# FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## The Proposed Establishment of a 67 000 m³ Dam and the Cultivation of 45.8 ha of Existing Cultivated Land to Macadamia Nut Trees, Located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm, within the KwaDukuza Local and iLembe District Municipality, Umhlali, KwaZulu-Natal

**REF: DC29/0006/2022**

**PREPARED FOR: LINNEAR SUGAR FARMING (PTY) LTD**
**DATE: 28 SEPTEMBER 2022**


*Residential*
*Commercial*
*Industrial*
*Agriculture*
*Linear*
*Service*

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| | Refer to **Appendix A** for CV. |


***INTERNAL REVIEW***

| | NAME | DATE | SIGNATURE |
|---|---|---|---|
| **REPORT COMPILED BY** | Rebecca Bowd and Kerryn Arbuthnot | 26 September 2022 |  |
| **REPORT REVIEWED BY** | Rebecca Bowd | 26 September 2022 |  |

# EXECUTIVE SUMMARY

The Applicant, Linnear Sugar Farming (Pty) Ltd, is proposing the establishment of a 67 000 m³ dam and the cultivation of 45.8 ha of existing cultivated land to macadamia nut trees, located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm, within the KwaDukuza Local and iLembe District Municipality, Umhlali, KwaZulu-Natal. During the Scoping Phase, a dam of 67 900 m³ was proposed, however, based on feedback from the Engineer and the survey that was undertaken, the proposed dam site will allow for a storage capacity of 67 000 m³.

The proposed project comprises the following components:

- Establishment of a 67 000 m³ dam;
- Cultivation of approximately 45.8 ha of existing cultivated land; and
- Installation of associated pipelines and pump station for irrigation purposes.

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. It falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna Water Management Area (WMA). The currently preferred dam design is proposed to comprise a storage capacity of 67 000 m³, a surface area of 1.5 ha, a wall height of 10 m and a wall length of 98 m.

The Applicant is also proposing the cultivation of approximately 45.8 ha of land to macadamia nut trees. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation).

Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes. The pipelines will have a total length of approximately 3.28 km. It is important to note that the proposed pipeline installation will not intersect any watercourses or land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation). As such, the pipelines will cross the existing cultivated lands, and will utilise the dam wall for connection to the pump station. The pump station will be 4 m x 4 m in extent, and will allow water to be pumped to the existing cultivated lands for irrigation of the macadamia nut trees. The proposed dam will thus serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle.

Although 28 Hydrogeomorphic (HGM) Units were identified within a 500 m of the proposed study sites, seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed. HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM Unit 2 will be impacted by the proposed dam establishment as well as the

cultivation activities. As such, the proposed cultivation sites were realigned to fall outside of the identified HGM Units. A 15 m freshwater ecosystem habitat buffer is also proposed to be implemented to maintain the ecological integrity and functioning of the HGM Units. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio according to the Wetland Offset Calculator as per the South African National Biodiversity Institute (SANBI, 2014) wetland offset guidelines (i.e. 0.6 ha is required). Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. In terms of the 'mitigation hierarchy', the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project. While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour.

Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3), which falls under the Indian Ocean Coastal Belt biome. Although no flora of conservation concern was identified within the proposed study sites, the riparian habitat in the valley bottoms was identified to be in a 'good ecological condition'. This riparian habitat will be protected through the implementation of the 5 m riparian habitat buffer which falls within the proposed 15 m freshwater ecosystem habitat buffer. The identification of 0.48 ha of riparian habitat within the proposed dam site and its associated loss, is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. In order to reduce the probability of flood damage, appropriate mitigation measures have been provided. Based on the hydrology, there is sufficient water within the catchment to sustain the proposed dam and associated irrigation demand, as well as the Ecological Water Requirements (EWR). It is important to note that the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam.

Hopewell Farm is a commercial agricultural operation comprising sugar cane and macadamia nut trees. The proposed project will diversify and ensure the long-term sustainability of the farm through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the Water Use License Application (WULA) for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry land.

The main issues which have been raised during the Scoping Phase Public Participation Process are:

- The riparian vegetation must be improved, and these areas appropriately protected;
- All conditions stipulated by Eskom must be adhered to;
- Specialist Studies must be based on the Screening Tool requirements;
- The lengths, diameters and alignment of the pipelines must be confirmed;
- The dimensions of the pump house must be confirmed;
- Details of the Dam Design and Engineering Report must be unpacked;
- Alternatives to the proposed project must be appropriately assessed;
- Climate change questions must be appropriately answered;
- The need and desirability of the proposed project must be adequately addressed;
- The potential need for rehabilitation measures and offsets must be confirmed;
- Definition of 'watercourse habitat' must be confirmed, and what the 1:3 ratio is referring to;
- All impacts and mitigation measures specific to the proposed project must be included;
- The Hydrologist must make recommendations on summer and winter outflow rates to ensure sustained water flow downstream to the uMhlali River;
- Clarification on whether boreholes will be required must be confirmed;
- Potential impacts of the proposed dam on downstream water users must be addressed;
- A Fire Management Plan and a Monitoring and Evaluation Plan must be incorporated into the Environmental Management Programme (EMPr);
- The EMPr must include the establishment and improvement of ecological corridors and possible conservation servitudes;
- Ambiguous and non-quantifiable terms must be removed from the EMPr; and
- A WULA is required to be undertaken for the proposed project.

The Scoping Phase has not identified any 'fatal flaws' with the proposed project, however; as part of the EIA Phase, a number of Specialist Studies have been compiled, and include:

- Wetland Assessment;
- Biodiversity Assessment;
- Hydrology and Flood Line Assessment;
- Preliminary Yield and Groundwater Alternatives Report;
- Phase 1 Heritage Impact Assessment and Desktop Paleontological Impact Assessment;
- Geotechnical Report; and
- Dam Design and Engineering Report.

The Environmental Consultant concludes that no fatal-flaws have been identified during the proposed project, and provided that the Environmental Management Programme (EMPr) and recommendations made in this Report are strictly adhered to, there should be no significant, detrimental impacts on the environment.

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# GLOSSARY

| | |
|---|---|
| **BID:** | **BACKGROUND INFORMATION DOCUMENT** |
| **CBA:** | **CRITICAL BIODIVERSITY AREA** |
| **C-PLAN:** | **CONSERVATION PLAN** |
| **DARD:** | **DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT** |
| **DEA&DP:** | **DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING** |
| **DEA:** | **DEPARTMENT OF ENVIRONMENTAL AFFAIRS** |
| **DEDTEA:** | **DEPARTMENT OF ECONOMIC DEVELOPMENT, TOURISM AND ENVIRONMENTAL AFFAIRS** |
| **DFFE:** | **DEPARTMENT OF FORESTRY, FISHERIES AND ENVIRONMENT** |
| **DWS:** | **DEPARTMENT OF WATER AND SANITATION** |
| **EAP:** | **ENVIRONMENTAL ASSESSMENT PRACTITIONER** |
| **EIA:** | **ENVIRONMENTAL IMPACT ASSESSMENT** |
| **EMF:** | **ENVIRONMENTAL MANAGEMENT FRAMEWORK** |
| **EMPr:** | **ENVIRONMENTAL MANAGEMENT PROGRAMME** |
| **EWR:** | **ECOLOGICAL WATER REQUIREMENT** |
| **FEPA:** | **FRESHWATER ECOSYSTEM PRIORITY AREA** |
| **GNR:** | **GOVERNMENT NOTICE NO.R** |
| **HGM:** | **HYDROGEOMORPHIC UNIT** |
| **I&APs:** | **INTERESTED AND AFFECTED PARTIES** |
| **IDP:** | **INTEGRATED DEVELOPMENT PLAN** |
| **MAE:** | **MEAN ANNUAL EVAPORATION** |
| **MAP:** | **MEAN ANNUAL PRECIPITATION** |
| **MAR:** | **MEAN ANNUAL RUNOFF** |
| **NEM:BA:** | **NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT** |
| **NEMA:** | **NATIONAL ENVIRONMENTAL MANAGEMENT ACT** |
| **NFEPA:** | **NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA** |
| **NHRA:** | **NATIONAL HERITAGE RESOURCES ACT** |
| **NMAR:** | **NATURAL MEAN ANNUAL RUNOFF** |
| **NWA:** | **NATIONAL WATER ACT** |
| **POPIA:** | **PROTECTION OF PERSONAL INFORMATION ACT** |
| **SANBI:** | **SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE** |
| **SDF:** | **SPATIAL DEVELOPMENT FRAMEWORK** |
| **SEA:** | **STRATEGIC ENVIRONMENTAL ASSESSMENT:** |
| **WMA:** | **WATER MANAGEMENT AREA** |
| **WUL:** | **WATER USE LICENSE** |
| **WULA:** | **WATER USE LICENSE APPLICATION** |

# 1 INTRODUCTION

The Applicant, Linnear Sugar Farming (Pty) Ltd, is proposing the establishment of a 67 000 m³ dam and the cultivation of 45.8 ha of existing cultivated land to macadamia nut trees, located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm, within the KwaDukuza Local and iLembe District Municipality, Umhlali, KwaZulu-Natal. During the Scoping Phase, a dam of 67 900 m³ was proposed, however, based on feedback from the Engineer and the survey that was undertaken, the proposed dam site will allow for a storage capacity of 67 000 m³.

The proposed project requires Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) in terms of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended – 2017) promulgated under Section 24 of the National Environmental Management Act (NEMA, Act No. 107 of 1998). A Water Use License (WUL) is also required in terms of Section 21 of the National Water Act (NWA, Act No. 36 of 1998). In terms of the EIA Regulations, the Applicant is required to appoint an independent Environmental Consultant to conduct the process. As such, Green Door Environmental has been appointed to conduct the Scoping and EIA Process.

The proposed project comprises the following components:

- Establishment of a 67 000 m³ dam;
- Cultivation of approximately 45.8 ha of existing cultivated land; and
- Installation of associated pipelines and pump station for irrigation purposes.

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. It falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna Water Management Area (WMA). The currently preferred dam design is proposed to comprise a storage capacity of 67 000 m³, a surface area of 1.5 ha, a wall height of 10 m and a wall length of 98 m.

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existing cultivated lands, and will utilise the dam wall for connection to the pump station. The pump station will be 4 m x 4 m in extent and will allow water to be pumped to the existing cultivated lands for irrigation of the macadamia nut trees. The proposed dam will thus serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle.

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year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam.

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# 2 LEGISLATIVE FRAMEWORK

## 2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT NO. 108 OF 1996)

The Constitution of the Republic of South Africa (Act No. 108 of 1996) is the legal source for all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and the underlying principle behind Section 24 of the Act is that 'everyone has the right to an environment that is not harmful to their health or well-being'. Furthermore, the environment should be protected for present and future generations by preventing pollution, promoting conservation and practising ecologically sustainable development.

## 2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)

### 2.2.1 EIA Regulations

The NEMA came into effect in January 1999. The NEMA is South Africa's overarching environmental legislation and its primary objective is to provide for cooperative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state, and to provide for matters connected therewith.

The NEMA provides the equitable distribution of natural resources, sustainable development, environmental protection, and the duty of care / polluter pays principles of environmental management frameworks.

In terms of the EIA Regulations promulgated under the NEMA, certain Listed Activities are specified for which either a Basic Assessment Process (GNR 324 and GNR 327) or a Scoping and EIA Process (GNR 325) is required.

The Listed Activities under **GNR 327** (Basic Assessment Process) which are applicable to the proposed project include:

- ***GNR 327 – Activity 12:*** *"The development of –*
  *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or…*
  *(i) within a watercourse;…"*

**Applicable as the proposed dam is to have a storage capacity of 67 000 m³ and will be established on a tributary of the Mhlali River.**

- ***GNR 327 – Activity 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…"*

**Applicable as the proposed dam establishment will require the excavation of approximately 10 500 m³ of material from a watercourse.**

- ***GNR 327 – Activity 27:*** *"The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for – …"*

**Please note that the proposed dam establishment will require the clearance of 0.78 ha of indigenous vegetation. As such, this Listed Activity is no longer applicable to the proposed project.**

The Listed Activities under **GNR 325** (Scoping and EIA Process) which are applicable to the proposed project include:

- ***GNR 325 – Activity 16:*** *"The development of a dam where the highest part of the dam wall, measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher, or where the high water mark of the dam covers an area of 10 hectares or more."*

**Applicable as the proposed dam is to have a wall height of 10 m.**

The proposed project is therefore subject to a **Scoping and EIA Process** in terms of the EIA Regulations, for which the Applicant is required to appoint an independent Environmental Consultant.

The aim of the EIA Regulations is to assess the possible environmental impacts that may arise from a proposed project, in order to make an informed decision on the future of the proposed project. The Scoping Phase is carried out at phase 1 of the Scoping and EIA Process and aims to identify all potential issues, impacts and project alternatives. The proposed project then proceeds into phase 2, the EIA Phase, during which the potential impacts and alternatives identified during the Scoping Phase are investigated in further detail. This phase also includes Specialist Studies to investigate certain potential impacts in more detail.

### 2.2.2 Sustainable Development

The principle of sustainable development has been established in the Constitution of the Republic of South Africa, and is given effect by the NEMA. Section 1(29) of the NEMA states that sustainable development refers to the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations.

Thus, sustainable development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- The disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- Waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Negative impacts on the environment and on people's environmental rights be anticipated; and, prevented and where they cannot altogether be prevented, are minimised and remedied.

### 2.2.3 'Polluter Pays' Principle

The 'Polluter Pays' Principle provides that 'the cost of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment'.

Section 28 of the NEMA makes provision that anyone who causes pollution or degradation of the environment is responsible for preventing impacts occurring, continuing or recurring, and for the costs of repair of the environment. In terms of the provisions under Section 28:

*'(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment'.*

## 2.3 NATIONAL WATER ACT (ACT NO. 36 OF 1998)

The proposed project falls within the ambit of the NWA because of its potential to cause pollution of water resources defined under the NWA. The NWA recognises that water is a natural resource that belongs to all people. It regulates the manner in which persons obtain the right to use water and provides for just and equitable utilisation of water resources.

Sustainability and equity are identified as central guiding principles in the protection, use and management of water resources. These guiding principles recognise:

- The basic human needs of present and future generations;
- The need to protect water resources;
- The need to share some water resources with other countries; and

- The need to promote social and economic development through the use of water.

Section 19 of the NWA states that the person responsible for land upon which any activity is or was performed and which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

Part 5 of the NWA deals with the pollution of water resources, following an emergency incident. This could include an accident involving the spill of a harmful substance that finds, or may find, its way into a water resource. In terms of Section 30 of the NEMA and Section 20 of the NWA, the responsibility for remedying the situation rests with the person responsible for the incident or the substance involved. If there is a failure to act, the relevant Catchment Management Agency may take the necessary steps and recover the costs from the responsible person(s).

**Water Use Licensing**

Certain activities are listed, as 'Water Uses' and these activities are required to be licensed or authorised, under the NWA. Under the NWA, 'Water Use' includes, among other things, the following:

- Taking water from a water resource;
- Storing water;
- Stream flow reduction activities;
- Diverting the flow of water in a watercourse;
- Disposing of waste in a manner that may detrimentally impact on a water resource;
- Altering the bed, bank, course or characteristics of a watercourse; and
- Controlled activities, such as irrigating with waste, power generation with water, atmospheric modification or recharging an aquifer.

The Applicant is aware that the proposed project requires a WULA to be undertaken. The Scoping and EIA Process forms part of the WULA documentation, which will be submitted to the Department of Water and Sanitation (DWS) for consideration (WU22921). Green Door Environmental has been appointed to undertake the WULA.

## 2.4 NATIONAL VELD AND FOREST FIRE ACT (ACT NO. 101 OF 1998)

The purpose of the National Veld and Forest Fire Act (Act No. 101 of 1998) is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act provides regulations for the establishment, registration, duties and functioning of fire protection associations. In addition, it provides for the prevention of veld fires through a fire emergency rating system. Chapter 4 of the National Veld and Forest Fire Act places a duty on owners to prepare and maintain firebreak, and provides regulations on the role of adjoining landowner. Chapter 5 places a duty on all owners to acquire equipment and have fight fire personnel available to combat fire. Chapter 6 provides regulations on offences and penalties.

## 2.5 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10 OF 2004)

The National Environmental Management: Biodiversity Act (NEM:BA, Act No. 10 of 2004) makes provision for the management and conservation of South Africa's biodiversity within the framework of the NEMA through:

- The protection of species and ecosystems;
- Sustainable use of indigenous living organisms; and
- The equitable distribution of benefits that result from biological resources.

Sections 75 and 76 of the NEM:BA deals with alien invasive species monitoring, control and eradication plans and how they should be implemented:

- Section 75 (1) states that *'control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs';*
- Section 75 (2) states that *'any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment'; and*
- Section 75 (3) states that *'The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regeneration or re-establishing itself in any manner'.*

**Category 1a** Listed alien invasive vegetation species (such as Bluebell Creeper, Water Primrose, Skeleton Weed) are those species that must be removed and eradicated, and require compulsory control. No person is allowed to sell, advertise, exhibit, transmit, send, deliver for sale, exchange or dispose of any specimen. It is also illegal to accept a Category 1a plant as a gift or disperse of the weed from one place to another. All Category 1a species are required to be removed by law and no permits are issued.

**Category 1b** Listed alien invasive vegetation species (such as Bugweed, Lantana, Madagascar Periwinkle and Triffid Weed) are those species that must be controlled. These plants need to be eradicated and removed as they are declared weeds and are not tolerated. No person is allowed to grow, sell, breed or move any specimen. These plants are known to have a high invasive potential, and an invasion of these species can require an Alien Invasive Vegetation Management Programme, and need to be eradicated. No permits are issued for Category 1b species.

**Category 2** Listed alien invasive vegetation species (such as Black Wattle, Australian Blackwood, St John's Wort, Jacaranda Tree) are those species that require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit. In order to carry out a restricted activity, a permit is required. A person on whose land a Category 2 Listed alien invasive vegetation species occurs must ensure that the species does not spread outside of the land where the permit is specified. These

plants may only be grown in areas demarcated on sites where such plants may be established, retained and strictly controlled. In the case for the exemption of an existing plantation whereby a plantation existed before the NEM:BA notice came into effect; it is exempted from requiring a permit for any restricted activity. A permit is needed to authorise multiple restricted activities. Category 2 vegetation may only be acquired or sold by any person who has an area of land which has been demarcated for the growing of that species.

**Category 3** Listed alien invasive vegetation species (such as the Chameleon Plant, Stinging Nettle, Lesser Balloon Vine) are those species that are prohibited from growing, breeding, selling, buying and donating. Further plantings are prohibited. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. Without a permit, trade in category 3 plants is not allowed, however, the trade in the wood of Category 3 plants is allowed. If these plants exist already, they may be retained but no new planting or trade may occur. A permit is required to take on any of the restricted activities. Any action taken to control weeds or invader plants must be executed with caution and in a manner that will have minimal environmental impact.

If any alien invasive vegetation species do occur, despite using the necessary means to control them, the Applicant must control them by means of any of the control methods that are appropriate for the species concerned. Methods that are used need to be appropriate and suitable for the species concerned, as well as it being determined by the ecosystem which they occur in. Any action taken to control weeds or invader plants must be performed with caution and in a manner that will have minimal environmental impact. It is important that the control plan that is put in place is an annual plan of operation and should be for a minimum of five years.

# 3 ASSISTING GUIDELINE DOCUMENTS

## 3.1 THE DEPARTMENT OF ECONOMIC DEVELOPMENT, TOURISM AND ENVIRONMENTAL AFFAIRS ASSISTING GUIDELINE DOCUMENT SERIES

### 3.1.1 Western Cape Department of Environmental Affairs and Development Planning EIA Guideline and Information Document Series (March 2013)

In order to assist potential Applicants, Environmental Consultants and Interested & Affected Parties (I&APs) to understand what is required of them in terms of the EIA Regulations, what their rights are and / or what their role may be, the Department of Environmental Affairs (DEA) has made provision for the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) to issue an EIA Guideline & Information Document Series. Following permission from the National Minister, the Department formally published the following EIA guidelines in terms of Section 24J:

- **Guidelines on Transitional arrangements (March 2013);**
- **Guideline on Appeals (March 2013);**
- **Guideline on Alternatives (March 2013);**
- **Guideline on Public Participation (March 2013);**
- **Guideline on Exemption Applications (March 2013);**
- **Guideline on Need and Desirability (March 2013); and**
- **Guideline on Generic Terms of Reference for EAPs and Project Schedules (March 2013).**

Unpublished guidelines in terms of Section 24J of the NEMA are as follows:

- **Information Document on the Interpretation of the Listed Activities (August 2010); and**
- **Information Document on Biodiversity Offsets (October 2011).**

The following three guideline documents were consulted in the compilation of this Report:

**Guideline on Alternatives (March 2013)**

The NEMA defines the 'best practicable environmental option' as '*the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*'. Alternatives are defined in the NEMA, EIA Regulations as '*different means of meeting the general purpose and requirements of the activity*'. The '*feasibility*' and '*reasonability*' of and the need for alternatives must be determined by considering, inter alia, (a) the general purpose and requirements of the activity, (b) need and desirability, (c) opportunity costs, (d) the need to avoid negative impact altogether, (e) the need to minimise unavoidable negative impacts, (f) the need to maximise benefits, and (g) the need for equitable distributional consequences.

**Guideline on Public Participation (March 2013)**

The general objectives of integrated environmental management laid down in the NEMA include to:

*'Ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment'. The National Environmental Management Principles include the principle that 'the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary to achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured'.*

The guideline provides details on when to facilitate public participation, the methods to apply for notifications to I&APs, the formats required to be used for notifications, details on requirements for commenting and consultation periods, the process of identifying and responding to stakeholders, and guidelines for compilation of public participation reports for inclusion to the Basic Assessment Process or Scoping and EIA Process.

**Guideline on Need and Desirability (March 2013)**

The guidelines specify that the needs and desirability of a project must be measured within a local strategic context against the municipalities Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF). These local strategies and policies will contain the local community's needs, interests and objectives in respect of desired land uses and location and nature of project within the municipality. Of equal importance is the question of whether the project meets the societal needs and interests of the broader public. Fourteen questions provided in the guidelines are intended to provoke adequate consideration of 'need and desirability' in order to ensure that the best practicable environmental option is pursued and that the project more equitably serves broader societal needs.

### 3.1.2 Department of Environmental Affairs and Tourism Guideline Documents

The Department of Environmental Affairs and Tourism (DEATs) vision is based around economic growth and sound environmental management, which is underpinned by sustainable development. The DEATs mission is to lead economic growth, development and environmental management in KwaZulu-Natal.

### 3.1.3 The Protection of Personal Information Act (POPIA, Act No. 14 of 2013)

The Protection of Personal Information Act (POPIA, Act No. 14 of 2013) came into effect on 01 July 2021, and aims to promote the protection of personal information. In terms of the POPIA, personal information refers to 'the name of the person if it appears with other personal information relating to the person or if the disclosure of the name itself would reveal information about the person'. The EIA Regulations require, inter alia, transparent disclosure of registered I&APs and their comments. I&APs who submit comment, attend a Public Information Session or request registration in writing for the Scoping and EIA Process are deemed registered I&APs who must be added to the list of I&APs. By registering, I&APs are deemed to give their consent for relevant information to be processed and disclosed, in fulfilment of the requirements of the EIA Regulations.

For the purposes of the Scoping and EIA Process and in terms of the requirements of the POPIA, only the names, affiliation and comments of I&APs have been included in this Report. Should additional personal information be required by the DEDTEA, consent to share this personal information will be obtained from the I&AP first.

## 3.2 iLEMBE DISTRICT MUNICIPALITY: INTEGRATED DEVELOPMENT PLAN REVIEW (2021 / 2022) AND SPATIAL DEVELOPMENT FRAMEWORK (2021)

The iLembe District Municipality is approximately 3260 km² and is located towards the east coast of KwaZulu-Natal between the eThekwini Metropolitan Municipality in the south and the King Cetshwayo District Municipality in the north. It is one of ten district municipalities in KwaZulu-Natal. The uMgungundlovu and uMzinyathi District Municipalities border onto the iLembe District Municipality. It is the smallest district municipality with a total population of approximately 657 612 people. It comprises four local municipalities, namely; the Mandeni, KwaDukuza, Ndwedwe and Maphumulo Local Municipalities.

Despite the strategic location of the district municipality, it faces numerous economic challenges such as high levels of poverty in rural inland areas. The agricultural sector is one of the main economic activities within the district municipality, and the Mandeni, KwaDukuza and Ndwedwe Local Municipalities are the commercial agricultural hubs within the district municipality. Commercial agricultural activities make up a major portion of the iLembe District Municipality and these activities comprise mainly of sugar cane. The sugar industry provides an important contribution to the economy, both on a local and national scale. Other agricultural activities include forestry, fruit and vegetables, and fresh cut flowers. It has been noted that farmers are diversifying their activities to include sub-tropical fruits and macadamia nuts, and thus it is essential that land be properly managed as a resource, and high potential agricultural land be retained.

Given the high potential agricultural land within the iLembe District Municipality, it is important to recognise the value in safeguarding this land and ensuring that it is used for the most appropriate uses. The district municipality has the opportunity to elevate the land available for agricultural activities through the growth and enhancement of the agricultural sector, as well as to meet the demands of food security.

Although the agricultural sector plays an important role in the district municipality, this sector is not fully exploited. As such, the following focal points need to be targeted to make the sector more economically viable, susceptible to growth and to ensure the generation of employment opportunities, namely; investment in infrastructure, attracting new global markets, encouraging the development of a knowledge economy, and assisting subsistence farmers.

## 3.3 iLEMBE DISTRICT MUNICIPALITY: ENVIRONMENTAL MANAGEMENT FRAMEWORK (2014)

The iLembe District Municipality Environmental Management Framework (EMF) was finalised in 2014. The EMF seeks to understand the biophysical and socio-cultural systems of geographically defined areas and

to reveal where specific land uses may best be located, as well as to offer performance standards, and to control zones for maintaining appropriate use of such land. The iLembe District Municipality is host to a number of sensitive and unique natural environmental elements, which include coastal and dune areas, natural coastal flats vegetation, river valleys and diverse topography. These rich natural resources and their strategic location make the district municipality a preferred development area and tourism hot spot, thus placing significant pressure on the natural ecology within the area. The EMF comprises a number of control zones that will assist in managing development within the district municipality, namely; a terrestrial biodiversity management zone, rural support zone, commercial agriculture zone, stewardship zone, coastal management zone, urban settlement zone, industrial activity zone and infrastructure zone.

The commercial agriculture zone represents areas with high land capability and suitability for commercial agriculture. These areas are considered important for food production, food security and for the generation of employment opportunities linked to agricultural activities. Intensive and extensive agricultural activities are pursued in the commercial agriculture zone to ensure food security for current and future generations. Land use and infrastructural development must therefore relate to and be supportive of agricultural activities within this zone. It has been noted that there is potential to expand on agricultural production within the district municipality when taking the current extent of productive soils into consideration. Water availability and encroaching urban development are major threats to the agricultural sector and food security. Optimising the agricultural sector is thus of critical importance.

## 3.4 KWADUKUZA LOCAL MUNICIPALITY: INTEGRATED DEVELOPMENT PLAN REVIEW (2021 / 2022)

The KwaDukuza Local Municipality is approximately 633 km² and stretches from the Zinkwazi River in the north to the Tongaat River in the south. It is one of the most prosperous local municipalities, and is the district node and dominant commercial sector within the iLembe District Municipality. The local municipality comprises a population of approximately 276 719 people.

The dominant sectors within the local municipality include agriculture, light industry and tourism. The agricultural sector is one of the most dominant sectors within the KwaDukuza Local Municipality due to its wealth of natural resources and favourable climatic conditions. Agricultural land that is currently under cultivation, accounts for over 84 % of the total land area of the local municipality. Although sugar cane remains one of the key sectors of the economy, there has been an increasing decline over the years due to a number of factors, one of them being the diversification of agricultural activities. The agricultural sector has thus been identified as key to addressing poverty in KwaZulu-Natal.

## 3.5 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS

The National Freshwater Ecosystem Priority Areas (NFEPA) project responds to the high levels of threat prevalent in the water resources of South Africa. It provides strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. These strategic priorities are known as Freshwater Ecosystem Priority Areas (FEPAs). Intended key users of NFEPA

products include: National Departments of Water and Sanitation, National Department of Environmental Affairs, catchment management agencies and their associated stakeholders, the National and Provincial Departments of Agriculture, the Department of Mineral Resources, South African National Biodiversity Institute, South African National Parks, bioregional programmes, provincial conservation agencies, provincial environmental affairs departments, municipalities, non-governmental organisations, conservancies and environmental consultants.

According to the available NFEPA wetland system coverage, the proposed study sites do not intersect any NFEPA watercourses (Refer to **Figure 1** and **Appendix B**). The Mhlali River however, is located approximately 1.5 km downstream of the proposed dam site and has been classified as a NFEPA river.


**Figure 1:** Map showing the NFEPAs identified within a 500 m radius of the proposed study sites (Source: Kinvig and Associates Environmental Consulting).

# 4 METHODOLOGY FOR THE EIA PHASE

The methodology for the Scoping and EIA Process is based on the procedures detailed in Regulations 39 to 44 of the EIA Regulations, promulgated in terms of Section 24 (5) of the NEMA in GNR 326.

The entire Scoping and EIA Process was completed in two phases, with the Scoping Phase as phase 1 and the EIA Phase as phase 2. The Scoping Phase is described in Section 4.3. The EIA Phase is described in Section 4.4.

## 4.1 SITE VISIT AND BASELINE INFORMATION GATHERING

The proposed project was initiated by meeting with the Applicant to discuss what is being proposed. Further to this, site visits were undertaken to gather more detailed baseline environmental information and identify the sensitivity of the proposed dam site. This was supplemented by information gathered through related desktop and field studies, including:

- Topography (visual aspects, steepness of slope, stability);
- Surface / groundwater (presence of sensitive hydrological features e.g. wetland systems and aquatic ecology);
- Biodiversity (presence of sensitive floral and faunal communities, specifically Red Data species);
- Air quality; and
- Socio-economic impacts (effect on surrounding neighbours, landowners and land use e.g. employment, visual impacts etc.).

## 4.2 APPLICATION FOR SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The official Application Form, provided by the DEDTEA, was completed with all the necessary details, including contact details and signed declarations by the Applicant and the Environmental Consultant. It also includes a description of the proposed project, property location and applicable Listed Activities. This was submitted to the DEDTEA on 19 April 2022 and acknowledgement was received on 03 May 2022. All I&APs were notified of the Reference Number, and their opportunity to provide comment on the Draft Scoping Report for an additional 30 days on 03 May 2022. I&APs were informed that no substantial changes had been made to the proposed project since circulation of the Draft Scoping Report on 31 March 2022. A copy of the Application Form and the notification letter to I&APs has been included in **Appendix C**.

A Pre-application meeting was held virtually via Zoom on 16 March 2022 (Refer to **Appendix D** for the Pre-application meeting agenda and minutes).

## 4.3 SCOPING PHASE

### 4.3.1 Scoping Report

The purpose of the Scoping Report was to identify the potential impacts and alternatives of the proposed project. It included a Plan of Study which identified the relevant Specialist Studies, which were undertaken

during the EIA Phase, as well as further public participation to be conducted. The Plan of Study was made available for comment in the Scoping Report.

All relevant legislation pertaining to the proposed project was identified. The need and desirability of the proposed project was also briefly explored and any feasible alternatives were identified. The Scoping Report was supplemented with other relevant and necessary documentation, including maps, photographs, layouts etc.

The Draft Scoping Report was circulated to all I&APs from 31 March 2022 for a 30 day comment period. All comments received following circulation of the Draft Scoping Report were included in the Final Scoping Report. The Final Scoping Report was submitted to the DEDTEA on 24 May 2022 for decision. On 13 June 2022 the DEDTEA approved the Final Scoping Report (Refer to **Appendix E**). Since acceptance of the Scoping Phase, the process has advanced to the EIA Phase.

### 4.3.2 Public Participation Process

A Public Participation Process, as described in Regulation 39 – 44 of the EIA Regulations was undertaken. This included:

- Newspaper adverts were published in the North Coast Courier (English) on 25 March 2022 and in the Isolezwe (Zulu) on 04 February 2022 to notify I&APs of the proposed project (Refer to **Appendix F**);
- Site posters in English and Zulu were placed on the access roads to Hopewell Farm on 21 February 2022 (Refer to **Appendix G**);
- A Background Information Document (BID) was circulated by fax, email, post, or hand delivered from 10 February 2022 (Refer to **Appendix H**);
- A list of I&APs was compiled, and is continually updated (Refer to **Appendix I**);
- Hard copies of all comments received following circulation of the newspaper adverts, site posters and BID are included in **Appendix J**;
- A Scoping Phase Public Information Session was held at Hopewell Farm on 23 March 2022 (Refer to **Appendix K** for the Public Information Session notification, attendance register, handout, minutes and a photograph);
- Hard copies of all comments received following circulation of the Draft Scoping Report and the Application Form notification letter are included in **Appendix L**; and
- Hard copies of all comments received following submission of the Final Scoping Report are included in **Appendix E**.

## 4.4 EIA PHASE

### 4.4.1 EIA Report

As part of the EIA Phase for the proposed project a number of Specialist Studies have been compiled:

- Wetland Assessment;
- Biodiversity Assessment;

- Hydrology and Flood Line Assessment;
- Preliminary Yield and Groundwater Alternatives Report;
- Phase 1 Heritage Impact Assessment and Desktop Paleontological Impact Assessment;
- Geotechnical Report; and
- Dam Design and Engineering Report.

A detailed description of the proposed project is provided in Section 5 of this Report. Identified potential alternatives to the proposed project have been provided in Section 6. A detailed description of the environment (physical, biological, social, economic and cultural) that may be affected by the proposed project, as well as potential environmental implications and associated mitigation measures and recommendations are provided in Section 8 and 9. In order to assess the potential environmental issues associated with the proposed project, each aspect addressed in Section 8 and 9 has been given a qualitative rating in relation to its environmental impact. Each aspect has been divided into a number of different classes, each of which has been assigned various criteria (Refer to Section 10).

The Draft EIA Report and the Environmental Management Programme (EMPr) (Refer to Section 4.4.2) was circulated to all I&APs for a 30 day comment period. All comments received following circulation of the Draft EIA Report have been summarised and responded to in the Final EIA Report which has been submitted to the DEDTEA for decision. All I&APs will be notified of this decision.

### 4.4.2 Public Participation Process

Please note that due to the poor attendance during the Scoping Phase Public Information Session, an EIA Phase Public Information Session was not held. I&APs were given an opportunity to communicate with the Environmental Consultant prior to the Draft EIA Report 30 day comment period being reached should they have wished for an EIA Phase Public Information Session to be held. Please note that no communication was received by the Environmental Consultant from I&APs regarding the need for an EIA Phase Public Information Session to be held.

