

# **JADE HILLS FARMING PTY LTD: THE PROPOSED CONSTRUCTION OF THE NEW JADE HILLS DAM**

**ON PORTION 26 OF FARM STINKFONTEIN 383, CERES, WESTERN CAPE**

## **DRAFT ENVIRONMENTAL IMPACT REPORT**



**DEADP REF: 16/3/3/2/B5/2/1054/20**

March 2021

# **JADE HILLS FARMING PTY LTD**

## **PROPOSED CONSTRUCTION OF THE NEW JADE HILLS DAM**

On Portion 26 of Farm Stinkfontein 383, Ceres, Western Cape

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### **PREPARED FOR:**

**Jade Hills Pty (LTD)**

**P.O. Box 72**

**Ceres**

**6835**

**Tel: 083 256 2567**

### **PREPARED BY:**

**EnviroAfrica**

**P.O. Box 5367**

**Helderberg**

**7135**

**Tel: 021 – 851 1616**

**Fax: 086 – 512 0154**

## INDEPENDENCE & CONDITIONS

EnviroAfrica is an independent consulting firm that has no interest in the proposed activity other than fair remuneration for services rendered. Remuneration for services is not linked to approval by decision making authorities and EnviroAfrica has no interest in secondary or downstream development as a result of this project. There are no circumstances that compromise the objectivity of this Environmental Impact Report. The findings, results, observations and recommendations given here are based on the author's best scientific and professional knowledge and available information. EnviroAfrica reserves the right to modify aspects of this report, including the recommendations if new information becomes available which may have a significant impact on the findings of this report.

## RELEVANT QUALIFICATIONS & EXPERIENCE OF THE EAP

This Draft Environmental Impact Report was compiled by Clinton Geyser who has a MSc. Degree in Environmental Management. He has been working as an Environmental Assessment Practitioner since 2009 and is currently employed at EnviroAfrica cc.

### Qualifications:

- BSc. Earth Sciences, Majors in Geology and Geography and Environmental Management (1998 – 2000) and;
- BSc. (hons): Geography and Environmental Management (2001) and;
- MSc. Geography and Environmental Management (2002), all from the University of Johannesburg.

### Expertise:

Clinton Geyser has over eleven years' experience in the environmental management field as an Environmental Assessment Practitioner and as an Environmental Control Officer, having worked on a variety of projects in the Western, Eastern and Northern Cape.

The entire process and report was supervised by Bernard De Witt who has more than 20 years' experience in environmental management and environmental impact assessments.

Please refer to **Appendix 13** for the CV's of the EAPs.

# CONTENTS

INDEPENDENCE & CONDITIONS .....	3
RELEVANT QUALITIFICATIONS & EXPERIENCE OF THE EAP.....	3
1. INTRODUCTION.....	7
2. NEED AND DESIRABILITY .....	10
2.1    NEED .....	10
2.2    DESIRABILITY .....	10
3. LEGAL REQUIREMENTS .....	11
3.1    THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA.....	11
3.2    NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) .....	11
3.3    NATIONAL HERITAGE RESOURCES ACT.....	13
3.4    EIA GUIDELINE AND INFORMATION DOCUMENT SERIES.....	14
3.6    NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT.....	15
4. ALTERNATIVES .....	16
4.1    SITE ALTERNATIVES FOR THE PROPOSED DAM.....	16
4.2    ACTIVITY ALTERNATIVES .....	16
4.3    NO-GO ALTERNATIVE .....	16
5. SITE DESCRIPTION .....	17
5.1    LOCATION .....	17
5.2    VEGETATION .....	18
5.3    CRITICAL BIODIVERSITY AREAS .....	19
5.4    FRESHWATER .....	20
5.5    CLIMATE .....	21
5.6    SOCIO-ECONOMIC CONTEXT .....	21
5.7    HERITAGE FEATURES.....	22
6. PROCESS TO DATE .....	23
6.1    TASKS UNDERTAKEN TO DATE .....	23
6.2    TASKS TO BE UNDERTAKEN DURING THE EIA PHASE .....	24
6.3    PROFESSIONAL TEAM .....	25
6.4    PUBLIC PARTICIPATION.....	25
6.4.1    PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE: .....	27
6.4.2    INTERESTED AND AFFECTED PARTIES .....	27
7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS.....	28
8. SPECIALIST STUDIES.....	31
8.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS .....	31
8.2    BREIFS FOR SPECIALIST STUDIES .....	31
9. ENVIRONMENTAL IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION METHODOLOGY.....	34
ENVIRONMENTAL SIGNIFIGANCE RISK RATING .....	36
10.ASSESSMENT OF ENVIRONMENTAL IMPACTS.....	37
10.1    Botanical Impact Assessment .....	37
10.2    Freshwater Verification and Risk Assessment.....	40
10.3    Heritage Assessment .....	45
11.SUMMARY OF IMPACTS .....	47
11.1 Summary of Impacts.....	47
12.CONCLUSION AND RECOMMENDATIONS .....	50
13.DETAILS AND EXPERTISE OF THE EAP .....	52

## **APPENDICES**

<b>APPENDIX 1:</b>	<b>LOCALITY MAPS</b>
<b>APPENDIX 2:</b>	<b>PRELIMINARY DESIGN DRAWINGS</b>
<b>APPENDIX 3:</b>	<b>SITE PHOTOGRAPHS</b>
<b>APPENDIX 4:</b>	<b>SENSITIVITY MAPS</b>
<b>APPENDIX 5:</b>	<b>AUTHORITY CORRESPONDENCE</b>
<b>APPENDIX 6:</b>	<b>PUBLIC PARTICIPATION PROCESS</b>
<b>APPENDIX 7:</b>	<b>SPECIALIST REPORTS</b>
<b>APPENDIX 8:</b>	<b>IMPACT ASSESSMENT RATINGS</b>
<b>APPENDIX 9:</b>	<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>
<b>APPENDIX 10:</b>	<b>MAINTENANCE MANAGEMENT PROGRAMME</b>
<b>APPENDIX 11:</b>	<b>PRELIMINARY DESIGN REPORT AND WULA REPORT</b>
<b>APPENDIX 12:</b>	<b>OTHER DOCUMENTATION</b>
<b>APPENDIX 13:</b>	<b>EAP CV</b>
<b>APPENDIX 14:</b>	<b>SIGNED DECLARATIONS</b>

## **ACRONYMS**

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
MMP	Maintenance Management Plan
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
ESA	Ecological Support Area
SAHRA	South African Heritage Resources Agency

SANBI  
WULA

South African National Biodiversity Institute  
Water Use Licence Application

# 1. INTRODUCTION

## 1.1 BACKGROUND

Agriculture is the main economic driver of the Cape Winelands area and mainly responsible for the socio-economic stability of the area.

Mr Jean Faul is the representative and landowner of Jade Hills Farming, and also the Applicant. This application is for the investigation and consideration of the construction of a new earth filled dam on Portion 26 of Farm Stinkfontein 383, Ceres, Western Cape or otherwise known as Jade Hills Farms.

The farm was bought from the previous landowners in 2013. The previous landowners farmed this property with the neighbouring property as one unit. When this property was sold off the existing 8.6ha listed water use with the Rietvallei scheme has come with it. The Rietvallei Scheme originates from the mid 1960's and was registered in June 1969 with a permit that entails surplus winter to be abstracted from the Titus River between 15 April to 30 September. The scheme originally consisted of contour earth trenches which was later upgraded to pipelines. The scheme currently has 8 abstraction points and serves a total of about 150ha over a few properties. Stinkfontein 383/26, also known as Jade Hills, has access to one of these abstraction points, namely Loxtonia/Jade Hills Delivery point, which has an allocation of 8.6ha out of the total 150ha. Please refer to the WULA Report, **Appendix 11.2**.

Consideration is therefore being given for the construction of the proposed Jade Hills dam for potting up of this particular winter water use for summer irrigation. The concerned water use was never potted up before due to the lack of storage capacity and was used on the neighbouring property, also belonging to the previous owner. The new owner of the property would like to ensure the productive use of this winter water use with the aim to establish an irrigated development on the previously dry-land farming property. Should the construction of the dam be approved, an expansion of about 10.5ha of fruit orchards is proposed. The establishment of 10.5ha fruit orchards would provide economic stability and job creation for a labour market that needs it urgently.

The proposed development entails the construction of a new dam for the storing of winter water for summer irrigation. It is proposed that the construction of the dam occurs in two phases. This application is for the investigation of the proposed phase 1 development. For phase 1 it is proposed that the dam will have a capacity of  $\pm 67000\text{m}^3$ , a maximum wall height of  $\pm 11.1\text{m}$  and a total surface area of  $\pm 2\text{ha}$ . An existing water use of (8.6ha) for the taking of water exists and water will come from the Rietvalley scheme for phase 1. A pipeline of approximately 700m with a diameter of 150mm is proposed from the Jade Hills Delivery Point. Water to flow via gravity to the dam.

The applicant is Jade Hills Farming (Pty) Ltd who will undertake the activity should it be approved. EnviroAfrica CC has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA). Sarel Bester Ingenieurs BK is responsible for the Water Use License Application (WULA) in terms of the National Water Act (Act 36 of 1998) (NWA).

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) on 03 December 2020. The Scoping Report and Plan of Study for EIA were approved by DEA&DP on 28 January 2021 and EnviroAfrica were advised to proceed with the EIA process (**Appendix 5.3**).

This Draft Environmental Impact Report (EIR) for comment, which will be submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) for consideration, forms part of the EIA process. The purpose of this Draft EIR for comment is to describe the proposed project, the process followed to date, to present alternatives and to identify the potential impacts of the proposed development on the receiving environment, as well as provide recommendations and mitigation measures as suggested by the specialist.

## 1.2 DESCRIPTION OF THE PROPOSED ACTIVITY

It is proposed that a farm storage dam be constructed on Portion 26 of Farm Stinkfontein No. 383. Water will be used for the irrigation of proposed 10.5ha of fruit orchards.

### Existing water use right & abstraction:

An existing water use of (8,6ha) for the taking of water exists and water will come from the Rietvallei scheme for phase 1. Please refer to figure 2 below and Appendix A, Locality Maps, for the existing Rietvallei Scheme Irrigation abstraction point, pipeline and Jade Hills delivery point. It is proposed that a  $\pm 700\text{m}$  long, 150mm diameter pipeline be constructed from the existing Jade Hills Delivery Point towards the dam from where water will flow via gravity to the proposed dam.

The eWULA process has been initiated by Sarel Bester Ingenieurs, WULA Reg nr: WU9322. The WULA includes the following activities under the National Water Act:

- Section 21 (b) - storing of water
- Section 21 (c) - impeding or diverting the flow of a watercourse
- Section 21 (i) - altering the bed, banks, course or characteristics of a watercourse

Please refer to **Appendix 5.2** for a letter from Rietvallei Irrigation Board for confirmation of the exiting water use right for the property and **Appendix 11.2** for the WULA Report

### Proposed construction of the dam:

The proposed development entails the construction of a new dam for the storing of winter water for summer irrigation. The proposed that the dam will have a capacity of  $\pm 67000\text{m}^3$ , a maximum wall height if  $\pm 11.1\text{m}$  and a total surface area of  $\pm 2\text{ha}$ . A pumphouse of approximately  $40\text{m}^2$  is proposed on the upstream side of the dam wall.

**Table 1: Proposed Development of Jade Hills Dam**

Description	Phase 1
Wall height (m)	11.1 m
Wall length (m)	237 m
Dam Capacity ( $\text{m}^3$ )	67 000 $\text{m}^3$
Flooded area (Ha)	1.7 ha
Footprint area (Ha)	2.0 ha

The dam will be located on existing agricultural land (wheat farming) on the same property where the 10.5ha of fruit orchards will be established. The location was chosen to ensure the project life cycle



costs are minimised (gravity feed vs. pumping cost etc.). Farm roads between the fruit orchards is proposed and irrigation infrastructure will fall within farm roads on transformed land.

Access to the dam will be from existing farm roads and electricity will be from existing connections. Please see **Appendix 1** for locality maps and layout plans & **Appendix 2** for design drawings.



**Figure 1:** Google Earth image showing the locality of the proposed Jade Hills Dam and agricultural development site (red circle).



**Figure 2:** Google Earth image showing an overview of the development. The blue polygon is the proposed dam footprint, and the green polygon the proposed agricultural development. The blue line is the proposed pipeline. Portion 26 of Farm Stinkfontein No. 383 is indicated by the red polygon.

