BONATHABA DAM: THE PROPOSED DEVELOPMENT OF AN INSTREAM DAM ON PORTIONS 2 AND 3 OF FARM NO. 1100, BONATHABA, MALMESBURY, WESTERN CAPE

DEADP REF: 16/3/3/2/F5/16/2015/21

AUGUST 2021

Black Orchid Farming (Pty) Ltd

THE PROPOSED DEVELOPMENT OF AN INSTREAM DAM ON PORTIONS 2 AND 3 OF FARM NO. 1100, BONATHABA, MALMESBURY, WESTERN CAPE

PREPARED FOR:

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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 QUALITFICATIONS & EXPERIENCE OF THE EAP

This Draft Environmental Impact Report was prepared by Anthony Mader:

Qualifications: BSc, BSc (Hons), PhD (currently completing) at the University of the Witwatersrand, Johannesburg, South Africa.

Experience: Anthony has over three years of experience within environmental consulting and has worked on private and government projects throughout the country, including Western Cape, Northern Cape, KwaZulu-Natal, and the Eastern Cape. Anthony has facilitated Environmental (EA) and Water Use (WUA) applications whereas other duties included auditing of various types of construction types to ensure environmental compliance with the EA. The variety of projects Anthony has worked on include, but are not limited to;

- Housing developments;
- Civil engineering infrastructure projects such as water supply schemes, roads, culverts, bridges, warehouses, and a substation; and
- Auditing of water supply schemes, housing developments, warehouses, roads, bridges, and reservoirs

Anthony Mader joined EnviroAfrica CC in March 2020 and is employed as an Environmental Assessment Practitioner (EAP), working on various private and government projects throughout the Western Cape and Northern Cape.

The entire process and report were supervised by Bernard De Witt who has more than 30 years' experience in environmental management and environmental impact assessments.

Please refer to **Appendix 14** for the CV of the EAP.

ADMINISTRATIVE DETAILS

Highlight the Departmental Region in which the intended application will fall	**CAPE TOWN OFFICE:**		GEORGE OFFICE:
	REGION 1 **(City of Cape Town, West Coast District**	REGION 2 (Cape Winelands District & Overberg District)	REGION 3 (Central Karoo District & Garden Route District)

Duplicate this section where there is more than one Proponent Name of Applicant/Proponent:	Black Orchid Farming Pty (Ltd)	
Name of contact person for Applicant/Proponent (if other):	Ms. Mine van Wyk	
Company/ Trading name/State Department/Organ of State:	Black Orchid Farming Pty (Ltd)	
Company Registration Number:		
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	Roggebaai	Postal code: 8012
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EAP name:	Anthony Mader	
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Qualifications:	BSc; BSc (Honours) - in Environment, Ecology, and Conservation; Ph.D. (currently completing)	
EAPASA registration no:	N/A	
Duplicate this section where there is more than one landowner Name of landowner:	**The Applicant is the Landowner**	
Name of contact person for landowner (if other):		
Postal address:		
		Postal code:
Telephone:	( )	Cell:
E-mail:		Fax: ( )
Name of Person in control of the land:	**The Applicant is the Landowner**	
Name of contact person for person in control of the land:		
Postal address:		
		Postal code:
Telephone:	( )	Cell:
E-mail:		Fax: ( )

Duplicate this section where there is more than one Municipal Jurisdiction Municipality in whose area of jurisdiction the proposed activity will fall:	West Coast District Municipality	
Contact person:	Mr. David Joubert	
Postal address:	P.O. Box 242	
	Moorreesburg	Postal code: 7310
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E-mail:	mm@wcdm.co.za	Fax: (086) 692 6113

CONTENTS

APPENDICES

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	South African National Biodiversity Institute
WULA	Water Use Licence Application

1. INTRODUCTION

1.1 BACKGROUND

Agriculture is a major economic driver in the Swartland Local Municipality, contributing to the socioeconomic stability of the area. Black Orchid Farming proposes the development of an in-stream dam on Portion 2 and Portion 3 of Farm No. 1100, Bonathaba, located between Malmesbury and Wellington.

The Bonathaba Farm, as well as Zwartfontein Farm (located adjacent to Bonathaba), form part of a development plan to approximately double the productive hectares of the farm's agricultural output. This development plan aims to create a large-scale, sustainable citrus and grape operation, creating over 200 new employment opportunities while retaining over 600 jobs[1]. Environmental factors, namely soil and climatic conditions, along with the Cape Town Harbour being closely situated to the Farms (approximately 60km as the crow flies), provide suitable growing and export conditions for the grape and citrus production industry. The proposed Bonathaba Dam development is in line with the West Coast District Municipality's IDP with regards to sustaining and supporting primary and secondary sectors within the economy of the district, including the agriculture sector[2]. Moreover, the West Coast District's economy is dominated by both the manufacturing (20.3% in 2016) and the agricultural sector (at 20.2%, generating R 5 482 300 in 2016), highlighting the need to create sustainable agricultural practices within the District Municipality.

The proposed dam will have a gross storage capacity of one million cubic meters (1 000 000m^3) with a development footprint of approximately 19.2ha. The proposed dam will overlap both properties where the dam wall will be located on the eastern boundary of the two properties (Figure 1), most of which will impact existing vineyards and/or orchards. The proposed site is situated within Ward 12 of the Swartland Local Municipality, West Coast District Municipality, and is located at the following coordinates: 33°31'13.66"S; 18°55'17.53"E.

The Bonathaba Farming Venture has an Existing Water Use Right (Appendix 9) where water is abstracted from the Berg River, located approximately 720m east of the proposed site for the dam development (Figure 8). The proposed dam development will require a Water Use Authorisation (WUA) in terms of section 21 of the National Water Act (NWA), Act No. 36 of 1998, where applicable water use activities include;

- S21 (b) Storing of water
- S21 (c) Impeding or diverting the flow of the watercourse
- S21 (i) Altering the bed, bank, course, or characteristic of a watercourse

The applicant, Black Orchid Farming (Pty) Ltd, 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 107 of 1998, as amended (NEMA).

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) on **17th May 2021.** The Scoping Report and Plan of Study for EIA were approved by DEA&DP on **XXX June 2021** and EnviroAfrica were advised to proceed with the EIA process (**Appendix 5**).

[1] https://uff.co.za/wp-content/uploads/2018/08/Bonathaba-Farm-deal-sheet.pdf
[2] http://westcoastdm.co.za/wp-content/uploads/2019/06/290519WCDM-IDP-2017-2022-Review-2-FINAL-1.pdf

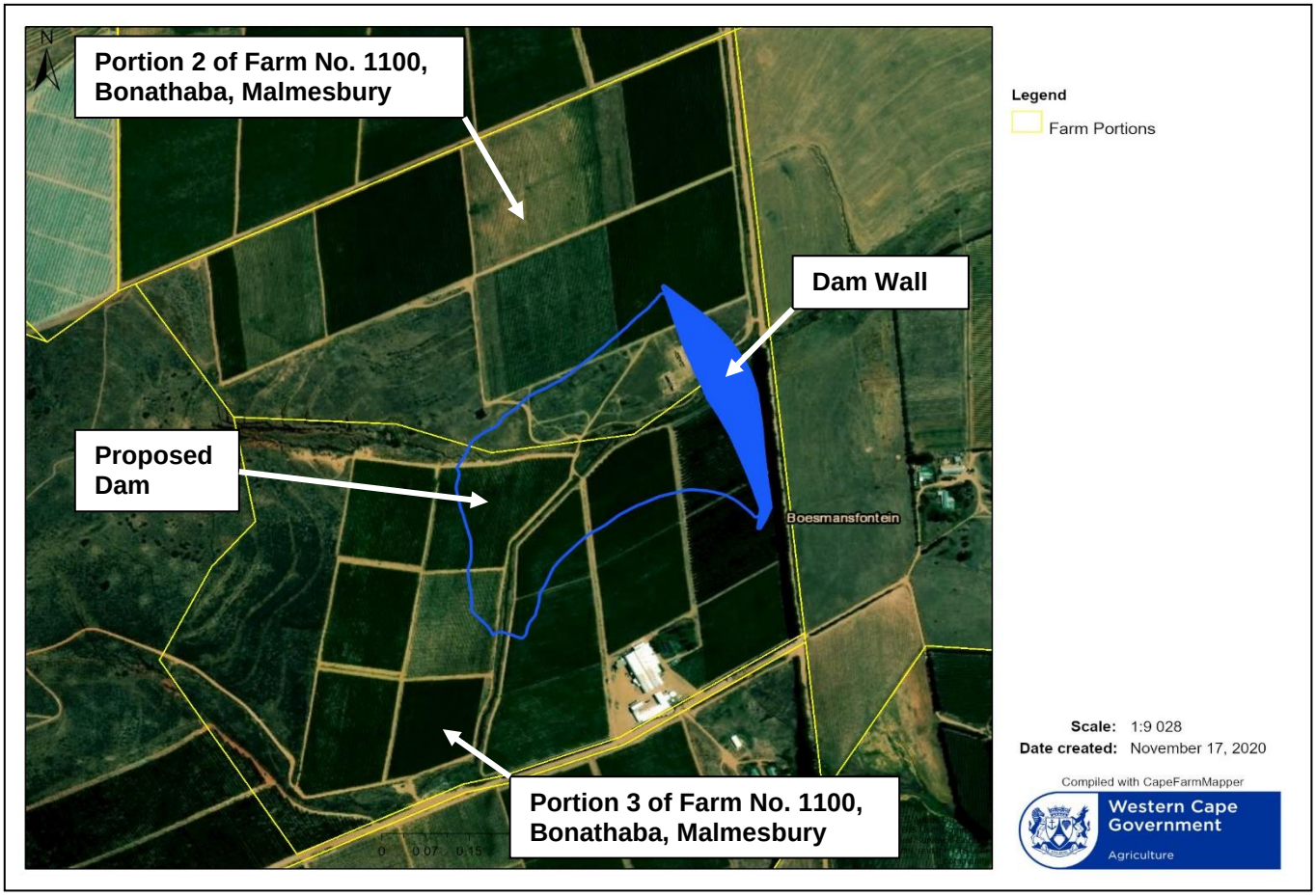


Figure 1. Proposed Dam Development on Portions 2 and 3 of Farm No. 1100, Bonathaba, Malmesbury (33°31'13.66"S; 18°55'17.53"E).

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, EAP, and other relevant personnel where applicable.

1.2 DESCRIPTION OF THE PROPOSED ACTIVITY

This application is for the proposed development of an in-stream dam on Portions 2 and 3 of Farm No. 1100, Bonathaba, Malmesbury, Western Cape (Figure 2). The proposed instream dam will have a development footprint of approximately 19.2ha and have a gross storage capacity of 1 000 000m³. The dam wall will be 18m in height along with a spillway channel which will be created (Table 1; Figure 3; Appendix 2). The site has an existing water use rights, and the proposed dam will provide insurance of water supply for irrigation of the existing irrigation areas (see Appendix 9). Access to the proposed dam will be gained by existing farm roads and the construction of a 4m wide gravel road around the basin and embankment of the dam footprint. A new pump station with a footprint of 150m² is proposed and will be located within 32m of the watercourse (see Appendix 2.3). A new outlet pipe will be constructed and a pipeline from the proposed dam will be connected to an existing pipe from the Berg River (see Appendix 2.3) is also proposed. A spillway channel will be constructed and located on the left flank of the proposed dam boundary (Appendix 2.3). A dam safety and classification application will be submitted to the Dam Safety Office. In summary, the proposed development (including associated infrastructure) (Table 1; Appendix 2.3) will be comprised of:

- Construction of the proposed Bonathaba Dam (1 000 000m^3 storage capacity, 18m high embankment) with a spillway (spillway discharge channel – 10m wide) on its left abutment.
- A New 500mm dia HDPE outlet pipe will be constructed in reinforced concrete underneath the dam embankment and connected to a new pump station located at the downstream toe of the embankment.
- New 500mm dia PVC Class 8 pipeline (~600m long) from the pump station to tie into existing 400mm pipe which is connected to the pump station located on the banks of the Berg River.
- A 4m wide gravel access road will be constructed around the entire dam basin and embankment.
- Pump station (~150m^2)

The Bonathaba Dam will be established on approximately 10.4ha of areas currently under permanent crops (namely table grapes) whereas approximately 8.8ha of already disturbed vegetation (due to previous agricultural activities) will be impacted. The location was selected based on environmental sensitivity and to ensure the project life cycle costs are minimized (gravity feed vs. pumping cost etc.). No new roads will be constructed as an existing access road will be utilized to gain access to the proposed site.

The proposed dam development will require a Water Use Authorisation (WUA) in terms of section 21 of the National Water Act (NWA), Act No. 36 of 1998. Applicable section 21 activities include;

- S21 (b) Storing of water
- S21 (c) Impeding or diverting the flow of the watercourse
- S21 (i) Altering the bed, bank, course, or characteristic of a watercourse

Table 1. Parameters for the proposed development of the Bonathaba Dam. Note, NOCL = Non-overspill crest level; FSL = Full supply level. Source: Ingerop.

Description	Size/ extent
NOCL	**108m**
FSL	**107m**
Freeboard	**1m**
Water Surface Area at FSL	**15.5ha**
Gross Capacity	**1 000 000m^3**
Crest length	**480m**
Crest width	**4m**
Wall height	**18m**
Upstream slope	**1V:3H**
Downstream slope	**1V:2H**
Minimum basin storage level	**92m**
Downstream toe level	**90m**
Loss of Citrus	**~2.84ha**
Loss of Table Grape	**~7.56ha**
Total Footprint area	**~19.2ha**

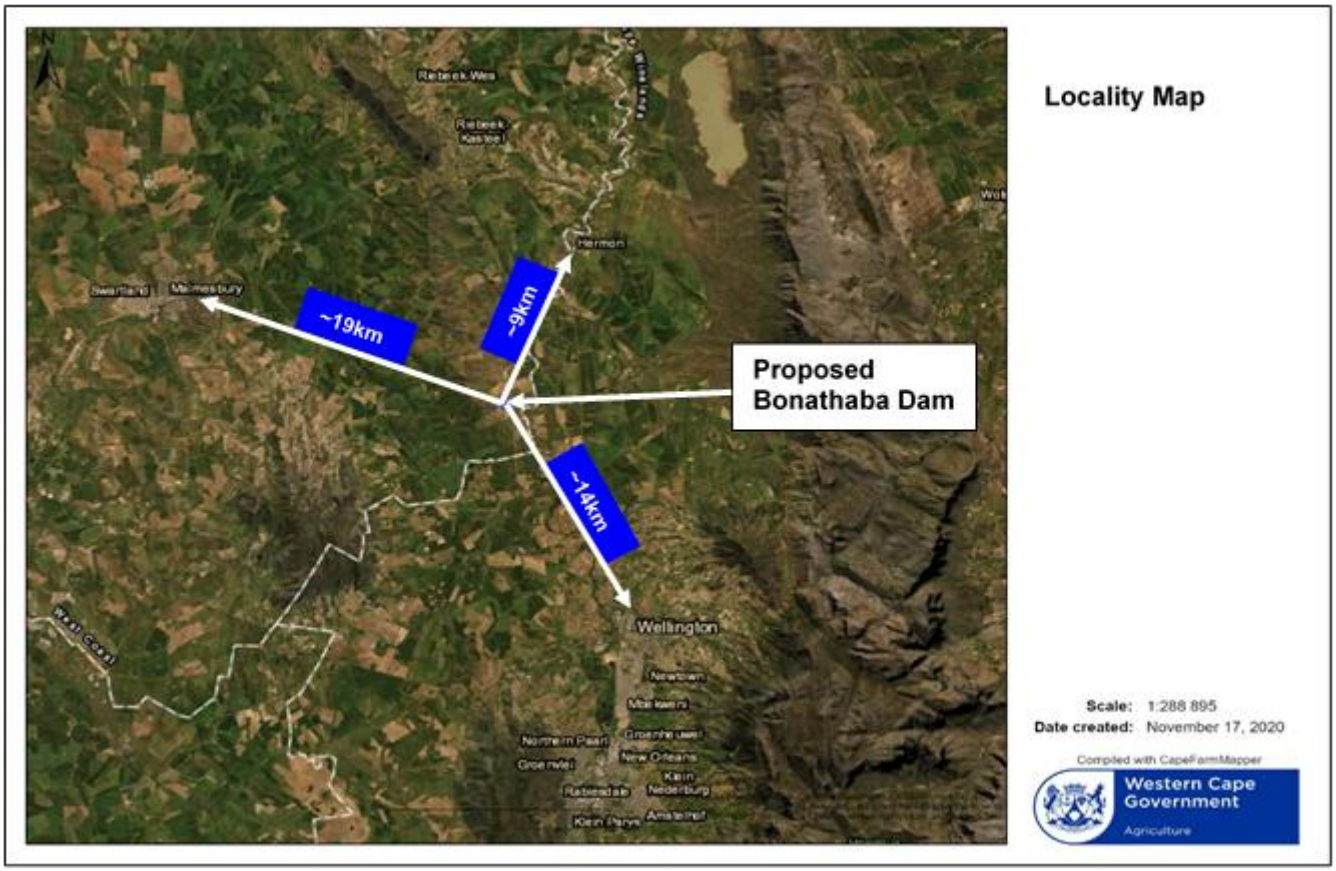


Figure 2. Location of proposed site for the Bonathaba Dam development.

