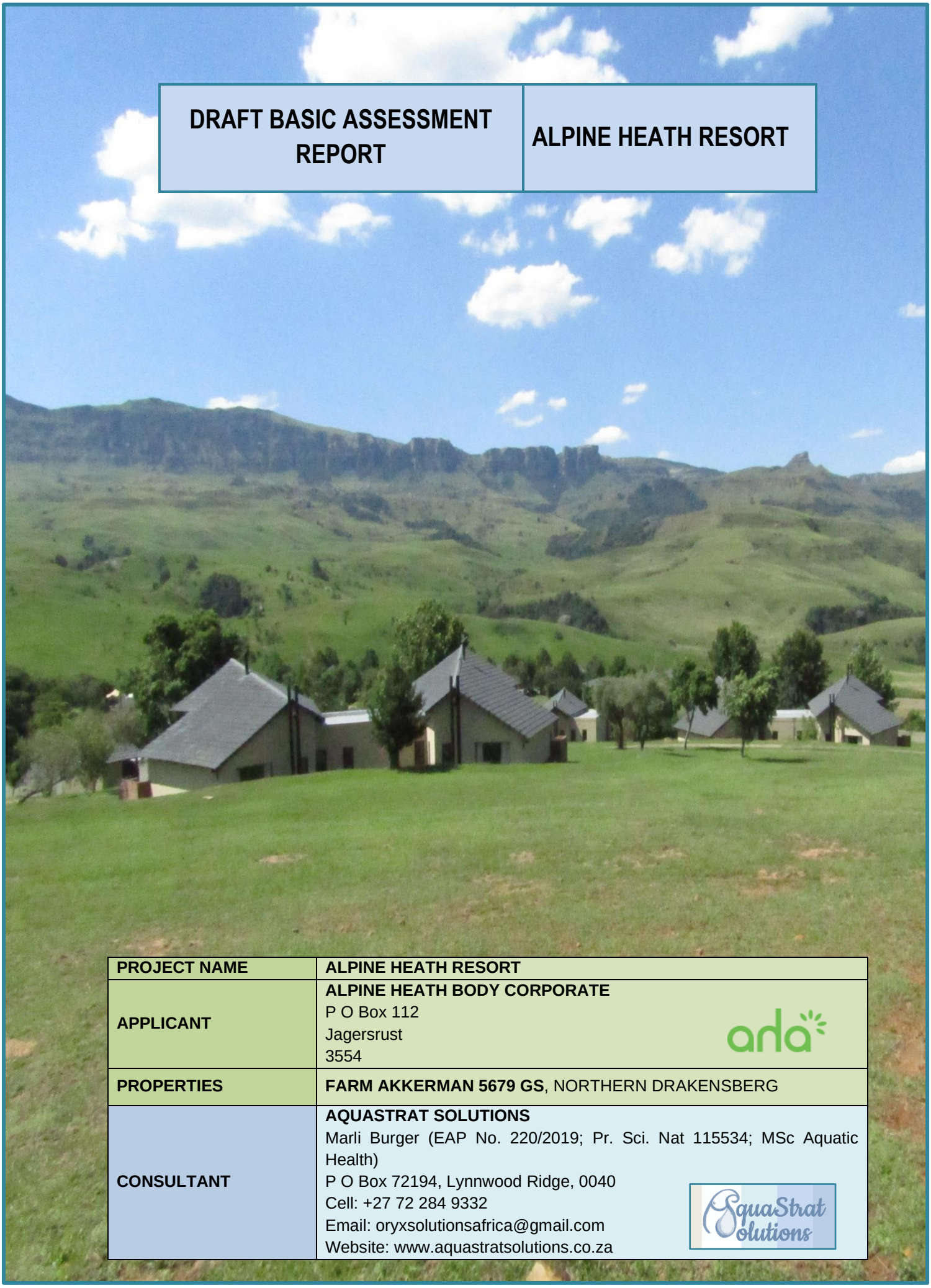
DRAFT BASIC ASSESSMENT REPORT

ALPINE HEATH RESORT



PROJECT NAME	**ALPINE HEATH RESORT**
APPLICANT	**ALPINE HEATH BODY CORPORATE** P O Box 112 Jagersrust 3554
PROPERTIES	**FARM AKKERMAN 5679 GS**, NORTHERN DRAKENSBERG
CONSULTANT	**AQUASTRAT SOLUTIONS** Marli Burger (EAP No. 220/2019; Pr. Sci. Nat 115534; MSc Aquatic Health) P O Box 72194, Lynnwood Ridge, 0040 Cell: +27 72 284 9332 Email: oryxsolutionsafrica@gmail.com Website: www.aquastratsolutions.co.za

Executive summary

Alpine Heath Body Corporate proposes the **installation of gabion structures** along an eroded section of a drainage line on the north-eastern side of the existing resort footprint.

The farm is 306.89 ha of which approximately 35 ha consists of the resort footprint. The construction of the resort was completed in December 1996 and the majority of the existing infrastructure precedes the Environmental Conservation Act, Act 73 of 1989, as the commencement date of the ECA Regulations is 8 September 1997. The upgrading of the sewer system to include oxidation ponds was exempted by the Department of Agriculture and Environmental Affairs (DAEA) in 2002. The EMP by Eco Scapes, submitted in 1999 to the DAEA, and revised December 2001 by Real Landscapes KZN (as part of the Conditions of Establishment in terms of the Town Planning Ordinance No 27 of 1949) is updated for this process to include:

(a) Erosion control gabion installations
(b) Current impacts on the environment that can be managed

Specialist assessments were conducted for the following aspects:

- Wetlands
- Rivers (aquatic)
- Hydrology
- Flood line
- Heritage including Archaeology and Palaeontology
- Terrestrial Faunal Biodiversity
- Terrestrial Vegetation Biodiversity

The proposed activities do not pose a serious risk to the environment and expected impacts of the installation phase can be mitigated. The updated EMP includes recommended mitigation and monitoring measures and frequency for all current impacts, as well as expected impacts of the proposed erosion control activity on the site. The mitigation and monitoring measures is included in an Environmental Management Program that will form part of day-to-day management activities of the resort.

Contents

Figures

Tables

Appendices

1. Introduction

1.1 Background

Alpine Heath Body Corporate proposes the installation of erosion control gabion structures along an eroded section of a drainage line situated within the existing footprint of the Alpine Heath Resort, on the Farm Akkerman 5679 GS, Northern Drakensberg, KZN. The study site is located south of the Sterkfontein Dam Nature Reserve and northwest of Bergville Town on the Old Cavernberg Road, KZN Province.

1.2 Process and Objectives of the Environmental Study

1.2.1 Process

A pre-application site meeting was held with the KZN EDTEA Compliance and Enforcement unit on 21 January 2021 to establish whether a rectification or S24G NEMA process is required. The presentation of information, including a letter of exemption by the Department of Agriculture and Environmental Affairs (signed 28 June 2002, discovered and provided to AquaStrat Solutions on 12 March 2021) was presented to the KZN Economic Development, Tourism and Environmental Affairs (EDTEA) on 1 April 2021. The KZN EDTEA decided that a **Section 24G application is not required** for the current structures and activities of Alpine Heath Resort.

A second pre-application site meeting was held with the KZN EDTEA Environmental Applications unit on 16 April 2021. It was confirmed that an Environmental Application in terms of Section 24 of the National Environmental Management Act, Act 107 of 1998 and Regulation 19, Basic Assessment, of GN 982 of 2014 (as amended in 2017), must be done.

A public participation process was followed to inform Interested and/or Affected parties (I&APs) about the proposed development and to gather issues and concerns to be investigated during the BA process. This process will be discussed further in section 5.

This draft Basic Assessment Report will be made available to registered I & Aps and State Departments for comment towards the end of April. All issues and concerns will be addressed and included in the Final Basic Assessment Report. The application form was submitted to EDTEA on 5 August 2021 and a reference number will be obtained.

1.2.2 Objectives

The following objectives of the Basic Assessment Process is set as per Appendix 1 of the EIA Regulations, GN 982 of 2014:

To set out environmental outcomes, impacts and residual risks of the proposed activity

The objective of the basic assessment process is to, through a consultative process:

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine-
    i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    ii. the degree to which these impacts-

  (aa) can be reversed;

  (bb) may cause irreplaceable loss of resources; and

  (cc) can be avoided, managed or mitigated;
- through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-
    i. identify and motivate a preferred site, activity and technology alternative;
    ii. identify suitable measures to avoid, manage or mitigate identified impacts; and
    iii. identify residual risks that need to be managed and monitored.

1.3 Approach

This report has been compiled in accordance with the requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment Regulations (EIA) December 2014, as amended in 2017. Subsequent to the appointment of the independent Environmental Assessment Practitioner (EAP), a literature research and information collection process were undertaken to understand the Status Quo of the site. The data collection and consolidation process included site inspections and engagement of specialists, as well as consultation with the regulatory authorities.

This BAR adheres to the requirements contained in Appendix 1 of GNR 982, as noted in Table 1.3-1, which provides the BAR structure. The supporting documents that are mentioned from each of the report sections follow that specific section number. The specific appendices stipulated in the regulations are referenced as Appendix A, B, etc.

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BA Report
Appendix 1, Section 3 (a)	Details of – 1. The EAP who prepared the report; and the expertise of the EAP; and (i) The expertise of the EAP, including a curriculum vitae.	Section 2 & Appendix F
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 3
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3 and Appendix A
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 4
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 5
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including- (i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by Interested and Affected Parties, and an indication of the manner	Section 7 Section 9 and Appendix E Section 9

Appendix 1, Section 3 (h)	in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and; A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 10 Section 13 Section 12.2 Section 13 Section 14 Section 13 Section 7
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 12 &13
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, (i) Impacts; (ii) The including- Cumulative nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources;	Section 13

	The degree to which the impact and risk can be avoided, managed or mitigated.	
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 10 and Section 14
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 16 Appendix B & C
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 14 and Appendix H
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 14
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 15
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 16
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	N/A
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to:- (i) The correctness of the information provided in the report; The inclusion of the comments and inputs from stakeholders and interested and affected parties; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Appendix G

Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	N/A
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	N/A
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	N/A

The Environmental Management Programme (EMPr) has been compiled according to Appendix 4 of the GNR 982 of the EIA Regulations, 2014 (as amended in 2017) and is attached as Appendix H.

2. EAP details

ENVIRONMENTAL CONSULTANTS – AquaStrat Solutions

Marli Burger: MSc Aquatic Health; EAPASA No. 2019/220; Pr. Sci. Nat. No.115534

Expertise of the EAP

Marli Burger is a SACNASP registered Professional Natural Scientist (Nature Conservation) and EAPASA registered Environmental Consultant with 14 years of experience in environmental legal compliance. She has a Master's degree in Science (Aquatic Health) from the University of Johannesburg and specialises Environmental Project Management. She has been involved in a variety of different types of Environmental Impact Assessments and Water Use License (WUL) She has been involved in a variety of different types of BA's and EIAs including applications for water supply projects, dams, transmission lines, roads and residential developments in South Africa. Marli has also been involved in the use of Geographic Information Systems, environmental status quo reports, water quality assessments, legal compliance and open space planning.

CV's of the project EAP is attached as Annexure E.

3. Project Team details

The process initially expected to be followed (24G, refer to section 1.2.1 above) necessitated a wider scope of investigation than what is required for the process of applying for the erosion control gabion installation. In order to maximise the value of the information, the specialists were requested to include current impacts of the resort on the receiving environment, as well as mitigation measures for these impacts, in their assessment, additionally to the assessment and mitigation measures for the gabion installation activity.

The following specialists produced the reports for this project as indicated below.

Table 1. Specialist reports for Alpine Heath Resort

Specialist report	Specialist	Professional Registration
Aquatic Assessment	Byron Grant	*Pri.Sci.Nat.* SACNASP: Professional Natural Scientist (Aquatic Science, Ecological Science & Zoological Science)
Wetland Assessment	Rowena Harrison	*Pri.Sci.Nat.* SACNASP: Professional Natural Scientist (Soil Science)
Terrestrial Vegetation Assessment	Michelle Pretorius	*Pri.Sci.Nat.* SACNASP: Professional Natural Scientist (Botanical Science & Ecological Science)
Terrestrial Fauna Assessment	Dr. Craig Widdows	*Pri.Sci.Nat.* SACNASP: Professional Natural Scientist (Ecological Science & Zoological Science)
Hydrological Assessment	Allan Bailey	*Pr.Eng.* ECSA: Professional Engineer
Flood line Delineation	Balarka Robinson	*Pr.Eng.* ECSA: Professional Engineer
Palaeontology Assessment	Elize Butler	PSSA: Palaeontologist
Heritage Impact Assessment	Leonie Marais-Botes	SAVK: Heritage Practitioner

4. Project Locality

Property description:	Farm Akkerman 5679 GS
Current land-use zoning:	Lodge
Surrounding land-use zoning:	Mostly zoned for Agriculture and Lodges
Property size:	306.89 ha of which the resort footprint is approx. 35 ha
Development footprint size (m^2):	Approximately 150m^2 Including: gabion structures
Project map:	Locality, Layout and Sensitivity Maps are attached as Appendices A – C.
Site coordinates	28°36'51.3"S 29°00'03.1"E
SG 21 Digit Code	N0GS00000000567900000

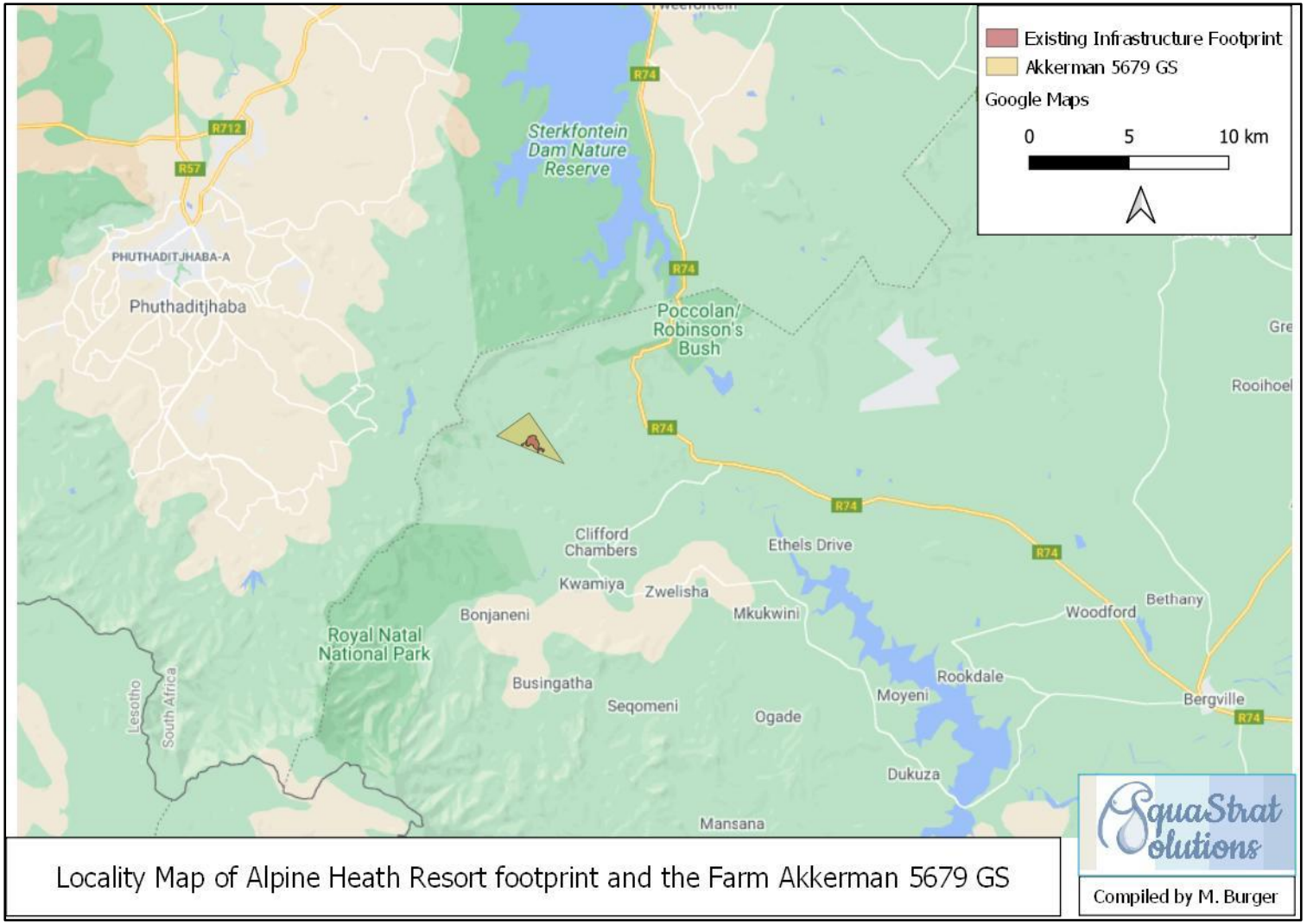


Figure 1: Locality Map of the site.

