**APPLICANT: FAEROES PROPERTIES (PTY) LTD**

**CONSULTATION ENVIRONMENTAL SCOPING REPORT:**

**PROPOSED ESTABLISHMENT OF TWO DAMS ON THE REMAINING EXTENT OF THE FARM FAIRVIEW 605-LT, AGATHA, TZANEEN**



**JULY 2016**

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**Telephone:** 015 307 3606 / 083 339 2731

**Fax:** 015 307 3080 / 086 527 0012

**E-mail:** [louise@polygonenvironmental.co.za](mailto:louise@polygonenvironmental.co.za)

**Postal address:** PO Box 1935,Tzaneen, 0850

**Website*:*** [www.polygonenvironmental.co.za](http://www.polygonenvironmental.co.za)

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| ***ACRONYMS AND ABBREVIATIONS:*** | |
| **DWS** | Department of Water and Sanitation |
| **EAP** | Environmental Assessment Practitioner |
| **ECO** | Environmental Control Officer |
| **EIA** | Environmental Impact Assessment |
| **EIR** | Environmental Impact Report |
| **EMPR** | Environmental Management Programme |
| **ESR** | Environmental Scoping Report |
| **ESS** | Environmental Scoping Study |
| **GPS** | Global Positioning System |
| **GTM** | Greater Tzaneen Municipality |
| **Ha** | Hectare |
| **HIA** | Heritage Impact Assessment |
| **I&AP** | Interested and/or Affected Party |
| **LDEDET** | Limpopo Department of Economic Development and Environmental Tourism |
| **MAE** | Mean Annual Evaporation |
| **MAMSL** | Metres Above Mean Sea Level |
| **MAP** | Mean Average Precipitation |
| **NEMA** | National Environmental Management Act (1998) |
| **NWA** | National Water Act (1998) |
| **MDM** | Mopani District Municipality |
| **WUL** | Water Use Licence |
| **WULA** | Water Use Licence Application |

**CONTACT DETAILS**

**Environmental Impact Assessment Practitioner**

*Polygon Environmental Planning CC*

*Contact:* Ms. Louise Agenbag

*Tel.:* 015 307 3606 / 083 339 2731

*Fax:* 015 307 3080

*E-mail:* [louise@polygonenvironmental.co.za](mailto:louise@polygonenvironmental.co.za)

*Postal address:* PO Box 1935, Tzaneen, 0850

*Web:* [www.polygonenvironmental.co.za](http://www.polygonenvironmental.co.za)

*EAP’s Qualifications (Louise Agenbag):*

* BSc (Hons) Geography (*cum laude*), University of Pretoria
* BSc Environmental Sciences (*cum laude*), University of Pretoria
* Certificate in Environmental Management Systems (ISO14001:2004), North-West University, Potchefstroom campus
* Completed short courses in Water Use Authorisation and Project Management
* More than 11 years’ experience in environmental impact assessment and management (2005 to current), 9 of which at management level (2007 to current)
* Member of IWMSA (Institute of Waste Management of Southern Africa) and IAIAsa (International Association for Impact Assessment, South African chapter)

**Applicant**

*Faroes Properties (Pty) Ltd*

*Contact:* Mr. Giovanni Giuseppe (Nino) Burelli

*Tel.:* 082 808 7751

*Fax:* 086 527 9690

*E-mail:* nino@francolinhill.co.za

**Environmental Authority**

*Department of Economic Development, Environment & Tourism (LDEDET)*

*Contact:* Mr. Rhulani Mthombeni

*Tel.:* 015 290 7057

*Fax:* 015 295 5015

*E-mail:* MthombeniRV@ledet.gov.za

# INTRODUCTION

Polygon Environmental Planning has been appointed by Faroes Properties (Pty) Ltd to conduct an Environmental Impact Assessment (EIA) for the proposed establishment of two dams on the Remainder of the farm Fairview 605-Lt, Agatha, Tzaneen.

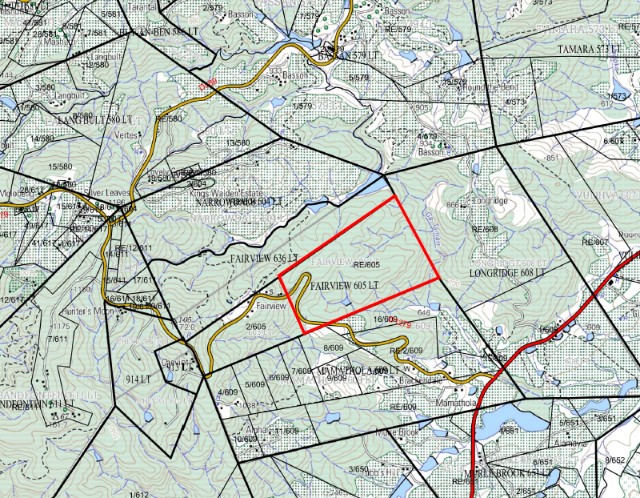
This consultation Environmental Scoping Report (ESR) was compiled following the scoping-phase investigations and public participation, and is currently available for public review and comment. Following the comment period, all comments received with regards to the draft report will be incorporated into the final ESR, which will then be submitted to the Limpopo Department of Economic Development and Environmental Tourism (LDEDET) for their review.

# SITE LOCATION AND DESCRIPTION

* 1. **Location**

The two proposed new dam sites are located on the Remaining Extent of the farm Fairview 650-LT, approximately 17 km south of Tzaneen, Limpopo Province (Figure 2.1).

**Figure 2.1:** 1:50 000 topocadastral map of the location (proposed dam sites indicated with yellow stars)



**N**

The approximate coordinates for the centre of property are 23° 55' 50.95" S and 30° 10' 23.58" E. The approximate coordinates for the two proposed dams are as follows (preferred sites):

* Upper dam: 23° 55’ 47.11”S 30° 09’ 58.94”E
* Lower dam: 23° 55’ 35.3”S 30° 10’ 41.99”E

The site is under the jurisdiction of the Greater Tzaneen Municipality. The property is approximately 190ha in extent.

* 1. **Description**

The Remainder of the farm Fairview 650-LT currently consists mostly of old Eucalyptus plantations, some of which have been cleared to make way for newly established avocado and macadamia nut orchards. Some natural areas remain in the steep gorges on the property, although the majority of these areas have been heavily invaded by exotic vegetation. A small dam exists within the southernmost section of the property. The Old Coach Road, small gravel roads as well as small tributaries of the Ga-Tamari River all traverse the property.

Properties in the vicinity of the subject property are predominantly utilised for commercial timber and fruit plantations.

**Figure 2.1:** Aerial photograph (Google Earth 2016) showing the location and boundaries of the property and proposed new dam sites



The following table provides general information pertaining to the site.

**Table 1.1:** General site information

|  |  |
| --- | --- |
| **District** | Mopani District |
| **Local Municipality** | Greater Tzaneen Municipality |
| **Property description** | Remaining Extent of the farm Fairview 605-LT |
| **Surveyor-General code** | T00LT0000000060500000 |
| **Nearest town** | Tzaneen |
| **Coordinates** | Upper Dam: 23° 55’ 47.11”S 30° 09’ 58.94”E  Lower Dam: 23° 55’ 35.3”S 30° 10’ 41.99”E |
| **Current land use** | Forestry (Eucalyptus plantation)  Pockets of indigenous vegetation with alien infestation |
| **Surrounding land use** | Agriculture and forestry  Natural areas |



# PROJECT DESCRIPTION

The owner and applicant has for decades been farming on the property neighbouring the project site. The remainder of Fairview 605-LT was then purchased by the applicant in 2015 with the aim of increasing avocado and macadamia nut production, linking with the adjoining operational farm.

Approximately 100ha of orchards are planned, all of which will be on land which until recently (late 2015 / early 2016) was occupied by Eucalyptus plantations, which have occupied the bulk of the property for several decades. Pockets of virgin land comprising natural vegetation (albeit containing alien invasive species) will be left intact, as these areas are inaccessible for farming purposes (which is also why it was not previously planted with Eucalyptus).

The new crops of avocados and macadamia nuts will need to be supplemented with additional irrigation, which cannot be solely supplied by the small existing dam on the property. Two new dams are thus proposed to be established for the storage of water for use in irrigation of the orchards – one in a non-perennial stream and the other in what appears in a storm water drainage line. The dams are proposed to act as balancing dams fed from an existing dam on the neighbouring property by means of existing pipelines. A pump house is proposed to be established next to at least one dam, with water to be pumped from here into the network of irrigation pipelines in the orchards.

The two proposed dams are currently known as the “upper dam”, situated in the higher-lying western part of the property, and the “lower dam” in the lower-lying eastern part. The **upper dam** is proposed to have a dam wall of maximum 15m high, with the water covering an area of 2,2ha at full supply level. The **lower dam** is proposed to have a dam wall of maximum 19m high, with the water covering an area of 3,3ha at full supply level.

Both are proposed to be earthfill dams, as no suitable rock was found at either site for the foundation conditions required for construction of any other type of dam. Earthfill dams are built up by compacting successive layers of earth, using less permeable materials to form a core and more permeable materials on the upstream and downstream sides. Separate spillways will also form part of the designs. Material for the walls is proposed to be excavated from within the dam basins (below the full supply line) and moved to the dam wall positions for use in construction.

Designs for the two dams are still being drawn up and will be included in the Environmental Impact Report (EIR) in the next stage of this EIA.

