

**Phase 1 Archaeological Impact Assessment for the
proposed development of a Dinosaur Interpretation
Centre within Golden Gate Highlands National Park, FS
Province.**



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Executive Summary

At the request of Enviroworks Environmental Consultants a Phase 1 Archaeological Impact Assessment was carried out for a proposed new Dinosaur Interpretation Centre next to the Glen Reenen Camping Site situated within the Golden Gate Highlands National Park, Free State Province. The site is made up of high-relief terrain covered by grass-covered valley sediments and scree deposits (colluvium), intersected by the Little Caledon River to the north. A foot survey of the riverbank and adjacent slopes revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area. The project design concept is intended to blend in with the landscape of the surrounding environment and the uniqueness of the GGHNP Area. Thus, the cultural landscape should not be negatively affected by the proposed development. The proposed site is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C). The age of the planted trees currently located within the proposed impact zone allocated for parking could not be established during the assessment. It is advised that, as a prerequisite, specialist input is obtained from a botanist in order to ascertain the age of the trees located within the proposed impact zone.

Table of Contents

Executive Summary.....	2
Introduction.....	3
Methodology	4
Description of the Affected Area	4
Locality data.....	4
Archaeological Background.....	5
Field Assessment.....	6
Impact Statement and Recommendation	6
References.....	7
Tables and Figures.....	8
Appendices.....	18

Introduction

At the request of Enviroworks Environmental Consultants a Phase 1 Archaeological Impact Assessment was carried out for a proposed new Dinosaur Interpretation Centre next to the Glen Reenen Camp Site situated within the Golden Gate Highlands National Park (GGHNP), Free State Province (**Fig. 1**). Infrastructure, associated with the proposed facility will include inter alia, exhibition spaces, offices, storerooms, public bathrooms and an outdoor terrace that will altogether cover an area of around 2.7 ha (**Fig. 2**). Archaeological sites over 100 years old, graves older than 60 years, and structures older than 60 years are protected in terms of the National Heritage Resources Act (NHRA), no 25 of 1999. The study is required in terms of Section 38 of the National Heritage Resources Act 25 of 1999 as a prerequisite for any development that will change the character of a site exceeding 5 000 m² in extent or linear development exceeding a distance of 300 m in length (**Appendix 1**).

The task involved identification and assessment of possible archaeological heritage within the proposed project area, In accordance with section 9(8) and appendix 6 (“Specialist reports”) of the NEMA EIA Regulations, 2014 (**Appendix 2**), the specialist report also takes into account the following terms of reference:

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

Methodology

The archaeological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological information, aerial photographs and site records were consulted and integrated with data acquired during the on-site inspection. The study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**) and a probability of impact methodology as prescribed by Enviroworks Environmental Consultants (**Appendix 3**).

Description of the Affected Area

Locality data

1 : 50 000 scale topographic map: 2828DA Golden Gate

The study area is located alongside the Glen Reenen camp terrain and next to the R712 road between Clarens and Phudhaditjhaba (**Fig. 3**). The terrain is located on the farm Glen Reenen 1361 which was registered in 1960. The site is made up of high-relief terrain covered by grass-covered valley sediments and scree deposits (colluvium), bounded by the Little Caledon River to the north (**Fig. 4 - 6**).

General site coordinates :

A) 28°30'22.45"S 28°37'8.65"E

B) 28°30'24.04"S 28°37'5.68"E

C) 28°30'30.09"S 28°37'14.57"E

D) 28°30'27.50"S 28°37'15.69"E

Archaeological Background

The archaeological footprint in the area are primarily represented by Stone Age archaeological localities, rock art sites and an extensive footprint related to the distribution of Iron Age settlements and early history of Sotho-speaking communities in the Caledon Valley. A transitional Middle/Later Stone Age buried sequence on the farm Sunnyside 1425, located about eight kilo-meters southeast of Clarens, yielded a date of around 30 ka obtained by optically stimulated luminescence. Alluvial and swamp deposits from several sites in the region have previously also provided evidence about the Late Quaternary history of the region.

