PROPOSED EXPANSION OF AN INSTREAM DAM ON FARM 66/1 ROODEZANDSKLOOF, TULBAGH AND FARM 329, TULBAGH

ENVIRONMENTAL MANAGEMENT PROGRAMME

Date:
4 December 2025

Prepared for:
Modderasrivier Boerdery (Pty) Ltd

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PROJECT DETAILS

TITLE:	**Proposed Expansion of an Instream Dam (Modderas Dam) on Farm 66/1 Roodezandskloof, Tulbagh and Farm 329, Tulbagh**
DEA&DP REF:	**16/3/3/1/B5/14/1097/25**
PROCESS:	**Basic Assessment Process**
REPORT:	**Environmental Management Programme with a Maintenance Management Plan**
APPLICANT:	**Modderasrivier Boerdery (Pty) Ltd**
APPOINTED EAP:	**Lindsay Speirs Du Toit (trading as Earth Grace Environmental Consultancy)**
EAPASA REGISTRATION NO:	**2019/1470**
REPORT DATE:	**4 December 2025**
REPORT COMPILED BY:	**Lindsay Speirs Du Toit**

The curriculum vitae of the EAP and an oath undertaken by the EAP are attached as **Annexure 1.**

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ACRONYMS

AGIS	Agricultural Geo-reference Information System
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs (National)
DEA&DP	Department of Environmental Affairs and Development Planning
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
ELU	Existing Lawful Water Use
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FSP	Fine-scale Plan
EWR	Environmental Water Requirement
FSL	Full Supply Level
GN	Government Notice
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
LMA	Local Municipal Area
NEMA	National Environmental Management Act (No. 107 of 1998), as amended.
NEMBA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act (No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act (No. 25 of 1999)
NID	Notice of Intent to Develop (for Heritage Western Cape)
NWA	National Water Act (Act 36 of 1998)
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
RMMP	River Maintenance Management Plan
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
OEMP	Operational Environmental Management Plan
SAHRA	South African Heritage Resources Agency
V&V	Verification & Validation
WCBSP	Western Cape Biodiversity Spatial Plan
WUA	Water Users Association
WULA	Water Use Licence Application

1. INTRODUCTION

Lindsay Speirs Du Toit (trading as Earth Grace Environmental Consultancy) has been appointed by Modderasrivier Boerdery (Pty) Ltd, to develop an Environmental Management Programme (EMPr) which will be used to promote and ensure environmental monitoring, control and management associated with the proposed development and associated infrastructure. This process is undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) and the EIA Regulations 2014, as amended.

The NEMA requires that an EMPr be submitted, where a Basic Assessment Process must be undertaken as part of the application for Environmental Authorisation (EA), to the competent authority. The content of an EMPr must contain the information set out in Appendix 4 of the NEMA EIA Regulations, 2014 (as amended).

This EMPr contains management requirements and recommendations made by the Environmental Assessment Practitioner (EAP), participating specialists and stakeholders, as well as in terms of best practice. Should the future EA contain requirements (conditions) that contradict any points in this EMPr, the requirements (conditions) in the authorisation supersede this EMPr. This EMPr should be reviewed and updated to include any additional recommendations that arise from the Scoping/EIA Process, as well as any conditions of authorisation should the project be authorised.

Section 28 of NEMA provides for the Duty of Care principle that "*…obliges every person who causes, has caused or may cause significant environmental degradation to take reasonable measures to prevent such degradation from occurring, continuing or recurring*". This clause forms the underpinning philosophy of this EMPr.

Should the Department of Environmental Affairs and Development Planning (DEA&DP) grant the EA for the proposed activities and accepts this EMPr as part of the process; this will confer a legal obligation to comply with the specifications of the EMPr on the Holder of the EA. This EMPr includes all relevant documentation contained or referred to within it, along with any amendments or appendices to this document. The DEA&DP must approve any changes to the EMPr. The NEMA EIA, Regulations, 2014 (as amended) must be taken into consideration when any amendments must be made to the EMPr.

The Applicant/Holder of the EA must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The Contractor must make adequate provision in their budgets for the implementation of the EMPr.

It is then the responsibility of the Applicant/Holder of the EA to undertake the following:

- Ensure that all requirements of the EMPr are met for the duration of the construction works. The Applicant/Holder of the EA always has the ultimate responsibility to ensure compliance in South African law.
- Appoint an Environmental Control Officer (ECO) to monitor the implementation of the construction phase of the EMPr, where required to do so by DEA&DP. Appoint and ECO to monitor any other aspects covered in this document or its Appendices that expressly calls for an ECO to be involved.

- Bind all contractors undertaking work on these sites, to the specifications in this same EMPr, as well as Appendices and any amendments thereto.

1.1. Purpose of this EMPr

The purpose of this EMPr is to ensure that the environmental impacts and management of the various phases of the proposed development on the receiving environment are managed, mitigated and kept to a minimum (i.e. the outcome of implementing the EMPr). The EMPr must provide easily understood and provide clearly defined actions that must be implemented during each phase of the development of the proposal. The EMPr is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is binding on the Applicant/Holder of the EA, all contractors and sub-contractors and visitors to the site. It must be included as part of any tender documents / agreements, as well as contractual documents between the Applicant/Holder of the EA and any contractors. Copies of this EMPr must be kept on site and all senior personnel are expected to familiarise themselves with the content of this EMPr.

Any changes or deviations to this EMPr must be authorised by the competent authority, DEA&DP.

1.2. Status of this EMPr

It is of utmost importance that this EMPr be read in conjunction with any legally obtained authorisations such as an EA. This EMPr is viewed as a dynamic document that must be reviewed and updated on a continual basis.

The EMPr is valid for the duration of the project with each applicable phase corresponding to the identified requirements.

1.3. EMPr Requirements

REQUIREMENT	DESCRIPTION
(a) Details of the EAP who prepared the EMPr; and	Annexure 1
(b) The expertise of the EAP to prepare an EMPr, including a curriculum vitae.	Annexure 1
(c) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 2
(d) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Annexures 2 and 3
(e) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental	Sections 6 and 9

REQUIREMENT	DESCRIPTION
impact assessment process for all the phases of the development including – (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities.	
(f) A description of the proposed impact management actions, identifying the way the impact management outcomes contemplated above will be achieved and must, where applicable include actions to – (i) avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practises; (iii) comply with any applicable provisions of the act regarding closure, where applicable; and (iv) comply with any provisions of the act regarding financial provisions for rehabilitation, where applicable.	Section 6 – Environmental Impacts and Mitigation Measures
(g) The method of monitoring the implementation of the impact management actions contemplated above.	Section 10 – Monitoring
(h) The frequency of monitoring the implementation of the impact management actions contemplated above.	Section 10 – Monitoring
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 7 – Roles and Responsibilities
(j) The time periods within which the impact management actions must be implemented.	Section 9 – Impact Management Outcomes and Actions
(k) The mechanism for monitoring compliance with the impact management actions.	Section 10 - Monitoring
(l) A program for reporting on compliance, considering the requirements as prescribed in the Regulations.	Section 10 - Monitoring
(m) An environmental awareness plan describing the manner in which – (i) The Applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Sections 7, 8 and 9.
(n) Any specific information that may be required by the competent authority.	None.

2. EMPr PHASING

2.1. Planning, Design and Pre-Construction Phase

The pre-construction phase refers to the design phase of the project. This will ensure that any requirements and best practise mechanisms are built into the planning or design phase to be developed in the construction and operational phase.

2.2. Construction Phase

The construction phase refers to the actual construction of the enlarged dam and associated infrastructure on the property.

2.3. Post Construction and Operational Phase

This stage begins when all construction activities are completed.

Various aspects of the proposed development will require rehabilitation, alien clearing, monitoring, routine maintenance and management to be carried out. A **Maintenance Management Plan** (MMP) for the future maintenance of structures or infrastructure within a watercourse as well as general rehabilitation of the watercourse, forms part of the Operational Management Plan (**Section 9.3**) of this EMPr.

Government Notice (GN) R. 327 listed activities (Listing Notice 1) Items 19, 19A and GN R. 324 (Listing Notice 3) Item 12 allows for the infilling and removal of material and clearing of vegetation activities identified in the broader EMPr to be maintained and repaired as required. The relevant listed activity is given below.

Listing Notice 1 (GN. 327)

Item 19: *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*

but excluding where such infilling, depositing, dredging, excavation, removal or moving –

- *(a) will occur behind a development setback;*
- *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;*
- *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;*
- *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or*
- *(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.*

The MMP included under **Annexure 6** of this report must be adhered to during the maintenance process.

The Applicant must ensure that the operational and maintenance phases maintain the underpinning principles ‘Duty-of-Care-to-the-Environment’ and ideals of sustainable development.

2.4. Closure and Decommissioning Phase

Decommissioning refers to the process of removing the operating assets of any development after completion of the operating life cycle.

Dam 2 will be decommissioned.

3. LEGISLATIVE REQUIREMENTS

The project Applicant/Holder of the EA is required to comply with all necessary legislation and policies applicable to development and management of the development. These include but are not limited to:

3.1. The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) states that everyone has a right to a non-threatening environment and those 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. The underpinning principles of NEMA's Duty of Care section reflects these principles of the Constitution.

3.2. The National Environmental Management Act, 1998 (Act No. 107 of 1998)

NEMA makes provision for the identification and assessment of activities that are potentially detrimental to the environment, and which require authorisation from the competent authority (in this case, DEA&DP) based on the findings of an EIA.
NEMA embraces the notion of sustainable development as contained in the Constitution of South Africa (Act 106 of 1996) in that everyone has the right:

- to an environment that is not harmful to their health or wellbeing; and
- to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.

NEMA aims to provide for cooperative environmental governance by establishing principles for decision-making on all matters relating to the environment and by means of Environmental Implementation Plans (EIP) and Environmental Management Plans/Programmes (EMPr).
Principles contained in Section 2 of the NEMA, amongst other things, prescribe that environmental management must:

- In order of priority aim to avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment and avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

It is incumbent upon the landowner, to ensure that the abovementioned principles, entrenched in this EMPr are upheld and complied with.

In terms of Section 24(5) and 44 of NEMA, the following Listed Activities requires authorisation:

Listing Notice 1:

19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving –

(a) will occur behind a development setback;
(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;
(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;
(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or
(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.

More than 10 cubes of material will be moved and excavated within the watercourse to expand the existing instream dam.

48: The **expansion** of-.

(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or
(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;

where such expansion occurs –

(a) within a watercourse;
(b) in front of a development setback; or
(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

excluding-

(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;
(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;
(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 23 in Listing Notice 3 of 2014, in which case that activity applies;
(dd) where such expansion occurs within an urban area; or
(ee) where such expansion occurs within existing roads, road reserves or railway line reserves

The existing dam and associated infrastructure will be expanded by more than 100 m². The dam footprint will be expanded by 2.2 ha. This will occur within a watercourse and within 32 m of a watercourse, since the dam is an instream dam.

Listing Notice 3:

23: The **expansion** of-

(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or

(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;

where such expansion occurs –

(a) within a watercourse;
(b) in front of a development setback adopted in the prescribed manner;
(c) or if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;
(d) excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.

The dam will be expanded by more than 10m², outside an urban area. There are patches identified as CBAs within the existing dam basin and dam embankment.

3.3. The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) deals with the handling, depositing, treatment, processing, recycling, re-use and/or storage of both “general" and “hazardous” waste products. This Act was assented by the President on 10 March 2009 and enacted on 3 July 2009. Subsequently all waste related activities are omitted from NEMA and must be authorized in terms of NEM:WA.

The proposed development will not produce waste. A Waste License is therefore not required in terms of NEM:WA for the proposed development.

3.4. The Environment Conservation,1989 (Act No. 73 of 1989)

The EIA Regulations contained in the Environment Conservation,1989 (Act No. 73 of 1989) (ECA) have been replaced by NEMA. However, property owners must comply with the draft regulations pertaining to noise as published in the province of Western Cape Provincial Extraordinary Gazette as provision made in Section 25 of the ECA), as well as Section 24 of the ECA regarding waste management and Section 20 of the ECA dealing with waste management under Part IV, Control of Environmental Pollution.

3.5. The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing, significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

The National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No. 32689, 6 November 2009) was gazetted in 2014. The list of threatened terrestrial ecosystems supersedes the

information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessment (NSBA) 2004 & 2011.

The entire farm is located outside of the urban edge in an area designated for agricultural use.

3.6. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) aims to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

As with NEM:BA, alien invasive plant / weed species listed in terms of CARA must be controlled and/or removed.

A permit is required when cultivating virgin soil. This application is facilitated by the Department of Agriculture LandCare office and will be issued by the DAFF. This must be applied for at least 3 months prior to cultivation.

No CARA application is required.

3.7. The National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) gives effect to the constitutional right of access to water. The Act's overall purpose is to ensure that South Africa's water resources are protected, used and managed in ways which take into account a number of factors, including inter-generational equity, equitable access, redressing the results of past racial and gender discrimination, promoting sustainable and beneficial use, facilitating social and economic development, and providing for water quality and environmental protection.

The NWA makes persons who own, control, occupy or use land responsible for taking measures to prevent pollution of water resources, and empowers Government authorities to take measures to enforce this obligation.