Water use authorisation is already in place for water abstraction, and the authorised volume is sufficient for the proposed new orchards. In addition, an application is currently underway through the Department of Water and Sanitation (DWS) for an additional 26 000m3/year to be added to the farm’s authorised water volume, due to the removal of the thirsty Eucalyptus trees which constituted a Section 21(d) water use (stream flow reduction). A Water Use Licence Application (WULA) will be submitted to DWS for the Section 21(b), (c) and (i) water uses triggered by the proposed dams, once the designs have been finalised.



# PROJECT MOTIVATION, NEED AND DESIRABILITY

## Motivation, need and desirability of the overall project

The success of commercial agriculture is in a large way dependent on a secure irrigation source. Currently only one small dam exists on the property concerned. The existing surface water abstraction allocation from DWS on the property is sufficient for irrigation of the planned new orchards, but the existing small dam has insufficient capacity to store the full water allocation and cannot sufficiently supply water to the planned orchards year-round. Without the additional proposed dams, the future orchards on the farm are unlikely to produce optimally in terms of volume and quality of fruit.

Establishment of the dams is not anticipated to harm downstream water users, as the applicant only proposes the abstraction of their existing water allocation as granted by DWS, and is not applying for any additional water abstraction. Ecological water requirements as well as the requirements of other water users will be taken into account in the design of the dams, so that the ecological reserve (as determined by DWS), as well as the volume of water required for meeting other water users’ allocations downstream, will be released from the dams to meet those requirements. This will be considered in more detail as part of the WULA.

The motivation for replacing the Eucalyptus plantations on the property with avocado and macadamia nut orchards is that the local climatic and soil conditions are very well suited to these crops and there is currently a very high demand for both, locally and internationally. The applicant also has many years’ experience with these particular crops in the Tzaneen area and is therefore well versed in their particular requirements; and all the necessary support infrastructure for both crops (e.g. packhouses, transportation, agricultural chemicals, etc) is readily available in the area, as both avocados and macadamia nuts are widely produced in the region.

Construction of the dams is anticipated to create approximately 10 jobs, or contribute to supporting those jobs in companies supplying the construction services. The dams are also anticipated to indirectly contribute to the creation of 40 temporary jobs in terms of planting of the orchards. By enabling commercial agriculture on the site, the proposed dams are furthermore anticipated to contribute to the creation of approximately 50 new, permanent jobs on the farm, which will be dependent on the construction of these dams. Furthermore, the project is anticipated to contribute to the local economy, which in a large way is based on agriculture.

## Motivation for selected preferred alternatives

The property was selected for its location directly adjacent to an existing farm already operated by this applicant, which means that the operations on the property could tie in with those on the existing, operational farm. Soil and climatic conditions are also very well suited to the proposed crops of Avocados and Macadamia nuts and there is an existing, sufficient water abstraction allocation on the property.

The selection of the dam sites on the property was based on the following considerations:

* **Upper Dam:** The preferred position provides more storage capacity than the alternative site (refer to Section 5 below). This results in a shallower slope in the dam basin and allows for the construction of a lower dam wall than would be required in the alternative position. Furthermore, better conditions for an overflow were found at the preferred site, as the overflow can be placed on a rocky layer, greatly reducing the risk of soil erosion.
* **Lower Dam:** The preferred position allows for construction of a relatively short dam wall, and the overflow can be placed over a natural “saddle” in the topography – almost a natural overflow. This overflow position will allow water to be discharged in a position that will not pose any danger to the toe of the dam wall. Furthermore, no large trees would need to be removed for construction of this wall. This position also allows for sufficient storage capacity for the applicant’s irrigation requirements.

The type of dam – earthfill – was selected for both of the proposed dams, as no suitable rocky foundation conditions were found at either site for the establishment of any other type of dam. Earthfill is therefore the only available option.

# INVESTIGATION OF ALTERNATIVES

## Project Alternatives

No project alternatives were investigated within the ambit of this EIA, as the applicant’s purpose with the project is to establish sufficient water storage for irrigation of his proposed orchards. The project proposal is furthermore line with surrounding land use, which mostly consists of timber plantations, orchards and associated infrastructure.

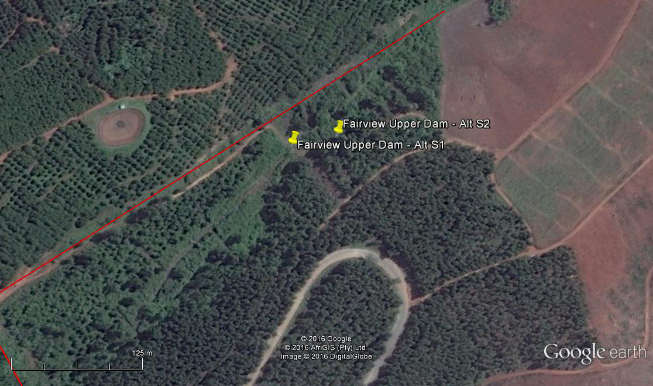
## Site Alternatives

In purchasing a property for expansion of his agricultural operations, the applicant selected this property for its location directly adjacent to an existing farm already operated by the applicant, which means that the operations on the new property could tie in with those on the existing, operational farm. Soil and climatic conditions are also very well suited to the proposed crops of Avocados and Macadamia nuts and there is an existing, sufficient water abstraction allocation on the property. By the time that the EIA commenced, no other properties were therefore considered.

The option of establishing only one, very large dam was considered but quickly rejected as it was found that a single dam with sufficient storage capacity for the irrigation needs onsite would inundate part of the Agatha road traversing the site. No feasible position was found on the property where a single sufficiently large dam can be constructed.

It was then determined that two separate dams would be more feasible, and alternative positions for the dams were investigated on the property. For the bottom dam, only one truly feasible option presented itself, but for the upper dam, two positions approximately 50m from each other were investigated, as indicated on the following aerial photograph.

**Figure 5.1:** Alternative dam sites investigated



The selection of the dam sites on the property was based on the following considerations:

* **Upper Dam:** The preferred position provides more storage capacity than the alternative site (refer to Section 5 below). This results in a shallower slope in the dam basin and allows for the construction of a lower dam wall than would be required in the alternative position. Furthermore, better conditions for an overflow were found at the preferred site, as the overflow can be placed on a rocky layer, greatly reducing the risk of soil erosion.
* **Lower Dam:** The preferred position allows for construction of a relatively short dam wall, and the overflow can be placed over a natural “saddle” in the topography – almost a natural overflow. This overflow position will allow water to be discharged in a position that will not pose any danger to the toe of the dam wall. Furthermore, no large trees would need to be removed for construction of this wall. This position also allows for sufficient storage capacity for the applicant’s irrigation requirements.

## Technology Alternatives

The type of dam – earthfill – was selected for both of the proposed dams, as no suitable rocky foundation conditions were found at either site for the establishment of any other type of dam. Earthfill is therefore the only available option.

## No-go Alternative

The ‘no-go’ alternative refers to the scenario in which the proposed activity does not take place and the site remains as it is.

If the no-go alternative is taken, the impacts that can be anticipated to be associated with the proposed dams would not come to pass and the conditions and trends on the property can be expected to remain as per the status quo. Impacts that can be expected to be experienced in case of the no-go alternative being selected include the following:

**Table 5.1:** Potential impacts that may be associated with the no-go option

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **POTENTIAL IMPACT** | **STATUS** | **EXTENT** | **MAGNITUDE** | **LIKELIHOOD** | **SIGNIFICANCE** |
| **Bio-physical aspects** | | | | | |
| Soil erosion and siltation remain the same | Neutral | Local | Medium | Highly probable | Low-medium |
| Topography remains unchanged | Neutral | Local | Low-Medium | Highly probable | Low |
| Unused agricultural potential | Neutral | Local | Medium | Highly probable | Medium |
| No compaction of wetland soil | Neutral | Local | Very low | Highly probable | Low |
| No disturbance of aquatic fauna and flora by construction activities | Neutral | Local | Low-medium | Highly probable | Low |
| No ingress of foreign matter into streams and wetlands, or concomitant impacts on fauna and flora | Neutral | Local | Unknown | Highly probable | Low |
| Water abstraction rates remain unchanged | Neutral | Local | Low | Highly probable | Low-medium |
| Wetland portions retain connectivity | Neutral | Local | Low | Highly probable | Medium |
| Hydrological and flow regime remain unchanged | Neutral | Local | Medium | Highly probable | Low-medium |
| Sediment movement / transportation within the system remains unchanged | Neutral | Local | Medium | Highly probable | Medium |
| Free-flowing portions of stream remain free-flowing, and wetlands are not inundated | Neutral | Local | Low | Highly probable | Low-Medium |
| No creation of habitat for water-loving birds and other fauna. | Neutral | Local | Low-medium | Highly probable | Low-Medium |
| Water quality remains unchanged | Neutral | Local | Unknown | Highly probable | Low-Medium |
| Habitat remains intact | Neutral | Local | Low | Highly probable | Medium |
| No veld fire risk associated with construction | Neutral | Local | Unknown | Definite | Low |
| No contribution to further spreading of alien plant species or encroachment by indigenous trees due to disturbance of natural vegetation | Neutral | Local | Low | Definite | Low |
| No disruption of the activities of fauna on and around the site | Neutral | Local | Very low | Highly probable | Very low |
| **Socio-economic aspects** | | | | | |
| No supporting local businesses through local procurement of materials, equipment & services (construction phase) | Neutral | Local | Low | Definite | Low |
| No job creation (construction phase), whether direct or indirect | Neutral | Local | Low | Definite | Low |
| No contribution to operational-phase job creation and job security | Neutral | Local | Low | Definite | Low |
| No contribution to local economy (operational phase) | Neutral | Local | Low | Definite | Low |
| No visual impact of construction activities and site clearing | Neutral | Local | Low | Definite | Very low |
| No visual impact of the dams | Neutral | Local | Very low | Definite | Very low |
| No noise associated with construction activities and heavy vehicles during construction | Neutral | Local | Very low | Definite | Very low |

# APPLICABLE LEGISLATION

## Environmental Legislation

### National Environmental Management Act, EIA Regulations (2014)

The EIA Regulations (2014), published in terms of section 24(5) read with section 44 of the National Environmental Management Act (NEMA, Act No. 107 of 1998), stipulate the EIA process that is required to be undertaken for the proposed project (Table 6.1).