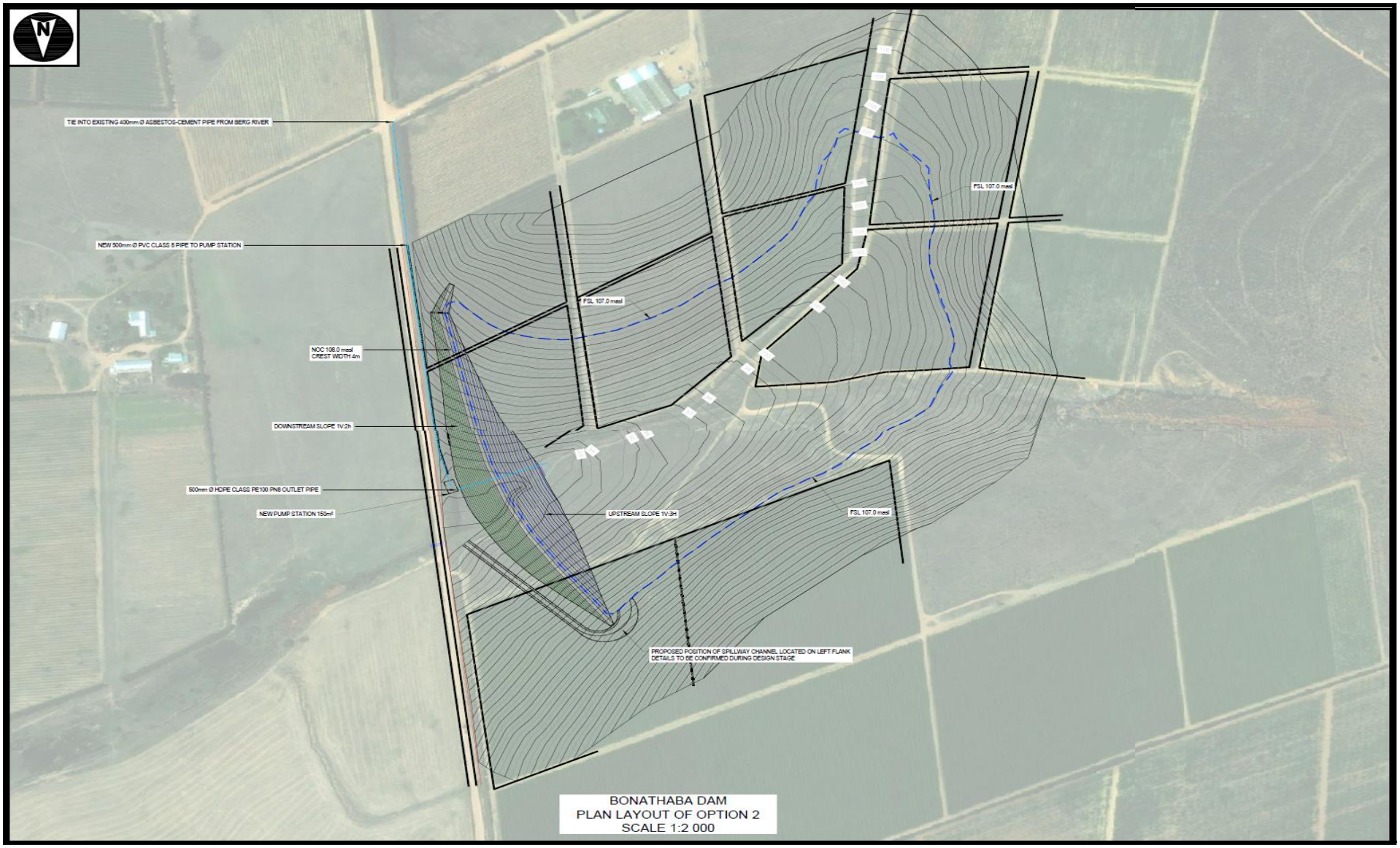


Figure 3. Proposed, preferred site plan layout. Source: Ingerop Consulting Engineers and Project Managers, (2020). Note, map direction (i.e. north direction). See Appendix 2 for more information.

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 (Appendix 9). This existing water use could never be potted before due to inadequate storage capacity on the property and thus, the water use was never utilized to its full potential. The proposed development is required to ensure the long-term economic viability and sustainability of the production of table grapes and citrus through a reliable water supply from the dam for irrigation.

The West Coast District Municipality's IDP and SDF identify and support efforts made to promote sustainability and growth within/ of the agricultural sector. One of the main issues highlighted by the West Coast Districts Spatial Development Framework (SDF)[3] is the recent drought and the negative implications of drought on the agricultural sector. Various climatic drivers, namely higher temperatures and drier conditions further exacerbate the impact of drought events on the agricultural sector[4], which require careful planning and adequate responses to sustain and grow the sector. In this area, the agricultural industry depends on water abstracted from the Bergrivier for irrigation. Due to the absence of rainfall during mid-summer when water is required (which is generally too little to sustain agricultural activities), water is generally abstracted during winter and subsequently stored in dams for irrigation during the summer months.

This is especially the case for the study area located within the Swartland Local Municipality – identified as the most prominent agricultural Local Municipal area within the West Coast District. This is highlighted by the Agricultural Sector being a major contributor to the District's economy (at 20.2%, generating R 5 482 300 in 2016).

Moreover, there is a need to promote socioeconomic development by creating employment opportunities. The proposed Bonathaba Dam (and Zwartfontein) development plan will create over two hundred (200) new employment opportunities while retaining over 600 jobs[5]. Therefore, there is a need for the proposed dam development to ensure agricultural productivity is sustained, along with creating employment opportunities, within the context of the study area, local, and district municipal areas.

[3] http://westcoastdm.co.za/wp-content/uploads/2020/09/WCDM-SDF-2020-1.pdf
[4] Zscheischler, J., Martius, O., Westra, S., Bevacqua, E., Raymond, C., Horton, R.M., van den Hurk, B., AghaKouchak, A., Jézéquel, A., Mahecha, M.D. and Maraun, D. 2020. A typology of compound weather and climate events. *Nature reviews earth & environment*, pp.1-15.

2.2 DESIRABILITY

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

2.2.1 Location and Accessibility

The proposed location of the dam site is considered ideally suited for the construction of the Bonathaba Dam due to the (i) environmental (lower expected impact on indigenous vegetation and presence of favourable soil and climatic conditions) and (ii) proximity to Cape Town Harbour (situated approximately 60km as the crow flies). This provides the ideal location for the table grape and citrus industry to grow and contribute to socio-economic development within the area.

From an engineering perspective, the location was chosen to ensure the project life cycle costs are minimized where the decisive factors typically include basin characteristics with reference to available capacity versus demand, optimal costing of works, risk, etc, and thus, the location is preferred based on these factors. No new roads will be constructed as an existing access road will be utilized to gain access to the proposed site. Moreover, Sites 1-4 were initially identified and considered for the proposed location of the Bonathaba Dam however, based on the steep topography, expensive construction estimates, and the environmental impact of these sites on virgin land, it was decided that only the preferred layout (33°31'13.66"S 18°55'17.53"E; Figure 3 and Table 1) should be considered.

Locality maps are included in **Appendix 1,** Design Layout Plans **Appendix 2,** with site photographs in **Appendix 3.** Please refer to the DEA Screening Tool (**Appendix 7.1**) and Site Sensitivity Verification (SSV) Report (**Appendix 7.2**) for more information on the *desirability* of the proposed development with regards to whether the proposed location is the right place for locating the type of land-use/activity.

2.2.2 Compatibility with the Surrounding Area

The site is largely surrounded by agricultural activities (Figure 4; **Appendix 4** for Crop Census Map and site photographs in **Appendix 3**). Moreover, numerous farm dams are located within the larger community and will therefore, not be a novel development in the context of the area. The nature of the proposed development site is in line with property zoning (namely Agriculture). 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. Please refer to the DEA Screening Tool (**Appendix 7.1**) and Site Sensitivity Verification (SSV) Report (**Appendix 7.2**) for more information on the *desirability* of the proposed development with regards to whether the compatibility of the proposed development with the surrounding area.

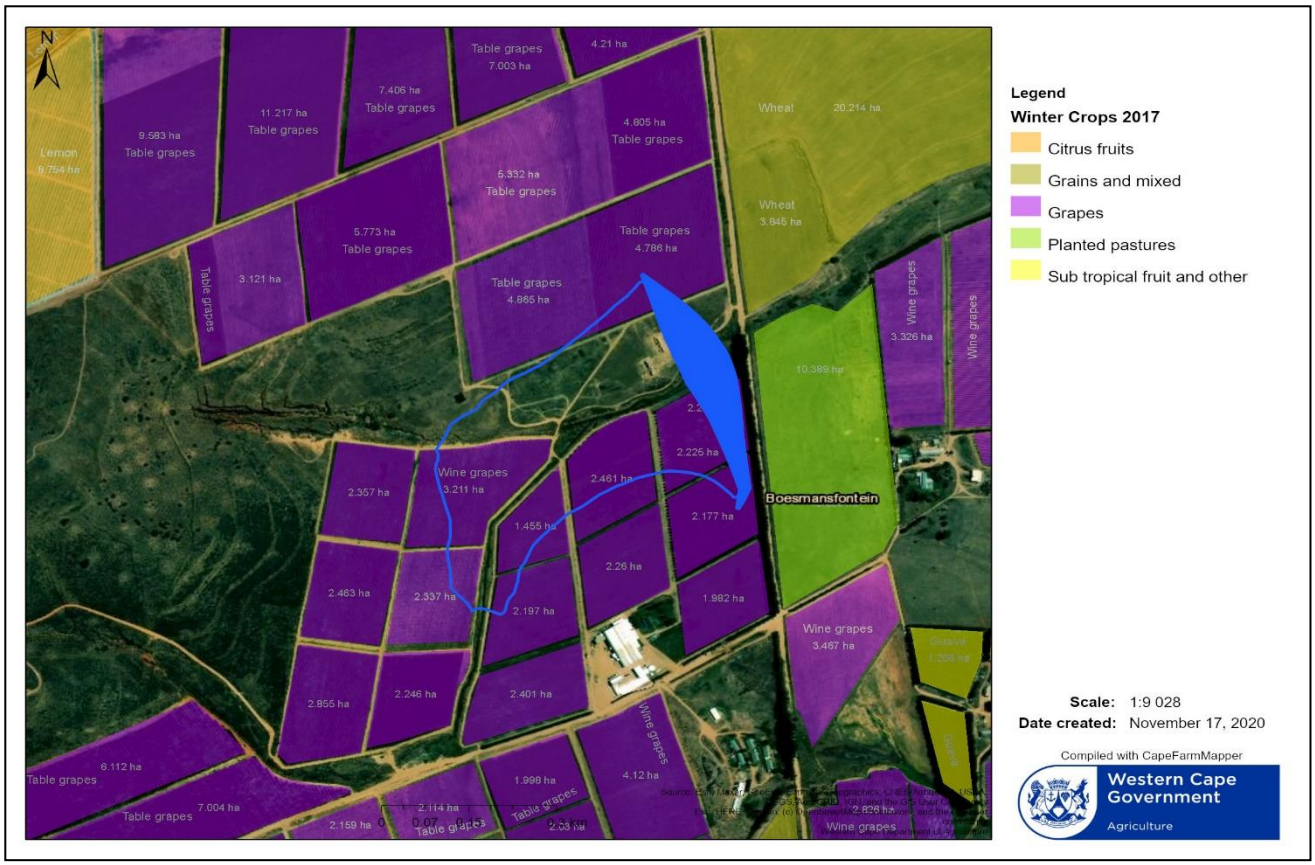


Figure 4. Crop census associated with the site for the proposed development of the Bonathaba Dam.

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

GN R327	Short description of relevant Activity(ies) in terms of Listing Notice 1	Description of specific portion of the development that might trigger the listed activity.
9	"The **development** of **infrastructure** exceeding 1000 metres in length for the **bulk transportation of water or storm water**; (i) **with an internal diameter of 0,36 metres or more**; or (ii) with a peak throughput of 120 litres per second or more; excluding where; (a) such infrastructure is for the bulk transportation of water or storm water drainage inside a road reserve; or (b) where such development will occur within an urban area."	**The pipes associated with the proposed dam have diameters exceeding 0.36m.**
12	"The development of - (i) **dams** or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) **infrastructure or structures with a physical footprint of 100 square metres or more**; where such development occurs - (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;"	**The proposed dam is located within a watercourse and will have a development footprint of more than 100m².**
19	"The **infilling** or d**epositing** of any material of more than **10 cubic metres** into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;"	**The proposed dam is located within a non-perennial stream, material will be excavated and used to increase the dam wall height**.
27	"**The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation**, except where such	**The proposed activity will enable the clearance of approximately 19.2 ha of disturbed vegetation.**

	clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.”	
GN R325	**Short description of relevant Activity(ies) in terms of Listing Notice 2**	**Description of specific portion of the development that might trigger the listed activity.**
16	“The development of a dam where the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.”	**The proposed dam will have a wall height of 18m and cover an area of approximately 19.2ha.**
GN R324	**Short description of relevant Activity(ies) in terms of Listing Notice 3**	**Description of specific portion of the development that might trigger the listed activity.**
4	The development of a road wider than 4 meters with a reserve less than 13,5m (i) Western Cape (ii) Areas outside urban areas	It is proposed that a 10m wide, 1600m long access road be constructed around the proposed dam footprint.
12	Clearance of an area of more than 300 m² 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.	**The proposed activity will result in the clearance of more than 300m² of transformed/ disturbed vegetation within an ESA2 and Critically Endangered Vegetation Type (namely the Swartland Shale Renosterveld).**
14	“The development of – (i) **dams** or weirs, where the dam or weir, **including infrastructure and water surface area exceeds 10 square metres**; or (ii) **infrastructure or structures with a physical footprint of 10 square metres or more**; where such development occurs - (a) **within a watercourse**; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	**The proposed development of a dam will have a water surface area exceeding 10m² within an ESA2.**

	i. Western Cape i. Outside urban areas: (ff) **Critical biodiversity areas** or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;"	

A Pre-Application Scoping Report was submitted to the DEA&DP on the **15th December 2020**. An Application Form was submitted to the DEA&DP on the **7th April 2021**. A Draft Scoping Report (submitted on the **7th April 2021**) was undertaken to identify potential issues and impacts associated with the proposed development of the Bonathaba Dam. The Final Scoping Report was submitted to the DEA&DP for approval / acceptance on condition on the **17th May 2021.** The Final Scoping Report and Plan of Study was approved by the DEA&DP on the **XXX**.

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 m² 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.

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (**Appendix 8.3**) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required".*

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*

Moreover, the following guidelines were considered and incorporated (where applicable):

- DEADP Guidelines: The DEA&DP Guideline on Need & Desirability (2010), DEA&DP Guideline on Public Participation (2010), DEA&DP Guideline on Alternatives (2010), and DEA&DP Guideline for Environmental Management Plans (2005) were consulted and adhered to when undertaking this Basic Assessment Report.