## 2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, and EIA 2014 regulations, as amended, the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e. the question of what is the most sustainable use of land.

### 2.1 NEED

This application is for the storage of an already existing water use. This existing water use could never be potted before due to inadequate storage capacity on the property and the water use was never be utilised to its full potential. Therefore, the need existed for the consideration for the construction of the proposed new Jade Hills dam. The water would be applied to its full potential and furthermore support agricultural development that will have a direct influence in the socio-economic status of the previously disadvantaged. Should the construction of the dam be approved, an expansion of about 10.5ha of fruit orchards is proposed. The establishment of 10.5ha fruit orchards will promote economic growth and about 12 additional permanent employment opportunities will be generated for a community that urgently needs it.

### 2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed dam development.

#### 2.2.1 Location and Accessibility

Portion 26 of Farm Stinkfontein No. 383 is a very small property with a rather flat local topography situated within the Ceres valley. From an engineering point of view, the location was chosen to ensure the project life cycle costs are minimised (gravity feed vs. pumping cost etc.). The site is considered the best and only economical option with a natural basin situated relatively high relative to the area-to-be-developed. The storage/cost ratio is considered viable under the circumstances requiring the least amount of earthworks while offering the best gravitational benefits with considering irrigation aspects, both considered positive from an economical point of view.

Both the existing as well as the proposed farm infrastructure lends itself towards this option. The proposed footprint is on existing fields without any negative impact on natural vegetation. The site is also situated close to the existing Rietvlei Scheme off-take point from where water would be received ensuring minimal losses.

Access to the farm will be from via existing farm roads, no additional access roads will need to be constructed.

Please refer to the locality and layout maps, included in **Appendix 1**, Design Layout Plans **Appendix 2**, with site photographs in **Appendix 3**.

### **2.2.2 Compatibility with the Surrounding Area**

The site is largely surrounded by agricultural activities, dry-land farming. This is evident in Figure 1 above and site photographs **Appendix 3**. Please also refer to the Crop census map, **Appendix 4**.

The proposed activity will therefore not be “out of character” with the surrounding land use and is expected to have a negligible impact on the visual character of the area.

## **3. LEGAL REQUIREMENTS**

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 24 (5): NEMA EIA Regulations 2010. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

### **3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA**

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

### **3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)**

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Western Cape to the Department of Environmental Affairs and Development Planning (DEA&DP).

On the 4 December 2014 the Minister of Environmental Affairs promulgated regulations in terms of environmental impact assessments, under sections 24(5) and 44 of NEMA, namely the EIA Regulations 2014 (GN No. R 326) these regulations were amended in April 2017, and include:

- GN No. R. 327 (Listing Notice 1);
- GN No. R. 325 (Listing Notice 2); and
- GN No. R. 324 (Listing Notice 3).

Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the 2014 EIA regulations, as amended in 2017, the following potentially listed activities may be triggered (refer to Table 2 below)



**Table 2: Summary of 2014 EIA regulations triggered**

<b>GN R327</b>	<b>Short description of relevant Activity(ies) in terms of Listing Notice 1</b>	<b>Description of specific portion of the development that might trigger the listed activity.</b>
12	<p>The <b>development</b> of;</p> <p>(iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size;</p> <p>(xii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs;</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p>	<p>Proposed development of a dam with a footprint of more than 100m<sup>2</sup> within an episodic drainage line. The proposed agricultural component and associated infrastructure will also be within 32m of the drainage line.</p>
19	<p>The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10cubic meters from a watercourse:</p>	<p>Proposed development of a dam will constitute the excavation of more than 10m<sup>3</sup> material in an episodic drainage line.</p>
27	<p>The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a MMP.</p>	<p>The proposed development will constitute that clearance of more than 1ha but less than 20ha of transformed/ disturbed vegetation.</p>
<b>GN R325</b>	<b>Short description of relevant Activity(ies) in terms of Listing Notice 2</b>	<b>Description of specific portion of the development that might trigger the listed activity.</b>
16	<p>Development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 meters or higher or where the high-water mark of the dam covers an area of 10ha or more.</p>	<p>It is proposed that the dam wall height is 11.1m</p>
<b>GN R324</b>	<b>Short description of relevant Activity(ies) in terms of Listing Notice 3</b>	<b>Description of specific portion of the development that might trigger the listed activity.</b>
12	<p>Clearance of an area of more than 300 m<sup>2</sup> of indigenous vegetation (i) Western Cape (i) Within any critically endangered or endangered ecosystem listed in terms of Section 53 of the NEMBA or prior to the publication of such a list, within an area that has be identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (ii) within a CBA identified in a bioregional plan.</p>	<p>The proposed activity will enable the clearance more than 300m<sup>2</sup> of transformed/ disturbed vegetation within an ESA2.</p>

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural and social interests. The activity seeks to provide additional employment and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people,*

*especially developmental and social benefits, as well providing additional employment and economic development opportunities.*

- Development will be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures will be included in the EMP.*
- Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the Environmental Management Programme (EMP) – *this will be included in the EIR.*
- The use of non-renewable natural resources will be responsible and equitable.
- The negative impacts on the environment and on people's environmental rights will be anticipated, investigated and prevented, and where they cannot be prevented, will be minimised and remedied.
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process.
- The social, economic and environmental impacts of the activity will be considered, assessed and evaluated, including the disadvantages and benefits.
- The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

### **3.3 NATIONAL HERITAGE RESOURCES ACT**

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority and in the Western Cape, SAHRA have, in most cases, delegated this authority to Heritage Western Cape (HWC).

In terms of Section 38 of the National Heritage Resources Act, SAHRA and/or HWC will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.*
- *any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent;*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may

destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

### 3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines that form part of the DEA&DP's *Environmental Impact Assessment Guideline and Information Document Series* (Dated: October 2011):

- ✓ *Guideline on Transitional Arrangements*
- ✓ *Guideline on Alternatives*
- ✓ *Guideline on Public Participation*
- ✓ *Guideline on Exemption Applications*
- ✓ *Guideline on Appeals*
- ✓ *Guideline on Need and Desirability*
- ✓ *Information Document on the Interpretation of the Listed Activities*
- ✓ *Information Document on Generic Terms of Reference for EAPs and Project Schedules*

### 3.5 NATIONAL WATER ACT

The National Water Act (Act no 36 of 1998) provides the legal framework for the effective and sustainable management of our water resources. The Act was published in 1998 with the aim of fundamentally reforming the past laws relating to water resources which were discriminatory and not appropriate to South African conditions. Central to the National Water Act is a recognition that water is scarce and precious resource that belongs to all of the people of South Africa. It also recognises the ultimate goal of water resource management is to achieve the sustainable use of water for the benefit of all South Africans. The Act aims to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders.

Besides the provisions of NEMA for this EIA process, the proposed dam also requires authorizations under the National Water Act (Act NO. 36 of 1998). The Breede-Gouritz Catchment Management Agency BGCMA is appointed by the Department of Water Affairs to manage this particular larger Breede & Gouritz CMA is appointed by the DWS to manage this particular larger Breede & Gouritz River catchment area whereas Titus River Irrigation Board is one of the smaller delegated entities to regulate water uses in the area in which the applicant's property is located. BGCMA will be a leading role-player in this EIA.

An existing water use of (8,6ha) for the taking of water exists and water will come from the Rietvallei scheme for phase 1 (**Appendix 5.2**). With adequate water-saving measures proposed, this will be sufficient for the proposed 10.5ha agricultural development.

The eWULA process has been initiated by Sarel Bester Ingenieers, WULA Reg nr: WU9322. The WULA includes the following activities under the National Water Act:

- Section 21 (b) - storing of water
- Section 21 (c) - impeding or diverting the flow of a watercourse
- Section 21 (i) - altering the bed, banks, course or characteristics of a watercourse

The proposed dam to fall within an episodic drainage line. Please refer to **Appendix 5.2** for a letter from Rietvallei Irrigation Board for confirmation of the existing water use right for the property and **Appendix 11.2** for the WULA Report

In terms of Chapter 12 of the National Water Act, the proposed dam is considered a dam with a safety risk. The dam therefore requires a permit to construct from the Dam Safety Office of the Department of Water Affairs. The design and construction must conform to the conditions of the Dam Safety Regulations as set out in Government Notice R139 in Government Gazette No. 35062 of 24 February 2012. Regulations 10 and 15 will be applicable to the proposed dam. A licence to construct application will only be submitted after an application for the safety classification of the proposed dam has been submitted, and only after the NEMA process has been concluded.

### **3.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT**

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities. The need to protect listed ecosystems is addressed (*Section 54*).

## **4. ALTERNATIVES**

Alternatives have been considered during the Scoping phase and these are described below.

### **4.1 SITE ALTERNATIVES FOR THE PROPOSED DAM**

Portion 26 of Farm Stinkfontein No 383, or Jade Hills is a very small property with a rather flat local topography situated in the Ceres valley. Due to the fact that property is rather small there are no other economically viable alternative sites available on the property. This particular site however is considered the best and only economical option with a natural basin situated relatively high relative to the area-to-be-developed.

Although not very good, the cost/storage ratio is considered viable under the circumstances requiring the least amount of earthworks while offering the best gravitational benefits when considering irrigation aspects, both considered positive from an economical point of view.

Other than that, there is no real viable alternatives, and both the existing as well as the proposed farm infrastructure lends itself towards this option. The proposed footprint is on existing fields without any negative impact on any natural vegetations. The site is also situated close to the existing Rietvlei Scheme off-take point from where the water would be received ensuring minimal losses.

Therefore, no other site alternatives were considered and investigated.

### **4.2 ACTIVITY ALTERNATIVES**

The purpose of the proposed dam is to provide storage capacity for the storage of existing water use right. No activity alternatives were considered.

### **4.3 NO-GO ALTERNATIVE**

This is the option of not developing the proposed dam. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not constructing the storage dam will not be realised. The existing water use would therefore never be utilised to its full potential and the proposed agricultural development of 10.5 ha of fruit orchards will not take place. This would have a direct impact on the socio-economic status of the previously disadvantaged groups, which is expected to create jobs in the area, as described in Section 2.1 above.



## 5. SITE DESCRIPTION

### 5.1 LOCATION

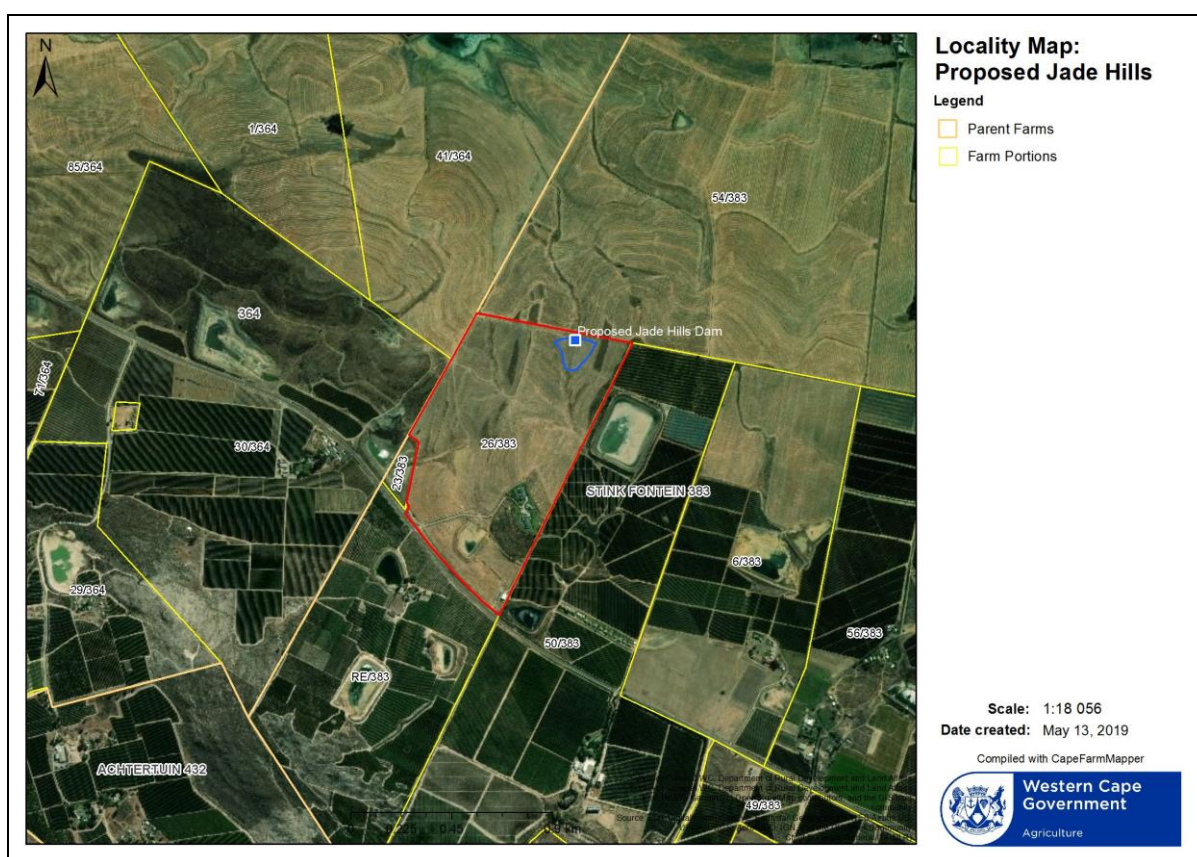
The site is located on Portion 26 of Farm Stinkfontein No. 383 otherwise known as Jade Hills Farm. The farm is located within the Ceres Valley about 6km east-south-east of Ceres. The proposed dam will fall on existing agricultural area (wheat production) and almost no remaining natural vegetation is expected. The drainage line of the property is also considered transformed with no natural vegetation.