**Table 6.1:** Applicable Environmental Legislation

|  |  |
| --- | --- |
| **ACTIVITY NR.** | **ACTIVITY DESCRIPTION** |
| **Listing Notice 1** | |
| 12(iv)(a) | The development of dams where the dam, including infrastructure and water surface area, exceeds 100m2 in size; where such development occurs within a watercourse.  *For the establishment of two instream dams, taking up a total area of approximately 6,5ha including infrastructure and water surface area.* |
| 19(i) | The infilling or depositing of any material of more than 5m3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5m3 from a watercourse.  *For moving more than 5m3 of material (mainly soil) from within the dam basins (below the full supply lines) to the dam wall positions for construction of two earthfill dam walls.* |
| 27 | The clearance of an area of 1ha or more, but less than 20ha, of indigenous vegetation, except where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity, or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.  *For the clearance of approximately 6,5ha of indigenous vegetation for establishment of two dams.* |
| **Listing Notice 2** | |
| 16 | The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5m or higher or where the high-water mark of the dam covers an area of 10ha or more.  *For the establishment of two dams with walls of maximum 15m and 19m high, respectively. The water surface area will be less than 10ha (±5,5ha).* |
| **Listing Notice 3** | |
| 12(a)ii | The clearance of an area of 300m2 or more of indigenous vegetation in Limpopo Province, within critical biodiversity areas identified in bioregional plans, except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.  *For the clearance of approximately 3,3 – 4 ha of indigenous vegetation in a CBA for the establishment of the “lower dam”. (The “upper dam” site, which is anticipated to result in clearing of a further ±2,5ha, is in an ESA.)* |
| 14(iv)(a)(a)ii(ff)  14(xii)(c)(a)ii(ff) | The development of dams, where the dam, including infrastructure and water surface area, exceeds 10m2 in size; or infrastructure or structures with a physical footprint of 10m2 or more; where such development occurs within a watercourse or (if no development setback has been adopted) within 32m of a watercourse. Applicable in Limpopo Province, outside urban areas, in critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.  *For development of two instream dams taking up approximately 6,5ha, including water surface area and infrastructure, and one or two pump houses next to the dam(s) with a physical footprint which will likely exceed 10m2. The lower dam site is located in a CBA 1 and the upper dam site in an ESA2.* |

### National Water Act (1998)

The following activities, which are classified as water uses in terms of the National Water Act (NWA, Act No. 36 of 1998), will require authorisation by DWS in the form of either a Water Use Licence (WUL) or registration in terms of the General Authorisation (GA):

**`**

**Table 6.2:** Applicable water uses in terms of the National Water Act (1998)

|  |  |  |
| --- | --- | --- |
| **Section** | **Description of Water Use** | **Relevant Activity** |
| 21(b) | Storage of water | The storing of water in the dams. |
| 21(c) | Impeding or diverting the flow of water in a watercourse. | Impedance of the onsite streams by the establishment of the dams. |
| 21(i) | Altering the beds, banks, course or characteristics of a watercourse. | Alteration of the bed, banks and characteristics of the streams by the establishment of the dams. |

A Water Use Licence Application (WULA) or application for registration in terms of the GA will be submitted to DWS on behalf of the applicant by the relevant consultant in due course.

## Other Legislation

**Table 6.3:** Other applicable legislation

|  |  |  |
| --- | --- | --- |
| **LEGISLATION** | **RELEVANT SECTIONS** | **PERTAINS TO** |
| The Constitution Act (No 108 of 1996) | Chapter 2, Section 24 | Bill of Rights: Environmental rights |
| Conservation of Agricultural Resources Act (1983) | Section 5 | Prohibition of the spreading of weeds |
| Fencing Act (No 31 of 1963) | Section 17 | Clearing of bush for fencing |
| Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947) | Sections 3 – 10 | Control of the use of pesticides, herbicides and fertilizers, and precautions to protect workers in this regard |
| Limpopo Environmental Management Act | Schedule 2, 3, 11 and 12 | Lists of protected animals and plants |
| National Environmental Management Act (No 107 of 1998) and regulations (2014) | | |
| National Environmental Management: Air Quality Act (No 39 of 2004) | Section 32 | Control of dust |
| Section 34 | Control of noise |
| Section 35 | Control of offensive odours |
| National Environmental Management: Biodiversity Act (No 10 of 2004) | Section 57 | Restricted activities involving listed threatened or protected species |
| Sections 65–69 | Regulation of activities involving alien species |
| Sections 71, 73 and 75 | Regulation of activities involving invasive species |
| National Environmental Management: Waste Amendment Act (No 26 of 2014) | Chapter 4, Part 4 | Waste management activities |
| Chapter 5 | Licensing of waste management activities |
| Chapter 5 | Institutional and planning matters |
| Chapter 7 | Compliance and enforcement |
| National Heritage Resources Act (No 25 of 1999) | Section 34 | Protection of structures older than 60 years |
| Section 35 | Protection of archaeological and palaeontological sites and material as well as meteorites |
| Section 36 | Conservation of burial grounds and graves |
| National Forests Act (No 84 of 1998), as amended by the Forestry Laws Amendment Act (No 35 of 2005) | Section 7 | Prohibition on destruction of trees in natural forests |
| Sections 12–16 | Declaration of trees, groups of trees, woodlands or tree species as protected |
| Section 17 | Declaration of controlled forest areas |
| National Water Act (No 36 of 1998) | Section 19 | Prevention and remedying effects of pollution, particularly where pollution of a water resource occurs or might occur as a result of activities on land |
| Section 20 | Control of pollution of water resources following an emergency incident |
| Chapter 4 (Sections 21-55) | Governs water use |
| Mineral and Petroleum Resources Development Act (No 28 of 2002), as amended | Chapter 4 | Mining permits and licences; environmental management in borrow pits |
| Occupational Health and Safety Act (No 85 of 1993) | Section 8 | General duties of employers to their employees |
| Section 9 | General duties of employers and self-employed persons to persons other than their employees |

## Municipal and provincial planning tools

### Greater Tzaneen Municipality – Integrated Development Plan and Spatial Development Framework

The GTM Spatial Development Framework (SDF, 2008) indicates the site as containing areas of low environmental sensitivity and areas of high sensitivity. It is also indicated as having areas with slopes between 1:5 and 1:20.

**Figure 6.1:** Extract from GTM SDF (2008)

<MAP REMOVED DUE TO SIZE RESTRICTIONS FOR UPLOADING TO SAHRIS>

Agriculture forms a significant part of the municipal economy. The GTM Integrated Development Plan (IDP, 2014/2015) indicates that the GTM is the main contributor to the Mopani District’s agricultural GDP (Gross Domestic Product), supplying 43% of the district’s agricultural GDP.

### Limpopo Conservation Plan version 2 (2013)

According to the Limpopo Conservation Plan version 2 (2013), the site is situated partly within an Ecosystem Services Area (ESA2) and partly within a Critical Biodiversity Area (CBA1). The proposed upper dam site is located within an ESA2 and the lower dam site within a CBA1.

**Figure 6.2:** Extract from Limpopo Conservation Plan

<MAP REMOVED DUE TO SIZE RESTRICTIONS FOR UPLOADING TO SAHRIS>

### National Freshwater Ecosystems Priority Areas

The site does not fall within any Freshwater Ecosystem Priority Areas (FEPAs), though it does contain a possible wetland (this was investigated in more detail as part of the specialist wetland delineation and functional assessment that Limosella Consulting did for this proposed project).

**Figure 6.3:** Location of the site in the context of FEPAs





# IMPACT ASSESSMENT METHODOLOGY

Potential impacts were scored on the following basis:

* **Status:**
* *Positive* – the proposed project is to have a positive impact in terms of the particular parameter;
* *Negative* – the proposed project is to have a negative impact in terms of the particular parameter;
* *Neutral* – the proposed project is to have neither a positive nor a negative impact in terms of the particular parameter.
* **Extent:**
* *Local* – the impact is to be felt on the site and in its immediate surroundings, up to a radius of 50km from the site;
* *Sub-regional* – the impact is to be felt at a distance of up to 100km from the site;
* *Regional* – the impact is to be felt in the Limpopo Province;
* *National* – the impact is to be felt across provincial boundaries.
* **Duration:**

Refers to the period of time over which impacts can be expected to be experienced.

* *Short term* – 0 to 5 years;
* *Medium term* – more than 5 years, up to 15 years;
* *Long term* – more than 15 years;
* *Permanent* – the impact is irreversible.
* **Magnitude:**

Refers to the intensity of the potential impact, if it is experienced.