### 4.4.3 Environmental Management Programme

As part of the EIA Phase, an EMPr has been compiled which contains guidelines to ensure that the proposed project will be carried out in an environmentally responsible and acceptable manner (Refer to Section 11). The EMPr includes the following:

- Spill Contingency Plan;
- Fire Management Plan;
- Alien Invasive Vegetation Management Programme;
- Erosion control measures; and
- Water management measures.

The EMPr will be used as a framework for environmental compliance monitoring and reporting for the operational lifetime of the proposed project (Refer to **Appendix T**).

# 5 THE PROPOSED PROJECT

## 5.1 PROPERTY LOCATION AND LAND DESCRIPTION

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at the following GPS coordinates:

- Centre: 29°27'49.48" S and 31°07'49.87" E;
- Corner 1: 29°27'46.23" S and 31°07'48.94" E;
- Corner 2: 29°27'46.98" S and 31° 7'54.65" E;
- Corner 3: 29°27'52.36" S and 31°07'48.23" E;
- Corner 4: 29°27'52.23" S and 31°07'47.21" E; and
- Corner 5: 29°27'50.80" S and 31°07'46.75" E;

The proposed dam site falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna WMA. The currently preferred dam design is proposed to comprise a storage capacity of 67 000 $m^3$, a surface area of 1.5 ha, a wall height of 10 m and a wall length of 98 m.

The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation).

Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes and these pipelines will have a total length of approximately 3.28 km. The proposed pipeline installation will not intersect any watercourses or land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation). As such, the pipelines will cross the existing cultivated lands, and will utilise the dam wall for connection to the pump station.

Seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed. Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3), which falls under the Indian Ocean Coastal Belt biome. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

Hopewell Farm is a commercial agricultural operation comprising sugar cane and macadamia nut trees. The proposed project will diversify and ensure the long-term sustainability of the farm through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the WULA for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry

land.

To access Hopewell Farm, from Pietermaritzburg, travel on the N3 towards Durban. Take the offramp onto the N2 towards Ballito. In Ballito, turn left onto Ballito Drive and travel for approximately 1.7 km towards the R102 Road. Turn left onto the R102 Road and travel for approximately 800 m. Turn right onto Esenembi Road and travel for approximately 8 km to Hopewell Farm, located at GPS coordinates 29°28'11.89" S and 31°07'34.54" E.

Refer to **Figure 2 to 4** for maps showing the proposed study sites and surrounding area, and **Figure 5** for photographs showing the proposed study sites.

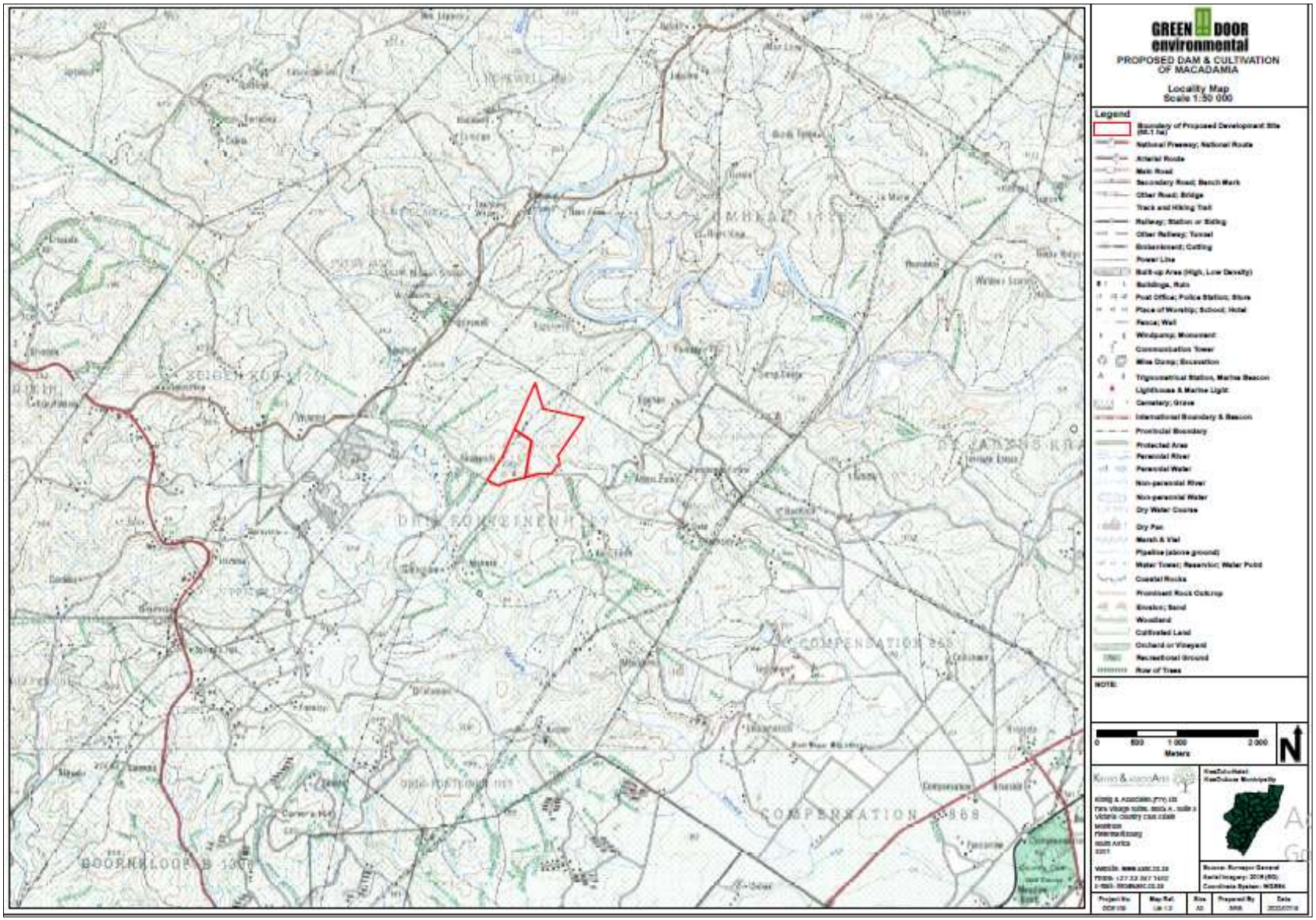


**Figure 2:** Locality Map showing the proposed study sites and surrounding area, Umhlali, KwaZulu-Natal (Source: Kinvig and Associates Environmental Consulting).

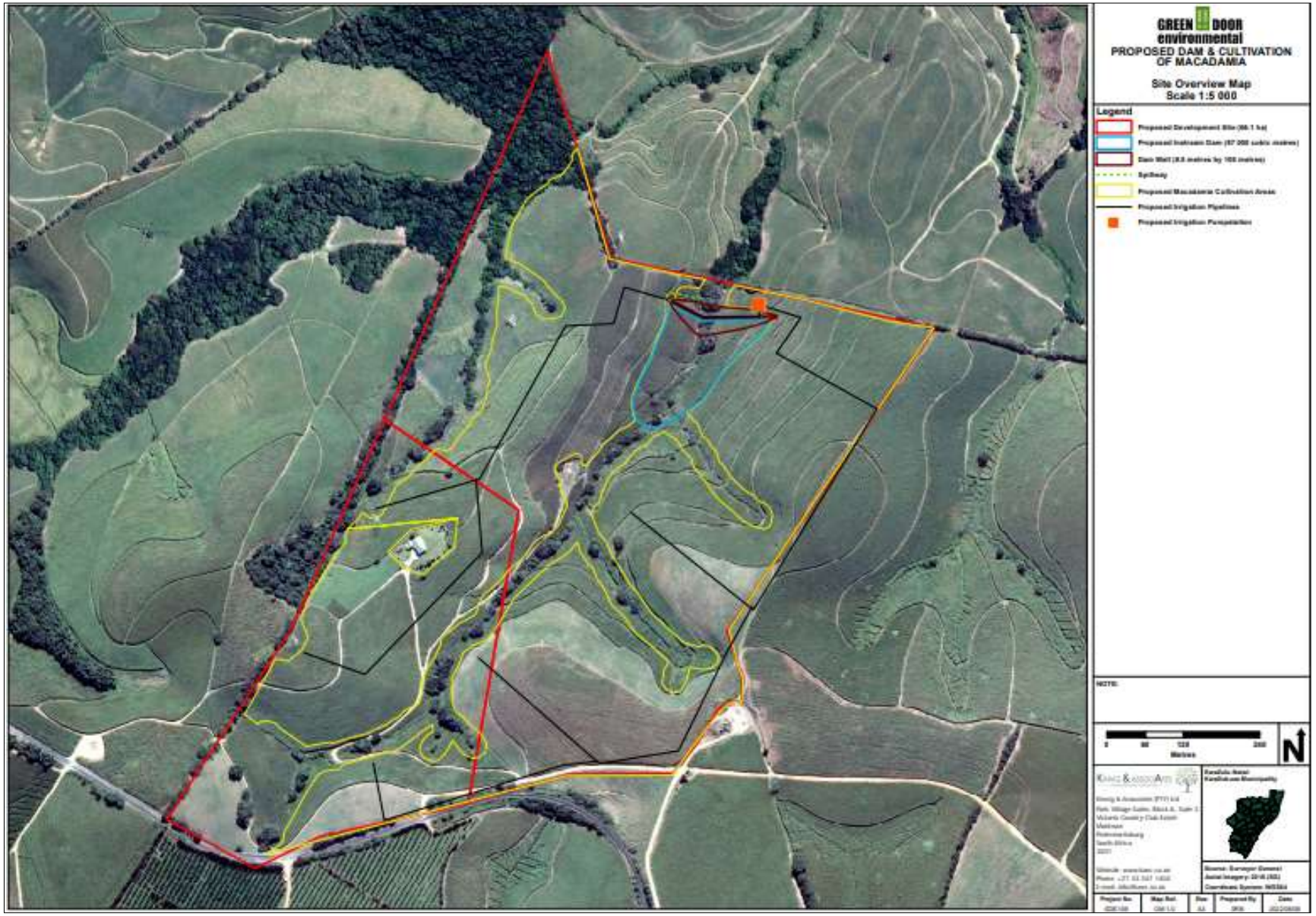


**Figure 3:** Map showing the proposed study sites and surrounding area, Umhlali, KwaZulu-Natal (Source: Kinvig and Associates Environmental Consulting).


**Figure 4:** Map showing the proposed dam site, Umhlali, KwaZulu-Natal (Source: Green Door Environmental).

*Photograph showing Hopewell Farm.*


*Photograph showing Hopewell Farm.*


*Photograph showing Hopewell Farm.*

*Photograph showing the existing cultivated lands proposed to be cultivated to macadamia nut trees.*

*Photograph showing the existing cultivated lands proposed to be cultivated to macadamia nut trees.*

*Photograph showing the proposed dam site.*

**Figure 5:** Photographs showing the proposed study site, Umhlali, KwaZulu-Natal.

## 5.2 THE PROPOSAL

The Applicant, Linnear Sugar Farming (Pty) Ltd, is proposing the establishment of a 67 000 m³ dam and the cultivation of 45.8 ha of existing cultivated land to macadamia nut trees, located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm, within the KwaDukuza Local and iLembe District Municipality, Umhlali, KwaZulu-Natal. During the Scoping Phase, a dam of 67 900 m³ was proposed, however, based on feedback from the Engineer and the survey that was undertaken, the proposed dam site will allow for a storage capacity of 67 000 m³.

The proposed project comprises the following components:

- Establishment of a 67 000 m³ dam;
- Cultivation of approximately 45.8 ha of existing cultivated land; and
- Installation of associated pipelines and pump station for irrigation purposes.

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. It falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna WMA.

***GNR 327, Activity 12*** *is applicable as the water surface area will exceed 100 m² and it will be established within a watercourse i.e. on a tributary of the Mhlali River.* ***GNR 327, Activity 19*** *is also applicable as the proposed dam establishment will require the removal of more than 10 m³ of material from a watercourse i.e. 10 500 m³ of material from a tributary of the Mhlali River.* ***GNR 325, Activity 16*** *is further applicable as the highest part of the dam wall will be 5 m or higher i.e. the dam wall will be 10 m in height.*

The Applicant is also proposing the cultivation of approximately 45.8 ha of land to macadamia nut trees. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation).

Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes. The pipelines will have a total length of approximately 3.28 km. It is important to note that the proposed pipeline installation will not intersect any watercourses or land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation). As such, the pipelines will cross the existing cultivated lands, and will utilise the dam wall for connection to the pump station. The pump station will allow water to be pumped to the existing cultivated lands for irrigation of the macadamia nut trees. The proposed dam will thus serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle.

Although 28 HGM Units were identified within a 500 m of the proposed study sites, seven HGM Units

(HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed (Refer to **Appendix B**). HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM Unit 2 will be impacted by the proposed dam establishment as well as the cultivation activities. As such, the proposed cultivation sites were realigned to fall outside of the identified HGM Units. A 15 m freshwater ecosystem habitat buffer is also proposed to be implemented to maintain the ecological integrity and functioning of the HGM Units. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. In terms of the 'mitigation hierarchy', the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project. While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour.

Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3), which falls under the Indian Ocean Coastal Belt biome (Refer to **Appendix O**). Although no flora of conservation concern was identified within the proposed study sites, the riparian habitat in the valley bottoms was identified to be in a 'good ecological condition'. This riparian habitat will be protected through the implementation of the 5 m riparian habitat buffer which falls within the proposed 15 m freshwater ecosystem habitat buffer. The identification of 0.48 ha of riparian habitat within the proposed dam site and its associated loss, is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas (Refer to **Appendix P**). In order to reduce the probability of flood damage, appropriate mitigation measures have been provided. Based on the hydrology, there is sufficient water within the catchment to sustain the proposed dam and associated irrigation demand, as well as the EWR (Refer to **Appendix Q**). It is important to note that the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam.

Hopewell Farm is a commercial agricultural operation comprising sugar cane and macadamia nut trees. The proposed project will diversify and ensure the long-term sustainability of the farm through increased

macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the WULA for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry land.

Refer to **Table 1** below for the preferred dam design specifications and **Figure 6** for the dam design (Refer to **Appendix N**).

**Table 1:** Preferred dam design specifications.

| ASPECT | MEASUREMENT |
|---|---|
| Storage capacity | 67 000 m³ |
| Dam area | 1.5 ha |
| Wall height | 10 m |
| Wall length | 98 m |
| Wall width | 3.5 m |
| Spillway width | 12 m |
| Dropbox | 3 m² |
| Pipeline length | 3.28 km |
| Pipeline diameter | 200 mm |
| Total clearance of indigenous vegetation | 0.78 ha |
| Total material to be excavated from watercourse | 10 500 m³ |

The anticipated construction period is approximately one month. Refer to **Figure 2 to 4** for maps showing the proposed study sites and surrounding area, and **Figure 5** for photographs showing the proposed study sites.

The 1.5 ha area that will be inundated by the dam will be cleared of boulders, trees, stumps, grass and topsoil. The topsoil will be stockpiled and used on the face of the dam to allow for the establishment of suitable grass cover. Layers of sand and organic, or porous material will be excavated and removed from the construction area.

The cut-off trench and base of the dam will be kept free of water during the construction phase. Any porous, organic, or loose material will be removed before the topsoil is placed in the foundation and compacted. All rock surfaces in the foundation will be excavated to sound rock and washed clean using air and water jets. Joints and cracks that are exposed will then be cleaned and filled with grout to ensure that the contact with the fill material is tight.

Material with high clay content will be placed in the central zone of the embankment and material with a higher sand fraction will be placed in the outer zones of the embankment. All excavations for the earth fill will be below the full supply level of the basin. The entire embankment will be constructed in layers and

compacted systematically over each layer. Any holes or depressions that occur in the abutments, core trench or outlet pipe will be hand rammed to maximum compaction.

Two wing walls and spillways will be required. Each spillway is to be 10 m in width, and sloped slightly from the wing wall to the far edge of the bottom bank of the spillway. The spillway will be excavated to the recommended minimum width. The total freeboard of the embankment will be no less than the minimum recommended height above the spillway level. The spillway and the slope downstream of the spillway will be cleared of obstruction such as trees and boulders, and all depressions will be filled appropriately. It will then be top soiled and grassed to minimise the risk of erosion. The embankment and spillway will then be fenced off.

In order to facilitate a speedy and uninterrupted construction phase, all materials will be preconditioned and made easily available, prior to any material being placed on the embankment. The stockpiling of the rock fill from the spillway will assist in increasing the rate at which materials can be placed on the embankment and reduce the potential for delays.

A summary of the main work items involved in the construction phase of the proposed dam includes:

- Clear area to be inundated and stockpile material;
- Excavate to rock and compact topsoil in the foundation;
- Clean and grout rock where necessary;
- Place and compact material to embankment;
- Excavate spillway and remove obstructions;
- Topsoil all exposed portions of work; and
- Grass exposed areas with indigenous, endemic grasses species.

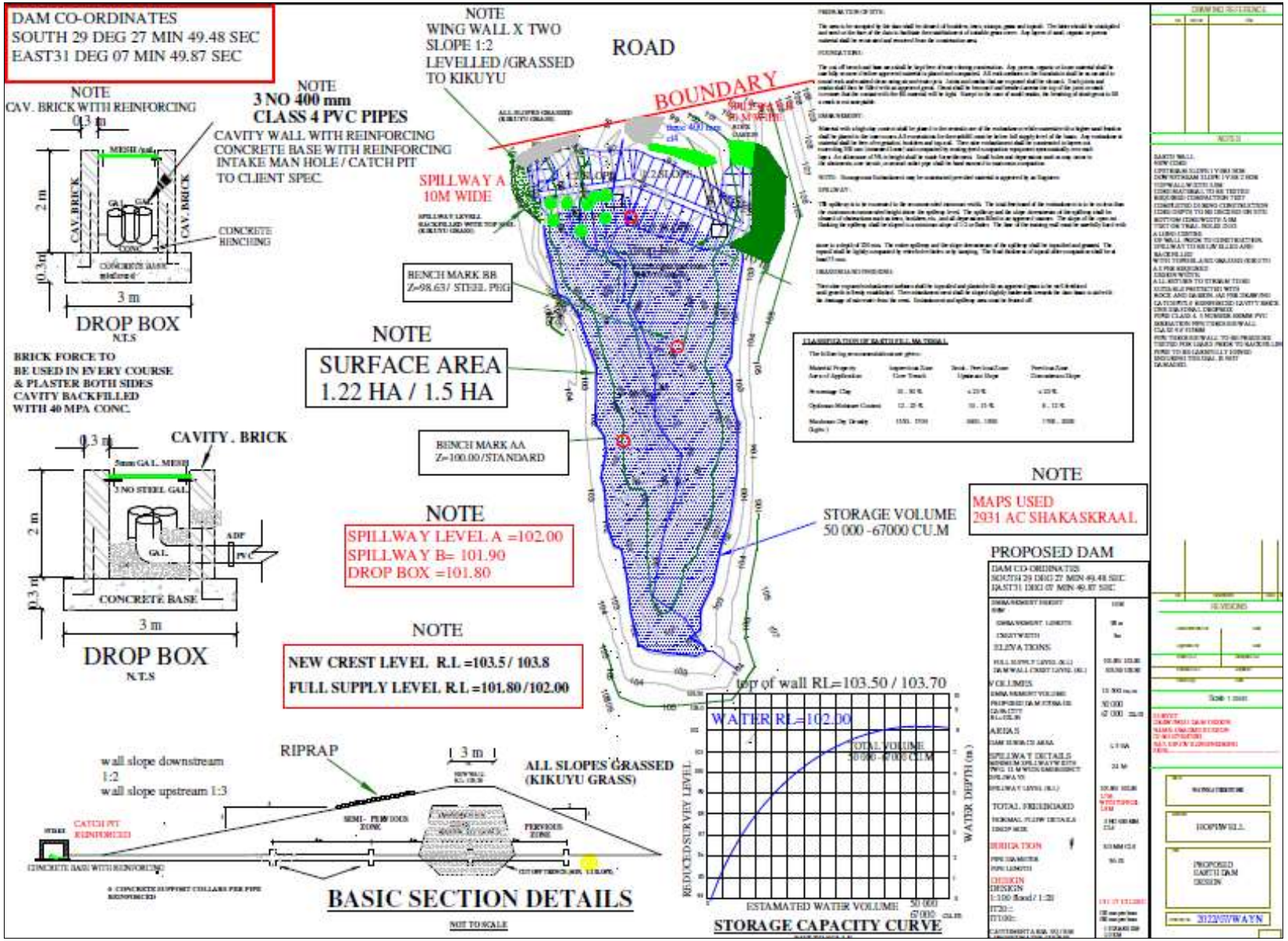


**Figure 6:** Dam design (Source: Graeme Hudson).

## 5.3 MOTIVATION

Although there is a significant once off cost associated with the establishment of a dam, there are minimal maintenance costs. In the agricultural industry, it is becoming increasingly important for farmers to utilise economies of scale in order for their business to remain sustainable. The job security of the labour employed on Hopewell Farm relies on the sustainability of the business. In order to ensure the long-term sustainability of the farm, there needs to be diversification of agricultural activities, as well as water available for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle. The need for a reliable source of water is becoming ever more important due to climate change and variability. Thus, it is important that there is water available in the form of a storage mechanism such as a dam, to allow the macadamia nut trees to be irrigated when minimal rainfall is received. As such, increased water storage and availability is important to ensure increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the WULA for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry land.

Climate change refers to the increase in the average temperature of the earth, mainly surfaces, air and the ocean. It is affecting both the availability of water, as well as the quality of water, through changes in rainfall patterns, with more intense storms, floods and droughts, changes in soil moisture and surface runoff, and the impacts associated with increased evaporation and temperatures. In South Africa, the effects of climate change are increasing, with more severe weather conditions. Society is affected by climate change, especially those who are disadvantaged in areas such as water and sanitation, food security, health and energy. However, farmers are prone to the impacts of climate change, due to the high fire danger, and crop and livestock yields are directly related to the variability in temperatures and rainfall. This in turn has knock on effects for society and the economy as a whole due to the affordability and availability of produce and essential food supplies, and the associated increased poverty, malnourishment and food insecurity rates. Fruit, nuts, vegetables and protein form an essential part of our diets, due to their many nutrients and vitamins that are vital for the efficient functioning of our bodies. Limited access to these essential nutrients and vitamins has the potential to result in an unhealthy population that is prone to diseases and illnesses, and restricting the possibility of obtaining employment. If this produce had to be imported, both into South Africa, and from other areas of the country, it would incur import duties and transport costs which the consumer would have to pay for.

In order to ensure that sustainable development is achieved and that contributions to climate change are minimised, it is imperative that all development, transformative and resource-utilising activities take cognisance of climate change. At the same time, it is important to note that part of the response to climate change includes adapting to its effects and promoting development and activities which allows the population to become more resilient to the impacts of climate change. This may include ensuring delivery of basic services (water, sanitation and electricity), improving food security and enhancing economic security.

Although 28 HGM Units were identified within a 500 m of the proposed study sites, seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed (Refer to **Appendix B**). HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM Unit 2 will be impacted by the proposed dam establishment as well as the cultivation activities. As such, the proposed cultivation sites were realigned to fall outside of the identified HGM Units. A 15 m freshwater ecosystem habitat buffer is also proposed to be implemented to maintain the ecological integrity and functioning of the HGM Units. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. Should the recommendations be implemented, the proposed project will have a 'medium to low impact' on the sensitive environments. Fauna and flora communities will benefit as a result of the presence of additional open water and wetland habitat. The implementation of the recommendations and mitigation measures will allow for the surrounding HGM Units and flora species to be maintained and monitored, which will have significant benefits, as well as providing habitat and foraging for fauna species.

Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3), which falls under the Indian Ocean Coastal Belt biome (Refer to **Appendix O**). Although no flora of conservation concern was identified within the proposed study sites, the riparian habitat in the valley bottoms was identified to be in a 'good ecological condition'. This riparian habitat will be protected through the implementation of the 5 m riparian habitat buffer which falls within the proposed 15 m freshwater ecosystem habitat buffer. The identification of 0.48 ha of riparian habitat within the proposed dam site and its associated loss, is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. In order to reduce the probability of flood damage to the watercourse as well as the cultivated lands, the following recommendations must be adhered to (Refer to **Appendix P**). Feedback from the Preliminary Yield and Groundwater Alternatives Report has confirmed that there is sufficient water within the catchment to sustain the proposed dam and associated irrigation demand, as well as the EWR (Refer to **Appendix Q**). As such, the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low. It is important to note that the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be

possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam.

The ‘mitigation hierarchy’ is regarded as the best practice framework for environmental planning and managing environmental impacts. It refers to a set of prioritised; sequential steps that are applied to anticipate avoid and reduce the potential negative impacts of a project on the natural environment. Given the abovementioned information, it is important to explain why the offset of 0.199 ha of freshwater ecosystem habitat was the final and only option. Although a borehole is an alternative option of water supply for the macadamia nut trees, it comes with monthly pumping and maintenance costs. Borehole water is also required to be stored in a storage mechanism such as a dam or an off-stream reservoir. An off-stream reservoir would not result in the loss of freshwater ecosystem habitat, however, the cost to establish a reservoir is exorbitant. Pumping water from the borehole to the reservoir would also result in significant costs. This in turn, would result in the project being economically unviable. It must further be highlighted that the health of potential boreholes in terms of pumping rates within the farm is not known, and it is likely that a number of boreholes would need to be drilled before a suitable borehole location has been identified. Drilling of boreholes is not only expensive, but there are no guarantees that a suitable borehole site will be available.

The use of a dam is not only beneficial due to acting as a storage mechanism, but water can also be released to downstream water users during dry months. These downstream water users are likely to be previously disadvantaged individuals, thus this release of water is beneficial. Although 0.199 ha of freshwater ecosystem habitat will be lost associated with the proposed dam establishment, it will also result in the creation of additional wetland habitat which is beneficial to both fauna and flora.

Given the abovementioned information, the use of borehole water for the irrigation of macadamia nut trees carries with it great risk and cost. The Applicant is not, and is unlikely to be in a financial position to pursue borehole water for the project. As such, the use of borehole water not only makes the project unfeasible, but it will not result in the generation of employment opportunities, skills development, income generation and improved quality of life. Thus, the Applicant will not proceed with this option, and thus the offset is the final and only option for the proposed project. It is understood that 0.6 ha is required to be rehabilitated to mitigate this loss, and the implementation of the relevant rehabilitation recommendations will allow for the surrounding HGM Units and flora species to be maintained and monitored, which will have significant benefits, as well as providing habitat and foraging for fauna species. Although the use of boreholes may be ecologically feasible, it is not economically feasible, which will thus be detrimental to the sustainability of the farm and the job security of the labour.

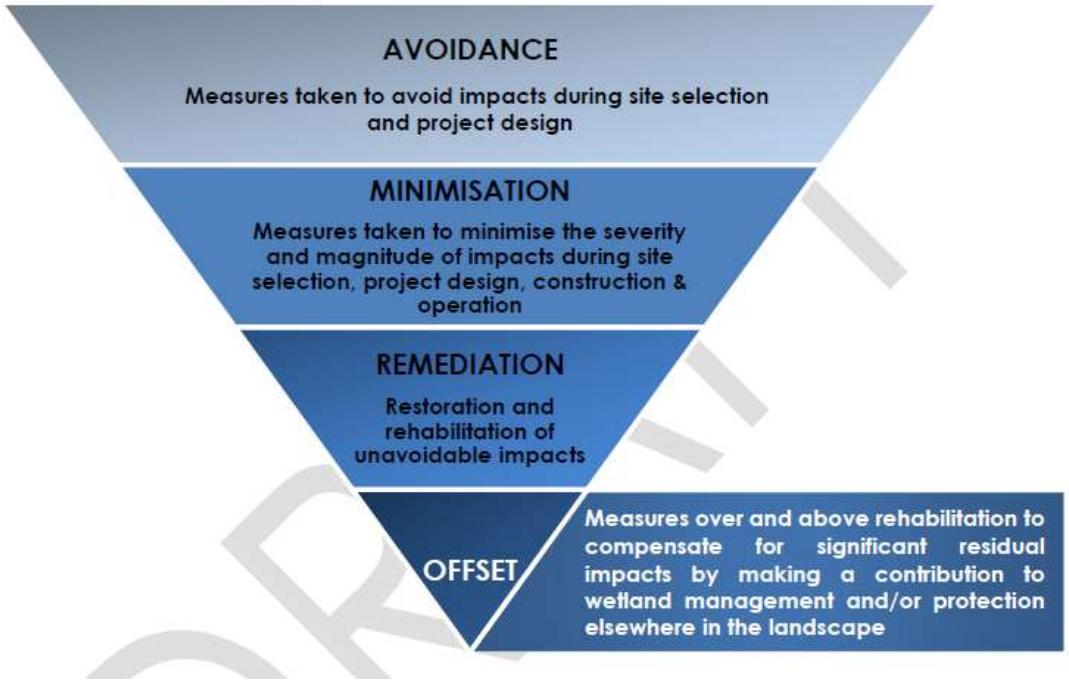


**Figure 7:** Diagram illustrating the 'mitigation hierarchy'.

### 5.3.1 Description of Services

**Electricity**

The proposed project may require electrical supply during the construction phase, however; this can be supplied via portable generators for the duration of the construction phase or as and when required. During the operational phase, water from the proposed dam will be pumped via the associated pipelines to surrounding lands for irrigation of the macadamia nut trees.

**Water**

Potable water, for use during the construction phase of the proposed project, will be sourced from an existing supply on Hopewell Farm.

**Sewage**

Portable toilets will be provided by the contractor responsible for the proposed project. These portable toilets will be utilised for the disposal of domestic sewage generated by the construction labour, which will comprise approximately ten labour.

**Waste and Domestic Refuse**

Any waste and domestic refuse generated by the construction labour during the construction phase will be collected and stored onsite in an appropriate manner, before disposal at a registered landfill site. The proposed project will not generate any waste or domestic refuse during the operational phase. Solid and hazardous waste, such as concrete waste generated during the construction phase, will be handled in a similar manner, collected and stored appropriately onsite and then disposed of at an appropriate hazardous waste landfill site.

**Traffic and Access**

To access Hopewell Farm, from Pietermaritzburg, travel on the N3 towards Durban. Take the offramp onto the N2 towards Ballito. In Ballito, turn left onto Ballito Drive and travel for approximately 1.7 km towards the R102 Road. Turn left onto the R102 Road and travel for approximately 800 m. Turn right onto Esenembi Road and travel for approximately 8 km to Hopewell Farm, located at GPS coordinates 29°28'11.89" S and 31°07'34.54" E.

Traffic volumes are not expected to directly increase as a result of the proposed project, nor are the type of vehicles utilising the roads anticipated to change. During the construction phase, there will be construction vehicles and equipment onsite, but this machinery will continue to remain onsite until project completion and will therefore not impact on traffic or access roads. Farm machinery and equipment will be used for the agricultural activities. Thus, no significant traffic related impacts are anticipated during the construction phase and operational phase of the proposed project.

# 6 ALTERNATIVES

The EIA Regulations require an identification and investigation of alternatives. These could include alternative layouts, activities, locations, infrastructure, land uses as well as the 'do-nothing' alternative. For the purposes of the Scoping Phase, several alternatives were identified. These alternatives and their feasibilities have been evaluated in the EIA Phase and reported on in this Report.

For the proposed project, five different types of alternatives have been identified:

- Do-nothing – the assessment of environmental and socio-economic impacts if the proposed project or any of its alternatives do not proceed.

- Dam size – the assessment of alternative dam wall heights (and storage capacities).
  - The preferred dam wall height of 10 m (and storage capacity of 67 000 m³);
  - A dam wall height less than 10 m (and storage capacity less than 67 000 m³); and
  - A dam wall height more than 10 m (and storage capacity more than 67 000 m³).

- Dam location – the assessment of alternative dam locations.
  - The preferred dam site located at GPS coordinates 29°27'49.48" S and 31°07'49.87" E; and
  - A dam site located upstream of the preferred dam site. Please note that a dam site downstream of the preferred dam site would not be possible since this property is not owned by the Applicant.

- Dam configuration – the assessment of alternative dam configurations.
  - A single dam (preferred); and
  - Two small dams which collectively hold the equivalent amount of water as a single dam.

- Cultivation sites – the assessment of alternative cultivation sites.
  - The preferred cultivation sites; and
  - Alternative cultivation sites to be investigated during the EIA Phase.

The abovementioned types of alternatives have been assessed in detail during the EIA Phase (Refer to **Section 10**).

## 6.1 DO-NOTHING

The do-nothing alternative would be to continue operating Hopewell Farm as is, and without the proposed dam establishment and cultivation of land to macadamia nut trees.

**POSITIVE**

- If the do-nothing alternative is chosen, the farm will continue to operate with the existing water supply and cultivated lands;

- As there would be no construction phase, there would be no potential for negative impacts, such as noise and dust nuisances, erosion and sedimentation, pollution potential and encroachment of alien invasive vegetation;
- The identified HGM Units, and fauna and flora communities will not be impacted;
- Time, money and effort will no longer need to be put into the implementation of the recommendations and mitigation measures; and
- The hydrological flow and stream flow characteristics will not be altered, thus water flow to downstream water users and the surrounding catchment, and to maintain the ecological reserve, will continue at its current rate.

**NEGATIVE**

- If the do-nothing alternative is chosen, the farm will continue to operate with the existing water supply and cultivated lands;
- As such, it is highly unlikely that the farm will remain sustainable given the importance of farmers to utilise economies of scale;
- The job security of the labour employed on the farm relies on its sustainability;
- When water is scarce, and during times of desperation, water would need to be brought in with tankers, or obtained from alternative water sources for the irrigation of the macadamia nut trees;
- Thus, this has the potential to impact on the macadamia nut production and yield, and in turn will have an impact on the sustainability of the farm and thus the job security of the labour;
- The areas which would have benefited from the implementation of the recommendations and the mitigation measures will not benefit;
- There will be no water storage for use in times of drought, which could reduce the resilience of the farming operation, and which could have both social and economic impacts during and post times of drought;
- The implementation of the rehabilitation recommendations, the 15 m freshwater ecosystem habitat buffer and the 5 m riparian habitat buffer will not take place, and thus the benefits associated with these mitigation measures will not be realized; and
- This will negatively impact on the skills development, income generation and quality of life of the labour. It also has the potential to have long-term impacts on the area, the local municipality as well as the local economy.

## 6.2 DAM SIZE

The currently preferred dam design has a storage capacity of 67 000 m³ and occupies an area of approximately 1.5 ha. The proposed dam has a wall height of 10 m, and a wall length of 98 m.

The dam design specifications were based on the following:

- The volume of water required for the irrigation of the proposed cultivation sites;
- The volume of water required to meet the EWR;
- The volume of water required to increase the sustainability of the farm; and

- The need to avoid high impacts on the HGM Units and biodiversity.

Thus, given the abovementioned information, the proposed 67 000 m³ dam is adequate to ensure the irrigation of the proposed cultivation sites, as well as to ensure the sustainability of the farm. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. The impacts of the proposed dam on flora and fauna is considered negligible.