The site coordinates for the dam wall are: S 33° 22'31.67", E19° 22'13.15".

The SG code for the property is: C01900000000038300026

Access to the farm is via existing access roads on the property.

Please refer to the figures below and Appendix 1 for Locality maps.



**Figure 2:** Locality Map indicating the proposed locality of Jade Hills dam on Portion 26 Farm Stinkfontein No 383, Ceres.



**Figure 3:** Photo taken standing in the proximity of the dam toe locality, facing North towards the locality of the dam wall. Episodic Drainage line visible in the photo

## 5.2 VEGETATION

The proposed dam will be located in an area that was utilized for wheat cultivation over a long period of time. Aerial imagery indicated that the site is most likely transformed as a result of past and present agricultural practices.

According to the Vegetation Map from Cape Farm Mapper (see figure 5 below and **Appendix 4**) the vegetation that would have been present on site would and would be affected by the proposed dam development is Ceres Shale Renosterveld. This type of vegetation is considered “Vulnerable” according to the *National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)*, *National List of Ecosystems that are threatened and in need of protection*. It is expected that the proposed dam will fall mostly on agricultural land and that no natural vegetation will be lost. Please refer to the figure above and **Appendix 3** for site photographs.





**Figure 4:** Vegetation Map, Cape Farm Mapper

Please refer to **Appendix 4** for sensitivity map.

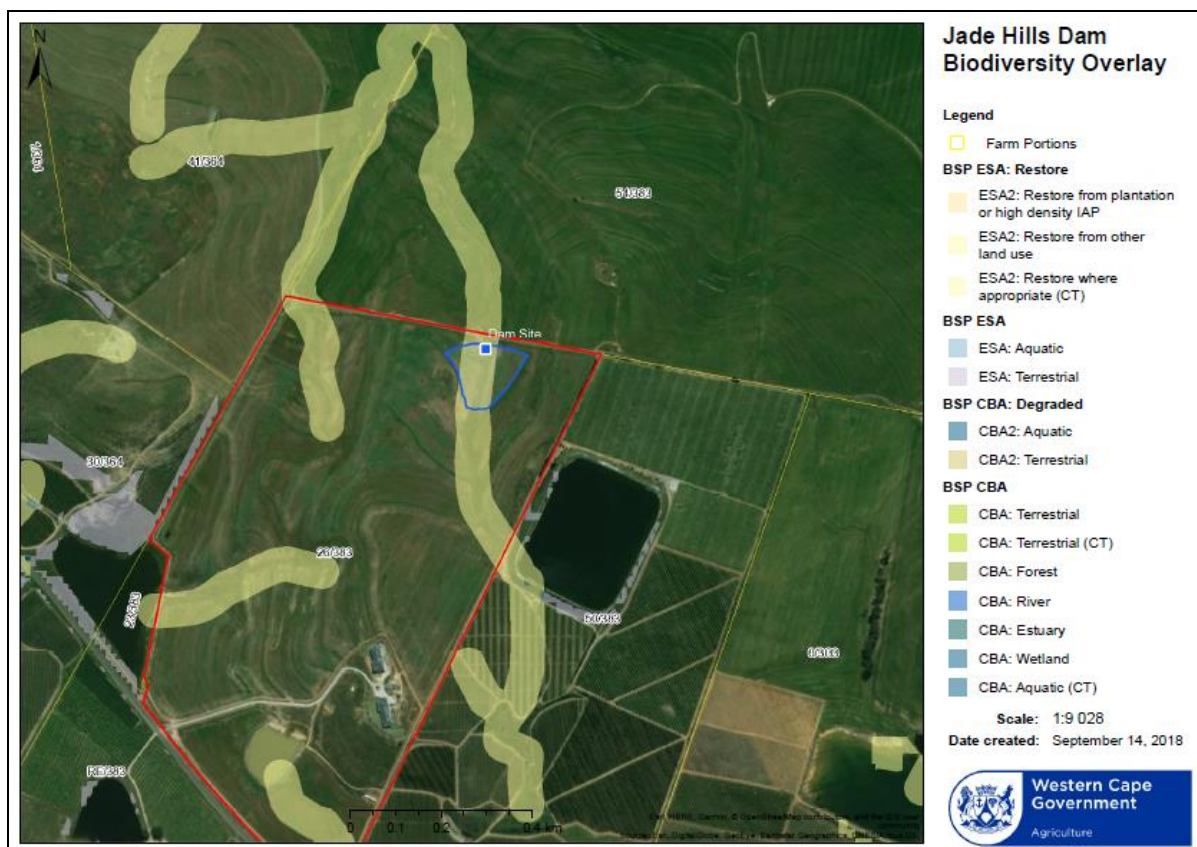
A Botanical assessment was conducted (**Appendix 7.1**) and findings is discussed in Section 10 of the EIR.

### 5.3 CRITICAL BIODIVERSITY AREAS

According to the Biodiversity Overlay Maps from Cape Farm Mapper (see figure 6 below and **Appendix 4**) the proposed dam will not fall within a Critical Biodiversity Area (CBA) but will fall within an Ecological Support Area 2 (ESA2).

Category 2 ESAs are areas that are likely severely degraded or have no natural cover remaining and therefore require restoration. These areas are not essential for meeting biodiversity targets but play an important role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas, and are often vital for delivering ecosystem services. The management objectives for Category 2 ESAs is to restore or manage the features to minimize impacts on ecological processes and ecological infrastructure functioning, especially soil and water related services, and to allow for faunal movement.

It is therefore necessary that that good environmental control measures be implemented during construction and operations of the dam. Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area which can contribute to the conservation of biodiversity.

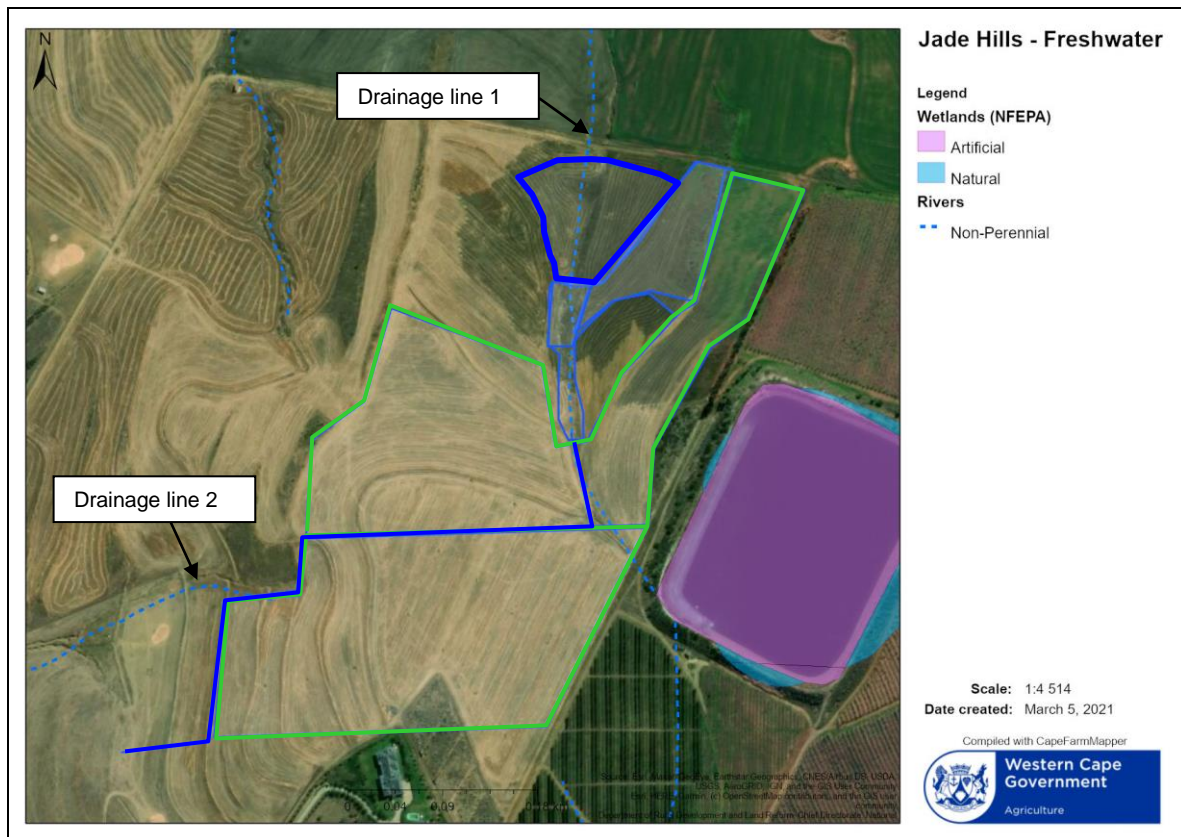


**Figure 5:** Biodiversity Overlay Map, Cape Farm Mapper.

## 5.4 FRESHWATER

According to the Freshwater Resources Map from Cape Farm Mapper (please refer to figure 7 below and **Appendix 4**) the proposed dam will intercept a non-perennial stream/ drainage line. Agricultural activities on the property and surrounding properties is expected to have modified the movement of surface water through the landscape.

A second drainage line is located south-west of the dam, but the proposed pipeline has been diverted to avoid this drainage line.



**Figure 7:** NFEPA Map, Cape Farm Mapper. Blue line indicates the pipeline route, the green polygon the proposed agricultural areas, and the blue polygon the proposed dam.

Please refer to **Appendix 4** for sensitivity maps.

A Freshwater Verification Report (**Appendix 7.2.1**) and a Freshwater Risk Assessment (**Appendix 7.2.2**) were conducted, and the findings are discussed in Section 10 of the EIR.

## 5.5 CLIMATE

Ceres normally receives about 599mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for Ceres per month. It receives the lowest rainfall (9mm) in February and the highest (117mm) in June. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Ceres range from 15.2°C in July to 28.2°C in February. The region is the coldest during July when the mercury drops to 3.8°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures. ([www.saexplorer.co.za](http://www.saexplorer.co.za)).

## 5.6 SOCIO-ECONOMIC CONTEXT

According to the 2017 Socio-economic Profile: Witzenberg Municipality socio-economic upliftment of previously disadvantaged communities remains one of the main challenges faced by the municipality.

The local economy of the Witzenberg Municipality area is driven by the agriculture sector at 17,3%. In 2014, the agriculture sector's GDP growth rate was 8.5% this growth rate can be attributed to a

significant increase in the exports in fruits. The sector that contributes the most to job creation in the Witzenberg Municipal area is the agricultural sector at 34,7 %. The official unemployment rate has steadily been rising in the municipal area for the last decade, there is a definite need for economic development, and subsequent employment opportunities.

Should the construction of the dam be approved, an expansion of about 10.5ha of fruit orchards is proposed. The establishment of 10.5ha fruit orchards will promote economic growth and about 12 additional permanent employment opportunities will be generated for a community that urgently needs it. Construction of the proposed dam will create jobs during the construction phase of the activity.

