



EP3 Environmental (Pty) Ltd

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DRAFT BAR FOR THE PROPOSED
CONSTRUCTION OF 4 WEIRS AND A
ROAD CULVERT ON PORTION 3 OF
THE FARM ROODEKRANS 133 JT,
DULLSTROOM AREA, MPUMALANGA

DARDLEA REFERENCE NUMBER:
1/3/1/16/1N-39

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(For official use only)

File Reference Number:

Application Number:

Date Received:

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

Kindly note that:

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.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

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

YES ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

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

The proposed project entails the construction of 4 weirs and the construction of a road culvert. The culvert will be constructed under the existing farm dirt road. The weirs and the culvert will be located along an unnamed tributary of the Crocodile River. The tributary is fed by a spring and is non-perennial. The flow direction is in a north to southerly direction. One weir will be located up-stream of the road culvert and the other 3 will be located down-stream of the road culvert.

The farm Roodekrans is situated approximately 10 km southeast from Dullstroom town. There are two non-perennial tributaries of the Crocodile River on the property.

The weirs trigger listed activities under the National Environmental Management Act (Act no 107 of 1998) however the upgrade of the existing road which entails the installation of a culvert does not trigger any listed activities under the NEMA as the upgrade will occur within the footprint of the existing dirt road.

Previously the drainage channel to the east of the property was diverted, at the point where it crosses under the farm access dirt road, towards the existing dam on the property and both channels fed into the existing dam. As a result the eastern channel and surrounding wetland was mostly dewatered and alien vegetation became established along this section.

The proposed development will divert the eastern channel back along its original course and it is also along this section of the channel that 3 of the weirs will be constructed. The proposed development will allow natural rehabilitation and recovery of the degraded wetland downstream of the access road. The weirs have been designed in a manner that will improve the current state of the tributary of the Crocodile River and thereby improve the current status of the Ecological Support Area of the Critical Biodiversity Area as identified under the Mpumalanga Biodiversity Sector Plan (developed by the Mpumalanga Parks and Tourism Agency) (refer to page 10 of the Aquatic Baseline Report).

THE WEIRS

The weirs will be constructed to retain water and to provide water for cattle on the farm.

Weir 1 will be located on the northern side of the road in an area classified as high sensitivity with

wetland and drainage features (according the ecological report attached in appendix D). Weir 1 will be 7.75 meters in length and 6 meters in width. Weirs 2, 3 and 4 will be on the south side of the farm access road in an area classified as medium sensitivity wetlands in a degraded state (according to the ecological report). Weir 2 will be 8.8 meters in length and 7 meters in width. Weir 3 will be 9 meters long and 7 meters in width. Weir 4 will be 8.35 meters in length and 6 meters in width. The total surface areas and exact locations of each weir on the property are indicated in the table below.

The weirs will be constructed using gabions and scour pools will be prepared using rock material on the down-stream side of the weirs which will aid in preventing erosion. Furthermore, graded cobbles and gravels will be used to make a smooth transition to the natural channel boundary.

Description	Lat (DDMMSS)	Long (DDMMSS)	Dimensions (length, breadth and area)
Weir 1	25°29'22.52" S	30°9'30.02" E	7.75 x 6 = 46 m ²
Weir 2	25°29'29.83" S	30°9'25.22"E	8.8 x 7 = 61.6 m ²
Weir 3	25°29'31.07" S	30°9'24.46"E	9 x 7 = 63 m ²
Weir 4	25°29'34.26" S	30°9'22.15"E	8.25 x 6 = 49.5 m ²
Total Area			220.6 m²

Refer to the attached design drawings under Appendix C for more details.

THE ROAD CULVERT

An existing farm access road that crosses a drainage line will be upgraded to prevent the road from being washed away during rainfall events and to allow the stream to flow more freely. The upgrade will entail the installation of suitable culverts and an increase in the height of the road. The road will not be widened and will be upgraded within the current footprint.

The road crossing the area below the small dam along the access road has caused dewatering of the channeled valley bottom wetland causing the invasion of the wetland by terrestrial species and weeds. The installation of the culverts under the road will aid in rehabilitating the downstream channel and wetland areas.

Three pipe culverts, each with a diameter of 1 meter and approximately 8 meters in length will be installed under the road. Gabions will be placed along the embankments of the road to prevent the road from being eroded by stormwater. Refer to the attached engineering design plans under Appendix C for more details.

While the upgrade of the road will not trigger any listed activity under the NEMA (Act 107 of 1998), it will affect the watercourse and this activity will therefore be included in a Water Use License Application (WULA) that will be submitted to the Department of Water Affair and Sanitation.

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>Example: 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.</p>	<p>A bridge measuring 5 m in height and 10m in length, no wider than 8 meters will be built over the Orange river</p>
<p>GNR 983: GN No. 983 Item 12: The development of - <i>v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size;</i> <i>where such development occurs -</i> <i>(a) within a watercourse;</i></p>	<p>The total area of the 4 proposed weirs within the water course will be approximately 220.6 square meters.</p> <p>The culvert together with the gabions and rip rap will occupy an area of approximately 10 square meters directly within the water course and approximately 150 square meters in total in the flood line area indicated on the design drawings.</p>
<p>GN No. 983 Item 19: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from - <i>i) a watercourse;</i></p>	<p>More than 5 cubic meters of soil will be removed from a water course to make provision for the weirs.</p>
<p>GN No. 983 Item 30: Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).</p>	<p>A permit will be required to remove the following 3 protected plant species occurring on the site:</p> <ol style="list-style-type: none"> 1. <i>Zantedeschia albomaculata</i> 2. <i>Kniphofia multiflora</i> 3. <i>Eucomis autumnalis</i>
<p>GNR 985: GN 985 Item 14: The development of – <i>i) weirs, where the weir, including infrastructure and water surface area, exceeds 10 square metres in size;</i> <i>(a) In Mpumalanga:</i> <i>(ii) Outside urban areas, in:</i> <i>(bb) National Protected Area Expansion</i></p>	<p>The development entails the construction of 4 weirs which will collectively exceed an area of 10 square meters in size.</p> <p>The proposed weirs fall within Ecological Support Areas.</p>

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.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. 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

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Weir 1	25°29'22.52" S	30°9'30.02" E
Culvert	25°29'26.85" S	30°9'26.67"E
Weir 2	25°29'29.83" S	30°9'25.22"E
Weir 3	25°29'31.07" S	30°9'24.46"E
Weir 4	25°29'34.26" S	30°9'22.15"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

Alternative:

Latitude (S):

Longitude (E):

Alternative S1 (preferred)

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

Alternative S2 (if any)

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

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

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

b) Lay-out alternatives



c) Technology alternatives



d) Other alternatives (Activity Alternative)

Alternative 2: 1 Dam, 4 Weirs and 1 Culvert (Road Upgrade)		
Dam:	25°29'36.66" S	30°9'21.85" E
Weir 1	25°29'22.52" S	30°9'30.02" E
Weir 2	25°29'29.83" S	30°9'25.22"E
Weir 3	25°29'31.07" S	30°9'24.46"E
Weir 4	25°29'34.26" S	30°9'22.15"E

e) No-go alternative

It is not anticipated that any other development will take place along this water course should the activities not go ahead as the property is privately owned and is not located in an area where any other developments would be feasible.

Wetlands and a drainage channel are present on the site

The drainage channel, classified as a water course does not show any wetland characteristics, although it still functions as a natural ecosystem. The water courses are classified as channels according to the National Wetland Classification System (Sanbi, 2009).

The drainage channel on the site shows slight signs of erosion in certain areas along its banks and these areas will not be rehabilitated should the proposed activities not go ahead as the placement of a weir in the water course would eliminate upstream erosion to a certain extent over time by reducing flow velocity.

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):

Alternative:

- Alternative A1¹ (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Size of the activity:

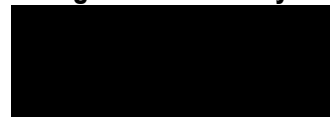
220.6 m ²
1500 m ²

or, for linear activities:

Alternative:

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Length of the activity:

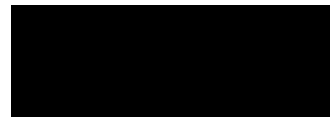


b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Size of the site/servitude:



4. SITE ACCESS

Does ready access to the site exist?

YES ✓	

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

Describe the type of access road planned:

There is already an existing dirt road to the property, no new roads will be constructed. The culvert will be constructed under this existing road.

¹ "Alternative A.." refer to activity, process, technology or other alternatives.

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):

1. Is the activity permitted in terms of the property's existing land use rights?	YES ✓	NO	Please explain
The property is zoned for agriculture and as the objective of the proposed weirs will be to dam water for livestock, the activity will be in line with the property's existing land use rights.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES ✓		Please explain
The preferred alternative will not change the land use and does not conflict with the current land-use on the property.			
(b) Urban edge / Edge of Built environment for the area		NO ✓	Please explain
The proposed site is located in a rural area and as such falls outside of the urban edge.			
(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?).		NO ✓	Please explain
According to the municipality's Spatial Development Framework agriculture should be used to promote employment opportunities within the municipal boundaries. The agricultural sector has also been identified as a key economic sector which must be utilised in order to spur economic growth and employment creation in Mpumalanga. This is also highlighted in the local municipality's IDP. As the proposed activities will be for agricultural purposes, it is deemed to be in line with the SDF and IDP of the local municipality.			

(d) Approved Structure Plan of the Municipality		NO <input checked="" type="checkbox"/>	Please explain
The proposed infrastructure does not require any approved structure plans from the local municipality.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)		YES <input checked="" type="checkbox"/>	Please explain
<p>The proposed development (preferred alternative) will not have a significant negative impact on the environment and will be used to improve the present ecological state of the stream on the property and can therefore only contribute to goals of the EMF.</p> <p>The preferred alternative is considered to be sustainable as the weirs have been designed to ensure continual flow of water and will not significantly reduce the amount of water entering the Crocodile River from the tributary along which the weirs and the culvert will be constructed.</p>			
(f) Any other Plans (e.g. Guide Plan)		NO <input checked="" type="checkbox"/>	Please explain
No other plans need to be authorised for the proposed activities.			
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)?		NO <input checked="" type="checkbox"/>	Please explain
As mentioned the proposed activities are in line with one of the priorities of the SDF and IDP, as the proposed weirs will be used for damming of water in order to provide water for livestock. As such the proposed activity will promote agricultural development within the area.			
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.)		NO <input checked="" type="checkbox"/>	Please explain
Although the proposed activity will promote agricultural development within the area, it will only be on a small scale and not on a commercial scale.			
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.)		NO <input checked="" type="checkbox"/>	No services are required for the proposed activity.
No additional services will be required for the proposed activity			

<p>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.)</p>		NO ✓	Please explain
<p>No additional services will be required from the local municipality, as the proposed activities will merely be for damming of water in order for watering of livestock.</p>			
<p>7. Is this project part of a national programme to address an issue of national concern or importance?</p>		NO ✓	Please explain
<p>As the proposed infrastructure will be on a small scale, it is not deemed that any issues of national concern or importance will be addressed.</p>			
<p>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.)</p>	YES ✓		Please explain
<p>The location factors do favour the land use as the preferred activity is associated with existing land-use activities and the land-use zoning (agricultural) of the area and the weirs will be constructed along a natural drainage line.</p>			
<p>9. Is the development the best practicable environmental option for this land/site?</p>	YES ✓		Please explain
<p>As long as continual flow is ensured the preferred activity (the weirs and culvert) is considered sustainable and the current ecosystem will only be slightly impacted on at the point where the weirs will be constructed. The construction of the weirs will also aid in preventing further erosion of the upstream water course.</p>			
<p>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</p>	YES ✓		Please explain
<p>The stream will be diverted back to its original course and will be used to improve the current state of the tributary of the Crocodile River thereby improving the current status of the Ecological Support Area. The proposed activity will also promote agricultural development within the area.</p>			
<p>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</p>		NO ✓	Please explain
<p>It is not expected that the proposed land use will set a precedent as the proposed activity is located on private property and will not alter the current land-use.</p>			

12. Will any person's rights be negatively affected by the proposed activity/ies?		NO √	Please explain
No persons or persons rights will be affected negatively by the preferred activity.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		NO √	Please explain
The activity is not located on any "urban edge"			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?		NO √	Please explain
The proposed activity is not associated with any of the SIP's			
15. What will the benefits be to society in general and to the local communities?	Please explain		
The proposed activities will promote agricultural development within the area and as such may contribute to local job creation for local communities.			
16. Any other need and desirability considerations related to the proposed activity?	Please explain		
The proposed activities will promote agricultural development within the area and as such may contribute to local job creation for local communities. The proposed activities are also in line with the local municipality's IDP and SDF.			
17. How does the project fit into the National Development Plan for 2030?	Please explain		
The proposed development does not directly fit into the NDP for 2030, however, jobs will be created during the construction phase for local contractors and community members.			
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.			
The potential environmental, socio-economic and cultural impacts associated with the proposed activity were identified, predicated and evaluated as part of the environmental assessment conducted. The impacts of the proposed site and layout, as well as the impacts of the alternative layout were predicted and associated mitigation measures provided in order to mitigate these impacts to acceptable levels. A full list of the potential environmental, socio-economic and cultural impacts with their risk ratings and mitigation measures is included in Appendix F of this report.			
Specialist studies were conducted in order to evaluate the proposed site and identify any sensitive areas which might be impacted on by the proposed activity. The specialist studies provided the necessary mitigation measures to reduce any negative impacts associated with the proposed activity. The environmental assessment included a public participation period which ensured input from various stakeholders and interested and affected parties.			

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

The principles of section 2 of NEMA were taken into account during the environmental assessment process. All potential significant impacts were identified along with the necessary mitigation measures which will ensure that pollution and degradation of the environment are avoided or minimised. The risks of potential impacts were rated according to a set methodology and this was used to determine the significance of negative impacts identified. Specific mitigation measures were developed for the proposed activity and a detailed description of the proposed mitigation measures are included in the Environmental Management Program.

The proposed activity was evaluated taking into account people and their needs, as the activity will aid to job security, electricity security and food security. The proposed mitigation measures will ensure that the activity will be socially, environmentally and economically sustainable, as proposed mitigation measures reduces the associated negative impacts.

The ecological assessment conducted pointed out that there sensitive ecosystems on site and as such the best environmental solution was opted for in order to minimise negative environmental impacts. A heritage impact assessment conducted indicated that there are cultural resources of significance on site, however these were excluded from the development footprint. All mitigation measures included in the specialist reports must also be adhered to.

Mitigation measures established pertaining to waste management encourages as integrated waste management approach ensuring that waste will be minimised, re-used or recycled as far as possible. The public consultation which formed part of the environmental assessment further ensured that all stakeholders and interested and affected parties involved were provided with an opportunity to provide their comments, thus promoting public involvement.

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:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act, 2004 (Act No. 107 of 1998)	The proposed development triggers certain listed activities (as indicated above) under the NEMA	Department of Environmental Affairs (DEA).	1998
National Environmental Management: Biodiversity Act, 2004 (NEMBA: Act No. 10 of 2004)	A permit will be required to remove 3 protected plant species occurring on the site. 1. <i>Zantedeschia albomaculata</i> 2. <i>Kniphofia multiflora</i> 3. <i>Eucomis autumnalis</i>	Department of Environmental Affairs (DEA).	1998
National Water Act (Act No. 36 of 1998)	A Water Use License is required as the activity triggers items c and i under section 21: (c) <i>Impeding or diverting the flow of water in a watercourse</i> (i) <i>Altering the bed, banks, course or characteristics of a watercourse</i>	Department of Water and Sanitation	1998
National Heritage Resources Act (NHRA – Act 25 of 1999)	Heritage resources are present on the property however these resources are located more than 50 meters away from the planned location of the weirs and culvert and will not be impacted upon at all.	South African Heritage Resources Association (SAHRA)	1999
Human Tissue Act (Act 65 of 1983).	A grave of which the age is not known is located on the property. The grave is located more than 50 meters away from the proposed development and will not be disturbed at all.	SAHRA and National Department of Health and Provincial Department of Health	1983
Ordinance of the Removal of Graves and Dead Bodies of 1925 (Ordinance 7 of 1925)	A grave of which the age is not known is located on the property. The grave is located more than 50 meters away from the proposed development and will not be disturbed at all.		1925

Integrated Environmental Management (IEM) Department of Environmental Affairs: DEA, 1992). IEM is a philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process. The goal is to achieve a balance between development and conservation.	The objectives and implementation requirements of IEM have been followed, the environmental impact of the activity is being evaluated and mitigation measures have been provided and will be implemented once the proposed activity commences.	Department of Environmental Affairs (DEA)	1992
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	This Act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.	Department of Agriculture, Forestry and Fisheries.	1983
Mpumalanga Nature Conservation Act	This Act deals with the conservation of wild animals, fresh water fish and the conservation and protection of flora in the Mpumalanga Province. Animals and plants are both listed in the schedules with different degrees of protection afforded to each.	DARDLEA	2014
Mpumalanga Biodiversity Conservation Plan (MBCP)	The Mpumalanga Biodiversity Conservation Plan (MBCP) maps the distribution of the province's known aquatic biodiversity sub-catchments into five categories. These are ranked according to ecological and biodiversity importance and their contribution to meeting the quantitative targets set for each biodiversity feature (Ferrar and Lötter 2007). The categories are: <ul style="list-style-type: none"> • Protected areas – already protected and managed for conservation; 	DARDLEA and Mpumalanga Parks and Tourism Agency (MPTA)	2007

	<ul style="list-style-type: none"> • Irreplaceable areas – protection crucial, no other options available to meet targets; • Highly Significant areas – protection needed, very limited choice for meeting targets; • Important and Necessary areas – protection needed, greater choice in meeting targets; • Ecosystem Maintenance – transformed/modified areas. <p>According to the MBCP, the area falls within the Irreplaceable category (Refer to figure 9 in the Baseline Aquatic Report under Appendix D).</p>		
Mpumalanga Biodiversity Sector Plan (MBSP)	<p>In essence the MBSP is a map guiding areas of conservation concern for the Mpumalanga Province. Two maps have been developed one being the terrestrial critical biodiversity areas (CBA) and the other the freshwater CBA. The freshwater ecosystems of Mpumalanga have been mapped in the following categories for the MBSP:</p> <ul style="list-style-type: none"> • Critical Biodiversity Areas (CBA) – areas of high biodiversity value, needed to meet biodiversity targets. These areas should be maintained in natural or near natural state; • Ecological Support Areas - these areas support CBA but are not essential for meeting conservation targets; • Other natural areas – these areas have natural 	MPTA	2014

	<p>characteristics but have not been earmarked as priority areas for conservation but perform a range of biological as well as ecological functions;</p> <ul style="list-style-type: none"> • Heavily Modified Areas – Areas which have been impacted and have had a significant or complete loss of natural habitat and ecological function. <p>In terms of the MBSP Roodekrans contains a CBA, an Ecological Support Areas as well as Heavily Modified Areas:</p> <ul style="list-style-type: none"> • The proposed weirs all fall within Ecological Support Areas. • The dam (Alternative activity) would be present in the Ecological Support Area as well as the Heavily Modified Area. 		
National Freshwater Ecosystem Priority Areas (NFEPA) project.	Roodekrans falls within two FEPA's. The unit identification numbers of these FEPA's are 930 and 962 respectively. The largest portion of Roodekrans falls into FEPA 930 which is a river FEPA as well as a Fish Sanctuary.	South African National Biodiversity Institute (SANBI), the Water Research Commission & the CSIR.	2014

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

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

YES ✓

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

18 m³

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

The construction related waste such as rocks for gabions and overburden will be reused elsewhere on the farm, and general waste produced will be taken to the local landfill site.