By establishing a dam with a wall height less than 10 m and a storage capacity less than 67 000 m³, will result in a smaller volume of water being stored. Although a smaller dam would have the potential to conserve surrounding HGM Units and biodiversity, a dam of this storage capacity would not be sufficient to meet the irrigation demand of the proposed cultivation sites. This will likely have an impact on the macadamia nut tree growth, yield and production as water is required to be supplemented to support their critical flowering stage. The Applicant would have to supplement the water supply in the dam via the drilling of boreholes or pumping water from alternative water sources on the farm. While the use of boreholes is ecologically feasible, it is not economically feasible, and will thus be detrimental to the sustainability of the farm and the job security of the labour. In the long-term, a dam of this storage capacity has the potential to result in more negative impacts than benefits. It has the potential to impact on the long-term sustainability of the farm, and thus the job security of the labour.

The establishment of a dam with a wall height more than 10 m and a storage capacity more than 67 000 m³ was also assessed. Based on the results of the Preliminary Yield and Groundwater Alternatives Report there is not sufficient water in the catchment for a dam of this size (Refer to **Appendix Q**). The topography of the area does not allow for a dam of this size either. Based on the results of the Dam Design and Engineering Report, the maximum dam size that the topography will allow, is the preferred and proposed dam size of 67 000 m³ (Refer to **Appendix N**). Although a dam of this size will result in a larger volume of water being stored and would thus be able to meet the irrigation demand of the proposed cultivation sites along with other water demands on the farm, it will not only result in the inundation of existing cultivated lands on the farm, but it will also result in the inundation of a larger portion of both freshwater ecosystem habitat and riparian habitat. This will more than likely require the implementation of a wetland and biodiversity rehabilitation and offset measures due to the significant loss of these sensitive habitats. This will result in significant costs, time and effort required to put into conserving this habitat. In the long-term, a dam of this size will have the potential to result in additional costs in terms of dam maintenance. A dam of this size will have a profound impact on hydrological flow and stream flow characteristics, thus water flow to downstream water users and to sustain the EWR would be severely compromised.

**POSITIVE**

- The currently preferred dam specifications optimise the ratio of the dam wall height and length to volume, and thus allows for maximum storage capacity with relatively lower construction costs;

- The proposed dam will have minimal impacts on the surrounding HGM Units and biodiversity;
- The dam size is adequate for the operation and sustainability of the farm, and irrigation of the proposed cultivation sites;
- It will result in the long-term sustainability of the farm through increased macadamia nut production and yields, as well as increased employment opportunities for the farm. This in turn will result in the generation of skills development, income generation, improved quality of life and benefits to the local economy;
- It will result in the generation of freshwater ecosystem habitat, thus fauna and fauna communities will benefit as a result of an additional body of water as well as wetland habitat;
- The implementation of the recommendations and mitigation measures will allow for the surrounding HGM Units and biodiversity to be maintained and monitored;
- Feedback from the Preliminary Yield and Groundwater Alternatives Report confirmed that there is sufficient water available in the catchment for the proposed dam, as well as to sustain the EWR (Refer to **Appendix P**);
- The proposed dam will result in a minimal reduction in water flows, and would be feasible to meet the normal flow and legal flow requirements, and the irrigation demand of the farm; and
- As such, the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low.

**NEGATIVE**

The size of the proposed dam will result in the loss of 0.199 ha of freshwater ecosystem habitat.

## 6.3 DAM WALL LOCATION

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E, and it falls on a tributary of the Mhlali River.

The dam wall location was based on the following:

- The natural topography of the area;
- The extent of the catchment and availability of water;
- The distance to the surrounding lands proposed to be cultivated;
- The limited impacts on downstream water users and hydrological flow; and
- The minimal impacts on HGM Units and biodiversity.

Thus, given the abovementioned information, the proposed dam wall site is adequate. The dam is proposed to be established at the lowest point on the tributary of the Mhlali River in order to maximise the potential catchment of water. It is also located within the deepest section of the tributary and thus has the most potential to maximise the catchment. The natural topography of the area allows the dam to be established in a relatively easy manner, with minimal construction costs, and impacts on the surrounding HGM Units and biodiversity. The topography is relatively steep which thus allows the depth of the dam to be maximised. The proposed dam site minimises the loss of HGM Units and biodiversity.

Feedback from the Preliminary Yield and Groundwater Alternatives Report has confirmed that there is sufficient water available in the catchment for the proposed dam, as well as to sustain the EWR (Refer to **Appendix P**). The proposed dam will result in a minimal reduction in water flows, and would be feasible to meet the normal flow and legal flow requirements, as well as the irrigation demand of the farm. As such, the impacts associated with the proposed dam on the EWR and downstream water users are considered low.

Alternative dam wall locations would have either resulted in significant impacts to HGM Units and biodiversity, or would have provided inadequate water storage for the irrigation demand of the proposed cultivation sites. It is important to note that the preferred and proposed dam site is located approximately 50 m from the farm property boundary. As such, a dam site further downstream cannot be assessed due to this property not being owned by the Applicant. Any dam wall location further upstream would have resulted in 'less catchment' and thus a lower volume of water to full the dam. Further upstream of the proposed dam site, the tributary is smaller and the area is relatively flat. As such, the depth and thus the water volume would not be able to be maximised. This would have impacted on the sustainability of the farm, as not enough water would be available to support the critical flowering phase of the macadamia nut trees. In order to obtain the correct water volume further upstream to meet the farms irrigation demand, multiple smaller dams would need to be established. This was not considered feasible due to the larger area of HGM Units and biodiversity that would be lost, as well as the costs associated with the establishment of multiple smaller dams in comparison to one single dam.

**POSITIVE**

- The natural topography maximises the dam size. As such, it will result in relatively lower construction costs as it is to be established on the deepest section of the tributary;
- The proposed dam minimises the impacts on surrounding HGM Units and biodiversity;
- There is sufficient water available within the catchment and at the proposed dam wall location; and
- There are limited impacts on downstream water users and hydrological flow.

**NEGATIVE**

The location of the wall of the proposed dam will result in the loss of 0.199 ha of freshwater ecosystem habitat.

## 6.4 DAM CONFIGURATION

The currently preferred dam configuration comprises a single dam with a storage capacity of 67 000 m³ and occupies an area of approximately 1.5 ha. The proposed dam has a wall height of 10 m, and a wall length of 98 m.

The dam configuration was based on the following:

- The natural topography of the area;

- The extent of the catchment and availability of water;
- The distance to the surrounding lands proposed to be cultivated;
- The limited impacts on downstream water users and hydrological flow; and
- The minimal impacts on the HGM Units and biodiversity.

Thus, given the abovementioned information, the proposed dam configuration is adequate. The natural topography of the area allows for a single dam to be established in a relatively easy manner, with minimal construction costs, and impacts on the surrounding HGM Units and biodiversity.

The establishment of multiple (two or three) smaller dams which collectively hold the equivalent amount of water as the single dam, has the potential to result in increased sedimentation, and thus the potential to impact on a dams storage capacity and ability to store water. The volume of silt discharged into a dam is the same whether it be a single or multiple dams. As a result, the percentage of storage capacity reduced in two or three smaller dams would be much greater in comparison to a single dam. Multiple smaller dams are thus ineffective as long-term storage solutions as they often act as sumps capturing sediment and losing storage capacity.

**POSITIVE**

- The establishment of a single dam in comparison to multiple smaller dams of the equivalent storage capacity allows for a shorter construction phase and relatively lower construction costs. As such, it allows the disturbed areas to be rehabilitated and revegetated as soon as possible;
- A single dam has the potential to result in less impacts to surrounding HGM Units and biodiversity;
- The need for the implementation of recommendations and mitigation measures for a single dam are far less and easier to implement in comparison to multiple dams;
- The earth fill storage ratio is a measurement of cost feasibility. Earth fill required for the embankment and spillway of a single dam will thus be less costly; and
- Water loss in dams is related to evaporation from wind and the sun, and from heavy rainfall which results in overflow of water via the spillway. The more efficient a dam, the lower the water loss is per square metre of storage capacity. The yield of a dam is thus greater from a single dam in comparison to multiple smaller dams. A single dam is thus more beneficial from a water conservation point of view.

**NEGATIVE**

Potential for less ‘edge’ and thus less suitable habitat for fauna and flora communities.

## 6.5 CULTIVATION SITES

The cultivation of approximately 45.8 ha of existing cultivated land to macadamia nut trees is proposed to take place on Hopewell Farm. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past

ten years (i.e. indigenous vegetation).

Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes. The pipelines will have a total length of approximately 3.28 km. It is important to note that the proposed pipeline installation will not intersect any watercourses or land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation). As such, the pipelines will cross the existing cultivated lands, and will utilise the dam wall for connection to the pump station.

During the Scoping Phase, approximately 45 ha of land was proposed to be cultivated to macadamia nut trees (Refer to **Figure 8 – dark green shading**). Based on feedback from the Specialist Studies, the proposed cultivation sites have been realigned and now total 45.8 ha (Refer to **Figure 8 – light green shading**). Figure 8 clearly illustrates how the currently preferred cultivation sites have been realigned and increased in extent in order to maximise the area available to be planted to macadamia nut trees based on the proposed 15 m freshwater ecosystem habitat buffer. Please note that the light green shading in Figure 8 illustrates the additional area available to be planted to macadamia nut trees in addition to the dark green shading.

Approximately 55 ha of arable land is available within the property surrounding the proposed dam site. Out of this 55 ha, 45.8 ha of land is suitable for macadamia nut trees which forms part of the proposed project. The remaining 10 ha of arable land will continue to be planted to sugar cane.

The proposed cultivation sites were based on the following:

- Proximity to the proposed dam to minimise the length of the pipelines;
- The availability of arable and flat land suitable for macadamia nut trees;
- The need to maximise the size of the proposed cultivation sites based on the surrounding non-sensitive area and topography;
- The need to maximise the size of the proposed cultivation sites based on the yield of the proposed dam;
- The need to minimise potential impacts on HGM Units and biodiversity;
- The need to be located outside of the HGM Units and associated 15 m freshwater ecosystem habitat buffer; and
- The need to be located outside of the 5 m riparian habitat buffer.

Thus, given the abovementioned information, the proposed cultivation sites are adequate.

**POSITIVE**

- The proposed cultivation sites are located on Hopewell Farm which is owned by the Applicant;
- They respect the HGM Units and associated 15 m freshwater ecosystem habitat buffer;
- They respect the 5 m riparian habitat buffer;
- The proposed cultivation sites have resulted in their size being maximised;

- They are located in close proximity to the proposed dam which reduces costs associated with the installation of pipelines;
- Potential impacts on surrounding HGM Units and biodiversity has been minimised. This in turn will result in the preservation of any fauna and flora communities; and
- Majority of the proposed cultivation sites have been historically cultivated.

**NEGATIVE**

None.


**Figure 8:** Map showing the previous (dark green shading) and currently proposed cultivation sites (light green shading), Umhlali, KwaZulu-Natal (Source: Google Earth).

# 7 PUBLIC PARTICIPATION PROCESS

A Public Participation Process was undertaken according to Regulation 39 to 44 of the EIA Regulations as promulgated under Section 24 of the NEMA.

## 7.1 APPLICATION FOR SCOPING AND EIA PROCESS

The official Application Form, provided by the DEDTEA, was completed with all the necessary details, including contact details and signed declarations by the Applicant and the Environmental Consultant. It also includes a description of the proposed project, property location and applicable Listed Activities. This was submitted to the DEDTEA on 19 April 2022, and acknowledgement was received on 03 May 2022. All I&APs were notified of the Reference Number, and their opportunity to provide comment on the Draft Scoping Report for an additional 30 days on 03 May 2022. I&APs were informed that no substantial changes had been made to the proposed project since circulation of the Draft Scoping Report on 31 March 2022. A copy of the Application Form and the notification letter to I&APs has been included in **Appendix C**.

A Pre-application meeting was held virtually via Zoom on 16 March 2022 (Refer to **Appendix D** for the Pre-application meeting agenda and minutes).

## 7.2 NOTIFICATION OF THE PROPOSED PROJECT DURING THE SCOPING PHASE

A Public Participation Process, as described in Regulation 39 to 44 of the EIA Regulations was undertaken. This included:

- Newspaper adverts were published in the North Coast Courier (English) on 25 March 2022 and in the Isolezwe (Zulu) on 04 February 2022 to notify I&APs of the proposed project (Refer to **Appendix F**);
- Site posters in English and Zulu were placed on the access roads to Hopewell Farm on 21 February 2022 (Refer to **Appendix G**);
- A Background Information Document (BID) was circulated by fax, email post, or hand delivered from 11 February 2022 (Refer to **Appendix H**);
- A list of I&APs was compiled, and is continually updated (Refer to **Appendix I**);
- Hard copies of all comments received following circulation of the newspaper adverts, site posters and BID are included in **Appendix J**;
- A Scoping Phase Public Information Session was held at Hopewell Farm on 23 March 2022 (Refer to **Appendix K** for the Public Information Session notification, attendance register, handout, minutes and a photograph);
- Hard copies of all comments received following circulation of the Draft Scoping Report are included in **Appendix L**;
- Hard copies of all comments received following circulation of the Final Scoping Report are included in **Appendix E**;
- The Scoping Phase acceptance is included in **Appendix E**; and

- Hard copies of all comments received following circulation of the Draft EIA Report are included in **Appendix M.**

## 7.3 INTERESTED AND AFFECTED PARTIES

A register of I&APs was compiled at the outset of the proposed project. This includes names and contact details of authorities, Government / Municipal Departments, NGOs, local interest groups, and surrounding neighbours and landowners (Refer to **Appendix I)**. The list of I&APs is continually updated.

## 7.4 BACKGROUND INFORMATION DOCUMENT

Written notification in the form of a BID was circulated from 11 February 2022 by email, post, fax or hand delivered to relevant authorities, and surrounding neighbours and landowners (Refer to **Appendix H**).

Comments received following circulation of the newspaper adverts, site posters and BID are included in **Table 2** (Refer to **Appendix J**). Additional information has also been provided where it has become available.

**Table 2:** Comments received following circulation of the newspaper adverts, site posters and BID.

| I&AP | COMMENT | RESPONSE |
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| Nandipha Sontangane<br>Department of Forestry, Fisheries and Environment<br>11 February 2022 | • The Department of Forestry, Fisheries and Environment (DFFE) appreciates the opportunity given to register as an Interested and Affected Party (I&AP) for the abovementioned project.<br>• DFFE, through the sub-directorate Forestry Regulations and Support is the authority mandated to implement the National Forests Act (NFA, Act No. 84 of 1998), by regulating the use of natural forests and protected tree species in terms of the said Act.<br>• With reference to the BID, the project involves the cultivation of approximately 45 ha of land as well as the construction of a dam.<br>• The desktop analysis indicates that there are woody vegetation units associated with the riparian areas.<br>• Furthermore, the list of triggered activities includes 'The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation'.<br>• It is brought to our attention that DFFEs concerns pertain to the potential of the proposed project impacting on existing natural forests as well as protected tree species in terms of the NFA.<br>• The Department therefore requests that a Vegetation Assessment should be conducted for the proposed sites. | • Noted.<br>• This has been noted.<br>• This is correct, 45.8 ha of land is proposed to be planted to macadamia nut trees.<br>• Noted.<br>• This is correct.<br>• This has been noted.<br>• A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). The vegetation within the proposed study sites was identified to be classified as KwaZulu-Natal Coastal Belt Grassland which has a status of Critically Endangered and Nominally Protected. It must be noted that no grasslands were identified within the proposed study sites, and they are no longer representative of the KwaZulu-Natal Coastal Belt Grassland vegetation type. Critical Biodiversity Areas (CBAs) classified as Optimal were identified adjacent to the proposed study sites. With regards to flora, although no flora of conservation concern was identified within the proposed study sites, the riparian vegetation in the valley bottoms was identified to be in a good ecological condition, and thus represents important corridors for the dispersal of indigenous vegetation and stabilising watercourses. Approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is |

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| | | considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Based on the proposed recommendations, no riparian vegetation will be impacted by the proposed cultivation since 1.45 ha of riparian vegetation within a portion of the proposed cultivation sites has been excluded from the proposed project, and a 5 m riparian habitat buffer from the outer tree line must be implemented along the boundary of the proposed cultivation sites. |
| | • This study should include the type and condition of the vegetation species found within the site, as well as the extent of which they will be impacted. | • See above response. |
| | • Furthermore, the Department requests that the study addresses the potential impacts of the proposed activities on natural forests, as well as protected tree species occurring within or in close proximity to the proposed project site. | • See above response. |
| | • Further comments will be issued upon receipt and review of the following report inclusive of the Vegetation Assessment. | • Thank you. A copy of the Draft Scoping Report and the Draft EIA Report was sent to the DFFE. |
| | • Should any further information be required, please do not hesitate to contact this office. | • Thank you. |
| | • This letter does not exempt you from considering other legislations. | • The Environmental Consultant is aware of this. |
| Bongiwe Thabede<br>Department of Agriculture and Rural Development<br>25 February 2022 | • **General** | • The following general comments have been taken into consideration. |
| | • The Provincial Department of Agriculture and Rural Development (DARD): Agricultural Resource Management, Land Use Regulatory Unit acknowledges the receipt of the abovementioned application. | • Noted. |
| | • The main objective of the application is to request the Provincial Department of Agriculture and Rural Development to recommend, provide valuable inputs and comments on the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land. | • Noted. |
| | • **Background** | • The following background comments have been taken into consideration. |
| | • The Applicant, Linnear Sugar Farming (Pty) Ltd, wishes to apply for Environmental Authorisation for the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land to macadamia nut trees. | • This is correct, 45.8 ha of land is proposed to be planted to macadamia nut trees. |
| | • Activities require either a Basic Assessment Process (GNR 324 and | • The following comments relating to the proposed |

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| | GNR 327) or a Scoping and EIA Process (GNR 325) to be undertaken for Environmental Authorisation.<br>The following activities are triggered by the proposed development.<br>325, Activity 16: *"The development of a dam where the highest part of the dam wall…"*<br>Applicable as the proposed dam is to have a wall height of approximately 9.5 m.<br>327, Activity 9: *"The development of infrastructure exceeding 1000 metres in length…"*<br>Potentially applicable as water is proposed to be pumped via pipelines from the dam to the surrounding cultivated lands for irrigation purposes.<br>327, Activity 12: *"The development of –*<br>*i. canals exceeding 100 square metres in size;…"*<br>Dam is proposed to have a storage capacity of approximately 67 900 $m^3$.<br>327, Activity 19*: "The infilling or depositing of any material…"*<br>Applicable as the dam wall will result in the excavation of material from a watercourse. The installation of pipelines may potentially result in the excavation of material from a watercourse.<br>327, Activity 27: *"The clearance of an area of 1 hectare or more, but less than 20 hectares…"*<br>Potentially applicable as the propose dam will occupy a surface area of approximately 2.3 ha. This will be confirmed once feedback from the Specialist Studies has been received.<br>The dam has the following specifications:<br>Storage capacity – 67 900 $m^3$;<br>Surface area – 2.3 ha;<br>Wall height – 9.5 m; and<br>Wall length – 105 m.<br>The cultivation of 45 ha to macadamia nut trees is over the land that is currently planted with sugar cane.<br>There is possibility that the new activity will not observe the 32 m buffer of a watercourse. | project are correct. |
| | • **Comments on proposal**<br><br>• The submitted application is humbly requesting for a dam and a change in commodity which will be over an area of 45 ha.<br>• The planting of macadamia nut trees is viewed by the office as having lesser impact on the soils compared to the sugar cane that is currently | • The following comments have been taken into consideration.<br>• This is correct, 45.8 ha of land is proposed to be planted to macadamia nut trees.<br>• This has been noted. |

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| | planted.<br>• However, there is less information that was provided for both activities this is said admitting this is just a BID.<br>• The office to make a call highly recommends the Applicant to submit a detailed application with the relevant Specialist Studies.<br>• Land Use Regulatory Unit modestly request that the submitted application indicates the total size of both farm portions and attaches the relevant Specialist Studies.<br>• **Recommendation**<br>• Please be advised that the Provincial Department of Agriculture and Rural Development: Agricultural Resource Management: Land Use Regulatory component cannot conclude on the submitted BID.<br>• The sound recommendation is highly dependent on receiving a detailed application. | • The Final Scoping Report comprised detailed information surrounding the proposed project. A copy of the Draft EIA Report was sent to the DARD.<br>• The Specialist Studies have been included as Appendices in the Final EIA Report.<br>• The properties total 67 ha in extent.<br>• The following recommendation has been taken into consideration.<br>• Noted.<br>• A copy of the Draft Scoping Report and the Draft EIA Report was sent to the DARD. |
| Brian Akkiah<br>Eskom<br>10 March 2022 | • Please see comments below, as per your request received by Eskom on 10th February 2022.<br>• We confirm that an investigation has been carried out with regard to the supply of electricity, as well as any encroachment into Eskom's Servitudes, in respect to the application as set out above referring to Locality Map and KMZ file supplied by Green Door Environmental.<br>• Please note that Eskom's Overhead Lines namely, Avon / Ottawa 1 275 kV Line and Driefontein NB22 11 kV Line traverse the area of interest supplied by you.<br>• Please see attached drawing number ER_INV_124_2022 showing Eskom infrastructure in relation to the proposed area of interest.<br>• It is very important to note that Eskom's LV data is not reflected on the drawing supplied.<br>It is advisable you contact Eskom immediately, should you physically detect any conductors and / or underground cables on the ground and not reflected on the drawing.<br>Eskom's call centre number is 08600 37566.<br>Please note that NO CONSTRUCTION close to any of Eskom's infrastructure is permitted without a site inspection and written permission from Eskom.<br>Eskom's Senior Supervisor for Kwadukuza is Mr. Mathews Mngadi, who can be contacted on 032 437 4773 / 061 501 6065 or Mr Mxolisi Mpanza on 032 437 4701 / 079 215 6649 and email mngadiMS@eskom.co.za and mpanzama@eskom.co.za. | • The following comments have been taken into consideration.<br>• Noted.<br>• This has been noted and will be communicated with the Applicant and the Engineer.<br>• Thank you.<br>• All conditions stipulated by Eskom will be included as a recommendation of the EIA Report. |

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| | | Please contact Eskom's Senior Manager Ms. Lungile Motsisi on 011 800 5734 / 083 589 9165 and email motsisl@eskom.co.za for comments on Eskom's Transmission Lines (275 kV Lines).<br>Eskom wishes to advise you that in the event of your client wanting to move any Eskom infrastructure, it will be at the Applicant's / developer's cost.<br>The conditions listed below should be adhered to.<br>Please direct all correspondence to the Lands and Rights Manager Mr. SS Nsele on email nselesi@eskom.co.za.<br>Building Restrictions for 11-kV Overhead Power line:<br>No building or structures may be erected or installed above or below the surface of the ground, neither may any material which might endanger the safety of this power line be place within 15 (sixteen) meters from the center line of this power line, on either side (overall servitude width 30 meters), without prior written confirmation from Eskom.<br>Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the stipulated area by the Applicant, his / her agent, contractors, employees, successors in title, and assigns.<br>The Applicant indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom's services or apparatus or otherwise.<br>Eskom will not be held responsible for damage to the Applicant's equipment.<br>The Applicant's attention is drawn to the Electricity Act (Act No. 41 of 1987, as amended in 1994), Section 27(3), which stipulates that the Applicant can be fined and / or imprisoned as a result of damage to Eskom's apparatus.<br>No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and / or services, without prior written permission having been granted by Eskom.<br>If such permission is granted the Applicant must give at least seven working days prior notice of the commencement of work.<br>This allows time for arrangements to be made for supervision and / or precautionary instructions to be issued.<br>The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by | |

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| | Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act (Act No. 85 of 1993).<br>Equipment shall be regarded electrically live and therefore dangerous at all times.<br>A developer taking a new supply from Eskom, an increase of supply or line deviation is required to make an application to Eskom via the Eskom toll free number 0860037566.<br>This application will be processed in terms of Eskom's standard customer connection tariffs, conditions and policies at the developers cost.<br>There is an attached indemnity form that you are required to complete and return to Land Development as part of your acknowledgement.<br>The Data, Information and Drawings is made available to you by Eskom Holdings SOC Limited on an 'AS IS' basis, without warranty of any kind, including without limitation, the warranties of fitness for a particular purpose.<br>Availability of this data, information and drawings does not constitute scientific publication.<br>The data, information and drawings may contain errors, be incomplete or outdated).<br>Eskom Holdings SOC Limited and its employees make no representation or warranty, express or implied, including without limitation any warranty of fitness for a particular purpose or warranties as to the quality, accuracy, completeness or currency of the data, information and drawings.<br>This approval is valid for 12 months only, after which the Applicant must reapply if the work undertaken has not been completed.<br>• Any changes / deviations to the original application must be immediately communicated to this office together with a new application.<br>• All costs for damage/s to Eskom infrastructure during construction or any work carried out by the Applicant shall be borne by the Applicant. | • This will be done.<br>• This will be communicated with the Applicant. |

## 7.5 PRE-APPLICATION MEETING

A Pre-application meeting was held virtually via Zoom on 16 March 2022. The Pre-application meeting agenda and minutes are included in **Appendix D**.

Comments received during the Pre-application meeting are summarised and responded to in **Table 3** below. Additional information has also been provided where it has become available.

**Table 3:** Comments received during the Pre-application meeting.

| COMMENT (DEDTEA) | RESPONSE (ENVIRONMENTAL CONSULTANT) |
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| • It is important that you confirm what areas are under sugar cane and will require a crop change or rotation, and what areas will be transformed from indigenous vegetation. | • 45.8 ha of existing cultivated land will be planted to macadamia nut trees. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation). |
| • The lengths and diameters of the pipelines will need to be confirmed. Although it is likely that these specifications will not trigger a Listed Activity, the installation of the pipelines will trigger as they will cross a watercourse and result in the movement of material. | • GNR 327, Activity 9 is no longer applicable to the proposed project. The diameter of the pipelines will be 200 mm, and the lengths of the pipelines is 3.28 km. The pipelines will not intersect any watercourses or cross any indigenous vegetation. |
| • The description of the project must be linked to the specific Listed Activities. | • Refer to Section 2 of the Report. |
| • You have included 'proposed cultivation sites' in the project description. This can be removed, as just one polygon could show the areas to be planted to macadamia nut trees. | • This has been removed. |
| • GPS coordinates of each of the points of the dam polygon must be provided, as well as the watercourse crossings i.e. where the pipelines cross the watercourse. | • Refer to Section 5 of the Report for GPS coordinates of the dam polygon. The pipelines will not intersect any watercourses or any indigenous vegetation. |
| • The DEDTEA will only authorise a Listed Activity that has been applied for. Thus, the project description or description of each component must speak to or make reference to the Listed Activity. | • Noted. Refer to Section 2 of the Report. |
| • We will need to know exactly how many $m^3$ of material will be infilled or removed from the watercourse associated with the proposed dam and pipeline installation. | • Noted. Approximately 10 500 $m^3$ of material will be excavated from a watercourse for the proposed dam establishment. |
| • The KwaDukuza Local Municipality and iLembe District Municipality addresses are incorrect. | • Correspondence has been made with both municipalities and the addresses have been confirmed as correct. This has been included in the Application Form (Refer to **Appendix C**). |
| • Listed Activities must be consistent with each other. Thus, those Listed Activities mentioned in the BID must also be mentioned in the Application Form. I&APs must be notified should some Listed Activities be removed. | • This has been done. GNR 327, Activity 9 and 27 is no longer applicable to the proposed project. The Application Form was amended prior to submission to the DEDTEA for a Reference Number. |
| • Alternatives must be properly investigated and assessed. If this has not been done, then there will be a flaw in the process. | • This has been done. Refer to Section 6 of the Report for a detailed assessment of alternatives. |
| • In terms of the Public Participation Process, the North Coast Courier is the most popular English advert. I am happy with the Isolezwe as the Zulu advert. We usually expect that the Public Participation Process is undertaken following the Pre-application meeting. | • The English newspaper advert has since been published in the North Coast Courier (Refer to **Appendix F**). |
| • All relevant I&APs must be considered i.e. farmers associations, and the | • All relevant I&APs have been included in the list of I&APs (Refer to |

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| rate payers association must also be included if the proposed study site is near to a residential area. | **Appendix I**). |
| • In terms of the Specialist Studies, the Specialist Studies for the WULA must be included in the Scoping and EIA Process. We will need to know whether there is sufficient water available and whether the dam specifications are correct for the volume of water available. | • All Specialist Studies which form part of the WULA have been included in this Report. |
| • It is important to note that the DEDTEA do not just accept offsets. The impact hierarchy must be complied with in terms of how the impacts have been avoid and minimised. The area and quality of wetland system that will be lost will also need to be explained, along with how this will be compensated for. The DEDTEA will not allow for a net loss. I would like to stress the aspect of a net loss. This area has been historically farmed, thus any loss must be appropriately compensated for. | • This has been noted. According to the Biodiversity Assessment and the Wetland Assessment, no biodiversity or wetland rehabilitation measures or offsets are required to be implemented (Refer to **Appendix O and B**). However, specific rehabilitation recommendations have been proposed by the Wetland Specialist due to the loss of 0.199 ha of freshwater ecosystem habitat associated with the proposed dam establishment. In terms of the 'mitigation hierarchy', the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project (Refer to **Figure 7**). While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour (Refer to Section 5.3). |
| • All Specialist Studies must be informed by the Screening Tool. If you feel like a Specialist Study is not required, you need to motivate why it should not be undertaken if it is not required. | • This has been done. Refer to Section 12 of this Report. |
| • The Environmental Management Programme (EMPr) needs to be site specific. It must cover all aspects on the project as well as the rehabilitation aspects. The EMPr must be compiled in line with Appendix 4 of the EIA Regulations. All mitigation measures, outcomes and objectives must form part of the EMPr. | • This has been done (Refer to **Appendix T**). |
| • In terms of potential fatal flaws, any loss of indigenous vegetation must be appropriately classified and quantified, and compensated for. We do not want to see a net loss of indigenous vegetation, as well as wetland systems. | • This has been done. According to the Biodiversity Assessment, approximately 0.48 ha of the proposed dam site was identified to comprise riparian habitat (Refer to **Appendix O**). However, the loss of this vegetation is considered acceptable given that the remainder of the riparian habitat within the farm has been well conserved. Based on the recommended mitigation measures, the proposed cultivation will not result in the loss of any indigenous vegetation. According to the Wetland Assessment, the proposed cultivation sites will not result in any loss to the HGM Units since they fall outside of the proposed 15 m freshwater ecosystem habitat buffer. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat. Specific recommendations have been proposed to be implemented to compensate for this loss. |
| • In terms of modern agricultural practices, farmers generally cultivate | • This has been done. Refer to **Appendix P** for the Biodiversity |

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| within the riparian areas. All riparian areas must be identified and appropriate buffers must be put in place. These buffers can be properly rehabilitated to compensate for the loss of sensitive aspects. | Assessment and **Appendix B** for the Wetland Assessment which were compiled for the proposed project. |
| • The Application Form should only be lodged once all information is at hand and you are ready. We are strict with approving extensions to time frames. We are happy for the Draft Scoping Report to be circulated to I&APs without a Reference Number. Once the Reference Number has been received, I&APs must be notified. It can then be circulated for the legislated 30 day comment period in the Final Scoping Report. We will require an electronic copy as well as a hard copy of each report. | • The official Application Form, provided by the DEDTEA, was completed with all the necessary details, including contact details and signed declarations by the Applicant and the Environmental Consultant. It also includes a description of the proposed project, property location and applicable Listed Activities. This was submitted to the DEDTEA on 19 April 2022 and acknowledgement was received on 03 May 2022. All I&APs were notified of the Reference Number, and their opportunity to provide comment on the Draft Scoping Report for an additional 30 days on 03 May 2022. I&APs were informed that no substantial changes had been made to the proposed project since circulation of the Draft Scoping Report on 31 March 2022. A copy of the Application Form and the notification letter to I&APs has been included in **Appendix C**. |
| • We are very particular in terms of reviewing and comment provision if aspects have not been attended to. | • Noted. |
| • An attendance register will not be required for this virtual Pre-application meeting. The endorsement of the minutes will serve as an attendance register. | • Thank you. |

## 7.6 SCOPING PHASE PUBLIC INFORMATION SESSION

A Scoping Phase Public Information Session was held at Hopewell Farm on 23 March 2022. The purpose of the Public Information Session was to provide information to I&APs of the proposed project, present the major comments raised to date regarding the proposed project and give I&APs the opportunity to raise any additional comments which they feel must be addressed during the Scoping and EIA Process. All I&APs were personally invited by fax, e-mail, phone or post from 28 February 2022.

The Public Information Session was to take place in the form of a presentation (handout format) where all available information on the proposed project and Scoping and EIA Process to be followed would be presented in handout format. Please note that no comments were raised during the Public Information Session.

The following project team member was present:

- Kerryn Arbuthnot – Green Door Environmental (Environmental Consultant).

The Public Information Session notification, attendance register, handout, minutes and a photograph is included in **Appendix K**.

## 7.7 CIRCULATION OF THE DRAFT SCOPING REPORT

Copies of the Draft Scoping Report were circulated to the following I&APs for review and comment:

- Malcolm Moses – Department of Economic Development, Tourism and Environmental Affairs;
- Bayo Ogunnaike – Department of Agriculture and Rural Development;
- Nandipha Sontangane – Department Forestry, Fisheries and Environment;
- Khethiwe Methula – Department of Water and Sanitation;
- Brian Akkiah – Eskom;
- Michele Schmid – Department of Transport;
- Nerissa Pillay – Ezemvelo KZN Wildlife;
- Bernadet Pawandiwa – KwaZulu-Natal Amafa and Research Institute;
- Salora Pillay – iLembe District Municipality; and
- NJ Ndabani – KwaDukuza Local Municipality.

The Draft Scoping Report was circulated to all I&APs for a 30 day comment period from 31 March 2022. All I&APs were notified of the availability of the Draft Scoping Report and their opportunity to provide comment. Electronic copies of the Draft Scoping Report were made available to all I&APs on request.

Please note that the official Application Form, was completed and submitted to the DEDTEA on 19 April 2022, and acknowledgement was received on 03 May 2022. All I&APs were notified of the Reference Number, and their opportunity to provide comment on the Draft Scoping Report for an additional 30 days on 03 May 2022. I&APs were informed that no substantial changes had been made to the proposed project

since circulation of the Draft Scoping Report on 31 March 2022. A copy of the Application Form and the notification letter to I&APs has been included in **Appendix C**.

Comments received following circulation of the Draft Scoping Report and the Application Form notification letter are summarised and responded to in **Table 4** (Refer to **Appendix L**). Additional information has also been provided where it has become available.

