RIVER MAINTENANCE MANAGEMENT PLAN (MMP)

for the proposed

DASBERG DAM

ON PORTION 5 OF FARM VAN DER WATTSKRAAL NO.399, SWELLENDAM WESTERN CAPE

DEADP reference number: 16/3/3/2/E3/10/1003/17

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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 EMP. 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 River Maintenance and Management Plan was prepared by Ms Inge Erasmus who has a BA Honours in Geography and Environmental Studies from Stellenbosch University. Before completing her honours degree Inge gained practical experience as a junior environmental consultant at Hatch Goba in Johannesburg from 2014 until 2015. Inge acted as an environmental control officer on a variety of projects in the Northern Cape, conducting environmental compliance audits, as well as being part of a project team working on a major resettlement project for Kumba Iron ore. Inge joined Enviro Africa in February 2017, generally performing duties as an environmental assessment practitioner with regards to NEMA EIA applications.

The whole process and report was supervised by Peet Botes who has more than 10 years experience in environmental management and environmental impact assessments. Mr. Peet Botes holds a who holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (with Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he has been employed for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel), between Arniston and the De Hoop Nature Reserve, managing the environmental department of OTB and being responsible for developing and implementing an ISO 14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld and adjacent coastline, working closely with CapeNature (De Hoop Nature Reserve). In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical assessments and developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits. He was also responsible for the development of biodiversity section of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 botanical and environmental legal compliance audits. During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, project management, biodiversity- and botanical assessments, environmental compliance audits and environmental control work.

Mr. Botes is also a registered Professional Environmental and Ecological Scientists, since 2005, at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.

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2. EXECUTIVE SUMMARY

The applicant, Dasberg Boerdery (PTY LTD) proposes to construct a farm storage dam on Portion 5 of the Farm van der Wattskraal, No. 399, about 15,5km east of Riviersonderend and 45,7 km west of Swellendam. The proposed dam wall will be 19,5 m high and will have a capacity of approximately 625 000 cubic meters. The area to be inundated will be approximately 8,8 ha. Water will be used for the irrigation of proposed 105ha of citrus orchards. The citrus orchards will be developed on previously ploughed land, previously used for wheat farming.

A new pipeline, approximately 1.5 km in length and a diameter of about 250 mm will be constructed from the dam to the N2, where it will connect with an existing pipeline. The route has been chosen to avoid the stream/ wetland habitat to the west of the property (Portion 5 of Farm van der Wattskraal No. 399) and will extend through cultivated land. It is proposed the pipeline will cross the N2 within an existing sheep culvert and connect to the existing pipeline on Remainder of the Farm Wattskraal No. 399. The pipeline will be constructed on previously disturbed land and will thus not trigger any listed activities in terms of NEMA 2014, as amended. The total footprint of the dam with associated infrastructure is expected to be approximately 9.55 ha.

The existing road will be used for access.

Botanically the greater part of the property can be described as transformed in terms of intensive agriculture; mainly cereal farming and livestock production. Very little Central Rûens Shale Renosterveld remains and what remains has significant conservation value. These areas must generally be avoided with no further disturbance permitted. However, there is no other logical place for a dam except in the in-stream location, as suggested here, where the remnant renosterveld vegetation will be lost to the construction of the proposed dam. It is unfortunate to lose any more renosterveld notwithstanding that the area has a relatively 'low' classification (ESA2) but a positive outcome is that this dam project has stimulated the intention of the landowner to set aside an area of intact Central Rûens Shale Renosterveld for protection. The botanical specialist suggests that this would successfully compensate for the localized loss of the renosterveld at the Dasberg Dam site. The proposed Dasberg Dam would have a Low negative impact after mitigation, and given positive actions, both the conservation easement and 'Search & Rescue' as mitigation, the development of the dam is supported from a botanical perspective.

In terms of freshwater systems, watercourses within the region in which the dam is located have been impacted as a result of past and present agricultural and anthropogenic activities. The development of the dam within the unchanneled valley bottom wetland will result in additional transformation of the critically endangered East Coast Shale Renosterveld wetland vegetation type within the region. However, the transformation of 1,5 ha of already disturbed wetland habitat is not likely to result in a significant cumulative impact to critically endangered wetland habitat within the region, if the correct mitigation measures are implemented.