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

The construction waste will be disposed of at the municipal landfill site in Belfast (Emakhazeni Local Municipality).

Permit Reference No	Waste Disposal Site	Class	Type of Facility	Date Issued	Permit Holder	Address 1	Code
12/9/11/P95	Belfast Landfill Site - Approved	G:S:B-	Landfill	11/03/2009	Emakhazeni Local Municipality	P.O. Box 17 Belfast	1100

Will the activity produce solid waste during its operational phase?

NO ✓

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

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

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

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

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?

NO ✓

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

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

	NO ✓
--	---------

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

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

	NO ✓
--	------

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 ✓
--	------

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 ✓
--	------

If YES, provide the particulars of the facility:

Facility name:

Contact

person:

Postal

address:

Postal code:

Telephone:

E-mail:

Cell:

Fax:

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

--

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?

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

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

--

d) Waste permit

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

	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?

NO ✓

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

Describe the noise in terms of type and level:

--

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 ✓
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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:

0 litres (no water will be required for the activity)
--

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

NO ✓

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

14. ENERGY EFFICIENCY

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

None, as no electricity is required for the operational phase of the activity.
--

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

--

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. 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):

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

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

YES ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Mpumalanga
District Municipality	Nkangala District Municipality
Local Municipality	Emakhazeni Local Municipality
Ward Number(s)	Ward number 4
Farm name and number	Roodekrans 133 JT
Portion number	Portion 3
SG Code	TOJT00000000013300003

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Agricultural.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

NO ✓

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10 √	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	------------------	--------------	-------------	------------------

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	-------------	--------------	-------------	------------------

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	-------------	--------------	-------------	------------------

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 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 checked="" type="checkbox"/>	2.6 Plain	<input 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?

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

Any other unstable soil or geological feature

	NO ✓
YES ✓	

	NO ✓
YES ✓	

An area sensitive to erosion

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

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

5. SURFACE WATER

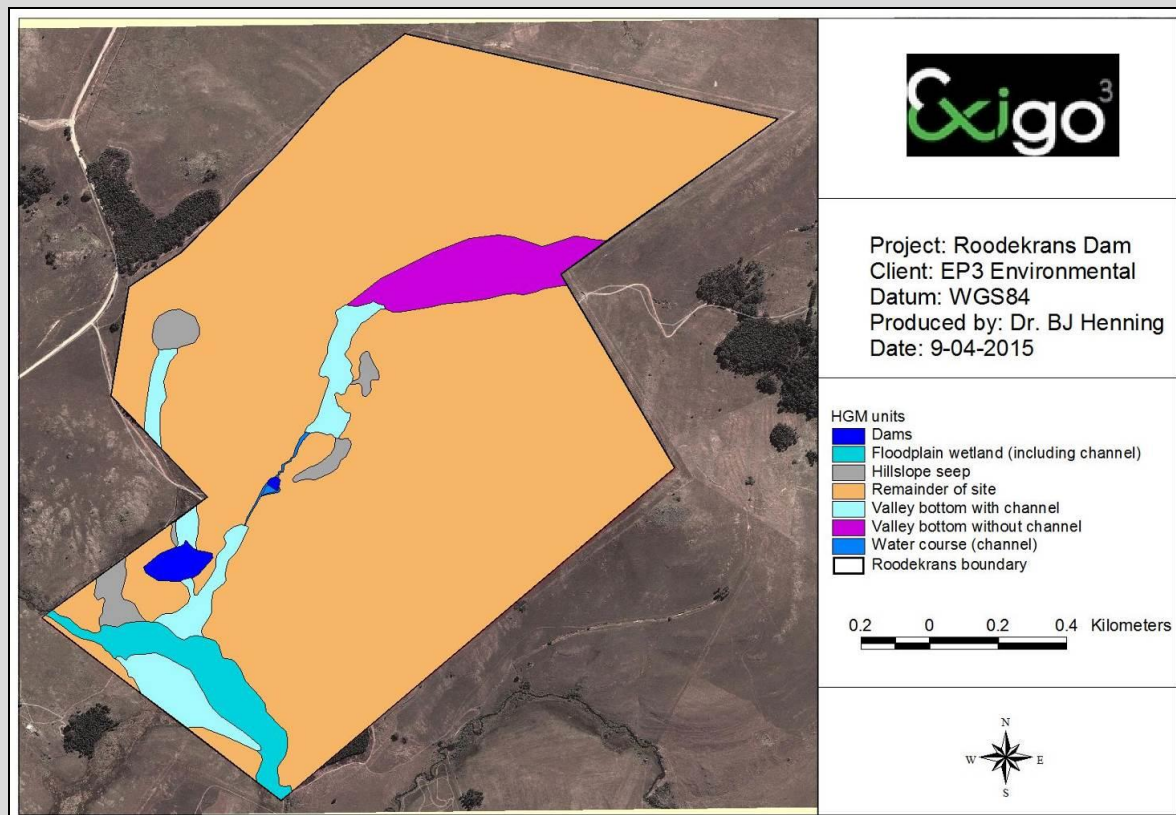
Indicate the surface water present on and or adjacent to the site and alternative sites?

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

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

This section provides a summary of the wetlands and water courses occurring on the site.

The Map below indicates the location of the types of wetlands and water courses found on the site. A description of each wetland type and water course has been provided here, although the Wetland Delineation Report attached under Appendix D should be referred to for more information.



The (Present Ecological State) PES assessment (in the Wetland Delineation Report under Appendix D) which indicates that the areas (water courses and valley bottom wetlands downstream of road crossings) impacted by the road crossings, alien species invasion and small dam construction in the channels are in a 'Moderately Modified' condition, compared to the 'Natural / Unmodified; and Largely Natural; PES of the remainder of the wetlands on site.

WETLANDS

The wetland types that were identified on site represent the following:

- Valley bottom wetlands
 - With a channel;
 - Without a channel;
- Hillslope seep wetlands;
- The dams on site represent artificial wetlands (depressions).

Small sections occur that can be classified as water courses, where the channels cut through rocky sections in the landscape (as indicated in Figure 8 in the Wetland Delineation report). The dams represent artificial wetlands.

WATER COURSES

The drainage channel classified as water courses does not show any wetland characteristics, although it still functions as a natural ecosystem. The water courses are classified as channels according to the National Wetland Classification System (Sanbi, 2009).

A channel is classified by Sanbi (2009) as an open conduit with clearly defined margins that (i) continuously or periodically contains flowing water, or (ii) forms a connecting link between two water bodies. Dominant water sources include concentrated surface flow from upstream channels and tributaries, diffuse surface flow or interflow, and/or groundwater flow. Water moves through the system as concentrated flow and usually exits as such but can exit as diffuse surface flow because of a sudden change in gradient. Unidirectional channel-contained horizontal flow characterises the hydrodynamic nature of these units. Channels generally refer to rivers or streams (including those that have been canalised) that are subject to concentrated flow on a continuous basis or periodically during flooding, as opposed to being characterised by diffuse flow. As a result of the erosive forces associated with concentrated flow, channels characteristically have relatively obvious active channel banks.

VALLEY BOTTOM WETLANDS

Valley bottom wetlands are classified as low-lying, gently-sloped areas that receive water from an upstream channel and/or from adjacent hillslopes, not subject to periodic over-bank flooding by a river channel. Surface water in the valley bottom wetlands of the study area flows only seasonally, although the channels are in most cases perennial.

Two types of valley bottom wetlands are associated with the study area as classified by Sanbi (2009) namely channelled valley-bottom wetlands and unchannelled valley bottom wetlands. The valley bottom wetland type is the most common wetland in the project area with the highest risk of being impacted on.

A channelled valley-bottom wetland is classified as a mostly flat valley-bottom wetland dissected by and typically elevated above a channel. Dominant water inputs to these areas are typically from the channel, either as surface flow resulting from overtopping of the channel bank/s or as interflow, or from adjacent valley-side slopes (as overland flow or interflow). Water generally moves through the wetland as diffuse surface flow, although occasional, short-lived concentrated flows are possible during flooding events. Small depressional areas within a channelled valley-bottom wetland can result in the temporary containment and storage of water within the wetland. Water generally exits in the form of diffuse surface flow and interflow, with the infiltration and evaporation of water from these wetlands also being potentially significant (particularly from depressional areas). The hydrodynamic nature of channelled valley-bottom wetlands is characterised by bidirectional horizontal flow, with limited vertical fluctuations in depressional areas (SANBI, 2009).

Unchannelled valley-bottom wetland can be described as: a mostly flat valley-bottom wetland area without a major channel running through. This wetland type is characterised by an absence of distinct channel banks and the prevalence of diffuse flows, even during and after high rainfall events. Water inputs are typically from an upstream channel, as the flow becomes dispersed, and from adjacent slopes (if present) or groundwater. Water generally moves through the wetland in the form of diffuse surface flow and/or interflow (with some temporary containment of water in depressional areas), but the outflow can be in the form of diffuse or concentrated surface flow. Infiltration and evaporation from unchannelled valley-bottom wetlands can be significant, particularly if there are a number of small depressions within the wetland area. Horizontal, unidirectional diffuse surface-flow tends to dominate in terms of the hydrodynamics.

The vegetation structure of the valley bottom wetlands vary from the actual channels being closed grassland in certain areas, to a sandy riverbed with alluvial sand and conglomerates along the riverbanks. The drainage channels that form part of the channelled valley bottom wetlands is mostly perennial.

HILLSLOPE SEEP WETLANDS

This vegetation unit represent the grassland areas classified as 'Hill slope Seep Wetlands' mostly adjacent to the valley-bottom wetlands. The seep areas either feed the valley-bottom wetland or occur isolated along a slope. A Hill slope seep is classified as a wetland area located on (gently to steeply) sloping land, which is dominated by the colluvial (i.e. gravity-driven), unidirectional movement of material down-slope. Water inputs are primarily from precipitation that that enters the wetland from an up-slope direction in the form of subsurface flow. Water movement through the wetland is mainly in the form of interflow, with diffuse overland flow ('sheetwash') often being significant during and after rainfall events. In this hill slope seep the water leaves the 'Hill slope seep without channelled outflow', although it is directly connected to a water course (SANBI, 2009).

The vegetation associated with the seep wetlands varies according to various factors such as land-use and soils. The most common grass species associated with hillslope seep wetland is *Andropogon eucomis*, *Eragrostis gummiflua* and *Helichrysum areonitens* (Photograph 4). Where degradation such as overgrazing has occurred the weeds such as *Verbena bonariensis* occur scattered in the herbaceous stratum. Some drains were created in the seeps that divert water away and impacted the seep wetlands negatively.

DEPRESSIONS

The dams in the project area represent exorheic depressions with channelled inflow. A depression is classified as a landform with closed elevation contours that increases in depth from the perimeter to a central area of greatest depth, and within which water typically accumulates. Dominant water sources are precipitation, ground water discharge, interflow and (diffuse or concentrated) overland flow. For 'depressions with channelled inflow', concentrated overland flow is typically a major source of water for the wetland, whereas this is not the case for 'depressions without channelled inflow'. Dominant hydrodynamics are (primarily seasonal) vertical fluctuations. Depressions may be flat-bottomed (in which case they are often referred to as 'pans') or round-bottomed (in which case they are often referred to as 'basins'), and may have any combination of inlets and outlets or lack them completely.

The man-made dams that occur in the project area are characterised by the way water exits the systems. Water exits by means of concentrated surface flow in channels for exorheic depressions, although the primary means of water still exits as evaporation.

The vegetation associated with depressions is mostly sedges and bulrushes depending on the depth of the water and the substrate. Species such as *Panicum serullata*, *Typha capensis*, *Schoenoplectus corymbosus*, *Ludwigia stolonifer* and *Leersia hexandra* mostly grow along the shallow edges of dams in the project area on a muddy substrate.

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

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

[Redacted]

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:

[Redacted]

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:

[Redacted]

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 ✓

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

The site does however fall within the following areas:

1. The Mpumalanga Tourism and Parks Agency (MTPA) and the Department of Agriculture and Land Administration (DALA) have jointly developed the Mpumalanga Biodiversity Conservation Plan (MBCP) (MBCP). As the first such plan produced for the Province, it is intended to guide conservation and land-use decisions in support of sustainable development.

According to the Ecological Report (included under Appendix D), the area where the proposed activities will take place fall in an area of “Least Concern” as identified by the MBCP.

2. The National Freshwater Ecosystem Priority Areas (NFEPA) project is a multi-partner project between the CSIR, the Water Research Commission, the South African National Biodiversity Institute, the Department of Environmental Affairs, the South African Institute of Aquatic Biodiversity and South African National Parks.

The project responds to the reported degradation of freshwater ecosystem condition and associated biodiversity, both globally and in South Africa. It uses systematic conservation planning to provide strategic spatial priorities for conserving South Africa’s freshwater biodiversity, within the context of equitable social and economic development.

The project has three inter-related components:

- A technical component to identify a national network of freshwater conservation areas;
- A national governance component to align DEA and DWS policies and approaches for conserving freshwater ecosystems; and
- A sub-national governance and management component that conducts case studies to demonstrate how NFEPA outcomes can be implemented (CSIR 2010).

River Condition (RIVCON) is a classification used by the NFEPA programme. *RIVCON A* and *B* are considered intact rivers that are able to contribute towards river ecosystem targets. According to NFEPA data, the Crocodile River is classified as RIVCON B. There are Wetland NFEPA’s to the east, south east, south and northwest as indicated in Figure 11.

Roodekrans falls within the following two FEPA's. The unit identification numbers of these FEPA's are 930 and 962 respectively. The largest portion of Roodekrans falls into FEPA 930 which is a river FEPA as well as a Fish Sanctuary.

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:

NO ✓

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:

An Archaeological Report was conducted and is included under Appendix D. All heritage sites were located more than 50 meters from the proposed structures.

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

NO ✓

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

NO ✓

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.

Level of unemployment:

Unemployment Rate:	25.9%
Youth unemployment rate (15-34 years)	34.2%

Economic profile of local municipality:

Mining:	28.7%
Transport	25.1%
Community Services:	14.2%
Finance:	8.5%
Trade	7.7%
Manufacturing:	6.9%
Agriculture:	3.8%

Level of education:

Education (aged 20+)	
No Schooling:	15%
Matric:	28.6%
Higher Education	7.4%

b) Socio-economic value of the activity

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

R 350,000.00

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

R 0

Will the activity contribute to service infrastructure?

NO ✓

Is the activity a public amenity?

NO ✓

How many new employment opportunities will be created in the development and construction phase of the activity/ies?

Construction phase: 10
Operational phase: 0
R100,000
100 %
None
NA (R0)
NA

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

What percentage of this will accrue to previously disadvantaged individuals?

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

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

What percentage of this will accrue to previously disadvantaged individuals?

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. 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
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Critical Biodiversity Area (CBA) ✓	Ecological Support Area (ESA) ✓	Other Natural Area (ONA)	No Natural Area Remaining (NNR) ✓	<p>In terms of the Mpumalanga Biodiversity Conservation Plan (MBSP) Roodekrans contains a CBA, an ESA as well as Heavily Modified Areas. It is important to note that the proposed weirs all fall within Ecological Support Areas.</p> <p>The two non-perennial tributaries of the Crocodile River are Ecological Support Areas and are therefore important to conserve to support the Crocodile River. The Ecological Support Areas are wetlands and according to the sub category classification in the MBSP and although these wetlands are not wetland FEPA's they still support hydrological functioning of rivers, groundwater and biodiversity. These wetlands also provide ecological infrastructure and other ecosystem services.</p> <p>The alternative activity (the dam) would be present in the Ecological Support Area as well as the Heavily Modified Area.</p>
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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	10 %	Wetland type: Valley bottom wetland PES (Present Ecological State): Unmodified / natural EIS (Ecological Importance & Sensitivity): Very High
Near Natural (includes areas with low to moderate level of alien invasive plants)	80%	Wetland type: Water course PES: Largely natural with few modifications EIS: Low / Marginal Wetland type: Valley bottom wetland PES: Moderately modified EIS: High

		<p>Wetland type: Hillslope seep wetlands</p> <p>PES: Largely natural with few modifications</p> <p>EIS: Moderate</p> <p>Rocky grassland associated with outcrops and terraces</p> <p>The vegetation unit is in a natural habitat and can be classified as having a Medium Sensitivity. The development of the dams and weirs will not impact on this sensitive habitat type. The main concern would be that this habitat is impacted by large construction vehicles moving through the area to get access to the construction sites for the weirs and dams.</p>
Degraded (includes areas heavily invaded by alien plants)	0 %	NA
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	10 %	<p>Exotic bushclumps</p> <p>Several areas dominated by homogenous stands of exotic tree species occur throughout the proposed development site. These areas have been completely modified and the herbaceous layer underneath these dense stands of woody species is completely absent. The “sterile” soils underneath the exotic bushclumps have also been acidified to such an extent that little or no plants can survive under these conditions.</p> <p>The following is recommended regarding development in these degraded bushclumps and encroached areas:</p> <p>The removal of exotic trees can be considered as an offset and will contribute to increase baseflow in the streams on the property.</p>

c) Complete the table to indicate:

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

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

The following was extracted from the Ecological Report (attached to the BAR under Appendix D):

The development site lies within the Grassland Biome which is found chiefly on the high central plateau of South Africa. Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. Trees are absent except in a few localised habitats. Geophytes are often abundant. Frost, fire and grazing maintain the grass dominance and prevent the establishment of trees (Low & Rebelo, 1996).