The WULA includes the following activities:

- **21(b) Storing of additional water**
- **21 (c) Impeding or diverting the flow of water in a watercourse – - enlargement of an instream dam**
- **21 (i) Altering the bed, banks, course or characteristics of a watercourse – enlargement of an instream dam**

3.8. National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The protection and management of South Africa‘s heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). Heritage Western Cape (HWC) is the enforcing authority in the Western Cape and is registered as a Stakeholder for this environmental process.

The application relates to the expansion of an existing dam on an operational farm within a farming area.

3.1. Dam Safety

The enlargement of the Modderas Dam falls within the category of a dam with a safety risk and will require approval in terms of Dam Safety Regulation. A dam safety application will be submitted to the Department of Water and Sanitation, should the proposed expansion be approved.

3.2. The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)

The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

In terms of this Act, a Health and Safety Officer and Protocol must be implemented on any sites. The appointment of a Health and Safety Officer (HSO) is the responsibility of the proponent and contractor and is included in this report to ensure due diligence on construction sites. It is the responsibility of the appointed to HSO to conduct any required audits and as such only the appointment of an HSO will be auditable in terms of this document.

4. DESCRIPTION AND LOCATION OF THE PROPOSED DEVELOPMENT

4.1. Locality

Modderasrivier Boerdery (Pty) Ltd wishes to enlarge the existing in-stream Modderas Dam (Dam D1) and decommission Dam D2. These dams are located on Portion 1 of the Roode Zands Kloof Farm No. 66 in the Tulbagh area. See **Figure 1**. The proposed enlarged dam will extend into Farm 329, Tulbagh, a farm property within Farm 1/66.

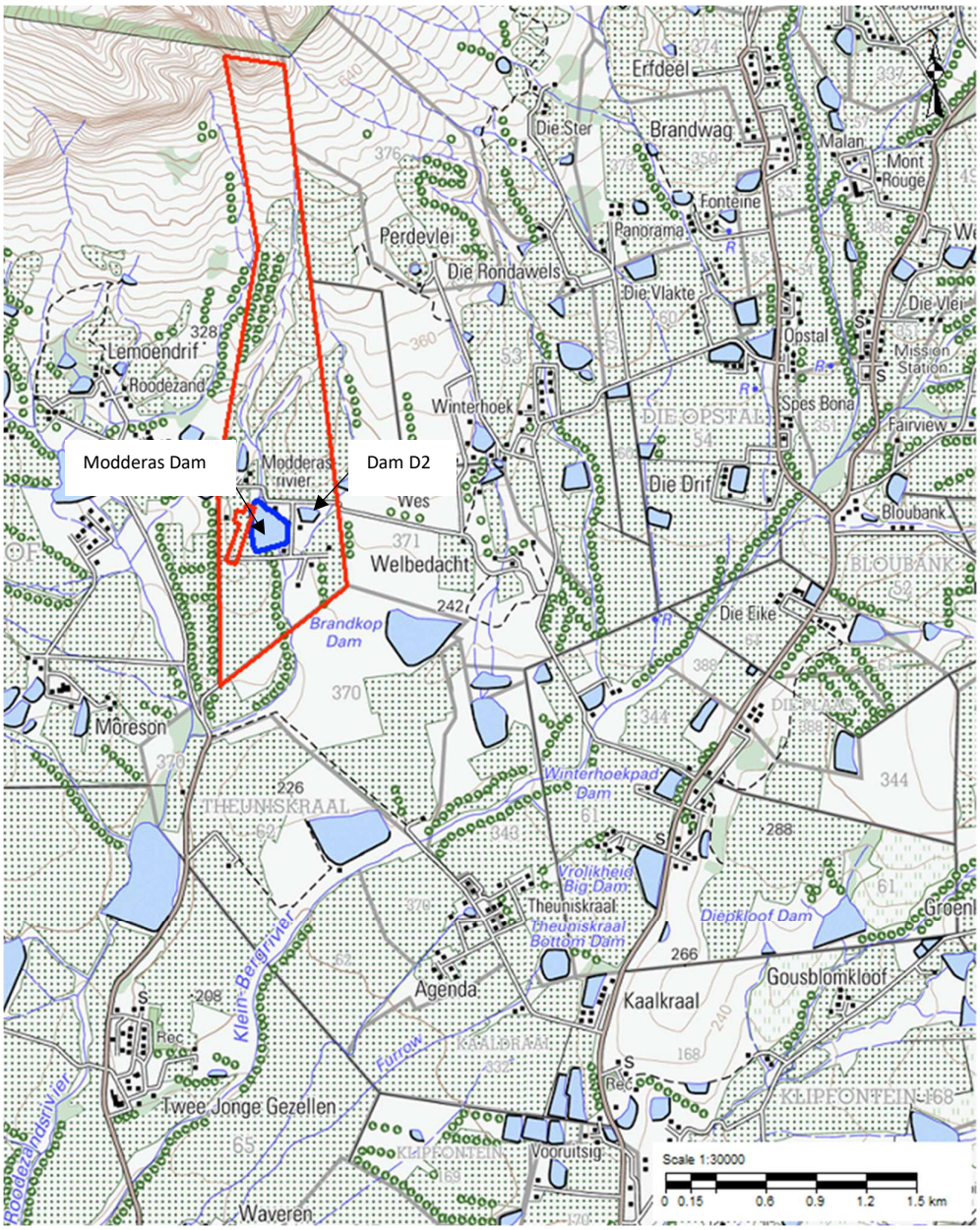

Figure 1: Location of the Modderas Dam and Dam D2

4.2. Proposed Development

The existing Modderas Dam is an in-stream dam on the Modderas River. The dam has a maximum capacity of 200 000 m³ and a wall height of 13.8 m. The intention is to increase the capacity of the Modderas Dam to 310 000 m³ and decommission Dam D2.

The details of the proposed project **(**Error! Reference source not found.) are as follows:

- The storage capacity of the Modderas Dam will be increased to 310 000 m³.
- The dam wall will be extended from 13.8 m by 1.3 m to a maximum of 15.1m in height.
- The Modderas Dam embankment crest will be constructed to have a crossfall of 2% to the upstream face.
- The upstream face of the embankment will be protected with durable rip-rap to prevent wave erosion.
- The spillway channel, as well as the embankment downstream face, will be topsoiled and planted with indigenous grass.
- The existing pump station will be used.
- The existing outlet pipe will be extended (within the dam footprint), and a new bypass spillway constructed.
- The existing storage dam D2, with a capacity of 31,000 m³, will be decommissioned.
- Access to the dam will be off existing roads and farm roads.
- Disturbed agricultural areas during construction will be reinstated with appropriate contouring, and soil/crop covering will be prepared and retained.

The dam's footprint will thus be developed by an additional 2.2 ha in extent, with a total dam footprint area of 7.5ha. The works will be undertaken within the footprint and full supply level of the proposed enlarged dam. A construction period of four months over the summer months is anticipated.

Water rights

The property lies on the wide valley floor of the Klein Berg River that flows into the middle reaches of the Berg River System. The Modderas River that drains the site comprises several small foothill streams. The DWS have confirmed the farm's existing lawful use (ELU) of 421,470 m³ per annum, consisting of 363,460 m³ per annum for surface water and 58,010 m³ per annum for groundwater (the WARMS registration certificate 22043520 dated 21 November 2023 shows the validation and verification of water uses on Portion 1 of the Roode Zands Kloof Farm 66, Tulbagh, as FINAL in terms of the confirmation of the water users in terms of Section 35(4) of the NWA, 1998). The farm's current total storage capacity is 231,000 m³.

Dam D2 failed a few years ago and can no longer store the 31,000 m³ it was designed to hold. It was decided to decommission Dam D2, thereby transferring the storage capacity of Dam D2 to the Modderas Dam.

It is further proposed to store an additional 79,476 m³ per annum from the stream in the upgraded dam, allowing the farm to access its full Existing Lawful Water allocation. This equates to storing an additional 132 460 m³ in the Modderas Dam. Additional water taken from the stream will be measured to ensure that the water allocation is not exceeded.

Based on the summary above, the applicant would need to apply for an additional storage of 79 000 m³. This has been done in a Water Use Licence application (WULA).

Foundation And Construction Materials:

The soils underlying the dam site generally comprise a thick layer of fine silty sand, which is underlain by a variable thickness of sandy lean clay, which grades to a weathered shale. The proposed dam enlargement will require a core trench on both flanks where the embankment is extended. The core trench is expected to be founded on weathered shale. According to the applicant, no seepage has been observed at the existing Modderas Dam, which indicates that the existing embankment's core trench was taken to a solid foundation.

The core trench should be excavated to a depth of ±6 m below ground level into an acceptable solid foundation. Soft, weak, coarse and organic materials must be removed during excavation to reduce foundation seepage. The core trench must be backfilled and compacted with the most impervious material available on site.

Sandy lean clay, which is typically a good choice of core material, is available in the dam basin. Elastic silt material is present, which can also be used as a core material when combined with other materials. All the materials required for the enlargement of Modderas Dam will be obtained for the basin. Additional rip-rap material will be sourced from the irrigation areas on the farm.

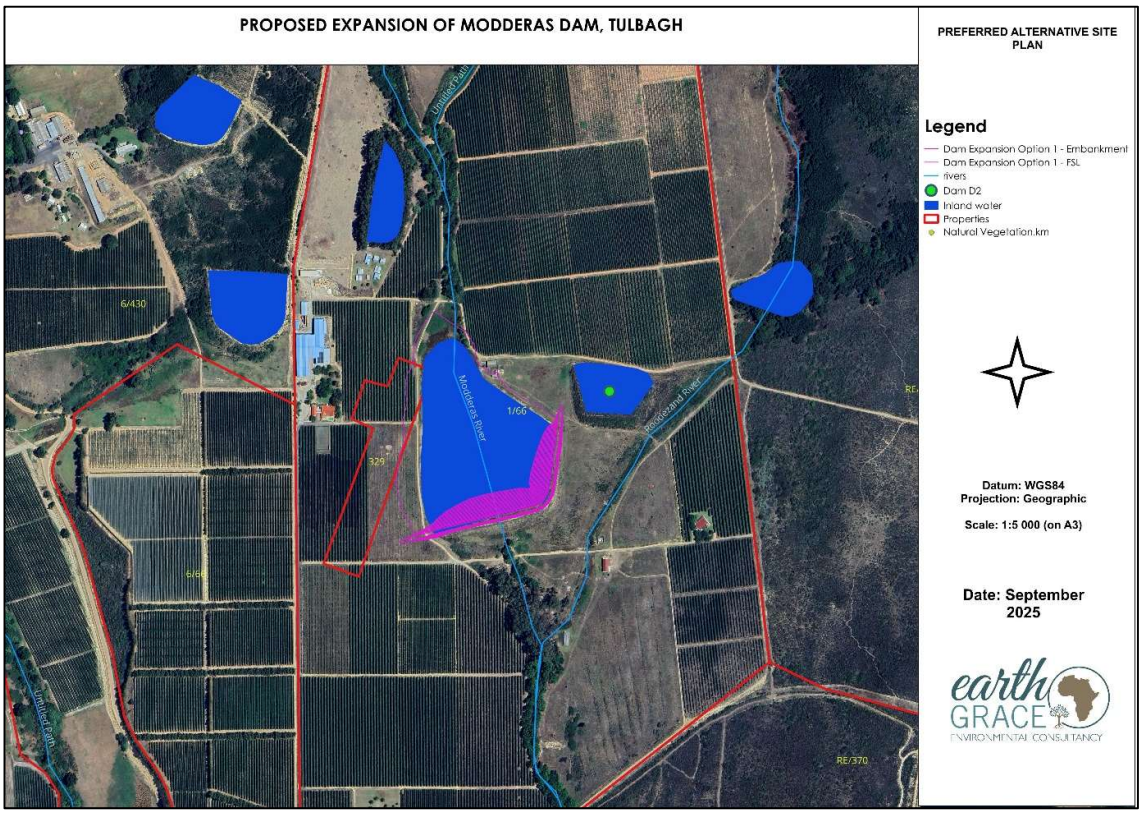

Figure 2: Proposed Dam Preferred Alternative

The table below shows the dam statistics of the preferred alternative.

Table 1: Dam Statistics

Aspects of Dam	Existing	Preferred Alternative
Water surface area at Full Supply Level	4.4 ha	5.5ha
Freeboard	1.3 m	1.5m
Maximum wall height	13.8 m	15.1m
Proposed wall crest width	6 m	4m
Downstream dam wall slope	1V:2H	1V:2H
Upstream dam wall slope	1V:2.1H	1V:3H
Wall length	303 m	387m
Average excavation depth	0.0 m	0.5m
Total capacity	200 000m³	310 000m³

Stormwater Management

The Modderas Dam embankment crest will be constructed to have a crossfall of 2% to the upstream face. To prevent wave erosion, the upstream face of the embankment must be protected with durable rip-rap.

The spillway channel as well as the embankment downstream face, must be topsoiled and planted with indigenous grass.

Disturbed agricultural areas during construction will be reinstated with appropriate contouring and soil/crop covering.

Maintenance Activities

Clearing of alien vegetation

Invasive alien species cause a decline in indigenous plant numbers, change the vegetation structure and reduce biotic and habitat diversity. The removal of invasive alien plants from aquatic habitats is desirable not only from an aquatic ecological perspective but also because they reduce the ability of that ecosystem to provide valued goods and services as alien vegetation reduces runoff and water availability; increases the instability and erosion potential of banks, modify water quality; reduce biodiversity; result in much hotter and more destructive fires which destroy indigenous seeds and are difficult to control; form barriers to the movement of biota and have economic consequences. The main invasive alien vegetation currently occurring within the disturbed areas on the farm include black wattle (Acacia mearnsii), blackwood (Acacia melanoxylon), sesbania (Sesbania punicea) and bramble (Rubus flagellaris).