5. Project Description

Alpine Heath Body Corporate proposes the installation of gabion structures along an eroded section of a drainage line on the north-eastern side of the existing resort footprint. This forms part of addressing current impacts on the terrestrial and aquatic resources on site.

The Terrestrial Biodiversity (Pretorius & Widdows, 2021), Wetland (Harrison, 2021) and Aquatic Assessments (Grant, 2021) included an evaluation of the current resort footprint impacts from the perspective that mitigation measures and ongoing management requirements need to be collated in one easily implementable management document, the Environmental Management Plan (EMP). The expected impacts that may result from the gabion installation, as well as mitigation and monitoring measures, are included in these reports.

History of the Resort

The property, Farm Akkerman 5679 GS, was owned by the Putterill and Everitt Families since the late 1800's. In 1991 – 1993 Mr Everitt obtained townplanning approval from the Development and Services Board (DSB) for a resort development called "Pebblebrook". In 1995 Murrary & Roberts purchased the property, when it consisted of disused agricultural cropland, a wattle forest and all watercourses were choked with wattle.

Figure 2: 1990 Historical aerial image (NGI, obtained Nov 2020) of agricultural footprint on the study site.

No aerial imagery is available for the period 1990 – Jun 2000.

In 1995 an application for revised conditions of establishment for the development of Alpine Heath was submitted to the Development and Services Board (DSB) – Bergville (Okhahlamba Municipality) and approved; development was allocated a Private Township Board (PTB) registration.

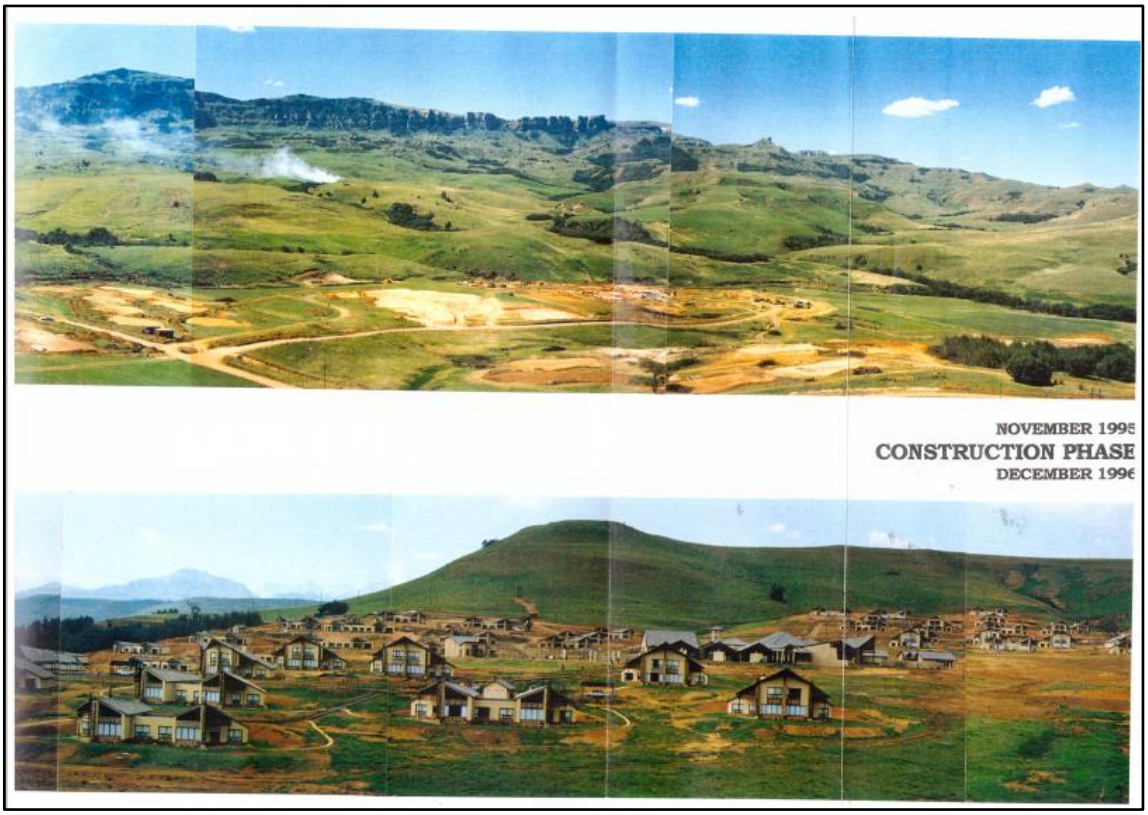


Figure 3: November 1995 and December 1996 photographs (from Clark & Thomas Architects Photographic Report, 1994 – 2000).

In 1996 Alpine Heath Resort was opened to the public and in 1997 Murray & Roberts applied to the DSB for expansion, wherein the local authority requested an EMP (of which Landscape management was the main focus and 1600 trees were planted). The Murray & Roberts owned resort consisted of:

- Sectors 1 – 4 units, main entrance and the Business Centre
- Small soakaway system from septic tanks
- Staff housing on the southeast section of the footprint
- Two dams: “Boma” dam and the smaller fishing dam, stocked with bass & trout
- River abstraction point, pipeline to reservoir and reservoir.

In 1997 the resort was sold and the ownership of Alpine Heath Resort changed to Alpine Heath Body Corporate.

In 1998 an application was submitted to the DSB for permission to establish a conference centre of 550m^2, storage facilities of 65m^2, a boma of 570m^2, increasing restaurant by 125m^2 and staff accommodation of 932m^2.

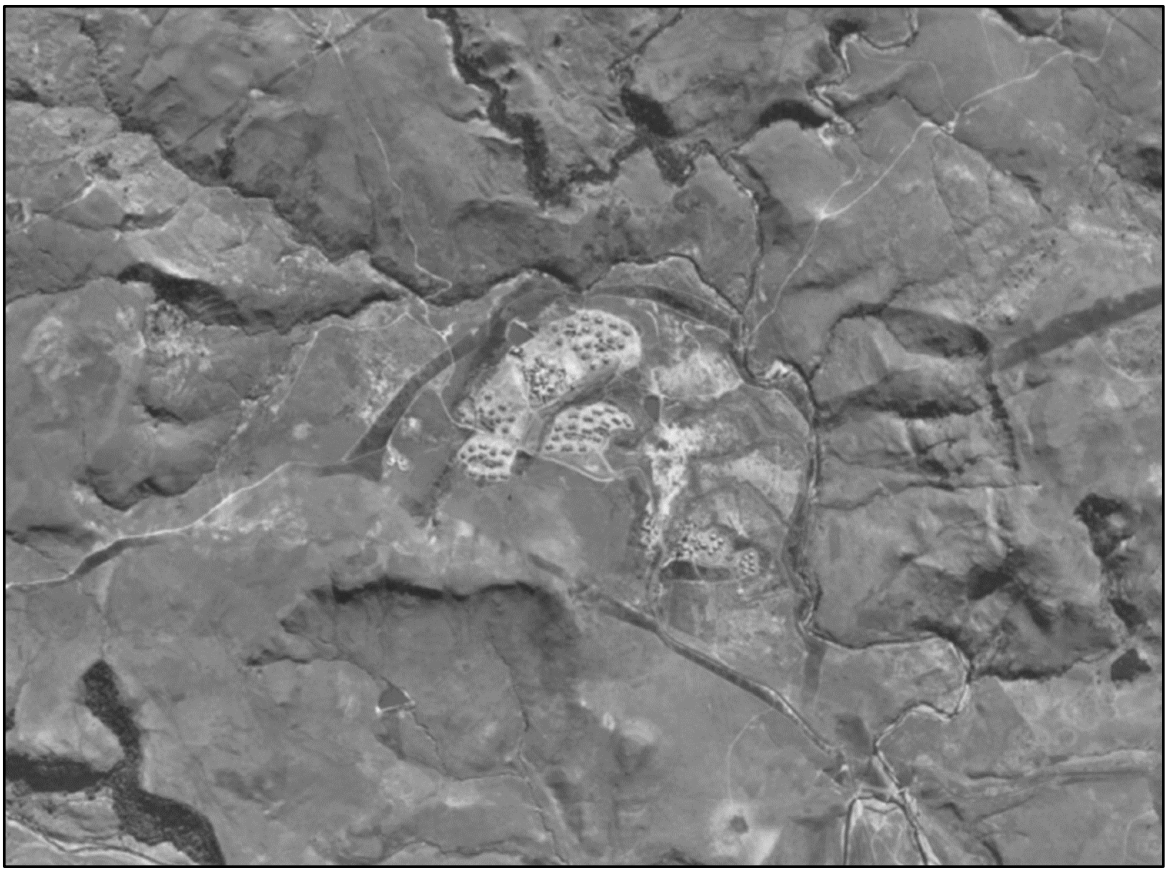


Figure 4: 2000 Historical aerial image (NGI, obtained Nov 2020) of Alpine Heath

In 2002 the Department of Agriculture and Environmental Affairs provided a letter to exempt the resort from further compliance with EIA Regulations in relation to the construction of a new sewage treatment and disposal system, consisting of 5 oxidation ponds with a throughput of 120m3 and an irrigation storage pond.

Two sewer pumphouses were added, one east of the staff housing and one north of unit 95 (sector 3) and these were connected to the existing reticulation that collected at existing septic tanks at each sector. The pumphouses pumped treated sewage discharge to the newly added evaporation ponds with reedbed.

In 2007 Alpine Heath added the horse stables on an old farming platform and plans were approved by Okhahlamba Municipality, Bergville.

In 2013 Manco (3rd party storage company whom Alpine Heath stored all their development & other documents) had a lack of storage and all records were boxed and sent to Metro File

where they were lost in a fire, losing most of the approved plans, authorizations and occupation certificates.

In 2014 three boreholes were sunk and pumphouses were constructed for borehole abstraction. Only two boreholes are currently equipped and being used.

In 2016 an upgraded pipeline was installed, by means of trenching, from the river abstraction point to the reservoir.

Stormwater management at Alpine Heath consists of:

The stormwater management of the resort includes levees around the chalets, swales along the roads and stormwater velocity breakers (stone pitching and/or vegetated swales) after piped sections below ground at road crossings.

Figure 5. Stormwater management measures at Alpine Heath resort (Robinson, 2021).

Refer to the Floodline Study (Mar 2021) for 1:100 year floodline determination and brief discussion of instream structures.

Figure 6. Boma dam spillway (Robinson, 2021)

Waste management at Alpine Heath consists of:

Restaurant kitchen oil and grease trap cleaned by SQ Oils and PW Conradi, when required

General waste management: bins emptied into shipping container removed weekly/as required by external waste management company.

Tabdrain tablets are supplied by Hychem and are applied at individual chalet drains for the treatment of oil and grease.

Bactallion tablets is used in combination with an oxygen tablet to accelerate digestion of waste in septic tanks. The digested wastewater gravitates to two pumphouses and is pumped to a series of evaporation ponds that discharges through a reedbed into the environment.

6. Legislative Requirements

There are certain legislative requirements to which the proposed establishment of a residential development must conform. The requirements of the applicable legislations or acts must be applied to this development proposal.

6.1 Constitution of Southern Africa, 1996 (Act No. 108 of 1996)

The Constitution of South Africa provides the legal foundation for the republic and sets out the rights and duties of its citizens and defines the structure of the government. In terms of Section 24 of the Constitution every person has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected through reasonable legislative measures.

6.2 National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014

NEMA aims to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith.

In December 2014 the Minister of Environmental Affairs and Tourism passed Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (NEMA). The purpose of this process is to determine the possible negative and positive impacts of the proposed development on the surrounding environment

and to provide measures for the mitigation of negative impacts and to maximise positive impacts.

Notice No. R 983 and R 984 of the New Regulations list activities that indicate the process to be followed. The Activities listed in Notice No. R 983 and R 985 requires that a Basic Assessment process be followed and the Activities listed in Notice No. R984 requires that the Scoping and EIA process be followed. However, the guidelines document supplied by DEA states that if any activity being applied for is made up of more than one listed activity and the scoping and EIA process is required for one or more of these activities, the full EIA process must be followed for the whole application.

The proposed development includes a number of listed activities in terms of GN 983 (Listing Notice 1) and therefore it will be necessary to follow a Basic Assessment process (as an independent process) in terms of NEMA (See Table 2).

Table 2: The activity is covered by the following sections of the 2014 Environmental Regulations

Regulation No:	Activity No:	Description of the activity
983, 4 December 2014	12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse;
983, 4 December 2014	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 metres from **[—(i)]** a watercourse;

This description encompasses all relevant structures associated with the gabion installation. The legislation requires that the Basic Assessment procedure for the proposed development has to be followed. This procedure entails a permitting process meeting various environmental reporting requirements.

Other legislative procedures that have been considered or need to be taken into account for the proposed project are the following:

- The National Water Act, 1998 (Act No. 36 of 1998)
- The National Water Act, 1998 (Act No. 36 of 1998) General Notice 1199 - development within 500 meters of a wetland
- The National Water Act, 1998 (Act No. 36 of 1998) General Notice 1198 - Rehabilitation of a wetland area
- National Environmental Management: Biodiversity Act, (Act No. 10 of 2004)
- Ezemvelo KZN Biodiversity Sector Plan, V2.0 (2015)
- Ezemvelo KZN Biodiversity Impact Assessment Guidelines (2013)
- KwaZulu-Natal Nature Conservation Management Amendment Act, 1999 (KZN CMAA; Act No. 5 of 1999)
- UThukela District Municipality IDP 2020/2021
- Okhahlamba Local Municipality Draft IDP 2016/2017
- Guidelines for Biodiversity Impact Assessments in KZN, 2013.
- Important Bird and Biodiversity Areas (IBA; 2015)
- KZN Heritage Act (Act 4 of 2008).
- The South African Heritage Resources Act (SAHRA), 1999 (Act No. 25 of 1999) protects the cultural resources on a proposed development site.
- The Municipal Systems Act, 2000 (Act No. 32 of 2000) and the Integrated Development Plans (IDP) regulates the planning processes of the local Municipality.
- National Environment Management Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Environment Management Waste Act, 2008 (Act No. 59 of 2008);
- National Veld and Forest Fire Act, 1998 (Act No.101 of 1998);
- Mountain Catchment Act, 1970 (Act No. 63 of 1970);
- World Heritage Convention Act, 1999 (Act No. 49 of 1999);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Land Use Planning Ordinance 15 of 1985 and the planning ordinances depending on the province in South Africa where construction will take place

Table 3. Description of compliance with the relevant legislation, policy or guideline.