* *Negligible* – the impact will barely be felt, if at all. No mitigation required;
* *Low* – the parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
* *Medium* – the parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
* *High* – functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.
* **Likelihood:**
* *Improbable* – it is unlikely that the impact will be experienced;
* *Possible* – the impact may be experienced. Monitoring required; mitigation may also be required based on the type of impact and its significance;
* *Highly probable* – the impact will most likely be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact;
* *Definite* – the impact will be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact.
* **Significance:**

Significance is based on a consolidation of the anticipated extent, duration, magnitude and likelihood of the potential impact.

* *Negligible* – The impact will barely be felt, if at all. No mitigation required;
* *Low* – The parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
* *Medium* – The parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
* *High* – Functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

# ENVIRONMENTAL SCOPING INVESTIGATION –

# BIO-PHYSICAL INVESTIGATIONS

Bio-physical investigations during the environmental scoping phase focused on potential surface water and ecological impacts. A specialist wetland/riparian delineation and functional assessment was conducted by Limosella Consulting to assess the status quo and to identify potential impacts on wetlands and riparian areas. A specialist ecological study was conducted by Bateleur Environmental Services to assess potential impacts on the ecology.

## Climate

### Status quo

The site is situated in a sub-tropical summer rainfall area with dry winters. Summers are hot and humid, with an average summer midday temperature of 29.1°C in Tzaneen in January; winters are mild with very rare frost, and the average winter midday temperature is 21.9°C in July. The region experiences its coldest temperatures during July when average evening temperature is 6.3°C.

Tzaneen receives its rainfall predominantly during summer months, averaging 881mm of rain per year. The applicant’s own records indicate average annual rainfall of ± 1 200mm; this is likely due to the orographic effect which leads to higher rainfall in certain mountainous areas than on plains. According to DWA’s Internal Strategic Perspectives (ISP) for the Luvuvhu/Letaba Water Management Area (WMA) (2004), this is the case near the western boundary of the catchment, where this site is located.

The average potential mean annual gross evaporation, as measured by A-pan, is about 1 800mm in the mountainous western section of the WMA, where this site is located. The highest A-pan evaporation occurs between October and January, and the lowest in June (Luvuvhu/Letaba ISP, 2004).

January is the month in which the highest rainfall is received, whilst on average in July the lowest rainfall is received. Frost is infrequent but may occur at higher altitudes (Mucina & Rutherford 2006, SA Explorer 2012). The area is not particularly windy.

### Potential impacts

The proposed project is not anticipated to have any impact on the local climate, aside from micro-climatic impacts of negligible significance.

The climate may impact on the project in that rain during the construction phase can cause soil erosion, particularly on exposed slopes which have not been stabilised. Rainfall during the operation phase will also determine how quickly the dam will fill.

**Table 8.1:** Potential impacts in terms of climate

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | | |
| **Potential impact** | **Status** | **Extent** | | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Rain during the construction phase can cause soil erosion, particularly on exposed, unstable slopes, which in turn may lead to siltation of the stream | Negative | Local | | Short term | Medium | Highly probable | Low-medium, depending on timing of construction |
| ***OPERATIONAL PHASE*** | | | | | | | |
| Not anticipated | - | - | - | | - | - | - |

## Topography, Soils, Agriculture and Geology

#### Status quo

Topography

The dam sites are located at 882m and 802m above mean sea level (mamsl) respectively, and are located within the steeply undulating Agatha area south of Tzaneen, which forms part of the Wolkberg Mountains. The topography is classified as “mountains and foothills” by the Olifants-Letaba Environmental Management Framework (OLEMF, 2010).

The dam sites are both located in valleys, on non-perennial drainage lines.

Soils

The dominant soil class associated with the study site is S2, Fa 301, Ea 87 and Ab 95, which may have restricted depth and excessive drainage. S2 soils have low natural fertility and high erosion potential (Limosella 2016). This soil class extends across approximately 55.5% of the Limpopo Province (Limosella 2016). The soil of the study area and surroundings are summarised in the table below:

**Table 8.2:** Soils associated with the proposed project site

|  |  |  |
| --- | --- | --- |
| **Soil Class (ARC, 2013)** | **Soil Description (AGIS 2015; ENPAT 2015)** | **Relation to wetlands** |
| **Fa 301** | Glenrosa and/or Mispah forms (other soils may occur), lime rare or absent in the entire landscape. Leucocratic biotite-granite. | Glenrosa soil form is described as a potential seasonal to temporary wetland soil. This soil form is characterised by a surface horizon which is maintained by biological activity and underlying rock or saprolite. Saprolite refers to a horizon of weathering rock which still has distinct affinities with the parent rock. |
| **Ab 95** | Red-yellow apedal, freely drained soils; red, dystrophic and/or mesotrophic as well as Pink and grey leucocratic biotite-granite; also granitic gneiss. | None. |
| **Ea 87** | One or more of: vertic, melanic, red structured diagnostic horizons, undifferentiated. Diorite and gabbro of the Rooiwater Complex. | None. |

Agriculture

The Letaba River Catchment – and in particular the Groot-Letaba sub-area within which this site is located – is a highly productive agricultural area, and agriculture is the base of the regional economy. Permanent fruit crops (such as are planned for this site and is also prevalent in the surrounding area) constitute approximately 47% of cultivation (Luvuvhu/Letaba ISP, 2004).

The Agatha area around the site is widely used for commercial agriculture and timber. The affected property was previously utilised for timber production and is proposed in future to be utilised for avocado and macadamia nut production. The proposed dam sites are not agriculturally viable areas as they are located within and directly surrounding drainage areas, which are inaccessible for agriculture. The dams themselves would however contribute to agricultural production as they will play a crucial role in the irrigation of the orchards.

Geology

The area is generally underlain by the potassium-poor gneisses of the Goudplaats gneiss (Swazian Erathem) and an Archaean granite dyke underlies most of the area. Shales and quartzite of the Wolkberg Group are present but not common (Mucina & Rutherford, 2006).

The Olifants-Letaba EMF indicates the general area as being underlain by Archaean granite and Gneiss basalt complex, which are the oldest exposed rock formations in the area. It forms the basement rock complex for other rock systems, and consists mainly of old Granite and Gneis formations and primitive groups of schistose rocks including metamorphosed sediments such as phyllites, banded ironstone, quartzite, conglomerate and limestone, together with rocks of igneous origin such as amphibolites, greenstone lavas, and chlorite-schists (Olifants-Letaba EMF, 2010).

#### Potential impacts

Topography

The topography will be slightly altered through the excavation of soil from within the dam basin for construction of the dam walls. This is anticipated to be of low significance, as the excavated area will in any case be inundated after completion of construction.

Soils

Potential acceleration of soil erosion is likely to occur on a short-term basis that is expected to be limited largely to the construction phase, when earthworks and clearing of vegetation takes place.

Agriculture

The inundation of the dam basin will make the affected are unusable for agriculture. However, this area was not previously used for agriculture, and it is unlikely that it would be used for agriculture in future due to steep slopes. The project is therefore *not* expected to sterilize usable agricultural land. Furthermore, the establishment of the proposed dam is anticipated to *improve* agricultural production on the rest of the property by ensuring greater security of irrigation water.

Geology

Impacts on the geology of the area are deemed negligible.

Potential impacts that may be associated with topography, soils, agriculture and geology are summarised in the following table:

**Table 8.3:** Potential impacts in terms of topography, soils, agriculture and geology

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Soil erosion and associated siltation downstream | Negative | Local | Short term | Medium | Highly probable | Low-medium (depending on timing of construction) |
| Alteration of topography within dam basins | Negative | Local | Long term | Low-Medium | Highly probable | Low |
| ***OPERATIONAL PHASE*** | | | | | | |
| Contribution to unlocking the agricultural potential of the property by providing irrigation security | Positive | Local | Long term | Medium | Highly probable | Medium |

* 1. **Surface hydrology and wetlands**

The following information pertains to the wetland/riparian delineation and functional assessment report conducted by Limosella Consulting, 2016.

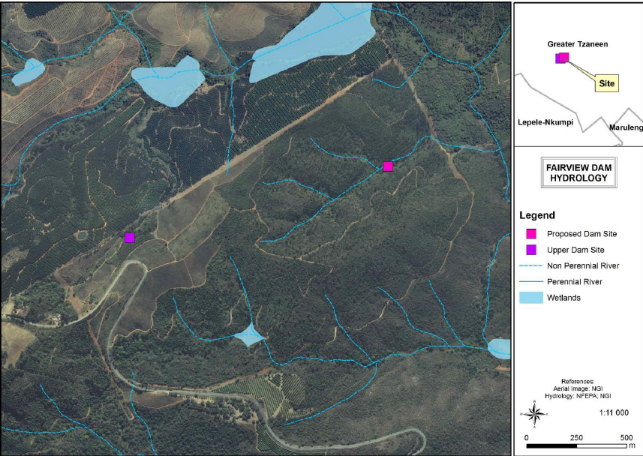
* + 1. *Status quo*

Surface hydrology

The proposed project site is located in the upper slopes of the surrounding catchments within the B81D Quaternary Catchment which forms part of the Groot Letaba Sub Area of the Luvuvhu and Letaba Water Management Area (WMA). Major rivers within this WMA include the Mutale, Luvuvhu and Letaba Rivers. In this specific catchment, the precipitation rate is lower than the evaporation rate with a Mean Annual Precipitation (MAP) to Potential Evapotranspiration (PET) of 0.46. Consequently, watercourses in this area are sensitive to changes in regional hydrology, particularly where their catchment is transformed and the water available to sustain them becomes redirected.