The most recent classification according to Mucina et al. (2005) classifies the general vegetation of the area as Lydenburg Montane Grassland. The site was previously classified according to Acocks (1988) as North-Eastern Sandy Highveld, while Bredenkamp & Van Rooyen in Low & Rebelo (1996) classified the site as part of the North-Eastern Mountain Grassland. This type comprises the grasslands of the northern parts of the great escarpment mountains in Mpumalanga. It stretches northwards along these mountains into Northern Province, and southwards through KwaZulu-Natal, reaching the northern parts of Eastern Cape. Altitude ranges from 1 400 to 1 900 m. This grassland type contains many endemic plant species: 78 endemic or near-endemic species occur on the Black Reef quartzites. These are mostly representatives of the Lilies (Liliaceae - now split into several families), Irises (Iridaceae), Daisies (Asteraceae), Mints (Lamiaceae) and Orchids (Orchidaceae). A further 31 endemic species occur on the drier dolomites of the Chuniespoort Group. These are all grassland species - no forest species are endemic to the vegetation type.

Although it is predominantly a grassland area, Acocks classified North-eastern Mountain Sourveld as an Inland Tropical Forest type, due to the patches of forest occurring in the sheltered ravines, gorges and valleys of the escarpment. North-eastern Mountain Grassland is restricted to the high altitude escarpment areas of Mpumalanga and Swaziland. The rainfall is high, mist plays an important role, while low temperatures, frost, snow and fire are also important determinants of this vegetation type (Bredenkamp, Granger & Van Rooyen, 1996)

This vegetation type is classified as having a vulnerable conservation status. The conservation target is 27%, with 2.4% formally protected within reserves as well as a number of private conservation areas. The level of transformation is relatively high at 23%, with mostly alien plantations (20%) and cultivated lands (2%).

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	The Lowvelder	
Date published	5 January 2015	
Site notice position	Latitude	Longitude
	TBA in the Final BAR.	
Date placed	5 January 2015	

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.

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

NOTE: This section will be completed upon completion of the PP Process.

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

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

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

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
NOTE: Public Participation is currently in progress, comments will be recorded in the Final BAR submitted to the DARDLEA.	

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	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
DARDLEA	Ms. Okwethu-Kuhle Fakude (Case Officer)	013 692 6300/ 5848		oqfakude@mpg.gov.za	Cnr. Rosemead & Ryan Street, Klipfontein, Witbank, 1035.
DWS (Department of Water and Sanitation)	Ms. Celiwe Mashava (Deputy Director)	013 235 4206/ 083 854 2715		None given as the email address does not work	TPA Building, Corner Rossouw Street and Schurink Street, Lydenberg, Mpumalanga
DAFF (Department of Agriculture, Forestry and Fisheries)	Ms. Njadu Novuzo (Deputy Director)	012 846 8597		PatriciaMJ@daff.gov.za	141 Cresswell Road, Silverton, Pretoria. 0184
Ward Councillor of Ward 4	Clr. Robert Mashele	076 635 2904/ 013 253 7600		masheler@emak.gov.za	25 Scheepers Street, Emakhazeni (Belfast) 1100 Mpumalanga
Emakhazeni local municipality	Mr. Daniel Nkhoza (Planning & Development Office)	013 253 7600		nkhonzad@emakhazenilm.gov.za	25 Scheepers Street, Emakhazeni (Belfast) 1100 Mpumalanga
Nkangala district municipality	Ms. Mpho Nembilwi Mr. Vusi Mahlangu (Air Quality Officer)	013 249 2000 Mpho Direct line: 013 249 2160. Vusi Direct line: 013 249 2164		nembilwim@nkanagaladm.gov.za Mahlangu.vm@nkangala.gov.za	24 Walter Sisulu Street, Middleburg, 1050
Mpumalanga Tourism Parks Agency (MTPA)	Ms. Balungile Bhengu (Regional Manager Nkangala Region) Mr. Frans Krige (EIA)	Balungile Direct Line: 013 282 8674/ 083 363 0489 Frans Krige Direct Line:		Bhengub207@gmail.com franskrige@telkomsa.net	Hall's gateway on the N4, Nelspruit. Private Bag X 11338, Nelspruit, 1200

	Official)	013 254 0279			
SANParks	Stephen Holness (Conservation Planner)	041 508 5414		dholness@nmmu. ac.za	PO Box 76693 NMMU, South Campus, Summerstrand, Port Elizabeth, 6031.
SAHRA (South African Heritage Resource Association)	Ms. Nokukhangya Khumalo	(021) 462 4502		nkhumalo@sahra. org.za	111 Harrington Street Cape Town,
EWT (Endangered Wildlife Trust)	Dr. Harriet Davies-Mostert (Head of Conservation) Kerryn Morrison (Crane Programme Manager)	011 372 3600/1/2/3		kerrynm@ewt.org. za	Building K2, Pinelands Office Park, Ardeer Road, Moderfontein, 1645. The Endangered Wildlife Trust, Private Bag X11, Moderfontein, 1609, Gauteng.

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.

NOTE:

The mitigation measures given in this section are a summary of the mitigation measures provided in Appendix F and are also included in the EMP. Refer to Appendix F and the EMP for more detailed information regarding mitigation measures to be implemented.

Potential environmental impacts and key issues were identified through a site visit, specialist studies, GIS and desktop studies and consultation of interested and affected parties. The significance of each of the potential impacts was calculated in order to determine to what extent the potential environmental impact have to be mitigated.

The predicted impacts were divided into the following categories:

- 1) Negligible** - The impact is not significant and does not require any mitigation.
- 2) Low**- The impact has a low significance which may require partial mitigation.
- 3) Moderate** - The impact is of importance and as a result might have a negative impact on the surrounding environment. Mitigation is there for required in order to reduce the negative impacts to tolerable levels.
- 4) High** - The impact is of high importance and as a result might have a major impact on the surrounding environment. Mitigation measures needed to reduce the negative impacts to tolerable levels is vital in order to make the proposed development feasible.

The following factors were evaluated when determining the significance of the impacts:

Longevity/ Duration

Short term: The duration of the impact will be over a short period of time.

Medium term: The duration of the impact will be over a medium period of time. Normally not longer than the last phase of the proposed project through implementation of adequate mitigation measures.

Long term: The duration of the impact will be over a long period of time. Normally throughout the operational phase of the proposed project through implementation of adequate mitigation measures.

Permanent: The impact will be permanent and will not even be addressed through implementation of adequate mitigation measures.

Intensity/ Magnitude

Low: Natural processes are not affected or disturbed as a result of the impact.

Medium: Natural processes are affected or disturbed as a result of the impact, however continues in an altered manner.

High: Natural processes are affected or disturbed in such a manner that it is permanent. Natural processes are ceased as a result of the impact.

Probability

Improbable: The possibility of the impact occurring is very low to negligible.

Probable: The possibility of the impact occurring is still low, however must be taken into account during development of mitigation measures.

Highly Probable: The possibility of the impact occurring is highly likely.

Definite: The possibility of the impact occurring is certain.

Significance

Negligible: The implication of the impact is negligible.

Low: The implication of the impact is low and limited mitigation will be required.

Moderate: The implication of the impact is moderate and specific mitigation measures will be required.

High: The implication of the impact is high and extensive mitigation measures will be required.

IMPACT RATING METHODOLOGY:

Aspect	Description	Weight
Scale	Local	1
	Site	2
	Regional	3
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Magnitude/Severity	Low	2
	Medium	6
	High	8
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Significance	Sum (Scale, Duration, Magnitude) x Probability	
	Negligible	<20
	Low	<40
	Moderate	<60
	High	>60

Activity	Impact summary	Significance WOM	Significance WM
Alternative 1: Preferred Alternative			
Planning and Design Phase			
Direct impacts:			
None.			
Indirect impacts:			
None.			
Cumulative impacts:			
<p>1. WATER RESOURCE DEPLETION Water is used to grow trees from which paper is used, therefore wasting paper results in an increase in water consumption.</p> <p>Mitigation</p> <ul style="list-style-type: none"> Plans and drawings must rather be communicated electronically prior to finalisation of the design plans/ drawings in order to ensure all details are correct prior to printing, this will ensure that no re-prints are required and will save paper. Any waste paper should be recycled. 		Low (32)	Negligible (16)
<p>2. LOSS OF HABITAT/ BIODIVERSITY Materials used in the planning and design phase, especially paper used for the printing of drawings and design plans might be used wastefully, resulting in an increased volume of waste going to landfill, thereby increasing the area of land needed for landfill space. Natural resources used for the development could result in loss of habitats (e.g. mining for minerals).</p> <p>Mitigation</p> <ul style="list-style-type: none"> Plans and drawings must rather be communicated electronically prior to finalisation of the design plans/ drawings in order to ensure all details are correct prior to printing, this will ensure that no re-prints are required and will save paper. All waste paper should be recycled. Identify environmentally friendly technologies, processes and materials in the design of the development. 		Moderate (40)	Low (20)
<p>3. GLOBAL WARMING Means of travel for meetings results in carbon emissions, thus contributing towards global warming.</p> <p>Mitigation</p> <ul style="list-style-type: none"> Travel for meetings should be limited as far as possible. Communication via telephone and email should be encouraged over physical meetings. 		Low (36)	Negligible (18)
<p>4. JOB CREATION (POSITIVE IMPACT) The development has the potential to provide new job opportunities and this opportunity should be maximised as far as possible.</p>		Negligible (16) (Positive)	Moderate (48) (Positive)

<p>Mitigation</p> <ul style="list-style-type: none"> • Identify and employ local contractors, suppliers and services as far as reasonably possible. • Ensure that employees are recruited from the local communities as far as possible. 		
Construction Phase		
Direct impacts:		
<p>1. ARCHAEOLOGICAL LOSS / LOSS OF HERITAGE RESOURCES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Activities taking place in the vicinity must be executed in a way as to avoid impact on the heritage resources at all times. • A conservation buffer zone of at least 50 meters around the burials must be established and maintained. • Graves should be fenced off and access control should be implemented. • An informed ECO should monitor and inspect the construction site on a regular basis in order to monitor possible impacts on heritage resources. • Regular examinations of trenches and excavations must be undertaken. • Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended and the ECO and the archaeological specialist should be notified immediately. A qualified archaeologist must verify the importance of the remains before construction activities continues and decide on the way forward. • No archaeological artefacts shall be disturbed or removed from site prior to the necessary consultation with the regulatory authorities, nor without the necessary permits required. • Contractors should be briefed on the nature of the heritage remains in the area prior to the commencement of construction activities. • Construction activities should be in line with the provisions of the National Heritage Resources Act (Act 25 of 1999). 	<p>Low (30)</p>	<p>Negligible (13)</p>
<p>2. DESTRUCTION OF AVIFAUNA HABITATS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The removal of vegetation should only occur on the footprint area of the development and not over the larger area. The clearing and damage of plant growth in these areas should be restricted to the footprint way leave area. • Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from leaving the demarcated area. • Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the avifauna of the area. • Landscape management at the site needs to consider different objectives, including 	<p>Low (28)</p>	<p>Negligible (14)</p>

<ul style="list-style-type: none"> 1. Maintaining pre-existing land uses; 2. Conserving and restoring natural habitats; 3. Managing land for priority species; <ul style="list-style-type: none"> • Hunting of birdlife should be prohibited on site. 		
<p>3. FRAGMENTATION OF AVIFAUNA HABITAT</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Use existing facilities (e.g., access roads) to the extent possible to minimize the amount of new disturbance. • Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to sensitive bird habitats during construction. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. 	<p>Low (32)</p>	<p>Negligible (16)</p>
<p>4. IMPACT ON AVIFAUNA MOVEMENTS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Care should always be taken to disturb the receiving environment as little as possible. Careful control of construction workers movements must be maintained at all times. • Staff that will stay on site should be accommodated in one location of the site to ensure that the impact will be minimal on the larger area. • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. • Educate workers regarding the occurrence of important resources in the area and the importance of protection. • Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g. courtship, nesting) seasons. In addition, control pets to avoid harassment and disturbance of wildlife. • Camp fires at the construction laydown area must be strictly controlled to ensure that no veld fires are caused. • Noise levels will be kept within acceptable limits by limiting of speed of haulage vehicles/tippers. <p>Compliance with appropriate noise legislation must take place.</p>	<p>Moderate (44)</p>	<p>Low (22)</p>
<p>5. HABITAT DESTRUCTION AND/ OR MODIFICATION: DESTRUCTION OR LOSS OF FLORAL DIVERSITY OR VEGETATION COMMUNITIES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The removal of plant species should only occur on the footprint area of the development and not over the larger area. • Threatened and endemic taxa (plant species) must be protected as far as possible, where they occur In the site footprint, these species must 	<p>Moderate (52)</p>	<p>Low (28)</p>

<p>be relocated where possible.</p> <ul style="list-style-type: none"> • Vegetation to be removed as it becomes necessary. • Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from disturbing areas outside of the demarcated area. • Construction vehicles and plant must not be allowed to operate outside of the site boundary and designated access routes. • Construction vehicles must be restricted to using existing roads and access routes as far as practically possible in order to reduce the impact on natural vegetation. • Only one temporary access route may be allowed to each construction area if required, and the access route should only allow for one way traffic so as to minimize disturbances / damage to the vegetation. • The collection of plants for medicinal, purposes is prohibited, unless they have specifically been earmarked for removal for construction purposes. • Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the flora of the area. • The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. • Training must be given to all employees of contractors, sub-contractors and service providers who will be operating on site in order to ensure that all employees know their roles and responsibilities in managing the environmental impact. 		
<p>6. HABITAT FRAGMENTATION (of Fauna)</p> <p>Mitigation</p> <ul style="list-style-type: none"> • All possible efforts must be made to ensure as little disturbance as possible to the sensitive habitats such as wetlands during construction. • Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. • Use existing facilities (e.g., access roads, degraded areas) to the extent possible to minimize the amount of new disturbance. • Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to the sensitive habitats on site during construction. 	<p>Moderate (52)</p>	<p>Low (22)</p>
<p>7. INCREASED SOIL EROSION AND SEDIMENTATION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Vegetation clearance must be kept to a minimum in order to minimise erosion during rainy periods. 	<p>Moderate (48)</p>	<p>Low (24)</p>

- Soil should be handled when dry during removal and placement to reduce the risk of compaction.
- Maintain topsoil stockpiles in a weed free condition.
- Topsoil should not be compacted in any way, nor should any object be placed or stockpiled upon it.
- Stockpile topsoil for the minimum time period possible i.e. strip just before the relevant activity commences and replace as soon as it is completed.
- The project should be divided into as many phases as possible, to ensure that the exposed areas prone to erosion are minimal at any specific time.
- During and after construction, ensure effective storm water management around permanent infrastructure, rehabilitate disturbed areas, protect topsoil and protect sensitive soils. This will reduce the possibility of soil erosion.
- Erosion control of all banks must take place so as to reduce erosion and sedimentation into river channels or wetland areas.
- The water quality in the streams supplied by wetlands that will be affected should be tested prior to the commencement of construction activities with the objective of establishing baseline data for further monitoring of water quality. These data can be used as a level on which upon monitoring will be based.
- Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. Control dust on construction sites and access roads using water-sprayers.
- Locate stockpiles away from concentrated flows, drainage lines and riverine areas and divert run-off around them.
- Topsoil stockpiles shall not exceed 2.0 meters in height.
- Topsoil and subsoil must be stockpiled separately.
- Topsoil stockpiles must be protected from water and wind erosion through adequate mitigation measures such as vegetation cover, berms or silt traps to trap sediment run-off, and watering during periods of high winds, etc.
- Avoid stripping of topsoil and subsoil during periods of high wind.
- Rehabilitate plant cover as a continual process, to maximize viability of the natural seedbank and reduce loss of topsoil during storage so as to prevent dust and loss of topsoil.
- Monitor rehabilitation success by comparing data from the servitude with that of surrounding habitats.
- Earthen berms or sand bags, should be used to create a barrier at the upslope side of the site or any exposed embankments or slopes to prevent storm water from flowing down the slopes and thereby preventing erosion.
- Earthen berms or sand bags or silt fences can also be put in place at the down-slope side of exposed slopes or embankments to trap sediment run-off.
- Exposed soil surfaces should be protected, especially on sloped gradients
- Institute a storm water management plan including strategies such as:
 1. minimising impervious area;