Legislation, policy of guideline	Description of compliance
National Environmental Management Act No. 107 of 1998 as amended (NEMA).	**Government Notice R 983 (Listing Notice 1):** 12 The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; 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 metres from [–(i)] a watercourse.
Constitution of Southern Africa Act No. 108 of 1996	The proposed development entails the provision of light industrial stands which is in line with the provisions of the Constitution of Southern Africa of socioeconomic development and the advancement of human rights and freedoms.
The National Water Act, 1998 (Act No. 36 of 1998) (NWA)	Water Use License required in terms of Section 21 (a), (c) & (i), (g) & (f) of the National Water Act, 1998 (Act No. 36 of 1998). Aquatic and wetland assessments were done for the site.
The National Water Act, 1998 (Act No. 36 of 1998) General Notice 509 - development within 500 meters of a wetland	Development within 500 m of a watercourse requires a Water Use License. The proposed activities are located within 500m of a wetland,

	therefore a Water Use License will be applied for.
The National Water Act, 1998 (Act No. 36 of 1998) General Notice 267 – WULA Regulations	Regulations to be followed for the Water Use License Application.
National Environmental Management: Biodiversity Act, (Act No. 10 of 2004	The identification of important ecological features on site. Terrestrial Biodiversity studies were undertaken for the site.
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes. The resort is currently in process of registering as Protected Area, with surrounding landowners, a large area between two existing Protected Areas.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise and offensive odours.
Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, will form part of the EMPr.
National Environmental Management: Waste Act 59 of 2008	This act provides fundamental reform of the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. Waste handling is included in the EMPr as per National Norms and Standards for storage of waste.

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants.
Ezemvelo KZN Biodiversity Sector Plan, V2.0 (2015)	The northern section of the farm, adjacent to the resort footprint, is indicated as an Ecological Support Area. ESAs are functional but not necessarily entirely natural terrestrial that are largely required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. Land Use objectives include maintaining ecosystem functionality and connectivity.
UThukela District Municipality IDP 2020/2021	The northern section of the farm, adjacent to the resort footprint, is indicated as an Ecological Support Area. The measures in the EMP align with the interventions required in the IDP, including alien invasive plant control and appropriate measures, fire management, erosion control.
Okhahlamba Local Municipality Draft IDP 2016/2017	The resort falls on the border of the Biodiversity Priority Area 1 and within an area identified as having “Good Potential” for tourist destination and development is subject to development application according to the Development Framework.
The South African Heritage Resources Act (SAHRA), 1999 (Act No. 25 of 1999) protects the cultural resources on a proposed development site.	A Phase 1 **Heritage Impact Assessment** (HIA) in terms of Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) application is being lodged with the Provincial Heritage Resources Authority. This act protects the cultural resources on a proposed development site.

	A Palaeontological Impact Assessment has also been completed.
The Municipal Systems Act, 2000 (Act No. 32 of 2000) and the Integrated Development Plans (IDP)	Regulates the planning processes of the local Municipality. development aligns with the IDP, which lists the property as one of the portions of land which was acquired in the 2014/15 financial year with the specific intention to develop a cemetery and an integrated human settlement thereon.
World Heritage Convention Act, 1999 (Act No. 49 of 1999);	The heritage aspects of the proposed development site were determined and a Phase 1 HIA completed.

7. Need and Desirability Motivation

Social & Economic Motivation

The area was mostly characterized by scattered agricultural activities in the catchment with land clearing increasing in the 1990s. **Bergville** is a small town situated in the foothills of the Drakensberg mountains, KwaZulu-Natal, South Africa. It was established as Bergville Mountain Village in 1897 and is now the commercial centre for a 2,500 km^2 dairy and cattle ranching area. Bergville is equidistant from Johannesburg and Durban and is also known as the gateway to the Northern Drakensberg holiday resorts. It lies on Route R74 which is a more scenic alternative to the N3 Toll Road. This route takes one via the Oliviershoek Pass, traditionally used to access the Drakensberg, from Johannesburg.

The residents of this area were reliant on agricultural activities for employment opportunities, however tourism now plays a very large role in the Drakensberg in terms of employment.

Ideally situated midway between Durban and Johannesburg, Alpine Heath Resort & Conference Centre gives families and nature-lovers the opportunity to explore their surroundings with luxury Drakensberg accommodation as a home base. The Drakensberg is home to many historical and cultural aspects and experiences and the resort offers the ideal accommodation from which to explore these aspects. The resort is open to the public for accommodation bookings.

The resort is surrounded by reclaimed nature reserves (Royal Natal National Park and Rugged Glen Nature Reserve) and protected environmental and biodiversity areas

(Poccolan/Robinson's Bush near Little Switzerland). The region has been identified as a tourism development node by provincial planning and environmental authorities as a part of the uKhahlamba Drakensberg Park World Heritage Site as a "wilderness resource". This is part of the motivation to get involved in the Proposed Northern Drakensberg Protected Area (described below). In addition, Alpine Heath Resort and Conference Centre is a property of the aha Hotel and Lodges Group, a division of Tourvest Holdings, that this recently announced a corporate conservation partnership with the Endangered Wildlife Trust (Barker, 2021).

Environmental Motivation

The resort offers accommodation and conference facilities and constitutes a large part of the supporting base for the tourism industry of the area. It is desirable to have these facilities in a Strategic Water Resource Area and a Freshwater Ecosystems Protected Area, as it helps to fund the maintenance/management and continued protection of these areas.

The resort is currently engaged in the Upper Vaal/Thukela water source partnership project, initiated by the WWF.

In 2018 initial proposals were tabled for the establishment of a Northern Drakensberg Conservancy as an ecological and conservation corridor incorporating Royal Natal, Rugged Glen, Poccolan and Robinson Bush and Sterkfontein Dam Nature Reserve. This could include a number of resorts, guesthouses, farming and private properties such as Alpine Heath.

The Proposed Northern Drakensberg Protected Area (NBPA) is planned as a multi-stakeholder stewardship partnership between landowners, tourism and hospitality industry and amenities, communities and authorities to cooperate and co-manage a large portion of the Northern Drakensberg to protect, promote and enhance the value of the natural assets of the area. The area of this ecological and conservation corridor includes potentially 13 properties located between the Royal Natal National Park and the Sterkfontein Nature Reserve. Initial estimates of the extent of the target area indicate approximately 10,000 ha. Currently seven properties have indicated their intention to participate. Opportunities arising from the NBPA stewardship initiative include and are not limited to:

- Protect migration corridors for flagship game such as Eland – estimated to exceed 250 head.
- Introduce a greater variety of game species (greater diversification) and conservation initiatives (e.g. Oribi breeding programme).
- Manage as a large area conservancy / private game reserve consortium (integrated land activities, agriculture, veld/grazing, wildlife, conservation and fire management).

- Potential to become a proclaimed Protected Area to allow for coordinated and integrated management of the target area.
- Promote and develop opportunities for biodiversity and ecosystem services projects including the restoration of river banks and ecosystems, erosion control, clearing of alien invasive vegetation, improving water flow and quality.
- Attract increased ecotourism to the broader Northern Drakensberg area to promote growth in tourism and hospitality industry with a particular conservation and environmental focus.
- Stimulate additional local economic development, job creation opportunities (e.g. nature guides) and the development of small and medium businesses supporting the tourism and hospitality industry and activities.
- Contribute to the protection and management of the Northern Drakensberg National Water Source Catchment Area (Barker, 2021)

8. Alternatives

The National Department of Environmental Affairs stresses that the no-go option be considered as a base case against which to measure the relative performance of the other alternatives. The impacts of other alternatives are expressed as changes to the base case or status quo. If considered viable the decision not to act may be considered in the evaluation and assessment process against the other alternatives. The following table (Table 4) describes the different alternatives that were investigated in more detail.

Table 4: The different alternatives that have been investigated

Alternatives	Description	Comments on project implementation
Activity alternatives	Alternatives to considering other activities to address the same ends	The site is already developed and there is no need to assess activity alternatives, as the gabion structures are required for stabilization of the drainage channel banks that have eroded down to bedrock.
Location or site alternatives	The property on which the proposal is intended and possible location for certain activities within the property.	Alternatives for the location of the gabion installation were not considered, as the erosion requiring immediate action is at the identified location.

Alternatives	Description	Comments on project implementation
Layout / Design alternatives	Design alternatives could include different engineering designs of the gabion structures.	The design alternatives were based on standard gabion designs and were considered in terms of having the least impact on the watercourse.
Scale alternatives	Refers to actual size of the activities proposed.	Scale alternatives were considered in terms of requirements for effective erosion control.
Technology alternatives	The use of solar instead of electricity to diminish the demand on the municipal electricity provision must be considered.	No electricity is required for the proposed activities
Land use alternatives	Consideration of alternative land uses on the development site.	The site is already developed and there is no need to assess land use alternatives.
No-go option	The status quo remains and no stabilization of the eroded drainage line takes place.	The no-go option will be investigated in section 3.4

8.1 Preferred design alternative

The installation of gabions along the eroded banks of the drainage line to the east of the resort footprint. The design alternatives were based on standard gabion designs and were considered in terms of having the least impact on the watercourse.

8.2 No-go alternative

The situation where the environment is left in the present condition and no interference is attempted; therefore the status quo is maintained.

Should the proposed activities not be implemented, the erosion of the drainage channel will continue and will pose a danger to infrastructure. Ongoing erosion will lead to loss of soil and sedimentation of the watercourses and will affect sensitive aquatic species, i.e. the Natal Stargazing Catfish.

Table 5: Summary of the feasible design alternative identified

Activity	DISQUALIFYING CONSIDERATIONS
No-go option	**Positive**: ○ No further human disturbance, however this is needed to control the current erosion impacts on the environment. **Negative**: ○ Risk of structure collapse if head cut erosion continues ○ Risk of erosion and sedimentation of the non-perennial channel and the Boma dam ○ Risk of establishment of alien invasive vegetation in disturbed areas
Preferred Alternative:	**Positive:** ○ Improved stability ○ Erosion and sedimentation control ○ Improvement of vegetation cover and prevention of alien invasive vegetation spread **Negative:** ○ Temporary impact from installation

This study therefore recommends that the preferred alternative be instituted.

9. Process followed to select preferred alternative

The site was assessed by the relevant specialists by determining baseline conditions on site, identifying expected impacts and provide recommendations for mitigation of the impacts. The Basic Assessment Report (this report) assesses the impacts before and after mitigation and considers the cumulative impact on the environment. Specialist studies completed for this project include:

- Aquatic Assessment
- Vegetation Assessment
- Terrestrial Fauna Assessment
- Heritage Impact Assessment: Archaeology and Palaeontology
- Hydrology Assessment
- Flood line Determination

10. Public Participation Process

10.1 Press advertising and site notices

The Public Participation Process forms the corner stone for detailing the Basic Assessment Report. The process identifies potential interested and affected parties on the project and solicits inputs and comments pertaining to the matter/activity proposed from such parties. Public Participation allows the public to contribute to the project and provides for better decision making by collective inputs from stakeholders, organs of state and specialists. In terms of the 2014 EIA Regulations, a Basic Assessment report must contain details of the public participation process undertaken for the project.

The public participation process is conducted in accordance to Regulation 39 to 44 of Government Notice R982 of the NEMA, as well as GN 267 of 2017 of the NWA. The process provides the public access to necessary information on the project. The public participation process for the Alpine Heath Resort commenced on **16 February** to **19 March 2021** and was extended to **6 April 2021.**

10.2 Newspaper Advertisement

The project was advertised in the local press as per the requirements. The proposed activity was advertised in English and Zulu in the Ladysmith Gazette, the largest local newspaper distributing in the area, and the notices appeared in print on 19 February 2021. (Please refer to Annexure 1 for a proof of the newspaper advertisement within Appendix E: Public participation process).

10.3 Site notices

Two A2 - sized on-site notices in English and Zulu, were placed at the resort entrance, as well as on the corner of the main access road (D119 road) to several neighboring properties and the study site on 16 February 2021. (Please refer to Annexure 2 for a proof of the notice within Appendix E: Public participation process).

10.4 Background Information Documents and notices/flyers

The Background Information Document and Notice was provided to all surrounding and directly downstream owners who were available for consultation during 16 – 17 February 2021. All other surrounding landowners were contacted regarding the BID and Notice and these were sent to parties who provided email addresses for receiving these. BIDs and

Notices were also provided to all relevant Departments, municipal representatives and Body Corporate members on 16 – 17 February 2021.

Additional I & APs were suggested by some of the registered I & APs, in relation to the Protected Areas project, and were included in the public participation. (Please refer to Annexure 3 for the BID within Appendix E: Public participation process).

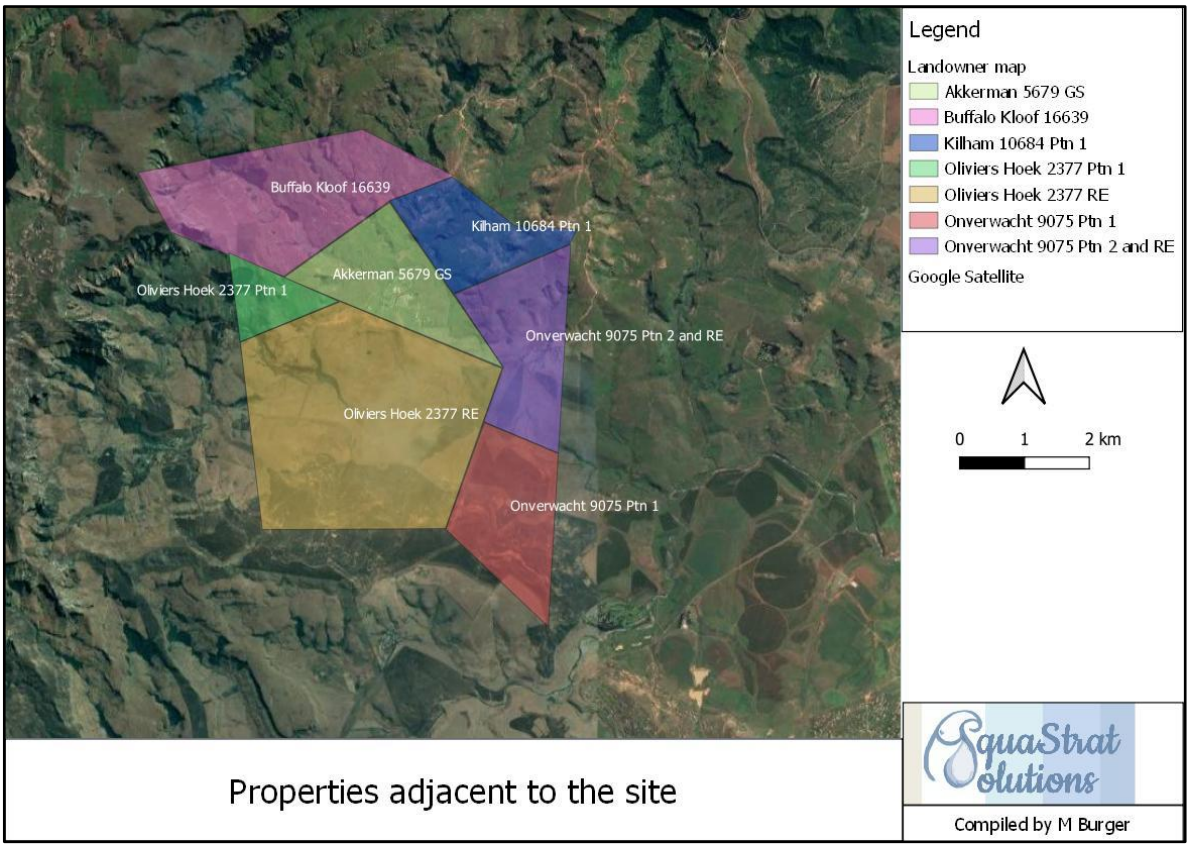


Figure 7. Neighbouring properties included in the public participation process.