Additionally, the area selected for the dam development falls within a Category 2 ESA. These areas are not essential for meeting biodiversity targets but play and important role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas and are often vital for delivery ecosystem services. The management objectives for Category 2 ESAs is to restore or manage the features to minimize impacts on ecological processes and ecological infrastructure functioning, especially soil and water related services, and to allow for faunal movement. Although the development of the dam will result in unavoidable impact of the ESA, it is not considered detrimental for meeting regional biodiversity targets.

2.1 PURPOSE OF THE MMP

The main purpose of this river maintenance and management plan is to guide the applicant and landowner, Mr. Schalk W Viljoen, which actions to follow to prevent avoidable damage to the wetland habitat associated with construction and operations of the proposed Dasberg dam and to enhance the positive benefits of the project. It should be noted that this MMP with its Method Statements (Appendix D1 – D6) should be read in conjunction with the Environmental Management Programme (EMPr) (Appendix 12 of the EIR). It should be noted that these method statements are merely guidelines and must be refined once the applicable contractors are appointed. The department must be informed of any changes to the the method statements and MMP.

3. DEFINITIONS AND ABBREVIATIONS:

3.1 DEFINITIONS

Applicant: the person or responsible person from an organization who applied for the proposed activity described in the ROD.

Bund: enclosure under / around a storage facility to contain spillage.

Construction: means the construction period of the project during which the actual works are carried out, deemed to include site establishment, site preparation, the works, maintenance period and decommissioning and is defined as from commencement of site establishment until site handover (practical completion).

Construction site: means the area influenced and affected by the construction activities or under the control of the Contractor often referred to as "the Site".

Construction Supervisor: The person responsible (appointed by the Applicant) to ensure that the construction is carried out to completion on time, within budged and that the Contractor fulfils his obligations in terms of the EMP.

Contaminated water: means water contaminated by the Contractor's activities, *e.g.* concrete water and runoff from plant/ personnel wash areas.

Contractor: the principal persons / company and all other sub-contractors involved in the construction of the project.

Declaration of understanding: Form that is signed by all contractors involved in the construction works of their understanding and acceptance of the EMP and site-specific additions to the EMP.

Development site: boundary and extent of development works and infrastructure.

Environment: means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part of the combination of the above two bullets and the interrelationships between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being

Environmental Aspect: Any element of any construction activity, product or services that can interact with the environment.

Environmental Control Officer: The ECO must be independent and suitably qualified and must have a sound knowledge of the environment in which the activity will take place.

Environmental Impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from any construction activity, product or services.

Method statement: A statement by the Contractor, describing the scope of intended construction works step-by-step, in order for the ECO and Construction Supervisor to understand the Contractors intentions and be able to comment on, so that they could assist with devising mitigating measures should it be necessary to avoid environmental impact.

No-Go Area(s): An area of such (environmental/aesthetical) importance that no person or activity are allowed within a designated boundary surrounding this area.

Site meetings: Periodic (weekly or monthly) meetings between the ECO, Construction Supervisor and Contractor to discuss construction activities that relate to the environment or any other environmental issues that might arise.

Works: The works to be executed in accordance with a contract.

Start-up meeting: a start-up meeting held on site, before any construction has begun to discuss EMP and determine site specific additions that will be included as the basis for the EMP.

Potentially hazardous substance: is a substance, which, in the reasonable opinion of the Engineer, can have a deleterious (detrimental) effect on the environment.

Precautionary principle: means the basic principle, that when in doubt or having insufficient or unreliable information on which to base a decision, to then undertake actions that will have minimum risk.

Reasonable: means unless the context indicates otherwise, reasonable in the opinion of the Engineer/Project Leader after he has consulted with a person, not an employee of the Applicant, suitably experienced in "environmental implementation plans" and "environmental management plans", both as defined in the Environmental Management Act (Act No 107, 1998).

Solid waste: means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

3.2 ABBREVIATIONS

CARA	Conservation of Agricultural Resources Act no. 43 of 1983
CBA	Critical Biodiversity Area
DEA	Department Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
DWA	Department of Water Affairs
EA	Environmental Authorization (Record Of Decision) issued by relevant authority for the authorisation to commence construction under certain environmental compliances
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer - Must be a suitably qualified independent environmental consultant appointed to ensure compliance to the EMP
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
EMP	Environmental Management Plan or Programme
FEPA	Freshwater Ecological Support Area
GPS	Global Positioning System
IHI	Index of Habitat Integrity
HWC	Heritage Western Cape
NWA	National Water Act
NEMA	National Environmental Management Act no. 107 of 1998.
NEM: AQA	National Environmental Management: Air Quality Act 39 of 2004.
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004.
NEM: PAA	National Environmental Management: Protected Areas Act 57 of 2003
NEM: WA	National Environmental Management: Waste Act 59 of 2008.
NFA	National Forest Act 84 of 1998.