## 5.7 HERITAGE FEATURES

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.*
- *any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent;*

A heritage screener was conducted by CTS Heritage and a Notice of Intend to Develop (NID) was submitted to Heritage Western Cape (**Appendix 7.3.1**).

Heritage Western Cape confirmed that there was no reason to believe that the proposed dam construction would impact on any heritage resources (**Appendix 5.1**).

## 6. PROCESS TO DATE

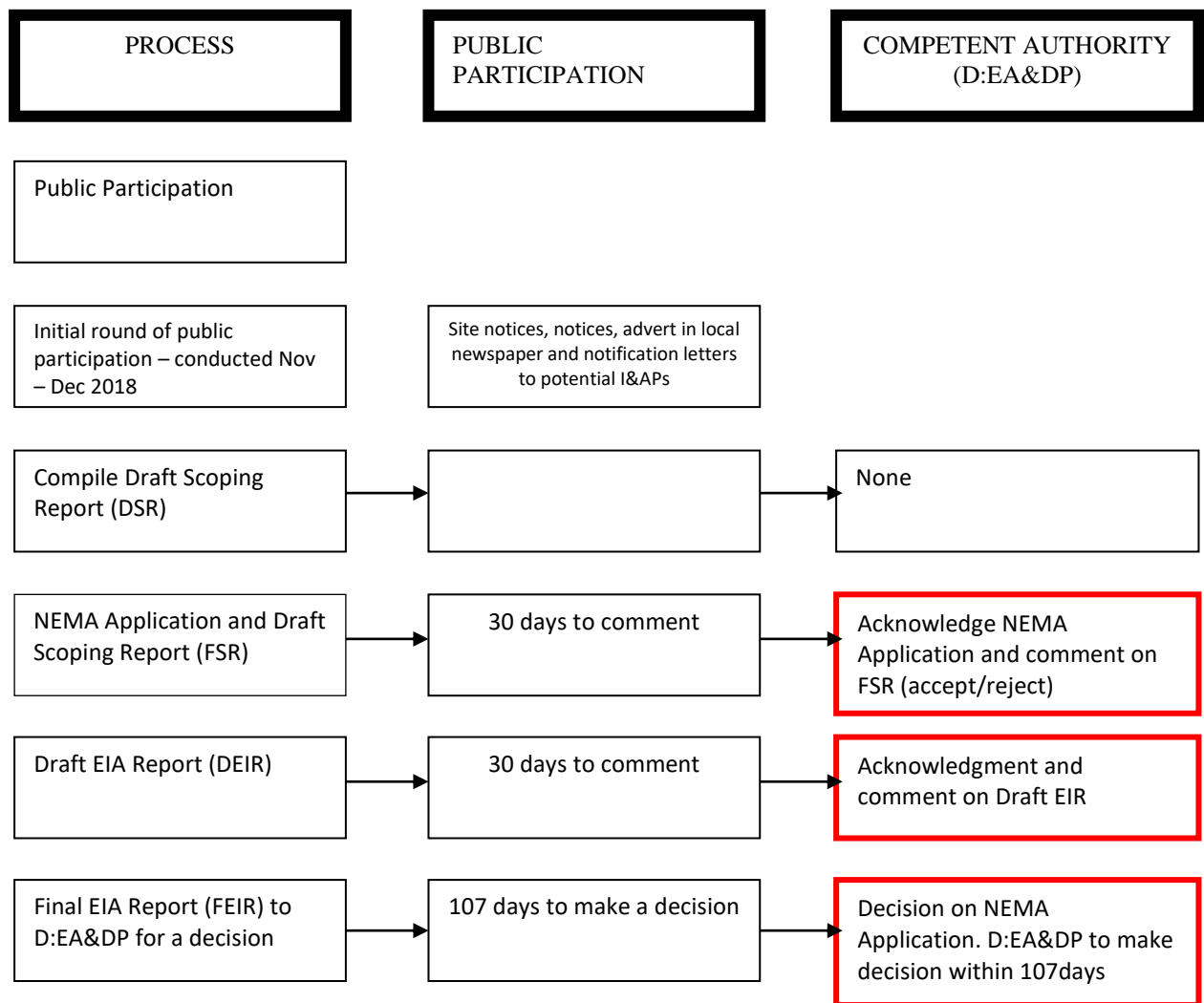
The section below outlines the various tasks undertaken to date, the members of the team involved in the project, as well as the Public Participation Process.

### 6.1 TASKS UNDERTAKEN TO DATE

Table 3 Tasks undertaken in the EIA to date.

DATE	TASK
<b><u>SCOPING PHASE</u></b>	
November - December 2018	Initial public participation, including newspaper advertisements, posters, letter drops, BID and notification letters to identified interested and affected parties.
08 February 2019	Submit Notice of Intent to DEADP
May 2019 – June 2019	Distribution of notifications for the availability of the Pre-Application Draft Scoping Report to Registered Interested and Affected Parties, and 30-day comment period
October 2020	Submission of NEMA Application
23 October	Acknowledgement of Receipt of the NEMA Application from DEADP
October 2020 – November 2020.	Distribution of notifications for the availability of the Post-Application Draft Scoping Report to Registered Interested and Affected Parties, and 30-day comment period
26 November 2020	30-day comment period ends.
	Compile the Final Scoping Report
03 December 2020	Submit Final Scoping Report to DE&NC.
28 January 2021	Acceptance of Scoping report and Plan of Study for EIA ( <b>Appendix 5.3</b> )
<b><u>ENVIRONMENTAL IMPACT ASSESSMENT REPORT PHASE (THIS PHASE)</u></b>	
March	Compilation of Draft Environmental Impact Report
March – May 2021	Draft Environmental Impact Report compiled and made available for viewing and comment to Registered Interested and Affected Parties (this report)





**Figure 8.** Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

## 6.2 TASKS TO BE UNDERTAKEN DURING THE EIA PHASE

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) (THIS DOCUMENT) for public comment based on specialist information.
- Advertise Draft EIR for public comment
- Distribute and/or make the Draft EIR available for viewing and comment
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR)
- Preparation of a FINAL EIR for submission to DEA&DP for consideration and decision-making.

Please refer to Figure 8 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties will have a chance to view and comment on all the reports that are submitted. The figures also indicated what timeframes are applicable to what stage in the process. If required, meetings with key stakeholders will be held.



At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR). The Final EIR will then be submitted to DEA&DP for consideration and decision-making.

Correspondence with I&APs will be via post, telephone, email and newspaper advertisements.

Should it be required, this process may be adapted depending on input received during the on-going process and as a result of public input. DE&NC will be informed of any changes in the process.

### 6.3 PROFESSIONAL TEAM

The following professionals are part of the project team.

Table 4: Members of the professional team

DISCIPLINE	SPECIALIST	ORGANISATION
Environmental Consultants	Clinton Geyser / Bernard de Witt	<b>EnviroAfrica</b>
Dam Engineers	Lizbe Bester	<b>Sarel Bester Ingenieurs BK</b>
Water Use Licence Application	Lizbe Bester	<b>Sarel Bester Ingenieurs BK</b>
Botanist	Peet Botes	<b>PB Consult</b>
Heritage		<b>CTS Heritage</b>
Freshwater	Christel du Plessis	<b>FEN Consulting</b>

### 6.4 PUBLIC PARTICIPATION

A Public Participation Process was undertaken in accordance with the requirements of the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series. *Guidelines on Public Participation 2013* and the NEMA EIA Regulations 2014 (amended). Issues and concerns raised during the Scoping phase are dealt within this report.

Interested and Affected Parties (I&APs) were identified throughout the process. Landowners adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 6.5**.

Public Participation was conducted for this proposed dam in accordance with the requirements outlined in Regulation 41, 42, 43 and 44 of the NEMA EIA Regulations 2014 as amended, as well as

the Department of Environmental Affairs and Development Planning's guideline on Public Participation 2011. The issues and concerns raised during the scoping phase will be dealt with in the EIA phase of this application.

As such each subsection of Regulation 54 contained in Chapter 6 of the NEMA EIA Regulations will be addressed separately to thereby demonstrate that all potential Interested and Affected Parties (I&AP's) were notified of the proposed development.

Table 5: Summary of the public participation process

<b>R41</b>	<b>Posters, Advertisement &amp; Notification letters</b>
(2) (a) (i)	<p>Poster were displayed on site, Portion 26 of Farm Stinkfontein No.383, Ceres; Ceres AgriMark; Ceres Stationary Shop across from the Pick n Pay; Witzenberg Local Municipality, Ceres.</p> <p>Posters were 60cm by 42 cm.</p> <p>Refer to <b>Appendix 6.3</b> for proof of posters.</p>
(ii)	N/A No alternative site
(2) (b) (iii)	<p>Notification letters were sent to the municipal ward councilor at the Witzenberg Municipality.</p> <p>Refer <b>Appendix 6.4</b> for proof. Please see the post office stamp on the I&amp;AP register for proof of notification letters sent.</p>
(iv)	<p>Notification letters were sent to Cape Winelands District Municipality and Witzenberg Local Municipality.</p> <p>Refer <b>Appendix 6.4</b> for proof. Please see the post office stamp on the I&amp;AP register for proof of notification letters sent</p>
(v)	<p>Notification letters were sent to the following organs of state:</p> <ul style="list-style-type: none"> <li>• Department of Environment and Development Planning</li> <li>• Breede-Gouritz Catchment Management Area</li> <li>• Cape Nature</li> <li>• Heritage Western Cape</li> <li>• Lower Breede River Conservancy Trust</li> <li>• WC Department of Agriculture and Land Use Management</li> </ul> <p>Refer <b>Appendix 6.4</b> for proof. Please see the post office stamp on the I&amp;AP register for proof of notification letters sent</p>
(vi)	<p>Notification letters were sent to neighbours</p> <p>Please refer to <b>Appendix 6.4</b>, neighbours were notified via email.</p>
(2) (c) (i)	<p>An advert was placed in the Witzenberg Herold 9 Nov 2019</p> <p>Please refer to <b>Appendix 6.1</b></p>
<b>R42 &amp; 34</b>	<b>Register of I&amp;AP</b>
(a), (b), (c),	A register of interested and affected parties was opened and maintained and is

(d)	available to any person requesting access to the register in writing Please refer to <b>Appendix 6.5</b> for the of Interested and Affected Parties register
<b>R43</b>	<b>Registered I&amp;AP entitled to comments</b>
3	I&AP were given 30 days for comments during the initial public participation phase
<b>R44</b>	<b>I&amp;AP to be recorded</b>
	A summary of issues raised by I&AP are addressed in the Comments and Response Report (C&RR) Refer to <b>Appendix 6.6</b> for the C&RR and for comments received.

#### 6.4.1 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of groups and individuals were identified as Interested and Affected Parties during the initial Public Participation Process. A complete list of organisations and individual groups identified to date, as well as those I&APs that have registered are shown in **Appendix 6.5**.

Full copies of the Environmental Impact Assessment Report (EIR) will be sent to all Registered I&APs, and will be notified of the Environmental Impact Report (EIR) by means of notification letters (via preferred method of communication), informing them of the availability of the Draft EIR and will be invited to comment. The EIR will be made available for a 30-day comment period. The comment period will also include a public

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (Final EIR) in the form of a Comments and Response Table. The Final EIR will be made available for a further 30-day comment period. The Final EIR will then be submitted to D:E&NC for decision.

Should it be required, this process may be adapted depending on input received during the ongoing process and as a result of public input. Both DENC and registered I&APs will be informed of any changes in the process.

#### 6.4.2 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) have been notified by means of advertisements in regional and local newspapers, site notices and letters and/or emails to registered I&APs on the project database.

A list of I&APs is included as **Appendix 6.5**.

## 7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

### 7.1 BIODIVERSITY

The proposed dam will be located in an area that was utilized for wheat cultivation over a long period of time. Aerial imagery indicated that the site is most likely transformed as a result of past and present agricultural practices.

According to the Vegetation Map from Cape Farm Mapper (Appendix D1) the vegetation that would have been present on site would and would be affected by the proposed dam development is Ceres Shale Renosterveld. This type of vegetation is considered “Vulnerable” according to the *National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)*, *National List of Ecosystems that are threatened and in need of protection*. It is expected that the proposed dam will fall mostly on agricultural land and that no natural vegetation will be lost. Please refer to Appendix C for site photographs.