**Table 4:** Comments received following circulation of the Draft Scoping Report.

| I&AP | COMMENT | RESPONSE |
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| Stephanie Denison<br>I&AP<br>26 March 2022 | • Please register me as an I&AP for the proposed new dam on Hopewell Farm.<br>• Please could you send me GPS coordinates for the dam?<br>• I own a property which borders on the uMhlali River so am interested in any storage or abstraction taking place in this catchment.<br>• I'll wait for the Draft SR.<br>• I see from the BID that it's not a huge storage capacity anticipated, just a big wall! | • You have been added to the list of I&APs (Refer to **Appendix I**.<br>• Please see attached for the BID.<br>• This has been noted. Thank you.<br>• Electronic copies of the Draft Scoping Report were made available to all I&APs on request from 31 March 2022. Electronic copies of the Draft EIA Report were made available to all I&APs on request from 19 August 2022.<br>• This is correct and the size of the wall is due to the topography of the area. |
| Stephanie Denison<br>I&AP<br>05 April 2022 | • Thanks for the link.<br>• The list of Specialist Studies looks good.<br>• Can I request that the Hydrologist please make recommendations on an outflow rate (summer and winter) to ensure that there is sustained flow downstream to the uMhlali River? | • Noted.<br>• Noted.<br>• A Hydrology and Flood Line Assessment was compiled for the proposed project (Refer to **Appendix P**). Please see below the simulated average EWR releases from the proposed dam to the downstream environment, for a simulation run with runoff data from 1920 to 2010. It can be seen that in dry seasons the releases satisfy the EWR requirements, and in wet seasons the overflow is more than what is required for the EWR. Based on the below, the simulated average released are well above the low flow requirements. The EWR / Instream Flow Requirement (IFR) is as follows:<br>Average = 25 % of the Mean Annual Runoff (MAR);<br>Maintenance of low flow = 16.020 (27.16 % of the MAR);<br>Drought low flow = 2.630 (4.46 % of the MAR); and<br>Maintenance of high flow = 9.907 (16.79 % of the MAR). |
| Nandipha Sontangane<br>Department of Forestry, Fisheries and Environment | • The Department of Forestry, Fisheries and Environment (DFFE) appreciates the opportunity given to comment on the DSR for the abovementioned project.<br>• DFFE through the sub-directorate Forestry Regulations and Support | • This has been noted.<br>• This has been noted. |

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| 06 April 2022 | is the authority mandated to implement the National Forests Act (NFA, Act No. 84 of 1998) by regulating the use of natural forests and protected tree species in terms of the said Act.<br>• With reference to the document and the desktop analysis conducted, majority of the natural vegetation within the proposed site has been transformed due to sugar cane farming.<br>• However, there are strips of closed canopy woody vegetation associated with what appears to be drainage lines.<br>• It is brought to your attention that DFFEs (Forestry) concerns pertain to the potential of the proposed project impacting on existing natural forests (s) as well as protected tree species in terms of the NFA.<br>• The Department, therefore, requests that a Vegetation Assessment should be conducted for the proposed site. | • This is correct.<br>• This is correct.<br>• Noted.<br>• A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). The vegetation within the proposed study sites was identified to be classified as KwaZulu-Natal Coastal Belt Grassland which has a status of Critically Endangered and Nominally Protected. It must be noted that no grasslands were identified within the proposed study sites, and they are no longer representative of the KwaZulu-Natal Coastal Belt Grassland vegetation type. CBAs classified as Optimal were identified adjacent to the proposed study sites. With regards to flora, although no flora of conservation concern was identified within the proposed study sites, the riparian vegetation in the valley bottoms was identified to be in a good ecological condition, and thus represents important corridors for the dispersal of indigenous vegetation and stabilising watercourses. Approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Based on the proposed recommendations, no riparian vegetation will be impacted by the proposed cultivation since 1.45 ha of riparian vegetation within a portion of the proposed cultivation sites has been excluded from the proposed project, and a 5 m riparian habitat buffer from the outer tree line must be implemented |

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| | | along the boundary of the proposed cultivation sites. |
| | • This study should include, the type and condition of the vegetation species found within the site as well as the extent of which they will be impacted. | • See above response and refer to **Appendix O**. |
| | • Furthermore, the Department requests that the study addresses the potential impacts of the proposed activities / amendments may have on natural forests (s) as well as protected tree species occurring within or in close proximity to the proposed project site. | • See above response. The relevant recommendations have been proposed which will ensure that the riparian vegetation that falls within the proposed cultivation sites is protected (Refer to **Appendix O**). |
| | • The Environmental Management Programme (EMPr) should include / address the establishment and improvement of ecological corridors and possible conservation servitudes. | • This has been done (Refer to **Appendix T**). |
| | • Furthermore, a fire management plan should be incorporated into the EMPr. | • A Fire Management Plan has been included in the EMPr (Refer to **Appendix T**). |
| | • Therefore, informed comments will be issued upon receipt and review of the Environmental Impact Assessment. | • A copy of the Draft EIA Report was sent to the DFFE. |
| | • Should any further information be required, please do not hesitate to contact this office. | • Thank you. |
| | • This letter does not exempt you from considering other legislations. | • This has been noted. |
| Bongiwe Thabede<br>Department of Agriculture and Rural Development<br>20 April 2022 | • **General** | • The following general comments have been taken into consideration. |
| | • The Provincial Department of Agriculture and Rural Development: Agricultural Resource Management, Land Use Regulatory Unit acknowledges the receipt of the abovementioned application. | • This has been noted. |
| | • The main objective of the application is to request the Provincial Department of Agriculture and Rural Development to recommend, provide valuable inputs and comments on the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land. | • Noted. 45.8 ha of existing cultivated land is proposed to be planted to macadamia nut trees. |
| | • **Background** | • The following background comments have been taken into consideration. |
| | • The Applicant, Linnear Sugar Farming (Pty) Ltd, wishes to apply for Environmental Authorisation for the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land to macadamia nut trees.<br>Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm is 67 ha in extent.<br>Activities require either a Basic Assessment Process (GNR 324 and 327) or a Scoping and EIA Process (GNR 325) to be undertaken for | • The following comments relating to the background of the proposed project are correct. |

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| | Environmental Authorisation.<br>The following activities are triggered by the proposed development:<br>GNR 325, Part 16: Applicable as the proposed dam is to have a wall height of approximately 9.5 m.<br>GNR 327, Part 9: Potentially applicable as water is proposed to be pumped via pipelines from the dam to the surrounding cultivated lands for irrigation purposes.<br>GNR 327, Part 12: Applicable as the dam is proposed to have a storage capacity of approximately 67 900 $m^3$.<br>GNR 327, Part 19: Applicable as the dam wall will result in the excavation of material from a watercourse. The installation of pipelines may potentially result in the excavation of material from a watercourse.<br>GNR 327, Part 27: Potentially applicable as the proposed dam will occupy a surface area of approximately 2.3 ha. This will be confirmed once feedback from the Specialist Studies has been received.<br>The dam has the following specifications:<br>Storage capacity – 67 900 $m^3$;<br>Surface area – 2.3 ha;<br>Wall height – 9.5 m; and<br>Wall length 105 m.<br>Water from the dam is planned to be pumped via 200 mm pipelines to the lands for irrigation purposes.<br>The proposed dam will serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle.<br>The proposed dam site falls on a tributary of the Mhlali River within the U3E quaternary catchment and the Pongola to Mtamvuna WMA.<br>There is also the Mhlali River which is located approximately 1.5 k downstream of the proposed site.<br>The cultivation of 45 ha of macadamia nut trees will be over the land that is currently planted with sugar cane.<br>There is a possibility that the new activity will not observe the 32 m buffer of a watercourse.<br>As per the submitted application, there might be an implementation of both wetland and biodiversity rehabilitation measures as to address wetland and biodiversity offsets respectively which are a result of encroachment into indigenous vegetation and within 32 m of a watercourse.<br>• **Comments on proposal** | • The following comments have been taken into |

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| | | consideration. |
| | • Hopewell Farm is indeed a commercial agricultural operation comprising sugar cane and macadamia nut trees. | • This is correct. |
| | • It is believed that the proposed project will diversify and ensure the long-term sustainability of Portion 68 and Portion 116 of Driefonteinen No. 1127. | • This is correct. |
| | • The proposed project is highly supporting agricultural production on the farm as per general assumption definitely it will result to lesser soil disturbance which directly prevents possibilities of soil erosion which might be associated with other cropping commodities. | • This is correct. |
| | • Therefore, the planting of macadamia nut trees is viewed by the office as having a lesser impact on the soils compared to the sugar cane that is currently planted. | • This is correct. |
| | • The other worrying factor might be encroachment to indigenous vegetation and within 32 m of a watercourse but the office is having high hopes that a rehabilitation measure will be implemented as to preserve the National Resources within the area. | • According to the Biodiversity Assessment, approximately 0.48 ha of the proposed dam site was identified to comprise riparian habitat (Refer to **Appendix O**). However, this loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. With the proposed recommendations being implemented, the proposed cultivation sites will not result in the loss of any riparian habitat. According to the Wetland Assessment, the proposed cultivation sites fall outside of the proposed 15 m freshwater ecosystem habitat buffer and will thus not result in the loss of any HGM Units. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat. Specific recommendations have been proposed to mitigate this loss (Refer to **Appendix B**). |
| | • As much as the proposed dam is on a tributary of the Mhlali River but the office highly recommends that downstream water users must be not affected by the proposed development. | • A Hydrology and Flood Line Assessment and a Preliminary Yield and Groundwater Alternatives Report was compiled for the proposed project (Refer to **Appendix P and Q**). The results of these Specialist Studies indicate that there is sufficient water available in the catchment for the proposed dam establishment, which takes into consideration downstream users as well as the EWR. |
| | • For the macadamia nut trees the monitoring and evaluation plan | • This has been included in the EMPr which forms |

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| | should also be incorporated with the daily operational plan.<br>• **Recommendation**<br>• Please be advised that the Provincial Department of Agriculture and Rural Development: Agricultural Resources Management, Land Use Regulatory Component supports the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land to macadamia nut trees, located on Portion 98 and Portion 116 of Driefonteinen No. 1127, Hopewell Farm.<br>• The support is on the basis that all recommendations by Specialists is taken into consideration and mitigation measures are taken as a priority and as according to the CARA Act of 1993. | part of this Report (Refer to **Appendix T**).<br>• The following recommendation has been taken into consideration.<br>• Thank you. This has been noted.<br>• This has been noted. |
| Khethiwe Methula<br>Department of Water and Sanitation<br>22 April 2022 | • The abovementioned document submitted to this office in April refers.<br>• This Department has given due consideration to the Report and has the following comments which needs to be addressed and form part of subsequent environmental processes:<br>• All identified water resources must be protected and treated as sensitive areas, the pollution and degradation of these areas must at all times be prevented.<br>• Page 1 states that the currently preferred dam design is proposed to comprise a storage capacity of 67 900 m³, a surface area of 2.3 ha, a wall height of 9.5 m and a wall length of 105 m.<br>• The Applicant is advised that any dam, which can store more than 50 000 m³ and has a wall of a vertical height of more than five metres, is considered a dam with a safety risk and must be registered.<br>• This is required in terms of Section 120 (1) of the National Water Act (NWA, Act No. 36 of 1998).<br>• The storage of water constitutes a water use in terms of Section 21 (b) “storing water” of the NWA and as such requires a water use authorisation.<br>It is understood from the Report that supplementary irrigation water will be sourced from the dam.<br>The Applicant is advised that taking water from a water resource constitutes a water use in terms of Section 21 (a) “taking water from a water resource” of the NWA and as such requires a water use | • Noted.<br>• The following comments have been taken into consideration.<br>• This will be done. The Applicant will be required to adhere to the EMPr which will include mitigation measures surrounding the management of water resources (Refer to **Appendix T**).<br>• This is correct.<br>• This has been noted. The Applicant is aware that the proposed project requires a WULA to be undertaken. The Scoping and EIA Process forms part of the WULA documentation, which will be submitted to the DWS for consideration. Green Door Environmental has been appointed to undertake the WULA.<br>• Noted. See above response.<br>• The following comments will be taken into consideration during the undertaking of the WULA. |

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| | authorisation.<br>Page 4 and 17 indicate that approximately 50 m pipelines will be installed within 32 m of a watercourse and that there will be excavation of material from a watercourse.<br>Please note that any activity taking place within the riparian habitat or 1:100 year floodline, whichever is the greatest distance constitutes water uses in terms of Section 21 (c) "impeding or diverting the flow of water in a watercourse" and (i) "altering the bed, banks, course or characteristics of a watercourse" of the NWA and must be authorised as such.<br>Further, all watercourses must be delineated according to this Department's Practical field procedure for identification and delineation of wetlands and riparian areas (Department of Water Affairs and Forestry, 2005).<br>Page 30 mentions that portable toilets will be provided during the construction phase of the project.<br>Please provide details relating to sewage management and disposal during the operational phase of the project.<br>It is noted from Page 6 that the Applicant is aware that a Water Use Authorisation will be required for the proposed project.<br>Please note that in terms of Section 22 of the NWA, no person may use water other than as permitted under the NWA.<br>Should the Applicant engage in any activity identified as a water use in terms of Section 21 of the NWA, without the necessary water use authorisation, this will be regarded as an unlawful water use, and the Applicant will be guilty of an offence and liable for a fine or imprisonment as stipulated in Section 151 of the NWA.<br>• The Plan of Specialist Studies to be undertaken for the Environmental Impact Assessment Phase is noted.<br>• Notwithstanding the above, the responsibility rests with the Applicant to identify any source or potential sources of pollution from his undertaking and to take appropriate measures in order to prevent any pollution of the environment.<br>• Failure to comply with the requirements of Section 19 of the NWA could lead to legal action being instituted against the Applicant.<br>• This reply is not an authorisation and does not grant any exemption from the requirements of any applicable Act, Ordinance, Regulation or Bylaw.<br>• Please do not hesitate to contact this office should you have any | • This has been noted.<br>• Noted. This will be incorporated into the WULA. As part of the Scoping and EIA Process, the Applicant will also be required to adhere to the mitigation measures included in the EMPr (Refer to **Appendix T**).<br>• Noted.<br>• Noted.<br>• Thank you. |

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| | concern, comments or queries. | |
| Kashrina Sookraj<br>Department of Economic Development, Tourism and Environmental Affairs<br>25 April 2022 | • The abovementioned matter has reference.<br>• This Department has no comments on the DSR for the Hopewell Farm.<br>• I await the final Scoping Report, please note that this document must be provided to the Department in hard copy once it is available for comment.<br>• Thank you.<br>• Should you have any enquiries related to this communication, please do not hesitate to contact me on the details below. | • The following comments have been taken into consideration.<br>• This has been noted.<br>• Noted. A hard copy of the Final Scoping Report and the Draft EIA Report was sent to the DEDTEA offices. This Report has been submitted to the DEDTEA for decision.<br>• Noted.<br>• Thank you. |
| Nomonde Ndebele<br>Ezemvelo KZN Wildlife<br>04 May 2022 | • Thank you for forwarding the Draft Scoping Report for the abovementioned application to Ezemvelo KZN Wildlife (Ezemvelo) for review and comment.<br>• Based on the information supplied, and the interrogation of Ezemvelo's biodiversity databases, Ezemvelo does not anticipate that the proposed activity would result in significant negative impacts upon local biodiversity, provided that best practice mitigation measures are implemented during the construction and operational phase.<br>• Please be informed that Ezemvelo does not require additional documentation with regards to this project, except when additional biodiversity information becomes available and/or additional biodiversity impacts are identified which are not presented in the abovementioned report. | • This has been noted.<br>• Noted.<br>• This has been noted. A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). With regards to flora, approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Although majority of the proposed cultivation sites were identified to be highly modified and comprise sugar cane, a portion of the proposed study sites comprises 1.45 ha of riparian vegetation, and portions are located near to a watercourse comprising riparian vegetation. Based on the proposed recommendations to be implemented, the proposed cultivation sites fall outside of and will not impact on any riparian vegetation. With regards to fauna, the larger mammals and reptiles were identified to be absent due to majority of the proposed study sites comprising sugar cane. However, suitable habitats |

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| | | were identified to be present for smaller fauna species. Although no fauna of conservation concern are likely to occur within the proposed study sites due to its highly modified nature, the riparian vegetation is likely to support viable populations of many common fauna species such as avifauna. Birds were identified to be active onsite, and it is highly likely that many bird species will utilise the proposed study sites. Butterfly species were also identified to be active and included *Chrysippus aegyptius, Junonia oenone, Hypolimnas misippus, Eurema hecavbe solifera,* and *Amauris albimaculata*. A copy of the Draft EIA Report was sent to Ezemvelo KZN Wildlife. |
| | • In this regard, it is respectively requested that the new biodiversity information is highlighted in the cover letter for any further reports.<br>• We trust that all the appropriate measures to safeguard the ecological integrity of the receiving environment will be implemented in accordance with the sustainable development principles of the National Environmental Management Act 107 of 1998.<br>• Should any biodiversity issues arise, please do not hesitate to contact this office. | • Noted. See above response.<br>• See above response.<br>• Thank you. |
| Mbali Mpanza<br>KwaDukuza Local Municipality<br>09 May 2022 | • I would like to register as an Interested and Affected Party (I&AP) for the abovementioned proposed development:<br>• Ms Mbali Mpanza, KwaDukuza Local Municipality. | • Noted. We have added you to the list of I&APs (Refer to **Appendix I**). |

## 7.8 CIRCULATION OF THE FINAL SCOPING REPORT

The Final Scoping Report was submitted to the DEDTEA on 24 May 2022 for decision. All I&APs were notified of the availability of this Report and their opportunity to provide comment. Electronic copies of the Final Scoping Report were made available to all I&APs on request.

The Scoping Phase acceptance was obtained on 13 June 2022 (Refer to **Appendix E**).

Comments received following submission of the Final Scoping Report are summarised and responded to in **Table 5** (Refer to **Appendix E**). Additional information has also been provided where it has become available.

**Table 5:** Comments received following submission of the Final Scoping Report.

| I&AP | COMMENT | RESPONSE |
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| Kashrina Sookraj<br>Department of Economic Development, Tourism and Environmental Affairs<br>13 June 2022 | • The abovementioned report received by this Department on 17 May 2022 has reference.<br>• The Department has reviewed the report and accepts the Final Scoping Report with the following conditions:<br>• All Specialist Studies must be conducted according to the requirements specified in the DFFE screening tool.<br>• Page 10 of the Scoping Report, 3.1.2, this document was not authored by Economic Development, Tourism and Environmental Affairs (EDTEA), it was authored by Department of Environmental Affairs and Tourism (DEAT).<br>• Please make the relevant changes to the report regarding this error.<br>• The Department looks forward to receiving the Environmental Impact Assessment Report.<br>• Should you require any assistance with the content of this letter, please do not hesitate to contact the contact person on the details provided on this letterhead. | • Noted.<br>• This has been noted. Thank you.<br>• Refer to Section 12 of this Report. All Specialist Studies have been informed by the Screening Tool. Should the Environmental Consultant feel that a Specialist Study is not required, motivation has been provided.<br>• This has been amended. Thank you.<br>• See above response.<br>• A copy of the Draft EIA Report was sent to the DEDTEA. This Report has been submitted to the DEDTEA for decision.<br>• Thank you. |

## 7.9 EIA PHASE PUBLIC INFORMATION SESSION

Please note that due to the poor attendance during the Scoping Phase Public Information Session, an EIA Phase Public Information Session was not held. I&APs were given an opportunity to communicate with the Environmental Consultant prior to the Draft EIA Report 30 day comment period being reached should they have wished for an EIA Phase Public Information Session to be held. Please note that no communication was received by the Environmental Consultant from I&APs regarding the need for an EIA Phase Public Information Session to be held.

## 7.10 CIRCULATION OF THE DRAFT EIA REPORT

Copies of the Draft EIA Report were circulated to the following I&APs for review and comment:

- Malcolm Moses – Department of Economic Development, Tourism and Environmental Affairs;
- Bayo Ogunnaike – Department of Agriculture and Rural Development;
- Nandipha Sontangane – Department Forestry, Fisheries and Environment;
- Khethiwe Methula – Department of Water and Sanitation;
- Brian Akkiah – Eskom;
- Michele Schmid – Department of Transport;
- Nerissa Pillay – Ezemvelo KZN Wildlife;
- Bernadet Pawandiwa – KwaZulu-Natal Amafa and Research Institute;
- Salora Pillay – iLembe District Municipality; and
- NJ Ndabani – KwaDukuza Local Municipality.

The Draft EIA Report was circulated to all I&APs for a 30 day comment period from 19 August 2022. All I&APs were notified of the availability of the Draft EIA Report and their opportunity to provide comment. Electronic copies of the Draft EIA Report were made available to all I&APs on request.

Comments received following circulation of the Draft EIA Report are summarised and responded to in **Table 6** (Refer to **Appendix M).** Additional information has also been provided where it has become available.

**Table 6:** Comments received following circulation of the Draft EIA Report.

| I&AP | COMMENT | RESPONSE |
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| Nandipha Sontangane<br>Department of Forestry, Fisheries and Environment<br>07 September 2022 | • The Department of Forestry, Fisheries and Environment (DFFE) appreciates the opportunity given to review and comment on the Draft EIA Report for the abovementioned development. | • This has been noted. |
| | • DFFE through the sub-directorate Forestry Regulations and Support, is the authority mandated to implement the National Forests Act (NFA, Act No. 84 of 1998) by regulating activities affecting natural forests and protected tree species in terms of the said act throughout South Africa. | • Noted. |
| | • The purpose of the Act is to promote sustainability forest management and the development of forests for the benefit of all. | • Noted. |
| | • With reference to the EIA document, the vegetation of the site falls within the KwaZulu-Natal Coastal Belt Grassland, however, the proposed site has been transformed due to anthropogenic activities, mainly sugar cane farming. | • This is correct. |
| | • The indigenous riparian vegetation within the site is degraded with a few woody species found along the stream. | • This is correct based on the Specialist Study results. |
| | • The dam construction will not have a detrimental impact on indigenous trees in a natural forest and protected tree species, therefore, the Department has no objection to the proposed dam construction, however, recommends the following: | • This has been noted. |
| | • The condition of the remaining riparian vegetation and other forest communities within the property ought to be improved by rehabilitating these strips using 100% indigenous trees and the removal of alien invasive plants. | • Noted. Please note that the riparian vegetation will be protected through the implementation of the 15 m freshwater ecosystem habitat buffer as well as the 5 m riparian habitat buffer (Refer to **Appendix B and O**). |
| | • Furthermore, these areas should be maintained as conservation and ecological corridors. | • This has been noted. |
| | • The edges / boundaries of the dam should be rehabilitated using indigenous trees which are endemic to the area. | • This has been included as a recommendation of the EIA Report. |
| | • This rehabilitation should be achieved through the compilation of a rehabilitation plan. | • See above response. This has been included as a recommendation of the EIA Report. Should the proposed project obtain Environmental Authorisation, a Rehabilitation Plan will be required to be compiled and approved by the DEDTEA and the DFEE prior to the construction phase commencing. |
| | • A map indicating the extent of the ecological corridors as well as the | • This will be included in the Rehabilitation Plan. |

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| | extent of the area that will be rehabilitated along the edges of the dam.<br>• Should any further information be required, please do not hesitate to contact this office.<br>• This letter does not exempt you from considering other legislations. | <br>• Thank you.<br>• Noted. The Environmental Consultant is aware of this. |
| Bongiwe Thabede<br>Department of Agriculture and Rural Development<br>12 September 2022 | • **General**<br>• The Provincial Department of Agriculture and Rural Development: Agricultural Resource Management, Land Use Regulatory Unit acknowledges the receipt of the abovementioned application.<br>• The main objective of the application is to request Provincial Department of Agriculture and Rural Development to recommend, provide valuable inputs and comments on the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of existing cultivated land.<br>• **Background**<br>• The Applicant, Linnear Sugar Farming (Pty) Ltd, is proposing the establishment of a 67 000 m³ dam and the cultivation of 45.8 ha of existing land to macadamia nut trees located on portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm.<br>Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm are both 67 ha in extent and are used as one property.<br>Hopewell Farm is indeed a commercial agricultural operation comprising sugar cane and macadamia nut trees.<br>The proposed project is trying to diversify and to ensure the long-term sustainability of the farm.<br>The proposed project comprises of the following components:<br>Establishment of a 67 000 m³ dam;<br>Cultivation of approximately 45.8 ha of existing cultivated land; and<br>Installation of associated pipelines and pump station for irrigation purposes.<br>The proposed dam will have a storage capacity of 67 000 m³, a surface area of 1.5 ha, a wall height of 10 m and a wall length of 98 m.<br>Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes.<br>The pipelines will have a total length of approximately 3.28 km.<br>As per the submitted report, no watercourse will be intersected by the | • The following comments have been taken into consideration.<br>• This has been noted.<br>• This has been noted.<br>• The following comments have been taken into consideration.<br>• The following comments surrounding the proposed project are correct. Please note that the proposed dam is to have a storage capacity of 67 900 m³. |

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| | proposed pipeline.<br>However, the proposed dam establishment will result in the loss of 0.199 ha of watercourse habitat and there are some rehabilitation recommendations that are proposed.<br>The project is twofold as there is an application of Water Use License in terms of the WULA but if the license is not obtained, macadamia will be produced under dry land.<br>Listed Activities that are impacted by the proposed project:<br>GNR 325, Activity 16 – Applicable as the proposed dam is to have a wall height of approximately 10 m;<br>GNR 327, Activity 9 – Potentially applicable as water is proposed to be pumped via pipelines from the dam to the surrounding cultivated lands for irrigation purposes;<br>GNR 327, Activity 12 – Dam is proposed to have a storage capacity of approximately 67 900 m³ and will be established on a tributary of the Mhlali River;<br>GNR 327, Activity 19 – Applicable as the dam wall will result in the excavation of 10 500 m³ of material from a watercourse; and<br>GNR 327, Activity 27 – Is no applicable as the establishment of a dam will only require 0.78 ha of indigenous vegetation.<br>The area that will be inundated by the dam will be cleared of boulders, trees, stumps, grass and topsoil.<br>The topsoil will be stockpiled and used on the face of the dam to allow for the establishment of a suitable grass cover.<br>No areas proposed to cultivation to macadamia nut trees need the clearance as it is planted with sugar cane. | |
| | • **Comments on proposal** | • The following comments have been taken into consideration. |
| | • The submitted application is requesting comment and recommendations for development of a dam and change of farm use from sugar cane to macadamia. | • This has been noted. |
| | • As per submitted application, the change is pushed by the fact that the Applicant feels that the returns made from the sugar cane are lesser than returns that will be from macadamia nuts. | • This is correct. |
| | • The land to be cultivated is currently planted with sugar cane and that was prior to 1998 that is according to the application. | • This is correct. |
| | • Land Use Management has reviewed the application and the following should be noted: | • Noted. |
| | • There are specifications of a dam that also included the positives and negatives that the dam might come with but mitigation measures have | • The Applicant will be required to adhere to all recommendations and mitigation measures |

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| | been drawn by the Applicant. | included in this Report. |
| | • The dam and lands to be cultivated are located in close proximity to each other as to minimise the length of the pipelines. | • This is correct. |
| | • No sensitive area or topography will be impacted by the proposed project as the Applicant was able to draw expected buffer zones. | • This is correct. The relevant freshwater ecosystem habitat and riparian habitat buffers are included in **Appendix B and O**. |
| | • As per our last communication, the Applicant was able to address all the issues that were raised which included indigenous vegetation encroachment, downstream users, and a monitoring and evaluation plan. | • This is correct. |
| | • Land Use Management again request that the evaluation plan should take the following into consideration: | • The following comments have been taken into consideration. |
| | • Rehabilitation plan of any wetlands onsite; | • The rehabilitation recommendations have been included in the EMPr which the Applicant will be required to adhere to (Refer to **Appendix T**). |
| | • Make sure that the soils are irrigable and has good drainage system; | • The soils are considered adequate for macadamia nut trees as the Applicant is familiar with the farm and the surrounding soil types. |
| | • There should be a soil data that address the issue of soil depth thus ensuring the profitability of the new venture; and | • See above response. An adequate investigation on soils was undertaken for the proposed dam site and has been included in the Geotechnical Report (Refer to **Appendix S**). |
| | • Protection of natural vegetation and resources should be of the biggest priority. | • Please note that this Scoping and EIA Process was based around the investigation into the potential impacts on natural vegetation and resources. As such, the relevant Specialist Studies were undertaken, and specific mitigation measures and recommendations proposed to ensure that environmental impacts are minimised. |
| | • **Recommendation** | • The following recommendations have been taken into consideration. |
| | • Please be advised that the Provincial Department of Agriculture and Rural Development: Agricultural Resource Management, Land Use Regulatory Component supports the proposed establishment of a 67 900 m³ dam and the cultivation of approximately 45 ha of land to macadamia nut trees, located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm. | • This has been noted. Thank you. |
| | • The support is on the basis that all recommendations by Specialists are taken into consideration and mitigation measures are taken as a priority and as according to CARA, Act of 1983. | • Noted. The Applicant will be required to adhere to all recommendations and mitigation measures which have been included in this Report. |

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| Mbali Mpanza<br>KwaDukuza Local Municipality<br>19 September 2022 | • The abovementioned report was received by the Environmental Management section on 22 August 2022.<br>• The KwaDukuza Municipality Environmental Management Section raises the following comments:<br>• The proposed project comprises the following components:<br>Establishment of a 67 000 m³ dam;<br>Cultivation of approximately 45.8 ha of existing cultivated land; and<br>Installation of 200 mm pipelines with a total length of approximately 3.2 km and a pump station.<br>• It is noted that the dimensions for the pump station structure have not been mentioned in the report.<br>• Therefore, the dimensions / design of the pump station structure must also be included in the report to provide a holistic / comprehensive picture of the proposed development.<br>• Wetland delineation and buffer zones (Wetland Assessment, dated June 2022) must be clearly depicted on the proposed development layout incorporating the proposed infrastructures and land use activities for the proposed developments on the retrospective sites.<br>• Recommendations from the Specialist Studies respectively must be incorporated in the Environmental Management Programme, dated 19 August 2022, in all phases of the development accordingly.<br>• Please do not hesitate to contact the Environmental Section, on the abovementioned contact details, if you have any queries regarding this correspondence. | • Noted.<br>• The following comments have been taken into consideration.<br>• The following comments surrounding the proposed project are correct.<br>• The pump station will be 4 m x 4 m in extent.<br>• Refer to **Figure 3 and 4** which shows the pump house.<br>• This has been done (Refer to **Figure 11**).<br>• All Specialist Study recommendations and mitigation measures have been included in this Report which the Applicant will be required to adhere to.<br>• Thank you. |
| Masupha Mathenjwa<br>iLembe District Municipality<br>19 September 2022 | • The above Draft Environmental Impact Assessment Report, dated 17 August 2022 and received by iLembe District Municipality (IDM) on 26 August 2022, refers.<br>• Below are findings after the assessment of the proposed site and development:<br>• 1. The proposed dam will be located within an environmentally disturbing property utilised to cultivate sugarcane produce.<br>• 2. There will be no land clearance, including indigenous vegetation, required for the cultivation of the proposed macadamia nut trees and the dam's construction.<br>• As a result, the 45.8 ha proposed for the cultivation of the macadamia nuts will be planted in an area zoned for Commercial Agriculture, according to the iLembe Environmental Management Framework (EMF). | • The following comments have been taken into consideration.<br>• This has been noted.<br>• Noted.<br>• Please note that the sugar cane will be cleared to allow for the macadamia nut trees. Land will be required to be cleared to allow for the establishment of the proposed dam.<br>• This has been noted. |

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| | • Such an area is essential for food production, security, and employment opportunities linked to agricultural activities.<br>• 3. According to EMF, a portion of the proposed property where the dam is proposed is situated within the Terrestrial Biodiversity Management zone.<br>• This zone comprises sensitive environmental features such as watercourses, wetlands and other water bodies.<br>• This zone represents the lifeblood (water resources) and foundations (ecologically functional and protected areas) for the overall environmental functioning and balance within the iLembe District.<br>• Such an area requires proper management to ensure that other aspects and activities that rely on high-quality natural resources remain viable.<br>• 4. The assessment of the proposed site indicates that riparian habitat exists in the valley within the proposed site, which appears to be in good ecological condition.<br>• 5. Common ecological effects of the dam construction are: | • This is correct.<br>• This has been noted.<br>• This is correct. Please note that the riparian vegetation will be protected through the implementation of the 15 m freshwater ecosystem habitat buffer as well as the 5 m riparian habitat buffer (Refer to **Appendix B and O**).<br>• The proposed dam site was appropriately assessed and it was determined that should the relevant recommendations and mitigations measures be implemented, the proposed dam establishment is acceptable from a wetland and biodiversity perspective.<br>• The Applicant will be required to adhere to all mitigation measures which form part of this Report (Refer to **Appendix T**).<br>• This is correct. A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). With regards to flora, approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Although majority of the proposed cultivation sites were identified to be highly modified and comprise sugar cane, a portion of the proposed study sites comprises 1.45 ha of riparian vegetation, and portions are located near to a watercourse comprising riparian vegetation. Based on the proposed recommendations to be implemented, the proposed cultivation sites fall outside of and will not impact on any riparian vegetation.<br>• The following comments have been taken into consideration. Please note that all potential impacts associated with the proposed dam establishment were appropriately assessed by the |

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| | | Specialists. |
| | • 5.1 Water quality is altered dramatically; | • During the construction phase, water quality may potentially be impacted. However, once construction is complete, the dam will perform a beneficial role in increasing water quality. Water quality related mitigation measures have been included in the EMPr which the Applicant will be required to adhere to (Refer to **Appendix T**). |
| | • 5.2 The dam system experiences water pollution; | • See above response. |
| | • 5.3 Aquatic biodiversity declines as the system become closed and move in and out; | • Feedback from the Preliminary Yield and Groundwater Alternatives Report has confirmed that the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low (Refer to **Appendix Q**). It is important to note that the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam. Please note that an Aquatic Assessment was not undertaken as the tributary is non-perennial, and as such, there is no water to sample and thus no aquatic habitat to support. |
| | • 5.4 The altered habitat is unsuitable for the native riverine community; | • See above response. There is sufficient water available within the catchment to sustain the EWR. As such, water will be regularly released from the proposed dam in order to sustain both riparian habitat and freshwater ecosystem habitat, as well as fauna and flora. |
| | • 5.5 The natural movement of water and sediment is disrupted, accumulating sediment; along the dam wall and weir. | • Mitigation measures surrounding the management of sediment and soil erosion have been included in the EMPr which the Applicant will be required to adhere to (Refer to **Appendix T**). Based on the Specialist Study results, the positive impacts associated with the proposed dam establishment far outweigh the negative impacts. |
| | • 6. In light of the above, IDM does not oppose the proposed development. | • This has been noted. |
| | • However, the developer should take note of the following: | • The following comments have been taken into consideration. |