Table 6: Landowner details of neighbouring properties

Farm name	Property owner
Akkerman 5679 GS	Application site; Alpine Heath Body Corporate
Buffalo Kloof 16639 GS	Greenfire Lodge: Sean
Kilham 10684 Ptn 1	Dirk Ackerman
Oliviers Hoek 2377 Ptn 1	Marius v Huisteen
Oliviers Hoek 2377 RE	Johan du Toit
Onverwacht 9075 Ptn 1	All out Adventures: Loretta Mecklenborg
Onverwacht 9075 Ptn 2 and RE	Montusi Lodge: Lindsay du Plessis

The BID provides an Interested and/or Affected Party (I&AP), with background information on the proposed project, as well as information regarding the Basic Assessment process that will be undertaken. It further indicates how you can become actively involved in the

project, receive information and raise issues that may concern and/or interest you. The sharing of information forms an important component of the public participation process and provides the opportunity to become actively involved in the process from the onset. I & Aps were given a 50-calendar day period to raise any issues or concerns regarding the project.

10.5 I&AP Correspondence

All comments received from interested and affected parties during the circulation of the Draft Reports will be acknowledged and recorded in an Issues and Response Register and will be addressed in the Final Basic Assessment Report accordingly (Issues and Concerns Register to be included as Annexure 8 within Appendix E of the Final BAR: Public participation process).

Issues raised and potential impacts identified during the Public participation process

The Basic Assessment Report aims to identify and list the environmental issues and potential impacts that are relevant to the project and determines where further information is required in the form of specialist studies and or investigations. The identification of such issues and potential impacts are solicited from stakeholders, interested and affected parties through a public consultation process as well and investigations undertaken by the environmental consultant and specialists.

The key identified issues and potential impacts pertaining to the proposed gabion installation outline the focus areas for the Impact Assessment and Specialist studies undertaken.

The following issues, determined through the public participation process with authorities and I&APs, has been investigated in further detail (See Appendix E for the Issues and Concerns register):

Biophysical environment

The biophysical environment is the relation between the physical environment and the biological life forms within the environment.

- Impacts on Biodiversity (Flora, Fauna and Avifauna)
- Impacts on Aquatic ecosystems (including Wetlands)
- Impacts on Soils and Geology
- Impacts on Hydrology and Flood lines

Social environment

The social environment refers to the environment developed by humans as contrasted with the natural environment.

- Impact on cultural and heritage resources
- Impacts on land use and also surrounding land uses
- Impact on traffic and roads

10.6 Comments on the Draft Basic Assessment Report

During the correspondence with I&APs, stakeholders were advised that the Draft Basic Assessment Report would be prepared and made available for public review. An electronic copy of the Report will be made available to registered interested and affected parties and the relevant Departments on the project database.

Stakeholders will be informed about the comment period for the Draft Basic Assessment Report through emails whereby the Report will be made available electronically.

The concerns raised during the public participation process on the draft report will be included in the final Basic Assessment Report.

10.7 Public Consultation for the EMPr

As part of the assessment, an EMPr is compiled. The EMPr is a requirement as per the EIA Regulations. The EMPr recommends how to operate and implement the project. The report would be distributed for public review and comment for a period of 30 calendar days.

All comments and issues received during the public review period of the EMPr would be captured in a Final BAR and submitted to EDTEA for review and approval. I &APs would receive notification of the submission and would have the opportunity to request copies of the final report.

10.8 Public Consultation during Decision making phase

During this phase EDTEA will review the Final BAR and consult with any other key organs of state eg. the Department of Water and Sanitation (DWS) before granting or refusing an environmental authorisation.

The environmental authorisation will be made available for public review for a period of 20 consecutive calendar days. This provides I&AP's with an opportunity to verify that the decision taken have considered their comments and concerns raised. I&APs are also then informed of the appeal procedure, should they have a reason to appeal.

11. Environmental Description

11.1 Biophysical Description

11.1.1 Climate and Rainfall

The project area is predominantly located within the Ze1-Little Berg Bioresource Unit (BRU) of KwaZulu-Natal (Camp, 1995). The climate for this area is characterised by summer rainfall patterns with some rainfall events during the winter months. The Mean Annual Precipitation (MAP) is approximately 1,198mm, with most of the rainfall occurring between September and March. The wettest time of the year is January with an average of 215mm and the driest is July with 10mm. The seasonality of precipitation is a driving factor behind the hydrological cycles of water resources within the area. Typically, watercourses have a higher flow rate during the summer months.

The mean monthly temperatures for the Ze1 BRU are 18.1°C and 8.4°C for January and June, respectively. Frost does occur within the region over a period of 5 to 6 months, with an average of 25 mid-winter nights expected to experience sub-freezing temperatures (EMP, 2001; Pretorius & Widdows, 2021).

11.1.2 Geology and Soil

According to the Terrestrial Biodiversity report (Pretorius & Widdows, 2021), regional geology comprises mudstones, sandstones and shales of the Beaufort and Ecca Groups (Karoo Supergroup) and are intruded by dolerites of Jurassic age. Land types include Bb, Ac, Fa and Ca (Mucina & Rutherford). Little Berg's sedimentary geological formation. Two of the four sandstone beds and one of the two igneous deposits typical of the Drakensberg occur on the property. Shallow Mispah soil form occurs on steep north- and northwest-facing slopes, moderately deep and better developed Clovelly, Griffin and Hutton soil forms occur on the moderate east- and southeast-facing slopes and deep, and relatively fertile alluvial soils of the Oakleaf and Dundee forms occur on the terraces adjacent to the Putterill River (EMP, 2001). Generally the soils on the steeper slopes founded on the sandstones and shales of the Beaufort and Molteno series are vulnerable to soil erosion if exposed, while

soils occurring on more moderate slopes and dolerite intrusions are more erosion resistant. Alluvial soils along watercourses are prone to erosion where vegetation cover is removed (EMP, 2001).

11.2 Wetlands

The project area is located within the Pongola-Mtamvuna Water Management Area (WMA) and within the V11C quaternary catchment. There are four major perennial rivers within this quaternary catchment including the Putterill River, the Thukela River, the Majaneni River, and the Khombe River, with the Putterill River flowing through the study site. A number of non-perennial drainage channels were also identified within the study site and flow into the Putterill River (Harrison, 2021). The figures below illustrate the channels and wetlands on site.

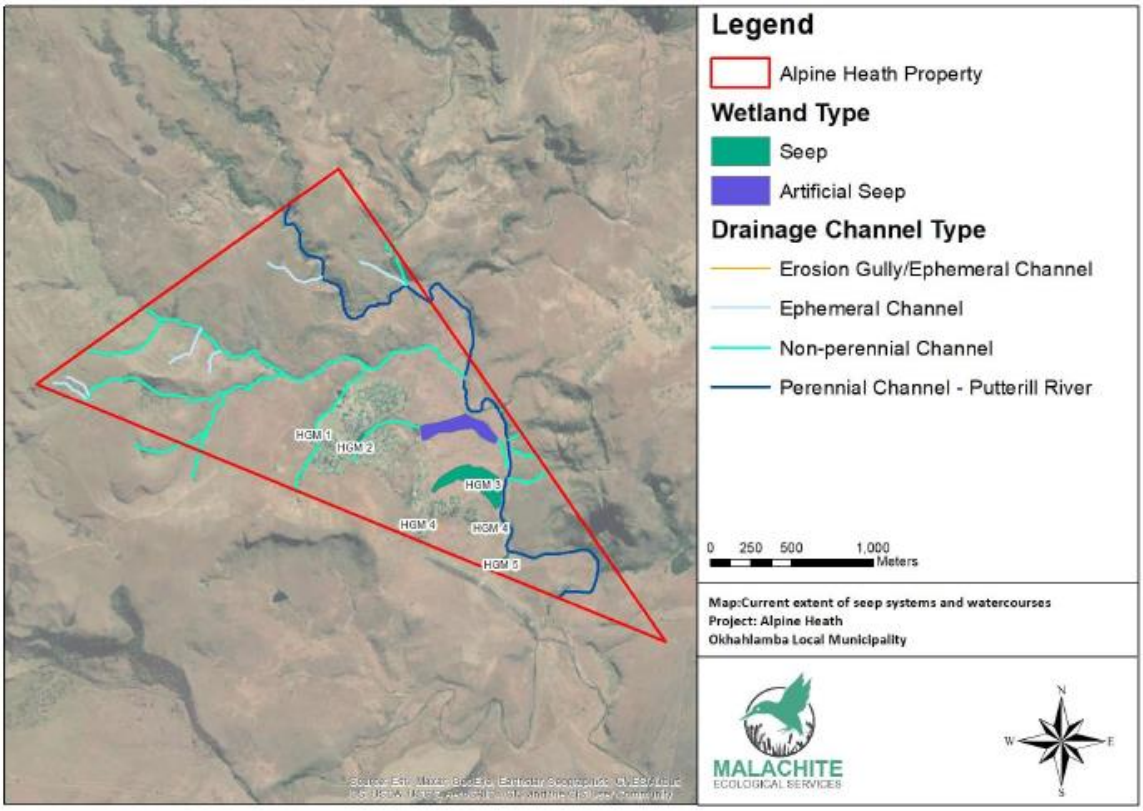


Figure 8. Wetlands and watercourses on the farm Akkerman 5679 GS (Harrison, 2021)

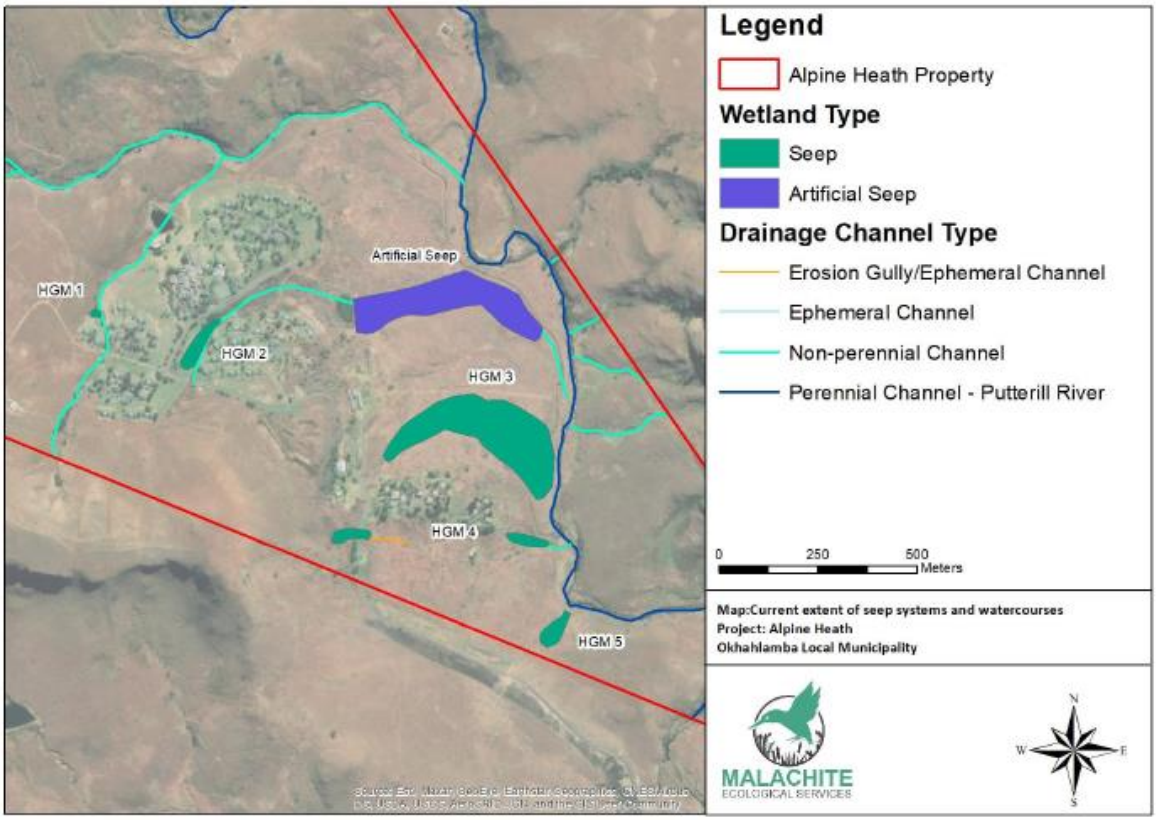


Figure 9. Wetlands and watercourses on and around the resort footprint (Harrison, 2021).

The assessment of the five HGM units as well as the artificial seep, with regards to their health according to the Wet-Health methodology, classified HGM 1, HGM 2 and HGM 4 as Seriously Modified (PES Category E), while HGM 3, HGM 5 and the artificial seep were classified as Largely Modified (PES Category D).

Table 7. Summary of PES scores of wetlands (Harrison, 2021)

HGM Unit	Extent Delineated (ha)	Hydrology	Geomorphology	Water Quality	Vegetation	PES Score (Category)
HGM 1	0.045	6.6	4.6	5.8	5.8	E (6.0)
HGM 2	0.42	6.9	3.7	5.5	6.0	E (6.0)
HGM 3	4.88	4.4	2.4	5.0	4.3	D (4.1)
HGM 4	0.51	7.3	5.3	6.1	6.0	E (6.5)
HGM 5	0.35	5.0	2.0	4.7	4.0	D (4.0)
Artificial Seep	3.88	5.3	3.6	3.5	6.0	D (4.7)

Ecosystem goods and services were calculated for the HGM units (Figure 28). Due to the impacted nature of the wetlands, all HGM units received generally low to moderate scores for the ecosystem services. Highest scores received were associated with streamflow regulation, particularly for HGM units 1, 2 and 3, flood attenuation, erosion control, sediment trapping and filtration (in the form of nitrate, phosphate and toxicant trapping). HGM 3 furthermore provides greater services with regards to the maintenance of biodiversity, this is largely as a result of the position of the seep away from the existing Alpine Heath Resort and associated infrastructure.