<p>2. Increasing infiltration to soil by use of recharge areas; 3. Use of natural vegetated swales instead of pipes; or 4. Installing detention or retention facilities with graduated outlet control structures.</p> <ul style="list-style-type: none"> • Rehabilitation: revegetate or stabilize all disturbed areas as soon as possible. Indigenous plants species can be planted in the buffer zone of the proposed development to enhance the aesthetic value of the site and stabilize soil conditions. • Ensure the amount of bare soil exposed is minimized by staging earthworks in phases and leaving as much ground cover intact as possible during construction. • Protect all areas susceptible to erosion and ensure that there is no undue soil • Repair all erosion damage as soon as possible and in any case not later than six months before the termination of the construction period. 		
<p>8. SOIL AND WATER POLLUTION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Hazardous chemical substances must be kept either in a bunded area or inside drip trays during both storage and when being used on site so as to prevent soil contamination should the container be knocked over or be leaking. • Drip trays or bunded areas must be designed to contain 110% of the total volume of chemicals to be stored in the bunded area/ drip tray. • Chemical storage areas must have a roof constructed over it, wherever possible, in order to prevent rain water ingress which would result in unnecessary contaminated waste water requiring disposal. • Storage areas and laydown areas must not be located near to any drainage lines, wetlands or water channels. • Berms must be created where necessary to trap any possible contaminants and pollutants from storage areas, waste areas and laydown areas. • Smaller spillages within the drip tray must be cleaned up immediately when they occur, utilising the emergency spill kit. • Drip trays must be used when re-fuelling and under plant and machinery (such as pumps or generators etc.). • Drip trays are to be used when doing any maintenance work on vehicles or plant and equipment. • Drip trays should be emptied into a holding tank and returned to the supplier or disposed of as hazardous waste. • All vehicles should be inspected for oil and fuel leaks regularly and frequently. • Servicing of plant should take place off site at a proper workshop with an impermeable concrete floor. • Should any maintenance or repair work and refuelling be required, it may not take place near to any drainage line or channel. • Should maintenance or emergency repairs of plant and vehicles need to be done on site then drip trays must be used to trap and contain any hydrocarbon spillages. • Spill kits should be on-hand to deal with spills immediately. Construction workers responsible for refuelling must be trained on the use of spill 	<p>Low (32)</p>	<p>Negligible (8)</p>

<p>kits.</p> <ul style="list-style-type: none"> • An emergency response plan to address spillages should be developed, implemented and communicated to all staff. • Hazardous waste such as waste contaminated with hazardous chemical substances must be placed in bins specifically provided for hazardous waste only. • Contaminated materials and waste must be disposed of at a registered hazardous waste disposal site and records of waste safe disposal certificates must be kept. • No littering or uncontained waste will be allowed on site. • General waste must be disposed of at a registered waste landfill site. • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed, but not near to any water channels or drainage lines. • Waste must be placed in waste bins as soon as waste is generated on the site. • Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility; • Toilets must be provided on site at a ratio of no less than 1 per 15 persons. • Sewage must be disposed of at a registered waste water treatment facility, and a letter stating that sewage from the site or sewage collected by the toilet servicing company may be and is being disposed of at the facility. • Should chemical toilets be used on site they must be emptied regularly to ensure that toilets do not over flow. • Safe disposal certificates must be obtained for all waste streams and must be kept on file on site as proof of proper disposal (in accordance with the National Environmental Management Waste Act (Act 36 of 1998). • Regular site inspections to be conducted in order to identify areas of concern with regards to surface and ground water related impacts. Such incidents must be reported to the ECO and attended to as soon as possible. 		
<p>9. HABITAT DEGRADATION DUE TO DUST & OTHER AIR POLLUTANTS</p> <p><u>Mitigation</u></p> <ul style="list-style-type: none"> • Ensure excessive vehicular movement is avoided. • Limit vehicle speed on un-surfaced roads and working area to 40km/hour or less. • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. • Dust generating activities (grading/excavating) should be avoided during periods of medium to high winds. • Disturbed areas must be rehabilitated as fast as possible in order to 	<p>Low (32)</p>	<p>Negligible (16)</p>

<p>reduce dust from exposed soil surfaces.</p> <ul style="list-style-type: none"> • Ensure that all vehicles are in a road-worthy condition to avoid excessive exhaust emissions. • Introduce efficient fire control measures e.g. no open fires, designated smoking areas, disposal of cigarettes/tobacco products and sufficient fire-fighting equipment. • Properly control waste to minimize odour's and gasses. • No open fires will be allowed on site and burning of waste is prohibited. • No vegetation shall be burned. • Control of hazardous chemical substances to minimize gasses and odours. 		
<p>10.SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES</p> <p><u>Mitigation</u></p> <ul style="list-style-type: none"> • Weeds and alien vegetation must not be allowed to propagate on the site. • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA (Conservation Agricultural Resources Act) or in terms of Working for Water guidelines. • The control of these species should even begin prior to the construction phase considering that small populations of these species were observed during the field surveys by the specialist. • The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. • Alien invasive tree species listed by the CARA regulations should be eradicated. • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. • Rehabilitate and re-vegetate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • A plan should be developed for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching. • Prohibit the use of fill materials from areas with known invasive vegetation problems. • Reseeding disturbed areas with native plants will aid in preventing the spread of invasive plants. 	<p>Low (36)</p>	<p>Negligible (14)</p>

<p>11.LOSS OF HABITAT DUE TO FIRE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • No fires are permitted on site unless in a designated braai area. • No vegetation shall be burned. • Fire-fighting equipment shall be readily available on site. • Fire extinguishers shall be placed at working area and all areas contained hazardous substances. • Maintain proper firebreaks around the development footprint. • Educate construction workers regarding risks and correct disposal of cigarettes. • Educate construction workers regarding all fire risks. 	<p>Low (26)</p>	<p>Negligible (7)</p>
<p>12.WETLAND MODIFICATION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Clearing of vegetation should be scheduled for the drier winter months and limited to areas immediately needed for construction. Vegetation stripping should occur in parallel with the progress of the construction of each weir to minimise erosion and/or run-off. Tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Only selected plant species must be used in the re-vegetation process. • All development activities should be restricted to the footprint areas of the proposed development. • The Environmental Site Officer (ESO) should demarcate and control these areas. Storage of fuels and other materials should be limited to demarcated areas. • Layouts have been adapted to fit natural patterns rather than imposing rigid geometries, it must be ensured that should any changes to the layout or design be made, the layouts must still fit to the natural patterns. • The Environment Control Officer (ECO) should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment and specifically wetlands. The ECO should enforce any measures that he/she deem necessary. • Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. • The removal of vegetation associated with the wetlands should be limited to the footprint areas. Protected plant species must be rescued and relocated where possible. • Should the development be approved by authorities, environmental monitoring of environmental aspects should be implemented during the construction phase of the development to ensure that minimal impact is caused to the wetlands of the area. • Any monitoring required as per the water use license must be undertaken. 	<p>Low (36)</p>	<p>Negligible (18)</p>
<p>12.a DESTRUCTION OR LOSS OF WETLAND FLORAL DIVERSITY OR RIPARIAN COMMUNITIES</p> <p>Mitigation</p>	<p>Low (36)</p>	<p>Negligible (18)</p>

<ul style="list-style-type: none"> • As impact 12's mitigation above. 		
<p>12.b LOSS OF WETLAND AND WATER DEPENDANT FAUNAL DIVERSITY THROUGH MIGRATION AND DECLINE IN ANIMAL NUMBERS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • As impact 12's mitigation above. 	<p>Low (36)</p>	<p>Negligible (18)</p>
<p>13.REINSTATEMENT OF THE WETLAND ALONG THE DRAINAGE CHANNEL</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Weirs must span the entire width of the channel and floodplain so as to avoid disturbance to the wetland zones of rivers and valley bottoms; • The disturbance of in-stream channels and riparian zones during construction must be minimized. • Physical structures, which could later alter hydrological regimes, should not be placed in the vicinity of any wetlands. 	<p>Low (26) (Positive)</p>	<p>Moderate (52) (Positive)</p>
<p>14.DEWATERING OF WETLANDS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The development of weirs in the system should allow for overflow of water into downstream areas. The overflows should be developed to reduce flow capacity and diffuse the baseflow into the downstream areas. • Provision should be made for active removal of invasive terrestrial plant species from wetlands that are temporarily affected by unnatural lowering of the water table. 	<p>Low (32)</p>	<p>Negligible (16)</p>
<p>15.CHANGING THE FLOW REGIME OF THE WATERCOURSE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • No unlicensed activities should take place in the watercourses and associated buffer zone. Any activities within 500 m of riparian areas are subject to authorization by means of a water use license. • Construction in and around watercourses must be restricted to the dryer winter months. • A temporary fence or demarcation must be erected around the works area to prevent access to sensitive environments. The works areas generally include the servitude, construction camps, areas where material is stored and the actual footprint of the infrastructure. • Prevent pedestrian and vehicular access into the riparian areas and buffer areas. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • Planning of the construction site must include eventual rehabilitation / restoration of indigenous vegetative cover in footprint area. • Alien plant eradication and follow-up control activities prior to construction, to prevent spread into disturbed soils, as well as follow-up control during construction, operation and closure. • The amount of vegetation removed should be limited. • Rehabilitation of damage/impacts that arise as a result of construction 	<p>Low (32)</p>	<p>Negligible (16)</p>

<p>must be implemented immediately upon completion of construction.</p>		
<p>16.CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).</p> <p><u>Mitigation</u></p> <ul style="list-style-type: none"> • Construction in and around watercourses must be restricted to the dryer winter months. • A temporary fence or demarcation must be erected around the works area to prevent water runoff and erosion of the disturbed or heaped soils into wetland areas. • Access roads and bridges should span the wetland area, without impacting on the permanent or seasonal zones. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area. • A vegetation rehabilitation plan should be implemented. Untransformed indigenous vegetation can be removed as sods and stored. The sods must preferably be removed during the winter months and be replanted by latest springtime. The sods should not be stacked on top of each other or within sensitive environs. Once construction is completed, these sods should be used to rehabilitate the disturbed areas from where they have been removed. In the absence of timely rainfall, the sods should be watered well after planting and at least twice more over the next two weeks. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. • Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • During the construction phase, measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. 	<p>Moderate (48)</p>	<p>Low (24)</p>

<ul style="list-style-type: none"> • Runoff from roads must be managed to avoid erosion and pollution problems. • Implementation of best management practices. • Source-directed controls. • Buffer zones should be maintained to trap sediments. 		
<p>17.ALTERATION OF WATER QUALITY – INCREASING THE AMOUNTS OF NUTRIENTS (PHOSPHATE, NITRITE, NITRATE).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone. • Establishment of buffer zones to reduce nutrient inputs in diffuse flow. 	Negligible (14)	Negligible (7)
<p>18.ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Maintenance of construction vehicles. • Control of waste discharges. • Guidelines for implementing Clean Technologies. • Maintenance of buffer zones to trap sediments with associated toxins. 	Low (22)	Negligible (11)
<p>19.CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • All recommendations included in the wetland specialist report should be considered; • Linear developments (e.g. roads) should span the watercourse. • Weed control in buffer zone. • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • Design of weirs and dams should limit alterations in flow and allow sufficient release of water during no flow periods. 	Low (28)	Negligible (14)
<p>20.LOSS OF AQUATIC BIOTA</p>	Low (28)	Negligible (14)

<p>Mitigation</p> <ul style="list-style-type: none"> • Ensure that no additional vegetation is removed, • No fires should be allowed in natural veld – demarcated areas for cooking should be allowed for workers in construction camp. • Avoid unnecessary river crossing - limit work within the stream, river or wetland. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • Mark all areas which don't form part of the proposed weir and dam development within wetlands and riparian areas as no-go areas. • New linear developments (e.g. roads) for construction of weirs and the dam should span the watercourse. • Weed control in buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • All management procedures listed above for the change in water quality. • It is essential that the ecological reserve of the two non-perennial tributaries should be determined prior to impoundment. 		
<p>21. LOSS OF FAUNA BIODIVERSITY</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Any animal species found on the site must be relocated to an area of safety and released into natural habitat. • No animals may be injured or killed purposefully or through negligence. • No animals may be trapped or kept as pets. • Hunting of animals is prohibited. • Training must be given to all employees of contractors, sub-contractors and service providers who will be operating on site in order to ensure that all employees know their roles and responsibilities in managing the environmental impact. 	<p>Low (28)</p>	<p>Negligible (14)</p>
<p>22. VISUAL IMPACT</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Keep disturbed areas to a minimum. • No clearing of land may take place outside the demarcated footprints. • Only indigenous plant species may be used during any rehabilitation. • Utilise existing roads and tracks to the extent possible. 	<p>Negligible (18)</p>	<p>Negligible (9)</p>
<p>23. NOISE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • All activities on site, as well as construction vehicles and machinery must comply with National Noise Legislation, Provincial Noise Regulations and Local Noise By-laws. • Appropriate silencing measures must be taken should noise levels exceed 85 decibels at the perimeter of the construction area. 	<p>Low (28)</p>	<p>Negligible (14)</p>

<p>24. TRAFFIC</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Construction and delivery vehicles must avoid moving around during periods of peak traffic as far as possible. • Contractors and construction personnel must adhere to traffic rules at all times, including prescribed speeding limits. • Access and entry points must be situated strategically in order to have a minimal impact on existing traffic volumes. • Construction vehicles must make use of existing access roads as far as possible. • All vehicles shall be roadworthy. • Repair damage to construction access roads within 24 hours of its identification; and • Access and haul roads shall be clearly demarcated and vehicle movement confined to the demarcated areas only. • Large trucks or delivery vehicles with heavy loads should travel outside of peak traffic times. 	<p>Low (32)</p>	<p>Negligible (16)</p>
<p>25. SAFETY AND SECURITY</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Activities on site shall be according to the provisions of the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) and the National Building Regulations. • Access control should be enforced. • Construction vehicles should be under the control of competent, trained and experienced personnel. • The relevant emergency and contact numbers to be visible on site in case of an emergency situation. • Regular site inspections to be conducted in order to identify areas of concern with regards to safety and fire hazards. • Open excavations and trenches shall either be closed or demarcated with the necessary warning signs. 	<p>Low (24)</p>	<p>Negligible (12)</p>
<p>26. SOCIO-ECONOMIC</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Locally based contractors and service providers should be utilised for the project in order to encourage local economic growth. • Where possible the contractor should involve local communities in order to provide them with training and skills development. • Unskilled work must be sourced from the local communities as far as possible. 	<p>Negligible (16) Positive</p>	<p>Low (32) (Positive)</p>
<p>Indirect impacts:</p>		
<p>None</p>		
<p>Cumulative impacts:</p>		

1. SURFACE AND GROUND WATER POLLUTION		
<p>Mitigation</p> <ul style="list-style-type: none"> • A storm water management plan must be developed and implemented and should include erosion control measures. • Hazardous chemical substances must be provided with and stored and used with secondary containments such as bunded areas or drip trays at all times so as to contain any leakages or accidental spillages of the HCS and thereby reducing the risk of soil and water pollution. • Hazardous chemical substances and ablution facilities may not be stored near any drainage line or close to any body of water and should be tied down to prevent them from falling or being blown over. • A spill kit must be available on site. • An emergency spill response plan should be developed and communicated to the staff on site. 	Low (36)	Negligible (18)
Operational Phase		
Direct impacts:		
1. VISUAL IMPACT		
<p>Mitigation</p> <ul style="list-style-type: none"> • Ensure alien vegetation and weeds are eradicated on an on-going basis. • Ensure that only vegetation which is indigenous or endemic to the region and specific habitats grows on the farm, especially around the weirs and the culvert. 	Negligible (16) (Positive)	Low (32) (Positive)
2. LOCAL ECONOMIC DEVELOPMENT		
<p>Mitigation</p> <ul style="list-style-type: none"> • The farmer should sell cattle in the local farmers market to boost local economic development. 	Negligible (16) (Positive)	Low (32) (Positive)
3. CHANGES IN GROUND WATER LEVEL		
<p>Mitigation</p> <ul style="list-style-type: none"> • Damming should be in such a way that downstream water users are not prohibited and without compromise to the surface water quality. The proposed weirs should therefore not compromise downstream water users and the environment. • The downstream ecological reserve must be maintained and the surface water quality must not deteriorate due to any anthropogenic activities. • Ensure that flow continues below the weirs is adequate to maintain the ecological reserve. 	Negligible (18)	Negligible (9)
4. CHANGES IN GROUND WATER QUALITY		
<p>Mitigation</p> <ul style="list-style-type: none"> • Continuous water quality monitoring is recommended for every 12 months for the determinants as analysed in the Hydrogeological Investigation. 	Low (36)	Negligible (18)

<p>5. CHANGES IN SURFACE WATER QUANTITY</p> <p>Mitigation</p> <ul style="list-style-type: none"> • It should be ensured that flow continues below the weirs to maintain the ecological reserve. 	Negligible (18)	Negligible (9)
<p>6. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Weeds and alien vegetation must not be allowed to propagate on the site. • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA (Conservation Agricultural Resources Act) or in terms of Working for Water guidelines. • Alien invasive tree species listed by the CARA regulations should be eradicated. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. • A plan should be developed for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching. 	Moderate (52)	Negligible (14)
<p>7. CHANGING THE FLOW REGIME OF THE WATERCOURSE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License. • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated areas. • Maintenance workers should respect and also maintain fences that are in place to prevent livestock from entering rehabilitated areas, until such time that monitoring found that rehabilitation is successful and the fences removed. • Maintenance should not impact on natural vegetation. • Maintenance vehicles must stay on dedicated roads/servitudes. 	Low (28)	Negligible (14)
<p>8. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Maintenance activities should not take place within watercourses or 	Low (24)	Negligible (12)

<p>buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License.</p> <ul style="list-style-type: none"> • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated areas. • Maintenance workers should respect and also maintain fences that are in place to prevent livestock from entering rehabilitated areas, until such time that monitoring found that rehabilitation is successful and the fences removed. • Maintenance should not impact on natural vegetation. • Maintenance vehicles must stay on dedicated roads/servitudes. 		
<p>9. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Ensure that maintenance work does not take place haphazardly, but according to a fixed plan, from one area to the other. • After maintenance, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Ensure maintenance vehicles are in proper order and well maintained. • Control of waste discharges. 	<p>Low (22)</p>	<p>Negligible (11)</p>
<p>10. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated or naturally vegetated areas. • The design of the weirs should limit fragmentation and isolation of sections of the non-perennial tributaries. 	<p>Low (36)</p>	<p>Negligible (18)</p>
<p>11. LOSS OF AQUATIC BIOTA</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License. • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated or naturally vegetated areas. • It is important that flow and depth classes should be maintained through engineering design and the determination of the ecological reserve for the two non-perennial tributaries of the Crocodile River as well as their contribution to the Crocodile River. 	<p>Negligible (16)</p>	<p>Negligible (8)</p>
<p>Indirect impacts:</p>		

1. IMPACT ON HUMAN HEALTH THROUGH WATER CONSUMPTION		
<p>Mitigation</p> <ul style="list-style-type: none"> • Continuous water quality monitoring is recommended for every 12 months for the determinants as analysed in this report if and only if groundwater is to be used for domestic purposes. This will ensure that any deviation or change in water quality is duly noted. However, given that the proposed damming of water will likely reduce groundwater use, monitoring is not a necessity, provided that the surface water quality does not deteriorate beyond acceptable levels. • Water should not be used for consumption prior to treatment, notably with respect to microbial determinants. 	Low (28)	Negligible (14)
Cumulative Impacts:		
NONE.		
Decommissioning Phase		
It is not foreseen that the weirs and road culvert will be decommissioned and as such this phase is not applicable to the development lifecycle for the preferred activity.		