- National Environmental Management Act (107 of 19989) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2010: Principles of environmental management, procedures to be followed and adhered to;
- Guideline on need and desirability (2017): Although some overlap with the DE&DP Guideline (2010), this guideline was consulted and adhered to with regards to considering the need and desirability aspects of the proposed Bonathaba Dam;
- Public Participation guideline in terms of NEMA (2017): Although some overlap with the DE&DP Guideline (2010), this guideline was consulted and adhered to with regards to considering the public participation process required for the proposed Bonathaba Dam development;
- Impact significance, Integrated Environmental Management, Information Series 5 (2002) and Environmental Impact Reporting, Integrated Environmental Management, Information Series 15 (2004): These guidelines were consulted and adhered to with regards to the assessment of the significance of impacts associated with the proposed development of the Bonathaba Dam.

Protocols included the general requirements for conducting initial verification of site sensitivity. The DEA Screening Tool, as well as the nature of the proposed project (i.e. development of a new dam) identified the need for certain specialist studies. The sensitivity, as stated in the DEA Screening Tool, was agreed / disputed based on the site visit, desktop studies, and specialist assessments. Please refer to **Appendix 7.2** for the Site Sensitivity Verification (SSV) Report.

The mitigation hierarchy has been applied to arrive at the best practicable environmental option. The mitigation hierarchy is comprised of four actions which are designed to be implemented sequentially[5], namely (1) avoidance, (2) minimization, (3) rehabilitation, and (4) offset (not applicable to this project), where the following actions are applicable and have been applied in the context of this environmental process to promote the best feasible environmental option:

(1) Avoidance: avoiding impacts on biodiversity within the proposed site of development and surrounding area and includes identifying potential risks and investigating alternatives[6]. Avoidance was carried out in the context of this process as environmental components (namely potential botanical and freshwater impacts) were identified and rated by specialists. Moreover, design alternatives were also investigated. Due to the nature of this proposed development, no site alternatives were investigated – this also aids in avoiding any potential negative impact(s) on pristine areas.

(2) Minimize potential impacts: mitigation measures[7] and recommendations have been proposed by the Botanical, Freshwater, and Heritage Specialists to mitigate and reduce identified potential impacts. These mitigation measures and recommendations have been incorporated into the EMPr and MMP and are to be implemented during the construction and operational (where applicable) phases.

[5]Arlidge, W.N., Bull, J.W., Addison, P.F., Burgass, M.J., Gianuca, D., Gorham, T.M., Jacob, C., Shumway, N., Sinclair, S.P., Watson, J.E. and Wilcox, C., 2018. A global mitigation hierarchy for nature conservation. *BioScience*, 68(5), pp.336-347.
[6]Phalan, B., Hayes, G., Brooks, S., Marsh, D., Howard, P., Costelloe, B., Vira, B., Kowalska, A. and Whitaker, S., 2018. Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *Oryx*, 52(2), pp.316-324.
[7]Mitigation measures and erosion control methods include, but are not limited to, silt fences, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, mulching, etc. Exposed areas, susceptible to erosion, must be rehabilitated. Mitigation measures are not limited to measures mentioned here as such measures may need to be adapted for site-specific maintenance. This includes planting vegetation, characteristic of the pertinent vegetation type, to stabilize the soil.

Rehabilitation: as per action 2 above, mitigation measures, including the need to rehabilitate areas (which also aids in reducing erosion during the operational phase) outside the construction footprint has been incorporated in the EMPr and MMP.

3.5 NATIONAL WATER ACT

Apart from 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 Department of Water Affairs, who administer that Act, will be a leading role-player in the EIA.

The Bonathaba Farming Venture has an Existing Water Use Right (Appendix 9) where water is abstracted from the Berg River, located approximately 720m east of the proposed site for the dam development (Figure 8). The proposed dam development will require a Water Use Authorisation (WUA) in terms of section 21 of the National Water Act (NWA), Act No. 36 of 1998. Applicable section 21 activities include;

- S21 (b) Storing of water;
- S21 (c) Impeding or diverting the flow of the watercourse; and
- S21 (i) Altering the bed, bank, course, or characteristic of a watercourse.

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 apply to the proposed dam. A license 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

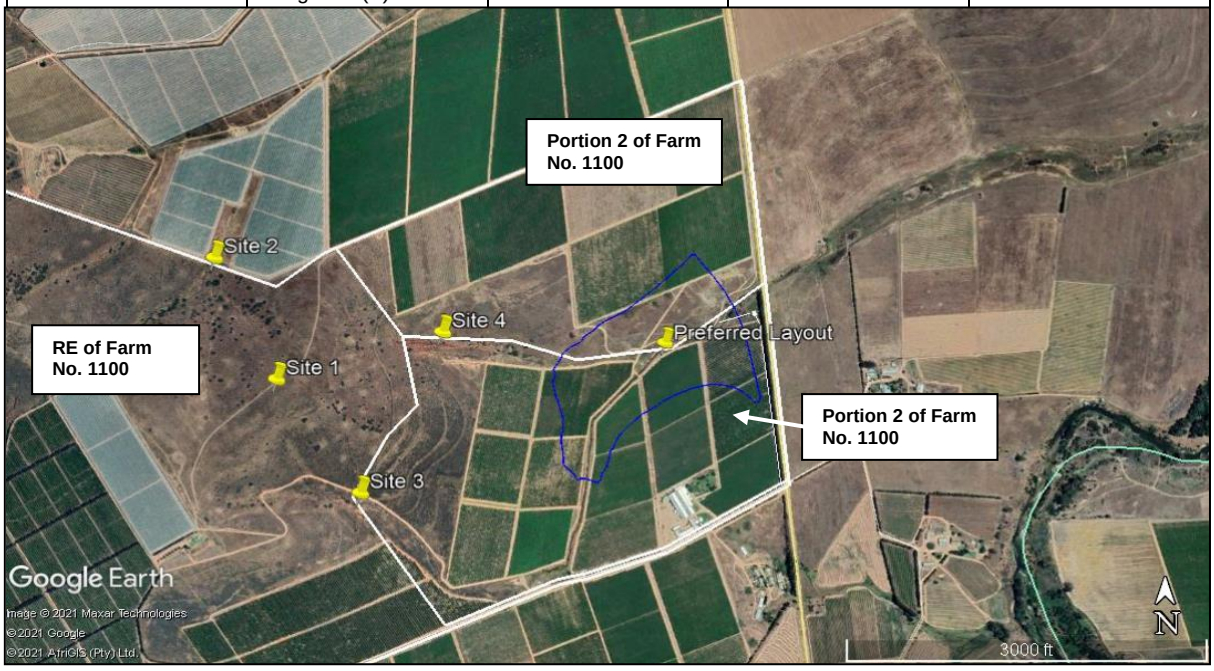
Alternatives have been considered during the Scoping phase and these are described below.

4.1 SITE ALTERNATIVES FOR THE PROPOSED DAM

The proposed site for the development of the Bonathaba Dam is considered the best and most economically feasible site (Alternative 1) relative to the existing conditions (i.e. disturbed vegetation, gravitational benefits, etc) of the area-to-be-developed. Sites 1-4 were initially identified and considered for the proposed location of the Bonathaba Dam however, based on the steep topography, expensive construction estimates, and the environmental impact of these sites on virgin land, it was decided that only the preferred layout (**33°31'13.66"S 18°55'17.53"E**; Figure 3 and Table 1) should be considered. It must be noted that these alternative site locations also fall within another property, namely RE of Farm No. 1100 (Table 3).

Table 3. Location and graphical representation of initially considered site locations.

Considered Alternatives				
Alternative Site 1	Latitude (S)	33°	31'	16.95"
	Longitude (E)	18°	54'	39.33"
Alternative Site 2	Latitude (S)	33°	31'	6.33"
	Longitude (E)	18°	54'	33.23"E
Alternative Site 3	Latitude (S)	33°	31'	26.89"S
	Longitude (E)	18°	54'	47.57"E
Alternative Site 4	Latitude (S)	33°	31'	12.83"S
	Longitude (E)	18°	54'	55.65"E



It must also be noted that no feasible alternatives were identified on Portions 2 and 3 of Farm No. 1100 due to (i) contours associated with the remainder of the site are not suitable for the development of a dam, and (ii) level of already transformed land (namely crops and processing facility) where an alternative location will impact a greater proportion of land under cultivation. Thus, the proposed location is the only available site on the two properties owned by the applicant for the proposed development. As per the Botanical Assessment (**Appendix 8.1**), most of the proposed developmental footprint will overlap areas currently under permanent crops (mostly table grapes) whereas approximately 8.8ha of already disturbed vegetation will be impacted [as the area was previously under wheat cultivation (**see Figure 7 of Appendix 8.1**) until 2006 and subsequently left lying fallow]. Few indigenous plant species were observed with most plants observed being weeds or pioneer species. The specialist also noted that the small watercourse associated with the study area has been previously impacted – the nature of the impact characteristic of intensive agricultural landscape practices.

Therefore, no other site alternatives were considered and investigated.

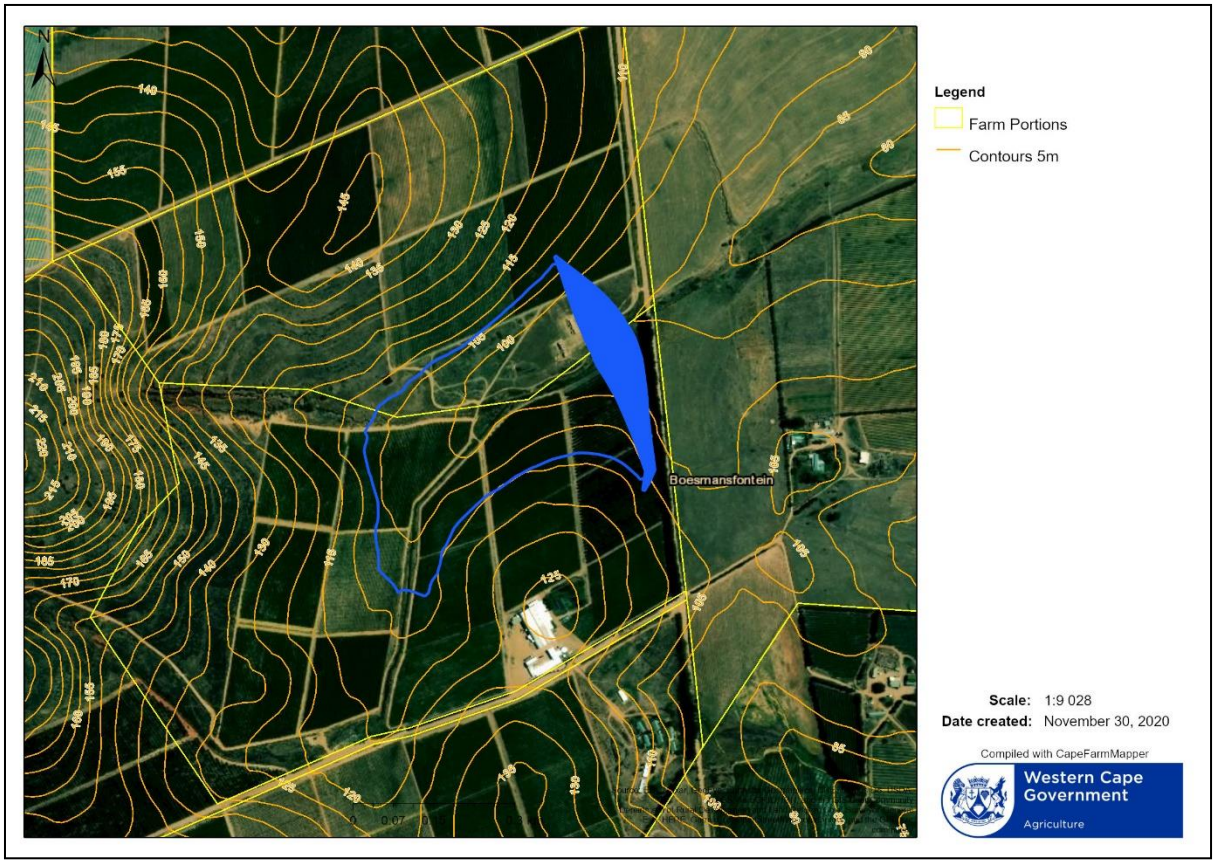


Figure 5. Physical constraints (i.e. topographic features) associated with the selection of a feasible site.

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 LAYOUT ALTERNATIVES FOR THE PROPOSED DAM

The purpose of the proposed dam is to provide Bonathaba Farm with enough water for its irrigation requirements. Two storage capacity (i.e. layout) alternatives, relative to the size of the dam were investigated and are presented below (**Table 4; Appendix 2**):

Table 4. General specifications of proposed dam storage capacity alternatives (**Appendix 2**).

Description	Alternative 1 (Not preferred)	Alternative 2 (Preferred)
	Refer to Appendix 2.1	Refer to Appendix 2.2
Wall length (m)	450	480
Crest RH (m)	106	108
Waltoon (m)	90	90
Maximum wall height (m)	16	18
Overflow RH (m)	105	107
Total Free Board (m)	1.0	1.0
Bottom RH (m)	92	92
Maximum Water Depth (m)	13	15
Full Surface Area (m^2)	125 000	155 800
Total Dam Surface Area (ha)	16.2	19.2
Total Capacity (m^3)	715 000	1 000 000
Water Embankment Ratio	6.3:1	5.51:1
Loss of Citrus (ha)	2.4	2.84
Loss of Table Grape (ha)	5.4	7.56

Although Alternative 2 will result in a larger footprint, the cost/storage ratio is considered viable under the circumstances relative to the (i) irrigational requirements of the Bonathaba Farm and (ii) site conditions. Therefore, Alternative 2 is the preferred layout.

4.4 NO-GO ALTERNATIVE

The no-go alternative will result in no further development, which will mean that there will be no impact on the environment. The 'status quo' will persist and the site will remain as is, transformed, and disturbed. Although this no-go option will not result in potential negative environmental impacts, the potential socio-economic benefits from implementing the activity would not be achieved/realized. As per the Botanical Assessment, the no-go alternative will result in a slow degradation of the site due to the surrounding land uses namely agricultural activities which will continue to directly and indirectly impact biotic factors. For example, faunal diversity changes through space and time and is directly influenced by anthropogenic activities. Such activities include the transformation of land (Chapin *et al*., 2000[8]). Direct impacts are typically associated with urban expansion, leading to land cover changes (and consequent loss of natural areas) and edge effects, whereas indirect impacts include impacts associated with the generation of waste and its management (McDonald *et al*., 2020)[9]. Edge effects have diverse impacts on biodiversity and ecological functioning (Razafindratsima *et al*.,

[8] Chapin Iii, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E. & Mack, M.C., 2000. Consequences of changing biodiversity. *Nature*, 405(6783), pp.234-242.

[9] McDonald, R.I., Mansur, A.V., Ascensão, F., Crossman, K., Elmqvist, T., Gonzalez, A., Güneralp, B., Haase, D., Hamann, M., Hillel, O. and Huang, K., 2020. Research gaps in knowledge of the impact of urban growth on biodiversity. *Nature Sustainability*, 3(1), pp.16-24.

2018)[10]. Such effects contribute to a disturbance factor, which is likely to have driven most wild animals away from the proposed site for development. As the site is currently under intensive agriculture, these activities are likely to persist should the no-go alternative be 'implemented'.

5. SITE DESCRIPTION

5.1 LOCATION

The proposed Bonathaba dam will be located on Portions 2 and 3 of Farm No. 1100, Bonathaba, Malmesbury (Figure 1 and Figure 3). The site is located within Ward 12 of the Swartland Local Municipality, West Coast District Municipality. The study area is located approximately 9km south of Hermon, 14km from Wellington, and 19km from Malmesbury (as the crow flies) (Figure 2).

The site coordinates for the proposed Bonathaba dam are **33°31'13.66"S; 18°55'17.53"E.**

The SG code for the proposed site is:
Portion 2 of Farm No. 1100 (property extent = 48.76ha): C04600000000110000002
Portion 3 of Farm No. 1100 (property extent = 60.57ha): C04600000000110000003

Access to the farm is from the Porseleinberg Road (entrance to the site at 33°31'25.62"S; 18°55'29.12"E), the site can be accessed via existing farm roads on the property.

Please refer to **Appendix 1** for Locality maps (Figure 5). Please refer to **Appendix 3** for Site Photographs. In order to highlight the level of previous disturbance/ transformation associated with the proposed site for development, historic images show previous transformation of land to agricultural land (Figure 7).