Surface water spatial layers such as the National Freshwater Ecosystems Priority Areas (NFEPA) Wetland Types for South Africa (SANBI, 2010) reflect the presence of several perennial and non-perennial rivers on and around the proposed site. The proposed site of the Lower Dam is located within a non-perennial river whilst the proposed Upper Dam site is most likely located within a storm drainage area. The area is characterised by numerous non-perennial streams and farm dams (Figure 8.1.).

**Figure 8.1:** Hydrology of the proposed dam sites (Limosella 2016).



Wetlands

Numerous watercourses were recorded on the proposed project site and surroundings. The main focus of the wetland assessment was on the areas where the two dams are proposed to be constructed whilst extrapolation was used for the rest of the wetlands in the remaining area. Overall five seepage areas, one unchannelled valley bottom wetland and one perennial riparian area were recorded on the study site (Figure 8.2). The unchannelled valley bottom and seepage area 1 were the main focus of the study due to the proposed dams located in these two watercourses. The seepage areas in this area are the headwaters and the origin of the larger unchannelled valley bottom wetlands downstream. The seepage wetlands are located on steep slopes and some are only seasonally inundated. The watercourses are classified up to level 6 according to the SANBI guidelines (Ollis et al, 2013).

**Table 8.4:** Level 1- 4 classification of the wetlands recorded on the study site (adapted from Ollis *et al,* 2013).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Level 1: System Type** | **Level 2: Regional Setting** | **Level 3: Landscape Setting** | **Level 4: HGM Unit** | | |
| **System** | **DWA Ecoregion** | **Landscape Unit** | **Level 4A:Wetland Type** | **Level 4B: Longtitudinal zonation** | **Level 4C: Inflow drainage** |
| Inland | North Eastern Highlands | Valley Floor | Unchannelled Valley Bottom | n/a | n/a |
| Slope | Seepage Area 1 | Without Channelled Outflow | n/a |
| Seepage Area 2 | Without Channelled Outflow | n/a |
| Seepage Area 3 | Without Channelled Outflow | n/a |
| Seepage Area 4 | Without Channelled Outflow | n/a |
| Seepage Area 5 | Without Channelled Outflow | n/a |
| Valley Floor | Perennial Riparian Area | Lower Foothills | n/a |

**Table 8.5:** Level 5 classification of the wetlands recorded on the study site (adapted from Ollis *et al*, 2013).

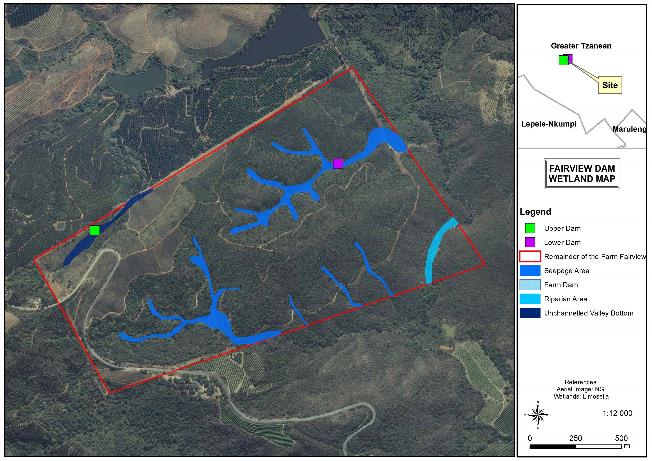
| **Level5: Hydroperiod and depth of inundation** | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Level 5A** | | | **Proportional Rating (0-6) for wetlands on site** | | | | | | | | | | | | | | |
| **Inundation Peroid** | | | | | | | | | | | | | | | | | |
|  | | | Unchannelled Valley Bottom | | Seepage Area 1 | | | Seepage Area 2 | | Seepage Area 3 | | | Seepage Area 4 | | Seepage Area 5 | | Perennial Riparian Area |
| Permanently Inandated | | | 4 | | 0 | | | 0 | | 0 | | | 0 | | 0 | | 5 |
| Seasonally Inandated | | | 3 | | 4 | | | 4 | | 4 | | | 4 | | 4 | | 3 |
| Intermittently Inandated | | | 3 | | 4 | | | 4 | | 4 | | | 4 | | 4 | | 2 |
| Never/Rarely Inandated | | | 2 | | 2 | | | 2 | | 2 | | | 2 | | 2 | | 1 |
| Unknown | | |  | |  | | |  | |  | | |  | |  | |  |
| **Level 5A** | | | **Proportional Rating (0-6) for wetlands on site** | | |  | | | | |  | | |  | |  | |
|  | **Saturartion periodicity (within 50 cm of the soil surface)** | | | | | | | | | | | | | | | | |
| Permanently Inandated | | | 3 | | 0 | | | 0 | | 0 | | | 0 | | 0 | | 5 |
| Seasonally Inandated | | | 2 | | 3 | | | 3 | | 3 | | | 3 | | 3 | | 3 |
| Intermittently Inandated | | | 1 | | 5 | | | 5 | | 5 | | | 5 | | 5 | | 3 |
| Never/Rarely Inandated | | |  | | 3 | | | 3 | | 3 | | | 3 | | 3 | | 2 |
| Unknown | | |  | |  | | |  | |  | | |  | |  | |  |
|  | **Level 5C: Inundation depth-class** | | | | | | | | | | | | | | | | |
|  | | n/a | | n/a | | | n/a | | n/a | | | n/a | | |  | |  |
|  | |  | |  | | |  | |  | | |  | | |  | | n/a |

**Table 8.6:** Level 6 classification of the wetlands recorded on the study site (adapted from Ollis *et al,* 2013).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Component** | **Dominant categories for selected descriptorss (Level 6)** | | | | | | | | |
| **Natural vs Artificial** | | **Substratum Type** | **Vegetation Cover, Form and Status** | | | | |
| **6A: NAtural vs Artificial** | **6B: Artificial Categories** | **6A: Primary Categories** | **6A: Vegetation Cover** | **6B: Primary Vegetation Cover** | **Detailed Vagetation From** | | **6E: Vegetation Status** |
| **6C: Herbaceous Vegetation** | **6D: Forest Vegetation** |
| **Unchannelled Valley Bottom** | Natural | N/A | Sandy Loam | Vegetated | Herbaceous | Grasses & sedges | n/a | Exotic |
| **Seepage Area 1** | Natural | N/A | Alluvial Deposits | Vegetated | Forest | Herbs/Forbs | Riparian Forest | Exotic |
| **Seepage Area 2** | Natural | N/A | Alluvial Deposits | Vegetated | Forest | Herbs/forbs | Riparian Forest | Exotic |
| **Seepage Area 3** | Natural | N/A | Alluvial Deposits | Vegetated | Forest | Herbs/forbs | Riparian Forest | Exotic |
| **Seepage Area 4** | Natural | N/A | Alluvial Deposits | Vegetated | Forest | Herbs/forbs | Riparian Forest | Exotic |
| **Seepage Area 5** | Natural | N/A | Alluvial Deposits | Vegetated | Forest | Herbs/forbs | Riparian Forest | Exotic |
| **Perennial Riparian Area** | Natural | Natural | Boulders & Bedrock | Vegetated | Forest | Reeds | Riparian Forest | Exotic |

The combined **Present Ecological Status (PES)** score for the wetlands on the study site is **C – Moderately modified**. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact (Table 8.7).

**Figure 8.2:** The results of the wetland delineation of the proposed dam sites (Limosella 2016)



**Table 8.7:** Summary of hydrology, geomorphology and vegetation health assessment for the wetlands located on the proposed dam sites (Limosella 2016)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Wetland Unit** | **Ha** | **Hydrology** | | **Geomorphology** | | **Vegetation** | | **Overall Health Score** | | |
| **Impact Score** | **Change Score** | **Impact Score** | **Change Score** | **Impact Score** | **Change Score** | **Impact Score** | **Change Score** | |
| **Unchannelled Valley Bottom** | 1.89 | 3.2 | 0 | 3.9 | 0 | 4.9 | 0 | 3.9 | | 0 |
| **PES Category and Projected Trajectory** | | **C** | **→** | **C** | **→** | **D** | **→** | **C** | | **→** |
| **Seepage Area 1** | 6.72 | 1.6 | 0 | 1.8 | 0 | 4.1 | 0 | 2.3 | | 0 |
| **PES Category and Projected Trajectory** | | **B** | **→** | **B** | **→** | **D** | **→** | **C** | | **→** |

**Table 8.8:** Summary of the PES of the wetlands on site.

| **Score** | **Comment** |
| --- | --- |
| C | * Reduction in flows due to plantations and fruit orchards * Eucalyptus plantations * Exotic shrubs and woody vegetation * Downstream dams * Increased hardened surfaces In catchment such as roads * Vegetation clearing * Increased bare soil in catchment * Some depositional features * Altered fire regime * Commercial plantations * Dense exotic vegetation patches * Sediment deposition * Old / abandoned lands |
| **C** | **Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact** |

The **Ecological Importance and Sensitivity (EIS)** score is 1.6 for the unchannelled valley bottom wetland and 1.9 for the Seepage Area 1. Both wetlands thus fall into the Moderate EIS category. Wetlands in this category are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modification. They do however play a small role in moderating the quantity and quality of water in major rivers (DWAF, 1999). The Recommended Ecological Management Class for these wetlands is thus a C. Details for the components assessed in the combined EIS score are presented in the full wetland report under Appendix D.