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| | • 6.1 The developer to provide details on the dam construction. | • Please refer to Section 5.2 for a detailed description of the proposed dam and its specifications. |
| | • The height of the weir and other information. | • See above response. |
| | • 6.2 The proposed dam establishment can affect natural features downstream, resulting in water supply shortages. | • This is incorrect. A WULA is being undertaken for the proposed project. The EWR will be required to be released from the proposed dam, along with any other legal flow requirements which will be included in the WUL. |
| | • Therefore, there should be a proper assessment of the possible impacts of the proposed dam downstream of the proposed area. | • This has been appropriately assessment (Refer to **Appendix Q**). The proposed dam will have minimal impacts on the ecological reserve and downstream water users. |
| | • 6.3 The proposed dam establishment has the potential to generate siltation that will affect the uMhlali River. | • Mitigation measures surrounding the management of sedimentation and soil erosion has been included in the EMPr which the Applicant will be required to adhere to (Refer to **Appendix T**). |
| | • Therefore, a plan must be in place to control soil erosion and sediment during the project's construction phase. | • See above response. |
| | • The developer must include such a plan in the Environmental Management Programme (EMPr). | • This has been done (Refer to **Appendix T**). |
| | • It should include managing the dam to avoid siltation and turbidity of adjacent drainage lines and other water bodies. | • This has been done. |
| | • 6.4 The closing of the rivers to form a dam often deeply modify the local aquatic ecology, which shifts from the river to Lake Habitat. | • Due to the tributary being non-perennial, there is no aquatic habitat to support. As such, the proposed dam will have minimal impacts on aquatic species. |
| | • Suppose aquatic species, such as migratory fish, decide to use the dam as a habitat. | • Due to the spillway design and releases from the dam, fish species (if present), will be able to migrate downstream. However, due to the tributary being non-perennial, the presence of fish species is highly unlikely. |
| | • In that case, the applicant must indicate how such species will be accommodated by the proposed system, so there is free movement in and out of the system. | • See above response. |
| | • 6.5 The closing of the river into a dam often led to weed invasion, especially to riparian vegetation. | • Please note that alien invasive vegetation clearing, and the rehabilitation and revegetation of bare and disturbed areas has been included in the EMPr which the Applicant will be required to adhere to (Refer to **Appendix T**). |

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| | • The EMPr should indicate how such problems will be solved for the project's lifecycle.<br>• 6.6 As a result of the proposed site being previously used for agricultural activities, there is potential for the release of excessive sediment loads into the dam and the release of chemicals as a result of agricultural activities.<br>• Therefore, it is likely that the identified concerns might find their way into the uMhlali River.<br>• Thus, the developer should indicate how such circumstances are to be managed, should they arise due to the implementation of the proposed development.<br>• 6.7 Rivers carry different sediment types down their riverbeds, allowing riverbanks to form.<br>• The construction of a dam blocks the flow of such deposits downstream.<br>• Therefore, the developer should ensure that the proposed dam does not affect the natural processes within this river system.<br>• The developer must ensure that the proposed development complies with all other planning tools applicable to the proposed site, including any other legislation applicable in undertaking the proposed development.<br>• Should you have further enquiries, please do not hesitate to contact the Environmental Specialist, Mr Masupha Mathenjwa, on 032 437 9415 or email: Masupha.Mathenjwa@ilembe.gov.za. | • See above response.<br>• Please note that the implementation of the relevant freshwater ecosystem habitat buffer and riparian habitat buffer will perform a role in preventing the potential impacts to water quality. A flood protection berm or embankment (0.5 m high with a 0.3 m base) must be installed along the sides of the cultivated lands, and a Surface Water Monitoring Programme will be implemented to monitor both the water quality and quantity onsite (Refer to Section 7 of the Hydrology and Flood Line Assessment (Refer to **Appendix P**)).<br>• This is highly unlikely should the mitigation measures included in the EMPr be adhered to (Refer to **Appendix T**).<br>• Please note that it is impossible to predict these such significant downstream impacts, as based on the feedback from the Specialist Studies, these impacts are highly unlikely should the recommendations and mitigation measures be adhered to.<br>• This has been noted.<br>• Due to the constant release of water from the proposed dam, the release of sediments and deposits will not be completely restricted.<br>• See above response.<br>• This has been taken into consideration. This Report forms part of the WULA which will be submitted to the DWS.<br>• Thank you. |
| Kashrina Sookraj Department of Economic Development, Tourism | • The abovementioned report received by this Department on 22 August 2022 has reference.<br>• The Department has reviewed the DEIR and has the following comments: | • The following comments have been taken into consideration and addressed within this Report.<br>• This has been noted. |

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| and Environmental Affairs<br>22 September 2022 | • Project description:<br>• The project description fails to adequately describe the proposal.<br>• Page 18 makes reference to Appendix M, the report must be unpacked and details provided in the project description.<br>• It is unclear if the irrigation pipelines will cross any watercourses, as the way in which the description is worded, it appears as if the pipelines cross watercourses which have been previously cultivated.<br>• Please reword this description.<br>• This section further goes on to describe a connection to a pumpstation.<br>• Explain how all these aspects tie together in the project.<br>• Page 18 speaks of the loss of 0.199 ha of watercourse habitat and will require specific rehabilitation measures, however, it is unclear what will be undertaken. | • The following comments related to project description have been taken into consideration.<br>• See below response.<br>• Please note that page 18 refers to the 'Property Location and Land Description'. **Appendix M** which was the Dam Design and Engineering Report, does not need to be unpacked here. This section merely refers to the location of the property and the description of land. Thus, just the dam design specifications have been quoted from **Appendix M** and used in this section. The Dam Design and Engineering Report has been unpacked in Section 5.2 which refers to 'The Proposal'.<br>• It has been highlighted in the Report (Refer to the Executive Summary, Introduction and Section 5.2) and shown in Figure 3, that the pipelines will not intersect any watercourses or indigenous vegetation. The pipelines will only cross the existing cultivated lands and will utilise the dam wall for connection to the pump station.<br>• This has been done. See above response.<br>• This is correct and this has been explained throughout the Report.<br>• Section 5.2 of the Draft EIA Report provided this information. Section 5.2 of the Final EIA Report remains unchanged and explains that the proposed project comprises the following components: establishment of a 67 000 m³ dam; cultivation of approximately 45.8 ha of existing cultivated land; and installation of associated pipelines and pump station for irrigation purposes. The pipelines will be connected to the pump station in order for the macadamia nut trees to be irrigated.<br>• Section 5.2, 9.4 and 12.1 of the Draft EIA Report provided this information. The Executive Summary, Introduction and Section 5.2 of the Final EIA Report, which remains unchanged, explained that the specific rehabilitation recommendations include the removal of sugar cane within the 15 m |

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| | | freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite, and makes reference to **Appendix B** which is the Wetland Assessment. Section 9.4 and 12.1 of the Report includes the detailed description of all Specialist Studies, and here the specific rehabilitation recommendations have been explained in detail here. It is our opinion that a detailed description of the proposed project pertaining to the wetland rehabilitation recommendations must be unpacked in detail under the relevant Specialist Study heading in Section 12.1 as well as the Surface Water and Wetland Systems heading in Section 9.4. |
| | • What is 1:3 referring to? | • The Environmental Consultant is unsure whether Section 12.1 or the Wetland Assessment was reviewed by the DEDTEA. This section explains what the 1:3 ratio refers to. Since the proposed dam establishment will result in the loss of freshwater ecosystem habitat from HGM Unit 2, specific rehabilitation recommendations are required to mitigate this loss. This loss can be adequately mitigated against through the implementation of a 1:3 ratio which will require 0.6 ha to be rehabilitated. It is further highlighted in the Wetland Assessment, that as per SANBI (2014), wetland offset guidelines (which is becoming the official Department of Water Affairs endorsed standard for developing wetland offsets) a no nett loss in overall wetland functional area should be adopted. Utilising the Wetland Offset Calculator a ratio of 1:1 was established; however, a recommended ratio of 1:3 has been advised to ensure the loss will provide an overall betterment of the watercourse on site (Refer to **Appendix B**). |
| | • More details are required.<br>• There is mention of loss of 'watercourse habitat', it is unclear as to | • Further information has been included in the Report.<br>• Communication with the Wetland Specialist has |

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| | what this is making reference to. | confirmed that 'watercourse habitat' was used for laymen purposes to be inclusive of wetland and riparian zones, and match wording to water use legislation. However, the Wetland Assessment has now been amended with the term 'freshwater ecosystems' to ensure that confusion is limited and to be aligned with the methodology of the Report. This should resolve the 'watercourse habitat' terminology confusion. |
| | • Is it loss of watercourse itself, the wetland functioning and the loss of wetland vegetation, or just the loss of vegetation? | • See above response. It is loss of freshwater ecosystem habitat. |
| | • Reword and expand. | • This has been done. See above response. |
| | • It is unclear how much of HGM2 will be impacted as a result of the development of the dam and cultivation, clarify this. | • Section 7.1, 9 and 10 (page 30, 44 and 45) of the Wetland Assessment states that 0.199 ha of freshwater ecosystem habitat will be lost from HGM Unit 2. |
| | • The description mentions 0.199 ha, however, this is not clear considering the words wetland habitat is being used. | • See above response |
| | • The impacts associated with the development of the dam, the wall, removal of soil and vegetation have not been identified, discussed or assessed within the entire document. | • This has been done. See above response. |
| | • It is unclear what exactly is proposed, how will it be constructed, how the proposal is linked to the listed activities as the project description fails to describe the proposal adequately. | • Section 5.2 of the Report explains the proposed project in detail. It states that the proposed project comprises the following components: establishment of a 67 000 m³ dam; cultivation of approximately 45.8 ha of existing cultivated land; and installation of associated pipelines and pump station for irrigation purposes. It further goes on to explain how the proposed dam will be established. Section 2.2. of this Report explains how each Listed Activity is applicable to each aspect of the proposed project. |
| | • The discussions in the pre-application meeting emphasised the need to link the project description to the listed activates and this has not been done in this document. | • Refer to Section 5.2 and Section 2.2 of this Report. |
| | • The amount of soil to be moved and removed has also been omitted, this was also discussed in the pre-application meeting and has not been included in the project description. | • This information was provided in the Draft EIA Report, however it has now been added to the Application Form. 10 500 m³ of material will be removed from the watercourse to allow for the proposed dam establishment (Refer to Section |

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| | | 5.2). |
| | • Address this.<br>• The dam wall is not discussed at any point in the project description, all details related to the wall and the construction of the dam wall **must be described in detail**. | • See above response.<br>• Please refer to Section 5.2 of both the Draft EIA Report and the Final EIA Report. The establishment of the dam refers to the establishment of the dam wall since a dam wall is required in order for a dam to perform its role as a storage mechanism. The following is explained: 'Material with high clay content will be placed in the central zone of the embankment and material with a higher sand fraction will be placed in the outer zones of the embankment. All excavations for the earth fill will be below the full supply level of the basin. The entire embankment will be constructed in layers and compacted systematically over each layer. Any holes or depressions that occur in the abutments, core trench or outlet pipe will be hand rammed to maximum compaction.' Section 12.1 and the Dam Engineering Report provides specific details on the dam design specifications (Refer to **Appendix N**). |
| | • Page 28 mentions for the first time a spillway, all details pertaining to the spillway must be described in the project description. | • Please note that a spillway goes hand in hand with a dam. Thus, when the Environmental Consultant refers to 'a proposed dam', this refers to all other components which form part of the dam infrastructure i.e. Dropbox, spillway, wing walls, core, embankment etc. Information on the spillway is presented in Section 5.2, as well as Section 12.1 of this Report. |
| | • It is noted that the information in the executive summary is repeated 4 times in the document, between pages i and 26, please avoid the constant repetition of information which has no new details, it is unnecessary. | • This has been addressed. |
| | • On page 32, reference is made to the Specialist Study found in Appendix O and P. | • Please note that excerpts do not need to be included in these sections, as the Environmental Consultant has not extracted it directly from the Specialist Study word for word. These sections have been put in our words, and the Specialist Study has merely been referenced should further information or clarity be needed. |

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| | • Please note that you must include sections that you are referring to as excerpts from the study. | • See above response. |
| | • Address this. | • See above response. This has been addressed. |
| | • Page 32, 36 and 37 the acronym EWR is used, what does this refer to? | • It refers to Ecological Water Requirement and has been referenced both in the Executive Summary as well as the Introduction of this Report. However, a glossary has since been included in the beginning of the Report. |
| | • A glossary of terms is not included at the beginning of the document and there is no way of identifying what this refers to. | • This has been done. See above response. |
| | • Address this. | • See above response. |
| | • Alternatives: | • The following comments associated with alternatives have been taken into consideration. |
| | • The alternatives mentioned on page 34 under dam size included the preferred option; a dam wall height less than 10 m and a dam wall height more than 10 m. | • This is correct. |
| | • There is only one alternative discussed in the DEIR and that is the preferred option. | • Please note that a discussion on the other two alternatives have been included in the Report. They have now been addressed further (Refer to Section 6 of this Report). |
| | • Discussions related to the two remaining options have not been presented and compared to the preferred option. | • This has been done. See above response. |
| | • Dam locations 3 options have been mentioned – the preferred option, a dam site located upstream and downstream of the preferred option. | • This is correct. |
| | • The EAP has failed to provide information on the 2 other alternatives, which are upstream and downstream of the preferred alternatives. | • This has been addressed further (Refer to Section 6 of the Report). |
| | • It is questioned how was the statement “alternative dam wall locations would have either resulted in significant impacts to HGM Units and biodiversity, or would have provided inadequate water storage for the irrigation demand of the proposed cultivation sites” made, these were never assessed in the Specialist Studies nor does the EAP provide any information showing that this will be the case. | • See above response. |
| | • As discussed in the pre-application meeting and documented in the minutes of this meeting, ‘alternatives must be properly investigated and assessed, if this has not been done, then there will be a fatal flaw in the process’. | • The Environmental Consultant is of the opinion that alternatives have been properly investigated and assessed, and that there are no fatal flaws within the Report (Refer to Section 6). |
| | • From the information provided, there have not been any alternatives provided based on a comparative analysis and therefore the process is fatally flawed. | • See above response. |
| | • These alternatives are unacceptable as there is only one option | • Three alternatives for each section have been |

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| | provided. | investigated and assessed. Given the information provided, it is obvious that the proposed dam alternative is the most preferred due to the information that has been included in Section 6 of this Report. |
| | • Page 70, under climate change, 4 bullet points question how is the project affected by climate change, these questions which are put forward by the EAP are not answered. | • This has been addressed (Refer to Section 8.2 of this Report). |
| | • Impacts and mitigation measures presented do not provide mitigation measures. | • This has been done. See above response. |
| | • Address this. | • This has been done. See above response. |
| | • Need and desirability in terms of impact to the environment is inadequately addressed. | • This has been addressed (Refer to Section 8.3 of this Report). The Environmental Consultant is of the opinion that the need and desirability of the proposed project has been emphasised throughout this section. It will ensure the long-term sustainability of the farm, by diversifying through the planting of macadamia nut trees. The proposed dam will ensure that water available for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle. The need for a reliable source of water is becoming ever more important due to climate change and variability. Thus, it is important that there is water available in the form of a storage mechanism such as a dam, to allow the macadamia nut trees to be irrigated when minimal rainfall is received. As such, increased water storage and availability is important to ensure increased macadamia nut production and yields. The sustainability of the farm will also ensure the job security of the labour as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. |
| | • There is no need shown for the loss of wetlands and wetland vegetation, as well as indigenous vegetation. | • Section 8.3 explains that there will only be a minimal loss of freshwater ecosystem habitat i.e. 0.199 ha and that the relevant rehabilitation recommendations will be implemented to mitigate this loss. The recommendations and mitigation |

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| | | measures proposed by the Specialists will ensure that the remaining freshwater ecosystem habitat and riparian habitat is protected, maintained and monitored, which will have significant benefits for the environment, as well as for fauna and flora. |
| | • There has been no demonstration from an environmental perspective that this dam will have a negligible impact on the environment. | • Please note that the proposed dam establishment will have significantly positive impacts in the socio-economic environment. It will ensure the sustainability of the farm, which in turn will ensure the job security of the labour employed on the farm. This in turn will result in skills development, income generation and improved quality of life. Although there will be a loss of 0.199 ha of freshwater ecosystem habitat, this loss will be appropriately mitigated through the implementation of specific rehabilitation recommendations where the rehabilitation of 0.6 ha occurs. Based on the Specialist Study results, the positive impacts associated with the proposed project far outweigh the negative impacts. |
| | • The impact on downstream users has not been assessed or acknowledged, what will be the impact of the dam on downstream users and can this impact be mitigated? | • Refer to **Appendix Q** for the Preliminary Yield and Groundwater Alternatives Report which highlights that the potential impacts associated with the proposed dam on the ecological reserve and downstream water users are considered to be low. This is based on the fact that there is sufficient water available within the catchment for not only the proposed dam, but also to sustain the EWR which is the water which is to be released to sustain the water flow as well as water to downstream users. Provided that the relevant mitigation measures and recommendations are implemented, and the EWR releases are maintained, the potential impact on downstream water users is considered to be highly unlikely. |
| | • These impacts have not been identified nor addressed, which is concerning as this is a fatal flaw. | • These have been addressed. See above response. |
| | • Page 80, potential impacts on the biophysical environment – the impacts associated with the loss of wetlands, wetland vegetation, movement and removal of soil from the watercourse **have not** been | • I request that you revisit Section 9, as this section includes the potential impacts and associated mitigation measures surrounding the loss of |

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| | identified as impacts associated with the development and these are some of the impacts which most felt on the biophysical environment.<br>• Why are these impacts not identified and not mitigated?<br>• This entire section must be reassessed, it is flawed and has not considered direct impacts related to the proposed development.<br>• All figures that are presented in this document must be in colour as it is very hard to determine what is being represented in the figures in black and white, or grey scale.<br>• The impact assessment matrix from page 95 to 105 is flawed, as mentioned in point 2.7 impacts associated with this development have not been identified or assessed.<br>• It fails to assess the movement, removal, infilling and deposition of soil from the watercourse, construction of a dam on the Umhlali River and the impact associated with downstream users, loss of ecosystem functioning, goods and services amongst other impacts associated with the development.<br>• All diagrams, figures and plates included in the Specialist Studies must be in colour.<br>• Specialist Studies:<br>• The Proposed Hopewell Farm Dam – Preliminary Yield and Groundwater Alternatives Report, dated 18 August 2022, prepared by GCS Water and Environmental, has reference.<br>• The study states that the dam will need to be supplemented by groundwater to ensure the dam receives a supply of water. | wetland systems, flora and fauna, as well as soil removal, erosion and management.<br>• See above response.<br>• The Environmental Consultant is of the opinion that this section lists the impacts and mitigation measures which are specific to the proposed project, and thus it is not fatally flawed.<br>• This has been done.<br>• See above response. The Environmental Consultant is of the opinion that this section lists the impacts and mitigation measures which are specific to the proposed project, and thus it is not fatally flawed.<br>• Refer to Section 9.1 to 9.8 which addresses all these impacts listed by the DEDTEA.<br>• This has been done.<br>• The following comments associated with alternatives have been taken into consideration.<br>• This has been noted.<br>• The Environmental Consultant is unsure whether this Specialist Study has been properly reviewed by the DEDTEA, as it states that 'to further supplement the water supply from the proposed dam, the drilling of boreholes for groundwater abstraction <u>can be considered</u>'. This means that should the Applicant ever wish to further supplement the water supply, they can consider the drilling of boreholes since there is groundwater available. This does not mean that this has to be done, and the drilling of boreholes does not form part of the proposed project. However, in terms of the 'mitigation hierarchy', and while the use of |

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| | | boreholes may be ecologically feasible, it is not economically feasible and the Applicant does not wish to proceed with this option (Refer to **Figure 7**). As such, to mitigate the loss of 0.6 ha of freshwater ecosystem habitat in terms of offset, is considered the final and only option. This will ensure that the sustainability of the farm and the job security of the labour is not impacted (Refer to Section 5.3). |
| | • Will boreholes be considered to supplement the dam?<br>• This is unclear in the study.<br>• It is noted with concern that the scenarios presented in this report are not carried through to the project description, for instance where will the secondary supply for the dam be coming from and the alternatives for supply as well. | • See above response.<br>• See above response.<br>• The Environmental Consultant is unsure what the DEDTEA is referring to by 'secondary supply'. Please note that there is sufficient water available within the catchment to allow for the establishment of the proposed dam and to meet the farms irrigation demand. No secondary supply or alternatives for supply are required for the proposed dam. It is important to note that should the proposed dam establishment not be authorised, then the macadamia nut trees will not be planted. Both the dam and the macadamia nut trees go hand and hand. There is no purpose for the dam to be established if there are no macadamia nut trees, and the macadamia nut trees will not be planted if there is no dam. The Applicant is replying on the proposed dam as the one and only primary source of water for the macadamia nut trees. |
| | • It is also noted that the options presented in the abovementioned study has not identified the most environmentally sustainable option and which option is most suitable for this dam. | • The Preliminary Yield and Groundwater Alternatives Report explains that the decision lies with the Applicant with regards to which scenario will be implemented and the volume of water which is required during a specific time (Refer to Section 12.1 of the Report and **Appendix Q**). This abstraction needs to be in line with a scenario and the recommended EWR release for that scenario. As such, there is no most environmentally sustainable option. All scenarios are suitable, however, each scenario is based on the Applicant's |

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| | | water demand during at a specific time. |
| | • This must be addressed. | • This has been done (Refer to Section 12.1). |
| | • The following comments are related to the EMPr. | • The following comments associated with the EMPr have been taken into consideration. |
| | • Words like avoid, should, appropriate, adequate/ly, regularly, convenient, necessary, needs to, ensure, suitable/y, may etc. are words that are open to interpretation and cannot be audited. | • The EMPr has been amended where applicable (Refer to **Appendix T**). |
| | • For the purpose of auditing, the EMPr must issue instructions that must be carried out by respective parties. | • This has been done. See above response. |
| | • Therefore, when issuing an instruction, the word must is to be used rather than should or may, as this can be interpreted in various different ways. | • This has been done. |
| | • The word must clearly state that the action has to be taken, failing which, it would be a contravention of the EMPr and conditions of the environmental authorisation. | • This has been done. |
| | • Please address this issue throughout the EMPr. | • The EMPr has been amended where applicable (Refer to **Appendix T**). |
| | • Phrases like as soon as possible, take special precautions, adequate care is taken, take preventative measures, in a safe and responsible manner, are phrases that cannot be used in an EMPr. | • See above response. |
| | • They are not quantifiable and are ambiguous. | • Noted. |
| | • The EMPr does not have specific conditions related to the removal of soil / sand for the construction of the dam. | • The EMPr has been amended under the Geology and Soils section. However, mitigation measures surrounding soils and erosion management are also included under the Fauna and Flora section. |
| | • It does not detail how work within the watercourse will be undertaken and the conditions related to the construction within the watercourse. | • The work to be undertaken for the proposed dam has been included in Section 5.2 of this Report. Please note that the proposed dam site is shown in **Figure 3 and 4** and this area will be transformed. No additional areas outside of the proposed dam site will be transformed. |
| | • It does not include method statements for work that will be undertaken within the watercourse and the areas which will be transformed as a result of the proposed activity. | • The Dam Design and Engineering Report has been included in the EMPr. |
| | • Page 23 under fauna and flora, bullet 2, how many metres must the no planting strip be? | • Please note that the no-planting strip is not a specific distance. It is recommended that no planting takes place within this entire area i.e. the narrow drainage line. It is important to note that cultivation is not proposed within this area anyway. |
| | • Page 24 under water quality and quantity, bullet 7, include this Water | • The Surface Water Monitoring Programme has |

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| | Monitoring Plan in the EMPr. | been included in the EMPr (Refer to **Appendix T**). |
| | • Page 24 under the abovementioned section, bullet 8, must this be done or is it optional? | • This has been addressed 'A flood protection berm must be installed'. |
| | • Page 25 first bullet at the top of the page under the abovementioned section, where are these non-perennial streams found in relation to the proposed dam? | • This has been included in the EMPr and **Figure 12** of this Report. |
| | • Expand and give details and provide correction mitigation measures for the impacts identified. | • Please note that this mitigation measure is associated with the Surface Water Monitoring Programme which has been included in the EMPr (Refer to **Appendix T**). |
| | • Page 27 under dam design, the last bullet states the dam must be established in line with the Dam Engineering Report. | • This has been included in the EMPr. |
| | • Are the conditions on page 26 and 27 not the conditions contained in the Dam Engineering Report? If not, attach the report to the EMPr. | • No. These conditions are associated with the Geotechnical Report. The Dam Design and Engineering Report conditions have been included in the EMPr (Refer to **Appendix T**). |
| | • Page 28, under waste management, bullet 1, this condition is unclear, what is the condition aiming to achieve? | • This has been noted and amended where applicable. |
| | • Under the abovementioned section, bullet 3, recycling must either be done or not at all. | • This has been addressed. |
| | • Reword this condition. | • This has been done. See above response. |
| | • Page 29 under hazardous waste, bullet 1, safe disposal certificates must be provided once hazardous waste is removed from the site. | • This has been done. |
| | • This must be included in this condition. | • This has been done. See above response. |
| | • The deficiencies identified above must be resolved in the Final EIR, failure to do so can jeopardise the success of this application. | • The Environmental Consultant is of the opinion that the abovementioned comments raised by the DEDTEA have been appropriately and thoroughly addressed. |
| | • The Department notes that this application for authorisation was lodged prior to 08 August 2022 (with the Final Scoping Report also accepted by the Department prior to the said date). | • This has been noted. |
| | • There is therefore no obligation for the review of the Draft Environmental Impact Report to be undertaken by a Registered Environmental Assessment Practitioner. | • Noted. |
| | • Should you require any assistance with the content of this letter, please do not hesitate to contact the contact person on the details provided on this letterhead. | • Noted. |

## 7.11 SUMMARY OF ISSUES RAISED DURING THE SCOPING PHASE

The main issues which have been raised during the Scoping Phase Public Participation Process are:

- The riparian vegetation must be improved, and these areas appropriately protected;
- All conditions stipulated by Eskom must be adhered to;
- Specialist Studies must be based on the Screening Tool requirements;
- The lengths, diameters and alignment of the pipelines must be confirmed;
- The dimensions of the pump house must be confirmed;
- Details of the Dam Design and Engineering Report must be unpacked;
- Alternatives to the proposed project must be appropriately assessed;
- Climate change questions must be appropriately answered;
- The need and desirability of the proposed project must be adequately addressed;
- The potential need for rehabilitation measures and offsets must be confirmed;
- Definition of 'watercourse habitat' must be confirmed, and what the 1:3 ratio is referring to;
- All impacts and mitigation measures specific to the proposed project must be included;
- The Hydrologist must make recommendations on summer and winter outflow rates to ensure sustained water flow downstream to the uMhlali River;
- Clarification on whether boreholes will be required must be confirmed;
- Potential impacts of the proposed dam on downstream water users must be addressed;
- A Fire Management Plan and a Monitoring and Evaluation Plan must be incorporated into the EMPr;
- The EMPr must include the establishment and improvement of ecological corridors and possible conservation servitudes;
- Ambiguous and non-quantifiable terms must be removed from the EMPr; and
- A WULA is required to be undertaken for the proposed project.

## 7.12 SUBMISSION OF THE FINAL EIA REPORT

The Final EIA Report has been completed and submitted to the DEDTEA for consideration. All I&APs will be notified of the DEDTEAs decision.

Electronic copies of the Final EIA Report are available to all I&APs on request.

# 8 POTENTIAL IMPACTS ON THE SOCIAL AND ECONOMIC ENVIRONMENTS

## 8.1 CORONA VIRUS (COVID-19) PANDEMIC

**Description**

The Covid-19 (Corona Virus) pandemic was far more than a health crisis. Both during and post the pandemic, societies and economies have been and continue to be affected at their core. Although the impact of the pandemic varied and will continue to vary from country to country, the extent of its impacts are not yet known. However, it will most likely increase poverty and inequalities on a global scale. As such, there is and will be a continuous need for countries to be self-sufficient whereby food is grown and produced within these countries to feed growing populations.

**Implication / Risk / Impact**

- Both temporary and permanent jobs will be created during the planning, construction and operational phase of the proposed project;
- The proposed project will ensure the long-term sustainability of the farm, through diversification of agricultural activities and increased water storage and availability for supplementary irrigation;
- Not only will the proposed project ensure the job security of the labour employed on the farm, it will ensure increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life;
- The proposed project will thus result in positive knock on effects to the surrounding population and the local economy;
- Macadamia nuts will be sold to surrounding businesses or exported out of South Africa which will be beneficial to the local economy and bring in foreign currency; and
- As such, although the pandemic has been and will continue to be widespread, the proposed project will play a beneficial role in alleviating its impacts within the surrounding area.

**Mitigation / Recommendations**

- Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield; and
- Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities.

## 8.2 CLIMATE CHANGE

**Description**

Climate change is a global challenge, which is both impacted by developments and activities and which has effects on development and activities. In South Africa, the effects of climate change are increasing, with more frequent heat waves, droughts, flood events and severe weather conditions. These conditions are especially challenging considering the water scarcity in the country, the high fire danger in many areas

and the high dependence on our widespread agricultural areas. At the same time, South Africa is challenged with the great need to promote development as a developing country, with the high-impact mining sector and linked electricity generation sector being predominant contributors to economic growth, whilst also being a predominant contributor to climate change.

In order to ensure sustainable development is achieved and that contributions to climate change are minimised, it is imperative that all development, transformative and resource-utilising activities take cognisance of climate change. At the same time, it is important to note that part of the response to climate change includes adapting to its effects and promoting development and activities which allows the population to become more resilient to the impacts of climate change. This may include ensuring delivery of basic services (water, sanitation and electricity), improving food security and enhancing economic security.

In order to appropriately respond to climate change, all developments and activities must consider the following:

**Implication / Risk / Impact**

***How does the proposed project affect climate change?***

The proposed project has the potential to contribute to climate change to a minor extent through energy and water usage, and waste generation during the construction phase and operational phase

***What effect does climate change have on the proposed project?***

There is potential for the proposed study sites to be impacted by flood events, drought, extreme weather conditions and temperature variations.

**Mitigation / Recommendations**

***What climate change adaptation responses are required for the proposed project?***

It is important to note that the Applicant has selected the most feasible agricultural activities under the current climate conditions. Thus, any long-term climatic change can be adapted to by the conversion to activities more suited to the current conditions, making changes to cultivation timeframes, or by increasing the variability or diversification of the agricultural activities.

***What pro-active climate change mitigation measures can be implemented for the proposed project?***

The proposed project will play an important role in building resilience to climate change by improving food security and generating employment opportunities. This in turn will result in skills development, income generation and improved quality of life.

## 8.3 LOCAL ECONOMY AND EMPLOYMENT OPPORTUNITIES

**Description**

The iLembe District Municipality, of which the KwaDukuza Local Municipality forms a part, is one of ten district municipalities in KwaZulu-Natal, and covers an area of approximately 3260 km². Although it is

strategically located, it faces numerous economic challenges such as high levels of poverty, based on both income inequality and low levels of development.

Agriculture and tourism make up the core components of the district municipality's economy. However, the agricultural sector has a limited base for economic expansion, and it is not fully exploited. The district municipality has the opportunity to elevate the land available for agricultural activities through the growth and enhancement of the agricultural sector, as well as to meet the demands of food security. The district municipality comprises favourable conditions for the development of the agricultural sector, and as such agriculture, whether it is subsistence or commercial, plays an important role in the economy. Agricultural employment opportunities and skills development are thus increasingly valuable in the area.

**Implication / Risk / Impact**

- A number of temporary jobs will be generated during the planning phase, which includes Engineers and Specialists;
- A number of temporary jobs will also be generated during the construction phase of the proposed project. This includes Engineers, contractors and labour (skilled, semi-skilled and unskilled);
- It will also contribute positively to the local economy and the social environment through spending of capital at local businesses;
- The proposed project will provide job security for approximately 60 labour employed on the farm. In KwaZulu-Natal, one job supports seven dependents. Thus, approximately 420 additional labour will benefit from the proposed project, as well as their dependents;
- During the operational phase, the proposed project will allow for increased water storage and availability for supplementary irrigation during the summer months, and a back-up during the dry, winter months; and
- It will ensure the long-term sustainability of Hopewell Farm, through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life.

**Mitigation / Recommendations**

- Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield; and
- Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities.

## 8.3 NEED AND DESIRABILITY

**Description**

In terms of the need and desirability, the proposed project will be in keeping with the surrounding land use. The proposed project will not alter the sense of place or the visual aesthetics of the area.

Although there is a significant once off cost associated with the establishment of a dam, there are minimal maintenance costs. In the agricultural industry, it is becoming increasingly important for farmers to utilise economies of scale in order for their business to remain sustainable. The job security of the labour employed on Hopewell Farm relies on the sustainability of the business. In order to ensure the long-term sustainability of the farm, there needs to be diversification of agricultural activities, as well as water available for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle. The need for a reliable source of water is becoming ever more important due to climate change and variability. Thus, it is important that there is water available in the form of a storage mechanism such as a dam, to allow the macadamia nut trees to be irrigated when minimal rainfall is received. As such, increased water storage and availability is important to ensure increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the WULA for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry land.

Although 28 HGM Units were identified within a 500 m of the proposed study sites, seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed (Refer to **Appendix B**). HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM Unit 2 will be impacted by the proposed dam establishment as well as the cultivation activities. As such, the proposed cultivation sites were realigned to fall outside of the identified HGM Units. A 15 m freshwater ecosystem habitat buffer is also proposed to be implemented to maintain the ecological integrity and functioning of the HGM Units. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. Should the recommendations be implemented, the proposed project will have a ‘medium to low impact’ on the sensitive environments. Fauna and flora communities will benefit as a result of the presence of additional open water and wetland habitat. The implementation of the recommendations and mitigation measures will allow for the surrounding HGM Units and flora species to be maintained and monitored, which will have significant benefits, as well as providing habitat and foraging for fauna species. In terms of the ‘mitigation hierarchy’, the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project. While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour.

Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3), which falls under the Indian Ocean Coastal Belt biome (Refer to **Appendix O**). Although no flora of conservation concern was identified within the proposed study sites, the riparian habitat in the valley bottoms was identified to be in a ‘good ecological condition’. This riparian habitat will be

protected through the implementation of the 5 m riparian habitat buffer which falls within the proposed 15 m freshwater ecosystem habitat buffer. The identification of 0.48 ha of riparian habitat within the proposed dam site and its associated loss, is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved. Although 1.45 ha of riparian vegetation was identified within a portion of the proposed cultivation sites, this area no longer forms part of the proposed project. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. In order to reduce the probability of flood damage to the watercourse as well as the cultivated lands, the following recommendations must be adhered to (Refer to **Appendix P**). Feedback from the Preliminary Yield and Groundwater Alternatives Report has confirmed that there is sufficient water within the catchment to sustain the proposed dam and associated irrigation demand, as well as the EWR (Refer to **Appendix Q**). As such, the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low. It is important to note that the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation will vary depending on the pumping schedule and inflow into the proposed dam.