[10] Razafindratsima, O.H., Brown, K.A., Carvalho, F., Johnson, S.E., Wright, P.C. and Dunham, A.E., 2018. Edge effects on components of diversity and above-ground biomass in a tropical rainforest. *Journal of Applied Ecology*, 55(2), pp.977-985.

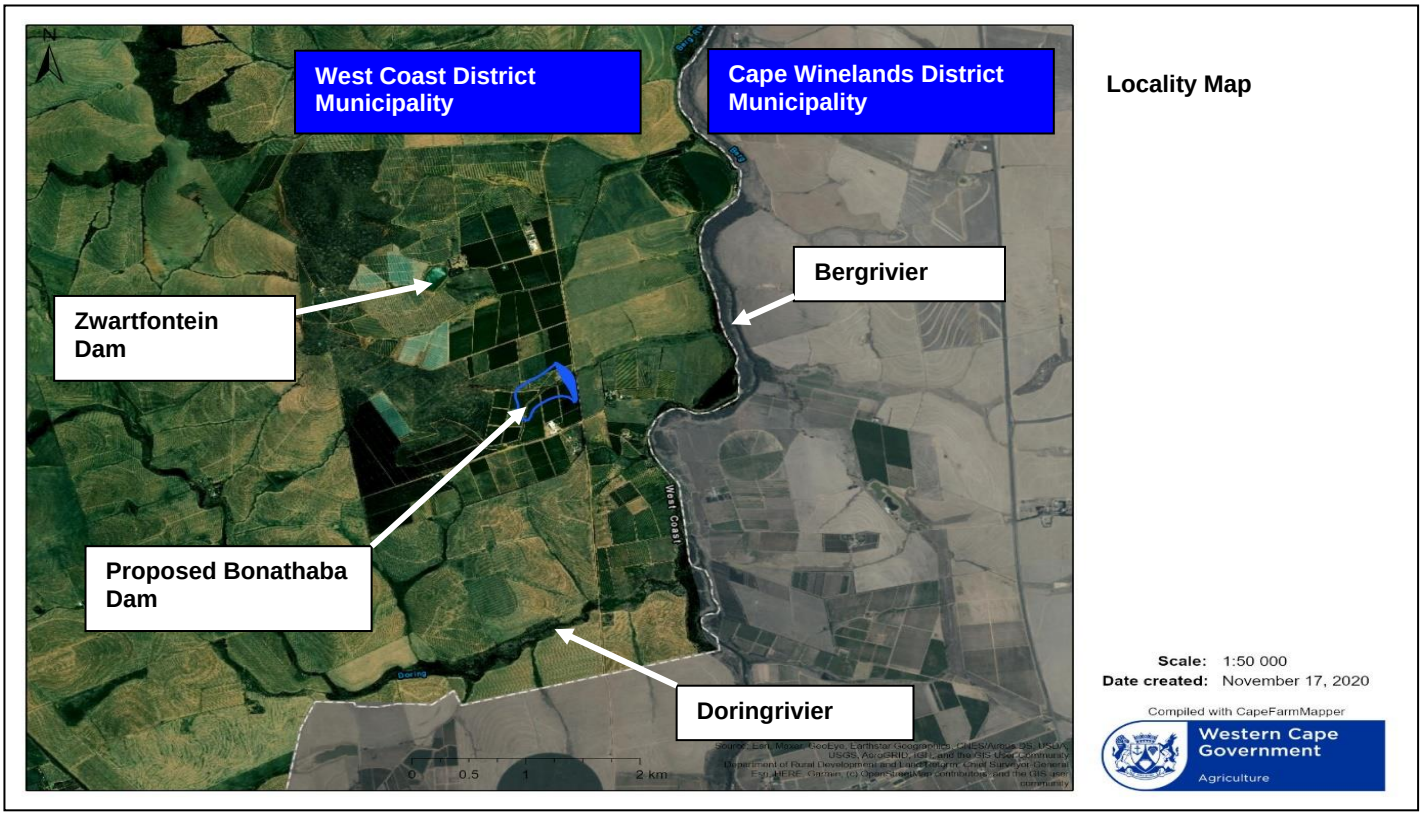


Figure 6. Locality map (1: 50 000) showing the location of the proposed Bonathaba Dam.

Figure 7. Historic images showing transformation of land associated with the proposed site for development. Note: A = 2004; B = 2009; C = 2014; D = 2021. Source: Google Earth, 2021.

Figure 8. Overview of proposed site for development. Proposed site for development has been previously transformed due to agricultural activities and previous construction of access road.

Figure 9. Overview of proposed disturbed / transformed site for development.

Figure 10. Vegetation present within the proposed development footprint.

Figure 11. Drainage line present within the development footprint.

Figure 12. Disturbed drainage line present near the southern portion of the proposed development footprint. Red arrow shows location of Bonathaba offices / processing facility.

Figure 13. Agricultural land within the proposed development footprint.

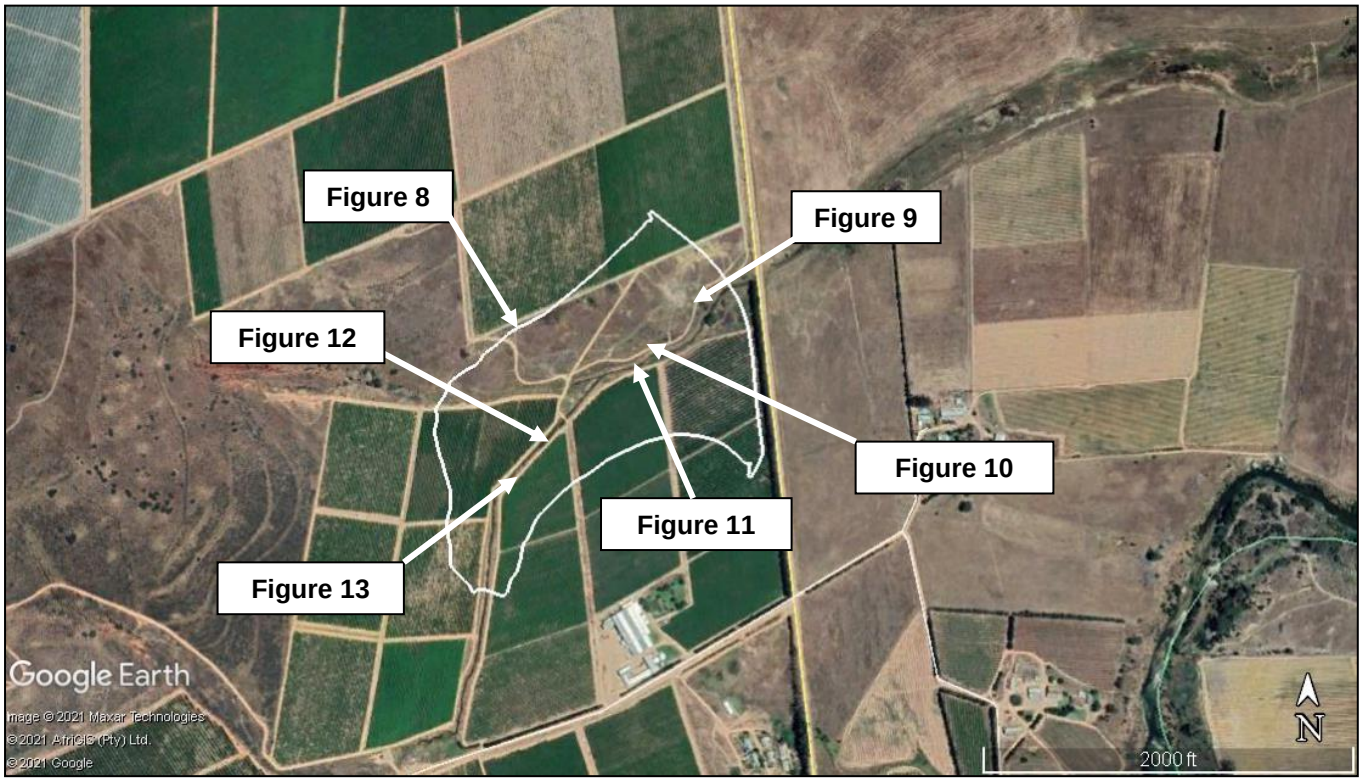


Figure 14. Location of photos referred to above (i.e., Figures 8 – 13).

5.2 VEGETATION

The site is situated within the Swartland Shale Renosterveld (Figure 6)[11], classified as a critically endangered (CR) 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, as well as the more recent (2018) National Biodiversity Assessment (Skowno *et. al*., 2019)[12]. The Swartland Shale Renosterveld, as described by Mucina and Rutherford (2006)[5], supports low-to-moderately tall leptophyllous[13] shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos. The vegetation type typically occurs on moderately undulating plains and valleys. Heuweltjies, which are generally associated with stunted trees and thicket, is a very prominent local feature of the environment, forming 'hummockveld' near Piketberg and the Tygerberg Hills. Disturbed areas are dominated by *Athanasia trifurcata* and *Otholobium hirtum*, whereas patches of *Cynodon dactylon* or 'grazing lawn' are often encountered.

As per the Botanical Assessment (**Appendix 8.1**), the largest portion of this footprint will overlap areas currently under permanent crops (namely table grapes) whereas the northern portion of the proposed dam footprint will impact an area of virgin soil. According to the foreman of the farm, this area used to be under wheat cultivation, which was confirmed by historic Google images (please refer to Figure 7 of Appendix 8.1). The site was cultivated at least until 2006, while the next available Google image (from 2009) shows the site lying fallow. No protected or red-listed plant species were observed during the site investigation. The most significant botanical feature identified by the Botanical Specialist was the presence of a few indigenous *Olea europaea* trees, located within the

[11] Mucina, L., Rutherford, M.C. and Powrie, L.W., 2006. *Vegetation Atlas of South Africa, Lesotho and Swaziland. The Vegetation of South Africa, Lesotho and Swaziland'*.(Eds L. Mucina and MC Rutherford.) pp, pp.748-789.
[12] Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzoti, B., Slingsby, J. (eds.) 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6370
[13] Defined as plants which possess long, slender leaves

development footprint. However, *Olea* trees can be transplanted, and it is recommended that these trees are carefully removed and transplanted, next to the new dam.

The specialist concluded that the proposed dam development will have a low impact on any remaining natural veld, as the site and its surroundings are already disturbed and/ or transformed. As per the specialist, it is considered highly unlikely that the development had or will contribute significantly to:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function, etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

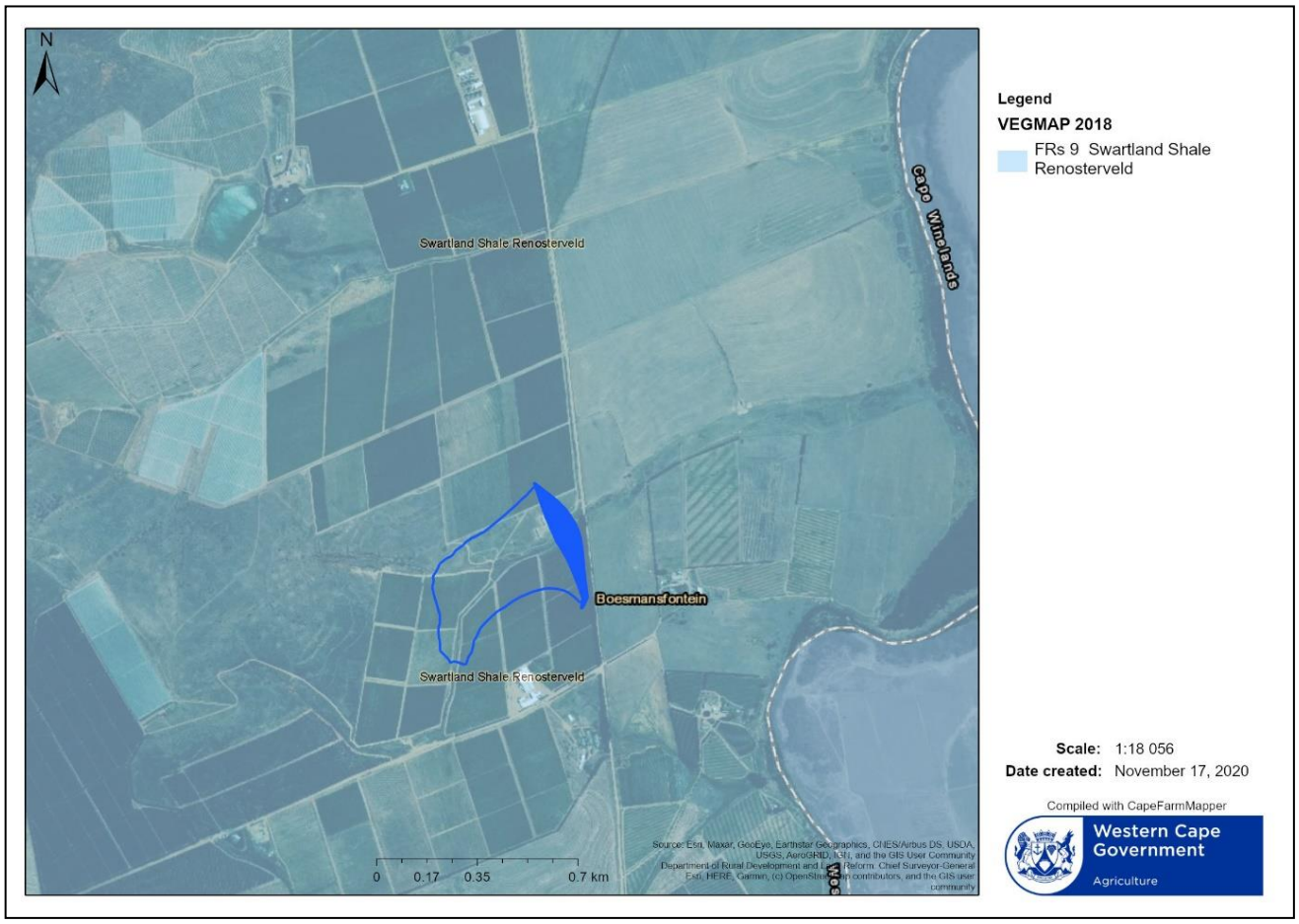


Figure 15: Vegetation type, namely Swartland Shale Renosterveld (classified as critically endangered), is associated with the proposed site for development.

Please refer to **Appendix 4** for sensitivity map. Please refer to Figures 8 – 14 for photographs showing status of vegetation on site.

A Botanical assessment was conducted (**Appendix 8.1)** and findings is discussed in Section 10 of the EIR.

5.3 CRITICAL BIODIVERSITY AREAS

The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) is comprised of a systematic biodiversity plan which delineates Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). These areas require safeguarding to ensure they are sustained and maintain their ecosystem functioning (Pool-Stanvliet, 2017)[14]. According to the Biodiversity Overlay Map from Cape Farm Mapper (**Figure 16; Appendix 4)**, two non-perennial watercourses, classified as an Ecological Support Area (ESA) will be impacted by the proposed Bonathaba Dam development. Although areas classified as ESA2 are recognized as being degraded, such areas should be protected from further impact and ideally restored to a more natural state to support some ecological processes/ function(s). As per the botanical specialist, very little or only remnants of the expected riparian vegetation were observed during the botanical assessment. The proposed site for development does not fall within any CBA.