NHRA	National Heritage Resources Act 25 of 1999.
NVFFA	National Veld and Forest Fire Act 101 of 1998.
NWA	National Water Act 36 of 1998
PES	Present Ecological State
Sub-WMA	Sub – Water Management Area
WMA	Water Management Area

4. LEGISLATIVE FRAMEWORK

The following specific environmental legislative is applicable to this **Maintenance Management Plan:**

- This Maintenance Management plan is to be approved in terms of the **NEMA EIA** Regulations 2014 (as amended) and only relates to **Activity 19, Listing Notice 1 (GN R.327);**
- The requirements of the **National Water Act 36 of 1998** (as amended);
- The requirements of the **National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA**) in terms of:
    - National list of ecosystems that are threatened and in need of protection (GN 1002 of 9 December 2011).
    - Alien and invasive species list 2016 (GN R. 864 of 29 July 2016).
- **Conservation of Agricultural Resources Act 43 of 1983**, as amended (CARA) in terms of:
    - Combating/preventing erosion; and
    - Combating weeds and invader plants

Overview of other applicable legislation:

- **Constitution of the Republic of South Africa (1996)**: of special relevance in terms of environment is section 24
- **Conservation of Agricultural Resources Act 43 of 1983 (CARA)**: supports conservation of natural agricultural resources (soil, water, plant biodiversity) by maintaining the production potential of the land and combating/preventing erosion; for example, by controlling or eradicating declared weeds and invader plants.
- **Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947),** to control the sell, purchase, use and disposal of agricultural or stock remedies.
- **Hazardous Substances Act 15 of 1973**: to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitizing or flammable nature, or by the generation of pressure
- **National Environmental Management Act 107 of 1998 (as amended):** replaces the Environmental Conservation Act (ECA) and establishes principles for decision-making on matters affecting the environment, and for matters connected therewith.
    - **Environmental Impact Assessment Regulations**: identifying activities (listed activities) for which environmental authorisation must be obtained.
- **National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA):** supports conservation of plant and animal biodiversity, including the soil and water upon which it depends.
    - **National list of ecosystems that are threatened and in need of protection** (GN 1002 of 9 December 2011).
    - **Alien and invasive species list 2016** (GN R. 864 of 29 July 2016).
- **National Environmental Management: Protected Areas Act 57 of 2003 (as amended Act 31 of 2004) (NEMPAA):** To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.
- **National Environmental Management: Waste Act 59 of 2008 (NEMWA):** To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
    - **List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment**: Identifies activities in respect of which a waste management license is required.
- **National Forests Act 84 of 1998 (as amended)**: supports sustainable forest management and the restructuring of the forestry sector.
    - **List of protected tree species** (GN 716 of 7 September 2012)

- **National Heritage Resources Act 25 of 1999**: supports an integrated and interactive system for the management of national heritage resources, including supports soil, water and animal and plant biodiversity.
- **National Veld and Forest Fire Act 101 of 1998 (NVFFA):** protects soil, water and plant life through the prevention and combating of veld, forest, and mountain fires
- **National Water Act 36 of 1998 (NWA):** promotes the protection, use, development, conservation, management, and control of water resources in a sustainable and equitable manner.

5. RIVER MAINTENANCE AND MANAGEMENT PLAN

5.1 INTRODUCTION

It is proposed that a farm storage dam be constructed on Portion 5 of Farm van der Wattskraal No. 399. Water will be used for the irrigation of proposed 105ha of citrus orchards.

The dam will be located on existing agricultural land (wheat farming) within the undulating Rûens veld and on the same property where the 100ha of the 105 ha citrus orchards will be established. The location was chosen to ensure the project life cycle costs are minimised (gravity feed vs. pumping cost etc.) as no pump station will be required and water will flow with gravity from the water source to the dam.