**Implication / Risk / Impact**

- A number of temporary jobs will be generated during the planning phase, which includes Engineers and Specialists;
- A number of temporary jobs will also be generated during the construction phase of the proposed project. This includes Engineers, contractors and labour (skilled, semi-skilled and unskilled);
- The proposed project will contribute positively to the local economy and the social environment through spending of capital at local businesses;
- The proposed project will provide job security for approximately 60 labour employed on the farm. In KwaZulu-Natal, one job supports seven dependents. Thus, approximately 420 additional labour will benefit from the proposed project, as well as their dependents;
- During the operational phase, the proposed dam will serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle;
- It will ensure the long-term sustainability of the farm, through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life;
- Although the proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required);

- The proposed cultivation sites are located outside of the proposed 15 m freshwater ecosystem habitat buffer;
- Although approximately 0.48 ha of the proposed dam site was identified to comprise riparian habitat, this loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved;
- Although 1.45 ha of riparian vegetation was identified within a portion of the proposed cultivation sites, this area no longer forms part of the proposed project;
- Based on the proposed recommendations, the proposed cultivation sites will not result in the loss of any riparian vegetation;
- The impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low;
- There is sufficient water available in the catchment for the proposed dam establishment, as well as to sustain the EWR; and
- The implementation of the Specialist Study recommendations and mitigation measures will ensure that the surrounding environment is protected, maintained and monitored, which will have significant benefits for both fauna and flora.

**Mitigation / Recommendations**

- Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield;
- Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities; and
- The required water volumes must be released from the proposed dam as stipulated by the DWS in the conditions of the WUL.

## 8.4 PLANNING INITIATIVES

### 8.4.1 National Development Plan

The National Development Plan (NDP) offers a long-term perspective on development in South Africa. It defines a desired destination and identifies the role different sectors of society need to play in order to reach that destination by 2030.

The NDP aims to eliminate poverty and reduce inequality in South Africa, by drawing on the energies of its people, growing an inclusive economy, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.

Although there has been significant progress, 25 years into democracy, South Africa remains a highly unequal society where too many people live in poverty and too few people work. The quality of school education for black learners is poor. The Apartheid spatial divide continues to dominate the landscape. A large proportion of young people feel that the odds are stacked against them. These immense challenges can only be addressed through a step change in the country's performance. To accelerate progress,

deepen democracy and build a more inclusive society, South Africa must translate political emancipation into economic wellbeing for all.

### 8.4.2. Provincial Growth and Development Strategy

Inequalities exist within the current South African economy, and there is a legacy of inequitable spatial development and associated economic development and potential. This has had a negative impact on public sector investment. This is evident in the unbalanced economic and social costs for poor communities in locations far from employment and other economic opportunities. The Provincial Growth and Development Strategy (PGDS) is a vehicle to address the legacies of the apartheid system's long-term impacts to the economy and to promote sustainable development and ensure the eradication of poverty and unemployment through the creation of additional employment opportunities and the rectification of past inequitable spatial development.

The South African Government has a mandate to restructure the process of development and service delivery in KwaZulu-Natal. This is to be achieved through the three spheres of government, the various government sectors and the different strategic frameworks. The keys challenges it faces, in the achievement of this mandate, is to effectively align and harmonise these structures towards this end, and to harness and align fiscal, financial and human resources at its disposal towards eradicating poverty, creating employment and laying the foundations for accelerated economic growth.

The PGDS offers a tool through which provincial government can direct and articulate its strategy and similarly for local government to reflect the necessary human, financial and fiscal support it needs to achieve these outcomes. It facilitates proper coordination between different spheres of government and aims to prevent provincial departments from acting out of concert with local municipalities. It enables intergovernmental alignment and guides activities of various role players and agencies (provincial sector departments, parastatals, district and local municipalities). Thus, the PGDS aims to enhance service delivery.

It is a framework for public and private sector investment, indicating areas of opportunities and development priorities. It addresses key issues of implementation blockages whilst providing strategic direction. The PGDS implies a developmental approach to government. This implies a pro-active and facilitative approach to development and not one based on formulating and applying regulations and restrictions. The PGDS on the one hand involves preparing policies, strategies and guidelines and on the other hand, it involves preparing mechanisms to align and facilitate the implementation, monitoring and evaluation of key growth and development priorities.

### 8.4.3 iLembe District Municipality Integrated Development Plan Review (2021 / 2022)

The iLembe District Municipality IDP undertook a comprehensive review and analysis of the district municipality, specifically highlighting the socio-economic and infrastructural backlogs, together with the developmental challenges. As a result, the district municipality is relatively rural in nature, and is

characterised by high levels of poverty, based on both income inequality and low levels of development.

As a result of its rural nature, terrain and topography, there are both challenges and opportunities. According to the iLembe District Municipality IDP, the challenges faced by the agricultural sector include failure of land reform, lack of farming experience and high potential land, climate changes and threats of land claims etc.

In order to address the challenges, the district municipality is committed to paying more attention to the following:

- Investment in infrastructure;
- Attracting new global markets;
- Encouraging the development of a knowledge economy; and
- Assisting subsistence farmers.

### 8.4.4 Alignment with Local Municipal Goals and Objectives

The proposed project complies with the goals and objectives of the KwaDukuza Local Municipality IDP. During the construction phase, the proposed project will result in the generation of temporary employment opportunities, which will in turn result in skills development, income generation and improved quality of life. This is beneficial in alleviating poverty. During the operational phase, the proposed project will result in the long-term sustainability of the farm due to increased water storage and availability, and the associated diversification of agricultural activities. This has positive impacts on the job security of the labour employed on the farm, as well as additional labour required due to increased macadamia nut production and yields. This in turn has the potential to reduce food insecurity ad malnourishment rates in the area.

**Implication / Risk / Impact**

- The proposed project complies with all of the above Planning Initiatives, most notably the generation of employment opportunities, job security and investment in the agricultural sector;
- As a result of its rural nature, terrain and topography, there are both challenges and opportunities experienced within the iLembe District Municipality; and
- The KwaDukuza Local Municipality and surrounding local communities thus relies disproportionately on the agricultural sector for the generation of employment opportunities and the associated skills development, income generation and improved quality of life.

**Mitigation / Recommendations**

None.

## 8.5 CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES

**Description**

A Phase 1 Heritage Impact Assessment and Desktop Paleontological Impact Assessment was compiled for the proposed project (Refer to **Appendix R**). No heritage sites, features or graves were identified within the

proposed study sites and the surrounding area is not part of any known cultural or heritage landscape. Based on the local geology identified within the proposed study sites, these local geologies are considered to have an insignificant / zero paleo-sensitivity rating as well as a low paleo-sensitivity rating, thus the likelihood of well-preserved fossils being present is low.

**Implication / Risk / Impact**

The proposed project will pose a minimal risk to heritage and paleontological resources.

**Mitigation / Recommendations**

- In the unlikely event that any graves, fossils or other heritage features are exposed, the ECO must be contacted; and
- Attention is drawn to the National Heritage Resources Act (NHRA, Act No. 25 of 1999) which, requires that projects that expose archaeological or historical remains must cease immediately, pending evaluation by KwaZulu-Natal Amafa and Research Institute, and a chance find protocol must be implemented.

## 8.6 SURROUNDING LAND USE AND AESTHETICS

**Description**

Hopewell Farm is a commercial agricultural operation comprising sugar cane. The Applicant is proposing the diversification of agricultural activities through the cultivation of land to macadamia nut trees. As such, the proposed project is unlikely to visually impact on surrounding landowners given that Umhlali is predominantly an agricultural area.

**Implication / Risk / Impact**

- The proposed project is to take place on an existing and operational farm, thus it is in keeping with the surrounding land use and aesthetics; and
- It will not alter the sense of place of the area or have a significant visual impact.

**Mitigation / Recommendations**

- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly;
- The planting of non-indigenous vegetation species must be prohibited; and
- Noise and dust nuisances generated during the construction phase must be controlled.

## 8.7 TRAFFIC, ROADS AND ACCESS

**Description**

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. The Applicant is also proposing the cultivation of 45.8 ha of existing cultivated land to macadamia nut trees. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127.

To access Hopewell Farm, from Pietermaritzburg, travel on the N3 towards Durban. Take the offramp onto the N2 towards Ballito. In Ballito, turn left onto Ballito Drive and travel for approximately 1.7 km towards the R102 Road. Turn left onto the R102 Road and travel for approximately 800 m. Turn right onto Esenembi Road and travel for approximately 8 km to Hopewell Farm, located at GPS coordinates 29°28'11.89" S and 31°07'34.54" E.

Traffic volumes are not expected to directly increase as a result of the proposed project, nor are the type of vehicles utilising the roads anticipated to change. During the construction phase, there will be construction vehicles and equipment onsite, but this machinery will continue to remain onsite until project completion and will therefore not impact on traffic or access roads. Farm machinery and equipment will be used for the agricultural activities. Thus, no significant traffic related impacts are anticipated during the construction and operational phase of the proposed project.

**Implication / Risk / Impact**

- There is potential for a minimal increase in traffic during the construction phase;
- Excessive speed poses a threat to both road users and fauna; and
- Increased use of the access roads on the farm may result in accelerated deterioration.

**Mitigation / Recommendations**

- Vehicles accessing the proposed study sites must be driven cautiously and within the required speed limits; and
- Maintenance of access roads on the farm must be undertaken as and when necessary.

## 8.8 CONSTRUCTION ACTIVITIES, NOISE AND DUST

**Description**

Construction activities will require onsite earthworks and the use of construction vehicles and equipment. These construction activities will generate noise and dust nuisances which the labour on the farm may experience. However, the construction activities are unlikely to have a significant impact on the labour, and there are no surrounding landowners in close proximity to the proposed study sites.

**Implication / Risk / Impact**

It is unlikely that the level of noise and dust nuisances generated during the construction phase will negatively impact on surrounding landowners, as there are none in close proximity.

**Mitigation / Recommendations**

- Construction activities must be limited to regular working hours (Monday to Saturday, 07h00 to 17h00), and construction on public holidays must not be permitted;
- Construction vehicles and equipment must be maintained and regularly serviced to ensure that unnecessary noise nuisances are prevented;
- Construction labour onsite must not generate unnecessary noise such as hooting or shouting;

- Dust suppressions measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions; and
- Vehicles accessing the proposed study sites must be driven cautiously within the required speed limits.

## 8.9 AIR QUALITY AND SURFACE WIND

**Description**

The proposed study sites are located within an agricultural area, thus air quality is generally of a good quality. They are also located away from all current land uses that could potentially impact on air quality. There are no surrounding landowners located in close proximity.

**Implication / Risk / Impact**

Potential exists for dust to be generated during the construction phase. However, dust nuisances are unlikely to impact on surrounding landowners.

**Mitigation / Recommendations**

- Dust suppressions measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions; and
- Vehicles accessing the proposed study sites must be driven cautiously within the required speed limits.

## 8.10 SECURITY

**Description**

A contractor is to be used for the establishment of the proposed dam, and existing farm labour will be used for the agricultural activities. In either event, it is unlikely that the proposed project will pose any significant security risks to surrounding landowners.

**Implication / Risk / Impact**

- Potential exists for labour to trespass onto adjacent properties; and
- There is potential for crime in the area to increase during the construction phase, as a result of people seeking employment opportunities onsite.

**Mitigation / Recommendations**

- Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield;
- Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities;
- All construction labour must remain within the boundaries of the farm at all times;
- Access onsite and offsite must be controlled;
- The construction labour must be issued with name badges and clearly identifiable uniforms; and
- Attendance registers for construction labour and visitors must be kept throughout the construction phase.

# 9 POTENTIAL IMPACTS ON THE BIOPHYSICAL ENVIRONMENT

## 9.1 TOPOGRAPHY

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. It falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna WMA. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127.

A Geotechnical Report was compiled for the proposed project (Refer to **Appendix S**). Topographically, the proposed dam site is characterised by gentle to moderate to steep undulating lands with slopes that vary from having concave slopes to convex slopes. The proposed dam site is characterised by a concave low-lying area that is surrounded to the eastern and western extents by higher lying lands with a low to moderate gradient. One small stream is situated at the proposed dam site which runs from southwest to northeast.

A Hydrology and Flood Line Assessment was compiled for the proposed project (Refer to **Appendix P**). Elevations at the proposed study sites range between 140 metres above mean sea level (mamsl) to 220 mamsl.

**Implication / Risk / Impact**

- The proposed dam site is the preferred option due to the natural topography of the area and the extent of the catchment;
- As such, this will allow for the proposed dam to be naturally contained and thus reduce the extent of earthworks required;
- The proposed cultivation sites are located in the preferred positions due to the natural topography of the land, the quality of the soils, as well as being located outside of the proposed buffers; and
- Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources.

**Mitigation / Recommendations**

- Nearby undisturbed areas must be protected from erosion by demarcating the construction site. No vehicular or pedestrian access must be allowed beyond the demarcated area;
- Erosion control measures must be implemented where necessary;
- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly; and
- The planting of non-indigenous vegetation species must be prohibited.

## 9.2 CLIMATE

**Description**

A Hydrology and Flood Line Assessment was compiled for the proposed project (Refer to **Appendix P**).

Hopewell Farm is situated within a sub-tropical climate area, and thus receives summer rainfall. It falls within the U3A rainfall zone, and experiences a Mean Annual Precipitation (MAP) between 571.6 mm / year and 1809 mm / year. The average annual rainfall is 995.5 mm / year. Hopewell Farm falls within the 22A evaporation zone, and experiences a Mean Annual Evaporation (MAE) between 1400 mm / year and 1500 mm / year. The Mean Annual Runoff (MAR) for the area is 63 567 000 $m^3$ / year. The average annual temperature ranges between 24 °C and 40 °C (high), and 6 °C and 11 °C (low).

**Implication / Risk / Impact**

- Topsoil which is stockpiled during the construction phase has the potential to be wind-blown, thus causing dust nuisances;
- Soil disturbance has the potential to result in the encroachment of alien invasive vegetation;
- Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;
- Potential exists for high intensity rainstorm events to cause severe erosion at the proposed study sites; and
- During dry and windy conditions, there is an increased risk for runaway fires.

**Mitigation / Recommendations**

- Appropriate mitigation measures must be implemented to minimise the area of soil disturbance and the potential for mobilisation of bare areas;
- Erosion control measures must be implemented where necessary;
- Stockpiled topsoil must be dampened or covered during times of high wind to prevent dust nuisances;
- Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;
- Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;
- Planting of non-indigenous vegetation species must be prohibited;
- Dust suppression measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions;
- Measures must be taken to cover exposed areas during high intensity rainfall events;
- Care must be taken throughout the construction phase to minimise risks of runaway fires occurring; and
- The construction phase must be undertaken during the dry, winter months.

## 9.3 GEOLOGY AND SOILS

**Description**

A Geotechnical Report was compiled for the proposed project (Refer to **Appendix S**). The proposed dam site was identified to be underlain by inter-stratified dark grey shale, siltstone and sandstone of the Vryheid Formation. This formation exists as a sequence of micaceous fine grained sandstones, very thinly bedded siltstones and shales. The proposed dam site is characterised by alluvial soil, hill-washed materials,

residual soils and inter-stratified sandstone of the Vryheid Formation. Transported soils overlie the residual soils followed by the sandstone bedrock of the Vryheid Formation.

A Phase 1 Heritage Impact Assessment and a Desktop Paleontological Impact Assessment was compiled for the proposed project (Refer to **Appendix R**). The local geology within the proposed study site is characterised by Natal Group sandstone. Dwyka tilite of the Karoo Supergroup is also identified to be present within the south eastern portion of the proposed study site. Dolerite dykes and sills are also known to occur within the surrounding area.

A Wetland Assessment was compiled for the proposed project (Refer to **Appendix B**). The underlying geology of the site is characterised by sandstone of the Natal Group, with small areas of dolerite. Soils within the proposed study sites are characterised by Glenrosa and r Mispah forms.

**Implication / Risk / Impact**

- Construction activities in areas of instability, irresponsible design and construction methods, and the use of inappropriate materials have the potential to result in the cracking or collapse of dam walls. This in turn has significant environmental and financial consequences;
- Topsoil which is stockpiled during the construction phase has the potential to be wind-blown, thus causing dust nuisances;
- Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;
- Soil disturbance has the potential to result in the encroachment of alien invasive vegetation;
- Potential exists for high intensity rainstorm events to cause severe erosion at the proposed study sites; and
- There is potential for failure of the dam wall if it is not maintained.

**Mitigation / Recommendations**

- The recommendations stipulated in the Geotechnical Report must be adhered to (Refer to **Appendix S**);
- Appropriate mitigation measures must be implemented to minimise the area of soil disturbance and the potential for mobilisation of bare areas;
- Erosion control measures must be implemented where necessary;
- Stockpiled topsoil must be dampened or covered during times of high wind to prevent dust nuisances;
- Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;
- Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;
- Planting of non-indigenous vegetation species must be prohibited;
- Dust suppression measures, such as spraying of water on bare soil, must be undertaken during dry, windy conditions; and
- Measures must be taken to cover exposed areas during high intensity rainfall events.

## 9.4 SURFACE WATER AND WETLAND SYSTEMS

**Description**

A Wetland Assessment was compiled for the proposed project (Refer to **Appendix B**). According to the NFEPA database, the proposed study sites do not intersect any NFEPA watercourses (Refer to **Figure 1**). Although 28 HGM Units were identified within a 500 m radius of the proposed study sites, seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed (Refer to **Figure 9 and 10**). HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM 2 will be impacted by the proposed dam establishment as well as the cultivation activities. It is important to note that the proposed pipeline installation does not intersect any watercourses, and will utilise the dam wall for connection to the pump station.

HGM Unit 1 is classified as a channelled valley bottom wetland system and is approximately 0.61 ha in extent. It has been maintained as an important ecological corridor onsite. It is well vegetated and mitigates most impacts associated with sugar cane. HGM Unit 2 is classified as an upper foothills river and is approximately 0.77 ha in extent. It is a riparian ecosystem due to the slope, as well as the rocky and confined nature of the channel. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat from HGM Unit 2, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. In terms of the 'mitigation hierarchy', the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project. While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour.

HGM Unit 3 and 4 are classified as seep wetland systems, and are approximately 0.21 ha and 0.15 ha in extent, respectively. These wetland systems are surrounding by sugar cane and have assisted agricultural activities by distributing flows downstream and preventing incising of the valley line. HGM Unit 5 is classified as a channelled valley bottom wetland system and is approximately 0.93 ha in extent. It is situated within the valley bottom onsite, and has been maintained as a feature that directs flows downstream. HGM Unit 6 is classified as a seep wetland system and is approximately 0.1 ha in extent. It is a small and naturalised wetland system that has become more prominent due to agricultural activities (i.e. contours and rows) which have altered the flow regime over time. HGM Unit 7 is classified as a seep wetland system and is approximately 0.1 ha in extent. It has remained a feature onsite and is thus well established. It provides diffuse flows to HGM Unit 5.

The wetland systems within Hopewell Farm were identified along the valley bottom and within a landscape that is under sugar cane. Due to agricultural activities which have taken place since 1937 and based on

historical imagery, as well as general disturbances within the farm, the wetland systems have experienced a number of impacts which has resulted in changes to their hydrogeomorphic functioning. However, it is important to note that based on historical imagery, the watercourses along the valley bottom have remained as features that direct and manage flows downstream. The agricultural activities have impacted on the integrity of the wetland systems with regards to their hydrology and vegetation, which in turn has resulted in a decline in their geomorphology. As such, the Present Ecological Status (PES) of HGM Unit 1, 3, 4, 5 and 7 is classified as 'moderately modified', and the PES for HGM Unit 6 is classified as 'largely modified'. In terms of the Ecological Important and Sensitivity (EIS), HGM Unit 3, 4, 6 and 7 are classified as 'low' as they are not considered to be ecologically important and sensitive at any scale. The EIS for HGM Unit 1 and 5 is classified as 'moderate' as they are considered ecologically important and sensitive at a provincial or local scale.

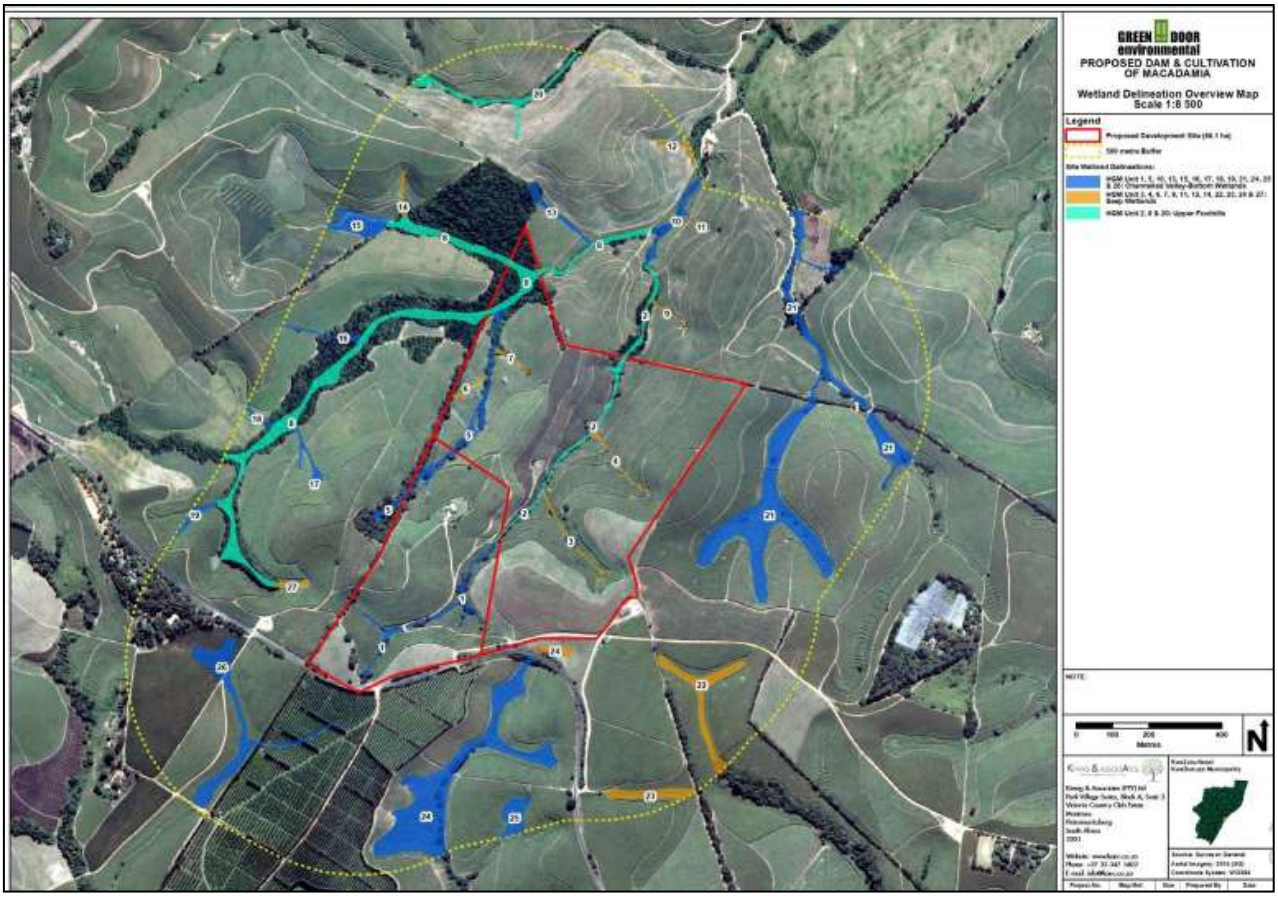


**Figure 9:** Map showing the 28 HGM Units identified within a 500 m radius of the proposed study sites (Kinvig and Associates Environmental Consulting).


**Figure 10:** Map showing the seven HGM Units identified within the proposed study sites (Source: Kinvig and Associates Environmental Consulting).

Given the abovementioned information, a 15 m freshwater ecosystem habitat buffer has been proposed to be implemented to the HGM Units (Refer to **Figure 11**). It is important to note that this buffer includes the 5 m riparian habitat buffer stipulated in the Biodiversity Assessment (Refer to **Appendix O**).

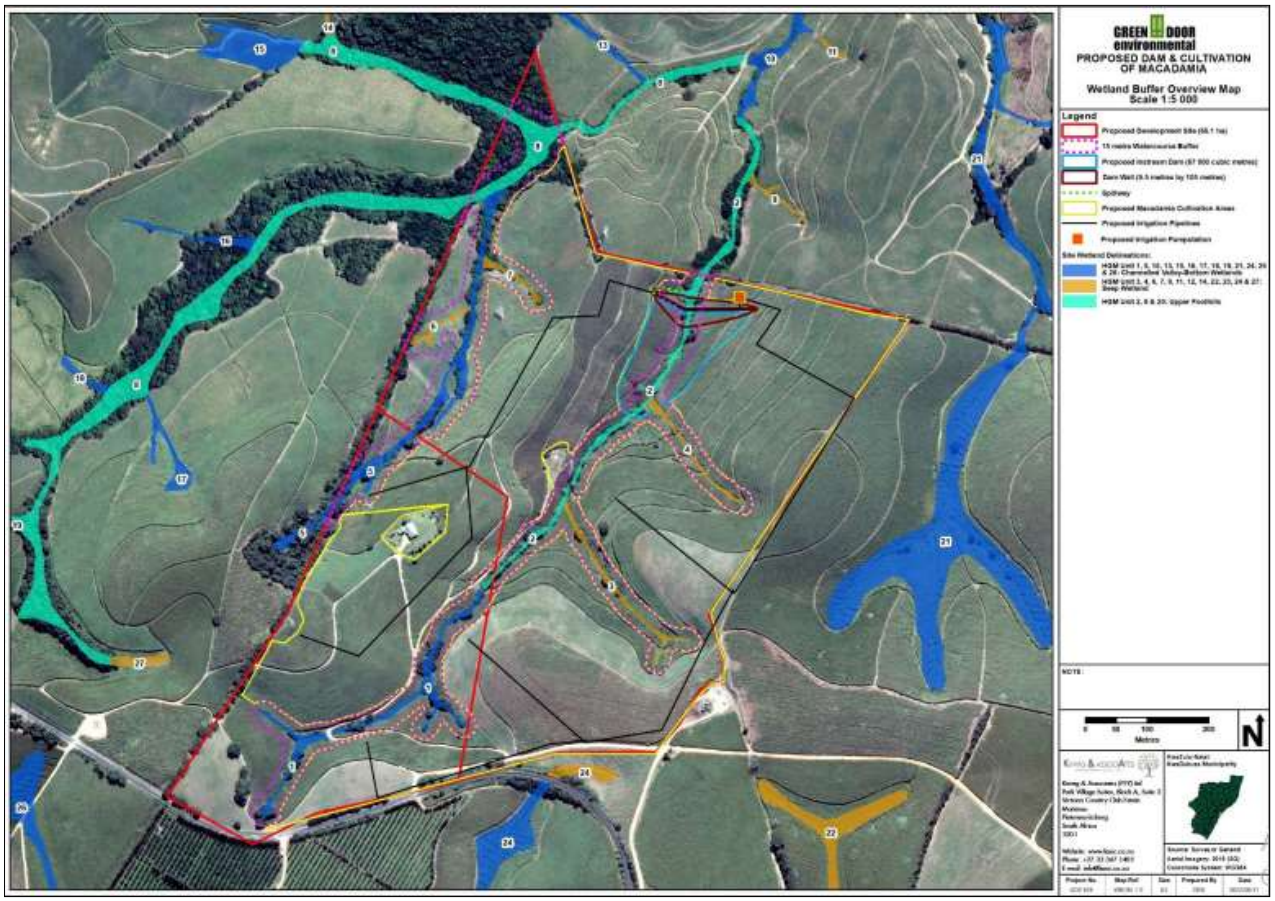


**Figure 11:** Map showing the 15 m freshwater ecosystem habitat buffer proposed to be implemented to the HGM Units (Source: Kinvig and Associates Environmental Consulting).

A Preliminary Yield and Groundwater Alternatives Report was compiled for the proposed project (Refer to **Appendix Q**). Hopewell Farm falls within the headwaters of the U30E quaternary catchment and the Pongola to Mtamvuna WMA. It falls within the U3A rainfall zone. Within the U30E quaternary catchment, the Natural Mean Annual Runoff (NMAR) is approximately 22 % of the MAP, which equates to 63 567 000.00 $m^3$ / year.

One sub-catchment / Hydraulic Response Unit (HRU) was delineated for Hopewell Farm, and HRU1 describes the drainage sub-catchment towards the proposed dam site. The U30E quaternary catchment is approximately 290.24 $km^2$ in extent and of the entire catchment, approximately 6.6 $km^2$ is made up of alien invasive vegetation species. As such, the maximum possible stream flow reduction within the catchment equates to 1 445 504.45 $m^3$ / year, and approximately 4.09 $m^3$ / year within the proposed dam site / sub-catchment.

A Hydrology and Flood Line Assessment was compiled for the proposed project (Refer to **Appendix P**). With regards to surface water quality within the area, two surface water samples were taken for the main river receiving drainage water from the proposed dam site. The water quality resulted revealed that the surface water is well within the ideal water quality ranges for potable water use, except for turbidity and

microbes. A high turbidity suggests that there is an existing siltation impact on the uMhlali River due to upstream activities, and a high microbial activity reveals risks if consumed without pre-treatment.

Due to the proposed change in land use from sugar cane to macadamia nut trees, stormwater peak flows are likely to increase when the trees are maturing. Once the macadamia nut trees reach maturity, the canopies will likely act as barriers to rainfall onto the surface, which will thus decrease runoff potential. With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. In order to reduce the probability of flood damage to the watercourse as well as the cultivated lands, the following recommendations must be adhered to.

**Implication / Risk / Impact**

- Vegetation clearing, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding watercourses; and
- Increased surface runoff and sediment deposition associated with poorly shaped lands and clearance of vegetation for the proposed dam site;
- Direct loss and disturbance to the natural habitat from the proposed dam establishment as well as back-flooding;
- Soil compaction and disturbance to vegetation;
- Soil and water quality impacts due to the application of fertiliser;
- Potential for erosion due to poor back-filling of trenches during the installation of pipelines;
- Reduction in flows to HGM Unit 2 downstream of the proposed dam site;
- Poor maintenance of access roads has the potential to result in stormwater impacts; and
- Infestation of alien invasive vegetation due to lack of alien invasive vegetation management.

**Mitigation / Recommendations**

- The 15 m freshwater ecosystem habitat buffer must be demarcated with painted stakes identifying the area as a ‘no-go’ area for agricultural activities;
- Although the proposed pipeline installation will not intersect any watercourses, the following must still be considered:
  - Any preferential flow paths identified before the buffer will require the installation of earthen berms to dissipate stormwater flow before being directed to the buffer areas; and
  - Reinstatement of the soils must occur with the returned soils to the same levels prior to pipeline installation.
- Existing crossings over the HGM Units onsite must be used;
- Due to the loss of 0.199 ha of wetland habitat associated with HGM Unit 2, rehabilitation recommendations have been proposed to be implemented;
  - Areas under sugar cane which fall within the 15 m freshwater ecosystem habitat buffer must cease. Ratoons must be removed or treated, and the buffer area revegetated appropriately;

  - The dam edge must include a terraced area to provide a shallow water for the establishment of vegetation. The terraced area must be at least 5 m wide along the dam edge so as to allow for shallow flooding at a maximum depth of 0.2 m (Refer to **Figure 12**);
  - General rehabilitation and management of the dam and watercourses onsite must take place;
- The sloped areas must be terraced along the cultivated lands to reduce peak flow velocities;
- A flood protection berm or embankment (0.5 m high with a 0.3 m base) must be installed along the sides of the cultivated lands;
- A Surface Water Monitoring Programme must be implemented to monitor both the water quality and quantity onsite (Refer to Section 7 of the Hydrology and Flood Line Assessment (Refer to **Appendix P**));
- Eroded areas must be revegetated to reduce the risk of increased runoff and sedimentation of watercourses;
- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly within the proposed study sites; and
- The non-perennial streams must be regularly inspected for flow obstructions which could lead to ponding and flooding (Refer to **Figure 13**).

**Figure 12:** Image showing an example of a terraced dam edge which provides shallow flooding for the establishment of vegetation (Source: Kinvig and Associates Environmental Consulting).


**Figure 13:** Map showing the non-perennial streams and associated monitoring points (Source: GCS Water and Environmental Consultants).

## 9.5 GROUNDWATER

**Description**

A Preliminary Yield and Groundwater Alternatives Report was compiled for the proposed project (Refer to **Appendix Q**). Although it was identified that there is sufficient water available within the catchment for the proposed dam, with the EWR taken into consideration, to further supplement the water supply from the proposed dam, the drilling of boreholes for groundwater abstraction can be considered. As such, this does not have to be undertaken. However, the Applicant does not wish to proceed with this option since although the use of boreholes may be ecologically feasible, they will not be economically feasible (Refer to Section 5.3). The quality of groundwater within the area was identified to be variable based on the underlying geology and hydrogeology characteristics associated with groundwater recharge. Literature and available hydrogeology maps for the area suggest that groundwater abstracted from the aquifer is suitable for both domestic and recreational use.

**Implication / Risk / Impact**

- The groundwater table generally mimics the topography, thus it may be shallower near to streams and topographic depressions where groundwater contributes towards groundwater baseflow; and
- The groundwater quality within the area will be variable and dependent on the underlying geology and hydrogeology characteristics associated with groundwater recharge.

**Mitigation / Recommendations**

To further supplement the water supply from the proposed dam, the drilling of boreholes for groundwater abstraction can be considered. Please note that this does not have to be undertaken, the Specialist is merely stating that should water supply ever need to be increased in the future, there is an option of drilling boreholes, to further supplement water supply. However, the Applicant does not wish to proceed with this option, since while the use of boreholes may be ecologically feasible, it is not economically feasible (Refer to Section 5.3).

## 9.6 FAUNA

**Description**

A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). Hopewell Farm was identified to fall within an area comprising predominantly sugar cane. The terrain within the area was identified to be undulating with valley bottoms that comprise watercourses with dense riparian vegetation that has been conserved. The Screening Tool indicated a Very High Sensitivity for Terrestrial Biodiversity and a Medium Sensitivity for Animal Species. With regards to fauna, the larger mammals and reptiles were identified to be absent due to majority of the proposed study sites comprising sugar cane. However, suitable habitats were identified to be present for smaller fauna species. Although no fauna of conservation concern are likely to occur within the proposed study sites due to its highly modified nature, the riparian vegetation is likely to support viable populations of many common fauna species such as avifauna. Birds were identified to be active onsite, and it is highly likely that many bird species will utilise the proposed study sites. Butterfly species were also identified to be active and included *Chrysippus aegyptius, Junonia oenone, Hypolimnas misippus, Eurema hecavbe solifera*, and *Amauris albimaculata.*

**Implication / Risk / Impact**

Disturbance and compaction of soils has the potential to result in the encroachment of alien invasive vegetation and the loss of natural habitat for fauna.

**Mitigation / Recommendations**

- The EWR must be released from the proposed dam to ensure that the water quality and fauna habitat is conserved; and
- Poaching must not be permitted, and if poaching occurs the culprit must be fined.

## 9.6 FLORA

**Description**

A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). Hopewell Farm was identified to fall within an area comprising predominantly sugar cane. The terrain within the area was identified to be undulating with valley bottoms that comprise watercourses with dense riparian vegetation that has been conserved. The vegetation within the proposed study sites was identified to be classified as KwaZulu-Natal Coastal Belt Grassland which has a status of Critically Endangered and Nominally Protected. It must be noted that no grasslands were identified within the proposed study sites, and they are

no longer representative of the KwaZulu-Natal Coastal Belt Grassland vegetation type. CBAs classified as Optimal were identified adjacent to the proposed study sites.