Alternative 2: Layout Design Alternative		
Planning and Design Phase		
Direct impacts:		
No direct impacts are anticipated.		
Indirect impacts:		
No direct impacts are anticipated.		
Cumulative impacts:		
1. WATER RESOURCE DEPLETION		
<p>Mitigation</p> <ul style="list-style-type: none"> • Plans and drawings must rather be communicated electronically prior to finalisation of the design plans/ drawings in order to ensure all details are correct prior to printing, this will ensure that no re-prints are required and will save paper. • Any waste paper should be recycled. 	Low (32)	Negligible (16)
2. LOSS OF HABITAT/ BIODIVERSITY		
<p>Mitigation</p> <ul style="list-style-type: none"> • Plans and drawings must rather be communicated electronically prior to finalisation of the design plans/ drawings in order to ensure all details 	Moderate (40)	Low (20)

<p>are correct prior to printing, this will ensure that no re-prints are required and will save paper.</p> <ul style="list-style-type: none"> • All waste paper should be recycled. • Identify environmentally friendly technologies, processes and materials in the design of the development. 		
<p>3. GLOBAL WARMING</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Travel for meetings should be limited as far as possible. Communication via telephone and email should be encouraged over physical meetings. 	Low (36)	Negligible (18)
<p>4. JOB CREATION (POSITIVE IMPACT)</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Travel for meetings should be limited as far as possible. Communication via telephone and email should be encouraged over physical meetings. 	Negligible (16) (Positive)	Moderate (48) (Positive)
Construction Phase		
Direct impacts:		
<p>1. ARCHAEOLOGICAL LOSS / LOSS OF HERITAGE RESOURCES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Activities taking place in the vicinity must be executed in a way as to avoid impact on the heritage resources at all times. • A conservation buffer zone of at least 50 meters around the burials must be established and maintained. • Graves should be fenced off and access control should be implemented. • An informed ECO should monitor and inspect the construction site on a regular basis in order to monitor possible impacts on heritage resources. • Regular examinations of trenches and excavations must be undertaken. • Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended and the ECO and the archaeological specialist should be notified immediately. A qualified archaeologist must verify the importance of the remains before construction activities continues and decide on the way forward. • No archaeological artefacts shall be disturbed or removed from site prior to the necessary consultation with the regulatory authorities, nor without the necessary permits required. • Contractors should be briefed on the nature of the heritage remains in the area prior to the commencement of construction activities. • Construction activities should be in line with the provisions of the National Heritage Resources Act (Act 25 of 1999). 	Moderate (60)	Low (30)

<p>2. DESTRUCTION OF AVIFAUNA HABITATS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The removal of vegetation should only occur on the footprint area of the development and not over the larger area. The clearing and damage of plant growth in these areas should be restricted to the footprint way leave area. • Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from leaving the demarcated area. • Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the avifauna of the area. • Landscape management at the site needs to consider different objectives, including <ol style="list-style-type: none"> 4. Maintaining pre-existing land uses; 5. Conserving and restoring natural habitats; 6. Managing land for priority species; • Hunting of birdlife should be prohibited on site. 	<p>Moderate (44)</p>	<p>Low (28)</p>
<p>3. FRAGMENTATION OF AVIFAUNA HABITAT</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Use existing facilities (e.g., access roads) to the extent possible to minimize the amount of new disturbance. • Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to sensitive bird habitats during construction. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. 	<p>Moderate (48)</p>	<p>Low (32)</p>
<p>4. IMPACT ON AVIFAUNA MOVEMENTS</p> <p>Disturbance through human activities, noise and fires:</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Care should always be taken to disturb the receiving environment as little as possible. Careful control of construction workers movements must be maintained at all times. • Staff that will stay on site should be accommodated in one location of the site to ensure that the impact will be minimal on the larger area. • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. • Educate workers regarding the occurrence of important resources in the area and the importance of protection. 	<p>Moderate (55)</p>	<p>Low (35)</p>

<ul style="list-style-type: none"> • Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g. courtship, nesting) seasons. In addition, control pets to avoid harassment and disturbance of wildlife. • Camp fires at the construction laydown area must be strictly controlled to ensure that no veld fires are caused. • Noise levels will be kept within acceptable limits by limiting of speed of haulage vehicles/tippers. • Compliance with appropriate noise legislation must take place. 		
<p>5. HABITAT DESTRUCTION AND/ OR MODIFICATION: DESTRUCTION OR LOSS OF FLORAL DIVERSITY OR VEGETATION COMMUNITIES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The removal of plant species should only occur on the footprint area of the development and not over the larger area. • Vegetation to be removed as it becomes necessary. • Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from disturbing areas outside of the demarcated area. • Construction vehicles and plant must not be allowed to operate outside of the site boundary and designated access routes. • Construction vehicles must be restricted to using existing roads and access routes as far as practically possible in order to reduce the impact on natural vegetation. • Only one temporary access route may be allowed to each construction area if required, and the access route should only allow for one way traffic so as to minimize disturbances / damage to the vegetation. • The collection of plants for medicinal, purposes is prohibited, unless they have specifically been earmarked for removal for construction purposes. • Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the flora of the area. • The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. • Training must be given to all employees of contractors, sub-contractors and service providers who will be operating on site in order to ensure that all employees know their roles and responsibilities in managing the environmental impact. 	<p>High (75)</p>	<p>Moderate (55)</p>
<p>6. HABITAT FRAGMENTATION (of Fauna)</p> <p>Mitigation</p> <ul style="list-style-type: none"> • All possible efforts must be made to ensure as little disturbance as possible to the sensitive habitats such as wetlands during construction. • Only necessary damage must be caused and, for example, 	<p>High (75)</p>	<p>High (65)</p>

<p>unnecessary driving around in the veld or bulldozing natural habitat must not take place.</p> <ul style="list-style-type: none"> • Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. • Use existing facilities (e.g., access roads, degraded areas) to the extent possible to minimize the amount of new disturbance. • Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to the sensitive habitats on site during construction. 		
<p>7. INCREASED SOIL EROSION AND SEDIMENTATION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • During and after construction, ensure effective storm water management around permanent infrastructure, rehabilitate disturbed areas, protect topsoil and protect sensitive soils. This will reduce the possibility of soil erosion. • Erosion control of all banks must take place so as to reduce erosion and sedimentation into river channels or wetland areas. • The baseline monitoring undertaken and recorded in the Geohydrological report should be used as a baseline data for further monitoring of water quality. These data can be used as a level on which upon monitoring will be based. • Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. Control dust on construction sites and access roads using water-sprayers. • Stockpiles: locate stockpiles away from concentrated flows and riverine areas and divert run-off around them. • Institute a storm water management plan including strategies such as: <ul style="list-style-type: none"> 5. minimising impervious area; 6. Increasing infiltration to soil by use of recharge areas; 7. Use of natural vegetated swales instead of pipes; or 8. Installing detention or retention facilities with graduated outlet control structures. • Rehabilitation: revegetate or stabilize all disturbed areas as soon as possible. Indigenous plants species can be planted in the buffer zone of the proposed development to enhance the aesthetic value of the site and stabilize soil conditions. • Ensure the amount of bare soil exposed is minimized by staging earthworks in phases and leaving as much ground cover intact as possible during construction. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Repair all erosion damage as soon as possible and in any case not later than six months before the termination of the construction period. 	<p>Moderate (60)</p>	<p>Low (36)</p>
<p>8. SOIL AND WATER POLLUTION</p>	<p>Moderate</p>	<p>Low</p>

<p>Mitigation</p> <ul style="list-style-type: none"> • Hazardous chemical substances must be kept either in a bunded area or inside drip trays during both storage and when being used on site so as to prevent soil contamination should the container be knocked over or be leaking. • Drip trays or bunded areas must be designed to contain 110% of the total volume of chemicals to be stored in the bunded area/ drip tray. • Chemical storage areas must have a roof constructed over it, wherever possible, in order to prevent rain water ingress which would result in unnecessary contaminated waste water requiring disposal. • Smaller spillages within the drip tray must be cleaned up immediately when they occur, utilising the emergency spill kit. • Drip trays must be used when re-fuelling and under plant and machinery (such as pumps or generators etc.). • Drip trays are to be used when doing any maintenance work on vehicles or plant and equipment. • Drip trays should be emptied into a holding tank and returned to the supplier or disposed of as hazardous waste. • All vehicles should be inspected for oil and fuel leaks regularly and frequently. • Servicing of plant should take place off site at a proper workshop with an impermeable concrete floor. • Should any maintenance or repair work and refuelling be required, it may not take place near to any drainage line or channel. • Should maintenance or emergency repairs of plant and vehicles need to be done on site then drip trays must be used to trap and contain any hydrocarbon spillages. • Spill kits should be on-hand to deal with spills immediately. Construction workers responsible for refuelling must be trained on the use of spill kits. • An emergency response plan to address spillages should be developed, implemented and communicated to all staff. • Hazardous waste such as waste contaminated with hazardous chemical substances must be placed in bins specifically provided for hazardous waste only. • Contaminated materials and waste must be disposed of at a registered hazardous waste disposal site and records of waste safe disposal certificates must be kept. • No littering or uncontained waste will be allowed on site. • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed, but not near to any water channels or drainage lines. • Waste must be placed in waste bins as soon as waste is generated on the site. • General waste must be disposed of at a registered waste landfill site. • Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility; • Toilets must be provided on site at a ratio of no less than 1 per 15 persons. • Sewage must be disposed of at a registered waste water treatment 	(52)	(26)
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<p>facility, and a letter stating that sewage from the site or sewage collected by the toilet servicing company may be and is being disposed of at the facility.</p> <ul style="list-style-type: none"> • Should chemical toilets be used on site they must be emptied regularly to ensure that toilets do not over flow. • Safe disposal certificates must be obtained for all waste streams and must be kept on file on site as proof of proper disposal (in accordance with the National Environmental Management Waste Act (Act 36 of 1998). • Regular site inspections to be conducted in order to identify areas of concern with regards to surface and ground water related impacts. Such incidents must be reported to the ECO and attended to as soon as possible. 		
<p>9. HABITAT DEGRADATION DUE TO DUST & OTHER AIR POLLUTANTS</p> <p>Possible contamination of soil during the construction phase, due to inadequate storage and handling of hazardous substances.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Ensure excessive vehicular movement is avoided. • Limit vehicle speed on un-surfaced roads and working area to 40km/hour or less. • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. • Dust generating activities (grading/excavating) should be avoided during periods of medium to high winds. • Disturbed areas must be rehabilitated as fast as possible in order to reduce dust from exposed soil surfaces. • Ensure that all vehicles are in a road-worthy condition to avoid excessive exhaust emissions. • Introduce efficient fire control measures e.g. no open fires, designated smoking areas, disposal of cigarettes/tobacco products and sufficient fire-fighting equipment. • Properly control waste to minimize odour's and gasses. • No open fires will be allowed on site and burning of waste is prohibited. • No vegetation shall be burned. • Control of hazardous chemical substances to minimize gasses and odours. 	<p>Moderate (52)</p>	<p>Low (24)</p>
<p>10. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES</p>	<p>Moderate (52)</p>	<p>Low (28)</p>

<p>Mitigation</p> <ul style="list-style-type: none"> • Weeds and alien vegetation must not be allowed to propagate on the site. • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA (Conservation Agricultural Resources Act) or in terms of Working for Water guidelines. • The control of these species should even begin prior to the construction phase considering that small populations of these species were observed during the field surveys by the specialist. • The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. • Alien invasive tree species listed by the CARA regulations should be eradicated. • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish; • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. • Rehabilitate and re-vegetate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • A plan should be developed for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching. • Reseeding disturbed areas with native plants will aid in preventing the spread of invasive plants. 		
<p>11. LOSS OF HABITAT DUE TO FIRE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • No fires are permitted on site unless in a designated braai area. • No vegetation shall be burned. • Fire-fighting equipment shall be readily available on site. • Fire extinguishers shall be placed at working area and all areas contained hazardous substances. • Maintain proper firebreaks around the development footprint. • Educate construction workers regarding risks and correct disposal of cigarettes. • Educate construction workers regarding all fire risks. 	<p>Moderate (52)</p>	<p>Negligible (14)</p>
<p>12. PERMANENT LOSS OF WETLAND AND THEIR ASSOCIATED FUNCTIONS THROUGH HABITAT</p>	<p>High (75)</p>	<p>High (65)</p>

<p>DESTRUCTION AND FRAGMENTATION</p> <p>Depleting water reserves and reducing the quantity of water available for downstream users.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Clearing of vegetation should be scheduled for the drier winter months and limited to areas immediately needed for construction. Vegetation stripping should occur in parallel with the progress of dam construction to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Only selected plant species must be used in the re-vegetation process. • All development activities should be restricted to the footprint areas of the proposed development. The Environment Site Officer (ESO) should demarcate and control these areas. Storage of road-building equipment, fuel and other materials should be limited to demarcated areas. Layouts should be adapted to fit natural patterns rather than imposing rigid geometries. • The Environment Control Officer (ECO) should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment and specifically wetlands. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. • The removal of vegetation associated with the wetlands should be limited to the footprint areas. • Should the development be approved by authorities, environmental monitoring of environmental aspects should be implemented during the construction phase of the development to ensure that minimal impact is caused to the wetlands of the area. • The Monitoring Plan as discussed in section 10 of the Wetland Delineation Report must be implemented. 		
<p>12.a DESTRUCTION OR LOSS OF WETLAND FLORAL DIVERSITY OR RIPARIAN COMMUNITIES</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Same as 12's mitigation measures above. 	High (75)	High (65)
<p>12.b LOSS OF WETLAND AND WATER DEPENDANT FAUNAL DIVERSITY THROUGH MIGRATION AND DECLINE IN ANIMAL NUMBERS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Same as 12's mitigation measures above. 	High (75)	High (65)
<p>13.LOSS OF INSTREAM HABITAT DUE TO CHANGES IN CHANNEL STRUCTURE AND CONDITION</p>	High (75)	High (65)

<p>Mitigation</p> <ul style="list-style-type: none"> • Weirs must span the entire width of the channel and floodplain so as to avoid disturbance to the wetland zones of rivers and valley bottoms; • The disturbance of in-stream channels and riparian zones during construction must be minimized. • Physical structures, which could later alter hydrological regimes, should not be placed in the vicinity of any wetlands. 		
<p>14. DEWATERING OF WETLANDS</p> <p>Mitigation</p> <ul style="list-style-type: none"> • The development of weirs and dams in the system should allow for overflow of water into downstream areas. The overflows should be developed to reduce flow capacity and diffuse the baseflow into the downstream areas. • Long-term monitoring of plant zonation, surface water quality and invertebrate faunal communities in potentially affected wetlands needs to be initiated at least two wet seasons prior to the start of construction. It should be noted that monitoring per se is not mitigation against an impact – it does however allow on-going assessment of the efficacy of recommended mitigation measures, with some potential for adjustment in the event that the measures recommended do not meet their objectives. In the present case, a detected failure of mitigation would be very difficult to address once construction had begun. • Provision should be made for active removal of invasive terrestrial plant species from wetlands that are temporarily affected by unnatural lowering of the water table. 	<p>Moderate (56)</p>	<p>Moderate (48)</p>
<p>15. CHANGING THE FLOW REGIME OF THE WATERCOURSE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • No unlicensed activities should take place in the watercourses and associated buffer zone. Any activities within 500 m of riparian areas are subject to authorization by means of a water use license. • Construction in and around watercourses must be restricted to the dryer winter months. • A temporary fence or demarcation must be erected around the works area to prevent access to sensitive environments. The works areas generally include the servitude, construction camps, areas where material is stored and the actual footprint of the infrastructure. • Prevent pedestrian and vehicular access into the riparian areas and buffer areas. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • Planning of the construction site must include eventual rehabilitation / restoration of indigenous vegetative cover in footprint area. • Alien plant eradication and follow-up control activities prior to construction, to prevent spread into disturbed soils, as well as follow-up control during construction, operation and closure. • The amount of vegetation removed should be limited. 	<p>Moderate (48)</p>	<p>Low (24)</p>

<ul style="list-style-type: none"> • Rehabilitation of damage/impacts that arise as a result of construction must be implemented immediately upon completion of construction. 		
<p>16. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Construction in and around watercourses must be restricted to the dryer winter months. • A temporary fence or demarcation must be erected around the works area to prevent water runoff and erosion of the disturbed or heaped soils into wetland areas. • Access roads and bridges should span the wetland area, without impacting on the permanent or seasonal zones. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area (DWAF, 2005). • A vegetation rehabilitation plan should be implemented. Untransformed indigenous vegetation can be removed as sods and stored. The sods must preferably be removed during the winter months and be replanted by latest springtime. The sods should not be stacked on top of each other or within sensitive environs. Once construction is completed, these sods should be used to rehabilitate the disturbed areas from where they have been removed. In the absence of timely rainfall, the sods should be watered well after planting and at least twice more over the next two weeks. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. • Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • During the construction phase, measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Runoff from roads must be managed to avoid erosion and pollution problems. • Implementation of best management practices. 	<p>High (75)</p>	<p>Moderate (52)</p>
<p>17. ALTERATION OF WATER QUALITY – INCREASING THE AMOUNTS OF NUTRIENTS (PHOSPHATE, NITRITE, NITRATE).</p>	<p>Low (22)</p>	<p>Negligible (11)</p>