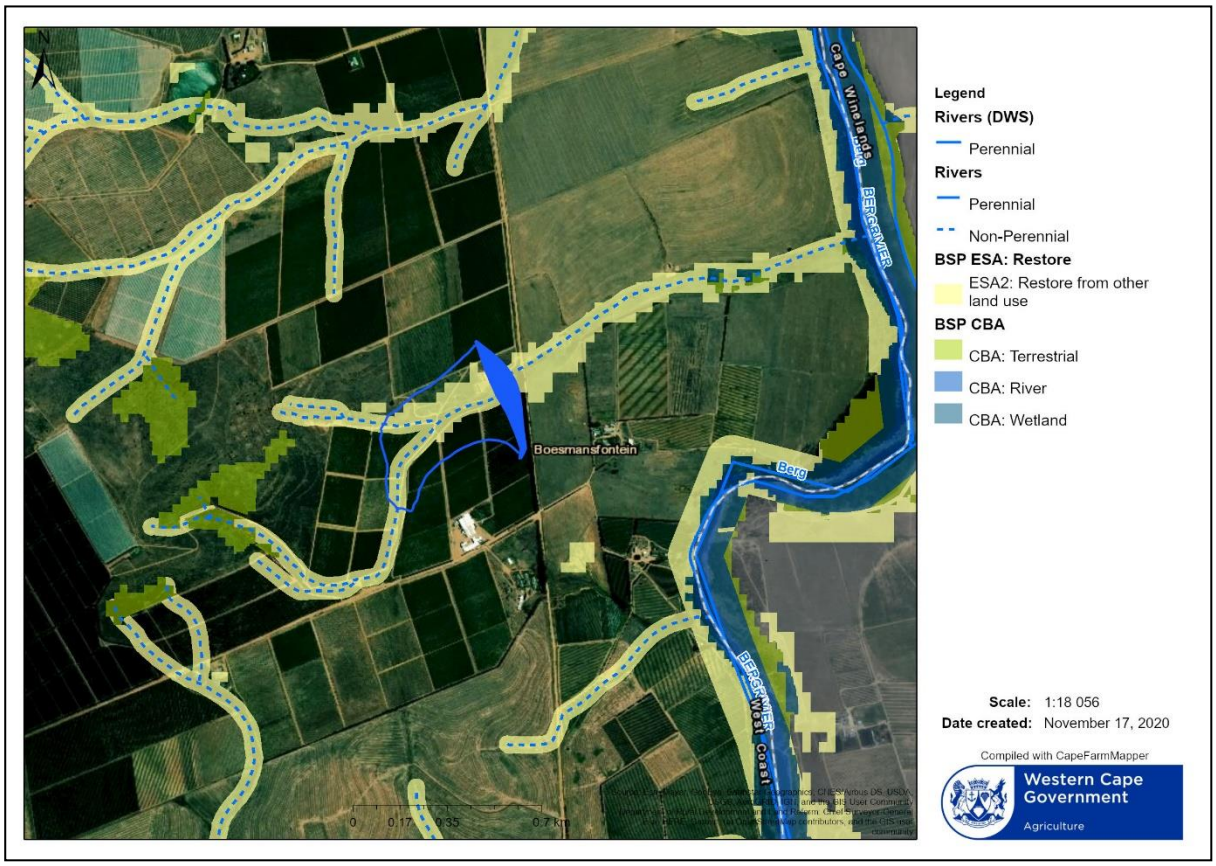


Figure 16: Biodiversity Spatial Plan (BSP) and Ecological Support Area (ESA) are associated with the proposed site for the development of the Bonathaba Dam.

[14]Pool-Stanvliet, R. 2017. Western Cape Biodiversity Spatial Plan Handbook. CapeNature Scientific Services Land Use Team, Jonkershoek, Stellenbosch

5.4 FRESHWATER

According to the Freshwater resources map from Cape Farm Mapper (Figure 17; **Appendix 4)**, the proposed Bonathaba Dam will intercept two non-perennial watercourses (namely drainage lines). As per the Freshwater Assessment (Appendix 8.2; *please refer to Appendix 3 for photos*), the proposed site is located within the G10D quaternary catchment, situated within a sub-catchment with an extent of approximately 140ha. The drainage line (approximately 3.3km in length) associated with the site drains into the Bergrivier and is mostly dry. Water would be present within these drainage lines shortly after winter rainfall events. Steep slopes associated with the proposed site for development may have a high erosion potential and therefore, is susceptible to erosion. Lower down the slope, the drainage line has been straightened into irrigation return flow channels where sections of the channel have eroded. As per Figure 17, the nearest NFEPA wetland is located approximately 640m east of the proposed development and is associated with the Bergrivier. Please refer to Figure 18 for photographs of the non-perennial drainage lines associated with the proposed development.

The Bonathaba Farming Venture has an Existing Water Use Right (**Appendix 9**). The proposed dam development will require a Water Use Authorisation (WUA) in terms of section 21 of the National Water Act (NWA), Act No. 36 of 1998, where applicable water use activities include;

- S21 (b) Storing of water
- S21 (c) Impeding or diverting the flow of the watercourse
- S21 (i) Altering the bed, bank, course, or characteristic of a watercourse

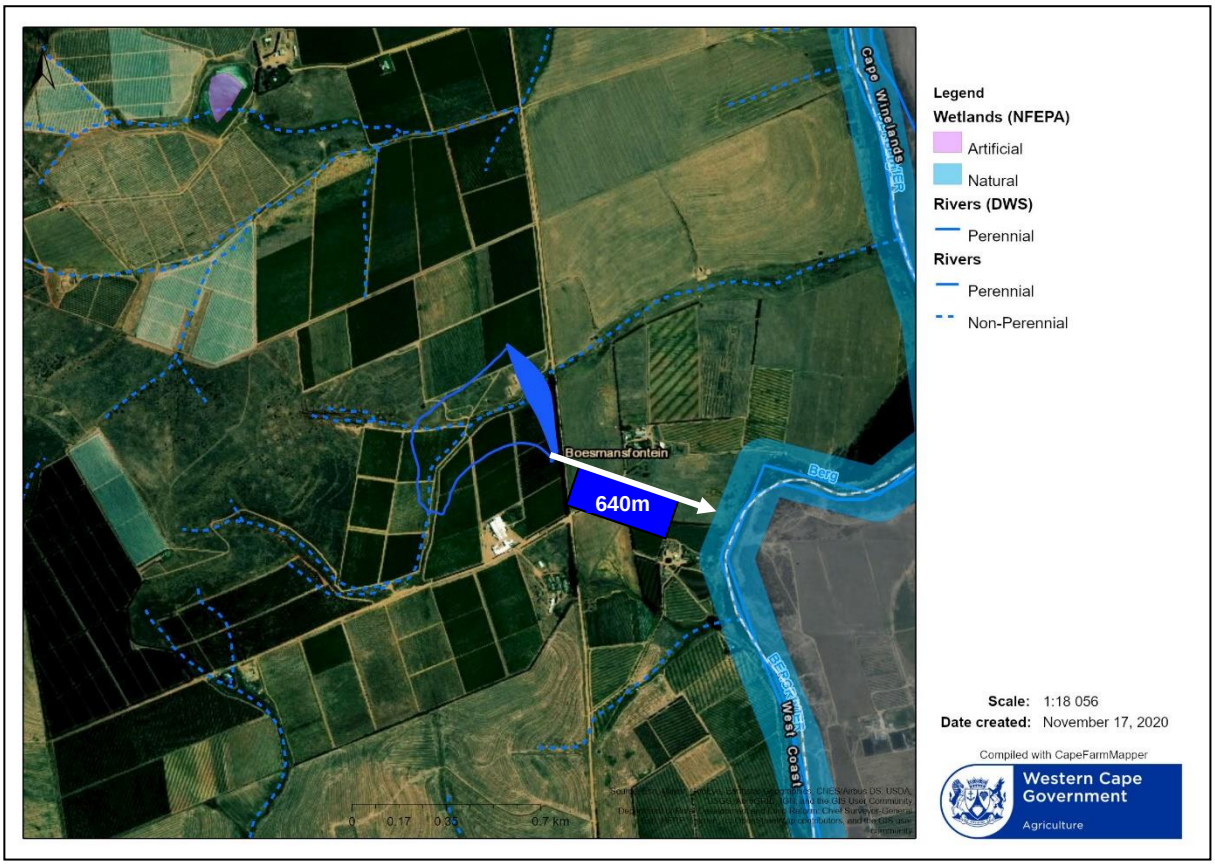


Figure 17. Freshwater Resources Map associated with the proposed development of the Bonathaba Dam.

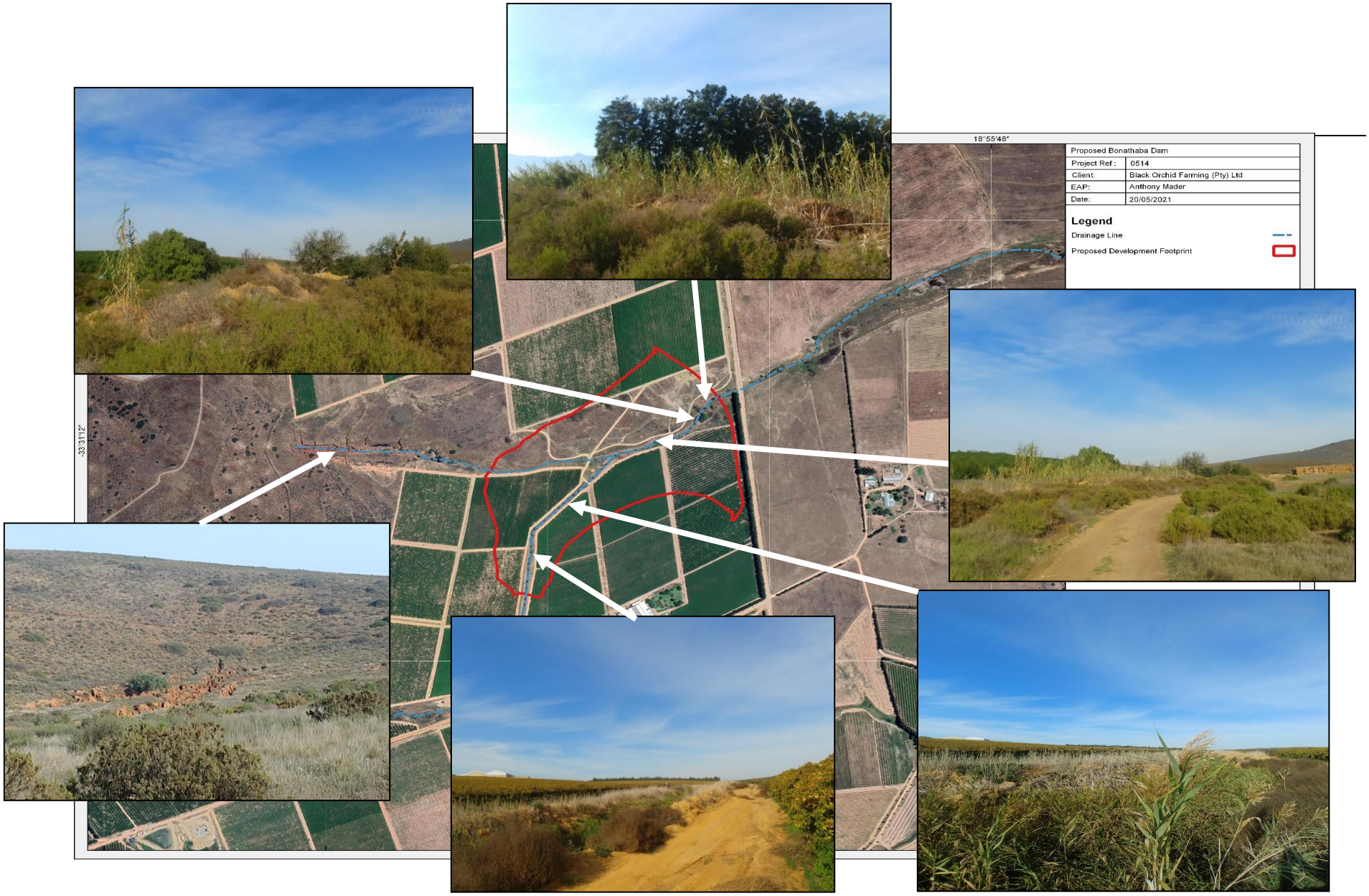


Figure 18. Photographs of status of drainage lines present within the proposed site for development relative to location on map.

Please refer to **Appendix 4** for sensitivity maps. A Site Sensitivity Verification Report (**Appendix 7.2**), based on the outcome of the DEA Screening Tool (**Appendix 7.1**). A Freshwater Report (**Appendix 8.2**) and a Freshwater Risk Assessment (**Appendix 8.2**) were conducted, and the findings are discussed in Section 10 of the EIR.

5.5 CLIMATE

Climate information from Hermon, the closest town, is presented. Hermon is located approximately 9km away from the proposed site for the development of the Bonathaba Dam (**Figure 3; Appendix 1**). Hermon normally receives approximately 471mm of rain per year of which most of this rainfall is received during winter. Hermon receives an average, monthly minimum of 9mm of rainfall in January and a maximum of 84mm in June, whereas minimum and maximum average midday temperatures range from 17.3°C (July) to 30.2°C (February), respectively[15].

5.6 SOCIO-ECONOMIC CONTEXT

According to the Department of Social Development's projections, the West Coast Municipality has a population of 450 610 (2018) which has been expected to increase by an estimated 530 860 people by 2024 (equating to a 2.8% average annual growth over this period)[16,17]. These figures place the West Coast District Municipality in the middle of other Districts, with the City of Cape Town, Cape Winelands, and Garden Route being bigger, whereas the Overberg and Central Karoo Districts have smaller populations.

In terms of education, the grade 12 drop-out rate for learners within the West Coast District declined marginally from 28.8 % in 2015 to 28.4 % in 2016; decreasing further to 26.9 % in 2017. Within the West Coast District, the grade 12 drop-out rate was highest in Cederberg, at 37.9 % in 2015, declining to 33.0 % in 2017, while the lowest was for the Swartland municipal area, which increases slightly from 20.1 % in 2015 to 20.2 % in 2017. The Swartland rate was also the lowest in the Province. Drop-outs are influenced by a wide array of socioeconomic factors including unemployment, poverty, and teenage pregnancies.

Over the last decade, the West Coast District's unemployment rate has been rising steadily; it increased from 9.0 % in 2015 to 10.1 %in 2016 and 11.1 % in 2017. The West Coast District's unemployment rate in 2017 is considerably below that of the Province's 18.2 % and is one of the lowest District's rates in the Province. This unemployment rate may have increased due to the current COVID-19 conditions as seen in other countries[18].

The local economy of the West Coast District municipal area is dominated by the manufacturing (R5 513.7 million; 20.3% in 2016) closely followed by the agriculture, forestry, and fishing sector (R5 482.3 million; 20.2%), wholesale and retail trade, catering and accommodation sector (R4 169.8 million; 15.3%), finance, insurance, real estate and business services (R3 093.7 million; 11.4%) and general government (R2 839.2 million; 10.5%). Combined, these top five sectors contributed R21.1 billion (77.7%) to the West Coast District Municipality's economy, which was estimated to be worth R27.2 billion in 2016. Moreover, the agriculture, forestry, and fishing sector contributed the most jobs in the West Coast District municipal area in 2016 (69 711; 39.3%), followed by the wholesale and retail trade, catering, and accommodation sector (28 433; 16.0%); community and social services (19 020;

[15] http://www.saexplorer.co.za/south-africa/climate/hermon_climate.asp
[16] West Coast District Municipality Social Economic Profile (SEP), 2018.
[17] http://westcoastdm.co.za/wp-content/uploads/2019/06/290519WCDM-IDP-2017-2022-Review-2-FINAL-1.pdf
[18] Blustein, D.L. and Guarino, P.A., 2020. Work and unemployment in the time of COVID-19: the existential experience of loss and fear. *Journal of Humanistic Psychology*. 60(5): 702-709.

10.7%); general government (17 432; 9.8%) and manufacturing (16 001; 9.0%). Combined, these top five sectors contributed 150 598 (84.8%) of the 177 604 jobs in 2016. This highlights the integral contribution of the agricultural sector within the context of job creation and contribution to the local and provincial economy and the need to sustain and grow the agricultural sector within the District Municipality.

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:

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (Appendix 8.3) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required".*

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 5. Tasks undertaken in the EIA to date.