Clearing of nuisance growth of indigenous aquatic vegetation

Common Phragmites australis reeds and Typha capensis bulrushes are indigenous plants with an ecological function. They offer a degree of refuge and habitat for biota as well as providing essential ecological services such as reducing erosion, causing deposition of silt, cooling instream habitats and reducing wind, thereby reducing evaporation. It is thus essential that where natural vegetation exists, it should be retained as far as possible and disturbed areas should be rehabilitated. Therefore, the objective of this activity is to control the reeds or bulrushes and not to eradicate them out of the river channel.

Phragmites reed and Typha bulrush growth, in general, need to be managed in rivers within developed areas where the natural control measures such as floods or grazing have largely been removed and there is an elevated supply of nutrients. The removal of these plants is thus periodically undertaken to maintain an open channel and ensure that high flows in the channel are unimpeded. The control of indigenous reeds, in particular, needs to be undertaken very judiciously, with careful control and consideration for the environment. **Control** should only aim to remove excessive nuisance plant growth and build-up of material that can cause flooding. These reeds are indigenous and must not be **eradicated** as they provide valued goods and services.

The primary impact of clearing reeds and bulrushes is the disturbance of riparian and aquatic habitats. The control or clearing of these plants is probably only required within the dams and water infrastructure. Any clearing of nuisance reeds within the watercourses is recommended to be cleared by hand, which would result in a very low impact. Secondary impacts would be the potential to facilitate erosion and the potential to facilitate the invasion of the area by alien plant species within the cleared areas. Furthermore, the reduction in surface roughness can result in erosion of the channel.

Repairs to infrastructure

The impact of repair work on the infrastructure within the watercourse will vary, largely depending on the level of repairs required and how the repairs are conducted. The sensitivity of the aquatic ecosystem is also an important consideration. This maintenance activity entails the smaller-scale repairing of infrastructure so that it can retain its original footprint and integrity, a like–for–like scenario. Any additions to infrastructure are, by definition, not within the scope of an MMP. Minor repairs will typically involve a localised disturbance of the river channel or banks while infrastructure is repaired. The disturbed areas following repairs can contribute towards high silt and sediment loads within the river as the material is not held by the roots of plants.

Sediment removal at infrastructure

During high flows, watercourses transport sediment particles and debris downstream. As the energy in the watercourse decreases (typically in pools or instream impoundments), the sediment and debris are deposited. If the watercourse channel becomes too full of sediment, it needs to be physically removed. Sediment and other materials often need to be removed to access infrastructure or to ensure that the infrastructure operates efficiently. The clearing of sediment at infrastructure can result in a localized disturbance within the riparian and aquatic habitats of the river. This disturbance can result in erosion and invasion by alien plants in the disturbed area.

Sediment removal from the channel for flood conveyance/channelisation

Larger scale deposition of sediment within watercourses can block or alter/impede flow in the watercourse, causing erosion and damage to the riverbanks and adjacent land or infrastructure. It may thus become necessary to remove sediment from the watercourse channel to prevent flood damage. Larger-scale sediment removal is likely to require advice from someone knowledgeable in river hydraulics to ensure that the work does not cause further damage to the integrity of the watercourse channel.

Repairs to riverbanks and associated bank stabilization infrastructure

The dynamic nature of a river results in erosion of the channel and banks and damage to infrastructure along the banks. The eroding or flood-damaged banks and adjacent areas may then need to be repaired to protect adjacent farmlands and infrastructure.

4.3. Property Details

The existing dam is situated on Portion 1 of No. 66, Tulbagh. The property is located within the Witzenberg Municipal Area in Ward 11. The landowner is the Modderasrivier Trust. The proposed enlarged dam will extend into Farm 329, Tulbagh.

Table 2: Relevant properties

Farm and Portion	Landowner	SG 21 Code	Extent (ha)	Municipality
Portion 1 of the Roode Zands Kloof Farm No. 66, Tulbagh	Modderasrivier Trust	C07500000000006600001	155.74	Witzenberg
Modderasrivier Farm No. 329, Tulbagh	Modderasrivier Trust	C07500000000032900000	2.14	Witzenberg

5. SITE DESCRIPTION AND ENVIRONMENTAL ATTRIBUTES

5.1. Climate and Hydrology

The area has a Mediterranean climate and receives about 639mm of rain per year, mostly during winter. The average rainfall and temperature values for the area can be seen in Figure 5. The lowest rainfall (10mm) is in February and the highest (111mm) is in June. The average midday temperatures range from about 10°C in July to 21°C in January and February. The annual average evaporation for the quaternary catchment area G10E, in which the property is located, is 1305mm.

Low flow in the watercourses in the area is between December and April, with flow mostly occurring from June to October. As can be expected, this resembles the rainfall pattern for the area. The smaller watercourses are likely to only flow for short periods after rainfall events.

A major fractured aquifer occurs within the area, with the water table typically occurring at depths of about 11 m below ground level and a yield of more than 5 litres a second. Due to the underlying geology, both the surface and groundwater quality tend to have relatively low levels of salinity with natural electrical conductivity concentrations of less than 70 mS/m. The recharge of the aquifer is estimated to be about 70mm/a and the aquifer is of high susceptibility and vulnerability to pollution from anthropogenic activities.

5.2. Geology and Soil

The geology on the farm consists of phyllite, shale, schist and greywacke of the Porterville Formation, Malmesbury Group, which is partly covered by talus gravel. Glenrosa and/or Mispah soil forms dominate.

5.3. Terrestrial Biodiversity

The existing dam, crops and general agricultural disturbances transform the site. The expansion will occur to the west (loss of crops) and slightly to the north and east. The land to the north is riparian in nature, and the land to the east is fallow farmland. Minimal to no loss of natural vegetation will occur.

The site is mapped as Breede Shale Fynbos, which is considered an Endangered Vegetation Type. The enlarged dam will extend into existing crops to the west, a small section of riparian habitat to the north and a small portion of disturbed farmland to the east. The area to the east has been disturbed by past farming activities, and the land remains fallow. Little to no natural vegetation will be lost.

5.4. Aquatic Ecosystems

Within the farm, much of the valley floor vegetation has been transformed by agriculture. At the site, the Modderas River comprises small foothill streams with a defined riparian zone of both indigenous and alien vegetation within the already modified valley floor.

The property's aquatic features include non-perennial tributaries of the Roodezand River, which flows into the Klein Berg River, a major tributary of the larger Berg River System. The Modderas River, which drains into the Modderas Dam, originates in the foothills of the Groot Winterhoek Mountains and flows in a southerly direction through the property. Some other streams join the stream before its confluence with the Roodezant River. A seep wetlands are mapped along most of the streams within the property.

Refer to the Biodiversity Maps included as **Annexure 2.**

5.5. Land Use Character of the Surrounding Area

The farm is located within an agricultural area outside of Tulbagh.

5.6. Environmental Sensitivity Map

A map superimposing the proposed activities, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, is included under **Annexure 2** of this EMPr.

6. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. Impacts of Preferred Alternatives

Below is a description of the anticipated impacts and risks resulting from the environmental aspects associated with the proposed activities.

AQUATIC ECOSYSTEMS:

Activities	Description	Aspects	Potential Environmental Impacts
Planning, Design and Development Phase			
Expansion of an existing dam	The proposed dam enlargement will potentially cause the following impacts: • Modify flow in the watercourse downstream of the dam • Disturbance and modification of aquatic habitat within the dam basin of the enlarged dam • Short-term water quality impacts during the construction works • Indirect impact on aquatic biota.	Aquatic Habitat	Modification of aquatic habitat at dam site; water quality impacts as well as potential for some flow modification
Construction activities	Construction vehicles may leak or spill fuel into dam, river or riparian zone.	Pollution of watercourse	**Contamination of the water resource caused by leaks or spillage of hydrocarbons from vehicles.**
Post Construction Phase			
Dam expansion and associated infrastructure	Potential ongoing disturbance and alien species invasion as well as possible flow disturbances.	Disturbance of freshwater systems	**Ongoing disturbance of aquatic habitat for operation/maintenance activities; flow impact, increased potential for alien vegetation growth and erosion**

SOCIAL:

Activities	Description	Aspects	Potential Environmental Impacts
Construction and Operational Phase			
Direct and indirect employment opportunities	A few construction related jobs will be created. With the improved farming operation, existing jobs will be secured and some operation phase jobs will be created; farming produce will increase.	Job security and creation. Economic growth for region and country.	**Improved farming operations will ensure job security to those already employed and job creation for members of the local community.**

DUST AND NOISE:

Activities	Description	Aspects	Potential Environmental Impacts
Planning, Design and Development Phase			
Earthworks and construction activities.	Construction vehicles and other construction machinery will generate dust and increase the noise levels during working hours. This is not a significant impact as the activities will occur on a working farm.	Increased dust and noise levels.	**Potential dust and noise impact.**

AESTHETICS AND VISUAL ASPECTS

Activities	Description	Aspects	Potential Environmental Impacts
Planning, Design and Development Phase			
Earthworks and construction activities.	Visual intrusion of construction site is expected during the short-term. This is not a significant impact as the activities will occur on a working farm.	Unappealing aesthetics of a construction site.	**Potential visual impact.**

6.2. Mitigation Measures

6.2.1 Construction Phase mitigation measures

- The area immediately to the east of Dam D2 which is to be decommissioned comprises a wider riparian and seep area associated with the smaller tributary of the Modderas River. With decommissioning of the dam, it is important the disturbance of these areas be avoided and that the dam basin simply be filled with soil that is free of alien vegetation seed.
- With regards to the implementation of the EWR in the lower Modderas Tributary, it is recommended that the smaller tributary that drains past Dam D2 be utilised to meet the environmental flow requirement as recommended. In the decommissioning of Dam D2, the dam should simply be left as is but no longer store water (i.e. divert water to it and abstract from it). Only the natural rainfall and runoff into the dam should be retained in the dam and allowed to seep out. There is quite a bit of natural vegetation in and around the dam that it would be best to not disturb.
- The construction works at the dam should take place during the driest months of the year to prevent any flow and water quality (sedimentation) impacts and should be carried out in conjunction with an approved EMP that addresses aspects such as prevention and containment of any contaminated runoff and chemical spills from the construction site; provision of ablution facilities at the construction site that are at least 30m from the watercourse, and mitigation of excessive sedimentation arising from the works.
- Disturbance of the natural vegetation cover upstream of the dam and immediately downstream of the dam within the watercourse should be avoided.
- Any disturbed areas that are located immediately outside of the dam basin should be rehabilitated by reshaping the area to resemble that of the surrounding natural landscape, and where necessary, these areas should be planted with suitable local indigenous vegetation.
- The disturbed areas at the dam should also be monitored for the growth of invasive alien vegetation, and any recruitment of alien plants should be removed.
- Local contractors should be used where possible.
- The Applicant / contractor must ensure that the generation of dust is minimised and should implement dust control measures to maintain a safe working environment, minimise nuisance for residents in the vicinity of the site and avoid damage to the surrounding cultivated areas.
- Construction activities should preferably not take place during extreme windy conditions.
- Construction vehicles shall comply with speed limits and haul distances should be minimised.
- Cleared areas to be exposed for the minimum time possible.
- Construction works should as far as possible be conducted during normal working hours (6:00 – 18:00) in order to reduce the ambient noise levels during the early morning and evenings when people are generally at home.
- 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.

6.2.2 Post Construction Phase/Operational Phase mitigation measures

- With regards to the implementation of the EWR in the lower Modderas Tributary, it is recommended that the smaller tributary that drains past Dam D2 be utilised to meet the environmental flow requirement.
- A programme should be put in place for the ongoing removal and control of invasive alien vegetation along the river corridors and in the wetland areas within the property, and in particular within the Modderas Tributary that is proposed to provide for the EWR downstream of Modderas Dam. Removal of invasive vegetation and revegetation of the aquatic habitats could be informed by an adopted Maintenance Management Plan (MMP) for the property.
- No stocking of the dam with alien fish should be allowed. Any stocking of the dam would need to get prior approval from CapeNature.
- Indigenous vegetation observed along the watercourse that is suitable for revegetation of cleared areas comprises Psoralea pinnata, Searsia angustifolia, Morella serrata, Olea europaea subsp. africana, Podocarpus elongatus, Melianthus major, Pteridium aquilinum, Salvia chamelaeagnea, Elegia capensis, Zantedeschia aethiopica, Carpha glomerata, Juncus capensis, Ficinia nodosa, Cyprus textilis and Isolepis prolifera.

7. ROLES AND RESPONSIBILITIES

The section below deals with the responsibilities of various parties during the construction and operational phases of development.

7.1. The Competent Authority

In the Western Cape, DEA&DP is the competent authority responsible for issuing Environmental Authorisations (EAs) in term of NEMA. This Directorate has overall responsibility for ensuring that the Applicant complies with the conditions of its EA as well as this EMPr once approved.