Rock art sites recorded in the region include the farms Beginsel, Bethal, Clarens Townlands, De Molen, Groendraai, Il Paradiso Schaapplaats, Wodehouse, Gladstone and Wilgenhof (farm numbers withheld). Another locality is situated about 2 km east of the proposed development footprint, next to the R712 on route to Phudhaditjhaba.

A number of Iron Age settlements, which resemble Maggs's Type V settlement pattern in many aspects of their material culture, are found in the Caledon Valley. They appear to date from the seventeenth century. According to historical accounts, the southward migration of early Sotho-speaking communities led to at least one group reaching the Caledon Valley about the mid-seventeenth century and occupying most of the upper and middle parts of the valley by 1800 AD. A major event to take place among the indigenous tribes of the interior highveld of South Africa before the coming of European settlers was the Difaqane raids and wars of the 1820's. Precipitated by the rise of Shaka's Zulu empire among the coastal Nguni-speaking peoples, it resulted in the creation of large-scale refugee communities that were continued and extended over the whole interior by resident Southern Sotho-speaking peoples who could not resist the advanced military and political system of the Nguni invaders, but rather led to the segmentation of the Southern Sotho into numerous antagonistic communities scattered along the Caledon River Valley. The invading BaTlokwa occupied and ruled the Golden Gate region during the 1830's after their chief Sekonyela established his first permanent capital (Marabeng) in the Ficksburg

district. Golden Gate also formed part of the Voortrekker route and after the British proclamation of the Orange River Sovereignty in 1848 it was occupied by the Basotho under Moshesh until 1866. Anglo Boer War activities in the region include maneuvers by retreating Boers at Rooibraai (site of well-known palaeontological locality) near the Glen Reenen camp terrain. Golden Gate was eventually proclaimed as a national park in 1963.

Field Assessment

A foot survey of the riverbank and adjacent slopes revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area.

Impact Statement and Recommendation

Significance of impacts is summarized in **Table 2**. In accordance with the types and ranges of heritage resources as outlined in Part 2, Sections 34, 35 and 37 of the National Heritage Resources Act (No 25 of 1999), there is no above-ground evidence of residential building structures or material of cultural significance, rock art, graves or intact archaeological sites within the demarcated area.

The project design concept is intended to blend in with the landscape of the surrounding environment and the uniqueness of the GGHNP Area. Thus, the cultural landscape should not be negatively affected by the proposed development (**Fig. 7**).

It is unlikely that the proposed development will result in any significant archaeological impact at the site. The proposed site is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C). A grove is indicated on the survey diagram of the area when it was previously registered as Melsetter 327 in 1917 (**Fig. 8**). Trees associated with historical settlements or farmsteads, that are older than 60 years old, are generally protected as heritage sites with cultural significance. Their removal or destruction will require the appropriate consent and a destruction permit from SAHRA. While many of the planted trees currently located within the proposed impact zone allocated for parking (current camping terrain) appear to be younger than 60 years old, the age of several specimens may well be older. It is advised that, as a prerequisite, specialist input is

obtained from a botanist in order to ascertain the age of the trees located within the proposed impact zone.

References

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Tables and Figures

Table 1. Field rating categories as prescribed by SAHRA.

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

Table 2. Summary of potential Archaeological Impact at the site before and after the Phase 1 Impact Assessment (see Appendix 3).