The citrus orchards will be developed on agricultural land previously used for wheat farming. It should be noted that existing historical crop lands will be used for the cultivation of citrus orchards and that the current footprint will not be enlarged. It is thus not virgin/ natural soil that will be disturbed, but previously cultivated, previously ploughed land. Please refer to **Appendix B1** for **layout plans** for the proposed dam and for the cultivation of the orchards.

Figure 1 of **Appendix B1** provides a layout plan for the proposed Dasberg dam as well as the proposed layout for the pipeline extension and shows Portion 5 of van der Wattskraal 399 (5/399) and Remainder of farm van der Wattskraal 399 (RE/399). **Figure 3** of **Appendix B1** provides a layout plan of the planned 105ha orchard cultivation in relation to the proposed dam. It is proposed that 5ha of orchards will be developed on Remaining extent of van der Wattskraal 399 (RE/399), west of the N2. 100 ha of orchards will be developed on Portion 5 of farm van der Wattskraal 399 (5/399), the same property on which Dasberg dam is proposed.

The proposed dam will have a maximum dam wall height of 19,5 m, a dam wall length of approximately 550 m, and will have a capacity of approximately 625 000 cubic meters. The water surface at full capacity will be approximately 8,8 ha. **Figure 1** of **Appendix B1** provides a layout plan of the proposed Dasberg Dam and **Figure 3** shows the proposed Dasberg dam design drawing. **Appendix 9 of the EIR** contains the Preliminary Design Report for the proposed dam which includes design drawings of the dam and associated infrastructure. Access to the dam will be from existing farm roads, with access to the farm from the N2.

A new pipeline, approximately 1.5 km in length and a diameter of about 250 mm will be constructed from the dam to the N2, where it will connect with an existing pipeline. Refer to **Figure 5 & 6** of **Appendix B1** for the layout plan of the proposed pipeline route. The route has been chosen to avoid the stream/ wetland habitat to the west of the property (Portion 5 of Farm van der Wattskraal No. 399) and will extend through cultivated land, (please refer to **Appendix B2 Figure 3** for the sensitivity map). It is proposed the pipeline will cross the N2 within an existing sheep culvert and connect to the existing pipeline on Remainder of the Farm Wattskraal No. 399. The pipeline will be constructed on previously disturbed land and will thus not trigger any listed activities in terms of NEMA 2014, as amended. The total footprint of the dam with associated infrastructure is expected to be approximately 9.55 ha.

For the proposed BEE project of 105ha citrus orchards. Water will be obtained from Eksteenkloof within existing water extraction rights (240 000 m^3). An additional 120 000m^3 abstraction from Eksteenskloof will be needed to be combined with the existing 240 000m^3 (to be transferred to van der Watts kraal399/5). An additional 232 000m^3 will be bought and transferred to the Dasberg Dam for storage, as well as an additional 60 000m^3 of summer listing waster which does not have to be stored. This will give a total of 652 000m^3 water that can be stored in the proposed dam. A WULA process, was submitted in April 2017 of which the reference number is **Ref 4/5/1/H10J/Dasberg 399/5**. Please refer to **Appendix 5.2.3.2 & 5.2.3.7 of the EIR.**

5.1.1 Site location and description

The site is located on Portion 5 of Farm van der Wattskraal No. 399, about 15,5 km east of Riviersonderend and 45,7 km west of Swellendam in the Western Cape (See Figure 1 below and **Appendix A**). The dam will be located on existing agricultural land (wheat farming) within the undulating rûens veld.
The site coordinates for the dam wall are: S 34° 7'52.79", E20° 02'53.51".
The Surveyor General code for the property is: C073000000003990005

Access to the farm is from the N2, the site can be accessed via existing access roads on the property.

Figure 1: Areal image showing the site location, with a green polygon, in proximity to surrounding towns and roads

5.2 BIODIVERSITY FEATURES

According to the Overberg CBA overlay map, the proposed dam falls within an Ecological Support Area (ESA). The dam will also absorb the upper reaches of a small stream (and its buffer zone of approximately 40 m) which contains Central Rûens Shale Renosterveld, classified as critically endangered.

5.2.1 Botanical:

A Botanical Assessment was conducted by Bergwind Botanical and key findings include:

- A single Critically Endangered (A1) vegetation type, Central Rûens Shale Renosterveld would have been the original vegetation type found over an extensive area and over most of Van der Watts Kraal. At the study site this vegetation type persists as a small remnant on both sides of the stream below the existing two small dams.
- The remnant renosterveld was found to be species-rich but not all species were in flower or were identifiable even though the survey was undertaken in spring. No species of conservation concern were recorded but the importance of the remnant should nevertheless not be underestimated.