During the construction and operational phases of the EMPr the lead authority will have the following role to play:

- Conduct ad hoc compliance inspections.
- Read the ECO's performance reports and act as deemed necessary.
- Whenever necessary, the authorities are to aid in understanding and meeting the specified requirements.
- Ensure and timeously recommend suitable corrective measures are undertaken by the Applicant/ER where the Applicant has reported non-compliance or when an audit report is received indicating any non-compliance.
- Enforcing compliance by the Applicant.

7.2. Holder of the EA

The Holder of the EA/ the Applicant (i.e. Modderasrivier Boerdery) is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts, both in the construction and operational phases. The Holder of the EA is responsible for the development and

implementation of the conditions of the EA in terms of the planning and design of the development and construction thereof.

The Holder of the EA remains fully responsible for the implementation of this EMPr, and compliance with the EMPr and EA until such time as an application for amendment indicating a change in ownership or transfer of the EA to another party is submitted to DEA&DP. Only once this amendment application has been approved, is this responsibility then shifted to the new holder of the EA.

Amongst the general responsibilities above the Holder of the EA is also completely and solely responsible for:

- Ensuring that any changes to the project or aspects thereof, as approved during the EIA process by the issuance of an EA, are timeously communicated to DEA&DP as these may require amendments to the EA via an amendment application process.
- Appointing an ECO, and where required an environmental auditor
- It is the Holder of the EA's responsibility to notify DEA&DP within 24 hours of an occurrence of any non-compliance with the EA, EMPr or any other environmental and water related legislation.
- Take the necessary action in terms of non-compliances.
- Ensuring that all the Applicant's, staff, representatives, contractors, consultants and any other agent operating under the employ of the Applicant comply with the EA, EMPr and any other environmental and water related legislation.
- Ensuring that all the necessary authorisations and permits have been obtained.
- Considering the ECO's observations and recommendations and acting where required.

7.3. The Employer's Representative

The Employer's Representative (ER), in this case the Farm Manager, would act as the Holder of the EA's on-site implementing agent and has the responsibility to ensure that the Applicant's responsibilities are executed in compliance with relevant legislation and the EA.

Any on-site decisions/inputs regarding environmental management are ultimately the responsibility of the ER.

The on-site ER will have the following responsibilities in terms of the implementation of the Construction phase of this EMPr and assisting the Applicant to ensure compliance with the EA, EMPr and any other environmental and water related legislation:

- Ensuring, in conjunction with the Holder of the EA, that the authorisations and permits have been obtained and conditions have been met.
- Ensure where required by the EA that a notice of commencement is submitted to DEA&DP at least two weeks prior to commencement.
- Assist the Holder of the EA with the appointing of an ECO and, where specifically required by the EA an Environmental Auditor.
- The ER will ensure that the appointed ECO is paid timeously thereby ensuring an ongoing ECO service.

- Should the Holder of the EA or the ER change or cancel the ECO's services (either verbally, in writing or implied due to non-payment of fees) or should the ECO terminate their services the ER must notify DEA&DP of this in writing within 7 days.
- Act regarding any non-compliance that is reported on or noted.
- Ensuring that the Holder of the EA is aware of any environmental non-compliance on site.
- Considering the ECO's observations and recommendations.
- Ensuring that ECO is made aware of any changes in terms of the project.
- Reviewing and approving the Contractor's method statements.
- Ensuring that all Contractor's and Sub-contractors are implementing the EMPr and meeting the necessary requirements of the EA.
- Ensuring that all works are occurring within the permitted areas.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Ordering the removal of person(s) and/or equipment not complying with the EMPr specifications.
- Ensure that the ECO is provided with any documentation required from the project team or contractors.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMPr, with input from the ECO and providing proof in this regard.

7.4. The Contractor

The Contractor is bound by the requirements of this EMPr. In the case of this project, the Contractor can also be the Farm Manager.

The Contractor will be subject to the issuance of penalties by the ER as stipulated herein. Any damage to the environment temporary or otherwise because of non-compliance with this EMPr will be made good at the contractor's cost. In addition, the Contractor will have the following responsibilities:

- The Contractor will ensure that all senior and management staff involved with the project are aware and familiar with the requirements of this EMPr.
- The ECO will assist with the environmental induction training of site staff. It is the contractor's responsibility however to ensure that all staff and sub-contractors attended and undergo the necessary environmental site inductions. The Contractor will maintain a register of all staff and sub-contractors that have undergone an environmental site induction.
- The contractor will adhere to and comply with all the requirements and specifications of this EMPr. Any non-compliance will be reported to the ECO and ER immediately.
- The contractor is fully responsible for all sub-contractors and service providers and their compliance with this EMPr on site. The Contractor will ensure that all sub-contractors and services providers are made aware of the requirements of the EMPr and that they have a responsibility to comply with the EMPr.
- The Contractor is responsible for ensuring that all sub-contractors and service providers comply with this EMPr.
- The Contractor will read the ECO's Environmental Performance Report and act as required.

7.5. The Environmental Control Officer

The Environmental Control Officer (ECO) will be an environmental consultant appointed by the Holder of the EA. The role of the ECO is to assist with the monitoring and where possible to provide guidance in terms of environmental matters.

The ECO will regularly monitor and review the on-site environmental management and implementation of the construction phase of this EMPr.
The ECO is not responsible for ensuring or enforcing compliance with the EA, EMPr or any other environmental and water related legislation. This is the responsibility of the Holder of the EA and the authorities. The role of the ECO is that of a monitoring and supportive function and advising the Holder of the EA of non-compliance with respect to the conditions of the EA.

The ECO's duties consist of the following:

- Where required, help in terms of the **Notice of Commencement** to the competent authority, DEA&DP.
- Conducting regular site inspections at the frequency as stipulated in **Section 10.1** of this EMPr.
- Monitoring and verifying as far as possible adherence to the EMPr and the EA.
- Monitoring and verifying that environmental mitigation measures are in place where necessary to facilitate keeping environmental impacts to a minimum.
- Reporting to the Holder and the ER any relevant observations made during site inspections.
- The ECO will report all noted/observed non-compliances with the EMPr and EA to the ER.
- As far as possible advice the ER about any environmental matters that may become an issue.
- Reviewing the Contractor's construction method statements together with the ER.
- The ECO will make recommendations to the ER, with regards to the issuing of penalties in accordance with the EMPr.
- Facilitating the maintaining of open and direct lines of communication between the ER, Contractor and where necessary, the public, about environmental matters.
- Assisting with the appointing of the relevant specialists (botanists, wetland specialists, etc.), as required, to advise the Engineer, Holder or ER.
- Assist the Contractor with basic environmental awareness training of all construction staff, as to the requirements for working on the site.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all personnel and subcontractors coming onto site and assisting with this where necessary.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMPr to the ER for action.
- Reporting to the Holder on the implementation of the EMPr and compliance with the EA on a regular basis.
- Where necessary, recommending additions and/or changes to the EMPr to the directorate.
- The ECO will draft an Environmental Performance Report monthly (except during shutdown periods). This report will be submitted to the Contractor, ER and to the competent authority, DEA&DP. The ECO may submit this via email.

7.6. The Environmental Auditor

Where required by the EA an environmental auditor will be appointed by the Holder of the EA. The auditor will be an independent environmental consultant. The auditor will carry out a compliance audit based on the EA and EMPr of all the activities being undertaken.

The auditor will conduct, and report audit findings based on the audit requirements stipulated in the EA. Any audit costs are for the Holder of the EA's account and are in addition to regular ECO services.

8. MANAGEMENT PROCEDURES

8.1. EMPr Reporting

The documentation listed below must be kept on site or at the farm offices, in the form of an **Environmental File**, to record compliance with the EMPr. The Environmental File must include, but is not limited to:

- Copy of the EMPr;
- Copy of the EA;
- Copy of all other relevant licences/permits;
- Copy of all rehabilitation plans (if necessary);
- Environmental Method statements;
- Environmental register, which shall include:
    - Complaints register.
    - Incident register – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
    - Monitoring results
- Waste Documentation such as Waste- and Sewerage Disposal Certificates (if necessary);
- Material Safety Data Sheets for all hazardous substances (if necessary);
- Dust suppression register (if necessary);
- Water Quality Monitoring reports (if necessary); and
- Written Corrective Action Instructions.

8.2. Public Liaison and Communication

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

8.3. Work Hours

Construction will be limited to day-time hours, where possible (between 06h00 and 18h00). If construction is required outside of these times, written permission is to be obtained from the local municipality.

8.4. Temporary Site Closure

In the event of a temporary site closure occurring such as the builder's holidays, temporary suspension of works or any period of inactivity longer than 7 working days the Contractor is to notify the ECO. The Contractor shall check the site according to the requirements of the ECO and ensure that all items are addressed. The Contractor will provide a brief written report on compliance to the ER and ECO prior to the temporary shutdown date.

8.5. Health and Safety

The Contractor shall always observe the Occupational Health and Safety Act No. 85 of 1993 (OHSA) and ensure adequate safety precautions on the site.

Telephone numbers of emergency services, including the local firefighting service, shall be displayed conspicuously in the Contractor's office near a telephone. No weapons (firearms, airguns, daggers etc.) are permitted on site. The Contractor shall ensure that contact details of the local medical services are available to the relevant construction personnel prior to commencing work.

8.6. Method Statements

Method statements are written submissions by the Contractor/Farm Manager to the ER (with input from the ECO) in response to the requirements of this EMPr. A minimum requirement will consist of the listed MS's below. Further MS's may be requested by the ER or as per the recommendation of the ECO.

Annexure 4a provides an example for a method statement template. It is the Contractors/Farm Manager's responsibility to ensure that the required method statements are drafted and submitted. A method statement for the construction of the dam has been compiled by the Dam Design Engineers and is included as **Annexure 4b.**

The Contractor'/Farm Manager shall not commence an activity for which a method statement is required until the ER has approved the relevant method statement.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the ER (Farm Manager) from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost and to the satisfaction the ECO and ER.

The method statements shall cover relevant details regarding:

- Construction and clearing procedures and location of the construction and clearing sites.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.

- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Mitigation measure that will be employed.
- Compliance / non-compliance with the EMPr Specification and motivation if non-compliant.

8.6.1 Method statements required

Based on the specifications in this EMPr, the following method statements may be required as a minimum, and more method statements may be requested as required.

MS1: ***Site clearing and preparation***

The Farm Manager/Contractor shall submit a site clearing method statement for all areas intended for clearing within the development footprint. The method statement shall clearly indicate what is to be cleared and how this will be done, where and how cleared material would be stored or disposed of, etc. This method statement will also detail the setting aside of topsoil for rehabilitation or planting and demarcation of no-go areas.

MS2: ***Construction activities related to dam expansion and associated infrastructure***

The Farm Manager/Contractor must stipulate how they will minimise the footprint of construction activities and prevent damage to infrastructure, roads, crops and natural areas/watercourses. Development of any maintenance tracks must be included here.

MS3: ***Stormwater Management***

The Farm Manager/Contractor shall submit a method statement to the Holder of the EA detailing how stormwater is to be managed and controlled.

MS4*:* ***Dust control***

The Farm Manager/Contractor shall submit a method statement to the Holder of the EA detailing how potential dust and windblown sand will be monitored and addressed on site. The Farm Manager will consider the recommendations above while bearing in mind that these are not the only available solutions.

MS5: ***Soil erosion prevention and sedimentation control***

The Farm Manager/Contractor shall submit a method statement to the Holder of the EA detailing how soil erosion and sedimentation control will be implemented, methods to be used and rehabilitation of disturbed areas.

MS6: ***Pollution control and management***

The Farm Manager/Contractor must submit a method statement to the Holder of the EA describing methods to be implemented to prevent any pollution of adjacent areas (natural or agricultural lands) and if pollution were to occur, how it will be remedied.

MS7: ***Rehabilitation***

Should vegetation rehabilitation be required because of disturbance and on slopes of dam wall, this must be addressed in this Method Statement. Rehabilitation details relating to plant species (all indigenous and suitable to the vegetation type), plant numbers, irrigation and establishment, planting methods etc. must also be detailed.

9. IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section of the report serves to prescribe mitigation measures to reduce, limit, eliminate or compensate for impacts, to acceptable/insignificant levels. In setting mitigation measures, the practical implications of executing these measures must be borne in mind. With early planning, both the cost and the impacts can be minimised.

9.1. Pre-Construction Management Plan

It is recommended that sustainable design considerations are implemented during the planning phase to ensure that the impacts associated with the development are avoided, minimised or managed before construction commences.

The pre-construction or planning management plan is to be used as a guide during the planning, design and detailing of the development components. This part of the plan is to be referenced by all involved in decision making during the planning and design phases.

9.1.1 Environmental Induction and Awareness Training

The ER in consultation with the ECO shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction on the importance and implications of the EMPr. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the EMPr.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.)
- Awareness regarding minimising waste will be discussed.
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

Where staff turnover is high, it may be necessary to undertake additional induction training sessions. The ER must keep records of all environmental training sessions, including names, dates and the information presented.

Notwithstanding the specific provisions of this section it is incumbent upon the ER to convey the sentiments of the EMPr to all personnel involved with the works.