	Duration	Extent	Irreplaceability	Reversibility	Negative Impact	Positive Impact	Probability	Cumulative	Significance Points	Significance Rating
Potential before AIA Assessment										
Trees at camp site	5	1	5	5	8	2	5	L	130	H
Parking area	5	1	4	5	8	8	3	L	93	M
Arrival and Orientation area	5	1	4	5	8	8	3	L	93	M
Interpretation Centre	5	1	4	5	8	8	3	L	93	M
Path back to picnic and nature trails	5	1	4	5	8	8	3	L	93	M
Path to find site	5	1	4	5	8	8	3	L	93	M
Potential after AIA Assessment										
Trees at camp site	5	1	5	5	6	2	3	L	72	M
Parking area	5	1	1	5	2	0	1	L	14	L
Arrival and Orientation area	5	1	1	5	2	0	1	L	14	L
Interpretation Centre	5	1	1	5	2	0	1	L	14	L
Path back to picnic and nature trails	5	1	1	5	2	0	1	L	14	L
Path to find site	5	1	1	5	2	0	1	L	14	L

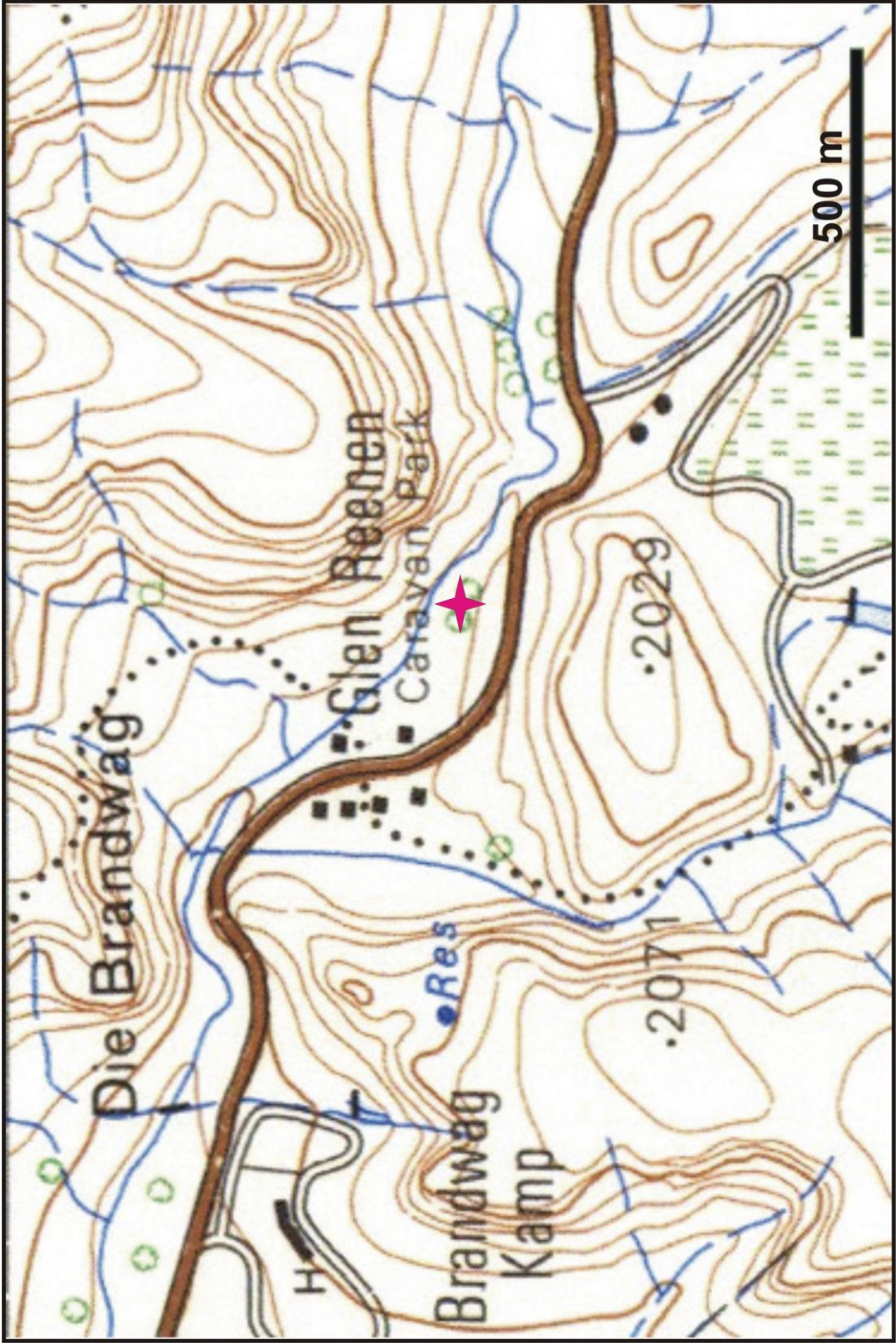


Figure 1. Site of the proposed Dinosaur Interpretation Center (portion of 1:50 000 scale topographic map 2828DA Golden Gate)