<p>Mitigation</p> <ul style="list-style-type: none"> • Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone. • Establishment of buffer zones to reduce nutrient inputs in diffuse flow. 		
<p>18. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Maintenance of construction vehicles. • Control of waste discharges. 	<p>Low (22)</p>	<p>Negligible (11)</p>
<p>19. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • All recommendations included in the wetland specialist report should be considered; • Weed control in buffer zone. • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • Design of weirs and dams should limit alterations in flow and allow sufficient release of water during no flow periods. 	<p>Moderate (44)</p>	<p>Low (22)</p>
<p>20. LOSS OF AQUATIC BIOTA</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Ensure that no additional vegetation is removed, • No fires should be allowed in natural veld – demarcated areas for cooking should be allowed for workers in construction camp. • Avoid unnecessary river crossing - limit work within the stream, river or wetland. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • Mark all areas which don't form part of the proposed weir and dam development within wetlands and riparian areas as no-go areas. • New linear developments (e.g. roads) for construction of weirs and the dam should span the watercourse. 	<p>Moderate (48)</p>	<p>Low (24)</p>

<ul style="list-style-type: none"> • Weed control in buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • All management procedures listed above for the change in water quality. • It is essential that the ecological reserve of the two non-perennial tributaries should be determined prior to impoundment. 		
<p>21. LOSS OF FAUNA BIODIVERSITY</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Any animal species found on the site must be relocated to an area of safety and released into natural habitat. • No animals may be injured or killed purposefully or through negligence. • No animals may be trapped or kept as pets. • Hunting of animals is prohibited. • Training must be given to all employees of contractors, sub-contractors and service providers who will be operating on site in order to ensure that all employees know their roles and responsibilities in managing the environmental impact. 	Moderate (44)	Low (22)
<p>22. VISUAL IMPACT</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprint. 	Moderate (52)	Low (26)
<p>23. NOISE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • All activities on site, as well as construction vehicles and machinery must comply with National Noise Legislation, Provincial Noise Regulations and Local Noise By-laws. • Appropriate silencing measures must be taken should noise levels exceed 85 decibels at the perimeter of the construction area. 	Moderate (44)	Low (28)
<p>24. TRAFFIC</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Construction and delivery vehicles must avoid moving around during periods of peak traffic as far as possible. • Contractors and construction personnel must adhere to traffic rules at all times, including prescribed speeding limits. • Access and entry points must be situated strategically in order to have a minimal impact on existing traffic volumes. • Construction vehicles must make use of existing access roads as far as possible. • All vehicles shall be roadworthy. • Repair damage to construction access roads within 24 hours of its identification; and 	Moderate (48)	Low (24)

Access and haul roads shall be clearly demarcated and vehicle movement confined to the demarcated areas only.		
<p>25. SAFETY AND SECURITY</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Activities on site shall be according to the provisions of the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) and the National Building Regulations. • Warning and demarcation signs must be used to demarcate open trenches. • Construction vehicles should be under the control of competent, trained and experienced personnel. • The relevant emergency and contact numbers to be visible on site in case of an emergency situation. • Regular site inspections to be conducted in order to identify areas of concern with regards to safety and fire hazards. • Open excavations and trenches shall either be closed or demarcated with the necessary warning signs. 	Moderate (48)	Low (24)
<p>26. SOCIO-ECONOMIC</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Locally based contractors and service providers should be utilised for the project in order to encourage local economic growth. • Where possible the contractor should involve local communities in order to provide them with training and skills development. • Unskilled work must be sourced from the local communities as far as possible. 	Low (24) (Positive)	Moderate (48) (Positive)
Indirect impacts:		
None		
Cumulative impacts:		
<p>1. SURFACE AND GROUND WATER POLLUTION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • A storm water management plan must be developed and implemented and should include erosion control measures. • Hazardous chemical substances must be provided with and stored and used with secondary containments such as bunded areas or drip trays at all times so as to contain any leakages or accidental spillages of the HCS and thereby reducing the risk of soil and water pollution. • HCS's and ablution facilities may not be stored near any drainage line or close to any body of water. • A spill kit must be available on site. • An emergency spill response plan should be developed and communicated to the staff on site. 	Moderate (52)	Low (26)

Operational Phase			
Direct impacts:			
1. VISUAL IMPACT Impact on the quantity of natural water resources as a result of water abstraction.		Low (24) (Positive)	Moderate (48) (Positive)
Mitigation <ul style="list-style-type: none"> • Ensure alien vegetation and weeds are eradicated on an on-going basis. • Ensure that only vegetation which is indigenous or endemic to the region and specific habitats grows on the farm, especially around the weirs and the culvert. 			
2. LOCAL ECONOMIC DEVELOPMENT		Negligible (16) (Positive)	Low (32) (Positive)
Mitigation <ul style="list-style-type: none"> • Cattle can be sold for an income for the farmer and local markets will also benefit from the sale of farm produce. 			
3. CHANGES IN GROUND WATER LEVELS		Low (36)	Negligible (18)
Mitigation <ul style="list-style-type: none"> • Damming should be in such a way that downstream water users are not prohibited and without compromise to the surface water quality. The proposed weirs and dam should therefore not compromise downstream water users and the environment. • The downstream ecological reserve must be maintained and the surface water quality must not deteriorate due to any anthropogenic activities. 			
4. CHANGES IN GROUND WATER QUALITY		Low (36)	Negligible (18)
Mitigation <ul style="list-style-type: none"> • Continuous water quality monitoring is recommended for every 12 months for the determinants as analysed in the Hydrogeological Investigation. 			
5. CHANGES IN SURFACE WATER QUANTITY		Low (36)	Negligible (18)
Mitigation <ul style="list-style-type: none"> • It should be ensured that flow continues below the dam and the weirs to maintain the ecological reserve. 			
6. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES		High (65)	Low (22)
Mitigation <ul style="list-style-type: none"> • Weeds and alien vegetation must not be allowed to propagate on the site. • Control involves killing the plants present, killing the seedlings which 			

<p>emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA (Conservation Agricultural Resources Act) or in terms of Working for Water guidelines.</p> <ul style="list-style-type: none"> • The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. • Alien invasive tree species listed by the CARA regulations should be eradicated. • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. • Rehabilitate and re-vegetate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. <p>A plan should be developed for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching.</p>		
<p>7. CHANGING THE FLOW REGIME OF THE WATERCOURSE</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License. • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated areas. • Maintenance workers should respect and also maintain fences that are in place to prevent livestock from entering rehabilitated areas, until such time that monitoring found that rehabilitation is successful and the fences removed. • Maintenance should not impact on natural vegetation. • Maintenance vehicles must stay on dedicated roads/servitudes. 	<p>Moderate (44)</p>	<p>Low (22)</p>
<p>8. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Rehabilitated vegetation should not be impacted on by maintenance. 	<p>Low (24)</p>	<p>Negligible (12)</p>

<ul style="list-style-type: none"> • Maintenance vehicles must remain on dedicated roads and servitudes. • Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint needed for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License. • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated areas and where soil or vegetation disturbances took place, this should be rehabilitated immediately. 		
<p>9. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Ensure that maintenance work does not take place haphazardly, but according to a fixed plan, from one area to the other. • After maintenance, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Ensure maintenance vehicles are in proper order and well maintained. • Control of waste discharges. 	Low (22)	Negligible (11)
<p>10. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated or naturally vegetated areas. • The design of the weirs should limit fragmentation and isolation of sections of the non-perennial tributaries. 	Moderate (52)	Low (26)
<p>11. LOSS OF AQUATIC BIOTA</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Maintenance activities should not take place within watercourses or buffer zones. Where unavoidable, the footprint for maintenance must be kept to a minimum. This is subjected to authorization by means of a Water Use License. • Where possible, maintenance within watercourses must be restricted to the drier winter months. • Maintenance activities should not impact on rehabilitated or naturally vegetated areas. • It is important that flow and depth classes should be maintained through engineering design and the determination of the ecological reserve for the two non-perennial tributaries of the Crocodile River as well as their contribution to the Crocodile River. 	Moderate (48)	Low (24)
<p>Indirect impacts:</p>		

<p>1. IMPACT ON HUMAN HEALTH THROUGH WATER CONSUMPTION</p> <p>Mitigation</p> <ul style="list-style-type: none"> • Continuous water quality monitoring is recommended for every 12 months for the determinants as analysed in this report if and only if groundwater is to be used for domestic purposes. This will ensure that any deviation or change in water quality is duly noted. However, given that the proposed damming of water will likely reduce groundwater use, monitoring is not a necessity, provided that the surface water quality does not deteriorate beyond acceptable levels. <p>Water should not be used for consumption prior to treatment, notably with respect to microbial determinants.</p>	<p>Low (28)</p>	<p>Negligible (14)</p>
<p>Cumulative Impacts:</p>		
<p>None.</p>		
<p>Decommissioning Phase</p>		
<p>It is not foreseen that the weirs and dam will be decommissioned and as such this phase is not applicable to the development lifecycle for the preferred activity.</p>		

<p>Alternative 3: No-go Option</p>	
	<p>Direct impacts:</p>

<p>1. CONTINUED DEGRADATION OF THE WATER COURSE ON THE SITE:</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None, as no activities will take place and the site will be left in its current state. 	<p>High (65)</p>	<p>Negligible (13)</p>
<p>2. CONTINUED DEGRADATION OF THE VALLEY BOTTOM WETLANDS ON THE SITE:</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None, as no activities will take place and the site will be left in its current state. 	<p>High (65)</p>	<p>Negligible (13)</p>
<p>Indirect impacts:</p>		
<p>None.</p>		
<p>Cumulative impacts:</p>		
<p>None</p>		

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.

Alternative A (preferred alternative)

1. Planning & Design Phase:

1.1. Direct Impacts: None

1.2. Indirect Impacts: None

1.3. Cumulative Impacts: 4

The following four cumulative impacts are anticipated, although these impacts will be negligible.

1.3.1. Water Resource Depletion

Water is used to grow trees from which paper is used, therefore by wasting paper results in an increase in water consumption.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Low (2)	Probable (2)	Negligible (16)

1.3.2. Loss of Habitat/ Biodiversity

Materials used in the planning and design phase, especially paper used for the printing of drawings and design plans might be used wastefully, resulting in an increased volume of waste going to landfill, thereby increasing the area of land needed for landfill space.

Natural resources used for the development could result in loss of habitats (e.g. mining for minerals).

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Permanent (5)	Low (2)	Probable (2)	Low (20)

1.3.3. Global Warming

Means of travel for meetings results in carbon emissions, thus contributing towards global warming.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

1.3.4. Job Creation (Positive Impact)

The development has the potential to provide new job opportunities and this opportunity should be maximised as far as possible.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Highly Probable (4)	Moderate (48) (Positive)

2. Construction Phase:

2.1. Direct Impacts: 26

2.1.1. ARCHAEOLOGICAL LOSS / LOSS OF HERITAGE RESOURCES

Impacts could involve displacement or destruction of Colonial Period features, sites and human burials in the vicinity of the Roodekrans weirs development. An archaeological impact assessment was undertaken. Three areas of Historical nature, similar in historical context, were observed on the property. Heritage resources include two graves and a series of well-preserved stonewall livestock enclosures and the remains of the original Roodekrans farmhouse are present on the property all carrying a high heritage significance.

It must be noted that the weirs will be located along a channel which is situated more than 50 meters from these heritage sites and as such, the proposed development should not have any impact on these.

This impact rating is lower for the preferred alternative as the weirs are located much further away from the heritage sites than the dam and therefore less likely to be affected

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	High (6)	Improbable (1)	Negligible (13)

2.1.2. DESTRUCTION OF AVIFAUNA HABITATS

The construction of the weirs will result in minor loss of and damage to natural bird habitats. During the construction phase some habitat modification and alteration will inevitably take place. However after the flooding of the areas, additional open water habitats will be created for avifauna.

This impact rating is lower for the preferred alternative as a smaller area will be affected by the construction of the weirs than by the alternatives dam and weirs.

Scale	Duration	Magnitude	Probability	Significance WM
Local (1)	Long term (4)	Low (2)	Probable (2)	Negligible (14)

2.1.3. FRAGMENTATION OF AVIFAUNA HABITAT

The preferred alternative will have a relatively small impact on the natural movement patterns and fragmentation of avifauna habitats.

This impact rating is lower for the preferred alternative as a smaller area will be affected by the construction of the weirs than by the alternatives dam and weirs.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Probable (2)	Negligible (16)

2.1.4. IMPACT ON AVIFAUNA MOVEMENTS

Disturbance through human activities, noise and fires

Construction and maintenance activities impact on birds through disturbance, particularly during breeding activities. Birds will move out of the area during construction activities as a result of noise disturbance. The presence of construction workers or regular workers during the construction phase on site over a protracted

period will result in an increased risk of uncontrolled fires which might cause loss of bird diversity when ground-living birds are killed in the fires or their nests destroyed.

This impact rating is lower for the preferred alternative as the duration of the construction period for the weirs (preferred alternative) will be shorter than that of the alternative activity, also the area which will be disturbed will be smaller for the preferred alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Probable (2)	Low (22)

2.1.5. HABITAT DESTRUCTION AND/ OR MODIFICATION: DESTRUCTION OR LOSS OF FLORAL DIVERSITY OR VEGETATION COMMUNITIES

The proposed development will result in minor loss of and damage to natural habitats if the vegetation is cleared. Rehabilitation of some areas would be possible but there is likely to be long-term damage. The impact of the habitat destruction will be on the flora and fauna of the study area:

- The construction will lead to the loss of individual plants such as grasses, forbs, trees and shrubs that will be cleared on the footprint area (although this will be limited due to the small size of the weirs and with the implementation of the mitigation measures);
- Loss of threatened, “near-threatened” and endemic taxa: The anticipated loss of some of the protected species *Zantedeschia jucunda*.
- The construction activities can impact on surrounding vegetation by altered surface run-off patterns;
- The disturbance of the area could lead to an increase in the growth of alien vegetation.

This impact rating is lower for the preferred alternative as a smaller area will be affected by the construction of the weirs than by the alternatives dam and weirs.

Scale	Duration	Magnitude	Probability	Significance WM
Local (1)	Long term (4)	Low (2)	Highly probable (4)	Low (28)

2.1.6. HABITAT FRAGMENTATION (of Fauna)

The construction will inevitably result in natural movement patterns being disrupted and, to a varying degree depending on how different species react to these barriers will result in the fragmentation of natural populations. The preferred alternative will have a low impact in fragmenting the habitats. Such impacts would be permanent, although additional open water habitats will be created.

This impact rating is lower for the preferred alternative as a smaller area will be affected by the construction of the weirs than by the alternatives dam and weirs.

Scale	Duration	Magnitude	Probability	Significance WM
Local(1)	Long term (4)	Medium (6)	Probable (2)	Low (22)

2.1.7. INCREASED SOIL EROSION AND SEDIMENTATION

The construction activities associated with the development may result in soil disturbance and is usually associated with accelerated soil erosion.

Soil, sediments and associated contaminants are transported into water bodies such as rivers and streams, resulting in the loss or alteration of habitats for aquatic organisms, as well as changes in water quality.

Soil erosion also promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous flora.

- Potential impact on soil as a result of vegetation clearance.
- Potential impact on topsoil as a result of poor stockpiling and management.
- Loss of topsoil as a result of erosion.
- Disturbance of soils (Soil compaction, erosion and crusting).
- Sterilisation of soil (soil stripping).

This impact rating is lower for the preferred alternative as the weirs will not impact the flow rate as much as a dam would.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

2.1.8. SOIL AND WATER POLLUTION

Construction work contemplated for the proposed development will always carry some risk of soil and water pollution, with spillages from construction vehicles contributing substantially. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on flora and fauna.

This impact rating is lower for the preferred alternative as there will be much fewer construction vehicles, less construction staff and less hazardous materials on the site.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Improbable (1)	Negligible (8)

2.1.9. HABITAT DEGRADATION DUE TO DUST & OTHER AIR POLLUTANTS

The environmental impacts of wind-borne dust, gases and particulates from the construction activities associated with the proposed development will have an impact on the vegetation of the area when dust settles on plant material reducing the amount of light reaching the chlorophyll in the leaves, thereby reducing photosynthesis, which in turn reduces plant productivity, growth and recruitment. The following activities will typically cause air pollution:

- Land clearing operations, building and scraping;
- Materials handling operations (truck loading & unloading, tipping, stockpiling);
- Vehicle entrainment on unpaved roads;

Dust deposited on the ground may cause changes in soil chemistry (chemical effects), and may over the long-term result in changes in plant chemistry, species composition and community structure. Sensitivities to dust deposition of the various plant species present in the area are not known. It is therefore difficult to predict which species may be susceptible. Dust in the area will be greatly increased in the dry season due to the nature of the soil in the area, with very small particulates.

It is anticipated that this impact will be low to negligible due to the small scale of the proposed weir construction.

This impact rating is lower for the preferred alternative as a smaller area will be affected by the construction of the weirs than by the alternatives dam and weirs.

Scale	Duration	Magnitude	Probability	Significance WM
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Site (2)	Long term (4)	Low (2)	Probable (2)	Negligible (16)
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2.1.10. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES

This is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact of virtually impact on every aspect of the surrounding ecosystem. Vehicles often transport many seeds and some may be of invader species, which may become established along the road, especially where the area is disturbed. Habitat disturbance also provides the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites.

Continued movement of personnel and vehicles on and off the site will result in a risk of importation of alien species throughout the life of the project.

This impact is rated lower than the alternative due to the smaller area which will be affected and therefore also easier to control.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

2.1.11. LOSS OF HABITAT DUE TO FIRE

An increase in human activity on the site and surrounding areas is anticipated. The risk of fires is increased which could have a definite impact on the flora of the larger area. The presence of construction workers or regular workers during the construction phase on site over a protracted period will result in a greatly increased risk of uncontrolled fires arising from cooking or heating fires and improperly disposed cigarettes etc.