The Screening Tool indicated a Low Sensitivity for Plant Species. With regards to flora, although no flora of conservation concern was identified within the proposed study sites, the riparian vegetation in the valley bottoms was identified to be in a good ecological condition, and thus represents important corridors for the dispersal of indigenous vegetation and stabilising watercourses. Approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Although 1.45 ha of riparian vegetation was identified within a portion of the proposed cultivation sites, this area no longer forms part of the proposed project. Indigenous tree species identified within the watercourses included *Ficus natalensis, Bridelia micrantha, Macaranga capensis, Psychotria capensis, Ptaeroxylon capensis, Syzigium cordatum, Tabernaemontana ventricosa,* and *Trichilisa dregeana.* Alien invasive vegetation species that were identified within the watercourses included *Solanum mautianum, Schinus terebinthifolius*, and *Cestrum laevigatum*.

**Implication / Risk / Impact**

- Vegetation clearing has the potential to result in soil being wind-blown, and generating dust nuisances;
- Vegetation clearing along with high intensity rainfall, have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;
- Disturbance and compaction of soils has the potential to result in the encroachment of alien invasive vegetation and the loss of natural habitat for flora; and
- Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources.

**Mitigation / Recommendations**

- Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;
- Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;
- Planting of non-indigenous vegetation species must be prohibited;
- The Alien Invasive Vegetation Management Programme must be implemented (Refer to **Appendix T)**.
- A portion of the proposed cultivation sites was identified to comprise a steep slope with a narrow drainage line which is an erosion hazard. Thus, a no-planting strip must be maintained within this entire area; and
- A 5 m riparian habitat buffer from the outer tree line must be implemented along the boundary of the proposed cultivation sites (Refer to **Figure 14**).

**Figure 14:** Image showing an example of where the 5 m riparian habitat buffer must be implemented within portions of the proposed cultivation sites (Source: Peter le Roux).

## 9.8 FIRE MANAGEMENT

**Description**

As the proposed study sites are located within an area that experiences dry, winter months, and due to the highly flammable nature of sugar cane and the surrounding vegetation, fires can be easily ignited by careless human activities and can spread very quickly and cause significant damage to the farm as well as surrounding properties.

**Implication / Risk / Impact**

- During the dry, winter months, there is an increased risk for runaway fires;
- Runaway fires have the potential to cause severe damage to the farm, as well as surrounding properties.

**Mitigation / Recommendations**

- During the operation phase, the proposed dam may potentially serve as a useful barrier to prevent fires from spreading as well as a source of water for fire fighting;
- Open fires must not be lit for cooking or heating purposes;
- The farm must have appropriate fire breaks and safety measures in place in terms of the National Veld and Forest Fire Act (Act No. 101 of 1998);
- Care must be taken throughout the construction phase to minimise the risks for runaway fires;
- All construction labour must be educated on methods to reduce the risks of fires and the procedures to follow on the occurrence;

- Construction vehicles and equipment must be regularly checked for oil or fuel leaks; and
- The Fire Management Plan included in the EMPr must be adhered to (Refer to **Appendix T**).

# 10 ASSESSMENT OF ENVIRONMENTAL IMPACTS

In order to assess potential environmental issues associated with the proposed project, each aspect addressed in Section 8 and 9 have been given a qualitative rating in relation to its environmental impact (Refer to **Table 7**). Each aspect has been divided into a number of different classes, each of which has been assigned various criteria.

Where relevant, the following methods have been used to predict the characteristics of identified impacts:

- Professional judgement;
- Quantitative mathematical models;
- Experiments and physical models;
- Physical or visual simulations or maps (including GIS tools);
- Case studies; and
- Past experience.

**Table 7:** Summary of aspects used for assessing environmental impacts.

| ASPECT | CLASS | CRITERIA |
|---|---|---|
| **NATURE OF IMPACT** | Positive | The impact on the environment will be positive. |
| | Negative | The impact on the environment will be negative. |
| | Direct | The impact is caused directly by the activity and generally occurs at the same time and at the place of the activity. |
| | Indirect | The impact induces changes that may occur as a result of the activity. |
| | Cumulative | The impact is a result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. |
| **OCCURRENCE OF IMPACT** | Construction | The impact will happen during construction. |
| | Operation | The impact will happen during operation. |
| | Decommissioning | The impact will happen during decommissioning. |
| | Immediate | The impact will happen immediately |
| | Delayed | There will be a delay in the impact occurring. |
| **PROBABILITY OF IMPACT OCCURRING (with mitigation)** | Definitely | The impact will definitely occur even with mitigation (100%). |
| | Likely | It is likely that the impact will occur (60%-99%). |
| | Fair | There is a fair chance that the impact will occur (30% -59%). |
| | Unlikely | It is unlikely that the impact will occur (0% - 29%) |
| **REVERSIBILITY (with mitigation)** | Possible | It is possible to reverse the impact. |
| | Partly | It is partly possible to reverse the impact. |
| | Not possible | It is not possible to reverse the impact. |
| **EXTENT OF IMPACT (with mitigation)** | Site | The impact will be limited to the site. |
| | Local | The impact will affect the local area (within a radius of 40km). |
| | Provincial | The impact will affect areas beyond the site but within the boundaries of the province. |
| | National | The impact will affect areas beyond the province but within the boundaries of South Africa. |

| | | |
|---|---|---|
| **DURATION (with mitigation)** | Short-term<br>Medium-term<br>Long-term<br>Permanent | 0-5 years (construction phase).<br>5-40 years (construction and operation).<br>(>40 years).<br>Permanent damage to the environment. |
| **SIGNIFICANCE OF IMPACT WITHOUT MITIGATION** | Low<br>Medium<br>High | Small impact / disturbance.<br>Moderate impact / disturbance expected.<br>Significant impact / disturbance expected. |
| **SIGNIFICANCE OF IMPACT POST-MITIGATION** | Low<br>Medium<br>High | Small impact / disturbance.<br>Moderate impact / disturbance expected.<br>Significant impact / disturbance expected. |

**Table 8** lists potential impacts associated with the proposed project, and details what mitigation measures must be undertaken to minimise these impacts.

**Table 8:** Assessment of potential impacts associated with the proposed project.

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | | |
| CORONA VIRUS COVID-19) PANDEMIC | • Both temporary and permanent jobs will be created during the planning, construction and operational phase of the proposed project;<br>• The proposed project will ensure the long-term sustainability of the farm, through diversification of agricultural activities and increased water storage and availability for supplementary irrigation;<br>• Not only will the proposed project ensure the job security of the labour employed on the farm, it will ensure increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life;<br>• The proposed project will thus result in positive knock on effects to the surrounding population and the local economy;<br>• Macadamia nuts will be sold to surrounding businesses or exported out of South Africa which will be beneficial to the local economy and bring in foreign currency; and<br>• As such, although the pandemic has been and will continue to be widespread, the proposed project will play a beneficial role in alleviating its impacts within the surrounding area. | • Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield; and<br>• Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities. | Positive Direct | - | Definite | Definite | - | - | Local | Local | Short-term during Construction Medium-term during Operation | Short-term during Construction Medium-term during Operation | High Positive | High Positive |
| CLIMATE CHANGE | • The proposed project has the potential to contribute to climate change to a minor extent through energy and water usage, and waste generation during the construction phase and operational phase; and<br>• There is potential for the proposed study sites to be impacted by flood events, drought, extreme weather conditions and temperature variations. | • It is important to note that the Applicant has selected the most feasible agricultural activities under the current climate conditions. Thus, any long-term climatic change can be adapted to by the conversion to activities more suited to the current conditions, making changes to cultivation timeframes, or by increasing the variability or diversification of the agricultural activities; and<br>• The proposed project will play an important role in building resilience to climate change by improving food security and generating employment opportunities. This in turn will result in skills development, income generation and improved quality of life. | Positive Direct | - | Definite | Definite | - | - | Local | Local | Short-term during Construction Medium-term during Operation | Short-term during Construction Medium-term during Operation | High Positive | High Positive |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | WITHOUT MITIGATION | WITH MITIGATION | | |
| LOCAL ECONOMY AND EMPLOYMENT OPPORTUNITIES | • A number of temporary jobs will be generated during the planning phase, which includes Engineers and Specialists;<br>• A number of temporary jobs will also be generated during the construction phase of the proposed project. This includes Engineers, contractors and labour (skilled, semi-skilled and unskilled);<br>• It will also contribute positively to the local economy and the social environment through spending of capital at local businesses;<br>• The proposed project will provide job security for approximately 60 labour employed on the farm. In KwaZulu-Natal, one job supports seven dependents. Thus, approximately 420 additional labour will benefit from the proposed project, as well as their dependents;<br>• During the operational phase, the proposed project will allow for increased water storage and availability for supplementary irrigation during the summer months, and a back-up during the dry, winter months; and<br>• It will ensure the long-term sustainability of Hopewell Farm, through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. | • Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield; and<br>• Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities. | Positive<br>Direct | - | Definite | Definite | - | - | Local | Local | Short-term during Construction Medium-term during Operation | Short-term during Construction Medium-term during Operation | High<br>Positive | High<br>Positive |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| **NEED AND DESIRABILITY**<br>• A number of temporary jobs will be generated during the planning phase,;<br>• A number of temporary jobs will also be generated during the construction phase of the proposed project;<br>• The proposed project will contribute positively to the local economy and the social environment through spending of capital at local businesses;<br>• The proposed project will provide job security for approximately 60 labour employed on the farm. In KwaZulu-Natal, one job supports seven dependents. Thus, approximately 420 additional labour will benefit from the proposed project, as well as their dependents;<br>• During the operational phase, the proposed dam will serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle;<br>• It will ensure the long-term sustainability of the farm, through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life;<br>• Although the proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, specific rehabilitation recommendations have been proposed to mitigate this loss;<br>• The proposed cultivation sites are located outside of the proposed 15 m freshwater ecosystem habitat buffer;<br>• Although approximately 0.48 ha of the proposed dam site was identified to comprise riparian habitat, this loss of this vegetation is considered acceptable;<br>• The proposed cultivation sites will not result in the loss of any riparian vegetation;<br>• The impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low;<br>• There is sufficient water available in the catchment for the proposed dam establishment, as well as to sustain the EWR; and<br>• The implementation of the recommendations and mitigation measures will ensure that the surrounding environment is protected, maintained and monitored, which will have benefits for both fauna and flora. | • Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield;<br>• Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities; and<br>• The required water volumes must be released from the proposed dam as stipulated by the DWS in the conditions of the WUL. | Positive Direct and Indirect | - | Definite | Definite | - | - | Local | Local | Short-term during Construction Medium-term during Operation | Short-term during Construction Medium-term during Operation | High Positive | High Positive |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| PLANNING INITIATIVES | • The proposed project complies with all of the above Planning Initiatives, most notably the generation of employment opportunities, job security and investment in the agricultural sector;<br>• As a result of its rural nature, terrain and topography, there are both challenges and opportunities experienced within the iLembe District Municipality; and<br>• The KwaDukuza Local Municipality and surrounding local communities thus relies disproportionately on the agricultural sector for the generation of employment opportunities and the associated skills development, income generation and improved quality of life. | • None. | Positive Direct and Indirect | - | Definite | Definite | - | - | Local | - | Medium-term & long-term | Medium-term & long-term | High Positive | High Positive |
| CULTURAL AND HISTORICAL RESOURCES | • The proposed project will pose a minimal risk to heritage and paleontological resources. | • In the unlikely event that any graves, fossils or other heritage features are exposed, the ECO must be contacted; and<br>• Attention is drawn to the National Heritage Resources Act (NHRA, Act No. 25 of 1999) which, requires that projects that expose archaeological or historical remains must cease immediately, pending evaluation by KwaZulu-Natal Amafa and Research Institute, and a chance find protocol must be implemented. | Negative Direct | Highly likely | Unlikely | Unlikely | Possible | Possible | Site & local | Site & local | Medium-term | Medium-term | Med | Low |
| SURROUNDING LANDUSE AND AESTHETICS | • The proposed project is to take place on an existing and operational farm, thus it is in keeping with the surrounding land use and aesthetics; and<br>• It will not alter the sense of place of the area or have a significant visual impact. | • Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly;<br>• The planting of non-indigenous vegetation species must be prohibited; and<br>• Noise and dust nuisances generated during the construction phase must be controlled. | Negative Direct & Indirect | Partly | Definitely | Fair | Not Possible | Possible | Site & local | Site & local | Long-term | Medium-term | High | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| TRAFFIC,ROADS AND ACESS | • There is potential for a minimal increase in traffic during the construction phase;<br>• Excessive speed poses a threat to both road users and fauna; and<br>• Increased use of the access roads on the farm may result in accelerated deterioration. | • Vehicles accessing the proposed study sites must be driven cautiously and within the required speed limits; and<br>• Maintenance of access roads on the farm must be undertaken as and when necessary. | Negative Direct | Partly | Definitely | Definitely | Partly | Possible | Site & local | Site & local | Short-term during ConstructionMedium-term during Operation | during Construction. Medium-term during | High | Low |
| CONSTRUCTIONACTIVITIES, NOISE AND DUST NUISANCES | • It is unlikely that the level of noise and dust nuisances generated during the construction phase will negatively impact on surrounding landowners, as there are none in close proximity. | • Construction activities must be limited to regular working hours (Monday to Saturday, 07h00 to 17h00), and construction on public holidays must not be permitted;<br>• Construction vehicles and equipment must be maintained and regularly serviced to ensure that unnecessary noise nuisances are prevented;<br>• Construction labour onsite must not generate unnecessary noise such as hooting or shouting;<br>• Dust suppressions measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions; and<br>• Vehicles accessing the proposed study sites must be driven cautiously within the required speed limits. | Negative Direct | Partly | Definitely | Fair | Partly | Partly | Site & local | Site & local | Short-term during Construction Medium-term during Operation | Short-term during Construction Medium-term during Operation | Med | Low |
| AIR QUALITY AND SURFACE WIND | • Potential exists for dust to be generated during the construction phase. However, dust nuisances are unlikely to impact on surrounding landowners. | • Dust suppressions measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions; and<br>• Vehicles accessing the proposed study sites must be driven cautiously within the required speed limits. | Negative Direct | Partly | Definitely | Fair | Partly | Partly | Site & local | Site & local | during Construction Medium-term during | during Construction Medium-term during | Med | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| SECURITY | • Potential exists for labour to trespass onto adjacent properties; and<br>• There is potential for crime in the area to increase during the construction phase, as a result of people seeking employment opportunities onsite. | • Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield;<br>• Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities;<br>• All construction labour must remain within the boundaries of the farm at all times;<br>• Access onsite and offsite must be controlled;<br>• The construction labour must be issued with name badges and clearly identifiable uniforms; and<br>• Attendance registers for construction labour and visitors must be kept throughout the construction phase. | Negative Direct | Highly likely | Fair | Unlikely | Partly | Possible | Site & local | Site | Short-term during Construction. Medium-term during Operation | Short-term during Construction. Medium-term during Operation | Medium | Low |
| TOPOGRAPHY | • The proposed dam site is the preferred option due to the natural topography of the area and the extent of the catchment;<br>• As such, this will allow for the proposed dam to be naturally contained and thus reduce the extent of earthworks required;<br>• The proposed cultivation sites are located in the preferred positions due to the natural topography of the land, the quality of the soils, as well as being located outside of the proposed buffers; and<br>• Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources. | • Nearby undisturbed areas must be protected from erosion by demarcating the construction site. No vehicular or pedestrian access must be allowed beyond the demarcated area;<br>• Erosion control measures must be implemented where necessary;<br>• Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly; and<br>• The planting of non-indigenous vegetation species must be prohibited. | Negative Direct and Indirect | Likely | Definitely | Unlikely | Partly | Possible | Site & local | Site | Medium-term | Short-term | Medium | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| CLIMATE | • Topsoil which is stockpiled during the construction phase has the potential to be wind-blown, thus causing dust nuisances;<br>• Soil disturbance has the potential to result in the encroachment of alien invasive vegetation;<br>• Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;<br>• Potential exists for high intensity rainstorm events to cause severe erosion at the proposed study sites; and<br>• During dry and windy conditions, there is an increased risk for runaway fires. | • Appropriate mitigation measures must be implemented to minimise the area of soil disturbance and the potential for mobilisation of bare areas;<br>• Erosion control measures must be implemented where necessary;<br>• Stockpiled topsoil must be dampened or covered during times of high wind to prevent dust nuisances;<br>• Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;<br>• Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;<br>• Planting of non-indigenous vegetation species must be prohibited;<br>• Dust suppression measures, such as spraying of water on bare soil, must be undertaken during dry and windy conditions;<br>• Measures must be taken to cover exposed areas during high intensity rainfall events;<br>• Care must be taken throughout the construction phase to minimise risks of runaway fires occurring; and<br>• The construction phase must be undertaken during the dry, winter months. | Negative<br>Direct & Indirect | Partly | Likely | Fair | Partly | Possible | Site & Local | Site | Medium-term | Short-term | Medium | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| GEOLOGY AND SOILS | • Construction activities in areas of instability, irresponsible design and construction methods, and the use of inappropriate materials have the potential to result in the cracking or collapse of dam walls. This in turn has significant environmental and financial consequences;<br>• Topsoil which is stockpiled during the construction phase has the potential to be wind-blown, thus causing dust nuisances;<br>• Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;<br>• Soil disturbance has the potential to result in the encroachment of alien invasive vegetation;<br>• Potential exists for high intensity rainstorm events to cause severe erosion at the proposed study sites; and<br>• There is potential for failure of the dam wall if it is not maintained. | • The recommendations stipulated in the Geotechnical Report must be adhered to (Refer to Appendix S);<br>• Appropriate mitigation measures must be implemented to minimise the area of soil disturbance and the potential for mobilisation of bare areas;<br>• Erosion control measures must be implemented where necessary;<br>• Stockpiled topsoil must be dampened or covered during times of high wind to prevent dust nuisances;<br>• Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;<br>• Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;<br>• Planting of non-indigenous vegetation species must be prohibited;<br>• Dust suppression measures, such as spraying of water on bare soil, must be undertaken during dry, windy conditions; and<br>• Measures must be taken to cover exposed areas during high intensity rainfall events. | Negative Direct and Indirect | Partly | Definitely | Unlikely | Partly | Possible | Site & Local | Site | Medium-term | Short-term | Medium | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| SURFACE WATER AND WETLAND SYSTEMS | • Vegetation clearing, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding watercourses; and<br>• Increased surface runoff and sediment deposition associated with poorly shaped lands and clearance of vegetation for the proposed dam site;<br>• Direct loss and disturbance to the natural habitat from the proposed dam establishment as well as back-flooding;<br>• Soil compaction and disturbance to vegetation;<br>• Soil and water quality impacts due to the application of fertiliser;<br>• Potential for erosion due to poor back-filling of trenches during the installation of pipelines;<br>• Reduction in flows to HGM Unit 2 downstream of the proposed dam site;<br>• Poor maintenance of access roads has the potential to result in stormwater impacts; and<br>• Infestation of alien invasive vegetation due to lack of alien invasive vegetation management. | • The 15 m freshwater ecosystem habitat buffer must be demarcated with painted stakes identifying the area as a 'no-go' area for agricultural activities;<br>• Although the proposed pipeline installation will not intersect any watercourses, the following must still be considered:<br>• Any preferential flow paths identified before the buffer will require the installation of earthen berms to dissipate stormwater flow before being directed to the buffer areas; and<br>• Reinstatement of the soils must occur with the returned soils to the same levels prior to pipeline installation.<br>• Existing crossings over the HGM Units onsite must be used;<br>• Due to the loss of 0.199 ha of wetland habitat associated with HGM Unit 2, rehabilitation recommendations have been proposed to be implemented;<br>• Areas under sugar cane which fall within the 15 m freshwater ecosystem habitat buffer must cease. Ratoons must be removed or treated, and the buffer area revegetated appropriately;<br>• The dam edge must include a terraced area to provide a shallow water for the establishment of vegetation. The terraced area must be at least 5 m wide along the dam edge so as to allow for shallow flooding at a maximum depth of 0.2 m;<br>• General rehabilitation and management of the dam and watercourses onsite must take place;<br>• The sloped areas must be terraced along the cultivated lands to reduce peak flow velocities;<br>• A flood protection berm or embankment (0.5 m high with a 0.3 m base) must be installed along the sides of the cultivated lands;<br>• A Surface Water Monitoring Programme must be implemented to monitor both the water quality and quantity onsite (Refer to Section 7 of the Hydrology and Flood Line Assessment (Refer to Appendix P));<br>• Eroded areas must be revegetated to reduce the risk of increased runoff and sedimentation of watercourses;<br>• Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly within the proposed study sites; and<br>• The non-perennial streams must be regularly inspected for flow obstructions which could lead to ponding and flooding. | Negative Direct and Indirect | Highly likely | Definitely | Fair | Partly | Possible | Site & local | Site | Long-term | Medium-term | High Negative | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| GROUNDWATER | • The groundwater table generally mimics the topography, thus it may be shallower near to streams and topographic depressions where groundwater contributes towards groundwater baseflow; and<br>• The groundwater quality within the area will be variable and dependent on the underlying geology and hydrogeology characteristics associated with groundwater recharge. | • None. | Negative Direct and Indirect | Highly likely | Definitely | Fair | Partly | Possible | Site & local | Site | Long-term | Medium-term | High Negative | Low |
| FAUNA | • Disturbance and compaction of soils has the potential to result in the encroachment of alien invasive vegetation and the loss of natural habitat for fauna. | • The EWR must be released from the proposed dam to ensure that the water quality and fauna habitat is conserved; and<br>• Poaching must not be permitted, and if poaching occurs the culprit must be fined. | Negative Direct and Indirect | Likely | Definitely | Unlikely | Not possible | Partly | Site & Local | Site & Local | Medium-term | Short-term | High Negative | Low |
| FLORA | • Vegetation clearing has the potential to result in soil being wind-blown, and generating dust nuisances;<br>• Vegetation clearing along with high intensity rainfall, have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;<br>• Disturbance and compaction of soils has the potential to result in the encroachment of alien invasive vegetation and the loss of natural habitat for flora; and<br>• Clearing of vegetation, stockpiling of material and construction activities have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources. | • Vegetation must remain intact where possible to limit high surface flows and mobilisation of sediment;<br>• Alien invasive vegetation clearing, rehabilitation and revegetation of disturbed areas must be undertaken regularly;<br>• Planting of non-indigenous vegetation species must be prohibited;<br>• The Alien Invasive Vegetation Management Programme must be implemented (Refer to Appendix T).<br>• A portion of the proposed cultivation sites was identified to comprise a steep slope with a narrow drainage line which is an erosion hazard. Thus, a no-planting strip must be maintained within this entire area; and<br>• A 5 m riparian habitat buffer from the outer tree line must be implemented along the boundary of the proposed cultivation sites. | Negative Direct and Indirect | Likely | Definitely | Unlikely | Not possible | Partly | Site & Local | Site & Local | Medium-term | Short-term | High Negative | Low |

| DESCRIPTION OF IDENTIFIED ENVIRONMENTAL IMPACT | | MITIGATION | NATURE OF IMPACT | DEGREE TO WHICH IMPACT CAN BE MITIGATED | PROBABILITY OF IMPACT OCCURRING | | REVERSIBILITY OF IMPACT | | EXTENT OF IMPACT | | DURATION OF IMPACT | | SIGNIFICANCE OF IMPACT WITHOUT MITIGATION | SIGNIFICANCE OF IMPACT WITH MITIGATION |
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| FIRE MANAGEMNT | • During the dry, winter months, there is an increased risk for runaway fires;<br>• Runaway fires have the potential to cause severe damage to the farm, as well as surrounding properties. | • During the operation phase, the proposed dam may potentially serve as a useful barrier to prevent fires from spreading as well as a source of water for fire fighting;<br>• Open fires must not be lit for cooking or heating purposes;<br>• The farm must have appropriate fire breaks and safety measures in place in terms of the National Veld and Forest Fire Act (Act No. 101 of 1998);<br>• Care must be taken throughout the construction phase to minimise the risks for runaway fires;<br>• All construction labour must be educated on methods to reduce the risks of fires and the procedures to follow on the occurrence;<br>• Construction vehicles and equipment must be regularly checked for oil or fuel leaks; and<br>• The Fire Management Plan included in the EMPr must be adhered to (Refer to Appendix T). | Negative Direct and Indirect | Likely | Definitely | Unlikely | Not possible | Partly | Site & Local | Site & Local | Medium-term | Short-term | High Negative | Low |

# 11 ENVIRONMENTAL MANAGEMENT PROGRAMME

In terms of the Regulations stated in Appendix 4 of Chapter 8 of the NEMA, GNR 326, an EMPr has been compiled which contains guidelines for ensuring that all activities associated with the proposed project are carried out in an environmentally responsible and acceptable manner (Refer to **Appendix T**). Specific management objectives and mitigation measures have been specified for the entire duration of the proposed project.

The EMPr is based on the principles of the NEMA as well as the recommendations made during both the Scoping Phase and the EIA Phase. It identifies roles and responsibilities of management personnel onsite, and will be used as a framework for environmental compliance monitoring and reporting, should the proposed project be authorised.

An EMPr is a legally-binding document that contains guidelines with which contractors must comply, and which must be strictly implemented and regularly monitored. If this is done, it is likely that the majority of the potentially adverse impacts associated with construction activities can be minimised or prevented. An ECO should be appointed by the Applicant to ensure compliance with the EMPr during the construction and operational phase of the proposed project. Should non-compliance occur, this must be brought to the attention of the DEDTEA who will conduct the required prosecution procedure.

Specific management objectives and mitigation measures are specified in the EMPr for the entire duration of the proposed project, including the following stages:

- Planning and design;
- Pre-construction and construction activities;
- Operation or undertaking of the activity;
- Rehabilitation of the environment; and
- Closure, where relevant.

The EMPr includes the following:

- Spill Contingency Plan;
- Fire Management Plan;
- Alien Invasive Vegetation Management Programme;
- Erosion Control Measures; and
- Water Management Measures.

# 12 RECOMMENDATIONS

## 12.1 ENVIRONMENTAL IMPACT STATEMENT

### 12.1.1 Summary of key findings and recommendations

It is important to note that the DFFE Screening Tool lists the following Specialist Studies to be compiled for the proposed project. The Environmental Consultant is of the opinion that not all these Specialist Studies are needed / relevant to the proposed project given its scale, and thus a motivation has been included below:

- Landscape / Visual Impact Assessment – Hopewell Farm is a commercial agricultural operation comprising sugar cane. The farm is surrounded by agricultural activities and as such, the proposed project is unlikely to visually impact on the landscape as well as the surrounding landowners;
- Archaeology and Cultural Heritage Impact Assessment – A Phase 1 Heritage Impact Assessment has been compiled for the proposed project;
- Paleontological Impact Assessment – A Desktop Paleontological Impact Assessment has been compiled for the proposed project;
- Terrestrial Biodiversity Impact Assessment – A Biodiversity Assessment has been compiled for the proposed project;
- Aquatic Biodiversity Impact Assessment – The tributary is non-perennial, and as such, there is no water to sample and thus no aquatic habitat to support. An Aquatic Assessment is thus not required for the proposed project;
- Hydrology Assessment – A Hydrology and Flood Line Assessment has been compiled for the proposed project;
- Socio-Economic Assessment – Given the minimal scale of this project, a Socio-Economic Assessment is not required. The proposed project will have minimal impacts on social as well as economic elements;
- Plant Species Assessment – A Biodiversity Assessment has been compiled for the proposed project; and
- Animal Species Assessment – A Biodiversity Assessment has been compiled for the proposed project.

The following Specialist Studies have been compiled for the proposed project:

- Wetland Assessment;
- Biodiversity Assessment;
- Hydrology and Flood Line Assessment;
- Preliminary Yield and Groundwater Alternatives Report;
- Phase 1 Heritage Impact Assessment and Desktop Paleontological Impact Assessment;
- Geotechnical Report; and
- Dam Design and Engineering Report.

**WETLAND ASSESSMENT**

A Wetland Assessment was compiled for the proposed project (Refer to **Appendix B**). According to the NFEPA database, the proposed study sites do not intersect any NFEPA watercourses (Refer to **Figure 8**). Although 28 HGM Units were identified within a 500 m radius of the proposed study sites, seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed (Refer to **Figure 9 and 10**). HGM Unit 1, and 3 to 7 have the potential to be impacted by the proposed cultivation activities, and HGM 2 will be impacted by the proposed dam establishment as well as the cultivation activities. It is important to note that the proposed pipeline installation does not intersect any watercourses, and will utilise the dam wall for connection to the pump station. These HGM Units are considered the most natural areas, and majority of the farm is under sugar cane. They have thus become prominent features onsite.

HGM Unit 1 is classified as a channelled valley bottom wetland system and is approximately 0.61 ha in extent. This wetland system has been maintained as an important ecological corridor onsite. It is well vegetated and mitigates most impacts associated with sugar cane. HGM Unit 2 is classified as an upper foothills river and is approximately 0.77 ha in extent. It is a riparian ecosystem due to the slope, as well as the rocky and confined nature of the channel. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat habitat from HGM Unit 2, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required) according to the Wetland Offset Calculator as per the SANBI (2014) wetland offset guidelines. Specific rehabilitation recommendations include the removal of sugar cane within the 15 m freshwater ecosystem habitat habitat buffer, reshaping of the existing contours, terracing of the dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite.

HGM Unit 3 and 4 are classified as seep wetland systems, and are approximately 0.21 ha and 0.15 ha in extent, respectively. These wetland systems direct flows to HGM Unit 2. They are surrounding by sugar cane and have assisted agricultural activities by distributing flows downstream and preventing incising of the valley line. HGM Unit 5 is classified as a channelled valley bottom wetland system and is approximately 0.93 ha in extent. It is situated within the valley bottom onsite, and has been maintained as a feature that directs flows downstream. HGM Unit 6 is classified as a seep wetland system and is approximately 0.1 ha in extent. It is a small and naturalised wetland system that has become more prominent due to agricultural activities (i.e. contours and rows) which have altered the flow regime over time. HGM Unit 7 is classified as a seep wetland system and is approximately 0.1 ha in extent. It has remained a feature onsite and is thus well established. It provides diffuse flows to HGM Unit 5.

The wetland systems within Hopewell Farm were identified along the valley bottom and within a landscape that is under sugar cane. Due to agricultural activities which have taken place since 1937 and based on historical imagery, as well as general disturbances within the farm, the wetland systems have experienced a number of impacts which has resulted in changes to their hydrogeomorphic functioning. However, it is important to note that based on historical imagery, the watercourses along the valley bottom have

remained as features that direct and manage flows downstream. The agricultural activities have impacted on the integrity of the wetland systems with regards to their hydrology and vegetation, which in turn has resulted in a decline in their geomorphology. As such, the PES of HGM Unit 1, 3, 4, 5 and 7 is classified as 'moderately modified', and the PES for HGM Unit 6 is classified as 'largely modified'. In terms of the EIS, HGM Unit 3, 4, 6 and 7 are classified as 'low' as they are not considered to be ecologically important and sensitive at any scale. The EIS for HGM Unit 1 and 5 is classified as 'moderate' as they are considered ecologically important and sensitive at a provincial or local scale.

Potential direct impacts associated with the proposed project:

- Potential erosion and deposition of sediment due to poor erosion control measures as a result of clearing of existing cultivated lands;
- Increased surface runoff and sediment deposition associated with poorly shaped lands and clearance of vegetation for the proposed dam site;
- Direct loss and disturbance to the natural habitat from the proposed dam establishment as well as back-flooding;
- Soil compaction and disturbance to vegetation;
- Soil and water quality impacts due to the application of fertiliser;
- Potential for erosion due to poor back-filling of trenches during the installation of pipelines; and
- Reduction in flows to HGM Unit 2 downstream of the proposed dam site.

Potential indirect impacts associated with the proposed project:

- Poor maintenance of access roads has the potential to result in stormwater impacts;
- Erosion and sedimentation; and
- Infestation of alien invasive vegetation due to lack of alien invasive vegetation management.

Given the abovementioned information, a buffer have been proposed to maintain the ecological integrity and functioning of the HGM Units. Due to the objectives of the proposed project, a 15 m freshwater ecosystem habitat habitat buffer has been proposed to be implemented to the HGM Units (Refer to **Figure 11**). It is important to note that this buffer includes the 5 m riparian habitat buffer. This buffer will ensure that the sensitive environments are adequately protected and are able to withstand the impacts associated with the proposed cultivation activities. It will also allow for the integrity of the HGM Units to increase over time.

Should the below mitigation / recommendations be implemented, the proposed project will have a 'medium to low impact' on the sensitive environments.

**Mitigation / Recommendations**

- The 15 m freshwater ecosystem habitat habitat buffer must be demarcated with painted stakes identifying the area as a 'no-go' area for agricultural activities;
- Although the proposed pipeline installation will not intersect any watercourses, the following must still be considered:

  - Any preferential flow paths identified before the buffer will require the installation of earthen berms to dissipate stormwater flow before being directed to the buffer areas; and
  - Reinstatement of the soils must occur with the returned soils to the same levels prior to pipeline installation.
- Existing crossings over the HGM Units onsite must be used; and
- Due to the loss of 0.199 ha of wetland habitat associated with HGM Unit 2, rehabilitation recommendations have been proposed to be implemented;
  - Areas under sugar cane which fall within the 15 m freshwater ecosystem habitat buffer must cease. Ratoons must be removed or treated, and the buffer area revegetated appropriately;
  - The dam edge must include a terraced area to provide a shallow water for the establishment of vegetation. The terraced area must be at least 5 m wide along the dam edge so as to allow for shallow flooding at a maximum depth of 0.2 m (Refer to **Figure 12**); and
  - General rehabilitation and management of the dam and watercourses onsite must take place;

**BIODIVERSITY ASSESSMENT**

A Biodiversity Assessment was compiled for the proposed project (Refer to **Appendix O**). Hopewell Farm was identified to fall within an area comprising predominantly sugar cane. The terrain within the area was identified to be undulating with valley bottoms that comprise watercourses with dense riparian vegetation that has been conserved. The vegetation within the proposed study sites was identified to be classified as KwaZulu-Natal Coastal Belt Grassland which has a status of Critically Endangered and Nominally Protected. It must be noted that no grasslands were identified within the proposed study sites, and they are no longer representative of the KwaZulu-Natal Coastal Belt Grassland vegetation type. CBAs classified as Optimal were identified adjacent to the proposed study sites.