Figure 2. Layout of the proposed development.



Figure 3. Aerial view of the study area.



Figure 4. The study area, looking west towards the Glen Reenen camp site in the background.



Figure 5. The study area, looking east.

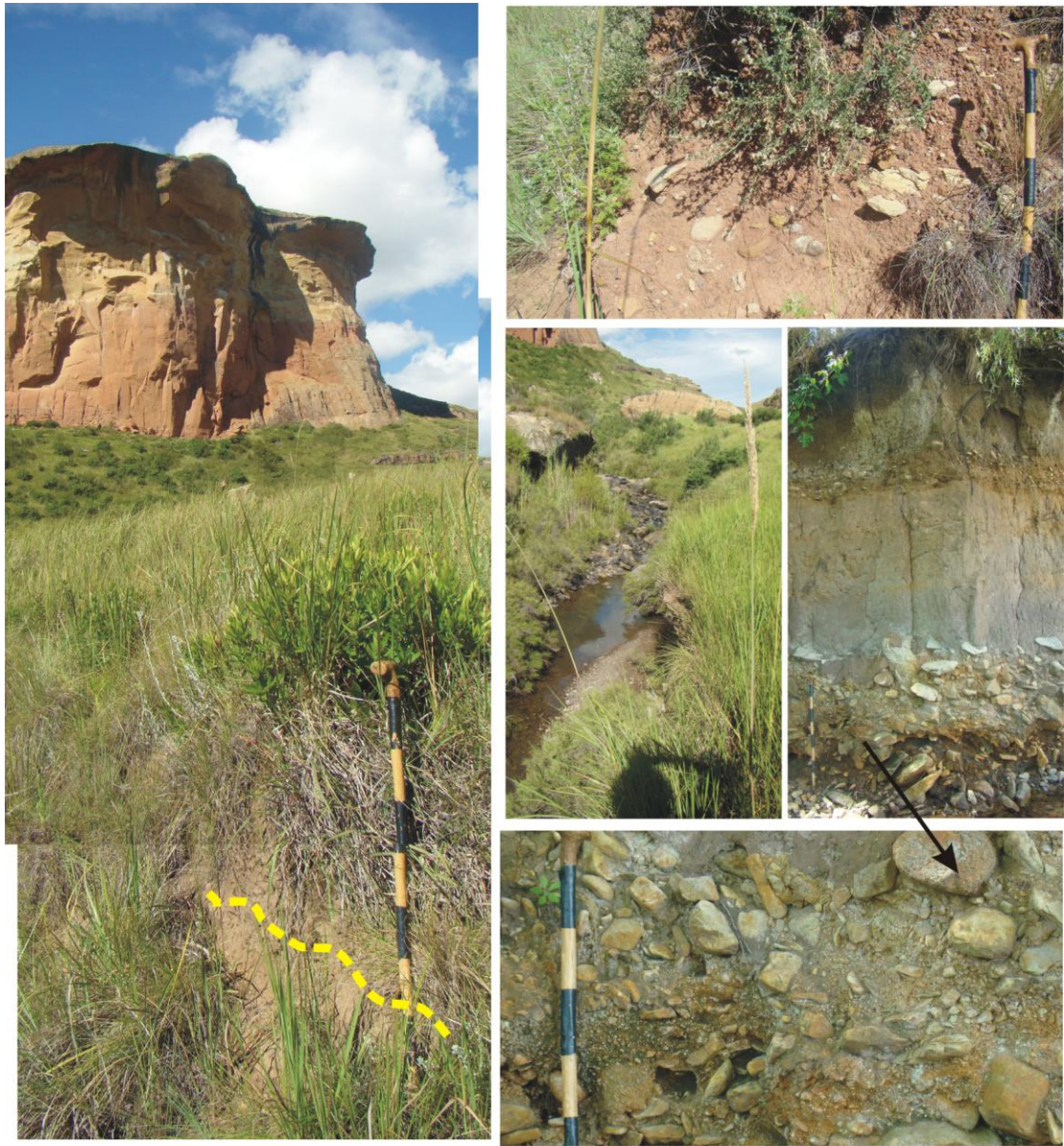


Figure 6. The site is underlain by grass-covered colluvium (left & top) and alluvial sediments derived from the adjoining river (middle & bottom right)..



Figure 7. A 3D - representation of the proposed design. The project design concept is intended to blend in with the landscape of the surrounding environment and the uniqueness of the GGHNP Area.



Figure 8. Portion of land survey diagram of the farm conducted in 1917 (trees highlighted in green).

Appendices

Appendix 1

Heritage resources management

- 38.** (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—
- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - (b) the construction of a bridge or similar structure exceeding 50 m in length;
 - (c) any development or other activity which will change the character of a site—
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,
- must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.
- (2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)—
- (a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or
 - (b) notify the person concerned that this section does not apply.
- (3) The responsible heritage resources authority must specify the information to be

provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

(4) The report must be considered timeously by the responsible heritage resources authority which must, after consultation with the person proposing the development, decide—

(a) whether or not the development may proceed;

(b) any limitations or conditions to be applied to the development;

(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;

(d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and

(e) whether the appointment of specialists is required as a condition of approval of the proposal.

(5) A provincial heritage resources authority shall not make any decision under

subsection (4) with respect to any development which impacts on a heritage resource

protected at national level unless it has consulted SAHRA.

(6) The applicant may appeal against the decision of the provincial heritage resources

authority to the MEC, who—

(a) must consider the views of both parties; and

(b) may at his or her discretion—

(i) appoint a committee to undertake an independent review of the impact assessment report and the decision of the responsible heritage authority;

and

(ii) consult SAHRA; and

(c) must uphold, amend or overturn such decision.

(7) The provisions of this section do not apply to a development described in

subsection (1) affecting any heritage resource formally protected by SAHRA unless the

authority concerned decides otherwise.