9.1.2 No-Go areas

Management Outcome:	Access to No-Go areas prevented.
Management Actions: • Identification of No-Go areas is to be informed by the environmental assessment, site walk through, and any additional areas identified during development; • Erect, demarcate and maintain a temporary fence around the perimeter of any No-Go area; • Fencing of No-Go areas is to be undertaken in accordance with **Section 9.1.3: Fencing**; and • Unauthorised access and development related activity inside No-Go areas is prohibited.	
Site Specific Actions: • The area immediately to the east of Dam D2 comprises a wider riparian and seep area associated with the smaller tributary of the Modderas River. With the decommissioning of the dam, it is essential that the disturbance of these areas be avoided and that the dam basin be filled with soil that is free of alien vegetation seed. See Figure 3. • Decommissioning should involve leaving the dam as is. • Disturbance of the natural vegetation cover upstream of the dam and immediately downstream of the dam, within the watercourse, should be avoided.	
Implementation:	
Responsible party:	ECO and Farm Manager and the Contractor (if necessary)
Method of implementation:	• No-Go area demarcation must be carried out and approved by the ECO. This must be always enforced during the construction phase by an ECO. • The Contractor/Farm Manager may declare additional No-Go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO.
Timeframe for implementation:	Prior to commencement and throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	ECO must confirm no-go area boundaries prior to commencement of the construction phase and whenever there are significant changes to the site layout plan.
Evidence of compliance:	ECO to obtain records from the Contractor/Farm Manager and report in Compliance Monitoring Report.

Figure 3: No-Go Area

9.1.3 No-Go Area Fencing

Management Outcome:	To minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing.
Management Actions: • The use of danger tape for demarcation purposes is discouraged and must be limited as far as possible. Brightly coloured droppers and coloured nylon cord/fencing wire with markers must be considered as an alternative to danger tape. • It will be the responsibility of the Farm Manager to decide on an appropriate system of protective fencing for the site, if required.	
Implementation:	
Responsible party:	The Farm Manager and the Contractor (where necessary)
Method of implementation:	The Farm Manager must ensure that all the management actions are implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Prior to commencement of the construction phase and whenever there are significant changes to the site layout plan.
Evidence of compliance:	ECO to obtain records from the Contractor/Farm Manager and report in Compliance Monitoring Report.

9.1.4 Site facilities

Management Outcome:	Clean and well-maintained toilet facilities, eating areas and potable water are available to all staff to minimise the risk of disease and impact to the environment and health impacts.

Management Actions:

Ablution facilities:

- Mobile chemical toilets are installed onsite if no other ablution facilities are available;
- The use of ablution facilities and or mobile toilets must be always used and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances;
- Where mobile chemical toilets are required, the following must be ensured:
  a) Toilets are located no closer than 100 m to any watercourse or water body;
  b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause;
  c) No spillage occurs when the toilets are cleaned or emptied, and the contents are managed in accordance with the EMPr;
  d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; Toilets are emptied before long weekends and workers holidays, and must be locked after working hours;
  e) Toilets are serviced regularly, and the ECO must inspect toilets to ensure compliance to health standards;
- Copies of the waste disposal certificates must be maintained in the Environmental File.

Eating areas:

- Adequate temporary shade must be provided within the construction areas.
- Suitable refuse bins must be provided at all eating areas to the satisfaction of the ER.
- If deemed necessary by the ER, the Contractor shall demarcate designated eating areas.
- No feeding of wild animals shall be permitted. Food and food products are to be stored in such a way so as not to attract scavenging animals.

Water provision:

- Safe drinking water fit for human consumption must be provided at the site offices and all other working areas.
- All drinking water must be from a legal source and comply with recognised standards for potable use.
- The provisions of the National Water Act, 1998 (Act No. 36 0f 1998) and its Regulations for taking water from natural water resources must be complied with.
- No water may be abstracted from streams, rivers, wetlands or boreholes unless the necessary water use authorisations are in place.
- If water is stored on site, drinking water and multi-purposed water storage facilities shall be clearly distinguished and demarcated.
- No water is to be wasted on site. Any leaks are to be reported and repaired immediately. All pipes, taps and associated infrastructure is to be maintained in good working order.

Implementation:	
Responsible party:	The Farm Manager and the Contractor (where necessary).
Method of implementation:	The Farm Manager must ensure that all the above actions are implemented.
Timeframe for implementation:	Prior to commencement of the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Prior to commencement of the construction phase and whenever there are significant changes to the site layout plan.
Evidence of compliance:	ECO to obtain records from the Contractor/Farm Manager and report in Compliance Monitoring Report.

9.1.5 Materials handling, use and storage

Management Outcome:	The Contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below.
Management Actions: All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Farm Manager and used or worn by the staff whose duty it is to manage and maintain the machinery and equipment. Contractor must comply with the Occupational Health and Safety Act,1993 (Act No. 85 of 1993) and Construction Regulations, 2003 as this governs what the contractor must do/provide for his staff. Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials will be stored in a secured, appointed area that is fenced and has restricted entry. Storage of hazardous products shall only take place using suitable containers approved by the ECO. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Fuel should be stored in a secure area in a steel tank supplied and maintained by the contractor according to safety procedures. Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area. The contractor must supply sufficient firefighting equipment in event of an accident and strictly no smoking will be allowed where fuel is stored and used.	
Implementation:	
Responsible party:	The Farm Manager and the Contractor (where necessary)
Method of implementation:	The Farm Manager/Contractor will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Farm Manager/Contractor to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.1.6 Site safety and security

Management Outcome:	All safety and security measures are in place.
Management Actions: **<u>Construction site:</u>** • The construction site should be secured against unauthorised entry. • All personnel must be adequately trained and informed in the tasks that they are expected to perform. This is required for their own safety as well as the safety of colleagues and other interested and/or affected parties. • No unauthorised personnel shall be allowed onto site. • The contractor must ensure that his equipment is protected. • Solid and construction waste should not accumulate on site as this could attract rodents and poses a safety hazard. • All excavated areas and/or holes should be clearly demarcated. • Maintain environmental incidents register in which all environmental incidents (e.g. accidental spillages etc.) are logged.	

Implementation:	
Responsible party:	Farm Manager
Method of implementation:	• The Contractor/Farm Manager shall always observe the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and ensure adequate safety precautions on the site. • The contractor/Farm Manager will be responsible for the supervision of construction personnel on site during the construction phase.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor must keep record of all construction personnel on site. • ECO to provide details of any safety or security incidents in Compliance Monitoring Report.

9.1.7 Public safety

Management Outcome:	All precautions are taken where possible to minimise the risk of injury, harm or complaints.
Management Actions: • Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. fuels etc.; • All unattended open excavations must be adequately fenced or demarcated; • Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed structures and protective scaffolding; • Ensure structures vulnerable to high winds are secured; • Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	
Implementation:	
Responsible party:	Farm Manager
Method of implementation:	• The Contractor/Farm Manager shall always observe the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and ensure adequate safety precautions on the site. • The Contractor/Farm Manager will be responsible for the supervision of construction personnel on site during the construction phase.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manager must keep record of all construction personnel on site. • ECO to provide details of any safety or security incidents in Compliance Monitoring Report.

9.2. Construction Management Plan

These Construction Phase requirements are aimed at using Best Practise Principles and / or specialist recommendations to manage the impacts on the environment during the construction of the development.

The Construction Management Plan forms part of the contract documentation.

9.2.1 Access roads and movement of construction vehicles

Management Outcome:	Minimise impact to the environment through the planned and restricted movement of vehicles on site.
Management Actions: • Traffic along public roads must be always accommodated. • Construction activities and deliveries may not interfere with the public road system. • All the required signage and hazard warnings are to be put in place. • All drivers must be in possession of an appropriate and valid driver's licence. • All relevant construction vehicles must be roadworthy and in an acceptable working condition. • All relevant permits for abnormal loads must be applied for and obtained from the relevant authority as required. • Access points to and from site as well as roadways in front of the site are to be kept clean and free from stone, sand and grit. These areas must be swept regularly. • All construction vehicles, when on site and on the surrounding property, will not exceed the speed of 25km per hour, to ensure safety of vehicles, personnel and the environment, and to lessen environmental degradation. Drivers who exceed the speed limit must be fined or dismissed by the Contractor or Farm Manager. • Access to the site must be gained at the designated areas as determined by the Farm Manager. As far as is possible use should be made of existing haul routes, tracks and roads. The creation of short-cut paths/routes or temporary vehicular tracks should be at the Farm Manager's discretion. • Vehicles may not be parked or driven within 32m of a watercourse, unless along an existing route/track.	
Implementation:	
Responsible party:	The Contractor (where necessary) and Farm Manager
Method of implementation:	• The Contractor/ Farm Manager must ensure that all the management actions are implemented. • The Contractor/ Farm Manager must ensure that the approved Traffic Accommodation Plan is implemented. • Should there be a need to undertake work that will impact on traffic the Contractor must ensure that all the required permissions have been obtained from the traffic authorities in writing. • The Contractor is responsible for ensuring that all vehicles are road worthy.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	ECO to obtain records from the Contractor/ Farm Manager and report in Compliance Monitoring Report.

9.2.2 Movement of construction personnel, labourers and equipment

Management Outcome:	Management and control of construction personnel, labourers and equipment.
Management Actions: • The Contractor/ Farm Manager must ensure that all construction personnel, labourers and equipment remain within the demarcated construction sites at all times. • Where construction personnel and/or equipment wish to move outside the boundaries of the site, the contractor/ labourers must obtain permission from the ECO. • The movement of all personnel on site must be monitored through a rollcall system. • No personnel, except for security personnel may are allowed to stay overnight on site.	
Implementation:	
Responsible party:	The Contractor/ Farm Manager
Method of implementation:	• The Contractor/ Farm Manager will ensure that all the above management actions are complied with and implemented. • The Contractor/ Farm Manager will ensure that drip trays are being always used, and that there are enough drip trays available on site.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/ Farm Manager and ECO
Frequency:	Throughout the construction phase.

Evidence of compliance:	• The Contractor/ Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.3 Workshop, construction vehicles and equipment maintenance and storage

Management Outcome:	Soil, surface water and groundwater contamination are minimized.
Management Actions: • All heavy earth-moving and transport vehicles and equipment must be kept in good working order with no leaking hydrocarbon fuel, fluids or lubricant emanating from these vehicles. Any leaks or similar mechanical problems are to be reported and repaired immediately. • All emergency maintenance and refuelling must take place at designated impervious areas and are prohibited from any watercourses. In addition, drip trays must be used for all refuelling and similar activities. This is to prevent any spillage contaminating the environment. • No servicing of vehicles may take place at the construction site to avoid accidental oil or lubricant spillages from occurring. An emergency spill kit must however still be kept at the site in case of accidental spillage. • Should emergency maintenance be required all precautions will be taken to prevent environmental impact. • Drip trays shall be used to collect used oil, lubricants, etc. during maintenance. Drip trays shall be provided for all stationary plant, generators, pumps and compressors. Drip trays shall be inspected and emptied daily and closely monitored during rain events to ensure that they do not overflow. All waste material in bunds and drip trays are to be managed as hazardous waste. All static plant (stationary > 6 months) shall be located within a bunded area with an impermeable surface. • Washing of vehicles and plant shall be restricted to urgent maintenance requirements only. Adequate wastewater collection facilities shall be provided. The use of detergents for washing shall be restricted to low phosphate and nitrate concentration as well as being a low sudsing type detergent.	
Implementation:	
Responsible party:	The Contractor/ Farm Manager
Method of implementation:	• The Contractor/ Farm Manager will ensure that all the above management actions are complied with and implemented. • The Contractor/ Farm Manager will ensure that drip trays are being always used, and that there are enough drip trays available on site.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/ Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.4 Storage, handling, use and disposal of materials

Management Outcome:	Safe storage, handling, use and disposal of substances.
Management Actions: The Contractor/ Farm Manager's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless of whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop) or not. Storage and/or handling of chemicals is prohibited within watercourses or within 32m from a watercourse. **Hazardous materials:** • The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; • All hazardous substances will be stored in suitable containers as defined in the Method Statement; • Containers will be clearly marked to indicate contents, quantities and safety requirements; • All storage areas will be bunded. The bunded area will be of sufficient capacity to contain a spill / leak from the stored containers; • An Alphabetical Hazardous Chemical Substance (HCS) control sheet will be drawn up and kept up to date on a continuous basis; • All hazardous chemicals that will be used on site will have Material Safety Data Sheets (MSDS); • All employees working with HCS will be trained in the safe use of the substance and according to the safety data sheet; • Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;	

- The Contractor/ Farm Manager must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;
- The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund;
- The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall);
- The floor of the bund must be sloped, draining to an oil separator;
- Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover;
- Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;
- All empty externally dirty drums must be stored on a drip tray or within a bunded area;
- No unauthorised access into the hazardous substance's storage areas shall be permitted;
- No smoking must be allowed within the vicinity of the hazardous storage areas;
- Adequate fire-fighting equipment must be made available at all hazardous storage areas;
- Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used;
- An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be always available;
- The responsible operator must have the required training to make use of the spill kit in emergency situations;
- In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). Refer to **Section 9.2.9.** for procedures concerning wastewater management and **Section 9.2.7.** for solid waste management.

Implementation:	
Responsible party:	The Contractor/ Farm Manager
Method of implementation:	The Contractor/ Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/ Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/ Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.5 Cement / Concrete Batching

Management Outcome:	To control concrete and cement batching activities to minimise spillages and contamination of soil, surface water and groundwater.

Management Actions:

- Concrete mixing must be carried out on an impermeable surface (such as on boards and/or within a bunded area with an impermeable surface) or make a hard surface and remove when done;
- Concrete mixing areas must be fitted with a containment facility for the collection of cement laden water. This facility must be impervious to prevent soil and groundwater contamination;
- Bagged cement must be stored in an appropriate facility and at least 32 m away from any watercourses, gullies and drains;
- A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;
- Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;
- Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;
- Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to **Section 9.2.16: Dust Control**)
- Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility;
- Temporary fencing must be erected around batching plants in accordance with **Section 9.1.4: Fencing**.