The EIS scores received for all HGM units was Very Low or Low[5] (Table 6). The location of the wetlands, particularly HGM units 1 and 2, as well as the disturbance of the wetlands, particularly HGM 4 limits the ability of the wetlands to provide suitable habitat for faunal and floral species. This is exacerbated through the encroachment of alien invasive and weed species, which were identified in all systems. All systems received Low scores for the Hydrological Functional Importance, and this supports the scores received in the Present Ecological State scores as well as the Wet-Ecosystem services scores. HGM unit 3 received a Moderate Score for Hydrological Functional Importance, due largely to the less impacted nature of this seep as well as its location away from the existing infrastructure. Socio-economic importance of the wetlands is low and is limited to some grazing for horses.

Table 8. Summary of EIS scores of wetlands (Harrison, 2021)

HGM Unit	EIS	Score (0-4)	Confidence (0-5)	Category
HGM 1	Ecological Importance and Sensitivity	0.90	4	Very Low
	Hydrological Functional Importance	1.44	4	Low
	Direct Human Benefits	0.33	3	Very Low
HGM 2	Ecological Importance and Sensitivity	1.24	4	Low
	Hydrological Functional Importance	1.68	4	Low
	Direct Human Benefits	0.33	3	Very Low
HGM 3	Ecological Importance and Sensitivity	1.44	4	Low
	Hydrological Functional Importance	2.23	4	Moderate
	Direct Human Benefits	0.67	3	Very Low
HGM 4	Ecological Importance and Sensitivity	0.92	4	Very Low
	Hydrological Functional Importance	0.99	4	Very Low
	Direct Human Benefits	0.33	3	Very Low
HGM 5	Ecological Importance and Sensitivity	1.39	4	Low
	Hydrological Functional Importance	1.78	4	Low
	Direct Human Benefits	0.33	3	Very Low
Artificial Seep	Ecological Importance and Sensitivity	1.42	4	Low
	Hydrological Functional Importance	1.47	4	Low
	Direct Human Benefits	0.33	3	Very Low

A 15m buffer was calculated based on the development type, type of wetland system, soil characteristics, vegetative basal cover during the construction and operational phases, topographical factors, and the sensitivity of the water resource.

11.3 River and channels (Aquatic Assessment)

The environmental and aquatic classification attributes of the site are summarized in the table below.

Table 9. Summary of relevant classification of the site (Grant, 2021)

Freshwater Ecoregion	Drakensberg Maloti Highlands
Water Management Area	Pongola-Mtamvuna
Strategic Water Source Area	Northern Drakensberg
NFEPA Status	FEPA Catchment & Fish Sanctuary
Provincial Status	None; Adjacent to Ecological Support Area & Local Corridor

The aquatic ecosystems of the watercourses associated with the site are largely in a natural state. The macroinvertebrate assemblages showed a lower ecological state just after the confluence of the main Putterill River and the unnamed tributary north of the resort footprint with a further loss of ecological integrity downstream of Alpine Heath, ascribed to habitat, water quality (after confluence) and flow-related aspects (downstream of resort). The presence of Amphilius natalensis (Natal Mountain Catfish) was confirmed, which confirms the designation of the catchment as a fish sanctuary and Freshwater Ecosystem Priority Area.

Table 10. Index for Habitat Integrity (IHI) values obtained for the instream and riparian components of the reach of the Putteril Spruit and its tributary associated with Alpine Heath (Grant, 2021).

Component	IHI Value	Ecological Category
Instream	90.20	A/B
Riparian	88.20	A/B

Table 11. Present Ecological State of the aquatic macro-invertebrate assemblage within the watercourses associated with Alpine Heath during the May 2021 assessment, based on the MIRAI approach (Thirion, 2008, from Grant, 2021).

Site	MIRAI Score	Ecological Category
Site AH1	90.14	A/B
Site AH2	92.06	A
Site AH3	83.83	B
Site AH4	74.52	C

The fish assemblage is considered to be in a near natural to moderately modified state (Ecological Category B/C) with the absence of two fish species, Anguilla mossambica (Longfin Eel) and Labeo rubromaculatus (Tugela Labeo), likely ascribed to the Department of Water and Sanitation gauging weir 6km downstream from the site creating a significant barrier to fish movement. The Ecological Importance and Sensitivity for the Putterill River and unnambed tributary associated with Alpine Heath was were classified as very high.

Table 12. Present Ecological State of the fish assemblage within the Putterill Spruit and its tributary associated with Alpine Heath, based on the FRAI approach (Kleynhans, 2008, from Grant, 2021).

Site	FRAI Score	Ecological Category
Putterill Spruit	81.70	B/C

The inclusion of new eDNA technology into routine monitoring of surface water resources associated with Alpine Heath would greatly enhance the evaluation of species supported by catchments upstream of Alpine Heath, and greatly assist in determining the presence and management actions required for species not identified during the present study, including both species of conservation concern and alien invasive species (Grant, 2021).

Table 13. Integrated EcoStatus categories obtained for each site assessed during the May 2021 assessment (Grant, 2021).

Site	Aquatic Macroinvertebrates	Fish	Integrated Instream Category	*Riparian Vegetation*	EcoStatus Category
Site AH1	*A/B*	*B/C*	B	B	B
Site AH2	*A*		B		B
Site AH3	*B*		B		B
Site AH4	*C*		C		B/C

Table 14. Species of conservation concern (SCC) and alien invasive species (AIS) adapted from Grant (2021):

SCC / AIS	Common name	Scientific name	IUCN Status & presence on site
SCC	Natal Mountain Catfish	Amphilius natalensis s.s.	Present on site; Least concern, however needs updating due to new species identified in 2021 (Mazungalu & Chakona) therefore precautionary status = Conservation relevance. Site falls in FEPA and fish sanctuary for this species.
SCC	Chubbyhead Barb	Enteromius anoplus	Present on site; Least concern, however needs updating due to new species identified in 2021 (Kambikambi) therefore precautionary status = Conservation relevance.
SCC	Longfin Eel	Anguilla mossambica	Expected but not confirmed on site; Near Threatened
SCC	Tugela Labeo	Labeo rubromaculatus	Expected but not confirmed on site; Vulnerable; endemic to Tugela River system
AIS	Rainbow Trout	Oncorhynchus mykiss	Not confirmed on site, potentially low frequency of occurrence in riverine reaches; recreational stocking in dams on site.
AIS	Largemouth Bass	Micropterus salmoides	Not confirmed on site, potentially low frequency of occurrence in riverine reaches; self-sustaining population in boma dam.

11.4 Vegetation

The site is situated within the Northern KwaZulu-Natal Moist Grassland of the Grassland Biome, as well as within the Low Escarpment Moist Grassland according to Mucina and Rutherford (2006).

According to Mucina and Rutherford (2006) the landscape of the Northern KZN Moist Grassland consists of Tall tussock grassland usually dominated by *Themeda triandra* and *Hyparrhenia hirta*. Open *Vachellia sieberiana* var. *woodii* savannoid woodlands encroach up the valleys, usually on disturbed (strongly eroded) sites. Conservation Status is indicated as **Vulnerable,** with a conservation target of 24%. Only about 2% statutorily conserved in the uKhahlamba Drakensberg Park as well as in the Chelmsford, Spioenkop, Moor Park, Wagendrift, Ncandu Nature Reserves. More than a quarter has already been transformed either for cultivation, plantations and urban sprawl or by building of dams (Chelmsford, Driel,

Kilburn, Mtoti, Wagendrift, Windsor and Woodstock). Alien *Acacia dealbata*, *Rubus*, *Eucalyptus* and *Populus* are invasive in places. Bush encroachment is common.

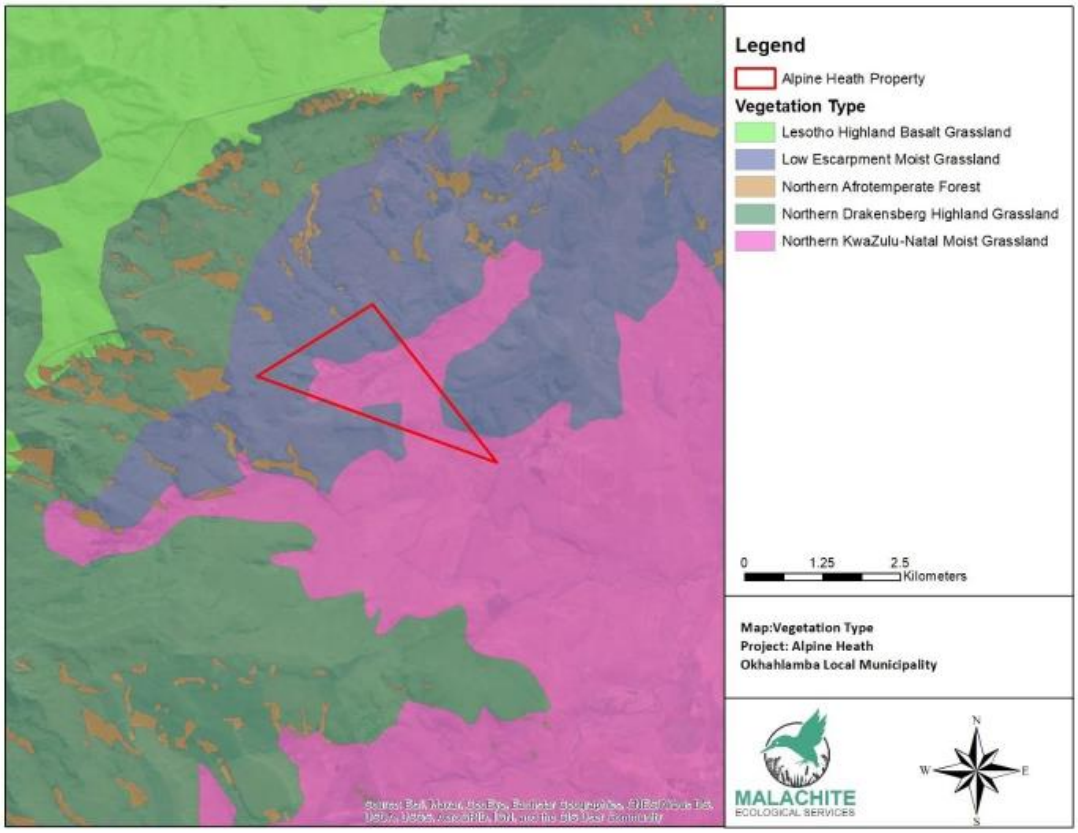


Figure 10. Vegetation types of the farm Akkerman 5679 (Pretorius & Widdows, 2021).

According to Mucina and Rutherford (2006) the Low Escarpment Moist Grassland consists of tall, closed grassland with *Hyparrhenia hirta* and *Themeda triandra* dominant. *Protea caffra* communities and patches of *Leucosidea* scrub feature at higher altitudes. Conservation Status is indicated as **Least threatened**, with a conservation target of 23%. Only 2% statutorily conserved in the Sterkfontein Dam Nature Reserve (Free State) and Ncandu Nature Reserve (KwaZulu-Natal). About 6% has been transformed by plantations or cultivated land. Alien *Acacia dealbata* occurs in place.

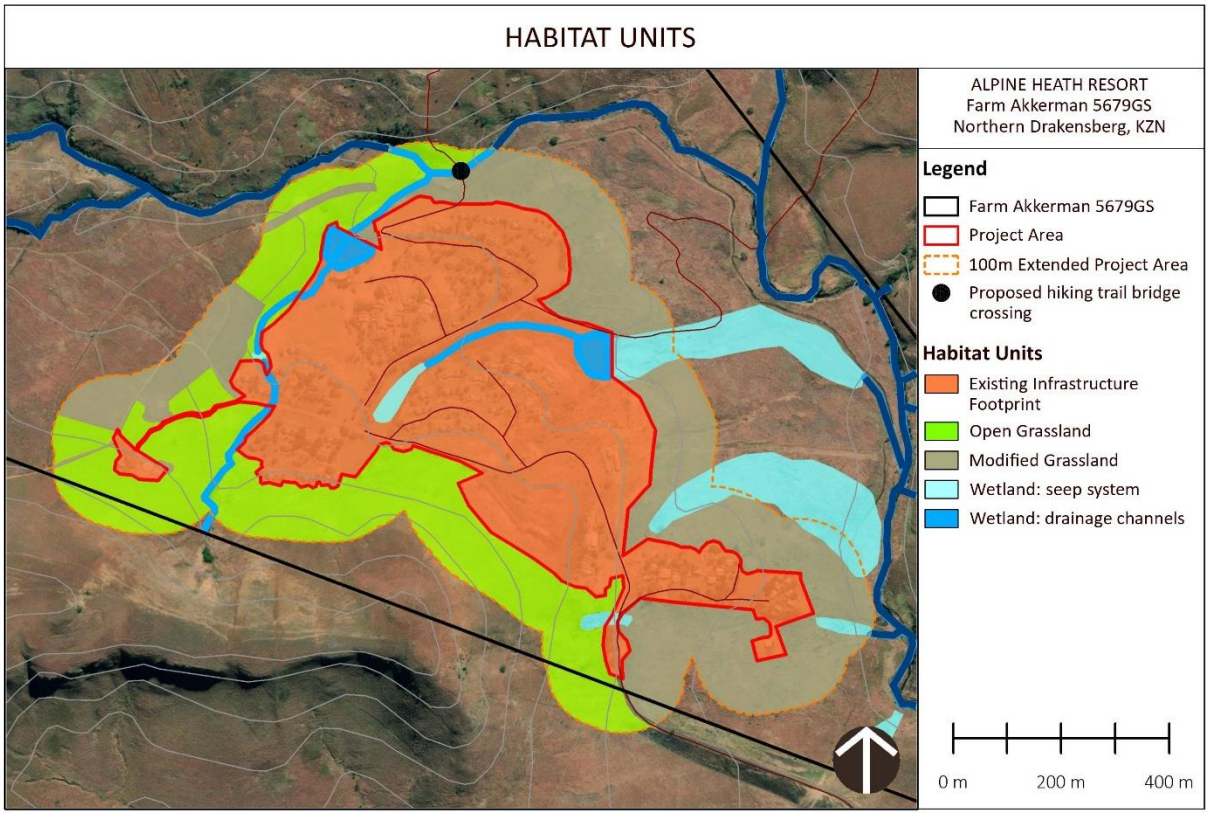


Figure 11. Habitat units identified on the site (Pretorius & Widdows, 2021).

Habitat units as indicated above include (Pretorius, 2021):

- The Existing Infrastructure habitat unit, which includes all built infrastructure associated with Alpine Heath Resort, including landscaped grounds and other open space areas. No naturally occurring floral or faunal SCC, protected or TOPS-listed species were recorded within this habitat unit. *Podocarpus latifolius,* a tree species protected in terms of the National Forests Act (Act No. 84 of 1998) occurs as an ornamental/ landscaping tree. A permit from the Department of Agriculture, Forestry and fisheries (DAFF) will be required should this tree ever by cut, disturbed or destroyed.
- The Open Grassland habitat unit which occurs mainly towards the south of the project area and is also associated with rocky slopes and areas of increased elevation towards the south. These areas have not been previously significantly impacted by development or agricultural activities. This habitat unit is of increased ecological sensitivity due to its intact habitat, including steep rocky slopes to the south, and high indigenous species diversity representative of the expected Northern KwaZulu-Natal Moist Grassland. There is also a high degree of landscape connectivity between surrounding habitats providing important faunal movement and foraging corridors. Any proposed future expansions to Alpine Heath Resort, if and when planned should avoid placement of infrastructure within

these areas. One floral SCC was recorded form this habitat unit namely *Merwilla plumbea*, which is listed by SANBI as NT.