- It is estimated that approximately 1.5 ha of the remnant renosterveld would be lost due to dam construction and inundation (operation). This is roughly half of the renosterveld found along the stream.
- The impact of the loss of Central Rûens Shale Renosterveld at a local scale at the Dasberg Dam site would result in Medium negative impact but the proposed conservation easement and recommended 'Search and Rescue' (see below) would provide mitigation for the lost habitat.
- Plants that can be relocated such as geophytes (bulbs) and succulents e.g. *Trichodiadema sp*. should be located, marked and rescued before the dam-building commences. The rescued plants should be relocated into the remaining part of the remnant not affected by the dam or to the area of the conservation easement.
- The proposed site falls within an Ecological Support Area 2 (ESA2) and thus has a conservation merit but is not essential to meeting conservation targets.
- The area is also classified as a Freshwater Ecosystem Priority Area.

Native flora observed at the site included *Arctotis acaulis, Asparagus capensis, Babiana* sp., *Brunsvigia* cf. *orientalis, Chrysocoma* sp., *Cotula turbinata, Cyphia* cf. *digitata, Drosanthemum* sp., *Galenia africana, Gladiolus gracilis, Helichrysum crispum, Linum cinereum, Microloma sagittatum, Moraea ciliata, Oxalis purpurea, Oxalis* sp. (red), *Polygala garcinii, Romulea flava, Sparaxis* sp., *Syringodea longituba, Tenaxia stricta, Trachyandra* sp., *Trichodiadema* sp., *Tulbaghia alliacea, Indigofera heterophylla*, *Diascia capensis, Romulea* cf. *rosea, Ursinia nana* and *Zaluzianskya* sp.

No alien flora was observed on the site.

5.2.2 Freshwater:

A Freshwater impact assessment was conducted by EnviroSwift, key findings include:

- The watercourse in which the dam is proposed falls within the Southern Coastal Belt Ecoregion and within the Breede Water Management Area (WMA) and Riviersonderend sub-Water Management Area (sub-WMA).
- The quarterly catchment indicated for the project footprint is H60K and the applicable wetland vegetation unit is the East Coast Shale Renosterveld, listed as critically endangered.
- The proposed dam will intersect a natural valleyhead seep wetland and floodplain wetland which are both indicated to be within a critically modified condition.
- The catchment in which the proposed dam falls has not been selected as a River Freshwater Ecosystems Priority Area (FEPA).
- According to the Western Cape Biodiversity Spatial Plan for Swellendam Municipality, the proposed dam will intersect an Ecological Support Areas (ESA 2) which is associated with a watercourse and wetland area. (ESA 2 are areas likely severely degraded or with no natural cover remaining *which require restoration*. These areas are not essential for meeting biodiversity targets but play a vital role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas, vital for delivering ecosystem services).
- The proposed dam will be located on an ephemeral watercourse which has been indicated as a combination of two Hydrogeomorphic (HGM) features namely valleyhead seep wetland and floodplain wetland as per the WCBSP. However, as per inspection by EnviroSwift the feature was considered to be more represented of an unchanneled valley bottom wetland.
- The unchanneled valley bottom wetland was dominated with obligate wetland species *Juncus* sp. with scattered, isolated patches of *Scirpus nodosus* and *Phragmites australi.*
- Cultivation of wheat within the wetlands catchment has resulted in decreased surface roughness (less natural vegetation cover), exposure of bare soils and in some areas compaction of soils. This has

decreased the natural infiltration rates of soils and has increased stormwater runoff and wetland flood peaks.