Implementation:	
Responsible party:	The Contractor
Method of implementation:	• The Contractor will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.

Monitoring:	
Responsible person:	The Contractor and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.6 Solid waste management

Management Outcome:	Wastes are appropriately stored, handled and safely disposed of at a licensed waste facility.

Management Actions:

- The ER is responsible for ensuring that the contractor implements and adheres to the waste management requirements and all relevant legislation.
- Awareness regarding minimising waste will be discussed during the ECO's inductions carried out at the beginning of the construction phase.
- The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour about the disposal of all refuse.
- The contractor must display NO LITTERING signage.
- Clearly marked waste bins must be provided to encourage recycling of waste during construction.
- Solid waste may be temporarily stored on site in a designated area approved by the ER prior to collection and disposal. A containment structure may be created for this purpose, consisting of four ready fence panels covered with shade cloth, one panel to be movable for access and emptying. The structure will have a roof (plastic covered ready fence panel or like protect from the rain). The floor is to be lined with DPC plastic to prevent ground or soil contamination from waste residue. If a waste skip is to be used for this purpose it must be kept covered with shade cloth.
- Solid waste must be removed as often as required (when the containment area is full) or as instructed by the ER or ECO to a licensed waste disposal site. Recyclable waste should be separated and recycled if possible and opportunities provided on site to facilitate the collection of recyclable waste products. Staff should be trained in waste segregation and storage. Arrangements should be made with the relevant recycling companies for the transportation or collection for various wastes.
- Bins shall be covered, tip-proof, weatherproof and scavenger proof.
- No burning, on-site burying or dumping of waste shall occur. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags shall not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system.
- The contractor is responsible for ensuring that any sub-contractors on site manage and dispose of their waste in line with this EMP. The contractor will instruct all sub-contractors to follow waste management procedures.

- <u>Domestic Waste</u>
  - The Contractor shall provide refuse bins with lids to the satisfaction of the ER, for all construction areas. Refuse shall be collected and removed from all areas at least twice per week or as requested by the ER or ECO. Domestic waste shall be transported to the approved refuse disposal site in covered containers or trucks.

- <u>Construction Rubble / Waste</u>
  - Inert construction rubble shall be disposed of at a site approved by the Farm Manager. The Farm Manager will be responsible for ensuring that rubble is disposed of by the contractor at the site approved, and that the rubble can be legally disposed of at said site. Rubble stockpiles will be kept consolidated and at a reasonable size. Rubble will be removed regularly and/or at the request of the ECO.
  - Clean building rubble free from plastic, wood, wire metal, tar, asphalt or similar may be crushed and reused for specific purposes (e.g. road sub-base, concrete etc.) within the parameters set in the National Environmental Management: Waste Act 59 of 2008, (as amended) (NEM:WA). Rubble may not be buried on site for the sake of easy disposal.
  - All other solid waste or contaminated materials shall be disposed of offsite at an approved landfill site. The Contractor shall supply the Farm Manager with certificates of disposal or similar proof to indicate legal disposal. Copies of these will be provided to the ECO.
  - Any crushing and reuse of clean building rubble must fall within the thresholds allowed in terms of the NEM:WA. All local by laws must be adhered to. Should the volumes and area required exceed these parameters a Waste Licence will be required in terms of the Act.

Implementation:	
Responsible party:	The Contractor/ Farm Manager

Method of implementation:	• The Contractor/ Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/ Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/ Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.7 Hazardous materials

Management Outcome:	Hazardous wastes are appropriately stored, handled and safely disposed of at a licensed waste facility.
Management Actions: • All hazardous waste (including bitumen, old oil etc.) shall be disposed of at a DEA&DP approved hazardous landfill site (such as Vissershok), or hazardous waste facility, which is licensed to receive such waste. Alternatively, the contractor may appoint a reputable (the contractor must take steps to ensure that the waste contractor is legitimate and reputable) waste management service provider to remove and dispose of hazardous waste. • The Contractor must provide disposal certificates to the Farm Manager copies will be provided to the ECO. The Farm Manager will ensure that this process is followed by the contractor. • Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant or reputable recycler where practicable as an alternative to disposal. • Used oil, lubricants, cleaning materials, etc. from vehicles, machinery or bund areas shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company as an alternative to disposal. • Once a purpose manufactured hydrocarbon spill remediation product has been used or has been used to treat contaminated materials (soil, rubble etc.) the resulting waste must be disposed of at a facility licensed to receive such waste. • Storage and/or handling of chemicals is prohibited within watercourses or within 32m from the watercourse.	
Implementation:	
Responsible party:	The Contractor/Farm Manager
Method of implementation:	The Contractor/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.8 Stormwater runoff and wastewater runoff

Management Outcome:	Undertake responsible water usage and prevention of erosion through stormwater management practises.
Management Actions: • Wastewater from activities such as washing tools, batching and similar, will be collected in a drum or container. • An impermeable sump lined with thick DPC plastic may be constructed by the Contractor to collect wastewater from batching and tool washing. The sump will be open to allow the water to evaporate. Care must be taken to ensure that input does not exceed the evaporation rate and that no overflow from the sump occurs. This is of particular importance during the wet season. Once the sump is dry the remaining material at the bottom of the sump will be disposed of with the general waste and rubble. • Small volume wastewater collected from washing and other small volume cement work activities will be disposed of on top of the general rubble pile where it will be absorbed. This will be done in such a way as to ensure that there is no run-off from the rubble pile to surrounding areas. The wastewater shall not be of such volume that it will saturate the entire body of rubble or will soak through the rubble pile. • Runoff from fuel depots / bunds / workshops / machinery washing areas and water contaminated with petro-chemicals and hydrocarbons shall be addressed as indicated in the hazardous waste section of this document.	

• Water from kitchens, showers, sinks and toilets etc. shall be discharged into a conservancy tank for removal from the site or be plumbed into a sewer line if this is available. • At no point will waste water from tool washing, batching, grouting, cleaning, showers, kitchens or similar sources be permitted to enter or be disposed of, *inter alia*, in the following manner: • Into a storm water system. • Directly onto bare soil. • Within 50m of a wetland. • Into a water course or on the bank of a water course. • Stormwater management must be addressed both in terms of flooding and pollution potential; no stormwater runoff from any premises containing waste, or water containing waste emanating from activities and premises may be discharged into a water resource – polluted stormwater must be contained.	
Implementation:	
Responsible party:	The Farm Manager
Method of implementation:	• The Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	• Throughout the construction phase.
Monitoring:	
Responsible person:	The Farm Manager and ECO
Frequency:	Throughout the construction phase
Evidence of compliance:	• The Contractor/Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.9 Stockpiling and stockpile areas

Management Outcome:	To reduce erosion and sedimentation because of stockpiling.
Management Actions: • The areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Farm Manager for his approval together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage; • All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site to minimise impacts to watercourses, wetlands and water bodies; • Topsoil should be stockpiled separately from all other materials, for later re-use. • All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; • No stockpiling of materials that could leach out and cause pollution may occur; • Stockpiles must not exceed 2 m in height; • During the construction phase, but particularly during periods of strong winds and heavy rain, the stockpiles should be covered with appropriate material (e.g. cloth, tarpaulin etc.) in order to prevent erosion generation resulting in smothering of crops and sedimentation of watercourses; • Where possible, sandbags (or similar) should be placed at the bases of the stockpiled material to prevent erosion of the material. • Stockpiles shall be positioned and sloped to create the least visual impact; • No foreign material generated/deposited during construction shall remain on site on completion. Areas affected by stockpiling shall be reinstated to the satisfaction of the Farm Manager; • As dealt with under the dust control section of this document stockpiles may need to be covered as a dust control measure; • No stock piling will take place within 32m of any watercourse or from the boundary of any wetland buffer.	
Implementation:	
Responsible party:	The Contractor/Farm Manager
Method of implementation:	The Contractor/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manager and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.10 Vegetation

Management Outcome:	Vegetation clearing, if necessary.
Management Actions: • Rocks and vegetation debris should not be dumped onto natural vegetation or within watercourses. • All protected elements/areas located on the site, will be clearly marked, and care should be taken by the ECO to ensure that they are not unnecessarily disturbed during construction works on site. • Damage to the indigenous vegetation anywhere on the site (outside of the approved area) will be subject to penalties. All alien vegetation must be removed according to standard legislated alien clearing methods.	
Implementation:	
Responsible party:	The Farm Manager
Method of implementation:	• The Farm Manager must ensure that all the management actions above are implemented. • The Farm Manager shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation to be retained on the construction site or beyond the site boundaries because of their activities.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	ECO to provide details in Compliance Monitoring Report.

9.2.11 Protection of fauna

Management Outcome:	Minimise disturbance to fauna.
Management Actions: • The Farm Manager shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place. • The feeding of any wild animals is prohibited. No food or food products will be stored in such a way to attract scavengers. • No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; • The use of pesticides is prohibited unless approved by the Farm Manager • Drainage structures (e.g. gutters, drains, sumps, ditches) must be designed, as far as possible, so that they do not act as pitfall traps for small creatures. They should either have gently sloping edges or be adequately covered to prevent creatures from falling into them. • Any animals encountered during site preparation and construction activities should be left unharmed and allowed to safely move to natural areas.	
Project Specific Management Actions: • No stocking of the dam with alien fish should be allowed. Any stocking of the dam would need to get prior approval from CapeNature.	
Implementation:	
Responsible party:	The Farm Manager
Method of implementation:	The Farm Manager must ensure that all the management actions above are implemented.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	ECO to provide details in Compliance Monitoring Report.

9.2.12 Protection of watercourses

Management Outcome:	Prevent pollution and contamination of the watercourse environment, prevent erosion, impeding flow and protect aquatic habitat.
Management Actions: • All watercourses and water bodies must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor/Farm Manager's activities; • In the event of a spill, prompt action must be taken to clear the polluted or affected areas; • Appropriate rehabilitation and re-vegetation measures for the watercourse must be implemented timeously.	
Project Specific Management Actions: • The area immediately to the east of Dam D2, which is to be decommissioned, comprises a wider riparian and seep area associated with the smaller tributary of the Modderas River. With the decommissioning of the dam, it is essential that the disturbance of these areas be avoided and that the dam basin be filled with soil that is free of alien vegetation seed. • The construction works at the dam should take place during the driest months of the year to prevent any flow and water quality (sedimentation) impacts and should be carried out in conjunction with an approved EMP that addresses aspects such as prevention and containment of any contaminated runoff and chemical spills from the construction site; provision of ablution facilities at the construction site that are at least 30m from the watercourse, and mitigation of excessive sedimentation arising from the works. • Removal of invasive vegetation and revegetation of the aquatic habitats could be informed by an adopted Maintenance Management Plan (MMP) (**Annexure 6**) for the property. • The construction works at the dam should take place during the driest months of the year to prevent any flow and water quality (sedimentation) impacts and should be carried out in conjunction with an approved EMP that addresses aspects such as prevention and containment of any contaminated runoff and chemical spills from the construction site; provision of ablution facilities at the construction site that are at least 30m from the watercourse, and mitigation of excessive sedimentation arising from the works. • Disturbance of the natural vegetation cover upstream of the dam and immediately downstream of the dam within the watercourse should be avoided. • No stocking of the dam with alien fish should be allowed. Any stocking of the dam would need to get prior approval from CapeNature. • Indigenous vegetation observed along the watercourse that is suitable for revegetation of cleared areas comprises *Psoralea pinnata, Searsia angustifolia, Morella serrata, Olea europaea subsp. africana, Podocarpus elongatus, Melianthus major, Pteridium aquilinum, Salvia chamelaeagnea, Elegia capensis, Zantedeschia aethiopica, Carpha glomerata, Juncus capensis, Ficinia nodosa, Cyprus textilis and Isolepis prolifera.*	
Implementation:	
Responsible party:	The Contractor/Farm Manager
Method of implementation:	• The Contractor/Farm Manager must ensure that all the management actions above are implemented.
Timeframe for implementation:	• Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	ECO to provide details in Compliance Monitoring Report.

9.2.13 Protection of Heritage resources

Management Outcome:	Protection of heritage resources, archaeological remains and unmarked graves.
Management Actions: • If any archaeological remains (including but not limited to fossil bones and fossil shells, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, marine shell heaps, stone artifacts and bone remains, structures and other built features, rock art and rock engravings) are discovered on the property, they must immediately be reported to Heritage Western Cape and must not be disturbed further until the necessary approval has been obtained from HWC. • If any unmarked graves or buried archaeological heritage resources are uncovered or exposed during bulk earthworks, these must immediately be reported to Heritage Western Cape (Att: Stephanie Barnardt 021 483 9685). Burials must not be disturbed further until the necessary approval has been obtained. An archaeologist must be contracted to remove the remains at the expense of the developer. • In the event important fossil material is found during excavations, the HWC Fossil Finds Procedure must be implemented..	
Implementation:	

Responsible party:	The Contractor/Farm Manager
Method of implementation:	• The Contractor/Farm Manager must ensure that all the management actions above are implemented.
Timeframe for implementation:	• Throughout the construction phase.
Monitoring:	
Responsible person:	ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	ECO to provide details in Compliance Monitoring Report.