This impact rating is lower for the preferred alternative as there will be less construction staff on site for the construction phase of the preferred activity than for the alternative activity.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Improbable (1)	Negligible (7)

2.1.12. WETLAND MODIFICATION

Small pockets of wetland habitat will be modified as the water fills up behind the weirs. However, the specialist reports state that the weirs could play a role in re-instating the old drainage lines.

This rating is lower for the preferred alternative as the area impacted will be much less than that of the alternative activity (with the dam).

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Low (2)	Probable (2)	Negligible (18)

12.a DESTRUCTION OR LOSS OF WETLAND FLORAL DIVERSITY OR RIPARIAN COMMUNITIES

The following major impacts of the development will potentially impact on the flora of the site:

- Loss of threatened, “near-threatened” and endemic taxa: The anticipated loss of some of the riparian and wetland habitats that support endemic species will result in the local displacement of endemic listed flora.

- The construction activities and associated impacts will lead to the loss of individual plants associated with wetlands.
- The construction activities can impact on surrounding wetland and riparian vegetation by dust and altered surface run-off patterns.
- The disturbance of the area could lead to an increase in the growth of alien vegetation.

This rating is lower for the preferred alternative as the area impacted will be much less than that of the alternative activity (with the dam).

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Low (2)	Probable (2)	Negligible (18)

12.b LOSS OF WETLAND AND WATER DEPENDANT FAUNAL DIVERSITY THROUGH MIGRATION AND DECLINE IN ANIMAL NUMBERS

- Loss of wetland and water dependant faunal diversity through migration and decline in animal numbers
- The following major impacts of the development will potentially impact on the faunal habitats of the site:
- Habitat modification by construction activities will force wetland-dependant fauna out of the area and animal numbers will decrease. This impact could also take place because of hunting and snaring of animals in and around the wetlands.
- Loss of threatened, “near-threatened” and conservation important taxa: The anticipated loss of the areas adjacent to the wetlands will ultimately also result in the local displacement of some fauna species that occur in the wetlands.
- Changes in the community structure: It is expected that the faunal species composition will shift, due to an anticipated loss in habitat surface area. In addition, it is predicted that more generalist species (and a loss of functional guilds) will dominate the study area. Attempts to rehabilitate will attract taxa with unspecialised and generalist life-histories. It is predicted that such taxa will persist for many years before conditions become suitable for succession to progress.

This rating is lower for the preferred alternative as the area impacted will be much less than that of the alternative activity (with the dam).

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Low (2)	Probable (2)	Negligible (18)

2.1.13. REINSTATEMENT OF THE WETLAND ALONG THE DRAINAGE CHANNEL

According to the wetland report, the development of small weirs in the wetlands could manage these ecosystems back to their original state.

The placement of weirs in the water course will eliminate upstream erosion to a certain extent over time by reducing flow velocity.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Highly probable (4)	Moderate (52)

2.1.14. DEWATERING OF WETLANDS

The alteration of channel flow and sediment transport downstream of water obstructions often causes sustained environmental impacts. Life in and around a water course evolves and is conditioned on the timing and quantities

of river flow. Subtle changes in the quantity and timing of water flows impact aquatic and riparian life, which can unravel the ecological web of a riparian system.

The road crossing the area below the small dam along the access road has caused dewatering of the channelled valley bottom wetland causing the invasion of the wetland by terrestrial species and weeds. The installation of the culverts under the road will aid in rehabilitating the downstream channel and wetland areas.

This rating is lower for the preferred alternative as the weirs will hold small amounts of water compared to the alternative with the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Probable (2)	Negligible (16)

2.1.15. CHANGING THE FLOW REGIME OF THE WATERCOURSE

Development within water resources e.g. infrastructure footprint within the wetland area or riparian area, thereby diverting or impeding flow.

Lack of adequate rehabilitation resulting in colonization by invasive plants.

This rating is lower for the preferred alternative as the weirs will hold small amounts of water compared to the alternative with the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Probable (2)	Negligible (16)

2.1.16. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).

Earthwork activities.

Clearing of surface vegetation will expose the soils, which in rainy events would wash down into wetlands, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.

Disturbance of soil surface.

Disturbance of slopes through creation of roads and tracks.

Changes in runoff characteristics.

Erosion (e.g. gully formation, bank collapse).

This rating is lower for the preferred alternative as the weirs hold much less water than the dam of the alternative activity.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

2.1.17. ALTERATION OF WATER QUALITY – INCREASING THE AMOUNTS OF NUTRIENTS (PHOSPHATE, NITRITE, NITRATE).

Disposal or discharge of human (including partially treated and untreated) sewage during the construction phase of the development.

This rating is lower for the preferred alternative as there will be fewer construction staff on the site for the

construction of the weirs than for the construction of the alternatives dam (and weirs), therefore the risk is less.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Improbable (1)	Negligible (7)

2.1.18. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.

Runoff from road surfaces.

Discharge of pollutants from chemical storage areas and accidental spillages.

This rating is lower for the preferred alternative as there will be fewer construction vehicles and hazardous chemical substances kept on the site for the construction of the weirs (preferred activity).

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Improbable (1)	Negligible (11)

2.1.19. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).

Deposition of wind-blown sand.

Loss of fringing vegetation and erosion.

Alteration in natural fire regimes.

Alteration of flow.

This rating is lower for the preferred activity as a smaller area will be affected.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

2.1.20. LOSS OF AQUATIC BIOTA

Loss of instream habitat.

Deposition of wind-blown sand.

Loss of fringing vegetation and erosion.

Alteration in natural fire regimes and subsequent loss of non-marginal and marginal vegetation.

Increase in invasive species due to disturbance.

Change in water quality.

Changes in flow.

This rating is lower for the preferred activity as a smaller area will be affected.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

2.1.21. LOSS OF FAUNA BIODIVERSITY

Negative impact on fauna species on site as a result of construction activities and poaching.

This rating is lower for the preferred activity as a smaller area will be affected and therefore the impact on

fauna will be less.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

2.1.22. VISUAL IMPACT

Visual Impact to surrounding areas as a result of construction.

This rating is lower for the preferred activity the weirs cover a small area in comparison to the dam of the alternative activity.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Improbable (1)	Negligible (9)

2.1.23. NOISE

Potential noise impact associated with the noise generated during the construction phase.

This rating is lower for the preferred activity as there will be less construction vehicles and plant and workers on the site, compared to the alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

2.1.24. TRAFFIC

Traffic impact will be low to negligible as construction plant and vehicles will not be travelling on public roads, apart from delivering and collecting the plant, equipment and materials before and after construction which is not expected to significantly affect traffic flow.

The location of the site is also very isolated and is not located near to any town and therefore little impact will occur on traffic in the area.

This rating is lower for the preferred activity as there will be less construction vehicles and plant and workers required for the preferred activity by comparison to the alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Low (2)	Probable (2)	Negligible (16)

2.1.25. SAFETY AND SECURITY

- Construction personnel on site may contribute to an increase in crime in the area.
- The influx of construction personnel during the construction period might have an impact on the general safety in the areas, however due to the size and extent of the planned project the risk potential is low, as the amount of construction personnel will be minimal.
- Open trenches or excavations might have an impact on safety during the construction phase.

This rating is lower for the preferred activity as there will be fewer construction workers on the site compared to the number for the alternative activity.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Improbable (1)	Negligible (12)

2.1.26. SOCIO-ECONOMIC

Temporary employment opportunities will be created during the construction phase of the project which will have a positive socio-economic impact.

The preferred activity will require less construction staff than the alternative activity; therefore the positive rating is lower for the preferred activity.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Low (2)	Highly probable (4)	Low (32) (Positive)

2.2. Indirect Impacts: None

2.3. Cumulative Impacts: 1

2.3.1 SURFACE AND GROUND WATER POLLUTION

Surface water and ground water may become contaminated as a result of sediment laden storm water entering into water resources, or as a result of any chemicals, especially oils entering into these water systems as a result of negligence and lack of planning.

This can compound the problem of water pollution in the region.

This impact is rated higher for the alternative activity due to the larger scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3. Operational Phase:

3.1. Direct Impacts: 11

3.1.1. VISUAL IMPACT

The weirs will improve the aesthetic appeal of the farm as from a human perspective, water features are always appealing.

Due to the small scale of the preferred activity, the impact rating is lower.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Highly probable (4)	Low (32) (Positive)

3.1.2. LOCAL ECONOMIC DEVELOPMENT

The weirs will provide the small herd of cattle on the farm with water, thus aiding in improving local economic

development.

This impact rating is the same as the alternative as both activities will provide water for the cattle.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Highly probable (4)	Low (32) (Positive)

3.1.3. CHANGES IN GROUND WATER LEVELS

Through damming of water, local water budgets may be affected to the effect of changing groundwater levels, changing groundwater quality due to prolonged exposure of water to possible surficial contamination and other related groundwater; surface water interactions.

The construction of the weirs in the surface drainage is not expected to pose any significant impact on the groundwater regime and the development is supported by the preliminary findings in the Hydrogeological report.

The impact rating is lower for the preferred activity due to the smaller scale of the preferred activity.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Improbable (1)	Negligible (9)

3.1.4. CHANGES IN GROUND WATER QUALITY

Ground water may become contaminated as a result of anthropogenic activities.

The impact rating is the same for both the preferred and alternative activities as there will be no difference in anthropogenic activities during the operational phases.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3.1.5. CHANGES IN SURFACE WATER QUANTITY

Surface water from the tributaries of the Crocodile River might be affected by the weirs.

This impact is rated lower for the preferred activity due to the smaller volume of water used associated with the weirs.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Improbable (1)	Negligible (9)

3.1.6. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES

This is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact of virtually impact on every aspect of the surrounding ecosystem. Vehicles often transport many seeds and some may be of invader species, which may become established along the road, especially where the area is disturbed. Habitat disturbance also provides the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance.

Continued movement of people and vehicles on and off the property, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project.

This impact is rated lower than the alternative due to the smaller area which will be affected and therefore also easier to control.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

3.1.7. CHANGING THE FLOW REGIME OF THE WATERCOURSE

Vehicles driving in/through watercourses during maintenance activities may cause damage to vegetated areas.

The impact rating is lower for the preferred activity due to the smaller scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

3.1.8. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).

Vehicles accessing the area during maintenance activities may impact on surface vegetation.

The impact rating is lower for the preferred activity due to the smaller scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Improbable (1)	Negligible (12)

3.1.9. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.

Runoff from road surfaces. Contaminated water or discharge of chemicals from improperly stored hazardous chemical substances or accidental spillages.

This impact rating is the same for both the preferred and alternative activities as there will be no variance in the activities associated with this risk between the two.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Improbable (1)	Negligible (11)

3.1.10. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).

Maintenance activities may result in the following:

- Loss of vegetation;
- Loss of hydrological flow classes;
- Loss of biodiversity.

This impact rating is lower for the preferred activity due to the smaller scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3.1.11. LOSS OF AQUATIC BIOTA

Loss of in-stream habitat.

Loss of flow.

This impact rating is lower for the preferred activity due to the smaller scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Improbable (1)	Negligible (8)

3.2. Indirect Impacts: 1

3.2.1 IMPACT ON HUMAN HEALTH THROUGH WATER CONSUMPTION

This impact rating is the same for both the preferred activity and the alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

3.3. Cumulative Impacts: None

4. Decommissioning Phase:

It is not foreseen that the weirs and road culvert will be decommissioned and as such this phase is not applicable to the development lifecycle for the preferred activity.

Alternative B

1. Planning & Design Phase:

No significant impacts are anticipated for the planning and design phase.

1.1. Direct Impacts: None

1.2. Indirect Impacts: None

1.3. Cumulative Impacts: 4

The following three cumulative impacts are anticipated, although these impacts will be negligible.

1.3.1. Water Resource Depletion

Water is used to grow trees from which paper is used, therefore wasting paper results in an increase in water consumption.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Low (2)	Probable (2)	Negligible (16)

1.3.2. Loss of Habitat/ Biodiversity

Materials used in the planning and design phase, especially paper used for the printing of drawings and design plans might be used wastefully, resulting in an increased volume of waste going to landfill, thereby increasing the area of land needed for landfill space.

Natural resources used for the development could result in loss of habitats (e.g. mining for minerals).

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Permanent (5)	Low (2)	Probable (2)	Low (20)

1.3.3. Global Warming

Means of travel for meetings results in carbon emissions, thus contributing towards global warming.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

1.3.4. Job Creation (Positive Impact)

The development has the potential to provide new job opportunities and this opportunity should be maximised as far as possible.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Highly Probable (4)	Moderate (48) (Positive)

2. Construction Phase:

2.1. Direct Impacts: 26

2.1.1. ARCHAEOLOGICAL LOSS / LOSS OF HERITAGE RESOURCES

Impacts could involve displacement or destruction of Colonial Period features, sites and human burials in the vicinity of the Roodekrans weirs development.

An archaeological impact assessment was undertaken. Three areas of Historical nature, similar in historical context, were observed on the property. Heritage resources include two graves and a series of well-preserved stonewall livestock enclosures and the remains of the original Roodekrans farmhouse are present on the property all carrying a high heritage significance.

It must be noted that the weirs will be located along a channel which is situated more than 50 meters from these heritage sites and as such, the proposed development should not have any impact on these.

The impact rating is higher for the alternative as the dam would be closer to the heritage sites and therefore a greater risk of potential disturbance to the heritage sites.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	High (8)	Probable (2)	Low (30)

2.1.2. DESTRUCTION OF AVIFAUNA HABITATS

The construction of the dam and the weirs will result in loss of and damage to natural bird habitats. During the construction phase some habitat modification and alteration will inevitably take place. However after the flooding of the areas, additional open water habitats will be created for avifauna.

This rating is higher for the alternative due to the larger area which would be disturbed as a result of the construction of the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Local (1)	Long term (4)	Low (2)	Highly Probable (4)	Low (28)

2.1.3. FRAGMENTATION OF AVIFAUNA HABITAT

The alternative will have a moderate to low impact on the natural movement patterns and fragmentation of avifauna habitats.

This rating is higher for the alternative due to the larger area which would be disturbed as a result of the construction of the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Highly Probable (4)	Low (32)

2.1.4. IMPACT ON AVIFAUNA MOVEMENTS

Disturbance through human activities, noise and fires

Construction and maintenance activities impact on birds through disturbance, particularly during breeding activities. Birds will move out of the area during construction activities as a result of noise disturbance. The presence of construction workers or regular workers during the construction phase on site over a protracted period will result in a greatly increased risk of uncontrolled fires which might cause loss of bird diversity when ground-living birds are killed in the fires or their nests destroyed.

This impact is rated higher than that of the preferred alternative as the construction period for the weirs is shorter than the period required to construct the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Definite (5)	Low (35)

2.1.5. HABITAT DESTRUCTION AND/ OR MODIFICATION: DESTRUCTION OR LOSS OF FLORAL DIVERSITY OR VEGETATION COMMUNITIES

The proposed development will result in loss of and damage to natural habitats if the vegetation is cleared. Rehabilitation of some areas would be possible but there is likely to be long-term damage in large areas, especially where the dam will completely flood some of the wetland areas. Most habitat destruction will be caused

during the construction phase during the backflooding of the dams and construction of weirs and dam walls in the wetlands. The impact of the habitat destruction will be on the flora and fauna of the study area:

- The construction will lead to the loss of individual plants such as grasses, forbs, trees and shrubs that will be cleared on the footprint area (although this will be limited due to the small size of the weirs and with the implementation of the mitigation measures);
- Loss of threatened, “near-threatened” and endemic taxa: The anticipated loss of some of the woodland habitats that support endemic species will result in the local displacement of endemic listed flora, including the loss of loss of some of the protected species *Zantedeschia jucunda*.
- The construction activities can impact on surrounding vegetation by altered surface run-off patterns;
- The disturbance of the area could lead to an increase in the growth of alien vegetation.

This impact is rated higher than the preferred alternative as a larger area will be affected by the construction of the dam

Scale	Duration	Magnitude	Probability	Significance WM
Local (1)	Long term (4)	Medium (6)	Definite (5)	Moderate (55)

2.1.6. HABITAT FRAGMENTATION (of Fauna)

The construction will inevitably result in natural movement patterns being disrupted and, to a varying degree depending on how different species react to these barriers will result in the fragmentation of natural populations. The development will have a high to moderate impact in fragmenting the habitats. Such impacts would be permanent, although additional open water habitats will be created.

This impact rating is higher for the alternative with the dam as the dam covers a larger area than the preferred alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Local (2)	Permanent (5)	Medium (6)	Definite (5)	High (65)

2.1.7. INCREASED SOIL EROSION AND SEDIMENTATION

The construction activities may result in widespread soil disturbance and is usually associated with accelerated soil erosion. Soil, sediments and associated contaminants are transported into water bodies resulting in the loss or alteration of habitats for aquatic organisms, and changes in water quality.

A dam holds back sediments that would naturally replenish downstream ecosystems. When a river is deprived of its sediment load, it seeks to recapture it by eroding the downstream river bed and banks (which can undermine bridges and other riverbank structures, as well as riverside woodlands). Riverbeds downstream of dams are typically eroded by several meters within the decade of first closing a dam; the damage can extend for tens or even hundreds of kilometers below a dam.

The use of heavy machinery during construction will result in the compaction of soil, resulting in decreased infiltration of rain water and increased surface run-off volumes and velocities leading to a greater erosion risk. Compaction can lead to erosion and channel incision in the water courses and change the in-stream habitat. This could result in higher velocity flows with greater erosive energy which can result in channel incision and gully erosion downstream within the channel and floodplain wetlands.

Soil erosion promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous flora.