DATE	TASK
SCOPING PHASE	
05 June 2020	Initial public participation, including newspaper advertisements, posters, letter drops, BID and notification letters to identified interested and affected parties.
25 June 2020	Submitted Notice of Intent to DEADP
15 December 2020	Distribution of notifications for the availability of the Pre-Application Draft Scoping Report to Registered Interested and Affected Parties, and 30-day comment period
7th April 2021	Submission of NEMA Application
26th April 2021	Acknowledgement of Receipt of the NEMA Application and the Draft Scoping Report from DEADP
7th April 2021	Distribution of notifications for the availability of the Draft Scoping Report to Registered Interested and Affected Parties, and 30-day comment period
10th May 2021	30-day comment period ends.
April - May 2021	Compile the Final Scoping Report
11th May 2021	Submit Final Scoping Report to DE&NC.
June 2021	Acceptance of Scoping report and Plan of Study for EIA (**Appendix 5.3**)
ENVIRONMENTAL IMPACT ASSESSMENT REPORT PHASE (THIS PHASE)	
May – July 2021	Compilation of Draft Environmental Impact Report
July 2021	Draft Environmental Impact Report compiled and made available for viewing and comment to Registered Interested and Affected Parties (this report)

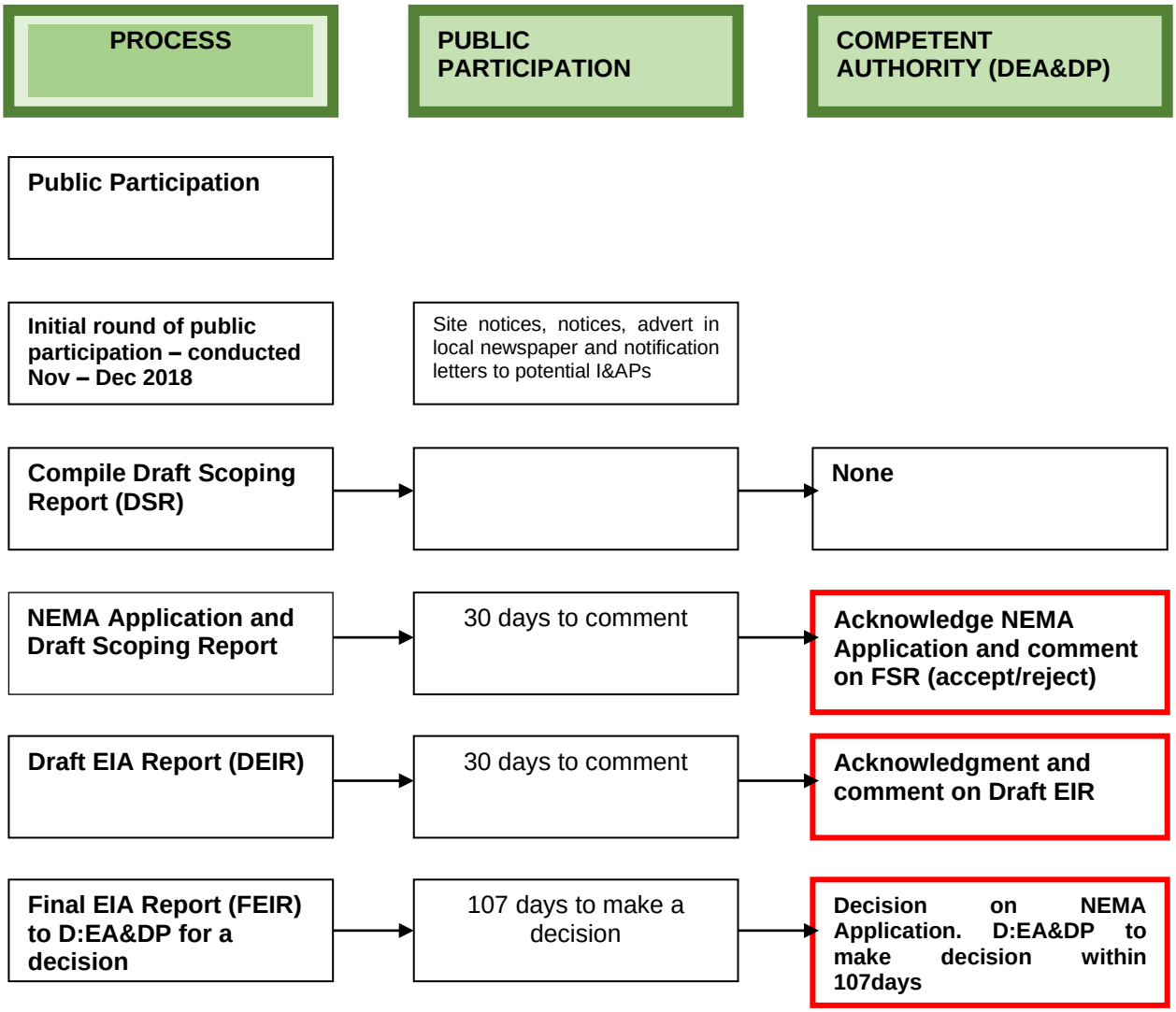


Figure 19. Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

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 report*) 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 (i.e., notify registered Interested and Affected Parties, I&APs);
- Receive comments on Draft EIR. All comments received (including comments received on the Draft and Final Scoping Reports) and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR); and
- Preparation of the Final EIR for submission to DEA&DP for consideration and decision-making.

Please refer to Figure 18 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties will be given the opportunity to view and comment on the Draft EIR submitted to the DEADP. 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 Draft 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. The DEA&DP 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	Anthony Mader / Bernard de Witt	**EnviroAfrica**
Dam Engineers	DJ Hagen	**Ingerop South Africa (Pty) Ltd**
Water Use Licence Application	Susan Pretorius / Francois Joubert	**Schoeman & Vennote**
Botanist	Peet Botes	**PB Consult**
Heritage	Jonathan Kaplan	**Agency for Cultural Resource Management**
Freshwater	Dr Dirk van Driel	**WATSAN**

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 6.1.**

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&APs) were notified of the proposed development.

Table 5: Summary of the public participation process

R41	**Posters, Advertisement & Notification letters**
(2) (a) (i)	Posters were displayed on Portions 2 and 3 of Farm No. 1100, Bonathaba including on the gate as viewed from Porseleinberg Road. Posters were also placed on: • Notice boards within the Bonathaba Offices • Notice Board at AgriMark in Hermon; • Notice Board at AgriMark in Wellington; Placed on the wall at the entrance of Agrico in Wellington. Posters were 60cm by 42 cm. Refer to **Appendix 6.2.2** for proof of posters.
(ii)	N/A No feasible alternative sites.
(2) (b) (iii)	Notification letters were sent to the municipal ward councilor at the Swartland Municipality. Refer **Appendix 6.1** for proof. Please see the post office stamp on the I&AP register for proof of notification letters sent.
(iv)	Notification letters were sent to the West Coast District Municipality and Swartland Local Municipality. Refer **Appendix 6.1** for proof.
(v)	Notification letters were sent to the following organs of state: • Department of Environment and Development Planning • BGCMA • Cape Nature • Heritage Western Cape • WC Department of Agriculture and Land Use Management Refer **Appendix 6.2.1.1- 6.2.1.7** for proof. Please see the post office stamp on the I&AP register for proof of notification letters sent.
(vi)	Notification letters were sent to neighbors. Please refer to **Appendix 6.2.1.1- 6.2.1.7,** neighbors were notified via email.
(2) (c) (i)	An advert was placed in the Swartland Gazette on 28th July 2020. Please refer to **Appendix 5.1.**
R42 & 34	**Register of I&AP**
(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 **Appendix 6.1** for the of Interested and Affected Parties register.
R43	**Registered I&AP entitled to comments**
3	Potential I&APs were given 30 days to register and/ or comment during the initial public participation phase.
R44	**I&AP to be recorded**
	A summary of issues raised by I&AP is addressed in the Comments and Response Report (C&R Report). Refer to **Appendix 6.2** 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 6.1.**

All Registered I&APs will be notified of the availability of the Draft EIR for comment and will be sent the Draft EIR and Appendices via their preferred method of communication / receipt of the Draft EIR (e.g., electronic, hard copy, etc.). The EIR will be made available for a 30-day comment period.

At the end of the comment period, the Draft 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 then be submitted to the DEA&DP for decision (107 day legislated decision period).

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 the DEA&DP 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 a local newspaper (namely the Swartland Gazette on the 28th of July 2020 – **Appendix 5.1**), site notices, notification letters, and/or emails to registered I&APs on the project database.

A list of I&APs is included as **Appendix 6.1**.

7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

6.1 BIODIVERSITY

The site is located within the Swartland Shale Renosterveld (Figure 6)[19], classified as a critically endangered (CR) 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, as well as the more recent (2018) National Biodiversity Assessment (Skowno *et. al*., 2019)[20]. It was anticipated that a more detailed botanical assessment, in addition to the high-level desktop study was required to be undertaken. Therefore, a site-based assessment by a specialist has been conducted to ground-truth the initial desktop assessment and determine if there is any sensitive or endangered vegetation on the proposed site. The findings of the Botanical Assessment will be discussed in detail in the EIR but are summarised below for ease of reference.

According to the Biodiversity Overlay Map from Cape Farm Mapper (Figure 7; **Appendix 4)**, a non-perennial watercourse, classified as an Ecological Support Area (ESA2) will be impacted by the proposed Bonathaba Dam development. Areas classified as ESA2 are recognized as being degraded, but that they should be protected from further impact and ideally restored to a more natural state to support some ecological processes/ function. As per the botanical specialist, very little or only remnants of the expected riparian vegetation were observed during the botanical assessment. The proposed site for development does not fall within any CBA. The objective is to restore and/or manage to minimize the impact on ecological processes and functioning.

Effectively 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. For example, the proposed dam may provide avifauna (water species) with habitat for breeding and nesting sites[21]. Because of the proximity to intensively cultivated areas, it is not expected that the proposed dam location will have a significant impact on fauna species. The impact on reptiles and amphibians is likely to be localized and may result in species being displaced (snakes and lizards) but no significant and irreversible impact on these species is expected. Mitigation measures to reduce any potential direct and acute impact on reptilian and amphibian species, such as conducting phased earthworks over time to allow various fauna to move away from the site of development, must be implemented.

No animals were noted on-site during the site visit however, conditions and measures have been addressed in the EMPr to mitigate potential impact(s) of the proposed development on animal species. The proposed site for the dam development will overlap areas that were already disturbed / transformed as a result of agriculture and associated practices. Furthermore, faunal diversity changes through space and time and are directly influenced by anthropogenic activities, including the disturbance and transformation of land for agricultural activities (Tilman et al., 1997[22]; Chapin et al., 2000[23]). Direct impacts are typically associated with changes in land cover (and consequent loss of natural areas) and edge effects, whereas indirect impacts include activities associated with the

[19] Mucina, L., Rutherford, M.C. and Powrie, L.W., 2006. *Vegetation Atlas of South Africa, Lesotho and Swaziland. The Vegetation of South Africa, Lesotho and Swaziland'*.(Eds L. Mucina and MC Rutherford.) pp, pp.748-789.
[20] Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzoti, B., Slingsby, J. (eds.) 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6370
[21] Sangode, V.K. and Rajkumar, B., 2020. Khairbandha Dam: a potential hotspot of avifaunal diversity and its socioeconomic impact on local communities in Gondia District, Maharastra. *Journal of Experimental Zoology*, India, 23(2), pp.1531-1533.
[22] Tilman, D. and Wardle, D.A., 1997. Biodiversity and Ecosystem Properties. *Science*, 278 (5345), pp.1865-1869.
[23] Chapin Iii, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E. and Mack, M.C., 2000. Consequences of changing biodiversity. *Nature*, *405*(6783), pp.234-242.

change in soil biogeochemistry (Didham *et al.,* 2015[24]; McDonald *et al.,* 2020[25]). For example, it has been reported that the physical and chemical properties associated with agricultural activities have significantly lower macro- and micronutrients compared with other land uses[26]. Thus, it is unlikely that the agricultural areas would adequately support vegetation characteristic of the Swartland Shale Renosterveld and consequently, fauna which would depend on the vegetation structure associated with this vegetation type. Moreover, edge effects have diverse impacts on biodiversity and ecological functioning (Razafindratsima *et al*., 2018)[27]. Such effects contribute to a disturbance factor, which is likely to have driven most wild animals away from the proposed site for development due to activities associated with intensive agricultural practices. For example, Horn *et al.,* (2011)[28] demonstrated a negative correlation between Swartland Shale Renosterveld plant biodiversity and proximity to the edge of the sampled areas (fragments disturbed by anthropogenic activities). It is considered highly unlikely that any large game remains in this area (no animals were observed within the development footprint during the site visit). This in turn would have affected the food chain and ultimately the density of tertiary predators, particularly mammals and larger birds of prey – impacting species on different trophic levels which lead to the reduction in ecosystem functioning and consequently, the provisioning of services (Loreau *et al.,* 2001[29]; Dobson *et al.,* 2006[30]). Therefore, long-term impacts associated with agricultural activities may have contributed to the disturbed / transformed state of the proposed site for development.

6.2 FRESHWATER

According to the Freshwater resources map from Cape Farm Mapper (Figure 17; **Appendix 4)**, the proposed Bonathaba Dam will intercept two non-perennial watercourses (namely drainage lines). As per the Freshwater Assessment (Appendix 8.2; *please refer to Appendix 3 for photos*), the proposed site is located within the G10D quaternary catchment, situated within a sub-catchment with an extent of approximately 140ha. The drainage line (approximately 3.3km in length) associated with the site drains into the Bergrivier and is mostly dry. Water would be present within these drainage lines shortly after winter rainfall events. Steep slopes associated with the proposed site for development may have a high erosion potential and therefore, is susceptible to erosion. Lower down the slope, the drainage line has been straightened into irrigation return flow channels where sections of the channel have eroded. As per Figure 17, the nearest NFEPA wetland is located approximately 640m east of the proposed development and is associated with the Bergrivier.

The Bonathaba Farming Venture has an Existing Water Use Right (Appendix 9). The proposed dam development will require a Water Use Authorisation (WUA) in terms of section 21 of the National Water Act (NWA), Act No. 36 of 1998, where applicable water use activities include;

- S21 (b) Storing of water
- S21 (c) Impeding or diverting the flow of the watercourse

[24]Didham, Raphael K., Gary M. Barker, Scott Bartlam, Elizabeth L. Deakin, Lisa H. Denmead, Louise M. Fisk, Jennifer MR Peters, Jason M. Tylianakis, Hannah R. Wright, and Louis A. Schipper. "Agricultural intensification exacerbates spillover effects on soil biogeochemistry in adjacent forest remnants." *PloS one* 10, no. 1 (2015): e0116474

[25]McDonald, R.I., Mansur, A.V., Ascensão, F., Crossman, K., Elmqvist, T., Gonzalez, A., Güneralp, B., Haase, D., Hamann, M., Hillel, O. and Huang, K., 2020. Research gaps in knowledge of the impact of urban growth on biodiversity. *Nature Sustainability*, *3*(1), pp.16-24.

[26]Yitbarek, T., Gebrekidan, H., Kibret, K. and Beyene, S., 2013. Impacts of land use on selected physicochemical properties of soils of Abobo area, western Ethiopia. Agriculture, Forestry and Fisheries, 2(5), pp.177-183.

[27] Razafindratsima, O.H., Brown, K.A., Carvalho, F., Johnson, S.E., Wright, P.C. and Dunham, A.E., 2018. Edge effects on components of diversity and above-ground biomass in a tropical rainforest. *Journal of applied ecology*, *55*(2), pp.977-985.

[28] Horn, A., Krug, C.B., Newton, I.P. and Esler, K.J., 2011. Specific edge effects in highly endangered Swartland Shale Renosterveld in the Cape Region. Accessible at: file:///C:/Users/Anthony/Downloads/horn_specific_2011.pdf

[29]Loreau, M., S. Naeem, P. Inchausti, J. Bengtsson, J. P. Grime, A. Hector, D. U. Hooper, M. A. Huston, D. Raffaelli, B. Schmid, D. Tilman, and D. A. Wardle. 2001. Biodiversity and ecosystem functioning: current knowledge and future challenges. *Science*. 294: 804 – 808.

[30]Dobson, A., Lodge, D., Alder, J., Cumming, G.S., Keymer, J., McGlade, J., Mooney, H., Rusak, J.A., Sala, O., Wolters, V. and Wall, D., 2006. Habitat loss, trophic collapse, and the decline of ecosystem services. *Ecology*, *87*(8), pp.1915-1924.

- S21 (i) Altering the bed, bank, course, or characteristic of a watercourse

Please refer to **Appendix 4** for sensitivity maps. A Site Sensitivity Verification Report (**Appendix 7.2**), based on the outcome of the DEA Screening Tool (**Appendix 7.1**). A Freshwater Report (**Appendix 8.2**) and a Freshwater Risk Assessment (**Appendix 8.2**) were conducted, and the findings are discussed in Section 10 of the EIR.