According to the Biodiversity Overlay Maps from Cape Farm Mapper (Appendix D2) the proposed dam will not fall within a Critical Biodiversity Area (CBA) but will fall within an Ecological Support Area 2 (ESA2) associated with drainage lines. The proposed pipeline will also intersect an ESA2 associated with a drainage line. The final layout of the proposed pipeline to be adjusted to not intersect the drainage line.

Category 2 ESAs are areas that are likely severely degraded or have no natural cover remaining and therefore require restoration. These areas are not essential for meeting biodiversity targets but play an important role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas, and are often vital for delivering ecosystem services. The management objectives for Category 2 ESAs is to restore or manage the features to minimize impacts on ecological processes and ecological infrastructure functioning, especially soil and water related services, and to allow for faunal movement. It is therefore necessary that that good environmental control measures be implemented during construction and operations of the dam. Properly design and managed farm dams can attract a variety of birds, insects and animals to the area which can contribute to the conservation of biodiversity.

It was anticipated that a botanical assessment, in addition to the high level desktop study will need to be undertaken. Therefore, a site-based assessment by a specialist was conducted to ground-truth the initial desktop assessment and determine if there is any sensitive or endangered vegetation on the proposed site, findings will be discussed in detail in the EIR but are summarised below for ease of reference.

### 7.2 FRESHWATER

According to the Water Resources Map from Cape Farm Mapper (**Appendix 4**), the proposed dam will intersect a non-perennial stream or drainage line which is likely contain remaining elements of riparian vegetation. Based on further investigation regarding associated infrastructure, the proposed abstraction pipeline will also intersect a non-perennial stream to the west of the property. It is proposed that the final pipeline layout be designed to not insect the non-perennial stream/ drainage line.

As stated above, an existing water use of (8,6ha) for the taking of water is in place (**Appendix 5.2**) and water will come from the Rietvalley scheme for phase 1. It is proposed that a separate Water Use License Application for the taking of water will have to be done for the proposed phase 2 development at a later stage.

The eWULA process has been initiated by Sarel Bester Ingenieers, WULA Reg nr: WU9322. The WULA includes the following activities under the National Water Act:

- Section 21 (b) - storing of water
- Section 21 (c) - impeding or diverting the flow of a watercourse
- Section 21 (i) - altering the bed, banks, course or characteristics of a watercourse

Please refer to **Appendix 5.2** for a letter from Rietvallei Irrigation Board for confirmation of the exiting water use right for the property and **Appendix 11.2** for the WULA Report.

### **7.3 HERITAGE**

The possible impact on heritage resources has been identified as a possible environmental impact because of the construction of the dam.

A Heritage Screener was conducted by CTS Heritage as a baseline assessment (**Appendix 7.3**) A heritage NID was submitted to Heritage Western Cape (HWC) (**Appendix 7.3.1**). HWC provided final comment that there was no reason to believe that the proposed dam development would impact on any heritage resources (**Appendix 5.1**).

### **7.4 VISUAL IMPACT**

The potential impact on the sense of place of the proposed dam has also been considered. The surrounding area is characterised by agricultural activities, as well as a number of farm dams in the local area, and the proposed dam and agricultural development will therefore not be uncharacteristic for the area.

The sense of place is not expected to be significantly altered by the proposed dam or agricultural development, and no further studies are suggested.

### **7.5 SAFETY**

According to the Preliminary Design Report from Sarel Bester Engineers (**Appendix 11.1**), a dam safety and classification application was submitted on April 2018 to the Dam Safety Office and the dam was classified on 11 June 2018 as a Small Category 11 dam with a significant hazard potential rating under reference 12/2/H101/FE. Refer to Appendix D in the Design report (**Appendix 11.1**).

### **7.6 LOSS OF AGRICULTURAL LAND**

The success of the proposed dam is of critical importance to the successful expansion of the planned 10.5ha agricultural development. The success of this project is expected to create a number of permanent jobs within the agricultural industry.

## **7.7 SOCIO-ECONOMIC IMPACT**

Although the construction of the proposed dam will create jobs during the construction phase of the activity, the dam will indirectly secure additional jobs during the operational phase. As indicated in *Section 2.1*, the proposed dam is of critical importance to the success to establish fruit orchards, which is expected to create permanent job opportunities in the agricultural sector.

## **7.8 OTHER ISSUES IDENTIFIED**

Any further issues raised during the public participation process or by the Competent Authority not mentioned in this section, will be dealt with during this EIA phase.

## 8. SPECIALIST STUDIES

As a result of the environmental issues and potential impacts identified in the Scoping Report and in Section 6, the need for the following specialist studies has been identified. that a fish study in the area will be required. As a result, the following specialist have been appointed:

- Archaeological Impact Assessment
- Botanical Assessment
- Freshwater Assessment

The specialists are provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

### 8.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

The impacts of the proposed activity on the various components of the receiving environment will be evaluated in terms of duration (time scale), extent (spatial scale), magnitude and significance. These impacts could either be positive or negative.

The magnitude of an impact is a judgment value that rests with the individual assessor while the determination of significance rests on a combination of the criteria for duration, extent and magnitude. Significance thus is also a judgment value made by the individual assessor. Each specialist has their own methodology to determine significance.

### 8.2 BREIFS FOR SPECIALIST STUDIES

#### 8.2.1 Botanical Statement

Peet Botes (PB Consult) conducted the botanical assessment and compiled the Botanical Statement. Please find the report attached **Appendix 7.1**

The terms of reference for the heritage study will be as follows:

- Give a short statement on the vegetation and its conditions encountered at the site and its immediate surroundings.
- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require “search & rescue” intervention.
- Make recommendations on impact minimization should it be required.

#### 8.2.2 Freshwater Assessment

The appointment of a Freshwater Specialist was proposed as the proposed dam is expected to absorb a non-perennial stream/ small drainage line. The drainage line is also associated with an ESA2 according to the Biodiversity Overlay Map from Cape Farm Mapper (**Appendix 4**). After consultation with BGCMA in Pre-Application Phase it was suggested that a Freshwater verification/ delineation be conducted to give clarity regarding the watercourse on site (Please refer to **Appendix 12.2** for meeting minutes).

Scientific Aquatic Services (SAS) were appointed to conduct the Freshwater Resource Verification.

The terms of reference for the Freshwater Resource Verification include the following:

- A detailed desktop study will be undertaken highlighting the Ecological Importance and Sensitivity and Present Ecological State based on databases such as the NFEPA database (2011), the BGIS website and the PES/EIS database (DWS, 2012);
- Delineation of the freshwater resources within the immediate zone of influence of the proposed development will take place according to “DWAF, 2008: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones”. Aspects such as soil morphological characteristics, vegetation types and wetness will be used to delineate the wetland temporary zone according to the guidelines;
- Delineation of the freshwater resources within 500m of the development will take place on a desktop basis, with limited field verification;
- All freshwater features identified will be mapped;
- A freshwater resource classification assessment will be undertaken;
- Applicable buffer zones and/or zones of regulation according to relevant legislation or provincial guidelines will then be delineated around the freshwater feature(s). In addition, the WRC’s “Preliminary Guidelines for the Determination of Buffer Zones for Wetlands, Rivers and Estuaries” tool will be applied to derive a scientifically relevant buffer. The applicable buffer maps will be provided; and
- A short verification report will be compiled.

The Freshwater Verification concluded that there are no true wetlands or riparian resources within the footprint area of the proposed dam. The footprint area is located within an area where an episodic drainage line is present. Other drainage lines were also identified in the investigation area. This feature is considered to be ecologically degraded.

The DWS Risk Assessment Matrix, promulgated in Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to activities as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998), was used to calculate the significance of perceived impacts on the key drivers and receptors (hydrology, water quality, geomorphology, habitat, and biota) of the episodic drainage line associated with the proposed dam.

The Risk Assessment also provides key mitigation measures for each activity.

### 8.2.3 **Heritage Assessment**

CTS Heritage was appointed to compile a Heritage Screener for the proposed development. Please find the report attached as **Appendix 7.3**.

The Heritage Screener Methodology includes the following:

- summarise the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed during the screening process.
- The possible impact of the proposed development on palaeontological resources is gauged by:
  - reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
  - considering the nature of the proposed development
  - when available, taking information provided by the applicant related to the geological background of the area into account



- The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated.
- This is included in the Heritage Notice of Intent to Develop (NID) submitted to Heritage Western Cape.

Heritage Western Cape provided Final Comment on 04 March 2019 (**Appendix 5.1**), stating that since there was no reason to believe that the proposed development would impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.

## 9. ENVIRONMENTAL IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION METHODOLOGY

The following impact rating approach used by EnviroAfrica CC is a basic exponential rating system to assess actual and potential negative environmental impacts of viable alternatives by the EAP.

Positive environmental impacts are not listed. All positive impacts need to be enhanced or increased where possible but positive impacts are not rated or given a score since the rating is based on risks.

Environmental activities or aspects are identified, based on:

- the phases of the project,
- the nature (or description) of the actual and potential impacts of the activities.

For every project activity or aspect, various environmental impacts are listed. Every negative impact is allocated a value – as per each of the following criteria:

- Probability (Likelihood)
- Extent
- Duration (Frequency)
- Consequence (Receiving Environment)
- Magnitude (Intensity/severity)

Every negative impact is allocated a ( - )value as per each of the following criteria:

- Probability (Likelihood)
- Extent
- Duration (Frequency)
- Magnitude (Intensity/severity)

Once a value is allocated for each of the criterion, the scores are averaged to determine the final impact rating (see Table 6 below).

EnviroAfrica then further assesses environmental significance, based on the nature of the impact, as per the score and colour key which forms part of the table below. This results in impacts having either a low (indicated in green), medium (indicated in yellow) or high (indicated in orange and red) negative significance.

**Note:** i. As a baseline, impact rating values/scores are allocated taking the **worst case** scenario into account i.e. with no mitigation. The baseline rating is compared with those after mitigation has been taken into account i.e. the post-mitigation rating. Post mitigation rating is used for the actual impact assessment.

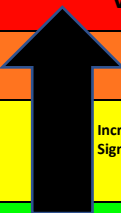
Table 6: Impact Assessment Methodology

SIGNIFICANCE CRITERIA	Very High	High	Medium	Low	Negligible (very-low)	Score
Value	16	8	4	2	1	
<b>Probability (likelihood) (P)</b>	Definite. Impact will definitely occur.	Highly probable. Very likely for impact to occur.	Probable. Impact may likely occur.	Improbable. Impact may occur. Distinct Possibility	Improbable. Low likelihood/unlikely for impact to occur.	
<b>Extent (E)</b>	Impact potentially reaches beyond national boundaries	Impact has definite provincial/potential national consequences	Impact confined to regional area/ town	Impact confined to local region and impact on neighbouring properties	Impact confined to project property / site	
<b>Duration (D)</b>	Permanent The impact is expected to have a permanent impact, with very little to no rehabilitation possible	Long-Term The impact is expected to last for a long time after construction with rehabilitation expected to be 15-50 years. Impact is reversible but only with long-term mitigation	Medium-term The impact is expected to last for some time after construction with rehabilitation expected to be 5 - 15 years. Impact is reversible but only with on-going mitigation	Short-term The impact is expected to last for a relatively short time with rehabilitation expected to be 2-5 years. The impact is reversible through natural process and/or some mitigation.	Very short/ temporary The impact is expected to be temporary and last for a very short time with rehabilitation expected to be less than 2 years. The impact is easily reversible through natural process and/or some mitigation.	
<b>Magnitude (Intensity/ Severity) (M)</b>	It is expected that the activity will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible	It is expected that the activity will have a severe impact on the surrounding environment. Functioning may be severely impaired and may be temporarily cease. Rehabilitation will be needed to restore system integrity	It is expected that the activity will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the activity will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the impact will have little or no effect on the integrity of the surrounding environment	
<b>Receiving environment (Consequence): (RE)</b>	Very sensitive, pristine area – protected site or species permanently or seasonally present	Unused area containing only indigenous fauna / flora species	Unused area containing indigenous and alien fauna / flora species	Semi-disturbed area already rehabilitated / recovered from prior impact, or with moderate alien vegetation	Disturbed area/ transformed/ heavy alien vegetation	
<b>FINAL RATING (average score)</b>						

## ENVIRONMENTAL RATING SIGNIFICANCE KEY:

### Negative Impacts

SIGNIFICANCE	RATING	Final rating score / value range
Very Significant	Very High	-11 to -16
Significant	High	-7 to <-11
Increasing Significance	Medium	-4 to <-7
Insignificant	Low	-2 to <-4
	Very Low	-1 to <-2



## ENVIRONMENTAL SIGNIFICANCE RISK RATING

Please refer to **Appendix 8** for the Environmental Impact Risk rating matrix. The matrix aims to identify potential impacts of the proposed development on the receiving environment, based on a desktop study.