The impact rating is higher for the alternative option due to the larger area which will be affected by the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Highly probable (4)	Low (36)

2.1.8. SOIL AND WATER POLLUTION

Construction work contemplated for the proposed development will always carry some risk of soil and water pollution, with spillages from construction vehicles contributing substantially. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on flora and fauna.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Medium (6)	Probable (2)	Low (26)

2.1.9. HABITAT DEGRADATION DUE TO DUST & OTHER AIR POLLUTANTS

The environmental impacts of wind-borne dust, gases and particulates from the construction activities associated with the proposed development will have an impact on the vegetation of the area when dust settles on plant material reducing the amount of light reaching the chlorophyll in the leaves, thereby reducing photosynthesis, which in turn reduces plant productivity, growth and recruitment. The following activities will typically cause air pollution:

- Land clearing operations, building and scraping;
- Materials handling operations (truck loading & unloading, tipping, stockpiling);
- Vehicle entrainment on unpaved roads;

Construction vehicles and equipment are the major contributors to the impact on air quality. Diesel exhaust gasses and other hydrocarbon emissions all add to the deterioration in air quality during this phase. Vehicles travelling at high speeds on dirt roads significantly aggravate the problem.

Dust deposited on the ground may cause changes in soil chemistry (chemical effects), and may over the long-term result in changes in plant chemistry, species composition and community structure. Sensitivities to dust deposition of the various plant species present in the area are not known. It is therefore difficult to predict which species may be susceptible. Dust in the area will be greatly increased in the dry season due to the nature of the soil in the area, with very small particulates.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

2.1.10. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES

This is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact of virtually every aspect of the surrounding ecosystem. Vehicles often transport many seeds and some may be of invader species, which may become established along the road, especially where the area is disturbed. The construction almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provides the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites.

Continued movement of personnel and vehicles on and off the site will result in a risk of importation of alien

species throughout the life of the project.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Highly probable (4)	Low (28)

2.1.11. LOSS OF HABITAT DUE TO FIRE

An increase in human activity on the site and surrounding areas is anticipated. The risk of fires is increased which could have a definite impact on the flora of the larger area. The presence of construction workers or regular workers during the construction phase on site over a protracted period will result in a greatly increased risk of uncontrolled fires arising from cooking or heating fires and improperly disposed cigarettes etc.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (12)	Negligible (14)

2.1.12. PERMANENT LOSS OF WETLAND AND THEIR ASSOCIATED FUNCTIONS THROUGH HABITAT DESTRUCTION AND FRAGMENTATION

The first filling of the dams will result in the permanent loss of wetland habitat; due to the nature of the development, this cannot be avoided. Individual small dams and the associated changes in ecological communities below them have received attention for facilitating the spread of pest species (e.g. black-flies: Palmer and O'Keeffe, 1995), acting as barriers to migratory species (e.g. amphidromous shrimps: Benstead et al., 1999), reducing macroinvertebrate abundance and diversity (Ogbeibu and Oribhabor, 2002), and reducing fish densities (Lessard and Hayes, 2003).

Another significant and obvious impact is the transformation upstream of the dam from a free-flowing river ecosystem to an artificial slack-water reservoir habitat. Changes in temperature, chemical composition, dissolved oxygen levels and the physical properties of a reservoir are often not suitable to the aquatic plants and animals that evolved with a given river system. Indeed, dams often host non-native and invasive species (e.g. snails, algae, predatory fish) that further undermine the river's natural communities of plants and animals.

The dam and weir construction activities will potentially have an impact on the wetlands, whether it be through direct or indirect impacts. Clearance of vegetation would be necessary at the construction sites, while the flooding areas will also be lost when the dam is lined. Loss of the wetland habitat will also result in permanent loss or displacement of the invertebrates, birds and small mammals dependant on the wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the wetlands and the surrounding landscape will be compromised.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Definite (5)	High (65)

2.1.12. a. DESTRUCTION OR LOSS OF WETLAND FLORAL DIVERSITY OR RIPARIAN COMMUNITIES

The following major impacts of the development will potentially impact on the flora of the site:

- Loss of threatened, "near-threatened" and endemic taxa: The anticipated loss of some of the riparian and wetland habitats that support endemic species will result in the local displacement of endemic listed flora.
- The construction activities and associated impacts will lead to the loss of individual plants associated with wetlands.
- The construction activities can impact on surrounding wetland and riparian vegetation by dust and altered surface run-off patterns.

- The disturbance of the area could lead to an increase in the growth of alien vegetation.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Definite (5)	High (65)

2.1.12. B. LOSS OF WETLAND AND WATER DEPENDANT FAUNAL DIVERSITY THROUGH MIGRATION AND DECLINE IN ANIMAL NUMBERS

- Loss of wetland and water dependant faunal diversity through migration and decline in animal numbers
- The following major impacts of the development will potentially impact on the faunal habitats of the site:
- The introduction of trout in the dam could have a substantial risk of this alien fish species being introduced into the Crocodile River ecosystem should a flooding event cause overflow of the dam. This will cause indigenous fish species to be displaced;
- Habitat modification by construction activities will force wetland-dependant fauna out of the area and animal numbers will decrease. This impact could also take place because of hunting and snaring of animals in and around the wetlands.
- Loss of threatened, “near-threatened” and conservation important taxa: The anticipated loss of the areas adjacent to the wetlands will ultimately also result in the local displacement of some fauna species that occur in the wetlands.
- Changes in the community structure: It is expected that the faunal species composition will shift, due to an anticipated loss in habitat surface area. In addition, it is predicted that more generalist species (and a loss of functional guilds) will dominate the study area. Attempts to rehabilitate will attract taxa with unspecialised and generalist life-histories. It is predicted that such taxa will persist for many years before conditions become suitable for succession to progress.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Definite (5)	High (65)

2.1.13. LOSS OF INSTREAM HABITAT DUE TO CHANGES IN CHANNEL STRUCTURE AND CONDITION

The construction of a dam and weirs will cause some potential damage to the structure of banks or river beds, and therefore the channel in which the water flows. The physical channel structure forms the template for instream habitat, and is essential for maintaining habitat quality. Any changes in channel condition and structure would have a cumulative effect, and if sufficiently extreme, may result in a shift in population structure and possibly biotic diversity at the site.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Definite (5)	High (65)

2.1.14. DEWATERING OF WETLANDS

The alteration of a river's flow and sediment transport downstream of a dam often causes the greatest sustained environmental impacts. Life in and around a river evolves and is conditioned on the timing and quantities of river flow. Disrupted and altered water flows can be as severe as completely de-watering river reaches and the life they contain. Yet even subtle changes in the quantity and timing of water flows impact aquatic and riparian life, which can unravel the ecological web of a river system.

Scale	Duration	Magnitude	Probability	Significance WM

Site (2)	Long term (4)	Medium (6)	Highly probable (4)	Moderate (48)
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2.1.15. CHANGING THE FLOW REGIME OF THE WATERCOURSE

Development within water resources e.g. infrastructure footprint within the wetland area or riparian area, thereby diverting or impeding flow.

Lack of adequate rehabilitation resulting in colonization by invasive plants.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

2.1.16. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).

Earthwork activities.

Clearing of surface vegetation will expose the soils, which in rainy events would wash down into wetlands, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.

Disturbance of soil surface.

Disturbance of slopes through creation of roads and tracks.

Changes in runoff characteristics.

Erosion (e.g. gully formation, bank collapse).

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Medium (6)	Highly probable (4)	Moderate (52)

2.1.17. ALTERATION OF WATER QUALITY – INCREASING THE AMOUNTS OF NUTRIENTS (PHOSPHATE, NITRITE, NITRATE).

Disposal or discharge of human (including partially treated and untreated) sewage during the construction phase of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Improbable (1)	Negligible (11)

2.1.18. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS).

Runoff from road surfaces.

Discharge of pollutants from chemical storage areas and accidental spillages.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Improbable (1)	Negligible (11)

2.1.19. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).

Deposition of wind-blown sand.

Loss of fringing vegetation and erosion.

Alteration in natural fire regimes.

Alteration of flow

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Probable (2)	Low (22)

2.1.20. LOSS OF AQUATIC BIOTA

Loss of instream habitat

Deposition of wind-blown sand.

Loss of fringing vegetation and erosion.

Alteration in natural fire regimes and subsequent loss of non-marginal and marginal vegetation.

Increase in invasive species due to disturbance.

Change in water quality

Changes in flow

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

2.1.21. LOSS OF FAUNA BIODIVERSITY

Negative impact on fauna species on site as a result of poaching.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Probable (2)	Low (22)

2.1.22. VISUAL IMPACT

Visual Impact to surrounding areas as a result of construction.

This rating is higher for the activity as the dam occupies a larger area, therefore a larger area will be affected.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Medium (6)	Probable (2)	Low (26)

2.1.23. NOISE

Potential noise impact associated with the noise generated during the construction phase.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Highly probable (4)	Low (28)

2.1.24. TRAFFIC

Traffic impact will be low to negligible as construction plant and vehicles will not be travelling on public roads, apart from delivering and collecting the plant, equipment and materials before and after construction which is not expected to significantly affect traffic flow.

The location of the site is also very isolated and is not located near to any town and therefore little impact will occur on traffic in the area.

This rating is higher for the activity as the dam as there will be more material required for the construction of the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Probable (2)	Low (24)

2.1.25. SAFETY AND SECURITY

Construction personnel on site may contribute to an increase in crime in the area.

The influx of construction personnel during the construction period might have an impact on the general safety in the areas, however due to the extent of the planned project it is not anticipated that there will be a significant impact, as the amount of construction personnel will be minimal.

Open trenches or excavations might have an impact on safety during the construction phase.

The impact rating is higher for the alternative as there will be more construction staff on the site for the construction of the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Probable (2)	Low (24)

2.1.26. SOCIO-ECONOMIC

Temporary employment opportunities will be created during the construction phase of the project which will have a positive socio-economic impact.

The impact rating for the alternative activity is higher than the preferred activity as the construction of the dam would require more labour, equipment and services and would have a more positive impact for the local communities during the construction phase.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Medium term (3)	Medium (6)	Highly probable (4)	Moderate (48)

2.2. Indirect Impacts: None

2.3. Cumulative Impacts: 1

2.3.1. SURFACE AND GROUND WATER POLLUTION

Surface water and ground water may become contaminated as a result of sediment laden storm water entering into water resources, or as a result of any chemicals, especially oils entering into these water systems as a result of negligence and lack of planning.

This can compound the problem of water pollution in the region.

This impact is rated higher for the alternative activity due to the larger scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Medium (6)	Probable (2)	Low (26)

3. Operational Phase:

3.1. Direct Impacts: 11

3.1.1. VISUAL IMPACT

The weirs will improve the aesthetic appeal of the farm as water features are appealing.

Due to the larger scale of the alternative activity, the impact rating is higher.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Highly probable (4)	Moderate (48) (Positive)

3.1.2. LOCAL ECONOMIC DEVELOPMENT

The weirs will provide the small herd of cattle on the farm with water, thus aiding in improving local economic development.

This impact rating is the same as the alternative as both activities will provide water for the cattle.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Low (2)	Highly probable (4)	Low (32) (Positive)

3.1.3. CHANGES IN GROUND WATER LEVELS

Through damming of water, local water budgets may be affected to the effect of changing groundwater levels, changing groundwater quality due to prolonged exposure of water to possible surficial contamination and other related groundwater; surface water interactions. For this purpose, the proposed dam and weirs require baseline groundwater parameters to ensure that the development is not to the detriment of the groundwater regime, both on site and off site.

The construction of a single dam and the weirs in the surface drainage is not expected to pose any significant impact on the groundwater regime and the development is supported by the preliminary findings from the Hydrogeological report.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3.1.4. CHANGES IN GROUND WATER QUALITY

Ground water may become contaminated as a result of anthropogenic activities.

The impact rating is the same for both the preferred and alternative activities as there will be no difference in anthropogenic activities during the operational phases.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3.1.5. CHANGES IN SURFACE WATER QUANTITY

Surface water from the tributaries of the Crocodile River might be affected by the dam and the weirs.

This impact is rated higher for the alternative due to the larger volume of water required for the dam.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Low (2)	Probable (2)	Negligible (18)

3.1.6. SPREAD AND ESTABLISHMENT OF ALIEN INVASIVE SPECIES

This is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact of virtually impact on every aspect of the surrounding ecosystem. Vehicles often transport many seeds and some may be of invader species, which may become established along the road, especially where the area is disturbed. Habitat disturbance also provides the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance.

Continued movement of people and vehicles on and off the property, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project.

This impact is rated higher than the preferred activity due to the larger area which will be affected.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Probable (2)	Low (22)

3.1.7. CHANGING THE FLOW REGIME OF THE WATERCOURSE

Vehicles driving in/through watercourses for maintenance purposes and damaging vegetated areas as a result.

The impact rating is higher for the alternative due to the larger scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Probable (2)	Low (22)

3.1.8. CHANGING THE AMOUNT OF SEDIMENT ENTERING WATER RESOURCE AND ASSOCIATED CHANGE IN TURBIDITY (INCREASING OR DECREASING THE AMOUNT).

Vehicles impacting on surface vegetation during maintenance activities.

This impact rating is higher for the alternative due to the nature of activity.

Scale	Duration	Magnitude	Probability	Significance WM
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Site (2)	Long term (4)	Medium (6)	Improbable (1)	Negligible (12)
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3.1.9. ALTERATION OF WATER QUALITY – TOXIC CONTAMINANTS (INCLUDING TOXIC METAL IONS (E.G. COPPER, LEAD, ZINC) AND HYDROCARBONS.

Runoff from road surfaces. Contaminated water or discharge of chemicals from improperly stored hazardous chemical substances or accidental spillages.

This impact rating is the same for both the preferred and alternative activities as there will be no variance in the activities associated with this risk between the two.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Medium (6)	Improbable (1)	(Negligible (11))

3.1.10. CHANGING THE PHYSICAL STRUCTURE WITHIN A WATER RESOURCE (HABITAT).

Maintenance activities may result in the following:

- Loss of vegetation;
- Loss of hydrological flow classes;
- Loss of biodiversity.

This impact rating is higher for the alternative activity due to the larger scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Regional (3)	Long term (4)	Medium (6)	Probable (2)	Low (26)

3.1.11. LOSS OF AQUATIC BIOTA

- Loss of in-stream habitat.
- Loss of flow.

This impact rating is higher for the alternative due to the larger scale of the development.

This impact rating is higher for the alternative activity due to the larger scale of the development.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Long term (4)	Medium (6)	Probable (2)	Low (24)

3.2. Indirect Impacts: 1

3.2.1. IMPACT ON HUMAN HEALTH THROUGH WATER CONSUMPTION

This impact rating is the same for both the preferred activity and the alternative.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Medium term (3)	Low (2)	Probable (2)	Negligible (14)

3.3. Cumulative Impacts: None.

4. Decommissioning Phase

It is not foreseen that the weirs and dam will be decommissioned and as such this phase is not applicable to the development lifecycle for the preferred activity.

Alternative C

NA

No-go alternative (compulsory)

1. Direct Impacts: 2

1.1. CONTINUED DEGRADATION OF THE WATER COURSE ON THE SITE.

The wetland specialist identified that the drainage channel banks show signs of erosion in certain areas along its banks and that these areas need to be rehabilitated as part of the development priorities.

Most of the ecosystem of the water course is degraded from an EIS (Ecological Importance and Sensitivity) point of view due to the road crossing and the wetland area, canalisation and the small construction in the water course.

Should the development not go ahead this ecosystem will not be returned to its original state.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Improbable (1)	Negligible (13)

1.2. CONTINUED DEGRADATION OF THE VALLEY BOTTOM WETLANDS ON THE SITE.

The impact of road crossings and small dams upstream had a significant influence on the PES (Present Ecological State) of the 2 valley bottom wetlands on the site which are classified as "Moderately Modified". Exotic weeds and terrestrial plant species have invaded these wetland as a result of dewatering and sedimentation imbalances caused by the flow disruptions upstream.

The degradation (erosion, sedimentation and weed invasion) will continue should the preferred activity not go ahead.

Scale	Duration	Magnitude	Probability	Significance WM
Site (2)	Permanent (5)	Medium (6)	Improbable (1)	Negligible (13)

2. Indirect Impacts: None.

3. Cumulative Impacts: None.

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

√

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).

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.

Taking into account the impacts associated with the proposed activity, the impact ratings and the mitigation measures stipulated in this report, as well as the Environmental Management Program, the Environmental Assessment Practitioner is of the opinion that the proposed activity will not have a detrimental impact on the environment. As a result it is recommended that the proposed development should be authorised provided that the activities take place in an environmentally sensitive manner along with implementation of the mitigation measures provided.

The following mitigation measures and recommendations must be implemented and adhered to during the different phases of the proposed project:

- A search and rescue of protected plant species must be undertaken and the plants must be relocated where possible.
- Construction must take place in the dry season if possible.
- Streamflow must be maintained during the construction phase and the operational phase.
- The site specific mitigation measures included in the attached Environmental Management Programme must be implemented and adhered to.
- Compliance with the Environmental Management Programme, as well as the Environmental Authorisation must be monitored and audited by an independent Environmental Control Officer on a regular basis and monthly ECO Audit Reports must be submitted on behalf of the applicant to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).
- Regular internal site inspections shall be conducted in order to ensure that mitigation measures are implemented. A checklist must be compiled and completed no less than once per week.
- Should any significant incidents occur the relevant local authority will be informed immediately and the incident will be managed accordingly.
- It is recommended that a site inspection be conducted once construction and rehabilitation have been completed and a close out report must be compiled in order to verify whether the necessary disturbed areas have been satisfactorily rehabilitated.
- A conservation buffer zone of at least 50 meters from the heritage sites identified in the Archaeological Impact Assessment must be established and maintained for the duration of the construction period. No activities including the storage of materials and movement of vehicles or plant will be allowed within the buffer zone.
- The eradication of the alien invasive species especially along the aquatic ecosystem should be set as an objective.
- A monitoring system should be implemented for the weirs after construction.
- Monitoring should be undertaken in line with the WUL requirements.

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- Weeds and invader plants must be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines.

Is an EMPr attached?

YES

✓

The EMPr must be attached as Appendix G.

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

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

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

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information