**Table 8.9:** Combined EIS scores obtained for the wetland system on the study site. (DWAF, 1999).

|  |  |  |
| --- | --- | --- |
| **WETLAND IMPORTANCE AND SENSITIVITY** | **Importance** | **Confidence** |
| Ecological importance & sensitivity | 2.3 | 3.0 |
| Hydro-functional importance | 1.6 | 2.5 |
| Direct human benefits | 0.8 | 3.0 |
| **Overall EIS score** | **1.6** | |

**Table 8.10:** Combined EIS scores obtained for the wetland system on the study site. (DWAF, 1999).

|  |  |  |
| --- | --- | --- |
| **WETLAND IMPORTANCE AND SENSITIVITY** | **Importance** | **Confidence** |
| Ecological importance & sensitivity | 3.3 | 3.0 |
| Hydro-functional importance | 1.9 | 2.5 |
| Direct human benefits | 0.5 | 3.0 |
| **Overall EIS score** | **1.9** | |

It is recommended that aquatic and vegetation specialists provide baseline information regarding the risk of loss of conservation-worthy vegetation, or potential fish habitat, as well as providing input regarding mitigation and monitoring for potential water quality impacts.

* + 1. *Potential impacts*

The construction of dams have numerous environmental impacts. According to Tahmiscioğlu *et al,* (2011) and Manatunge *et al,* (2010) (both quoted in Limosella 2016) the following positive and negative effects are associated with the construction of dams:

* Decreased sediment transfer within the wetland system.
* Decreased sediment transfer restricts the egg laying zone of fish
* Disruption of species migration within the stream.
* The areas that will be under water from the dam are lost.
* Deterioration of water quality due to the decomposition of fauna and flora in the water.
* Decreased water quantity downstream leading to biodiversity changes.
* Negative effects associated with the construction process.
* Narrowing of channel may lead to vegetation overgrowth.
* A rise in evaporation may be expected as a result of the increase in the water surface area.

Certain impacts can be seen as either positive or negative, depending on the perspective. Alteration of the hydrological regime from non-perennial to a more constant flow due to the dams may pose negative environmental impacts to a system adjusted to a non-perennial stream, but downstream water users may see it as a positive impact due to more reliable water availability throughout the year.

Similarly, inundation of areas of wetlands and free-flowing streams may be negative to the local ecology which is adjusted to non-perennial water availability, but could pose positive impacts in terms of habitat creation for water-loving species such as birds.

Infrastructure development and associated activities could have several impacts on a watercourse. The development changes habitats, the ecological environment, infiltration rates, amount of runoff and runoff intensity of stormwater, and therefore the hydrological regime of the area. On condition that mitigation measures are adhered to, no impact to downstream water resources are expected to result from the proposed development. The attached wetland report (Appendix D) summarises suggested primary management procedures as well as the Aspects and Impact Register/Risk Assessment for Watercourses Including Rivers, Pans, Wetlands, Springs, Drainage Lines (DWS undated). Recommended mitigation measures from the report will also be incorporated into the detailed EMPR in the impact assessment phase.

**Table 8.11:** Potential impacts in terms of surface hydrology and wetlands

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Compaction of wetland soil around the site if vehicles / machinery enter these areas | Negative | Local | Short term | Very low | Possible | Low |
| Disturbance of aquatic fauna and flora by construction activities | Negative | Local | Short term | Low-medium | Highly probable | Low |
| Ingress of foreign matter into streams and wetlands, with concomitant impacts on fauna and flora | Negative | Local | Short term | Unknown | Possible | Low |
| ***OPERATIONAL PHASE*** | | | | | | |
| Increased water abstraction, though still within existing allocation from DWS | Negative | Local | Long term | Low | Highly probable | Low-medium |
| Fragmentation of wetland | Negative | Local | Long term | Low | Definite | Medium |
| Change in hydrological regime from non-perennial to a more constant stream flow released downstream of the dam. | Negative / Positive | Local | Long term | Medium | Highly probable | Low-medium |
| Intercepting sediment load and preventing its transport downstream | Negative | Local | Long term | Medium | Highly probable | Medium |
| Inundation of portions of wetlands, and conversion of site from free-flowing to standing water. | Negative / Positive | Local | Long term | Low | Definite | Low-Medium |
| Creation of habitat for water-loving birds and other fauna. | Positive | Local | Long term | Low-medium | Highly probable | Low-Medium |
| Deterioration in water quality downstream | Negative | Local | Long term | Unknown | Possible | Low-Medium |

## Ecology

The following information pertains to the ecological specialist report conducted by Bateleur Environmental Services, 2016.

### Status quo

Vegetation type

The proposed location forms part of the Savannah Biome and more specifically within the SVI 8 Tzaneen Sour Bushveld vegetation unit, according to Mucina and Rutherfords 2006. The Tzaneen Sour Bushveld forms a band extending along the foot-slopes and hills of the north-eastern escarpment, from the Soutpansberg Mountains in the north via Tzaneen and narrowing to the Abel Erasmus Pass area in the south.

It is characterised by deciduous, tall open bushveld (parkland) with a well-developed, tall grass layer, occurring on the low to high mountains with undulating plains mainly at the base of, and on the lower to middle slopes of the north-eastern escarpment.

The vegetation unit has a conservation status of Endangered and a targeted conservation percentage of 19%. Only a little over 1% is statutorily conserved, almost all in the Lekgalameetse Nature Reserve, and about 2% conserved in private Nature Reserves such as the Selati Game Reserve and the Wolkberg (Serala) Wilderness Area. About 41% is transformed mainly because of cultivation (29%) and plantations (9%). The higher-lying parts of this unit have been heavily afforested with tree plantations while the lowerlying areas are under agricultural and horticultural crops. Scattered alien plants include *Solanum mauritianum, Melea azedarach* and *Caesalpinia decapetala*. The subtropical climate is conducive to the spread of *Cromolaena odorata, Lantana camara* and *Psidium guajava.*

**Figure 8.3:** Reference map of site location within the Tzaneen Sour Bushveld (SVI 8) Vegetation Type

<MAP REMOVED DUE TO SIZE RESTRICTIONS FOR UPLOADING TO SAHRIS>

Important taxonomy within the vegetation includes:

**Tall Trees**:

*Pterocarpus angolensis, Sclerocarya birrea subsp. caffra.*

**Small Trees:**

*Acacia polyacantha, Albizia versicolor, Ficus sansibarica, Parinari curatellifolia, Piliostigma thonningii, Pterocarpus rotundifolius, Trichillia emetica, Acasia davyi, Acasia sieberiana var. woodii, Antidesma venosum, Catha edulis, Faurea richetiana, Faurea saligna, Ficus burkei, Ficus petersii, Heteropyxis natalensis, Peltrophorum africanum, Terminalia sericea, Vernonia colorata.*

**Tall Shrubs:**

*Olea europaea subsp. africana, Pseudarthria hookeri var. hookeri, Rhus pentheri, Triumfetta pilosa var. tomentosa.*

**Low Shrubs:**

*Agathisanthemum bojeri, Barleria elegans, Dicliptera clinopodia, Flemingia grahamiana, Indigofera filipes, Polygala producta.*

**Woody Climbers:**

*Bauhinia galpinii, Pterolobium stellatum.*

**Graminoids**:

*Cybopogon caesius, Cybopogon nardus, Hyparrhenia cymbaria, Hyparrhenia poecilotricha, Hyperthelia dissolute, Alloteropsis semialata subsp. semialata, Andropogon schirensis, Bothrocloa bladhii, Monocymbium ceresiiforme, Paspalum scrobiculatum, Schizachyrium sanguineum, Themeda triandra.*

**Herbs**:

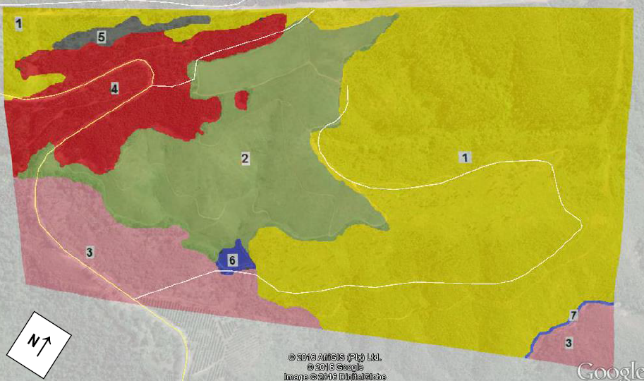
*Waltheria indica.*

Vegetation units on site

Five survey sites were identified according to the aerial photograph using the homogenous stratification method. The sites were assessed for floral species, tree, forbs, sedge, grass and aquatic species which were recorded. From this data the vegetation unit map was compiled for the study area. Please refer to Figure 8.4 which should be read with the comments on the vegetation units below:

* *Vegetation Unit 1:* Site number one on the vegetation unit map of the area comprises of a mix of exotic invaders, escaped forestry species and indigenous vegetation. The site is severely transformed by the invasive exotic species, making the almost thicket like vegetation structure to be impenetrable. The undergrowth is covered by species such as *Lantana camara* and *Chromelina* odorata while the tree line is dotted with *Eucalyptus sp*. The grass layer in this site is non-existent with only certain species such as *Setaria megaphylla* found in higher frequencies on road verges and patched areas left open by alien invasives. The forbs layer is comprised of a large number of invasive species. One protected tree species *Catha edulis* / Bushman’s tea was found within this site.
* *Vegetation Unit 2:* Site number two has been recently cleared using a bulldozer for the purpose of agriculture, thus the species recorded were very limited as the majority of this site was bare ground. Numerous newly germinating plants could be seen, but at the time of the study they were in an unidentifiable state.
* *Vegetation Unit 3:* Survey site number 5, which falls within vegetation unit number 3, represents the vegetation unit which is in the best ecological state of all the units in the study area. The frequency of invasive and exotics is low and these species are mainly confined to the road verges and disturbed areas on the borders of this vegetation unit. The vegetation can be described as a thicket and in some places almost forest like structure, with closed canopies and bare ground underneath. Limited sunlight penetration makes for low recordings of herbaceous species. This site is in a semi natural state.
* *Vegetation Unit 4:* This site was surveyed as site number three and falls within vegetation unit four. The vegetation on this site comprises of *Eucalyptus sp.* and is used for forestry (timber) farming purposes. The unit is a monoculture of Eucalyptus with only a small amount of other species being recorded as present; these other species represent themselves mainly in the form of young saplings and forbs.
* *Vegetation Unit 5:* Vegetation unit five was classified as a wetland, this vegetation unit starts off as a drainage line and the transforms into a wetland with water logged soils with sedge species *Cyperus dives* and *Schoenoplectus corymbosus* yielding the highest frequency of species recorded.