In addition to determining the individual impacts against the various criteria, the element of mitigation, where relevant, will also be brought into the assessment. In such instances the impact will be assessed with a statement on the mitigation measure that could/should be applied. Specialist recommendations and mitigation measures will be included. A more detailed assessment is included in Section 10, taking specialist findings into consideration.

## 10. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in **Section 8** were undertaken to determine significance of the impact that may arise from the proposed development. The findings of the specialist studies are summarised here. Full copies of the studies are included in **Appendix 7**.

The following studies were undertaken:

### 10.1 Botanical Impact Assessment

The Botanical Assessment was conducted by Mr. Peet Botes (PB Consult). Please refer to **Appendix 7.1** for the full report.

#### 10.1.1 Key findings

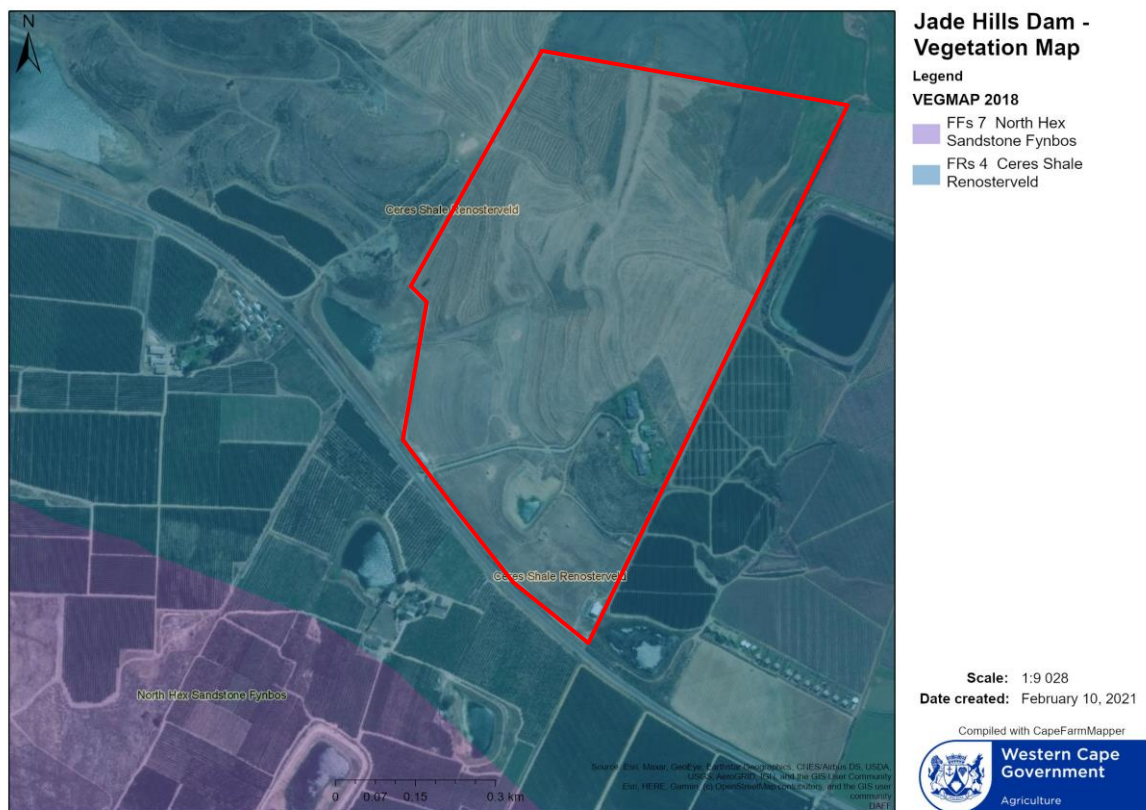
According to the Botanical Assessment (**Appendix 7.1**), according to the 2012 (beta 2) version of the Vegetation map of SA (Mucina & Rutherford, 2006) the site is located within an area that historically would have been covered by a vegetation type known as Ceres Shale Renosterveld (see Figure 9 below). Ceres Shale Renosterveld is classified as a vulnerable vegetation type in terms of “*List of ecosystems that are threatened and in need of protection*” (GN 1002, December 2011), promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004. Mucina & Rutherford (2006) describe Ceres Shale Renosterveld as medium tall cupressoid-leaved shrubland dominated by renosterbos, located on moderately undulating plains and lower mountain slopes, with heuweltjies (old termite mounds) prominent in places.

According to the Witzenberg spatial dataset of the WCBSP, the proposed dam does not fall within any CBA, but will overlap a proposed Ecological Support Areas (ESA)(Class 2)<sup>1</sup> associated with the channelled valley bottom seasonal streams.

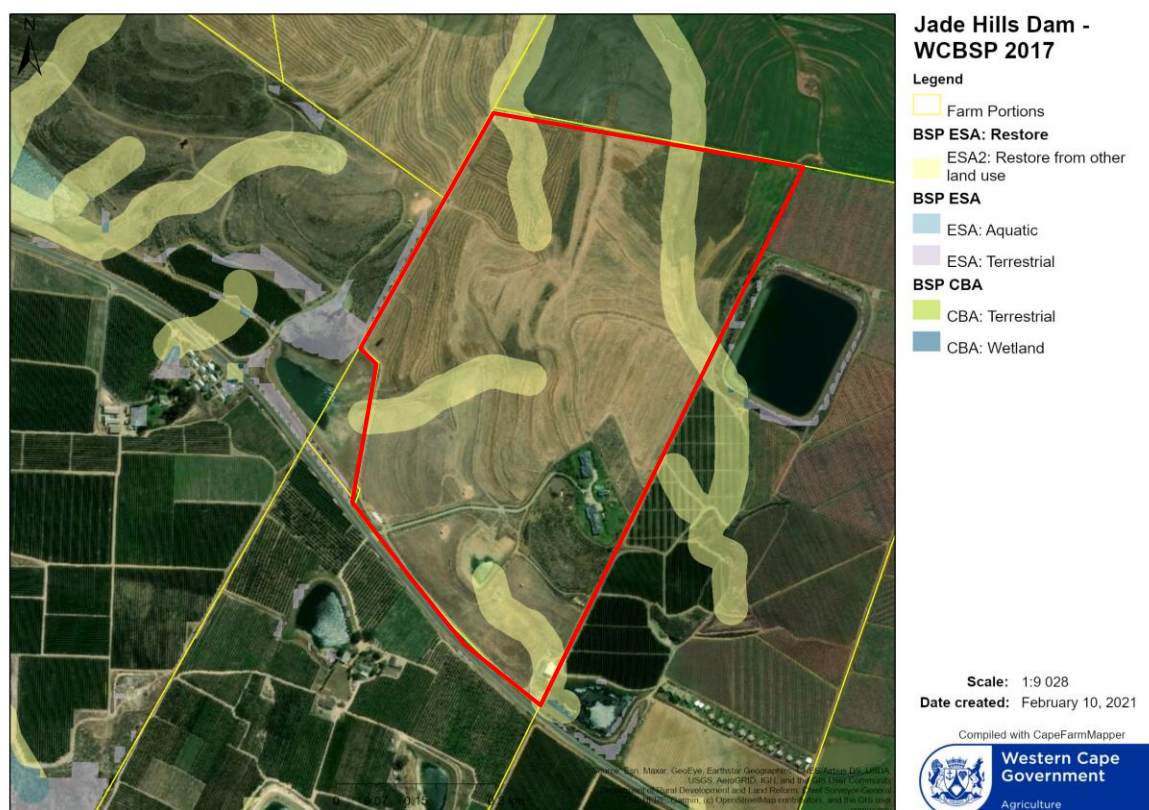
According to the Botanical Assessment (**Appendix 7.1**), in this case the ecological support areas (Class 2) are delineations along the channelled valley bottom wetlands (seasonal streams). Ideally these areas should be restored to its natural state, but in this case restoration will require intervention as there is no more natural vegetation left. The valley bottom wetlands would have to be replanted with riparian vegetation brought in from similar locations (because there is no natural riparian vegetation left on the property).

However, it is always an excellent idea to let the inflow water to the dam run through a constructed or artificial wetland area. This will help to prevent siltation of the dam and will also help to clean the water not only from sediment, but also from various micro-elements that may be detrimental to water health. Such a wetland should be established in the water inlet area and can be a simple affair like a shallow v-shaped inlet that widens as it drains towards the dam (the longer and larger the better). This inlet should then be planted with reeds like *Phragmites australis* and / or *Typha capensis*, which will over time, establish itself in a dense mat, which will help filtering / cleaning the inlet water before it reaches the dam.

Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area and so contribute to conservation of biodiversity.



**Figure 9:** CapeFarmMapper Vegetation Map (VegMap 2018), showing the area would historically be covered in Ceres Shale Renosterveld.



**Figure 10:** CapeFarmMapper Western Cape Biodiversity Spatial Plan (2017) map, showing that part of the site falls within an Ecological Support Area (2).



According to the Botanical Assessment (**Appendix 7.1**), desktop studies indicated that the site and its immediate surroundings were most likely transformed as a result of cultivation. This was confirmed by the site visit. A recent fire has impacted on the proposed dam site and the surrounding area, which means that many plants were probably not visible that normally, would have been. The proposed dam site was clearly degraded to such an extent that it is considered highly unlikely that any natural vegetation of any significance will remain.

However, just east of the proposed new dam site, and along the eastern boundary of the property (marked by the arrows in Figure 11) two areas of degraded natural veld remains, protected within two rocky areas or ridges. Even though it was burned, many indigenous species could be identified. Some were re-sprouting, some were just re-emerging and some can be identified from remains. Both these areas will not be impacted by the proposed development footprint and should be considered for protection as part of the proposed new ecological corridor and wetland area that is proposed as part of the development plan.



**Figure 11:** Google image, showing the proposed dam, cultivated land surrounding the dam and the two rocky ridges (Source: Appendix 7.1, Figure 6).

No natural vegetation was encountered on the site or its immediate surroundings, apart from a few hardy species (e.g. *Asparagus* species and *Montinia caryophyllacea*) that persisted in a small rocky outcrop within the proposed dam footprint. Because of the recent fire, it was not easy to identify many of these plants past genus level.

The vegetation of the rocky ridge seems to have been (and still are) dominated by *Montinia caryophyllacea* (the common pepper bush). Other species observed includes a number of bulb species, *Searsia glauca*, *Asparagus* species, *Galenia africana* and *Stoebe cf. plumose*. All of these plants are either hardy shrubs or pioneer species.

### 10.1.2 Impact Assessment

According to the Botanical Assessment, it is unlikely that the proposed development will lead to any significant impact on the biodiversity as a result of its placement. The site and its immediate surroundings are considered transformed with no natural veld remaining. Only a few hardy indigenous species remains.

### 10.1.3 Mitigation Measures

Recommendations on impact minimization are mostly limited to good environmental control (apart from potential positive off-sets):

- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase.
- Both areas of degraded natural veld should be protected as remaining natural veld (Figure 10).
- Before any work is done the site and access routes must be clearly demarcated (with the aim at minimal width/smallest footprint).
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- All areas impacted as a result of construction must be rehabilitated on completion of the project.
- An integrated waste management approach must be implemented during construction.
- It is recommended that a small artificial wetland is established where the small seasonal stream enters the dam and that all water from the Water Scheme are pumped to above this wetland, so that it will also enter the dam through the wetland. This inlet should then be planted with reeds like *Phragmites australis* and / or *Typha capensis*, which will over time, establish itself in a dense stand, which will help to clean the incoming water before it reaches the dam. Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area and so contribute to conservation of biodiversity.
- A second potential positive spin-off could be to incorporate the remaining natural veld on the rocky ridge to the east of the dam within the dam site itself, by fencing it in with the dam, or by refraining from cultivating the land between the dam and the rocky ridge, so that a slightly larger natural corridor can be established linking the artificial wetland with the remaining natural veld and with the dam.