(8) The provisions of this section do not apply to a development as described in

subsection (1) if an evaluation of the impact of such development on heritage resources

is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989),

or the integrated environmental management guidelines issued by the Department of

Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or

any other legislation: Provided that the consenting authority must ensure that the

evaluation fulfils the requirements of the relevant heritage resources authority in terms

of subsection (3), and any comments and recommendations of the relevant heritage

resources authority with regard to such development have been taken into account prior

to the granting of the consent.

(9) The provincial heritage resources authority, with the approval of the MEC, may,

by notice in the *Provincial Gazette*, exempt from the requirements of this section any

place specified in the notice.

(10) Any person who has complied with the decision of a provincial heritage

resources authority in subsection (4) or of the MEC in terms of subsection (6) or other

requirements referred to in subsection (8), must be exempted from compliance with all other protections in terms of this Part, but any existing heritage agreements made in terms of section 42 must continue to apply.

Appendix 6

Specialist reports

1. (1) A specialist report prepared in terms of these Regulations must contain—
 - (a) details of—
 - (i) the specialist who prepared the report; and
 - (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
 - (b) a declaration that the specialist is independent in a form as may be specified by the competent authority;
 - (c) an indication of the scope of, and the purpose for which, the report was prepared;
 - (d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;
 - (e) a description of the methodology adopted in preparing the report or carrying out the specialised process;
 - (f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;
 - (g) an identification of any areas to be avoided, including buffers;
 - (h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
 - (i) a description of any assumptions made and any uncertainties or gaps in knowledge;
 - (j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;
 - (k) any mitigation measures for inclusion in the EMPr;
 - (l) any conditions for inclusion in the environmental authorisation;
 - (m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
 - (n) a reasoned opinion—
 - (i) as to whether the proposed activity or portions thereof should be authorised; and

- (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
- (o) a description of any consultation process that was undertaken during the course of preparing the specialist report;
- (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- (q) any other information requested by the competent authority.