Several provincially protected floral species in terms of the KwaZulu-Natal Conservation Management Amendment Act (KZN CMAA; Act No. 5 of 1999) were recorded in this habitat unit, namely *M. plumbea*, *Ledebouria ovatifolia, L. cooperi, Gladiolus crassifolius, Eucomis autumnalis, Schizocarphus nervosus, Habenaria filicornis* and *Satyrium cristatum* subsp*. longilabiatum*. Habitat is available for other floral SCC and provincially protected species to occur.

- The Modified Grassland habitat unit, mainly occurring to the north of the project area. Tthese areas have been previously utilised, mainly for agricultural purposes. The structure and species composition of this habitat unit has been significantly altered, with a high abundance of listed alien invasive floral species present. Future expansions to Alpine Heath Resort, if and when planned, should be optimised within these historically disturbed areas and avoid high sensitivity open grassland areas. No floral or faunal SCC, protected or TOPS-listed species were recorded within this habitat unit, and such species have a low probability of occurrence due to past disturbances within this habitat unit.
- The Wetland habitat unit, which includes two artificial dams, a seepage system and various drainage channels draining towards the Putterill River. This unit provides niche habitat for certain floral species and the narrow riparian tracts specifically act as important movement corridors for faunal moving between the project area and surrounding landscape. A relatively high diversity of alien species occurs within this habitat unit, with active removal thereof taking place. The habitat unit is nonetheless regarded as being of increased ecological sensitivity from a biodiversity perspective. Any proposed future expansion to Alpine Heath Resort should take the location and extent of these areas and designated buffer zones into consideration. No floral SCC or TOPS-listed species were recorded, however two provincially protected floral species in terms of the KZN NCMAA, namely *Kniphofia linearifolia* and *Eucomis autumnalis* were noted in the drainage channels and seep wetlands, respectively.

11.5 Fauna

Based on the habitat units identified, the following summary of findings (Widdows, 2021):

- The Existing Infrastructure habitat unit: *Bradypodion dracomontanum* (Drakensberg Dwarf Chameleon; Near Threatened (NT)) may on occasion utilise the wooded and riparian vegetation within the resort.
- The Open Grassland habitat unit: There is a moderate probability of faunal SCC *Geronticus calvus* (Southern Bald Ibis; Vulnerable (VU)) and *Leptailurus serval* (Serval; NT) to occur.
- The Modified Grassland habitat unit: No SCC, protected or TOPS-listed species were recorded within this habitat unit, and such species have a low probability of occurrence due to past disturbances within this habitat unit.
- The Wetland habitat unit: The wetland/ grassland mosaics associated with the seep wetlands may provide habitat for *Otomys auratus* (Vlei Rat; NT). It must however be noted that cumulative loss of wetland-grassland mosaics within the catchment may increase the importance of such habitat for this species.

The site falls within the Sterkfontein Dam Nature Reserve IBA, that was expanded in 2014 to link with the Maloti Drakensberg Park IBA, which incorporates a Cape Vulture (Gyps coprotheres) breeding colony. Important bird species of this IBA include: Cape Vulture, Southern Bald Ibis (Geronticus calvus), Grey Crowned Crane (Balearica regulorum), Rudd's Lark (Heteromirafra ruddi), Bearded Vulture (Gypaetus barbatus), Blue Crane (Anthropoides paradiseus), Blue Korhaan (Eupodotis caerulescens), Melodious Lark (Mirafra cheniana), Denham's Bustard (Neotis denhami), Secretarybird (Sagittarius serpentarius) and Yellow-breasted Pipit (Anthus chloris) (Marnewick, 2015, from Widdows, 2021).

11.6 Biodiversity & Strategic Area Classification

The resort infrastructure footprint does not fall in a Critical Biodiversity Area (CBA) or Ecological Support Area (ESA), however the northern section of the property is categorized as an ESA according to the KZN Biodiversity Sector Plan.

The northern section of the property additionally falls within the Sterkfontein Dam Nature Reserve IBA and the Maluti Grassland National Protected Areas Expansion Strategy. The closest conservation areas include the Ukhahlamba Drakensberg Park World Heritage Site and Robinson's Bush and Poccolan Bush Nature Reserves.

The entire property falls within the Northern Drakensberg Strategic Water Source Area.

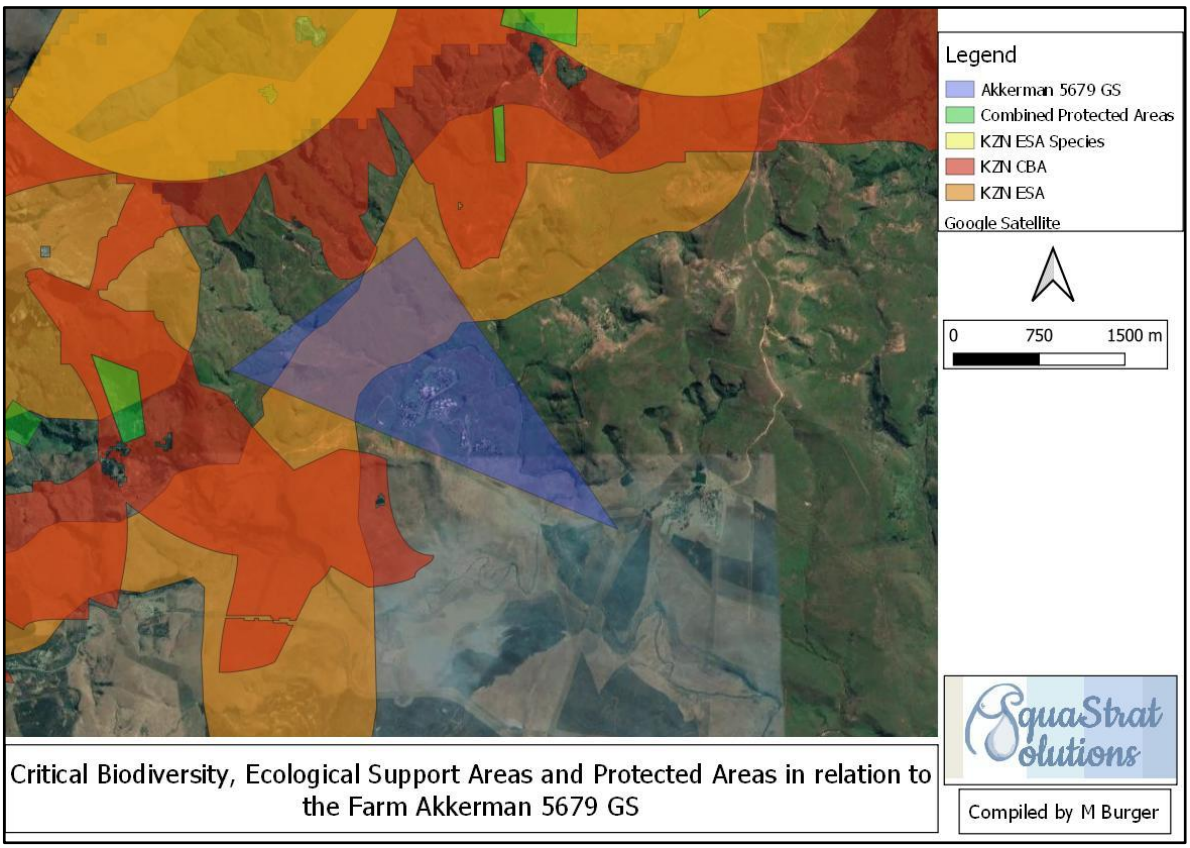


Figure 12: CBA and ESAs in relation to the Farm Akkerman 5679 GS.

As indicated on the uThukela District Municipality Terrestrial Systematic Conservation Plan, the resort falls in between CBA irreplaceable areas and along the Tugela North Corridor as well as the KZN Nature Conservation areas. The erosion control gabion installation activity, as well as the Protected Area goal and activities, align with National Outcome No. 10, among others, of the above Conservation Plan: the protection and enhancement of environmental assets and natural resources.

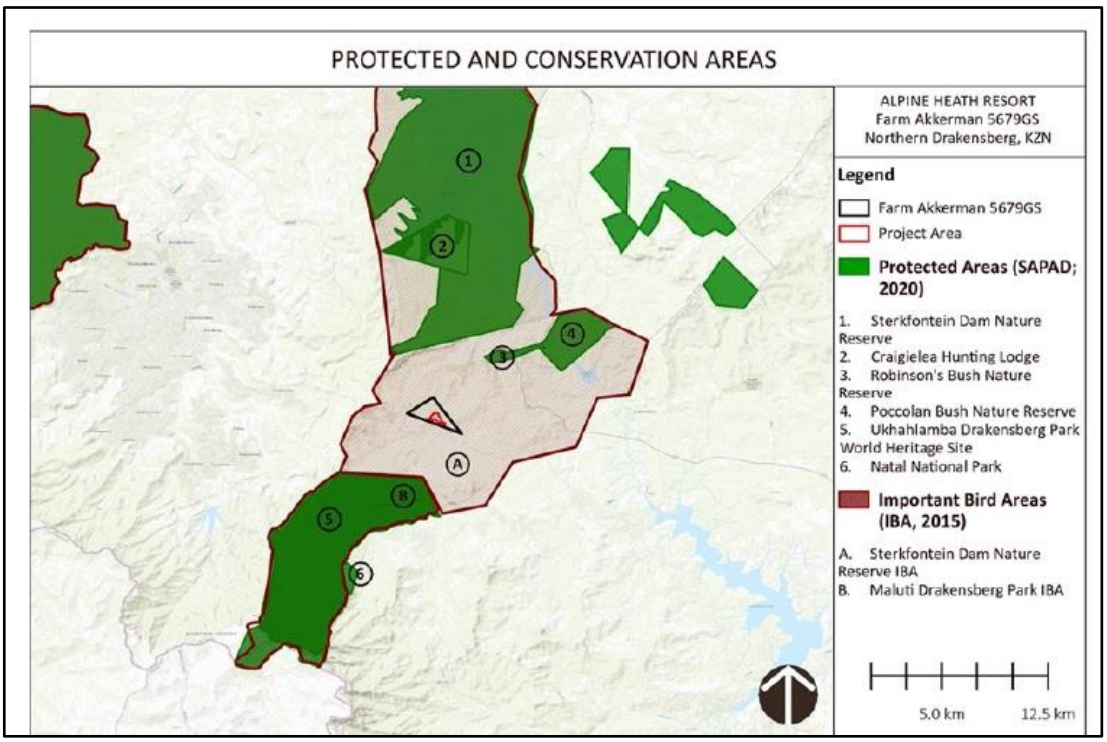


Figure 13: IBAs and Protected Areas in relation to the Farm Akkerman 5679 GS and the resort footprint (Pretorius & Widdows, 2021).

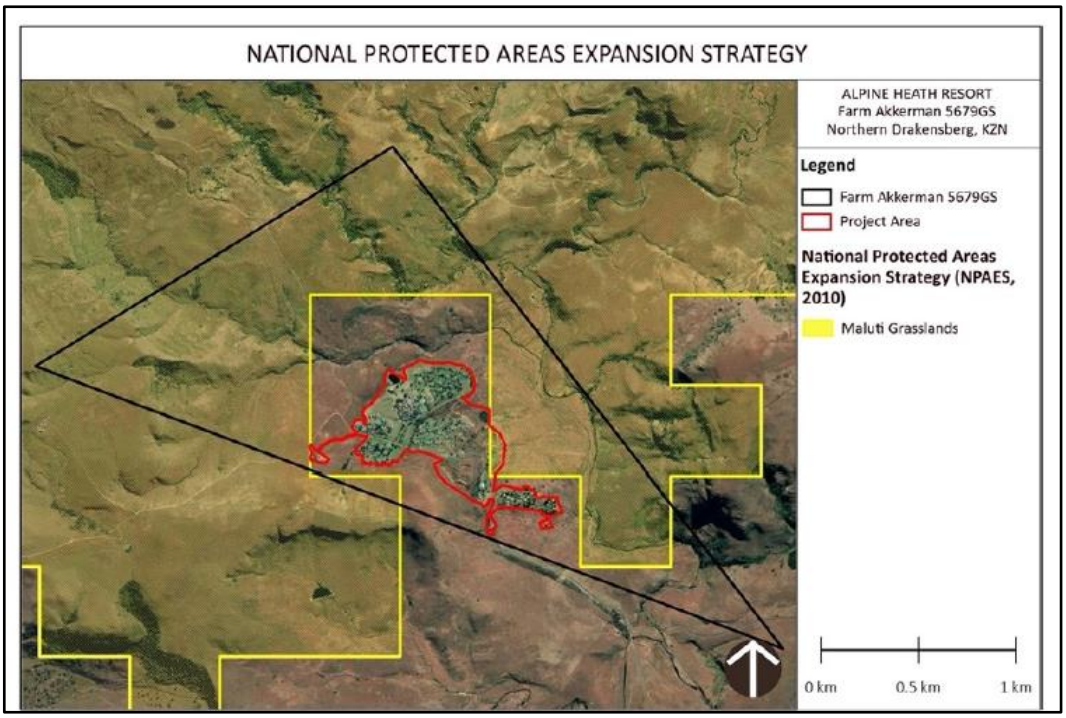


Figure 14: NPAES Areas in relation to the Farm Akkerman 5679 GS and the resort footprint (Pretorius & Widdows, 2021).

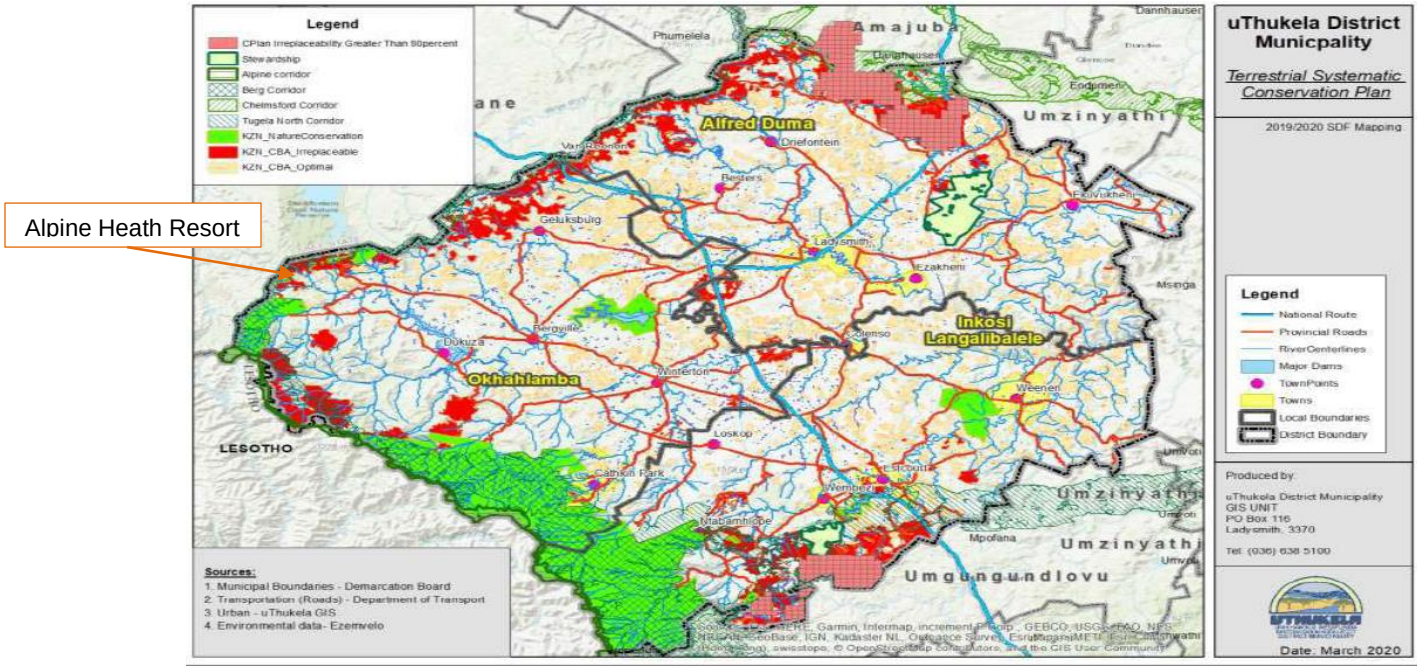


Figure 15: uThukela District Municipality Terrestrial Systematic Conservation Plan (2019/2020 SDF from 2020/21 IDP).