## 10.2 **Freshwater Verification and Risk Assessment**

### 10.2.1 Key findings

According to the Freshwater Verification Report (**Appendix 7.2.1**), desktop analysis found that, on review of the location of the proposed dam, the surrounding area has primarily been transformed by agricultural activities, including the construction of other dams within the drainage features of the region as a whole. This can be seen in the historical imagery dating back to 1942 when compared to the most recent digital satellite imagery (2017). The transformation of the surrounding areas to cultivated fields has also significantly modified the movement of surface water through the landscape.

Furthermore, on comparison of the digital satellite imagery available between 2013 and 2017; imagery from 2013 (just after the wet season) (see Figure 12) indicates a pronounced wetness digital signature of the drainage line within the footprint area of the proposed dam (hereafter referred to as 'drainage line 1') and a drainage line located south west of the footprint area (hereafter referred to as



'drainage line 2'), correlating to a surface flow paths identified in the historical imagery. After a period of drought in the Western Cape, and imagery of the dry season (December 2017), an area distinctly different to that of the surrounding area, is visible (Figure 12).

Following a site visit, the following key observations were made by the Freshwater Verification Report:

- The footprint area of the proposed dam is located within the footslope position in the landscape, changing into the valley bottom position just north of the proposed dam area. The proposed dam area has been burnt and cultivated.
- An episodic drainage line was identified to be located in the footprint area of the proposed dam. This drainage line is referred to as drainage line 1. This feature is considered to be degraded as it has no natural riparian vegetation remaining and very few vegetation species were present (vegetation had not recovered after the area was burnt). An erosion gully was present within the drainage line, of which the depth thereof was more incised in the downstream reaches. The natural compaction and rocky nature of the soil (strong soil structure) prevents exacerbation of erosion, but due to the removal of the vegetation in the surrounding area and the degradation thereof in the drainage line, the depth of the erosion gully is deeper in the downstream reaches of the drainage line in the investigation area. This drainage line enters a dam located approximately 930m north of the proposed dam area. No other wetlands were found to be located within the footprint area of the dam nor the investigation area. The wetland flat identified by the NFEPA Database (see Appendix 4 and Figure 7 above) to be located within the investigation area was identified as a dam located south-east of the proposed dam area.
- This episodic drainage line does not receive and retain sufficient water to support a wetland response or sustain riparian characteristics,
- This drainage line is expected to have surface water present only during and immediately after rainfall events, in which water would be present for a few days (if not shorter) and conveyed to the downstream dam. During the site visit, it was evident that the most upstream point of this drainage line is directly below an existing dam (upstream and south-east of the proposed dam area). No evidence of an outlet from the dam or visible seepage into the drainage line was evident, but it is possible that if the dam reaches full capacity, spill over water would be conveyed within the drainage line.
- It can be derived from the description of the drainage line as presented above, that it does lack the characteristics that define true watercourses, wetlands and riparian resources.
- Although the drainage line cannot be classified as a riparian resource (to which the drainage line mostly relates to, as per the definitions above) in the traditional sense thereof due to the lack of saturated soils and wetland/riparian vegetation, it does function as a waterway, through episodic conveying of water, and therefore potentially enjoys protection in terms of the National Water Act, 1998 (Act 36 of 1998), if a 1:100 floodline is present.
- Based on the description of drainage line 1 associated with the proposed Jade Hills dam development above and its digital satellite signatures (Figure 12), the drainage lines in the investigation area (west of the proposed dam) could be considered to have similar on-site characteristics as the drainage line associated with the proposed Jade Hills dam footprint. These drainage lines were not assessed on site but since the drainage line south west of the proposed dam (drainage line 2) may potentially be crossed by the proposed abstraction pipeline, it must be considered as part of this watercourse verification report.
  - Based on the most recent digital satellite imagery of drainage line 2, it presents with similar digital characteristics as that of the drainage line within the dam footprint, except that drainage line 2 is narrower and its catchment seemingly smaller.
  - From digital satellite imagery it can be seen that the local catchment of drainage line 2 has been transformed by cultivation and there are also no distinct changes in structure from the vegetation in drainage line 2 to that of the surrounding area. Based on this, the functioning and ecological condition of drainage line 2 is expected to be similar to that of the drainage line 1. As such, drainage line 2 may function as a waterway, through

episodic conveying of water, and therefore potentially enjoys protection in terms of the National Water Act, 1998 (Act No. 36 of 1998), if a 1:100 floodline is present.



**Figure 12:** Digital satellite imagery from 2013 (Top – wet season) and 2017 (Bottom – dry season), shows an area with a different digital signature than that of the surrounding area (indicated by black arrows). These areas correspond to the drainage lines as identified within the historical imagery (Source: Freshwater Verification Report (Appendix 7.2.1), Figure 6).

### 10.2.2 Impact Assessment

When evaluating the potential impacts of the proposed dam on the drainage line, the following aspects were taken into consideration:

- The area in which the proposed dam is located (including the episodic drainage line) is deemed to be significantly transformed due to extensive cultivation activities within the catchment. This has altered the movement of water in the landscape and impacted the biodiversity thereof. Thus, the episodic drainage line is considered ecologically degraded.
- This episodic drainage line could, potentially, have historically been more pronounced and hosted a larger diversity of species. Due to the transformation of its surrounding ecological corridor and the impact of the existing dam (located south-east of the proposed dam area) on the hydrological functioning of the drainage line, it is not expected that it would provide habitat to a large variety of faunal species during the wet season, and even less during the dry summer seasons.
- All activities related to the construction of the dam wall are site-specific, thus not of a significant extent relative to the drainage line, and therefore have a limited spatial extent; and
- All impacts are considered easily detectable, and the mitigation measures thereof are considered to be practically implementable.

The results of the risk assessment are summarised in **Appendix 7.2.2** (Table 1, Appendix 2), including key mitigation measures for each activity. There are four key ecological impacts on the drainage line that are anticipated to occur namely:

- Loss of habitat and ecological structure;
- Changes to the sociocultural and service provision;
- Impacts on the hydrology and sediment balance; and
- Impacts on water quality (when surface water is present).

Overall, the activities related to the proposed dam development are deemed to pose a 'Low' risk significance to the episodic drainage line. This is attributed to the already degraded ecological integrity of the drainage line, as well as the overall absence of indigenous vegetation and limited hydrological drivers which could potentially be impacted.

Nevertheless, possible edge effects that can arise from the construction activities include the disturbance of soils leading to increased sedimentation of the downgradient reach of the drainage line, erosion and possible further proliferation of alien and invasive vegetation. With the implementation of the recommended mitigation measures (see **Appendix 7.2.2** (Table 1, Appendix 2)), the risk that such effects would occur on the drainage line is considered to be low to very low.

During the operational phase of the dam, all operational activities are considered to pose a 'Low' risk significance to the drainage line and its downgradient reach, provided that the appropriate impact mitigation measures are implemented. The spillway and the dam wall should regularly be inspected for erosion, especially after heavy rainfall events when overflow from the dam is expected and the flow, velocity is increased. If erosion is noted, this should be rectified immediately, preferably by the reinstatement of the downgradient drainage line embankments through compaction of soil and revegetation thereof. If erosion is pronounced, erosion control devices such as reno mattresses should be considered, in consultation with a freshwater ecological specialist.

### 10.2.3 Mitigation Measures

The following mitigation/control measures were recommended:

- It is recommended that the construction activities be undertaken during the dry summer period when the flow is limited in the drainage line;
- Due to the erosion that was noted within the drainage line, use should be made of existing roads to gain access to the proposed dam footprint area. Due to the relative accessibility of the site, no unnecessary crossing of the drainage line may be permitted. This will limit any further erosion of the drainage line and its downstream reach;
- Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the proposed dam footprint area;
- All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential, and preferably only alien floral species to be removed. Based on the site conditions at the time of the field assessment (January 2019), very few vegetation species were present within the drainage line. Nevertheless, any indigenous species present outside of the dam footprint area must be preserved to maintain the current ecological condition of the immediate area and prevent any erosion and keep the soil profile intact. Once alien species are removed, they may not be stockpiled on site, but must immediately be removed from the site and disposed of at a registered waste disposal facility;
- Exposed soils to be protected using a suitable geotextile covering such as hessian sheeting.
- Ensure sediment control devices are in place before the start of the construction activities;
- Maintain sediment/erosion control devices to minimise the risk of sedimentation of the downgradient drainage line reach using silt traps;
- The spillway outlet of the dam should be constructed from energy dissipating structures (such as Armorflex or reno mattresses) to slow down the velocity of water inflow into the downgradient drainage line reach and preventing erosion thereof;
- Excavated materials and topsoil may not be contaminated, and it must be ensured that the minimum surface area is taken up by the stockpiles, and the stockpiles may not exceed 2m in height. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, for later usage as backfill material or as part of rehabilitation of the dam wall;
- All exposed soils must be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) to prevent erosion and sedimentation of the downgradient drainage line reach; and
- Construction of the dam wall should be done in a layered phased manner, where layers of imported material are placed on the dam wall and compacted. This process should be repeated until the desired height has been reached.
- Mitigation measures applicable to the spillway:
  - Energy dissipating structures should be installed at the spillway outlet to prevent erosion and scouring of the drainage line where the overflow will be discharged;
  - At the outlet, rocks must be placed and vegetation established (if applicable considering the highly episodic nature of the system) to bind the soil of the bed, and to prevent erosion. This will also diffuse flow and lower the velocity of water into the lower reach of the drainage line;
  - Upon completion of the construction activities, all footprint areas should be revegetated with indigenous vegetation.
- Previously removed soils (removed as part of the site preparation activities) should be used as topsoil for covering of the dam wall;
- It should be ensured that the topsoil used are weed free to limit the establishment of alien and invasive vegetation species;
- Re-seed the dam wall with indigenous species as soon as construction activities are completed.



- During the site visit undertaken, no obligate freshwater vegetation species were noted in the drainage line. To increase the habitat of the immediate environment, indigenous obligate freshwater vegetation species should be established in the areas where extended periods of saturation would occur, such as within the drawdown area of the constructed dam; and
- Implement an alien and invasive species control plan to prevent the establishment of such species.
- The spillway should regularly be inspected for erosion, especially after heavy rainfall events when overflow from the dam is expected and the flow, velocity is increased. If erosion is noted, this should be rectified, preferably by the reinstatement of the embankments through compaction of soil and revegetation thereof. If erosion is pronounced, erosion control devices such as reno mattresses should be considered, in consultation with a freshwater ecological specialist.
- The spillway should be maintained free of any debris and silt/sediment.
- During desilting, silt associated with the dam should immediately be removed to prevent sedimentation of the downgradient drainage line reach. Additionally, during desilting, a temporary silt trap should be installed at the spillway. This must be emptied regularly and not permitted to reduce the capacity of the dam.

#### **10.2.4 Conclusion**

The Freshwater Risk Assessment concluded that since the episodic drainage does not conform to the definition of a watercourse that supports aquatic ecosystems with an associated riparian zone, the proposed dam development will have a 'low' risk significance on the freshwater habitat and ecology, ecological and socio-cultural service provision and on hydrological function and sediment balance during the construction and operational phases, provided that clear, well-conceived and ecologically sensitive mitigation measures provided in this memorandum are implemented, and general good planning and monitoring are strictly adhered to.

Provided appropriate impact mitigation measures are implemented, it is the opinion of the ecologist that the ecological condition of the downgradient reach of the episodic drainage line is unlikely to be altered significantly by the proposed dam.

### **10.3 Heritage Assessment**

A heritage screener was conducted by CTS Heritage (Please see **Appendix 7.3**).

#### **10.3.1 Key findings**

The area proposed for the dam contains no existing structures and the nearest identified structures of heritage significance are located within the town of Ceres. In addition, the proposed farm dam is in keeping with the agricultural context of the cultural landscape. Very few Heritage Impact Assessments have been completed within 10km of the area proposed for the dam. The archaeological resources known from this area occur predominantly in the kloofs of the Winterhoek Mountain areas. According to Kaplan (2009, SAHRIS NID 3995), rock art is well known from the Koue Bokkeveld of the Ceres region. In addition, Kaplan has identified some early Stone Age artefacts while conducting archaeological assessments in this area. However, due to the extensive cultivation of this area since the mid-1800's, it is very unlikely that significant *in situ* archaeological resources will be impacted by the proposed dam development.