- Three small impoundments have been created in the upper reaches of the unchannelled valley bottom wetland and a road has also been constructed immediately downstream of the area earmarked for the construction of the dam. The features have resulted in the alteration of the natural hydrological flow patterns through the wetland. The dams impede surface flow to downstream wetland habitat. All areas upstream of the impoundments and the road which would have been characterised by seasonal and temporary wetland habitat under natural circumstances remains saturated for longer.
- The stockpiling of rocks within the unchannelled valley bottom wetland has had an impact on the natural flow patterns through the wetland and has resulted in the loss of natural wetland vegetation in stockpile areas.
- An increase in sediment laden stormwater runoff from surrounding disturbed areas has resulted in the erosion and sedimentation.
- The overall wetland health score calculated for the unchannelled valley bottom wetland in its present state falls within Category C – Moderately modified: A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.
- The development of the proposed dam will result in a decrease in the hydrology and vegetation condition of the wetland from a Category C Present Ecological State (PES) (Moderately modified) to a Category E PES (Seriously Modified). The overall health of the wetland after the development of the dam will fall within a Category D PES (Largely modified: A large change in ecosystem processes and loss of natural habitat and biota and has occurred).
- In terms of the Ecological Importance and Sensitivity (EIS). The unchannelled valley bottom wetland was determined to be of a moderate EIS (Wetlands that are ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers).
- It is considered unlikely that the disturbed and degraded wetland habitat associated with the unchannelled valley bottom wetland will support rare and endangered species or populations of unique species. The wetland is however likely to provide suitable breeding and foraging habitat for faunal species considered to be more common within the region.
- The unchannelled valley bottom wetland is not formally protected, however, the East Coast Shale Renosterveld wetland vegetation group is critically endangered within the region.
- The wetland calculated an overall low PES score (Largely modified), and therefore scored low for ecological integrity.
- The wetland has a low diversity of habitat types.

DESCRIPTOR	**NAME / DETAILS**
Water Management Area (WMA)	Breede Overberg WMA and Riviersonderend sub-WMA
Catchment Area	Breede River
Quaternary Catchment	H60K
Current Present Ecological State (PES)	C – Moderately modified
Ecological importance and sensitivity (EIS)	Moderate
River Freshwater Ecosystems Priority Area (FEPA) or Biodiversity conservation value	The site of the proposed activity is not within a FEPA

Type of water resource	River
Co-ordinates of applicable river portion (taken as the property boundaries)	• S34° 07' 56.12" E20° 02’ 40.54" (Approximately 250 m from the dam wall towards the South-western boundary of the property) • S34° 07' 42.81" E20° 03' 13.62" (Approximately 250 metres from the toe of the dam towards the North-eastern boundary of the property.)
Fresh Water Specialist	Mrs. Natasha van Haar and Louise Zdanow from EnviroSwift

5.3 OBJECTIVES OF MAINTENANCE ACTIVITIES

The main objectives of this river maintenance plan is to guide the landowner to correctly implement the mitigation measures as recommended by the Freshwater and Botanical specialists, to protect the integrity of the wetland habitat and to minimise the impact of the proposed Dasberg dam on the receiving environment.

5.3.1 Pre-construction maintenance objectives:

- Conserve as much of the remaining Renosterveld that does not fall within the footprint of the dam wall or dam itself by demarcating the development footprint and the establishing of a conservation easement.
- Mitigate, where possible the loss of seasonal and temporary wetland habitat and vegetation.
- Protect the bulbs and succulents found on site, specifically within that 1.5ha renosterveld fringing the two parallel strips, that will be lost due to the construction of the proposed Dasberg Dam.
- Mitigate and monitor alien plant invasion on the property throughout the project and after construction.

5.3.2 Construction maintenance objectives:

- Protect the integrity of the wetland habitat by mitigating, where possible, the loss of seasonal and temporary habitat from construction activities.
- Mitigate accidental disturbance of the wetland habitat and compaction of soils, outside of the development footprint (up and down stream of the proposed dam) due to construction activities.
- Mitigate the increased stormwater runoff and flow velocities which causes erosion and sedimentation of the downstream wetland habitat due to earthmoving activities during construction phase.
- Mitigate water quality impairment of the wetland habitat during construction phase.

5.3.3 Operations maintenance objectives:

- Mitigate erosion of downstream wetland habitat resulting from water discharge during operational phase
- Monitor wetland habitat and water quality up and down stream of the dam.

5.4 DESCRIPTION OF MAINTENANCE ACTIVITIES

The following section briefly describe the maintenance activities to be followed to achieve the abovementioned objectives. Site specific Method Statements were developed for river maintenance from recommendations made by the specialists. Please refer to **Appendix D1 – D6** for more detailed Method Statements. The Environmental Management Programme (EMPr) should be read in conjunction with these Method Statements.