6.3 HERITAGE

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

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (Appendix 8.3) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required".*

6.4 VISUAL IMPACT

The potential impact on the sense of place of the proposed dam has also been considered. The surrounding area is characterized by agricultural activities, as well as many farm dams in the local area. Thus, the proposed dam development will be '*within the character of the area'*. The sense of place is not expected to be altered by the proposed dam, and therefore, no further studies are envisaged to be required.

6.5 SAFETY

Due to the size of the dam and dam wall, the proposed dam is a safety risk in terms of Chapter 12 of the National Water Act and will require authorization from the Department of Water Affairs. As mentioned in Section 3 above, a license 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 and Environmental Authorisation has been issued. This will therefore not form part of the Environmental Impact Report.

6.6 LOSS OF AGRICULTURAL LAND

Due to the location of the proposed dam, a large part of the proposed Bonathaba Dam will inundate existing agricultural lands (namely Table Grapes). The total development footprint will be approximately 19.2ha of which, approximately 8.8ha of disturbed, indigenous vegetation, and approximately 10.4ha of the existing crops will be cleared for the proposed Bonathaba Dam development. In the context of the entire farm, the clearance of approximately 10.4ha of the agricultural crop will not significantly impact the agricultural potential of the farm. Moreover, the cost/storage ratio is considered viable under the circumstances relative to the (i) irrigational requirements of the Bonathaba Farm and (ii) site conditions. Please refer to Figures 7 – 14.

- Should the proposed dam be developed, the farm's production and staff employment would not be impacted for the following reasons as outlined by the Applicant:
    - The current plantings on the area which will be affected are comprised of:

- **~ 3ha lemons, planted in 1994:** The lemons are already reaching the end of the profitability in terms of tree age, production, and quality of fruits. This area was earmarked for replacement in the short term. Approximately 6ha of new lemons were planted in 2016 to replace the current 5ha that needs to be replanted due to age;
- **~ 2.2ha Tawny grapes, planted 2014 and ~ 2.5ha Magenta planted 2016:** The Tawny and Magenta cultivars are currently under a lot of pressure from international markets. This is attributed to the characteristics of this specific cultivar due to unacceptable quality, condition, and shelf life. Thus, these plants would need to be uprooted due to very low income; and
- **~ 1.5ha Sugra 19 planted in 2012 and ~ 1.2ha Crimson planted in 2008**: The Crimson and Sugra 19 field produce consistently low yields and are therefore not economically viable to continue with.

- Alternative areas on the farm can also be utilized for new plantings of the 10.4ha. Approximately 6ha have already been newly planted with lemons. Only 4.4ha will be needed to replace the total area of the fields lost. This would be covered in the yearly long term replanting strategy for the farm that consists of between 5% to 10 % of the farms planted area.

- Although there is an area of agricultural land which will be lost should the proposed development be approved, the total area of the dam relative to the farms size is less than 3%. If the proposed dam is not developed, a lack of water security (exacerbated by water shortages and droughts, amid global climate change) will result in crop losses which will directly impact employment security. Although the larger size layout (Alternative 2 – preferred layout) will result in a larger footprint, the cost/storage ratio is considered viable under the circumstances relative to the (i) irrigational requirements of the Bonathaba Farm and (ii) site conditions.

6.7 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. The Bonathaba Farm, as well as Zwartfontein Farm (located adjacent to the Bonathaba Farm – Figure 6), form part of a development plan to approximately double the productive hectares of the farm's agricultural output. This increase in productive hectares aims to create a large-scale, sustainable citrus and grape operation, creating over 200 new employment opportunities while retaining over 600 jobs[31]. Please refer to section 6.6 above for more information regarding potential impact on jobs.

6.8 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 the EIA phase.

[31] https://uff.co.za/wp-content/uploads/2018/08/Bonathaba-Farm-deal-sheet.pdf

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 have been identified. As a result, the following specialist have been appointed and studies have been conducted:

- Botanical Assessment;
- Freshwater Assessment; and
- Notice of Intent to Develop (NID)

The specialists were 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 were 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 8.1)**.

The terms of reference for this appointment were to:

- 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; and
- Make recommendations on impact minimization should it be required.

8.2.2 Freshwater Assessment

Dr Dirk van Driel conducted the Freshwater Assessment and compiled the Freshwater Report. Please find the report attached **(Appendix 8.2)**.

The appointment of a Freshwater Specialist was proposed as the proposed dam is expected to absorb two non-perennial stream/ small drainage lines. The drainage line is also associated with an ESA2 according to the Biodiversity Overlay Map from Cape Farm Mapper (**Appendix 4**).

The terms of reference for this appointment were to:

- Literature review and assessment of existing information;
- Site Assessment of the proposed activities and impact on the associated freshwater systems. This will include an assessment of the freshwater ecological condition, using river health indices such as in-stream and riparian habitat integrity, aquatic macro-invertebrates and any riparian vegetation to determine set back lines and geomorphological condition of the streams, which will then determine the overall Ecostatus of the streams and provide data that will inform the Water Use Licence Application of the project;
- Describe ecological characteristics of freshwater systems and compile report based on the data and information collected in the previous two tasks, describe ecological characteristics of the freshwater systems, comment on the conservation value, and importance of the freshwater systems and delineate the outer boundary of the riparian zones/riverine corridors;
- Evaluate the freshwater issues on the site and propose mitigation measures and measures for the rehabilitation of the site as well as setback line (if applicable) for future development.

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 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 non-perennial streams associated with the proposed dam.

8.2.3 Heritage Assessment

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

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (**Appendix 8.3**) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will 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 CRITIERIA	Very High	High	Medium	Low	Negligible (very-low)	Score
Value	**16**	**8**	**4**	**2**	**1**	
Probability (likelihood) **(P)**	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.	
Extent (E)	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	
Duration (D)	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.	
Magnitude (Intensity/ Severity) **(M)**	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	
Receiving environment (Consequence): **(RE)**	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	
FINAL RATING (average score)						

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 SIGNIFIGANCE RISK RATING

Please refer to **Appendix 10** 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 8**.

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 8.1** for the full report.

10.1.1 Key findings

According to the Botanical Assessment (**Appendix 8.1**), 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 Swartland Shale Renosterveld, which is now considered critically endangered (CR) 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. (Figure 15) (Dayaram *et al.,* 2019[32]; Skowno et. al., 2019[33]). The Swartland Shale Renosterveld is characterized as moderately undulating plains and valleys, supporting a low-to-moderately tall leptophyllous shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos. Heuweltjies are prominent within this vegetation type, forming 'hummockveld' near Piketberg, where stunted trees and thicket are often associated with the heuweltjies. Disturbed areas are dominated by *Athanasia trifurcata* and *Otholobium hirtum*. Patches of *Cynodon dactylon* or 'grazing lawn' are frequently encountered within this vegetation type.

According to the Swartland spatial dataset of the WCBSP, the dam does not fall within any CBA, but it overlaps proposed ecological support areas (Class 2) associated with the non-perennial streams (Figures 17 and 18). The proposed footprint is bordered by permanent crop to the north, south and by the Porseleinberg Road to the east. Remaining fallow land which is still connected to potential remaining natural veld (west of the fallow land) can be found to the west. However, this area was also under cultivation at least up till 2006. According to the National Land Use map, the proposed footprint overlaps fallow land, but also potential herbaceous wetland and low shrubland. However, the site visit confirmed that the site (the small seasonal streams included) can only be described as degraded and should be classified as fallow land or virgin soils (soils that were previously under cultivation). The site visit conducted by the Botanical Specialist confirmed that the remaining virgin soils had been clearly cultivated / disturbed over a long period of time. This is confirmed by historic google earth images (Figure 20). Limited indigenous plant species were present within the development footprint and these plant species are characterized as weedy or pioneer plant species. The small watercourse within the proposed development footprint was subject to disturbance from the intensive agricultural activity.

At present the site is covered in dense grassy layer covered mostly by the indigenous grass *Cynodon dactylon* (Fynkweek) with weedy or hardy shrubs scattered in between. It is also used as laydown and storage area for various items including straw bales. The shrubs observed were mostly disturbance

[32] Dayaram, A., Harris, L.R., Grobler, B.A., van der Merwe, S., Rebelo, A.G., Powrie, L.W., Vlok, J.H., Desmet, P.G., Qabaqaba, M., Hlahane, K.M. and Skowno, A.L., 2019. Vegetation Map of South Africa, Lesotho and Swaziland 2018: A description of changes since 2006. *Bothalia-African Biodiversity & Conservation*, *49*(1), pp.1-11.

[33] Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzoti, B., Slingsby, J. (eds.) 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6370

indicators like the *Galenia africana* (weedy species) and *Dicerothamnus rhinocerotis* (Renosterbos) or hardy species like Asparagus species, *Eriocephalus* cf. *africanus* and *Stoebe plumosa*. A great number of alien weeds like *Atriplex semibaccata*, *Echium vulgare*, *Salsola kali*, *Brassica* cf. *napus* (Canola), *Solanum retroflexum* (nightshade) were observed and even a few beefwood trees (Casuarina species) starting to establish itself.

Figure 20. Historic Google Earth image in 2005. Note, previous transformation of areas within the proposed site for development for agriculture (namely wheat cultivation). After 2006, the northern portion of the transformed area (within the proposed development footprint) laid fallow (yellow arrow). *Please refer to Figure 7 more subsequent maps.*

10.1.2 Impact Assessment

According to the Botanical Specialist, the proposed development will have a very low impact on any remaining natural veld. This attributed to the site and its surroundings being previously disturbed / transformed. The most significant botanical feature identified by the specialist are the presence of indigenous *Olea europaea* trees – located within the construction footprint. However, these trees cab be carefully removed and transplanted next to the proposed dam footprint. No protected or red-listed plant species were observed. The No-Go option is not likely to result in a "no-impact" scenario, as constant slow degradation is expected to continue as a result of agricultural activities in and around the site.

According to the Botanical Assessment, it is highly unlikely that the proposed development will significantly contribute to the:

- Significant loss of vegetation type and associated habitat;
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities;
- Loss of local biodiversity and threatened plant species; and
- Loss of ecosystem connectivity.

The Botanical Specialist concluded that "*with the available information, it is recommended that the project be approved, with the proposed mitigation actions*".

10.1.3 Mitigation Measures

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

- Before construction commence the two larger *Olea europaea* trees (located where the dam wall will be constructed) should be carefully removed and transplanted to just outside of the new dam footprint. In order to do so, the roots of these trees should be trimmed (*in-situ*). The trees should then be left for at least a couple of months to recover. Just before being transplanted the trees should be trimmed back (at least a third of the canopy), after which the tree can be transplanted, being careful to keep the tree in its same orientation (the north facing part of the tree, should again face north).
- The smaller trees on the disturbed riverbanks should also be considered for transplantation, but these could probably be done in one go.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase.
- The development footprint should be clearly demarcated and all construction activities should remain within this footprint (including lay-down areas).
- Indiscriminate clearing of areas must be avoided.
- All areas impacted from construction activities must be rehabilitated on completion of the project.

10.2 Freshwater Assessment

10.2.1 Key findings

According to the Freshwater Report (**Appendix 8.2**), the proposed site for development is located in a relatively small sub-catchment (~ 140ha), where drainage line within the proposed site for development is mostly dry and is 3.3km long. The main services supplied by the drainage line includes sediment trapping, flood attenuation, and erosion control (Figure 21). The drainage line does not offer / offers limited supply of services relative to water supply, food, tourism, and cultural contributions. The drainage line, situated between the cultivated areas, has been transformed / disturbed due to the straightening of these drainage lines into irrigation return flow channels which has resulted in increased flow and erosion. The drainage lines within the development footprint have been transformed into storm water management systems and return flow canals.

No wetlands were identified within 500m of the proposed site for development (Figure 17). Section of the Berg River near the pump house was selected as the biomonitoring point. The oxygen concentration was 4.6mg/L. Riparian zones were previously overgrown with *Eucalyptus* trees which have been felled. The South African Scoring System (SASS5) score at the sample point was 47 where the ASPT score was 4.3. This scored the Berg River a Class D (“Fair”). Upstream of the sampling point, numerous sources of agricultural return flow, wastewater treatment works, as well as urban stormwater may have contributed to this score.

Table 7. The Present Ecological State (PES), Ecological Importance (EI), and Ecological Sensitivity (ES) of the drainage line and Berg River. Please refer to the Freshwater Report (**Appendix 8.2**). *The EI is based on the presence of especially fish species that are endangered on a local, regional or national level.

Index/ Parameter	Drainage Line	Description	Berg River	Description
PES	E	This signifies that the drainage line has been significantly altered with a loss of ecological functioning.	C	It has lost some ecological functioning because of water quality and invasive organisms both instream and in the riparian zone. This score is better than the "D" downstream at Moredou, where the river is heavily overgrown with Eucalyptus trees.
EI*	N/A. Non-perennial watercourse with no fish present.		Considered ecologically important	
ES	Considered sensitive		Considered sensitive	

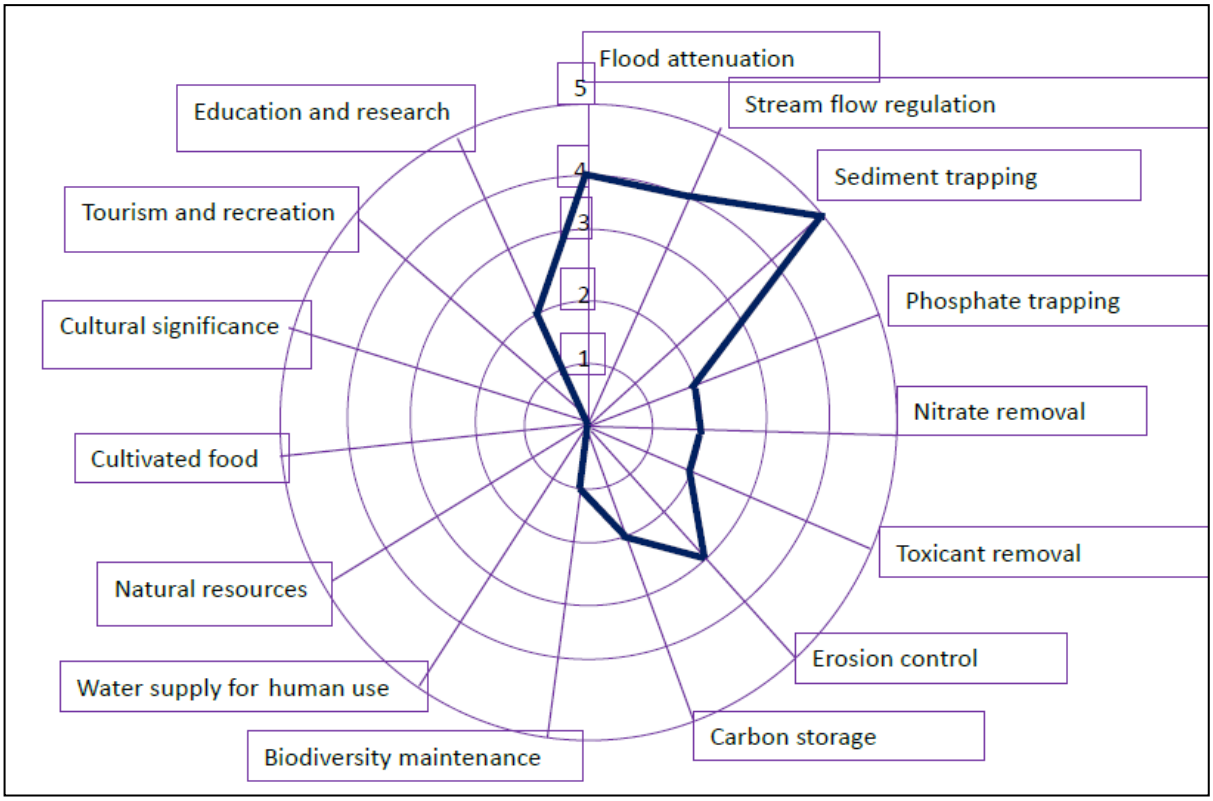


Figure 21. Resource economic footprint of the drainage line associated with the proposed site for development. Adapted from the Freshwater Report (**Appendix 8.2**).

As per the Freshwater Report, there is no need for ecological maintenance releases from the new dam. The original ecological functioning of the drainage line has been entirely altered, with little conservation value left. There are nevertheless some aquatic species that would hold out in this environment. Nevertheless, it is not necessary to release water for the benefit of these few die-hards (e.g. clicking stream frog).

