspan.</li> <li>This will lead to environmental, economic and social impacts.</li> <li>Sewage to be transported by municipal vehicles on a daily basis from the existing WWTW to a WWTW in Bloemfontein.</li> <li>This will lead to:                             <ul style="list-style-type: none"> <li>- possible mismanagement</li> <li>- possible overflow at the alternative WWTW</li> <li>- this is not a cost effective alternative</li> </ul> </li> </ul>	Medium – High Negative

Phase	Activity	Impact summary	Significance without mitigation	Proposed mitigation	Significance with mitigation
		<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>As the project is described as a basic service, the lack thereof will lead to major social and economic impacts that will indirectly cause severe environmental concerns.</li> </ul>	High Negative	<ul style="list-style-type: none"> <li>The Municipality will not be able to treat all the waste water that originates in Ganspan.</li> <li>This will lead to environmental, economic and social impacts.</li> <li>Sewage to be transported by municipal vehicles on a daily basis from the existing WWTW to a WWTW in Bloemfontein.</li> <li>This will lead to: <ul style="list-style-type: none"> <li>- mismanagement</li> <li>- overflow at the alternative WWTW</li> <li>- this is not a cost effective alternative</li> </ul> </li> </ul>	Medium – High Negative

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.



## 2. 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.

**NOTE:**

By implementing the recommendations of the ecological report, heritage report, this document and the EMPr, the impact of the construction of the proposed infrastructure will be kept to a minimum.

**Alternative 1 Preferred**

The same as above, including:

The expected environmental impacts relating to the proposed project are mostly temporary (during the construction phase) and the mitigation measures referred to in the current document, the EMPr and Specialist Reports will ensure that the disturbance is kept to a minimum and ensure that adequate rehabilitation takes place.

**No-go alternative (compulsory)**

The no-go alternative is not seen as a reasonable / feasible alternative as the proposed project is considered essential to enable the Municipality to provide residents with adequate basic WWTW services. The proposed project entails the construction of a pipeline and WWTW in order to enable the Municipality to treat effluent originating from Ganspan sufficiently.

As the project is described as a basic WWTW service, the lack thereof will lead to major social and economic impacts that will indirectly cause severe environmental concerns. The impacts expected during the construction phase of the proposed project can be minimised through the recommended mitigation measures and therefore the no-go alternative is not ideal.

**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	
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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
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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.

Refer to the EMPr in Appendix G for recommended mitigation measures.
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Is an EMPr attached?

YES	
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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.

**Neil Devenish**  
NAME OF EAP

  
SIGNATURE OF EAP

**22 June 2017**  
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 D<sub>1</sub>: Heritage

Appendix D<sub>2</sub>: Ecological

Appendix D<sub>3</sub>: Preliminary Design Report

Appendix D<sub>4</sub>: Geohydrology Report

**Appendix E:** Public Participation

Appendix E<sub>1</sub>: List of identified possible IAPs

Appendix E<sub>2</sub>: Proof of notification

Appendix E<sub>3</sub>: List of registered parties

Appendix E<sub>4</sub>: List of comments received

Appendix E<sub>5</sub>: Response to comments received

Appendix E<sub>6</sub>: Proof of submission of dBAR to registered parties

**Appendix F:** Impact Assessment

**Appendix G:** Environmental Management Programme (EMPr)

**Appendix H:** Details of EAP and expertise

**Appendix I:** Specialist's declaration of interest

**NOTE: Declaration by EAP is attached to Appendix H.**

Engineer

Heritage

Ecological

**Appendix J:** Additional Information

Appendix J<sub>1</sub>: Confirmation from Municipality

Appendix J<sub>2</sub>: Title Deed Document