It should be noted that these method statements are merely guidelines and must be refined once the applicable contractors are appointed. The department must be informed of any changes to the the method statements and MMP.

5.4.1 Pre-construction

- Environmental awareness training **(Please refer to section 7.5.1 of the EMPr)**
- Demarcation and signage **(Please refer to section 7.10.4 of the EMPr & MS06 Appendix D6)**
- Search and rescue plan **(MS01 Appendix D1)**. It should be noted that the landowner agreed upon a conservation easement, whereby another area of renosterveld is being set aside in compensation for the loss caused by the dam.
- Clearing of vegetation, stripping and topsoil management **(Please refer to section 7.10.8 of the EMPr & MS06 Appendix D6)**
- Alien eradication plan **(MS02 Appendix D2 and section 7.10.10 of the EMPr)**

5.4.2 Construction

- Mitigate the disturbance and compaction of soils up and down stream of the proposed dam **(MS03 Appendix D3)**
- Stromwater runoff, sedimentation and erosion control during construction (**MS04 Appendix D4)**
- Water quality management during construction **(Please refer to section 7.10 of the EMPr for standard management procedures and & MS06 Appendix D6)**

5.4.3 Operations

- Erosion control of downstream wetland habitat due to discharge water **(MS05 Appendix D5).**

For operatonal maintenance activites, please refer to section 5.5.4 for environmental monitoring and reporting.

5.5 RESPONSIBLE PARTIES

The applicant is also the land owner, namely Dasberg Boerdery (Pty) Ltd, who is represented by Mr. Schalk W Viljoen. Mr. Viljoen will be the permanent resident on the property and also responsible for the correct implementation of the river maintenance management plan. The contractor and ECO appointed by Mr Viljoen will be more involved with river maintenance during the pre-construction and construction phase. The responsibility of river maintenance and management during operations will mainly rest on the applicant, Mr. Viljoen.

Equipment (where needed) will be stored and safely managed by the landowner.

Only existing access roads will be used.

5.5.1 Contact details of proponent

Relevant parties	Dasberg Boerdery (Pty) Ltd
Maintenance Proponent	Mr. Schalk W Viljoen

RSA Identity no.	6604185125088
Landowner	Dasberg Boerdery (Pty) Ltd
Address:	P.O. Box 21 Riviersonderend 7250
Tel:	028 261 1565
Fax:	086 768 5817
Cell:	082 441 9471
Email:	schalk@whalemail.co.za

5.5.2 Environmental awareness training

The applicant (who is also the landowner) has been involved during the NEMA EIA application process and understands the implications off the recommendations made by the various specialists' reports, especially the freshwater specialist. By signing the declaration of understanding **(Appendix E)** the applicant declares that he understands his responsibility towards the implementation of the MMP and EMPr.

General awareness training will be given (as needed) in accordance with the EMPr **(Section 7.5.1 of the EMPr)**.

5.5.3 General control and restoration

General environmental control and restoration relating to the maintenance management plan will be the same as described in the Environmental Management Programme (**Section 7.10 of the EMPr)**

5.5.4 Environmental monitoring & reporting

Monitoring after construction will be the responsibility of the applicant (landowner) and aims at detecting changes that will inform intervention or remedial actions that might be needed to inform environmental performance. Monitoring will be done by physically walking the property, inspecting the dam itself as well as the wetland habitat up and down stream of the dam.

The Method Statements **(MS01 – MS05 Appendix D**) describe the monitoring procedures during construction and operations phase. The section bellow aims to describe monitoring to be conducted after construction by the applicant:

- ***Search and rescue programme:***
  - Post-construction monitoring of plants relocated during search and rescue to evaluate where the intervention was successful or not. This should be undertaken on a three-monthly basis for two years after transplanting in order to evaluate the success thereof, or as suggested by the appointed botanist who will be conducting the entire search and rescue operation.

- ***Alien plant eradication:***
  - After initial clearing, yearly follow-ups must be conducted by the applicant/landowner to control seedling and regrowth.

- ***Erosion control of downstream wetland habitat due to water discharge:***
  - Monitor discharge points for erosion and incision on a quarterly basis and after heavy rainfall events. Should erosion and incision be noted, immediate corrective measures must be undertaken. Rehabilitation measures may include the filling of erosion gullies and rills, and the stabilization of gullies with silt fences.