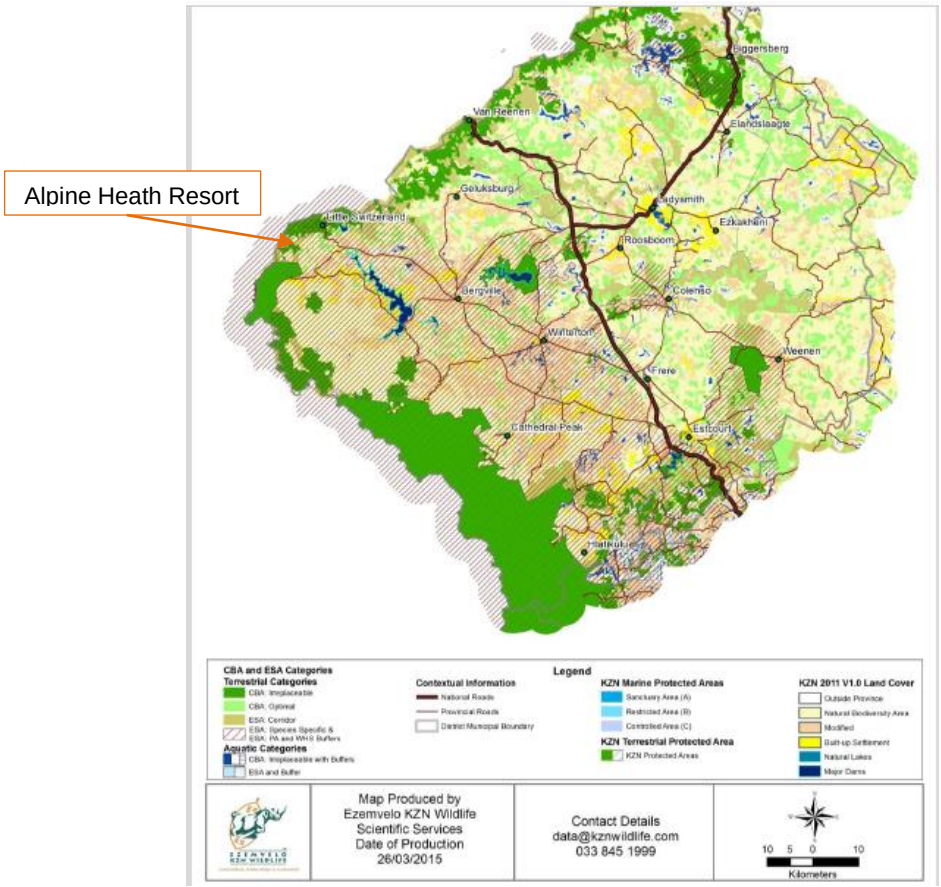


Figure 16: uThukela Biodiversity Sector Plan Map (Ezemvelo KZN Wildlife, 2015).

The resort also falls in the Maloti-Drakensberg Transfrontier Project (MDTP) that encompasses the Ukhahlamba Drakensberg Park, a World Heritage Site. According to the uThukela Biodiversity Sector Plan of 2015, the site falls in an Ecological Support Area (ESA) corridor. The Okhahlamba Local Municipality categorizes the area in which the site falls as Biodiversity Priority Area 1 and includes areas that need to be protected for their high biodiversity value.

11.7 Heritage Aspects

Archaeology:

- Enclosed graves older than 60 years are present within the site footprint
- Rock art paintings older than 100 years are present on the farm Akkerman 5679 GS
- A dwelling older than 60 years is present within the site footprint

Written approval is required to damage, alter, exhume or remove from its original position – graves on site according to the National Heritage Resources Act (Act 25 of 1999) (Marais-Botes, 2021).

Palaeontology:

No fossiliferous outcrop was found in the current footprint of the resort or in gabion installation areas (Butler, 2021).

11.8 Hydrology and Flood lines

The catchment was determined to be 30.4km^2 in extent. The hydrology assessment concluded that the water abstraction from the Putterill River, which is 10% of the annual total water demand of 15 200m^3 for the resort, taking the Ecological Water Requirements (EWR) into account (Bailey, 2021).

The predicted 1:100 year flood line showed that a small section of the Beauty Salon and Spa building is inside the 1:100 year flood, however detailed ground survey data may prove the expected flooding to be less severe. The predicted extent of flooding in the watercourses within the study area would generally be limited to the natural river channels and the adjoining floodplains. While the delineated floodlines are influenced by the relatively coarse nature of the available topographic data, they appear to be sufficiently accurate for environmental planning purposes (Robinson, 2021).

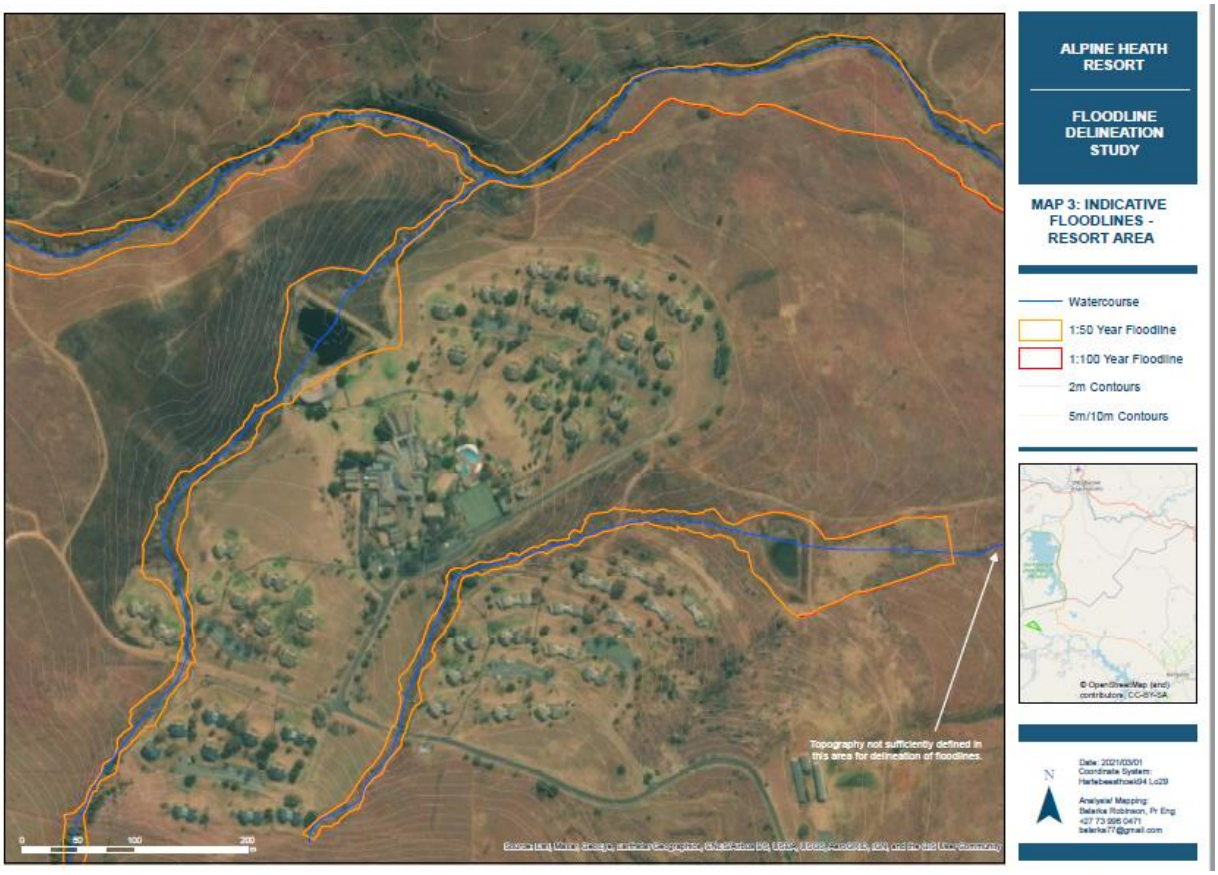


Figure 17. Floodline delineation assessment of Alpine Heath Resort (Robinson, 2021).

12. Socio-economic Description

The area was mostly characterized by scattered agricultural activities in the catchment with land clearing increasing in the 1990s. Bergville is a small town situated in the foothills of the Drakensberg mountains, KwaZulu-Natal, South Africa. It was established as Bergville Mountain Village in 1897 and is now the commercial centre for a 2,500 km2 dairy and cattle ranching area. Bergville is equidistant from Johannesburg and Durban and is also known as the gateway to the Northern Drakensberg holiday resorts. It lies on Route R74 which is a more scenic alternative to the N3 Toll Road. This route takes one via the Oliviershoek Pass, traditionally used to access the Drakensberg, from Johannesburg.

The residents of this area were reliant on agricultural activities for employment opportunities, however tourism now plays a very large role in the Drakensberg in terms of employment.

Ideally situated midway between Durban and Johannesburg, Alpine Heath Resort & Conference Centre gives families and nature-lovers the opportunity to explore their surroundings with luxury Drakensberg accommodation as a home base. The Drakensberg is home to many historical and cultural aspects and experiences and the resort offers the

ideal accommodation from which to explore these aspects. The resort is open to the public for accommodation bookings.

The resort is surrounded by reclaimed nature reserves (Royal Natal National Park and Rugged Glen Nature Reserve) and protected environmental and biodiversity areas (Poccolan/Robinson's Bush near Little Switzerland). The region has been identified as a tourism development node by provincial planning and environmental authorities as a part of the uKhahlamba Drakensberg Park World Heritage Site as a "wilderness resource". This is part of the motivation to get involved in the Proposed Northern Drakensberg Protected Area (described below). In addition, Alpine Heath Resort and Conference Centre is a property of the aha Hotel and Lodges Group, a division of Tourvest Holdings, that this recently announced a corporate conservation partnership with the Endangered Wildlife Trust (Barker, 2021).

13. Methodology for Impact Determination

13.1 Methodology of this assessment

The impact assessment processes were developed in order to:

(a) identify potential impacts of a proposed development/activity on the environment
(b) predict the likely nature of these impacts and
(c) evaluate the significance of the potential impacts.

Significance is a fundamental concept in the impact assessment steps above and ultimately, in decision-making within the specific socio-economic and environmental contexts. Significance consists broadly of three forms, namely Institutional recognition (including legislation, policies, guidelines), Public recognition (ex. voluntary conservation action) and Technical recognition (scientific and technical assessments of critical resource characteristics).

Significance can be determined in terms of a three-stage process involving scaling, weighting and aggregation (DEAT, 2002).

Scaling is the standardization of empirical data onto a common scale to allow comparisons between different types of impacts.

Weighting is the imposition of professional and/or societal values on a range of potential environmental impacts.

Aggregation is the combination of different types of impact values to produce composite scores, which facilitates a comparison of project alternatives.

Predictions on the nature of the impacts are based on simplified conceptual models of how natural processes function. Criteria that can be used to describe the nature of an impact include (DEAT, 2002; GN 326 of 2017; Chetty, 2015):

- spatial extent;
- resource sensitivity
- duration and timing of the impact;
- intensity or severity of the impact;
- status of the impact (i.e. either positive (a benefit) or negative (a cost) or neutral);
- reversibility (i.e. reversible or permanent);
- probability of occurrence
- degree of certainty; and
- mitigatory potential.

13.2 Rating

Although there are numerous approaches internationally to impact determination, the current general practice of determining significance is to derive it from a combination of scientific methods and values ascribed by the EIA team. The criteria from the list in 12.1 were incorporated in the four main aspects of significance determination, including spatial scale, duration, severity and probability. Rating of each criteria is based on a sliding scale with high impacts rated as 3, medium as 2 and low as 1. Each significance score is therefore assessed in relation to the highest impact potential score of 12. Degree of certainty is indicated for each aspect assessed, however is not included in the significance rating calculation. Degree of certainty is based on the following criteria: Scientific data (specialist assessment) specified (SD); Inferred from specialist assessment (IS); and Generally associated impact (GI). The criteria for rating the nature of impacts (DEAT, 2002) are illustrated below:

Table 15: Criteria for rating the extent or spatial scale of impacts

Spatial scale Rating		**Numerical rating**
High	Widespread; international scale	5
Medium-high	Regional or national	4
Medium	Beyond site boundary; greater surrounding area	3
Low-medium	Beyond footprint or cadastral boundary	2
Low	Within site boundary or footprint	1

Table 16: Criteria for rating the duration of impacts

Duration Rating		Numerical rating
High (Long term)	Permanent; long term	5
Medium-high	Impact will cease after operational life of activity	4
Medium (Medium term)	Reversible over time; Medium term (5 – 15 years).	3
Low-medium	Reversible; 1 – 5 years	2
Low (Short term)	Quickly reversible; short term (0 – 1 year).	1

Table 17: Criteria for rating intensity or severity of impacts

Severity Rating		Numerical rating
High	Substantial disturbance of pristine areas that have important conservation value; Destruction and/or permanent cessation of rare or endangered species and/or ecosystem pattern, process and functions.	5
Medium-high	Significant disturbance and temporary cessation of ecosystem pattern, process and functions; Important, sensitive or vulnerable systems are significantly affected.	4
Medium	Disturbance to important, vulnerable or sensitive systems but ecosystem pattern, process and functions can continue (modified).	3
Low-medium	Slight impact on ecosystem pattern, process and function	2
Low	Small negative impact on quality of ecosystem but process, pattern and functions are not affected.	1

Table 18: Criteria for rating probability of impacts occurring

Probability Rating		Numerical rating
High	Impact will occur regardless of prevention or mitigation	5
Medium -high	High probability of occurrence	4

Medium	Distinct probability of occurrence	3
Low-medium	Some possibility of occurrence	2
Low	Not likely to occur	1

Table 19: Summary of impact magnitude and significance

Impact Magnitude and Significance Rating		Rating range
High	Impact will have a significant effect on the receiving environment and is likely to be irreversible, which could result in a fatal flaw for the project. Alternatives to the proposed activity should be investigated.	**80 - 100**
Moderate to High	Impact will have a significant effect on the receiving environment and strict implementation of mitigation measures and monitoring as well as high level of compliance is required.	**60 - 79**
Moderate	Impact is likely to have a negative effect on the receiving environment and requires implementation of mitigation measures and routine monitoring to ensure effectiveness of mitigation.	**40 - 59**
Low to Moderate	Impact is considered to be acceptable and mitigation measures are recommended.	**20 - 39**
Low impact	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural and economic activities of communities can continue unchanged.	**0 - 19**

13.3 Mitigation

Mitigation is defined in the EIA Regulations (GN 326 of 2017) as “to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible”. Mitigation measures are included in each specialist assessment and these are included in the impact assessment to show an impact score before and after mitigation.