The area proposed for development is underlain by sediments of the Voorstehoek, Gydo and Gamka Formations of the Bokkeveld Group (very high palaeontological sensitivity). The Voorstehoek Formation consists of dark grey fossiliferous shale, mudrock and siltstone and thin sandstone beds.

The Gydo Formation consists of black to dark grey fossiliferous shale mudstone and siltstone and the Gamka Formation consists of dark grey lithic and feldspathic sandstone and siltstone. These formations belong to the Bokkeveld Group which is known for its rich trace fossil assemblages, shelly invertebrates (trilobites, brachiopods, echinoderms, molluscs *etc.*) and microfossils in the lower Bokkeveld and important fish, vascular plant and trace fossil biotas in the upper Bokkeveld. It is therefore likely that the proposed dam development will impact on significant palaeontological heritage, however it is unlikely that a palaeontological field assessment will reveal any new information due to the extensively cultivated nature of the development area. It is recommended that a Chance Fossil Finds Procedure be implemented for the development of the dam.

### **10.3.2 Conclusion**

The proposed development is unlikely to impact on significant archaeology, built environment or cultural landscape heritage resources. However, the area proposed for development is underlain by formations of very high palaeontological sensitivity. It is recommended that no further studies are required, however a Chance Fossil Finds Procedure must be adopted for the development of the dam.

CTS Heritage compiled a Heritage Notice of Intend to Develop (NID) (**Appendix 7.1.1**) and submitted it, along with the Heritage Screener, to Heritage Western Cape (HWC) for comment.

Heritage Western Cape provided Final Comment on 04 March 2019 (**Appendix 5.1**), stating that since there was no reason to believe that the proposed development would impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.

# 11. SUMMARY OF IMPACTS AND CUMMULATIVE EFFECT

## 11.1 Summary of Impacts

Please refer to **Appendix 8** for the impact and significance rating tables for the different phases of the proposed project as well as mitigation measures. The following table is a summary of all the impacts assessed, taking in consideration the risk assessment of the EAP (**Appendix 8**) as well as the risk assessments conducted by the various specialists.

Table 7: Impact Summary (Preferred Alternative)

Study	Impact	Significance No Mitigation	Significance With Mitigation
<b>Phase: Construction</b>			
Heritage	Loss and/or damage to potential archaeological and historical sites within the construction footprint	Negligible	Negligible
Palaeontology	Loss and/or damage to potential fossils within the construction footprint	Medium (Negative)	Low (Negative)
Botanical	Vegetation Status: Loss of vulnerable vegetation and associated habitat.	Low (Negative)	Negligible
Freshwater	<ul style="list-style-type: none"> <li>Degradation to the remaining vegetation within and surrounding the drainage line;</li> <li>Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and</li> <li>Soil and stormwater contamination from oils and hydrocarbons.</li> </ul>	Low (Negative)	Low (Negative)
	<ul style="list-style-type: none"> <li>Earthworks could be potential sources of sediment, which may be transported as runoff into the downgradient areas;</li> <li>Exposure of soils, leading to increased runoff, and erosion, and thus sedimentation of the drainage line;</li> <li>Increased sedimentation of the drainage line, leading to smothering vegetation associated with the drainage line; and</li> <li>Further proliferation of alien vegetation as a result of disturbances.</li> </ul>	Low (Negative)	Low (Negative)
	Runoff from the imported material	Low (Negative)	Low (Negative)



	could increase the sediment load of the downstream reach of the drainage line.		
	Sedimentation and water quality impairment (increased hydrocarbons, suspended solids, hazardous substances and oils from the heavy machinery used) of the downgradient drainage line reach leading to further degradation of the downgradient habitat.	Low (Negative)	Low (Negative)
	Loosening and exposure of soils leading to <i>in situ</i> erosion, and sedimentation of the downgradient drainage line reach.	Low (Negative)	Low (Negative)
	Potential sedimentation for the downstream drainage line reach;	Low (Negative)	Low (Negative)
	Potential proliferation of alien and invasive vegetation species.	Low (Negative)	Low (Negative)
Socio-economic	Job created during the construction phase	Low (Positive)	
Dust	Dust may be generated during the construction of the proposed development.	Medium-Low (Negative)	Low (Negative)
Visual	Visual impact of construction activities and plant on site	Low (Negative)	Low (Negative)
Traffic	Increase in trucks and construction plant	Very Low (Negative)	Very Low (Negative)
Noise	Noise will be generated during the construction phase.	Low (Negative)	Very Low (Negative)

Study	Impact	Significance No Mitigation	Significance With Mitigation
<b>Phase: Operational</b>			
Freshwater	<ul style="list-style-type: none"> <li>Changes in the wetting patterns and hydroperiod of the drainage line;</li> <li>Loss of ecoservice provisioning by the drainage line; and</li> <li>Increased periods of saturation along the edge of the dam.</li> </ul>	Low (Negative)	Low (Negative)
	<ul style="list-style-type: none"> <li>Erosion of the downstream</li> </ul>	Medium (Negative)	Low (Negative)

	drainage line reach where water enters the drainage line from the spillway; and • Potential increased sedimentation of the downstream drainage line due to erosion associated with the spillway.		
	Desilting activities resulting in the: • Removal of vegetation (terrestrial and wetland); and • Earthworks and silt stockpiling, the runoff from which has the potential to increase silt loads within the downstream drainage line.	Medium (Negative)	Low (Negative)
	In the event where a leak has been detected within the dam wall itself, impacts include: • An increase in water quantity could cause extended periods of water saturation of the downstream drainage line reach; • Repair of a leak would entail the impacts as per construction above.	Medium (Negative)	Low (Negative)
Visual	Visual impact of the dam and agricultural development	Medium-Low (Negative)	Low (Negative)
Socio-economic	Creation of long-term employment opportunities.	Low (Positive)	

## 11.2 Cumulative effect

Cumulative effect in relation to the activity means the past, current and reasonably future impact of an activity, considered together with the impact of activities associated with that activity, that itself may not be significant but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Due to the nature and extent of the impacts identified above, and that the impacts are rated as low to negligible, the cumulative impacts are also expected to negligible.

## 12. CONCLUSION AND RECOMMENDATIONS

The following specialist studies were undertaken as part of the Environmental Impact Assessment:

- Botanical Assessment
- Heritage Screener
- Freshwater Verification
- Freshwater Risk Assessment

The specialist studies and information provided in the EIA Report, indicate that the proposed development does not pose any significant impact to the environment and can be implemented with strict adherence to the recommended mitigation measures.

Mitigation measures as recommended by the specialists must be enforced if the proposed development were to be approved. These mitigation measures and recommendations are discussed in Section 10 of this report and have been included in the Environmental Impact Report (EMPr) attached as **Appendix 9**. Mitigation measures with regards to any activities in the watercourses are discussed in the river Maintenance and Management Plan (MMP)(**Appendix 10**). This MMP should be read in conjunction with the EMPr.

In terms of the need and desirability of the proposed development, the need exists for a storage dam that would provide sufficient storage of an already existing water use. This existing water use could never be potted before due to inadequate storage capacity on the property and the water use was never utilised to its full potential. The water would be applied to its full potential and furthermore support agricultural development that will have a direct influence in the socio-economic status of the previously disadvantaged. Should the construction of the dam be approved, an expansion of about 10.5ha of fruit orchards is proposed. The establishment of 10.5ha fruit orchards will promote economic growth and about 12 additional permanent employment opportunities will be generated for a community that urgently needs it.

The site is considered the best and only economical option as it is within a natural basin situated relatively high relative to the area-to-be-developed. The storage/cost ratio is considered viable under the circumstances requiring the least amount of earthworks while offering the best gravitational benefits with considering irrigation aspects, both considered positive from an economical point of view.

Both the existing as well as the proposed farm infrastructure lends itself towards this option. The proposed footprint is on existing fields without any negative impact on natural vegetation. The site is also situated close to the existing Rietvlei Scheme off-take point from where water would be received ensuring minimal losses.

Access to the farm will be from via existing farm roads, no additional access roads will need to be constructed.

The proposed dam and location are the only viable alternatives, and the only ones assessed. Due to the fact that property is rather small there are no other economically viable alternative sites available on the property. The site is considered the best and only economical option with a natural basin situated relatively high relative to the area-to-be-developed.

Therefore, no other site alternatives were considered and investigated.

The purpose of the proposed dam is to provide storage capacity for the storage of existing water use right. No other activity alternatives were considered.

The “no-go” option, which is the option of not going ahead with the proposed development. Although this might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not constructing the storage dam will not be realised. The existing water use would therefore never be utilised to its full potential and the proposed agricultural development of 10.5 ha of fruit orchards will not take place. This would have a direct impact on the socio-economic status of the previously disadvantaged groups, which is expected to create jobs in the area.

The potential impact on the sense of place of the proposed dam has also been considered. The surrounding area is characterised by agricultural activities, as well as a number of farm dams in the local area, and the proposed dam will therefore not be uncharacteristic for the area. The sense of place is not expected to be altered by the proposed dam, and no further studies are suggested.

According to the Heritage Screener conducted and comments from Heritage Western Cape, the proposed development is unlikely to impact on significant archaeology, built environment or cultural landscape heritage resources. However, the area proposed for development is underlain by formations of very high palaeontological sensitivity. It was therefore recommended that no further studies be required, however a Chance Fossil Finds Procedure must be adopted for the development of the dam.

According to the Botanical Assessment, it is unlikely that the proposed development will lead to any significant impact on the biodiversity as a result of its placement. The site and its immediate surroundings are considered transformed with no natural veld remaining. Only a few hardy indigenous species remain.

According to the Freshwater Verification and Risk Assessment, the overall, the activities related to the proposed dam development are deemed to pose a ‘Low’ risk significance to the episodic drainage line. This is attributed to the already degraded ecological integrity of the drainage line, as well as the overall absence of indigenous vegetation and limited hydrological drivers which could potentially be impacted.

Nevertheless, possible edge effects that can arise from the construction activities include the disturbance of soils leading to increased sedimentation of the downgradient reach of the drainage line, erosion and possible further proliferation of alien and invasive vegetation. With the implementation of the recommended mitigation measures the risk that such effects would occur on the drainage line is considered to be low to very low.

During the operational phase of the dam, all operational activities are considered to pose a ‘Low’ risk significance to the drainage line and its downgradient reach, provided that the appropriate impact mitigation measures are implemented.

Considering all the information, it is not envisaged that the development of the Jade Hill dam and associated agricultural development, will have a significant negative impact on the environment, if mitigation and monitoring measures, as advised by the specialists are strictly adhered to.

It is therefore recommended that the proposed Jade Hills Dam be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended enhancement and mitigation measures contained in Section 10 of this report, the EMPr (**Appendix 9**) and the MMP (**Appendix 10**).

### 13. DETAILS AND EXPERTISE OF THE EAP

This Draft Environmental Impact Report was prepared by Clinton Geyser who has a MSc. Degree in Environmental Management. He has been working as an Environmental Assessment Practitioner since 2009 and is currently employed at EnviroAfrica CC.

Report compiled by Clinton Geyser -

Qualifications:

- BSc. Earth Sciences, Majors in Geology and Geography and Environmental Management (1998 – 2000) and;
- BSc. (hons): Geography and Environmental Management (2001) and;
- MSc. Geography and Environmental Management (2002), all from the University of Johannesburg.

Expertise:

Clinton Geyser has over eleven years' experience in the environmental management field as an Environmental Assessment Practitioner and as an Environmental Control Officer, having worked on a variety of projects in the Western, Eastern and Northern Cape. Previous completed applications include, but not limited to:

- Civil engineering infrastructure including pipelines, Waste Water Treatment Works, and roads in the Western and Northern Cape.
- Agricultural developments, including reservoirs and dams, in the Western and Northern Cape.
- Telecommunications masts in the Western and Eastern Cape
- Housing Developments in the Western and Northern Cape.
- Resort developments in the Western and Northern Cape.
- Cemeteries in the Western Cape
- Waste Management Licences in the Western Cape

Employment:

Previous employment as an EAP: Doug Jeffery Environmental Consultants (2009 – 2012)

Current employment: EnviroAfrica cc (2012 – present).

The whole process and report was supervised by Bernard de Witt who has more than 20 years' experience in environmental management and environmental impact assessments.

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