10.2.2 Impact Assessment

According to the Freshwater Report (**Appendix 8.2**), the drainage lines were previously disturbed / transformed into stormwater management systems and return flow canals. The proposed dam would not add to the impact on these drainage lines should the ecological functioning, present within these channels, be conserved. Impacts identified by the Freshwater Specialist include;

1. Mud and sediment entering the drainage line during the construction of the dam wall (i.e., sedimentation of the drainage line);
2. Seepage and increased flow return due to the filling of the dam with water from the Berg River and abstraction from the dam for irrigation activities. This may result in eutrophication[34] of the watercourses;
3. Destruction of the drainage line; and
4. Erosion.

10.2.3 Mitigation Measures

The following mitigation/control measures (relative to impacts outlined above) were recommended:

1. The potential sedimentation of the drainage line can be mitigated for by (i) preventing fill from leaving the construction site, (ii) keeping the construction footprint as small as possible, and (iii) constructing the proposed dam during the dry season (i.e., summer).
2. Mitigation measures to be implemented for potential seepage and increased flow return include (i) not over-irrigating, (ii) measuring return flow, and (iii) pump the return flow back into the dam.
3. Mitigation measures to ensure the maintenance of the drainage lines includes (i) retaining as many reeds as possible (these include *Phragmites* spp. and *Typha* spp. reeds as photographed in Figure 18), (ii) conserving remaining ecological functioning of these drainage lines (this involves retaining as much biodiversity associated with these drainage lines as possible), and (iii) maintaining the drainage lines according to a schedule. As per the Freshwater Report, the mitigation measures are readily implementable where sediment and agri-chemicals can be prevented from entering the drainage line and subsequently, the Berg Rivier;
4. Measures recommended to mitigate erosion includes (i) keeping the construction footprint as small as possible, (ii) constructing the proposed dam during the dry season (i.e., summer), and (iii) landscaping and rehabilitating the construction site. The erosion mitigation measures recommended are not regarded as the further destruction of the drainage line due to the current transformed / disturbed condition of these drainage lines. The cumulative impact of implementing these erosion mitigation measures would be positive due to the prevention of the large-scale movement of the sediment.

   Please refer to the Freshwater Report (**Appendix 8.2**) for more information.

10.2.4 Conclusion

The driver of the Berg River is floods during the winter season as well as the low flow conditions during the dry season where the variability in the flow of the Berg River is fundamental to the River's ecology. It is envisaged that the proposed dam will not have any significant impacts on the Berg River

[34]Process whereby excess inorganics result in the exponential increase in algal and plant species (e.g., such as the alien invasive plant species, *Eichhornia crassipes* – Water Hyacinth) blooms. This negatively impacts biodiversity through restricting organism's access to essential resources (such as oxygen, sunlight, etc.).

as the demand on the Berg River has long been discounted against the minimum flow requirements and the ecological reserve. The Freshwater Specialist recommended that the proposed construction of the Bonathaba Dam be allowed subject to a Letter of Consent / General Authorisation. This highlights an overall low impact, post mitigation, associated with the proposed construction of the Bonathaba Dam.

10.3 Heritage Assessment

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

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (**Appendix 8.3**) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required".*

10.4. General

Impact management, mitigation, and monitoring measures are captured in the impact assessment and significance rating, attached as **Appendix 10**, as well as in the Environmental Management Plan/Programme (EMPr) attached as **Appendix 11**. The EMPr forms part of the contractual obligations to which all persons including, but not limited to, contractors / sub-contractors or employees involved in construction, operation, maintenance, or decommissioning work, must be committed. It also serves as a baseline information document for the project applicant and any entity working on behalf of the applicant, during the various phases of the proposed activity.

The EMPr aims to comply with Section 24N of the National Environmental Management Act No. 107 of 1998, as amended (NEMA), as well as any additional specific information requested by any government department, including the regulating authority for this specific project, the DEA&DP. The overall objective of the EMPr is to direct and guide all responsible parties, binding all contractors, sub-contractors, and all other persons working on the site to adhere to the terms and conditions of the EMPr during the construction, operation, maintenance, and decommissioning (if applicable) phases of the project. The overall outcome of the EMPr is to prevent avoidable damage and/or minimize or mitigate unavoidable environmental damage associated with the construction, operation, maintenance, and possible decommissioning phases of the proposed project.

The specific outcomes of the EMPr will be achieved by ensuring that the mitigation and management measures detailed in the EMPr are implemented and adhered to throughout the duration of the project. Compliance monitoring and independent assessment/auditing allow the verification of achievement of the EMPr outcomes and ultimately, fulfilment of the EMPr objectives. The EMPr is partly prescriptive (identifying specific people or organizations to undertake specific tasks, to ensure that impacts on the environment are minimized) but it is also a dynamic, evolving document, in that information gained during the various activities and/or monitoring of procedures on-site, could lead to changes in the EMPr.

The EMPr:

- identifies project activities that could cause actual environmental damage (or potential environmental risks) and provides a summary of actions required;
- identifies persons responsible for ensuring compliance with the EMPr;

- provides standard procedures to avoid and/or minimize the identified negative environmental impacts and to enhance the positive impact of the project on the environment;
- provides the site and project-specific rules and actions required, including a site plan/s showing:
    - areas where construction, maintenance, or demolition work may be carried out;
    - areas where any material or waste may be stored;
    - allowed access routes, parking, and turning areas for construction or construction-related vehicles;
- forms a written record of procedures, responsibilities, requirements, and rules for contractor/s, their staff, and any other person who must comply with the EMPr;
- provides a monitoring and auditing program to track and record compliance and identify and respond to any potential or actual negative environmental impacts; and
- provides a monitoring program to record any mitigation measures that are implemented

The following aims to give a high-level summary of potential impacts, objectives, and mitigation measures as captured in the EMPr:

Objective 1: Maintain a healthy biodiversity environment:

Potential Impacts:

- Loss of disturbed vegetation within a Critically Endangered Vegetation Type, namely the Swartland Shale Renosterveld;
- Soil contamination from construction; and
- Erosion

The following mitigation/ monitoring measure can be implemented to reduce these impacts and ultimately achieve Objective 1:

- A suitably qualified ECO must be appointed;
- Environmental Awareness training to be conducted with all workers;
- Ensure construction activities are restricted to the demarcated footprint, strictly prohibit any vehicles or construction-related activities outside of the demarcated footprint area;
- Access roads to the dam should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads and erect signs to remind workers not to deviate from the roads.
- Inspect all vehicles daily for the early detection of deterioration or leaks.
- The contractor should ensure drip trays are placed under stationary vehicles.
- Spill kits must be available. Workers should be trained on how to use spill kits to rectify a spill immediately. Records must be kept of any spills.
- Portable toilets **must not** be placed within 32m from any watercourse/ stream and serviced regularly to prevent leakage/spillage.
- No material must be stockpiled within 32m of the watercourse.
- 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.
- Indiscriminate clearing of areas must be avoided.
- All alien plants must be removed from within the construction footprint and immediate surroundings.
- 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.

- Implement an alien and invasive species control plan to prevent the establishment of such species.
- All areas impacted by construction activities must be rehabilitated on completion of the project.
- Erosion mitigation / control measures[35] must be implemented to reduce erosion associated with construction and operational activities where applicable.

Objective 2: Protection of Freshwater resources:

Potential Impacts:

- Loss of ESA2 (associated with drainage lines within the construction footprint)
- Loss of riparian habitat
- Erosion and sedimentation

The following mitigation/ monitoring measure can be implemented to reduce these impacts and ultimately achieve Objective 2:

- A suitably qualified ECO must be appointed;
- Environmental Awareness training to be conducted with all workers
- Ensure construction activities are restricted to the demarcated footprint, strictly prohibit any vehicles or construction-related activities outside of the demarcated footprint area
- Access roads to the proposed dam should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads and erect signs to remind workers not to deviate from the roads.
- No material is to be stockpiled within 32m of any watercourse. The stockpiles may not exceed 2m in height.
- 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 stabilize 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.
    - 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.
- No concrete/ cement will be mixed on-site and surplus must be disposed of in the correct manner.
- Inspect all vehicles daily for the early detection of deterioration or leaks. Drip trays are required and must be used for stationary heavy vehicles.
- The dam and the spillway should not be higher than the dam's full capacity, which will ensure that if the dam is at its design capacity, it would overflow during exceptional very high rainfall events.
- The construction footprint must be kept as small as possible;

[35] Erosion control methods include silt fences, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats and mulching. Exposed areas, susceptible to erosion, must be rehabilitated. This includes planting vegetation, characteristic of the pertinent vegetation type, to stabilize the soil.

- All building rubble should be removed following the completion of the dam. Any building rubble must not be stockpiled within 32m of the watercourse;
- No building rubble should be allowed to wash into the stream;
- The building should take place during the dry summer months
- Areas below the dam wall (at the spillway) must be monitored after heavy rainfall events for erosion and sedimentation.
- Should erosion and incision be noted, immediate corrective measures must be undertaken.
- Erosion at the spillway can be prevented by using rip-rap mattresses or spreaders. Other erosion mitigation / control measures must be implemented if applicable;
- Nuisance vegetation and sedimentation to be removed to ensure overflow;
- Rehabilitation measures may include the filling of erosion gullies and rills, gabions, and the stabilization of gullies with silt fences. Rehabilitation will also include the vegetation of bare areas of soil, susceptible to erosion, within the construction footprint. Impact on areas outside of the designated construction area must be minimized and where applicable, rehabilitated with plant species characteristic of the Swartland Shale Renosterveld Vegetation Type. See Appendix H (EMPr) for more information on rehabilitation.

Objective 3: Prevent the loss of any heritage resources

Potential Impact: Loss of paleontological or archaeological resources

A Notice of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by the Heritage Specialist (Agency for Cultural Resource Management). The area has a low SAHRIS palaeo-sensitivity. The specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (Appendix 8.3) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required".*

The following mitigation/ monitoring measure can be implemented to reduce these impacts and ultimately achieve Objective 3:

- A suitably qualified ECO must be appointed;
- Environmental Awareness training to be conducted with all workers
- Ensure construction activities are restricted to the demarcated footprint, strictly prohibit any vehicles or construction-related activities outside of the demarcated footprint area
- Access roads to the dam should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads and erect signs to remind workers not to deviate from the roads.
- Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately, and Heritage Western Cape must be notified without delay. These should be safeguarded - preferably *in situ* - and reported by the ECO as soon as possible to Heritage Western Cape (Ms. Stephanie Barnardt - 021 483 9543). This area must be marked using visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.
- No measures should be taken to cover up the suspected heritage resource with soil or to collect any remains such as bone, ceramics, or stone.
- All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.

- Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.

Any potential unforeseen impacts are covered in the EMPr (Appendix H) which should be implemented.

11. SUMMARY OF IMPACTS AND CUMMULATIVE EFFECT

11.1 Summary of Impacts

Please refer to **Appendix 10** 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 10**) 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
Phase: Construction			
Botanical	Vegetation Status: Clearance of vegetation and associated habitat within the Swartland Shale Renosterveld, a critically endangered vegetation type.	Low (Negative)	Very Low (Negative)
Freshwater	Sedimentation of the drainage line	Low (Negative)	Low (Negative)
	Destruction of the drainage line (loss of ESA2).	Medium (Negative)	Low (Negative)
	Erosion	High (Negative)	Low (Negative)
Agricultural	Loss of approximately 10.4ha of cropland.	Medium (Negative)	Low (Negative)
Socio-economic	Employment and skills-development opportunities created during the construction phase	Low (Positive)	N/A
Heritage	Loss and/or damage to potential archaeological and historical sites within the construction footprint	Negligible	Negligible
Palaeontology	Loss and/or damage to potential	Negligible	Negligible

	fossils within the construction footprint		
Dust	Dust may be generated during the construction of the proposed dam.	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
Phase: Operational			
Freshwater	Seepage and increased flow return resulting in eutrophication.	Medium (Negative)	Low (Negative)
	Impact on vegetation associated with the drainage line.	Medium (Negative)	Low (Negative)
Visual	Visual impact of the dam and agricultural development	Medium-Low (Negative)	Low (Negative)
Socio-economic	Creation and retention of long-term employment.	Medium (Positive)	Medium (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 expected to very low.

12. CONCLUSION AND RECOMMENDATIONS

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

- Botanical Report
- Freshwater Report
- NID

The specialist studies and information provided in the EIA Report, indicate that the proposed development does not pose any significant impact to the environment or socio-economic impacts 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 11**. Mitigation measures with regards to any activities in the watercourses are discussed in the River Maintenance and Management Plan (MMP)(**Appendix 12**). This MMP should be read in conjunction with the EMPr.

One of the main issues highlighted by the West Coast District's SDF is the recent drought and the negative implications of drought on the agricultural sector. Various climatic drivers, namely higher temperatures and drier conditions further exacerbate the impact of drought events on the agricultural sector, which require careful planning and adequate responses to sustain and grow the sector. In terms of the need and desirability of the proposed development, the existing water use could never be potted before due to inadequate storage capacity on the property and thus, the water use was never utilized to its full potential. The proposed development is required to ensure the long-term economic viability and sustainability of the production of table grapes and citrus through a reliable water supply from the dam for irrigation.

The proposed site for the development of the Bonathaba Dam is considered the best and most economically feasible site (Alternative 1) relative to the existing conditions (i.e. disturbed vegetation, gravitational benefits, etc) of the area-to-be-developed. It must also be noted that no feasible alternatives were identified on Portions 2 and 3 of Farm No. 1100 due to (i) contours associated with the remainder of the site are not suitable for the development of a dam, and (ii) level of already transformed land (namely crops) where an alternative location will impact a greater proportion of natural land and land under cultivation. As per the Botanical Assessment (**Appendix 8.1**), most of the proposed developmental footprint will overlap areas currently under permanent crops (mostly table grapes) whereas approximately 8.8ha of already disturbed vegetation will be impacted [as the area was previously under wheat cultivation until 2006 and subsequently left lying fallow]. Although limited indigenous plant species were observed with most plants observed being weeds or pioneer species, no plant species of conservational value were identified within the proposed development footprint. The specialist also noted that the small watercourse associated with the study area has been previously transformed / disturbed – the nature of the impact characteristic of intensive agricultural landscape practices. Therefore, no other site alternatives were considered and investigated. Although Alternative 2 will result in a larger footprint, the cost/storage ratio is considered viable under the circumstances relative to the (i) irrigational requirements of the Bonathaba Farm and (ii) site conditions. Therefore, Alternative 2 is the preferred layout. The purpose of the proposed dam is to provide storage capacity for the storage of the existing water use right. No other activity alternatives were considered.

The "no-go" alternative will result in no further development, which will mean that there will be no impact on the environment. The 'status quo' will persist and the site will remain as is, transformed, and disturbed. Although this no-go option will not result in potential negative environmental impacts,

the potential socio-economic benefits from implementing the activity would not be achieved/realized. As per the Botanical Assessment, the no-go alternative will result in a slow degradation of the site due to the surrounding land uses namely agricultural activities which will continue to directly and indirectly impact biotic factors.

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 were suggested.

According to the NID, the specialist concluded that the anticipated impact of the proposed Bonathaba Dam development on heritage resources is anticipated to be very low and recommended that a heritage impact assessment is not required. Comment received from HWC (Appendix 8.3) states that "*since there is no reason to believe that the proposed Bonathaba Dam on Ptn 2 & 3 of Farm 1100 Bonathaba, Malmesbury will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required*".

According to the Botanical Assessment, it is unlikely that the proposed development will significantly contribute to the (i) significant loss of vegetation type and associated habitat, (ii) loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities, (iii) loss of local biodiversity and threatened plant species; and (iv) loss of ecosystem connectivity.

According to the Freshwater Report, the proposed development will pose a 'Low' risk significance to the drainage line associated with the proposed site for development. This is attributed to the already degraded ecological integrity of the drainage line which was previously disturbed / transformed into stormwater management systems and return flow canals.

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

Considering all the information, it is envisaged that the proposed development of the Bonathaba Dam will not have a significant negative impact on the environment, should **mitigation measures and monitoring measures, stipulated in the EMPr and MMP be strictly adhered to**.

It is therefore recommended that the proposed development of the Bonathaba Dam be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended mitigation measures contained in Section 10 of this report, the EMPr (**Appendix 11**) and the MMP (**Appendix 12**).