14. Impact Assessment

14.1 Project assessment background

This impact assessment is based on the proposed construction / installation of the following:

(a) Gabion installation along eroded drainage line

The current impacts of the resort activities on the environment, although not evaluated in this Basic Assessment Report, are discussed in the specialist reports, and include mitigation and monitoring requirements for these impacts.

The Environmental Management Plan with relevant Schedule include all current impacts, as well as expected impacts from the proposed gabion installation activities, as well as mitigation, monitoring and auditing requirements.

13.1.1 IMPACTS THAT MAY RESULT FROM THE **CONSTRUCTION PHASE**: **EROSION CONTROL GABION INSTALLATION**

Potential impacts:	**Spatial scale**	**Duration**	**Severity**	**Probability**	**Degree of certainty**	**Significance before mitigation**	**Proposed mitigation:**	**Significance after mitigation**	**Risk management measures**
TERRESTRIAL BIODIVERSITY									
Destruction of habitat due to vegetation clearing.	1	1	1	2	IS	25% Low-moderate	• All construction-related impacts (including access to activity site, storing of equipment/building materials/vehicles or any other activity) should be kept out of sensitive areas. • Declared weed and invader species must be removed – ongoing after construction/installation. • All areas of disturbed and compacted soils need to be ripped, landscaped and be prepared for vegetation re-establishment to avoid progressive habitat degradation.	19% Low	- Appoint an ECO during construction to ensure compliance with the EMP and authorizations - Implement Rehabilitation measures - Ongoing monitoring and management as per EMP to be implemented by Resort Management
Proliferation of Alien Invasive species					SD	52% Moderate		27% Low - moderate	
Loss of Fauna and Flora (Biodiversity)	1	1	2	2	SD	30% Low-moderate		12% Low	
Soil contamination	1	1	1	2	GI	25% Low-moderate		19% Low	
Soil erosion	3	5	4	3	SD	75% Moderate - high		30% Low - moderate	

							• Spills and waste should be immediately cleaned up/removed. Spill kit on site. • Topsoil must be stored separately to protect seedbank for vegetation re-establishment. • The development footprint must remain as small as possible and the amount of vegetation cleared must be limited to what is absolutely necessary. • The gabions must be strictly installed according to manufacturer's specifications, must be stable and not contribute towards erosion or downstream sedimentation.		
AQUATIC ECOSYSTEMS									
Geomorphology: Sedimentation	2	2	2	2	SD	10% Low	• Instream sediment control to be implemented during construction/installation of gabions. • Installation must take place in the dry season (winter)	8% Low	The risk is related to the habitat requirements of the Natal stargazer catfish. Strict erosion control measures must be implemented during the
Water Quality	2	2	2	2	SD	52% Moderate		24% Low to moderate	
Hydrology	1	1	2	2	IS	30%		19%	

						Low to moderate	• Regular inspection of gabion structures after rainfall events for the first two years. • Avoid hydrocarbon and construction material spills in the watercourse and buffer areas – waste management. • Rehabilitation (including re-establishment of indigenous vegetation) of the construction/installation footprint around the structures is essential.	Low	construction/installation and rehabilitation must continue after installation. - Appoint an ECO during construction to ensure compliance with the EMP and authorizations - Implement Rehabilitation measures - Ongoing monitoring and management as per EMP to be implemented by Resort Management
Habitat & biota	2	2	2	2	SD	39% Low to moderate		18% Low	
WATER RESOURCES									
Groundwater Resource	1	1	1	1	GI	19% Low	• Groundwater and instream abstraction volume may not exceed the recommended rates and volumes. Additional water that may be required during the construction phase is expected to be minimal.	19% Low	Strict adherence to volume and rate recommendations. External audits to be done as per EMP.
Hydrology	2	1	1	1	IS	30% Low to moderate		20% Low	

							• Waste management implementation and sedimentation control must be implemented		
HERITAGE RESOURCES									
Destruction of unidentified heritage sites	1	1	1	1	IS	25% Low to moderate	• If archaeological sites or graves or fossil remains are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	19% Low	Heritage resources could be destroyed by construction activities, and any archaeological or palaeontological must be report to the ECO and the relevant Heritage practitioner.
AIR QUALITY									
Fugitive particulate emissions (dust) related to construction activities.	1	1	1	1	GI	25% Low to moderate	• Dust Control measures to be put in place as per the EMPr.	19% Low	Expected risk is low as the scope of the activities is limited to erosion control gabion installation.
WASTE MANAGEMENT									
Soil/water/air pollution due to improper waste handling, storage and disposal	1	1	2	2	GI	30% Low to moderate	• General litter from construction workers as well as construction waste on site must be effectively controlled.	19% Low	With the implementation of mitigation methods all impacts of the construction phase can be prevented.

							• The Contractor shall prevent littering and the random discard of solid waste on the site. • Waste collected during the construction phase will be recycled, re-used or recovered as far as economically feasible.		
NOISE									
Nuisance to visitors and neighbouring residents from construction activities.	1	1	2	2	GI	30% Low to moderate	• The contractor must be familiar with and adhere to any regulations and local by-laws regarding the generation of noise and hours of operation. • All construction activity will take place during normal working hours.	19% Low	Nuisance noise caused by construction activities is expected to be of short duration.
TRAFFIC									
Increased traffic in the project area and in the region	1	1	2	2	GI	30% Low to moderate	• All contractors should commit to following road safety rules.	19% Low	Traffic is not expected to be significantly impacted.

Risks to the safety of pedestrians and road users	1	1	2	2	GI	30% Low to moderate	• Traffic to and from the construction site should be limited to daylight hours. • Appropriate signage must be placed. • Contractor must ensure that trucks are not overloaded.	19% Low	Normal road rules and precautions apply.

13.1.2 IMPACTS THAT MAY RESULT FROM THE **OPERATIONAL PHASE**: **EROSION CONTROL GABION INSTALLATION**

Potential impacts:	**Spatial scale**	**Duration**	**Severity**	**Probability**	**Degree of certainty**	**Significance before mitigation**	**Proposed mitigation:**	**Significance after mitigation**	**Risk management measures**
TERRESTRIAL & AQUATIC BIODIVERSITY									
Habitat & biota	2	2	2	1	SD	35% Low to moderate	• Declared weed and invader species must be removed – ongoing after construction/installation. • All areas of disturbed and compacted soils need to be ripped, landscaped and be prepared for vegetation re-establishment to avoid progressive habitat degradation. • Indigenous vegetation must be used for rehabilitation of impacted areas • Ongoing maintenance may be required where floods damage gabion structures • Stabilize slopes steeper than 1:3 or where soils are dispersive/sandy	18% Low	- Ongoing monitoring and management as per EMP to be implemented by Resort Management
Proliferation of Alien Invasive species					SD	52% Moderate		27% Low - moderate	
Loss of Fauna and Flora (Biodiversity)	1	1	2	1	SD	25% Low-moderate		12% Low	
Soil erosion and sedimentation	2	2	2	2	SD	40% Moderate		30% Low - moderate	

							• Address erosion immediately once noted to avoid further damage • Hand-pulling and mechanical methods of removal should be used rather than chemical control in wetlands and drainage channels and if chemicals are use, manufacturer's specifications are to be followed.		

15. Mitigation Measures and EMPr

The following mitigation measures include a summary of main mitigation measures proposed by the respective specialist reports and the EMP contains a more detailed exposition of all mitigation measures, monitoring and auditing.

Vegetation

- Ongoing alien invasive species management must take place, with emphasis on eradicating NEMBA Category 1b listed alien invasive species.
- Alien and ornamental species encroachment into the surrounding natural areas must be prevented.
- Should alien ornamental floral species die off, these are to be replaced with locally indigenous floral species.
- Erosion must be strictly managed and immediately rectified where noted using soft engineering techniques and indigenous grass species, to prevent impacts on adjacent natural habitat.
- The development boundaries should be maintained in such a way as to ensure a natural ecotone between the development footprint and the surrounding landscape.
- Relevant staff should be educated on the presence of *Podocarpus latifolius* in terms of permit requirements for cutting/disturbing this tree.
- Landscaping staff should be educated on the presence of *Bradypodion dracomontanum* to ensure none are harmed during landscaping/ cutting of trees. Staff should also be educated on the confirmed and potential presence of nationally protected tree species within the existing infrastructure footprint area.

Wetland

- The use of only endemic indigenous plants for the landscaping of the development,
- Storm water management on site must take cognisance of possible pollution arising from the site, with emphasis on hydrocarbon pollution. As the depression wetland will assimilate these impacts over time the development must use sustainable urban drainage systems to mitigate these impacts, this must also include the mitigation of speeds of storm water entering the wetland from the study site.
- Signage must also be included to increase awareness of the wetland found on site and the impact of customers on the wetland.
- Allowance must be made for overtopping of the banks of the wetland during flooding events.

- Fencing of the site adjacent to the wetland area must be limited.
- Increased bins for litter, combined with signage indicating the use of the bins.

River and channels

- eDNA technology to establish presence of alien invasive fish species
- investigate draining the Boma Dam to remove Largemouth Bass
- investigate mechanisms to prevent release of Rainbow Trout to downstream reaches and routine monitoring of Alpine Heath fish population
- obtain permits for stocking and release of Rainbow Trout into the Boma dam
- No stocking of Rainbow Trout in the riverine reaches, and especially no Brown Trout is allowed in the dams or rivers associated with Alpine Heath

Fauna

- Low UV lighting must be utilised as far as possible so as to not impact nocturnal faunal-invertebrate dynamics, through the attraction of species to these artificially lit areas. Lights located on the project perimeter must preferably face away from sensitive habitats.
- No fires are allowed on site and especially no burning of waste is allowed.
- No hunting or removing of animal species or fishing of indigenous species is allowed on site.
- No disturbing of nests, burrows and other habitat of indigenous fauna is allowed on site.

Heritage Resources

Archaeology

- Protect graves and old dwelling from damage/destruction or removal
- Protect rock art painting and the area within 10m of these from damage/destruction as “No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council” according to the KZN Heritage Act, Act 4 of 2008, as well as the National Heritage Resources Act, Act 25 of 1999 .

Take note that “the ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or

meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government." (KZN HRA)
Note additionally that "The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site" (KZN HRA).

Palaeontology

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist (Butler, 2021).

Water Resources

Over abstraction of the Putterill River must be avoided and volumes need to be recorded daily and tallied monthly and annually to monitor and control water use from this resource. It is furthermore recommended that abstraction from the river be limited to the high flow months to avoid impacts on the flow characteristics of the watercourse as a precautionary measure for macroinvertebrate and fish assemblages.

Borehole yield tests can be considered as this will assist greatly in planning for sustainable use of this resource.
These abstractive water uses are to be included in the Water Use License Application.

16. Assumptions and Limitations

This report, including impact assessments, were made with information provided by the relevant specialist reports and available Departmental geographic databases. AquaStrat Solutions does not accept responsibility for conclusions made and mitigation measures proposed in good faith based on available databases or on the information provided. This report should therefore be viewed and implemented with these limitations in mind.

17. EAP Recommendation and Conclusion

Environmental impact statement

Proposal: Alpine Heath Erosion Control Gabion Installation

The resort footprint area is considered to be of low sensitivity and consists of built infrastructure, landscaped grounds and other open space areas. The Open Grassland habitat includes rocky slopes and elevated areas that have not been significantly impacted by agricultural or resort establishment activities. The Modified Grassland habitat has been previously utilised for agricultural purposes and includes a high abundance of listed alien invasive floral species. The Wetland habitat unit, including seep wetlands, drainage channels and the Putterill River, is considered sensitive.

The proposed activity of installing erosion control gabions do not pose a serious risk to the environment and expected impacts of the installation phase can be mitigated as specified in the EMP. The process initially expected to be followed (24G, refer to section 1.2.1 above) necessitated a wider scope of investigation than what is required for the process of applying for the erosion control gabion installation. In order to maximise the value of the information, the specialists were requested to include current impacts of the resort on the receiving environment, as well as mitigation measures for these impacts, in their assessment, additionally to the assessment and mitigation measures for the gabion installation activity.

The EMP therefore includes recommended mitigation and monitoring measures and frequency for all current impacts, all daily activities as well as expected impacts of the proposed erosion control activity on the site. The main nature conservation aim of Alpine Heath Resort EMP of 2001 is stated as ““to promote the wise use of natural resources of the estate and to prevent degradation of the environment” (Alpine Heath EMP 2001) and is reflected in the updated EMP of 2021. The expected outcomes of the 2021 EMP implementation include:

- Mitigation of potential impacts during the installation of gabions
- Enhancing terrestrial biodiversity by means of habitat management and improvement
- Enhancing aquatic biodiversity through responsible stocking of recreational fishing dams and protection of aquatic habitat
- Promoting sustainable use of water resources
- Protecting Heritage resources for present and future generations

- Minimizing impacts on the environment from solid and liquid waste sources

The preferred alternative of installing erosion control gabions will have the following positive impacts: Improved stability; Erosion and sedimentation control; Improvement of vegetation cover and prevention of alien invasive vegetation spread.

18. References

- Bailey, B. Floodline Delineation Study: Alpine Heath Resort.
- Barker, A. 2021. Alpine Heath Resort and Conference Centre: Sustainability and Environmental Initiatives. Trustee Communication 15 February 2021.
- Butler, E. 2021. Palaeontological Impact Assessment for the proposed Erosion Control Gabion Installation at Alpine Heath Resort on the Farm Akkerman No 5679 in the Bergville District, KZN.
- Chetty, M. 2015. Methodologies used for determining impact significance and the implications for EIA effectiveness in South Africa: Case studies from KwaZulu-Natal. Masters of Science Dissertation in Environmental Science.
- Clark & Thomas Architects Photographic Report, 1994 – 2000
- DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs And Tourism (DEAT), Pretoria
- Department of Rural Development and Land Reform (DRDLR) National Geo-spatial Information (NGI) accessed Nov 2020, Jan 2021.
- Ezemvelo KZN Biodiversity Sector Plan, V2.0 (2015)
- Grant, B. 2021. Aquatic Ecosystem Baseline & Impact Assessment of aha Alpine Heath Resort & Conference Centre, Northern Drakensberg.
- Harrison, R. Wetland Impact Assessment for the Environmental Application and Water Use License Application at the Alpine Heath Resort, on the Farm Akkerman 5679 GS, located within the Okhahlamba Local Municipality, KZN.
- Marais-Botes, L. Phase 1 Heritage Impact Assessment (HIA) for the Alpine Heath Resort on the Farm Akkerman 5679 GS, Northern Drakensberg, KZN.
- Mucina, L. & Rutherford, M.C. 2006. *The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19.* South African National Biodiversity Institute, Pretoria.
- Okhahlamba Local Municipality Draft IDP 2016/2017

- Pretorius M & Widdows C. 2021. Terrestrial Biodiversity Assessment as part of the Environmental Authorisation Process for the Alpine Heath Resort Located on Farm Akkerman 5679 GS, Northern Drakensberg, Kwazulu-Natal.
- Robinson, B. Alpine Heath Resort Floodline Delineation Study. March 2021.
- UThukela District Municipality IDP 2020/2021