**Figure 8.4:** Vegetation unit map of the Remainder of the farm Fairview 605-LT (Bateleur Environmental Services 2016)



The current state of the vegetation on site ranges from semi-natural to severely degraded, mostly attributed to the large area (site 2 as per the map above) which has already been cleared for agriculture, and the heavy infestation of alien invasive plants in sites 1 and 4 (as indicated on the map above). Only one protected tree (*Catha edulis* / Bushman’s tea) was found at site 1, with no protected forb or grass species found on the site as a whole. Plant species onsite are on par with what could be expected in the area, with the exception of the abundant presence of alien invasive plants.

**Table 8.12:** List of protected plant species potentially occurring onsite

|  |  |  |  |
| --- | --- | --- | --- |
| **Scientific name** | **Common Name** | **Conservation Status** | **Probability of Occurrence** |
| |  | | --- | | *Catha edulis* | | Bushman’s Tea | Protected | High (North-western corner of site) |
| *Sclerocarya birrea* | Marula | Protected | High (North-western corner of site) |

Fauna

By studying the habitat of the site, one could with fair accuracy determine the species which would occur on site. Due to the site being somewhat degraded ecologically, no evidence of larger mammal species was found. The potential of any protected species occurring on site is very low, as the preferred habitat of these species has been largely fragmented and disturbed. Please refer to the more detailed species lists contained in the Ecological Assessment Report by in Appendix D which include a probability rating regarding the occurrence of fauna species. Please refer to the table below (Table 8.6) for a list of protected faunal species that may occur onsite.

**Table 8.13:** List of protected faunal species potentially occurring onsite

|  |  |  |  |
| --- | --- | --- | --- |
| **Scientific name** | **Common Name** | **Conservation Status** | **Probability of Occurrence** |
| ***Invertebrates*** | | | | |
| |  | | --- | | *Harpactira spp.* | | Common Baboon Spider | Protected | Low |
| *Opisthacanthus spp.* | Creeping Scorpion | Protected | Low |
| *Opistophthalmus spp.* | Burrowing Scorpion | Protected | Low |
| ***Amphibians*** | | | | |
| *Pyxicephalus adspersus* | Giant Bullfrog | Near threatened | Med - Low  Prefers grassy pans, vleis and other depressions in open / flat areas |
| ***Mammals*** | | | | |
| *Mellivora capensis* | Honey Badger | Protected | Low |
| ***Reptiles*** | | | | |
| *Python natalensis* | African Rock Python | Protected | Low |
| ***Birds*** | | | | |
| *Necrosyrtes monachus* | Hooded Vulture | Critically endangered | Low |
| *Gyps coprotheres* | Cape Griffon Vulture | Endangered | Low |
| *Gyps africanus* | White-backed Vulture | Critically endangered | Low |
| *Aquila rapax* | Tawny Eagle | Endangered | Low |
| *Terathopius ecaudatus* | Bateleur | Endangered | Low |
| *Polemaetus bellicosus* | Martial Eagle | Endangered | Low |
| Trigonoceps occipitalis | White-headed Vulture | Critically endangered | Low |

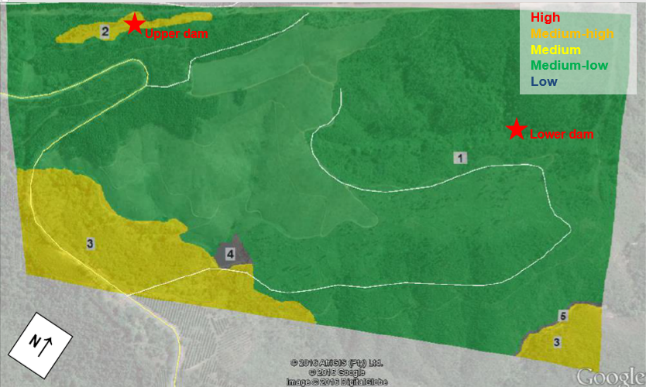
Although the desktop study showed promise for a wide variety of faunal species to occur on site, very few signs were found of faunal species. This can be attributed to the already diminished habitat. Although some endangered / protected species may occur on the site, the habitat doesn’t lend itself to the inhabitation of these species, which are mostly quite selective and particular, and prefer more pristine habitats. The likelihood of the protected species listed above actually occurring on the site is therefore low.

Ecological sensitivity

The following figure (Figure 8.5) shows the results of an ecological sensitivity study of the vegetation on the site. The ecological sensitivity map and associated categories below describe the current ecological health of the different areas on site while also giving an indication as to what extent the different areas will be affected by the proposed development as highly sensitive areas are more fragile and exposed to ecological disturbance and lower sensitivity areas less so as a general rule.

The site possesses only two areas which are still largely undisturbed (marked as areas 3 on the ecological sensitivity map below) and which have some ecological sensitivity and significance. The proposed dam sites are not within these areas. These areas must be managed according to relevant mitigation measures. Taking a holistic view on the proposed development, the impact on fauna and flora may have a net-positive effect as it will provide the necessary onsite management, funds, skills and equipment necessary to properly manage the site and the remaining natural areas, on condition that the necessary mitigation is implemented. The proposed development can therefore b supported from an ecological perspective.

**Figure 8.5:** Aerial view showing the ecological sensitive areas of the site



### Potential impacts

The potential impacts of the proposed dams on the vegetation are most likely to be fairly low as the areas to be affected by the proposed dams consist of mostly degraded natural vegetation with significant infestation of alien vegetation.

The construction phase will allow for the removal of a large amount of alien vegetation, however, it will also cause destruction of whatever natural vegetation remains in the dam basins.

Fauna are likely to be disturbed by construction-related activities, particularly noise, vibrations, human presence and of course the removal of sections of habitat. However, no negative long-term impacts on terrestrial fauna and birds are expected.

The presence of a year-round supply of surface water at the site (in the form of the dams) is likely to draw water-dependent fauna such as birds and provide foraging habitat for them. If indigenous vegetation is properly re-established along the boundaries of the dam and alien vegetation combated, breeding habitat can also be provided for birds.

**Table 8.9:** Potential impacts in terms of **vegetation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Veld fire risk associated with “hot” construction activities and workers smoking etc | Negative | Local | Short term | Very low | Possible | Very low |
| ***OPERATIONAL PHASE*** | | | | | | |
| Habitat destruction in the areas to be inundated | Negative | Local | Long term | Low | Definite | Medium |
| Possible further spreading of alien plant species or encroachment by indigenous trees due to disturbance of natural vegetation | Negative | Local | Long term | Low | Possible | Low |
| Changing the in-stream flow regime downstream of the dam, creating a steadier, more predictable flow, with concomitant impacts on ecology | Negative / Positive | Local | Long term | Low | Highly probable | Low-Medium |

**Table 8.10:** Potential impacts in terms of **fauna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Disruption of the activities of fauna on and around the site due to construction activities, and possible trapping / hunting / killing fauna by labourers | Negative | Local | Short term | Very low | Highly probable | Very low |
| ***OPERATIONAL PHASE*** | | | | | | |
| Creation of habitat for water-dependent fauna, e.g. certain fish and bird species | Positive | Local | Long term | Low | Highly probable | Low |
| Changing the in-stream flow regime downstream of the dam, with concomitant impacts on ecology | Negative / Positive | Local | Long term | Low | Highly probable | Low-Medium |

# ENVIRONMENTAL SCOPING INVESTIGATION –

# SOCIO-ECONOMIC INVESTIGATIONS

The only specialist investigation conducted in terms of socio-economic aspects, consisted of a specialist heritage investigation conducted by Shasa Heritage Consultants. Other socio-economic parameters were investigated at a desktop level.

## Heritage Assessment

A Phase 1 Heritage Impact Assessment (HIA) was undertaken by Shasa Heritage Consultants to determine the presence or absence of heritage resources and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features. Such resources include archaeological and historical sites and features, graves and places of religious and cultural significance.

The source of information was primarily the field reconnaissance and referenced literary sources. A pedestrian survey of selected areas of the demarcated area was undertaken, during which standard methods of observation were applied.

#### Status quo

The area can be considered disturbed due to the fact that most of the area has been impacted on by commercial timber and agricultural activities.