9.2.14 Emergency procedures

Management Outcome:	Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.

Management Actions:

- Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project.
- The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation.
- All staff must be made aware of emergency procedures as part of environmental awareness training.
- The relevant local authority must be made aware of a fire as soon as it starts.
  - In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see **Section 9.2.7: Hazardous materials**).

- Spills and Leaks
  - The Contractor/Farm Manger shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the ECO. The Contractor/Farm Manger shall ensure that the necessary spill response / hydrocarbon remediation materials (e.g. chemcap, spill-sorb, drizzat pads, enretech, OilCap and peat moss) and equipment for dealing with spills and leaks are always available on site. The source of the spillage shall be isolated. The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, sawdust or absorbent materials. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the ER.
  - The Contractor/Farm Manger shall submit his emergency procedure (to be detailed in MS9) prior to bringing on site any such substances.
  - All spills or accidents involving such materials are to be recorded by the Contractor/Farm Manger. The Contractor/Farm Manger is responsible for ensuring that these records are submitted to the ECO. The clean-up of spills and any damage caused by the spill shall be for the Contractor's account.

Implementation:	
Responsible party:	The Contractor/Farm Manger
Method of implementation:	• The Contractor/Farm Manger will ensure that all the above management actions are complied with and implemented. • The Contractor/Farm Manger shall take all reasonable steps to avoid increasing the risk of spills and leaks activities on site.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manger and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manger to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.15 Fire Prevention

Management Outcome:	Prevention of uncontrolled fires.

Management Actions:

- The Contractor/Farm Manger shall ensure that basic fire-fighting equipment is available at all construction areas and facilities. The workforce should be appropriately trained in the use of all equipment.
- Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include any workshop and fuel storage areas and areas where the vegetation or other material may promote the rapid spread of an initial flame. A fire extinguisher of the appropriate type must be present when welding or other "hot" activities are undertaken.
- In terms of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), burning is not permitted as a disposal method.

• Any work that requires the use of fire or open flame may only take place at a designated area approved by the Farm Manager and must be always supervised. Serviced fire-fighting equipment shall be available.	
Implementation:	
Responsible party:	The Contractor/Farm Manger
Method of implementation:	• The Contractor/Farm Manger will ensure that all the above management actions are complied with and implemented. • The Contractor/Farm Manger shall take all reasonable steps to avoid increasing the risk of fire through activities on site.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manger and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manger to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.16 Dust Control

Management Outcome:	Dust prevention measures are applied to minimise the generation of dust.
Management Actions:	
• The creating of nuisance/precipitant dust is controlled by the National Dust Control Regulations (R.827, 1 November 2013) promulgated under the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA). The contractor will ensure that the specifications of these regulations are always met. • Take all reasonable measures to minimise the generation of dust because of project development activities to the satisfaction of the ECO; • Removal of vegetation must be avoided until such time as soil stripping is required, and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; • Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; • During high wind conditions, the ECO will evaluate the situation and make recommendations as to whether dust damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; • Where possible, soil stockpiles must be in sheltered areas where they are not exposed to the erosive effects of the wind; • Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; • Appropriate dust suppression measures must be used when dust generation is unavoidable, e.g. dampening with water; particularly during prolonged periods of dry weather in summer. Such measures must also include the use of temporary stabilising measures (e.g. chemical soil binders, straw, brush packs, chipping); • Straw stabilisation must be applied at a rate of one bale/10m² and harrowed into the top 100 mm of top material, for all completed earthworks; • For significant areas of excavation or exposed ground, spray water or wet areas using trucks to minimise the spread of dust. • Alternatively, exposed soils can be protected, for the duration of the construction phase, with a suitable geotextile in order to prevent erosion generation resulting in smothering of crops and sedimentation of watercourses. • Vehicle speeds must not exceed 40km/h along dust roads or 20km/h when traversing unconsolidated and non-vegetated areas;	
Implementation:	
Responsible party:	The Contractor/Farm Manger
Method of implementation:	• The Contractor/Farm Manger will ensure that all the above management actions are complied with and implemented. • The Contractor/Farm Manger shall ensure that the generation of dust is minimised and shall implement a dust control programme.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manger and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manger to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.17 Noise Control

Management Outcome:	To prevent unnecessary noise to the environment by ensuring that noise from construction activity is mitigated.
Management Actions: • Operating hours as determined by the EA are adhered to during the development phase. Where not defined, development must be limited to daylight hours. • The Contractor/Farm Manger shall be responsible for compliance with the Western Cape Noise Control Regulations, 2013 and all other relevant legislation with respect to noise. • The Contractor/Farm Manger shall endeavour to keep noise generating activities to a minimum. • The Contractor/Farm Manger shall endeavour to, as far as possible, warn any local communities and residents that could be disturbed by noise generating activities, such as blasting or piling, well in advance and shall keep such activities to a minimum. • Construction processes and machinery/vehicles with the lowest noise emission values available must be utilised. A well planned and co-ordinated "fast track" procedure must be implemented to complete the total construction process in the shortest possible time. • All plant, equipment and vehicles are to have effective silencers/mufflers fitted that would otherwise cause a noise level exceeding 85dB. Exhaust systems are to be in good repair with no holes in the piping. • No sound amplification equipment (hooters, loud music speakers, sirens etc.) is to be used on site except in emergencies. • Excessively noisy plant or plant requiring repairs are to be removed from site.	
Implementation:	
Responsible party:	The Contractor/Farm Manger
Method of implementation:	• The Contractor/Farm Manger will ensure that all the above management actions are complied with and implemented. • The Contractor/Farm Manger shall be responsible for compliance with the Western Cape Noise Control Regulations, 2013 and all other relevant legislation with respect to noise.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manger and ECO
Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manger to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.18 Visual aspects or aesthetics

Management Outcome:	Neat and well-maintained site to minimise visual impacts.
Management Actions: • Any natural feature (e.g. rocks, etc.) situated on or around the site for survey or any other purposes shall not be defaced, painted, damaged or marked unless agreed beforehand with the ER. Any features affected by the Contractor/Farm Manger or his subcontractors in contravention of this clause shall be restored and rehabilitated to the satisfaction of the ER. • All construction areas must be always kept neat and tidy. Different materials and equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Site camp lighting must be minimal and cause the least visual impact at night. All light sources must be shielded so that only the area that needs to be lit is lit. No neon or backlit signage is to be allowed. No floodlights are permitted. Security lighting must be placed such that it is not a nuisance to residents and visitors to the area. Shields may be required to prevent lights from being visible from other parts of the protected area.	
Implementation:	
Responsible party:	The Contractor/Farm Manger
Method of implementation:	• The Contractor/Farm Manger will ensure that all the above management actions are complied with and implemented. • The Contractor/Farm Manger will ensure that the site is neat and well-maintained.
Timeframe for implementation:	Throughout the construction phase.
Monitoring:	
Responsible person:	The Contractor/Farm Manger and ECO

Frequency:	Throughout the construction phase.
Evidence of compliance:	• The Contractor/Farm Manger to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.2.19 Site clean-up, landscaping and rehabilitation

Management Outcome:	No environmental degradation may occur because of the development.
Management Actions: • The Contractor/Farm Manager shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction activities are decommissioned and removed upon completion of the activity. The Contractor/Farm Manager shall clear and clean the construction site to the satisfaction of the General Manager upon completion of the construction. • The Farm Manager will undertake all rehabilitation of disturbed areas, slopes (dam embankment) and bare areas, to the satisfaction of ECO. Expenses incurred in rehabilitating the site shall be for the Applicants account. • The Applicant will be responsible for any costs resulting from rehabilitation required due to non-compliance with this EMP. • It may be necessary to obtain specialist (Freshwater or Rehabilitation Specialist) input prior to undertaking the required rehabilitation.	
Project Specific Management Actions: • Any disturbed areas that are located immediately outside of the dam basin should be rehabilitated by reshaping the area to resemble that of the surrounding natural landscape, and where necessary, these areas should be planted with suitable local indigenous vegetation. • Indigenous vegetation observed along the watercourse that is suitable for revegetation of cleared areas comprises *Psoralea pinnata, Searsia angustifolia, Morella serrata, Olea europaea subsp. africana, Podocarpus elongatus, Melianthus major, Pteridium aquilinum, Salvia chamelaeagnea, Elegia capensis, Zantedeschia aethiopica, Carpha glomerata, Juncus capensis, Ficinia nodosa, Cyprus textilis and Isolepis prolifera.*	
Implementation:	
Responsible party:	The Contractor/Farm Manager
Method of implementation:	The Contractor/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Throughout the construction phase and before the onset of the rainfall season
Monitoring:	
Responsible person:	The Contractor/Farm Manager and ECO
Frequency:	Throughout the construction phase and on an ongoing basis thereafter.
Evidence of compliance:	• The Contractor/Farm Manager to ensure compliance. • The ECO to provide details in Compliance Monitoring Report.

9.3. Post Construction and Operational Management Plan

The Post Construction and Operational Phase of this EMPr refers to the day-to-day management activities that are required to ensure sustainability and the achievement of the principles and objectives of the development. The requirements are applicable to the proponent, all employees and all visitors to the property. An Operational and Maintenance Manual will be drafted by the Dam Engineers once the dam construction has been completed which must include an emergency preparedness plan.

Additionally, this section also intends to add to the Maintenance Management Plan (MMP) as contemplated in the NEMA EIA Regulations, 2014 (as amended). Government Notice (GN) R. 327 listed activities (Listing Notice 1) Item 19.

The MMP included under **Annexure 6** of this report must be adhered to during any maintenance activities.

9.3.1 Clearing Alien Vegetation

Management Outcome:	To control and reduce invasive alien vegetation on site
Management Actions: • The purpose of this activity is to remove invasive alien vegetation from the riparian zone areas of the river and its tributaries. The alien vegetation control measures should be carried out according to the guidelines as laid out on the Working for Water website (https://www.dwaf.gov.za/wfw/Control/) and in terms of the Conservation of Agricultural Resources Act, (Act 43 of 1983), Regulation 15E. • Follow-up alien vegetation control measures will need to be ongoing and for several years at least, depending on the site conditions, and rate and success of regeneration or revegetation. Progressively less follow-up weeding should be required once indigenous plants are regenerating well and at a rate faster than the invasive plants can become re-established. The cultivation of plant material to be planted within an area that requires replanting should only be done with species that are selected and that are suitable for the area and the type of habitat in which it would have the most optimal chance of survival. • Alien clearing must be executed with caution and in a manner that will cause least possible damage to the environment.	
Project Specific Actions: • A programme should be put in place for the ongoing removal and control of invasive alien vegetation along the river corridors and in the wetland areas within the property, and in particular within the Modderas Tributary that is proposed to provide for the EWR downstream of Modderas Dam. • Removal of invasive vegetation and revegetation of the aquatic habitats could be informed by an adopted MMP (**Annexure 6**) for the property.	
Implementation:	
Responsible party:	Farm Manager/Applicant
Method of implementation:	The Applicant/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Ongoing
Monitoring:	
Responsible person:	The Applicant/Farm Manager
Frequency:	Follow up clearing should take place at least annually.
Evidence of compliance:	The Applicant/Farm Manager to ensure compliance.

9.3.2 Rehabilitation

Management Outcome:	Management and Control of Soil Erosion through rehabilitation
Management Actions: • Areas disturbed during the construction phase and during maintenance activities , may be exposed to rainfall, wind and overland runoff which can result in erosion damage.	
Project Specific Management Actions: • Disturbance of the natural vegetation cover upstream of the dam and immediately downstream of the dam within the watercourse should be avoided. Any disturbed areas that are located immediately outside of the dam basin should be rehabilitated by reshaping the area to resemble that of the surrounding natural landscape and where necessary, these areas should be planted with suitable local indigenous vegetation. • Indigenous vegetation observed along the watercourse that is suitable for revegetation of cleared areas comprises *Psoralea pinnata, Searsia angustifolia, Morella serrata, Olea europaea subsp. africana, Podocarpus elongatus, Melianthus major, Pteridium aquilinum, Salvia chamelaeagnea, Elegia capensis, Zantedeschia aethiopica, Carpha glomerata, Juncus capensis, Ficinia nodosa, Cyprus textilis* and *Isolepis prolifera*.	
Implementation:	
Responsible party:	Farm Manager/Applicant
Method of implementation:	The Applicant/Farm Manager will ensure that all the above management actions are complied with and implemented. The ECO must ensure rehabilitation activities are implemented correctly and successfully.
Timeframe for implementation:	Rehabilitation activities to commence immediately after construction is complete. Rehabilitation measures to be complete within 2 months from commencement.

Monitoring:	
Responsible person:	The Applicant/Farm Manager External Auditor must ensure rehabilitation measures are successful.
Frequency:	Ongoing
Evidence of compliance:	The Applicant/Farm Manager to ensure compliance. External Auditor to compile and submit Auditor Report to the competent authority and registered I&APs.