Appendix 3. Enviroworks Probability of Impact Assessment Methodology

For each potential impact, the **DURATION** (time scale), **EXTENT** (spatial scale), **IRREPLACEABLE** loss of resources, **REVERSIBILITY** of the potential impacts, **MAGNITUDE** of negative or positive impacts, and the **PROBABILITY** of occurrence of potential impacts must be assessed. The assessment of the above criteria will be used to determine the **SIGNIFICANCE** of each impact, with and without the implementation of the proposed mitigation measures. The scales to be used to assess these variables and to define the rating categories are tabulated in **Table 1** and **Table 2** below.

Table 1: Evaluation components, ranking scales and descriptions (criteria).

Evaluation component	Ranking scale and description (criteria)
DURATION	<p>5 - Permanent</p> <p>4 - Long term: Impact ceases after operational phase/life of the activity (> 20 years).</p> <p>3 - Medium term: Impact might occur during the operational phase/life of the activity (5 to 20 years).</p> <p>2 - Short term: Impact might occur during the construction phase (< 5 years).</p> <p>1 - Immediate</p>
EXTENT (or spatial scale/influence of impact)	<p>5 - International: Beyond National boundaries.</p> <p>4 - National: Beyond Provincial boundaries and within National boundaries.</p> <p>3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p>2 - Local: Within 5 km of the proposed development.</p> <p>1 - Site-specific: On site or within 100 m of the site boundary.</p> <p>0 - None</p>
IRREPLACEABLE loss of resources	<p>5 – Definite loss of irreplaceable resources.</p> <p>4 – High potential for loss of irreplaceable resources.</p> <p>3 – Moderate potential for loss of irreplaceable resources.</p> <p>2 – Low potential for loss of irreplaceable resources.</p> <p>1 – Very low potential for loss of irreplaceable resources.</p> <p>0 - None</p>
REVERSIBILITY of impact	<p>5 – Impact cannot be reversed.</p> <p>4 – Low potential that impact might be reversed.</p> <p>3 – Moderate potential that impact might be reversed.</p> <p>2 – High potential that impact might be reversed.</p> <p>1 – Impact will be reversible.</p> <p>0 – No impact.</p>
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	<p>10 - Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p>8 - High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p>6 - Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p>4 - Low: Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p>2 - Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p>0 - Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
MAGNITUDE of POSITIVE	<p>10 - Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p>8 - High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p>

IMPACT (at the indicated spatial scale)	<p>6 - Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p>4 - Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p>2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p>0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
PROBABILITY (of occurrence)	<p>5 - Definite: >95% chance of the potential impact occurring.</p> <p>4 - High probability: 75% - 95% chance of the potential impact occurring.</p> <p>3 - Medium probability: 25% - 75% chance of the potential impact occurring.</p> <p>2 - Low probability: 5% - 25% chance of the potential impact occurring.</p> <p>1 - Improbable: <5% chance of the potential impact occurring.</p>

Evaluation component	Ranking scale and description (criteria)
CUMULATIVE impacts	<p>High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Low: The activity is localised and might have a negligible cumulative impact.</p> <p>None: No cumulative impact on the environment.</p>

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed (or calculated) using the following formula:

$$\text{SP (significance points)} = (\text{duration} + \text{extent} + \text{irreplaceable} + \text{reversibility} + \text{magnitude}) \times \text{probability}$$

The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per **Table 2** below.

Table 2: Definition of significance ratings (positive and negative)

Significance Points	Environmental Significance	Description
100 – 150	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
40 – 99	Moderate (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