- ***Monitor wetland habitat and water quality up and down stream of the dam.***
  - Ensure that a suitably qualified person is appointed to monitor the wetland habitat and water quality and quarterly as issues a report/ highlight fdareas of concern within a month of monitoring.

5.5.4.1 Portion of the stream to be monitored

The wetland habitat up and down stream of the dam must be monitored.

- S34° 07' 56.12" E20° 02’ 40.54" (Approximately 250 m from the dam wall towards the South-western boundary of the property).
- S34° 07' 42.81" E20° 03' 13.62" (Approximately 250 metres from the toe of the dam towards the North-eastern boundary of the property).

5.5.4.2 Monitoring frequency

Monitoring frequency and reporting will be on a quarterly basis, after flood incidents, or as stated otherwise in specialist reports, method statements and the EMPr.

5.5.4.3 Monitoring report

Monitoring report will focus mainly on physical site inspections aiming at early detection of erosion and the need for intervention and the measures to be taken. As such the monitoring report needs to address the following minimum criteria, namely the date of inspection, the portion of the river that was inspected, the result of the inspection and any actions that was or needs to be taken. A simple monitoring table will be used to report on findings (Refer to the table underneath as an example of the monitoring report format).

Table 1: Example of monitoring report

DATE	AREA MONITORED	MONITORING CRITERIA	TICK BOX	ACTIONS TO BE TAKEN
		No problem areas observed		
		Minor erosion (no intervention)		
		Minor erosion (intervention needed)		
		Significant erosion (Specialist opinion needed)		

5.5.5 Appendices to the MMP

Appendices to the MMP has been included as part of the appendices of the larger EMP. Please refer to the following as reference to the applicable appendices:

- Locality maps (Appendix A)
- Layout Plans (Appendix B1)
- Sensitivity Maps (Appendix B2)
- Site photographs (Appendix C)
- Method statements pertaining to the MMP (Appendix D1 – D6)
  - MS01 Search and rescue plan
  - MS02 Alien invasive management plan
  - MS03 Mitigate disturbance and compaction of soils up and down stream of the dam

- MS04 Stormwater runoff, erosion, sedimentation control during construction
- MS05 Erosion control of downstream wetland habitat due to water discharge during operations
- MS06 Method Statement for the construction of Dasberg dam from Sarel Bester Ingenieurs BK

- Declaration of understanding by the applicant (Refer to Appendix E)

Please note that this MMP should be read in conjuction with the EMPr (Appendix 12 of the EIR).

APPENDIX A: LOCALITY MAPS

APPENDIX B1 LAYOUT PLANS

Figure 1	Map showing the proposed layout of Dasberg dam and the pipeline extension on Portion 5 of farm van der Wattskraal 399 (5/399) & Remainder of 399 (Rem399)
Figure 2	Proposed Dam design drawing
Figure 3	Layout plan of the planned orchard cultivation, 5 ha on Rem 399 (west of the N2), and 100 Ha on 5/399, in relation to the proposed dam
Figure 4	Portion 5/399 divided into fields in proximity to the proposed dam
Figure 5	Proposed pipeline route drawing
Figure 6	Pipeline route in relation to wetland/ stream to the South West

APPENDIX B2 SENSITIVITY MAPS

Figure 1	Vegetation Map
Figure 2	Overberg Critical Biodiversity Areas Map
Figure 3	Pipeline route in relation to wetland/ stream, indication the route is less than 32m from the stream
Figure 4	Map from Freshwater Impact report , indicating wetlands and rivers in relation to the proposed dam
Figure 5	Map from Freshwater Impact Report, indicating the ESAs
Figure 6	Map from Freshwater Impact Report, indicating the Unchannelled Valley Bottom Wetland in relation to the proposed dam

APPENDIX C: SITE PHOTOGRAPHS

APPENDIX D: METHOD STATEMENTS

Appendix D1	MS01 Search and rescue plan
Appendix D2	MS02 Alien invasive management plan
Appendix D3	MS03 Mitigate disturbance and compaction of soils up and down stream of the dam
Appendix D4	MS04 Stormwater runoff, erosion, sedimentation control during construction
Appendix D5	MS05 Erosion control of downstream wetland habitat due to water discharge during operations
Appendix D6	MS06 Method Statement for the construction of Dasberg dam from Sarel Bester Ingenieurs BK

APPENDIX E: DECLARATION OF UNDERSTANDING