9.3.3 Monitoring

Management Outcome:	Effective outcomes
Management Actions: • To manage and monitor the water use on the property. • Furthermore, flow meters must be installed according to the water use license, to measure abstraction volumes and potential water loss. • Ensure there are no leakages in the water supply infrastructure and that all equipment is in good working condition.	
Project Specific Management Actions: • The disturbed areas at the dam should also be monitored for the growth of invasive alien vegetation, and any recruitment of alien plants should be removed. • With regards to the implementation of the EWR in the lower Modderas Tributary, it is recommended that the smaller tributary that drains past Dam D2 be utilised to meet the environmental flow requirement as recommended. In the decommissioning of Dam D2, the dam should simply be left as is but no longer store water (i.e divert water to it and abstract from it). Only the natural rainfall and runoff into the dam should be retained in the dam and allowed to seep out. There is quite a bit of natural vegetation in and around the dam that it would be best to not disturb.	
Implementation:	
Responsible party:	Farm Manager/Applicant
Method of implementation:	The Applicant/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Monitoring to commence on completion of activities.
Monitoring:	
Responsible person:	The Applicant/Farm Manager
Frequency:	Ongoing
Evidence of compliance:	The Applicant/Farm Manager to ensure compliance.

9.4. Decommissioning Management Plan

If decommissioning does occur, all relevant legislation and policies must be complied with for the given period.

Management Outcome:	Decommissioning of Dam D2
Management Actions: • Only identified structures must be removed within a demarcated area to prevent unnecessary damage to the surrounding area; • Materials that can be recycled must be correctly sorted and stacked for removal to appropriate waste stream sites; • The footprint area of the facility must be rehabilitated. • Method Statements for the decommissioning work and rehabilitation must be included in the Decommissioning Management Plan.	
Project Specific Management Actions: • The area immediately to the east of Dam D2 which is to be decommissioned comprises a wider riparian and seep area associated with the smaller tributary of the Modderas River. With decommissioning of the dam, it is important the disturbance of these areas be avoided and that the dam basin simply be filled with soil that is free of alien vegetation seed. • In the decommissioning of Dam D2, the dam should simply be left as is but no longer store water (i.e divert water to it and abstract from it). Only the natural rainfall and runoff into the dam should be retained in the dam and allowed to seep out. There is quite a bit of natural vegetation in and around the dam that it would be best to not disturb.	

Implementation:	
Responsible party:	Farm Manager/Applicant
Method of implementation:	The Applicant/Farm Manager will ensure that all the above management actions are complied with and implemented.
Timeframe for implementation:	Monitoring to commence on completion of activities.
Monitoring:	
Responsible person:	The Applicant/Farm Manager
Frequency:	Ongoing
Evidence of compliance:	The Applicant/Farm Manager to ensure compliance.

10. MONITORING

Monitoring is an important tool in determining the effectiveness of management actions by measuring changes in the environment. The correct and successful implementation of impact mitigation measures to reduce adverse impacts on environmental conditions needs to be ensured by a proper monitoring programme. Monitoring of the general implementation of/adherence to the EMPr, shall be the responsibility of the ECO during Construction Phase. Reporting on adherence/compliance to stipulations as communicated to contractors, shall take place during scheduled site meetings.

10.1. EMPr Compliance Monitoring and Frequency

The Applicant and Contractor(s)/Farm Manager are responsible for monitoring all construction activities on a day-to-day basis to ensure compliance with the EMPr, EA and applicable WUL, throughout the construction phase of the development.

The appointed ECO will undertake EMPr compliance monitoring to ensure that the EMPr is implemented throughout the development phase of the proposed development. The findings and outcomes of these audits will be recorded in the Compliance Monitoring Report that will be submitted to the competent authority at intervals as indicated in the EA.

Depending on the speed and nature of the works being undertaken, the ECO will undertake at least one (1) site visit per month (excluding during shut down periods) to monitor compliance with the EMPr.

10.2. Monitoring methods

These could be in the form of fixed-point photography where an area is photographed on a regular / seasonal basis to ascertain changes, monitoring of a particular aspect such as water quality parameters, recordings of animal movement from fixed point etc. The most important aspect of any monitoring programme is consistency and continuity. This will ensure a level of scientific accuracy to determine baselines / thresholds and measure changes / deviations, which then drive management reactions.

Photographs must be taken during construction at each ECO site visit.

Furthermore, flow meters must be installed according to the water use license, to measure abstraction volumes and potential water loss.

10.3. Environmental Audits

The Holder of the EA (e.g. the Applicant) must, for the period during which the EA and EMPr, remain valid ensure that the compliance with the conditions of the EA and the EMPr is audited; and submit an Environmental Audit Report to the relevant competent authority.

Submission of the final Environmental Audit Report to the competent authority will indicate the end of the development phase.

10.4. Audit Reports Frequency and Format

The following table provides a summary of the timeframes for the various Audit Reports specified in the EA.

Table 3: Summary of Audit Report timeframes.

ENVIRONMENTAL AUDIT TIMEFRAMES	
Type	**Timeframe**
Construction Audit	Within 6 months from commencement of construction related activities.
Final Construction Audit	Within 6 months from completion of construction activities.

In terms of the NEMA EIA Regulations, 2014 (as amended) Audit Reports must be submitted to the registered Interested & Affected Parties within 7 days of submission to the competent authority.

The Environmental Audit Report must contain all information set out in Appendix 7 of the NEMA EIA Regulations, 2014 (as amended). Any other requirements of the EA or any other authorisations must be incorporated into an Audit where necessary.

10.5. Complaints register

The Contractor/Farm Manager shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

- Record the name and contact details of the complainant.
- Record the time and date of the complaint.
- Contain a detailed description of the complaint.
- Where relevant and appropriate, contain photographic evidence of the complaint or damage.
- Contain a copy of the Contractor's written response to each complaint received and keep a record of any further correspondence with the complainant. The Contractor's written response will include a description of any corrective action to be taken and must be signed by the Contractor and affected party. Where a damage claim is issued by the complainant, the Contractor shall respond as described below.

The Contractor/Farm Manager shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe.
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file.

3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties.
4. Ensure that contact with affected parties is always courteous.

11. COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

The EMPr forms part of the Contract Documentation and is thus a legally binding document. It is also necessary for the Contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of NEMA, an individual responsible for environmental damage must pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the Polluter Pays Principle, Section 28 of the NEMA embodies the polluter pays principle.

The Holder of the EA is responsible for, and required to, directly notify DEA&DP within 24 hours of any non-compliance that has occurred on the site.

11.1. Procedures

The Contractor/Farm Manager shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty.
In the event of non-compliance, the following recommended process shall be followed:

- The General Manager/ER shall issue a notice of non-compliance to the Contractor/Farm Manager, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor/Farm Manager shall act to correct the transgression within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor/Farm Manager shall provide the General Manager/ER with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- In the case of the Holder of the EA failing to remedy the situation within the predetermined time frame, the ECO shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the ECO shall be entitled to request such remedial works as may be required to make good such damage.
- In the event of a dispute, difference of opinion, etc. between any parties regarding or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to the specialists and / or the competent authority for determination.
- The ECO shall always have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

11.2. Offences and Penalties

Any avoidable non-compliance with the conditions of the EMPr shall be considered sufficient ground for the imposition of a penalty. Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas.
- Catching and killing of wild animals.
- Unauthorised damage to natural vegetation.
- Unauthorised camp establishment, including stockpiling, storage, etc.
- Hydrocarbons or hazardous material: negligent spills or leaks and insufficient storage.
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance.
- Late method statements or failure to submit method statements.
- Insufficient solid waste management, including clean-up of litter, unauthorised dumping etc.
- Erosion due to negligence or non-performance.
- Excessive cement or concrete spillage or contamination.
- Insufficient fire control and unauthorised fires.
- Non-induction of staff.

11.3. Indicative List of Penalties

Penalties will be issued for the transgressions listed in the table below. Penalties may be issued per incident at the discretion of the ER/ECO and to a maximum as indicated below. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental requirement.

The ER will inform the Farm Manager/ Contractor of the contravention and the amount of the fine and will deduct the amount from monies due under the Contract. Such fines will be paid by the Contractor/Farm Manager to the Applicant. The monies will be deducted under the contract value. The Applicant is responsible for the implementation of the EMPr and for compliance monitoring of the EMPr. The EMPr will be made binding on all contractors (including sub-contractors) operating on the site and will be included with the Contract. Non-Compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

Spot penalties for the activities detailed below, will be imposed by the ER on the Contractor and/or his Sub-contractors.

Possible transgressions	Recommended Penalty
Unauthorised entrance into no-go areas.	R7 000 – R15 000
Unauthorised persons walking outside the demarcated boundaries of the site	500 – R1 500
Activities unauthorised by the ER outside the demarcated boundaries of the site.	R5 000 – R10 000
Unauthorised damage (disturbance) to natural vegetation or damage to natural vegetation due to negligence or non-compliance with the requirements of the EMPr (Please note rehabilitation may also be required)	R7 000 – R18 000
Failure to suitably demarcate and maintain demarcations of “No-Go” areas or to do so timeously	R1 500 – R5 000
Failure to suitably demarcate and maintain demarcations of the site boundaries as agreed with by the ER areas or to do so timeously	R1 000 – R3 000
Persons collecting firewood outside the demarcated boundaries of the site	R500 – R1 500

Any vehicle being driven, and items of plant or materials being parked or stored outside the demarcated boundaries of the site	R5 000 – R10 000
Catching, trapping, intentional killing, disturbing, feeding of wild animals, reptiles or birds.	R1 000 – R3 000
Erosion due to negligence or non-performance or failure to control erosion. (Please note rehabilitation may also be required)	R1 500 – R5 000
Late method statements or failure to submit method statements.	R1 500 – R3 000
Failure to adhere to approved method statements	R2 500 – R7 000
Unauthorised camp establishment, including stockpiling, storage, etc.	R2 500 – R5 000
Insufficient fire control and unauthorised fires.	R2 500 - R20 000
Site environmental file not properly maintained: no copy of EA or EMPr, approved method statements not on file, ECO reports not on file etc.	R1 500 – R3 000
Failure to maintain a complaint register on site or failure to address/respond to complaints	R1 000 – R1 500
Failure to follow temporary shutdown procedures	R6 000 – R8 000
Any vehicle driving in excess of designated speed limits	R500 - R1 000
Improper storage/stockpiling of materials on site, or storage/stockpiling in unsuitable areas.	R250 - R1 000
Hydrocarbons or hazardous materials: negligent spills or leaks and insufficient storage, no hydrocarbon remediation product on site.	R1 000 - R5 000
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling such as the use of a funnel rather than a pump, no drip tray etc.	R2 000 - R10 000
Litter on site	R500 – R4 000
Insufficient solid waste management, unauthorised dumping, poor waste containment etc.	R2000 – R8 000
Failure to supply proof (invoices, waybills) of correct waste disposal on request	R2 000 – R7 000
Excessive cement or concrete spillage or contamination.	R2000 – R5 000
Cement / concrete mixing being done on bare soil and failure to manage water runoff from batching areas	R1 500 – R5 000
Wastage of water: leaking pipes and taps, proper taps or valves not fitted to pipes, taps or hoses left running, irrigating outside of permitted hours etc.	R500 – R2 000
Poor or improper wastewater management, washing of tools directly onto the ground.	R500 – R3 000
Failure to mitigate activities resulting in pollution or sedimentation of water resources (Please note rehabilitation may also be required)	R8 000 – R35 000
The eating of meals on site outside the defined eating area.	R200 - R1 000
Excess or unnecessary noise on or emanating from site	R500 - R1500
Failure to implement sufficient dust control measures.	R4 000 – R6 000
Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance	R1 000 - R9 000
Ablution facilities: non-use, insufficient facilities, insufficient maintenance	R500 - R1 000
Unauthorised activities outside of permitted working times	R2 000 - R10 000
Failure to notify ER / ECO of activities or impacts that may affect the environment	R2 000 - R4 000
Any other contravention of an EMPr specification or any condition of an environmental nature or instruction from ER.	Variable Up to R50 000
Commencing construction activities without an ECO on site.	Variable up to R10 000 per month

For each subsequent similar offence, the fine may be doubled in value to a maximum value of R100 000.

The ECO may also stop works.

11.3.1 Other penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he/she shall be liable to pay a penalty fine over and above any other contractual consequence. In terms of the Conventional Penalties Act, 1962 (Act No. 15 of 1962), a creditor is not entitled to recover both the penalty and damages. Accordingly, where a Contractor causes damage, the Employer can either enforce a penalty or make the Contractor make good the damage, but not both.

The Contractor is deemed NOT to have complied with this Specification if:

a. within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of the Specification;
b. environmental damage ensues due to negligence;
c. the Contractor fails to comply with corrective or other instructions issued by the ER within a specific time; and
d. the Contractor fails to respond adequately to complaints from the public.

Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties are suggested for transgressions:

a. Erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%.
b. Oil spills	A penalty equivalent in value to the cost of clean-up operation plus 20%.
c. Damage to indigenous vegetation	A penalty equivalent in value to the cost of restoration plus 20%.
d. Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus 20%.
e. Damage to cultural sites	A penalty to a maximum of R 100 000.00 shall be paid for any damage to any cultural/ historical sites.
f. Damage to trees	A penalty to a maximum of R100 000.00 shall paid for each tree removed without prior permission, or a maximum of R5 000.00 for damage to any tree, which is to be retained on site.
g. Penalties for removing or damaging trees:	
Girth of trunk (1m above ground level)	**Replacement value per tree**
0 – 15 mm	R300.00
16 – 30 mm	R600.00
31 – 50 mm	R1 000.00
51 – 75 mm	R2 000.00
76 – 100 mm	R4 000.00
101 – 150 mm	R10 000.00
150 – 300 mm	R15 000.00
Larger than 300 mm	R20 000.00 to R100 000.00