The Screening Tool indicated a Low Sensitivity for Plant Species, a Very High Sensitivity for Terrestrial Biodiversity and a Medium Sensitivity for Animal Species. With regards to flora, although no flora of conservation concern was identified within the proposed study sites, the riparian vegetation in the valley bottoms was identified to be in a good ecological condition, and thus represents important corridors for the dispersal of indigenous vegetation and stabilising watercourses. Approximately 0.48 ha of the proposed dam site was identified to comprise riparian vegetation. The loss of this vegetation is considered acceptable given that the remainder of the riparian vegetation within the farm has been well conserved. Although 1.45 ha of riparian vegetation was identified within a portion of the proposed cultivation sites, this area no longer forms part of the proposed project. Indigenous tree species identified within the watercourses included *Ficus natalensis, Bridelia micrantha, Macaranga capensis, Psychotria capensis, Ptaeroxylon capensis, Syzigium cordatum, Tabernaemontana ventricosa,* and *Trichilisa dregeana.* Alien invasive vegetation species that were identified within the watercourses included *Solanum mautianum, Schinus terebinthifolius*, and *Cestrum laevigatum*.

With regards to fauna, the larger mammals and reptiles were identified to be absent due to majority of the proposed study sites comprising sugar cane. However, suitable habitats were identified to be present for

smaller fauna species. Although no fauna of conservation concern are likely to occur within the proposed study sites due to its highly modified nature, the riparian vegetation is likely to support viable populations of many common fauna species such as avifauna. Birds were identified to be active onsite, and it is highly likely that many bird species will utilise the proposed study sites. Butterfly species were also identified to be active and included *Chrysippus aegyptius, Junonia oenone, Hypolimnas misippus, Eurema hecavbe solifera*, and *Amauris albimaculata.*

**Mitigation / Recommendations**

- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly within the proposed study sites and within the riparian vegetation;
- A portion of the proposed cultivation sites was identified to comprise a steep slope with a narrow drainage line which is an erosion hazard. Thus, a no-planting strip must be maintained with this entire area; and
- A 5 m riparian habitat buffer from the outer tree line must be implemented along the boundary of the proposed cultivation sites (Refer to **Figure 14**).

**HYDROLOGY AND FLOOD LINE ASSESSMENT**

A Hydrology and Flood Line Assessment was compiled for the proposed project (Refer to **Appendix P**). Hopewell Farm falls within the headwaters of the U30E quaternary catchment and the Pongola to Mtamvuna WMA. It falls within the U3A rainfall zone. MAP was recorded to range between 571.6 mm / year and 1809 mm / year and average rainfall is 995.5 mm / year. Hopewell Farm falls within the 22A rainfall zone, with a MAE ranging between 1400 mm / year and 1500 mm / year.

Within the U30E quaternary catchment, the Natural Mean Annual Runoff (NMAR) is approximately 22 % of the MAP, which equates to 63 567 000.00 $m^3$ / year.

The quality of groundwater within the area was identified to be variable based on the underlying geology and hydrogeology characteristics associated with groundwater recharge. Literature and available hydrogeology maps for the area suggest that groundwater abstracted from the aquifer is suitable for both domestic and recreational use.

With regards to surface water quality within the area, two surface water samples were taken for the main river receiving drainage water from the proposed dam site. The water quality resulted revealed that the surface water is well within the ideal water quality ranges for potable water use, except for turbidity and microbes. A high turbidity suggests that there is an existing siltation impact on the uMhlali River due to upstream activities, and a high microbial activity reveals risks if consumed without pre-treatment.

Due to the proposed change in land use from sugar cane to macadamia nut trees, stormwater peak flows are likely to increase when the trees are maturing. Once the macadamia nut trees reach maturity, the canopies will likely act as barriers to rainfall onto the surface, which will thus decrease runoff potential.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. In order to reduce the probability of flood damage to the watercourse as well as the cultivated lands, the following recommendations must be adhered to.

**Mitigation / Recommendations**

- The sloped areas must be terraced along the cultivated lands to reduce peak flow velocities;
- A flood protection berm or embankment (0.5 m high with a 0.3 m base) must be installed along the sides of the cultivated lands;
- A Surface Water Monitoring Programme must be implemented to monitor both the water quality and quantity onsite (Refer to Section 7 of the Hydrology and Flood Line Assessment);
- Eroded areas must be revegetated to reduce the risk of increased runoff and sedimentation of watercourses;
- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly within the proposed study sites; and
- The non-perennial streams must be regularly inspected for flow obstructions which could lead to ponding and flooding (Refer to **Figure 13**).

**PRELIMINARY YIELD AND GROUNDWATER ALTERNATIVES REPORT**

A Preliminary Yield and Groundwater Alternatives Report was compiled for the proposed project (Refer to **Appendix Q**). Hopewell Farm falls within the headwaters of the U30E quaternary catchment and the Pongola to Mtamvuna WMA. It falls within the U3A rainfall zone. MAP was recorded to range between 571.6 mm / year and 1809 mm / year and average rainfall is 995.5 mm / year. Hopewell Farm falls within the 22A rainfall zone, with a MAE ranging between 1400 mm / year and 1500 mm / year. Within the U30E quaternary catchment, the Natural Mean Annual Runoff (NMAR) is approximately 22 % of the MAP, which equates to 63 567 000.00 $m^3$ / year.

One sub-catchment / Hydraulic Response Unit (HRU) was delineated for Hopewell Farm, and HRU1 describes the drainage sub-catchment towards the proposed dam site. The U30E quaternary catchment is approximately 290.24 $km^2$ in extent and of the entire catchment, approximately 6.6 $km^2$ is made up of alien invasive vegetation species. As such, the maximum possible stream flow reduction within the catchment equates to 1 445 504.45 $m^3$ / year, and approximately 4.09 $m^3$ / year within the proposed dam site / sub-catchment. The NMAR for HRU1 was calculated to be 0.107 $mm^3$ / year, and after all allocations it has a surplus of 0.0077 $mm^3$ / year. Thus, there is approximately 0.077 $mm^3$ / year from HRU1 for irrigation purposes (i.e. 6424.38 $m^3$ / month).

Based on the average water requirements for macadamia nut trees, the water required for irrigation purposes comprises the following:

- The minimum requirement for five year old trees is 231 mm / year, and 653 mm / year for ten year old trees;

- The irrigation area is approximately 45 ha and the total number of trees equates to approximately 14 040 trees; and
- Thus, the estimated water requirements equate to 8662.5 m³ / month for five year old trees and 24 487.5 m³ / month for ten year old trees.

Given the abovementioned information, the target yield for the irrigation of five year old macadamia nut trees from the proposed dam will be possible. However, the assurance of supply for irrigation from the proposed dam will vary, depending on the pumping schedule and inflow into the dam. Please note that the decision lies with the Applicant which simulation will be implemented. These simulations are dependent on the volume of water to be abstracted and the specific time of abstraction. As such, whichever simulation is decided on, abstraction would need to be in line with this simulation as well as the EWR releases maintained. The following simulations were considered:

1. The assurance yield is 103 950 m³ / year, with a 50 % assurance of supply for pumping 8662.5 m³ / month for irrigation purposes. The assurance of having a full dam is 6.2 %, and the dam will be operating at 60 % to 80 % capacity and may sometimes be empty. Applying an irrigation factor (to achieve a higher dam volume throughout the year), suggests that the assurance yield is 57 904.83 m³ / year (4825.4 m³ / month) at an assurance of supply of 99.5 %. The assurance of having a full dam is 11.9 %;
2. The assurance yield is 43 449.54 m³ / year, with a 100 % assurance of supply. This is for pumping 8662.5 m³ in wet months and only available stream flow in dry months. The average annual abstraction volume based on the normalised distribution of pumping and inflow events is 3620 m³ / month. The assurance of having a full dam is 18.5 %;
3. The assurance yield is 74 152.59 m³ / year, with a 100 % assurance of supply. This is for pumping 8662.5 m³ in wet months plus the additional 50 % of available flowing water, and only available stream flow in dry months. The average annual abstraction volume based on the normalised distribution of pumping and inflow events is 6179.38 m³ / month. The NMAR from the sub-catchment has an assurance yield of 25.6 % (i.e. stream flow to the dam). The assurance of having a full dam is 5.3 %; and
4. The assurance yield is 78 132.25 m³ / year, with a 99.5 % assurance of supply. This is for pumping 8622.5 m³ in dry months plus the additional 50 % of available flowing water for wet months. The average annual abstraction volume based on the normalised distribution of pumping and inflow events is 6511.02 m³ / month. The NMAR from the sub-catchment has an assurance yield of 18.4 % (i.e. stream flow to the dam). The assurance of having a full dam is 3.9 %.

Given the abovementioned information, the simulations indicate that the volumes can be abstracted from the dam varying from 50 % to 99 % assurance of supply. Achieved abstraction under simulation 2, 3 and 4 suggests a greater average abstractable volume. However, this will only allow for abstraction of less water during low flow and more water during wet months. Simulation 2 to 4 provide the best probability of long-term water supply, based on a simulation from 1920 to 2010.

To further supplement the water supply from the proposed dam, the drilling of boreholes for groundwater abstraction can be considered. This is merely an option should water supply ever need to be supplemented in the future. However, the Applicant does not wish to proceed with this option, since while the use of boreholes may be ecologically feasible, it is not economically feasible (Refer to Section 5.3). The groundwater table generally mimics the topography, thus it may be shallower near to streams and topographic depressions where groundwater contributes towards groundwater baseflow. The groundwater quality within the area will be variable and dependent on the underlying geology and hydrogeology characteristics associated with groundwater recharge.

**Mitigation / Recommendations**

None.

**PHASE 1 HERITAGE IMPACT ASSESSMENT AND DESKTOP PALEONTOLOGICAL IMPACT ASSESSMENT**

A Phase 1 Heritage Impact Assessment and a Desktop Paleontological Impact Assessment was compiled for the proposed project (Refer to **Appendix R**). Based on the desktop assessment undertaken, the proposed study site has been cultivated before the 1970s. The earliest built structure onsite was established during 2010 and comprises a farm house. No heritage resources were identified, and the proposed study site does not form part of any known cultural or heritage landscape.

The local geology within the proposed study site is characterised by Natal Group sandstone. Dwyka tilite of the Karoo Supergroup is also identified to be present within the south eastern portion of the proposed study site. Dolerite dykes and sills are also known to occur within the surrounding area. These local geologies are considered to have an insignificant / zero paleo-sensitivity rating as well as a low paleo-sensitivity rating, thus the likelihood of well-preserved fossils being present is low. As such, the proposed project will pose a minimal risk to heritage and paleontological resources.

**Mitigation / Recommendations**

- In the unlikely event that any graves, fossils or other heritage features are exposed, the ECO must be contacted; and
- Attention is drawn to the National Heritage Resources Act (NHRA, Act No. 25 of 1999) which, requires that projects that expose archaeological or historical remains must cease immediately, pending evaluation by KwaZulu-Natal Amafa and Research Institute, and a chance find protocol must be implemented.

**GEOTECHNICAL REPORT**

A Geotechnical Report was compiled for the proposed project (Refer to **Appendix S**). Topographically, the proposed dam site is characterised by gentle to moderate to steep undulating lands with slopes that vary from having concave slopes to convex slopes. The proposed dam site is characterised by a concave low lying area that is surrounded to the eastern and western extents by higher lying lands with a low to

moderate gradient. One small stream is situated at the proposed dam site which runs from southwest to northeast.

The proposed dam site was identified to be underlain by inter-stratified dark grey shale, siltstone and sandstone of the Vryheid Formation. This formation exists as a sequence of micaceous fine grained sandstones, very thinly bedded siltstones and shales. The proposed dam site is characterised by alluvial soil, hill-washed materials, residual soils and inter-stratified sandstone of the Vryheid Formation. Transported soils overlie the residual soils followed by the sandstone bedrock of the Vryheid Formation.

Four Dynamic Penetrometer Light (DPL) tests were undertaken to determine the consistency of the subsurface soil materials and for the derivation of the soil bearing capacities onsite. The results indicated that the proposed dam site is covered by shallow medium dense soils with isolated loose zones from ground surface to a depth of 1.5 m, 1.8 m and 2.7 m. Six trial pits were excavated within the low lying areas along the open sugar cane lands. The conditions found in the trial pits were identified to be representative of the conditions at the proposed dam site. Groundwater seepage was noted within three out of the six trial pits. From the soil sampling results, it was noted that the trial pits comprised of a mixture of clayey sand, inorganic sandy clay, and inorganic clay all of which comprise a low, medium and high plasticity.

The following construction materials will be required for the proposed dam site:

- 6500 m³ of impervious soils;
- 13500 m³ of semi-impervious materials; and
- 750 m³ of rock fill.

The inspection pit profiles indicate that both flanks of the proposed dam site comprise sandstone overlying by layers of residual soils that are capped by hill-washed materials. The inspection pit that was excavated in the low lying areas near to the stream reveal alluvial soils that are capped by hill-washed materials. These materials are underlain by various layers of residual soils which overlie sandstone of the Vryheid Formation.

**Mitigation / Recommendations**

- The cut embankment in the alluvial soils and the residual soils must be restricted to a slope batter of 1:1.5 (34 °);
- Any trench excavations or temporary cut embankments deeper than 1.2 m must be suitably battered back or shored to prevent the collapse of sides or sliding of soils;
- The cut embankment must be protected against erosion by the rehabilitation and revegetation of disturbed areas;
- The proposed dam must be established during the dry season;
- Diverting channels or earth bunds must be established to divert the stream away from the partially excavated dam site;

- At the embankment foundation, topsoil will be required to be stripped of organic matter which prevents proper compaction;
- Selected materials must be used and placed in their appropriate zones at the specified slopes and compacted at the specified moisture content:
  - The fill materials must not contain any large clods or lumps;
  - Vegetation and boulders over 150 mm must be removed;
  - Foundation materials with a high clay or high organic content must be excavated to waste before the embankment is established;
  - Materials must be spread in horizontal layers that do not exceed 200 mm in thickness, and must be compacted by a vibratory roller to at least 98 % Proctor Dry Density and Optimum Moisture Content (OMC);
  - Prior to the placement of the horizontal layers, the fill materials must be compacted with minimum moisture content of not less than 2 % below the OMC; and
  - The construction machinery must be directed over different routes to allow for maximum distribution of compaction.
- An allowance of 5 % of the wall height must be made where the fill material is moisture conditioned and roller compacted. This allowance must increase to 10 % where there is no moisture conditioning and only traffic compaction;
- Soil within the spillway return area must be removed and if suitable, used for the embankment;
- Rocks and clay materials must be piled on the edge of the embankment and compacted into the soil;
- The height of the spillway will determine the full supply level of the proposed dam, thus it needs to be at least 1 m from the top of the crest;
- The upstream slope of the proposed dam must be a minimum of 1:2 (26.6 °) and the downstream slop must be a minimum of 1:1 ¾ (29.74 °), and these slopes must be appropriate vegetated to prevent erosion;
- The upstream slope must be protected by rock riprap using well graded rock with a thickness of between 450 mm and 600 mm, and between 5 kg and 75 kg in weight;
- A blanket of graded gravel must be provided underneath the riprap when the compacted materials of the underlying earth fill is of such gradation that there is danger that excessive fine soils may be washed out. This blanket must not be less than 300 mm thick;
- The shells must not be founded on materials with low organic content and low compressibility thus the layer of hill-washed soils and residual soils of poor bearing capacities must be removed;
- The clay core must be founded on materials that are sufficiently impervious and these materials are encountered at depths between 1.8 m and 2.4 m. alternatively, the clay core can be founded on highly weathered sandstone which is encountered at depths between 2.1 m and 2.7 m;
- The final location and width of the spillway structure must be verified by the excavation of test pits, sampling as well as laboratory testing during the design phase of the proposed project.

**DAM DESIGN AND ENGINEERING REPORT**

A Dam Design and Engineering Report was compiled for the proposed project (Refer to **Appendix N**). In terms of the survey undertaken, the proposed dam establishment is to comprise the following specifications:

- Wall height – 10 m;
- Top of wall width – 3 m;
- Wall length – 98 m;
- Storage capacity – 67 000 $m^3$;
- Surface area – 1.5 ha;
- Wall volume – 10 500 $m^3$;
- Freeboard – 1.7 m; and
- Spillway width – 12 m.

In terms of the abovementioned dam specifications, the following must be noted:

- The return to stream must be protected with rocks or gabion baskets where the slope is steep;
- The dropbox must comprise four 400 mm uPVC pipes, and must be a 3 $m^2$ reinforced cavity type reinforced brick and concrete structure;
- The dropbox must be installed 200 mm below the lower emergency spillway and must have a height of 1.5 m to 2 m;
- The dropbox must have a base of 40 megapascals;
- Two spillways must be established, each with a 10 m width;
- The spillways must be topsoiled and appropriately revegetated;
- A change of height of 200 mm is required between both spillways;
- The dam wall must have a width of 3 m to 3.5 m, and must be topsoiled and appropriate revegetated;
- The upstream dam wall must be 1 vertical to 3 horizontal, and the downstream dam wall must be 1 vertical to 2 horizontal; and
- Riprap must be placed on the upstream dam wall at 0.5 m below and 0.5 m above the full supply level.

### 12.1.2 Positive and negative implications of the proposed project

**POSITIVE**

- The proposed project complies with all of the above Planning Initiatives, most notably the generation of employment opportunities, job security and investment in the agricultural sector;
- As a result of the rural nature of the iLembe District Municipality, the KwaDukuza Local Municipality and surrounding local communities thus relies disproportionately on the agricultural sector for the generation of employment opportunities and the associated skills development, income generation and improved quality of life; .
- Both temporary and permanent jobs will be generated during the planning, construction and operational phase of the proposed project;

- The increased water storage and availability will ensure increased macadamia nut production and yields, as well as increased employment opportunities.
- Not only will the proposed project ensure the farms long-term sustainability, it will also result in positive knock on effects to the surrounding population and the local economy;
- The proposed project will ensure the financial viability of the farm thus contributing to local economic development;
- Macadamia nuts will be sold to surrounding businesses or exported out of South Africa which will be beneficial to the local economy and bring in foreign currency;
- During the construction phase, the proposed project will contribute positively to the local economy and the social environment through spending of capital at local businesses;
- During the operational phase, the proposed project will provide job security for approximately 60 labour employed on the farm;
- In KwaZulu-Natal, one job supports seven dependents. Thus, approximately 420 additional labour will benefit from the proposed project, as well as their dependents;
- There is sufficient water available in the catchment for the proposed dam establishment, as well as to sustain the EWR;
- The proposed dam will result in a minimal reduction in water flows, and would be feasible to meet the normal flow and legal flow requirements, and the proposed abstractions for irrigation purposes;
- As such, the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low;
- It will result in the generation of freshwater ecosystem habitat, thus fauna and flora communities will benefit as a result of an additional body of water as well as wetland habitat;
- The implementation of the recommendations and mitigation measures will allow for the surrounding HGM Units and biodiversity to be maintained and monitored;
- The proposed project is to take place on an existing and operational farm, thus it is in keeping with the surrounding land use and aesthetics;
- It will not alter the sense of place of the area or have a significant visual impact;
- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas will be undertaken regularly;
- Construction activities must be limited to regular working hours (Monday to Saturday, 07h00 to 17h00), and construction on public holidays must not be permitted;
- The proposed 15 m freshwater ecosystem habitat buffer will ensure that the ecological integrity and functioning of the HGM Units is maintained;
- Although the proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required);
- Although the proposed dam establishment will result in the loss of 0.48 ha of riparian habitat, this loss is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved;

- Although 1.45 ha of riparian vegetation was identified within a portion of the proposed cultivation sites, this area no longer forms part of the proposed project;
- Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites;
- All riparian habitat surrounding the proposed cultivation sites will be protected through the implementation of the 5 m riparian habitat buffer; and
- With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas.

**NEGATIVE**

- Potential for noise and dust nuisances to be generated during the construction phase;
- Vegetation clearing along with high intensity rainfall, have the potential to result in increased surface runoff, erosion and sedimentation of surrounding water resources;
- Disturbance and compaction of soils has the potential to result in the encroachment of alien invasive vegetation and the loss of natural habitat for floral communities; and
- Construction activities in areas of instability, irresponsible design and construction methods, and the use of inappropriate materials have the potential to result in the cracking or collapse of dam walls. This in turn has significant environmental and financial consequences.

### 12.1.3 Positive and negative implications of the identified alternatives

**DO-NOTHING**

**POSITIVE**

- If the do-nothing alternative is chosen, the farm will continue to operate with the existing water supply and cultivated lands;
- As there would be no construction phase, there would be no potential for negative impacts, such as noise and dust nuisances, erosion and sedimentation, pollution potential and encroachment of alien invasive vegetation;
- The identified HGM Units, and fauna and flora communities will not be impacted;
- Time, money and effort will no longer need to be put into the implementation of the recommendations and mitigation measures;
- The hydrological flow and stream flow characteristics will not be altered, thus water flow to downstream water users and the surrounding catchment, and to maintain the ecological reserve, will continue at its current rate.

**NEGATIVE**

- If the do-nothing alternative is chosen, the farm will continue to operate with the existing water supply and cultivated lands;
- As such, it is highly unlikely that the farm will remain sustainable given the importance of farmers to utilise economies of scale;

- The job security of the labour employed on the farm relies on its sustainability;
- When water is scarce, and during times of desperation, water would need to be brought in with tankers, or obtained from alternative water sources for the irrigation of the macadamia nut trees;
- Thus, this has the potential to impact on the macadamia nut production and yield, and in turn will have an impact on the sustainability of the farm and thus the job security of the labour;
- The areas which would have benefited from the implementation of the recommendations and the mitigation measures will not benefit;
- There will be no water storage for use in times of drought, which could reduce the resilience of the farming operation, and which could have both social and economic impacts during and post times of drought;
- The implementation of the rehabilitation recommendations, the 15 m freshwater ecosystem habitat buffer and the 5 m riparian habitat buffer will not take place, and thus the benefits associated with these mitigation measures will not be realised; and
- This will negatively impact on the skills development, income generation and quality of life of the labour. It also has the potential to have long-term impacts on the area, the local municipality as well as the local economy.

**DAM SIZE**

**POSITIVE**

- The currently preferred dam specifications optimise the ratio of the dam wall height and length to volume, and thus allows for maximum storage capacity with relatively lower construction costs;
- The proposed dam will have minimal impacts on the surrounding HGM Units and biodiversity;
- The dam size is adequate for the operation and sustainability of the farm, and irrigation of the proposed cultivation sites;
- It will result in the long-term sustainability of the farm through increased macadamia nut production and yields, as well as increased employment opportunities for the farm. This in turn will result in the generation of skills development, income generation, improved quality of life and benefits to the local economy;
- It will result in the generation of freshwater ecosystem habitat, thus fauna and fauna communities will benefit as a result of an additional body of water as well as wetland habitat;
- The implementation of the recommendations and mitigation measures will allow for the surrounding HGM Units and biodiversity to be maintained and monitored;
- Feedback from the Preliminary Yield and Groundwater Alternatives Report confirmed that there is sufficient water available in the catchment for the proposed dam, as well as to sustain the EWR (Refer to **Appendix P**);
- The proposed dam will result in a minimal reduction in water flows, and would be feasible to meet the normal flow and legal flow requirements, and the irrigation demand of the farm; and
- As such, the impacts associated with the proposed dam on the ecological reserve and downstream water users are considered low.

**NEGATIVE**

The size of the proposed dam will result in the loss of 0.199 ha of freshwater ecosystem habitat.

**DAM WALL LOCATION**

**POSITIVE**

- The natural topography maximises the dam size. As such, it will result in relatively lower construction costs;
- The proposed dam minimises the impacts on surrounding HGM Units and biodiversity;
- There is sufficient water available within the catchment and at the proposed dam wall location; and
- There are limited impacts on downstream water users and hydrological flow.

**NEGATIVE**

The location of the wall of the proposed dam will result in the loss of 0.199 ha of freshwater ecosystem habitat.

**DAM CONFIGURATION**

**POSITIVE**

- The establishment of a single dam in comparison to multiple smaller dams of the equivalent storage capacity allows for a shorter construction phase and relatively lower construction costs. As such, it allows the disturbed areas to be rehabilitated and revegetated as soon as possible;
- A single dam has the potential to result in less impacts to surrounding HGM Units and biodiversity;
- The need for the implementation of recommendations and mitigation measures for a single dam are far less and easier to implement in comparison to multiple dams;
- The earth fill storage ratio is a measurement of cost feasibility. Earth fill required for the embankment and spillway of a single dam will thus be less costly; and
- Water loss in dams is related to evaporation from wind and the sun, and from heavy rainfall which results in overflow of water via the spillway. The more efficient a dam, the lower the water loss is per square metre of storage capacity. The yield of a dam is thus greater from a single dam in comparison to multiple smaller dams. A single dam is thus more beneficial from a water conservation point of view.

**NEGATIVE**

Potential for less ‘edge’ and thus less suitable habitat for fauna and flora communities.

**CULTIVATION SITES**

**POSITIVE**

- The proposed cultivation sites are located on Hopewell Farm which is owned by the Applicant;
- They respect the HGM Units and associated 15 m freshwater ecosystem habitat buffer;
- They respect the 5 m riparian habitat buffer;
- The proposed cultivation sites have resulted in their size being maximised;
- They are located in close proximity to the proposed dam which reduces costs associated with the installation of pipelines;

- Potential impacts on surrounding HGM Units and biodiversity has been minimised. This in turn will result in the preservation of any fauna and flora communities; and
- Majority of the proposed cultivation sites have been historically cultivated.

**NEGATIVE**

None.

## 12.2 ENVIRONMENTAL OPINION

The Environmental Consultant is of the opinion that the proposed project, with the recommendations and mitigation measures, must be authorised. This authorisation must be granted provided that the following is made conditions of the Environmental Authorisation.

**SAFETY AND MONITORING**

The appended EMPr must be strictly enforced. During the construction phase of the proposed project, the construction activities must be monitored on a monthly basis by an independent ECO.

**WETLAND**

- The 15 m freshwater ecosystem habitat buffer must be demarcated with painted stakes identifying the area as a 'no-go' area for agricultural activities;
- Although the proposed pipeline installation will not intersect any watercourses, the following must still be considered:
  - Any preferential flow paths identified before the buffer will require the installation of earthen berms to dissipate stormwater flow before being directed to the buffer areas; and
  - Reinstatement of the soils must occur with the returned soils to the same levels prior to pipeline installation.
- Existing crossings over the HGM Units onsite must be used; and
- Due to the loss of 0.199 ha of wetland habitat associated with HGM Unit 2, rehabilitation recommendations have been proposed to be implemented;
  - Areas under sugar cane which fall within the 15 m freshwater ecosystem habitat buffer must cease. Ratoons must be removed or treated, and the buffer area revegetated appropriately;
  - The dam edge must include a terraced area to provide a shallow water for the establishment of vegetation. The terraced area must be at least 5 m wide along the dam edge so as to allow for shallow flooding at a maximum depth of 0.2 m; and
  - General rehabilitation and management of the dam and watercourses onsite must take place;

**HYDROLOGY**

- Whichever simulation is chosen by the Applicant, abstraction must be in line with this simulation and the correct EWR release maintained;
- The sloped areas must be terraced along the cultivated lands to reduce peak flow velocities;

- A flood protection berm or embankment (0.5 m high with a 0.3 m base) must be installed along the sides of the cultivated lands;
- A Surface Water Monitoring Programme must be implemented to monitor both the water quality and quantity onsite (Refer to Section 7 of the Hydrology and Flood Line Assessment);
- An earthen berm must be installed downstream and along the proposed cultivation sites to control any increased runoff; and
- The non-perennial streams must be regularly inspected for flow obstructions which could lead to ponding and flooding.

**BIODIVERSITY**

- A no-planting strip must be implemented within the entire narrow drainage line of a portion of the proposed cultivation sites (i.e. proposed cultivation site 2 of the Biodiversity Assessment);
- A 5 m riparian habitat buffer from the outer tree line must be implemented along the boundary of the proposed cultivation sites;
- A Rehabilitation Plan must be compiled to include the following:
  - The condition of the riparian habitat must be improved through rehabilitation using indigenous tree species and the clearance of alien invasive vegetation;
  - The remaining riparian habitat must be maintained as conservation and ecological corridors;
  - Indigenous tree species must be planted around the dam edge; and
  - A map must be compiled to illustrate the extent of the ecological corridors as well as the extent of the area to be rehabilitated along the dam edge.

**CULTURAL**

- In the unlikely event that any graves, fossils or other heritage features are exposed, the ECO must be contacted; and
- Attention is drawn to the NHRA which, requires that projects that expose archaeological or historical remains must cease immediately, pending evaluation by KwaZulu-Natal Amafa and Research Institute, and a chance find protocol must be implemented.

**GEOTECHNICAL**

The recommendations stipulated in the Geotechnical Report must be adhered to.

**GENERAL**

- All conditions stipulated by Eskom must be adhered to;
- Local businesses and unemployed people in the immediate area must be considered first, before employing labour and services from further afield;
- Where possible, any additional employment opportunities on the farm must include labour from surrounding local communities;
- The construction phase must be undertaken during the dry, winter months;

- The required water volumes must be released from the proposed dam as stipulated by the DWS in the conditions of the WUL;
- Alien invasive vegetation clearing, and rehabilitation and revegetation of disturbed areas must be undertaken regularly;
- Appropriate mitigation measures must be implemented to minimise the area of soil disturbance and the potential for mobilisation of bare areas;
- Noise and dust nuisances generated during the construction phase must be controlled;
- Construction vehicles and equipment must be maintained and regularly serviced to ensure that unnecessary noise nuisances are prevented;
- Construction activities must be limited to regular working hours (Monday to Saturday, 07h00 to 17h00), and construction on public holidays must not be permitted;
- All construction labour must remain within the boundaries of the farm at all times;
- Vehicles accessing the proposed study sites must be driven cautiously and within the required speed limits;
- Maintenance of access roads on the farm must be undertaken as and when necessary;
- The construction site must be demarcated and designated entry and exit points must be provided; and
- The farm must have appropriate fire breaks and safety measures in place in terms of the National Veld and Forest Fire Act (Act No. 101 of 1998).

# 13 CONCLUSION

The Applicant, Linnear Sugar Farming (Pty) Ltd, is proposing the establishment of a 67 000 m³ dam and the cultivation of 45.8 ha of existing cultivated land to macadamia nut trees, located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127, Hopewell Farm, within the KwaDukuza Local and iLembe District Municipality, Umhlali, KwaZulu-Natal.

The proposed project comprises the following components:

- Establishment of a 67 000 m³ dam;
- Cultivation of approximately 45.8 ha of existing cultivated land; and
- Installation of associated pipelines and pump station for irrigation purposes.

The proposed dam site is located on Portion 116 of Drie Fonteinen No. 1127, at GPS coordinates 29°27'49.48" S and 31°07'49.87" E. It falls on a tributary of the Mhlali River, within the U30E quaternary catchment and the Pongola to Mtamvuna WMA. The currently preferred dam design is proposed to comprise a storage capacity of 67 000 m³, a surface area of 1.5 ha, a wall height of 10 m and a wall length of 98 m.

The Applicant is also proposing the cultivation of approximately 45.8 ha of land to macadamia nut trees. The proposed cultivation sites are located on Portion 98 and Portion 116 of Drie Fonteinen No. 1127. It is important to note that this land is existing cultivated land comprising sugar cane, and has been cultivated prior to 1998. No areas proposed to be cultivated to macadamia nut trees will require the clearance of land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation).

Water from the dam is proposed to be pumped via 200 mm pipelines to the lands for irrigation purposes. The pipelines will have a total length of approximately 3.28 km. It is important to note that the proposed pipeline installation will not intersect any watercourses or land which has not previously been cultivated, or not cultivated within the past ten years (i.e. indigenous vegetation), and will utilise the dam wall for connection to the pump station. The pump station will allow water to be pumped to the existing cultivated lands for irrigation of the macadamia nut trees. The proposed dam will thus serve as a storage mechanism to be used for supplementary irrigation to support the critical flowering phase of the macadamia nut tree growth cycle.

Seven HGM Units (HGM Unit 1 to 7) were identified to be potentially impacted should the proposed project not be appropriately managed. The proposed cultivation sites were realigned to fall outside of the HGM Unit 1, and 3 to 7. The proposed dam establishment will result in the loss of 0.199 ha of freshwater ecosystem habitat from HGM Unit 2, and as such, specific rehabilitation recommendations have been proposed to mitigate this loss at a 1:3 ratio (i.e. 0.6 ha is required), namely, the removal of sugar cane within the 15 m freshwater ecosystem habitat buffer, reshaping of the existing contours, terracing of the

dam edge, as well as ongoing rehabilitation and revegetation of the proposed dam and watercourses onsite. A 15 m freshwater ecosystem habitat buffer is also proposed to be implemented to maintain the ecological integrity and functioning of the HGM Units. In terms of the 'mitigation hierarchy', the loss of 0.199 ha of freshwater ecosystem habitat and associated offset of 0.6 ha is considered the final and only option for the proposed project. While the use of boreholes may be ecologically feasible, it is not economically feasible to ensure the sustainability of the farm as well as the job security of the labour.

Under natural conditions, the proposed study sites would have been characterised by KwaZulu-Natal Coastal Belt Grassland (Cb 3). The riparian habitat within the valley bottoms was identified to be in a 'good ecological condition'. This riparian habitat will be protected through the implementation of the 5 m riparian habitat buffer. The identification of 0.48 ha of riparian habitat within the proposed dam site and its associated loss, is considered acceptable from a biodiversity perspective given that the remainder of the riparian habitat within the farm has been well conserved. Although suitable habitats were identified within the proposed study sites, no fauna species are likely to occur due to the highly modified nature of these sites. The riparian habitat however, is likely to support viable populations of many common fauna species.

With regards to the flood lines, and although the proposed study sites fall within the 1:100 year flood line and within the 32 m watercourse habitat buffer, the non-perennial streams associated with the proposed study sites can be considered low flooding risk areas. Based on the hydrology, there is sufficient water within the catchment to sustain the proposed dam and associated irrigation demand, as well as the EWR.

Hopewell Farm is a commercial agricultural operation comprising sugar cane and macadamia nut trees. The proposed project will diversify and ensure the long-term sustainability of the farm through increased macadamia nut production and yields, as well as increased employment opportunities. This in turn will result in skills development, income generation and improved quality of life. Should the WULA for the proposed project not be approved, the lands proposed to be cultivated to macadamia nut trees will be dry land.

Given the abovementioned information and provided that the EMPr and recommendations and mitigation measures made in this Report are strictly adhered to, there should be no significant, detrimental impacts on the environment, and a number of positive ecological and socio-economic impacts associated with the proposed project will be realised should it be approved.

# 14 REFERENCES

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# 15 APPENDICES

## APPENDIX A: ENVIRONMENTAL CONSULTANTS CV

## APPENDIX B: WETLAND ASSESSMENT

## APPENDIX C: APPLICATION FORM AND NOTIFICATION LETTER TO INTERESTED AND AFFECTED PARTIES (I&APs)

## APPENDIX D: PRE-APPLICATION MEETING AGENDA, MINUTES AND SCREENING REPORT

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## APPENDIX J: COMMENTS FOLLOWING CIRCULATION OF THE NEWSPAPER ADVERTS, SITE POSTERS AND BID

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## APPENDIX L: COMMENTS FOLLOWING CIRCULATION OF THE DRAFT SCOPING REPORT

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## APPENDIX P: HYDROLOGY AND FLOOD LINE ASSESSMENT

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## APPENDIX S: GEOTECHNICAL REPORT

**APPENDIX T: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)**