According to the most recent archaeological cultural distribution sequences by Huffman (2007), this area falls within the distribution area of various cultural groupings originating out of both the Urewe Tradition (eastern stream of migration) and the Kalundu Tradition (western stream of migration). The facies that may be present are:

Urewe Tradition: Kwale branch - Silver Leaves *facies* AD 280-450 (Early Iron Age)

*Mzonjani facies* AD 450 – 750 (Early Iron Age)

Moloko branch - *Icon facies* AD 1300 - 1500 (Late Iron Age)

Kalundu Tradition: Happy Rest sub-branch - *Doornkop facies* AD 750 - 1000 (Early Iron Age)

*Letaba facies* AD 1600 - 1840 (Late Iron Age)

**No archaeological or other heritage materials** were recorded on site and no sites or areas related to socio-religious activities were recorded.

#### Potential impacts

As no sites or objects of heritage-related significance were found onsite thus no heritage-related impacts are anticipated to be associated with the project.

Should any previously undetected subterranean heritage remains however be found on site during the remainder of the construction phase, this must be reported to the Limpopo Heritage Resources Agency (LIHRA) or South African Heritage Resources Agency (SAHRA) and work onsite halted until given the go-ahead by LIHRA and/or SAHRA.

**Table 9.1:** Potential heritage impacts

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| None expected | - | - | - | - | - | - |
| ***OPERATIONAL PHASE*** | | | | | | |
| None expected | - | - | - | - | - | - |

## Social Aspects



### Status quo: Greater Tzaneen Local Municipality (Information adapted from GTM IDP 2014/2015)

Location

The GTM forms part of the Mopani District in the Limpopo Province. The municipal area, which covers roughly 3 240 km2, extends from Haenertsburg in the west to Rubbervale in the east (a distance of 85 km), and from just south of Modjadjiskloof in the north to Trichardtsdal in the south (47 km).

The GTM comprises the proclaimed towns of Tzaneen, Nkowankowa, Lenyenye, Letsitele and Haenertsburg, together with 125 rural villages. The municipal area is divided into 34 wards; this site is located within Ward 16.

Population

According to the South African Statistics Census 2011, the GTM has increased its population from 375 588 to 390 092 (an increase of 14 504) with females outnumbering males as they comprise 53% of the population. Young people between the ages of 14 –35 constitute 40% (156 900) of the total population of the municipality.

Income, employment and education

The latest labour force survey by Statistics South Africa (first quarter 2012) indicates that unemployment in Limpopo has deteriorated from 19.3% in March 2011 to 21.9% in March 2012. During this period the number of discouraged work seekers increased from 415,000 (March 2011) to 424,000 in March 2012. This is the strict definition of unemployment, which excludes discouraged work seekers. The unemployment rate will be worse if discouraged work seekers are included.

Unfortunately, these official statistics are not available at the district or the municipal level. The only estimates at the municipal level that are available until the 2011 census results are published, are from commercial statistical service providers, such as Quantec and Global Insight. Quantec estimated the unemployment rate in GTM at 37.1% for 2010. They have not yet made an estimate for 2011.

Economic activities and opportunities

The finance, insurance, real estate & business services is the main employer within the GTM, providing 27% of the available jobs within the GTM’s area of jurisdiction. General governmental services supply 19% of jobs, followed by trade, catering and accommodation (15%), and transport, storage and communication (12%). Other economic sectors provide a minority of job opportunities.

The sector supplying the greatest proportion of the GTM’s Gross Domestic Product (GDP) is Community Services (32%), followed by Finance (24%) and Trade (10%).

The GTM is the main contributor to the Mopani District’s agricultural GDP (Gross Domestic Product), supplying 43% of the district’s agricultural GDP.

Infrastructure and services

**Water:** The GTM has applied to the Department of Water and Sanitation (DWS) for an increased allocation to abstract raw water for purification and supply to residents. However, due to the pressure on the Ebenezer and Tzaneen Dams, DWS has not yet been able to grant such an increase, and hence water supply is a concern over the long term. Water supply challenges is being experienced in the entire municipality especially where boreholes are dysfunctional due to lack of regular maintenance, theft of electrical cables while others being that they never operated from the time of construction. Some water schemes initially designed to cater certain number of households are unable to supply due to increase in demand while those schemes were not upgraded. Certain infrastructural projects are in the pipeline, such as raising the Tzaneen Dam wall and establishing a new dam near Nwamitwa; however, it is not known if or when these projects will be implemented.

The GTM’s drinking water quality is very good, and the GTM was awarded Blue Drop status by DWS in 2009 for the high quality of drinking water. Many of the rural areas are supplied by boreholes that are managed by the Mopani District Municipality (MDM).

**Sanitation:** Much of the municipal area, specifically in the extensive rural areas, relies on Ventilated Improved Pit (VIP) toilets. It is the MDM’s responsibility to install these. Haenertsburg relies on individual septic tanks and French drains, whilst Tzaneen, Nkowankowa and Lenyenye have waterborne sewerage. Farms generally make use of septic tanks and French drains. Several villages have been, or are in the process of being, reticulated with waterborne sewerage.

**Electricity:** Electricity over most of the municipal area is provided by the GTM, but Nkowankowa, Lenyenye and the southernmost areas of the municipal area are supplied directly by Eskom. The GTM also supplies electricity to certain areas which do not fall within its area of jurisdiction, including Eiland and Gravelotte. Major investments have been made into electricity supply infrastructure in Tzaneen over the past approximately 2 years, which has improved the reliability and future capacity of electricity supply. The electrification backlog is estimated at 17.8%. Free basic electricity is provided to 7 306 households.

**Housing:** There is a backlog of more than 12 590 RDP houses and 1 563 middle income beneficiaries, but challenges are experienced in terms of the availability of land for the provision of these houses.

**Health care:** There are 29 clinics, 4 health centres and 165 visiting points within the municipal area, but only 16 of the visiting points have functioning structures, with the rest of the visiting points being community centres, day-care centres, farms or even just designated trees.

**Waste management:** Kerbside refuse removal is provided in Tzaneen, Lenyenye, Nkowankowa, Haenertsburg and Letsitele and disposal is done at the landfill site at Tzaneen; however, this constitutes only 11% of the households within the municipal area. Very little at-source recycling is done, but basic composting of garden waste is done adjacent to the landfill site.

### Potential impacts

Construction is anticipated to extend over a period of a couple of months, and work will be done almost entirely by machinery. A contractor will be brought in to construct the dam using his/her machinery and staff, and no casual labourers are anticipated to be hired.

The following **short-term** socio-economic impacts may be expected during the construction phase of the proposed project:

* + Support of local job opportunities through support of local businesses in the procurement of materials, equipment and services to be used in the construction phase;
  + The possibility exists that the presence of construction activities may lead to an increase in criminal activity, trespassing and/or rowdiness;
  + Construction-related noise resulting mostly from construction machinery (particularly during earthworks), offloading of materials, and the rumble of heavy construction vehicles / plant on the road.

**Long-term** socio-economic impacts during the operational phase may relate to the following:

* Greater job security at the farm, as the dam will lead to reduced vulnerability of agricultural production to drought conditions, and therefore less risk of retrenchments during times of below-average rainfall.
* Contribution to local economic development – the dams will facilitate commercial agriculture on the property, which in turn is anticipated to contribute to the secondary agriculture-based industries in the area, such as transport and packaging firms. Staff employed at the farm are also anticipated to spend most of their disposable income locally, which in turn will also stimulate the local economy.

**Table 9.2:** Potential social impacts

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Supporting local businesses through local procurement of materials, equipment & services | Positive | Local | Short term | Low | Highly probable | Low |
| Direct and indirect job creation | Positive | Local | Short term | Low | Highly probable | Low |
| ***OPERATIONAL PHASE*** | | | | | | | |
| Contribution to job creation and job security by buffering the farm against drought | Positive | Local | Long term | Low | Highly probable | Low |
| Contribution to local economy | Positive | Local | Long term | Low | Highly probable | Low |

## Visual Aspects

### Status quo

The site has a visual appearance similar to surrounding natural vegetation, with riparian vegetation and large trees along the stream.

The dam sites are surrounded by a patchwork of timber plantations and natural bush. It has very low public visibility, being located in a valley on a private farm, surrounded by other farms. The proposed dam sites are somewhat visible from the public road that traverses the property.

### Potential impacts

Construction-phase visual impacts can be expected in the form of site clearing, earthworks and construction activities themselves. In light of the short duration of the construction period and the limited visibility of the dam sites to the public or neighbours, construction activities are expected to have very low significance in terms of visual impacts.

Operational-phase impacts are anticipated to be **positive** – dams are usually regarded as aesthetically pleasing. The impacts are anticipated to have very low significance, though, as the sites are largely hidden from the public’s or neighbours’ view.

**Table 9.3:** Potential visual impacts

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | | |
| **Potential impact** | **Status** | | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Construction activities and site clearing | Negative | | Local | Short term | Low | Definite | Very low |
| ***OPERATIONAL PHASE*** | | | | | | | |
| Visual impact of the new dams | | Positive | Local | Long term | Very low | Definite | Very low |

## Noise

### Status quo

The site is situated in an area where ambient noise levels are low, with sounds mostly associated with the voices of workers on surrounding farms and the sound of vehicles travelling on the nearby Old Coach Road. There are no sensitive noise receptors (e.g. schools or dwellings) in close proximity to the proposed dam sites; the dam sites are surrounded by forestry and agricultural areas.

### Potential impacts

Construction-phase impacts are anticipated to be mainly associated with construction activities themselves, including earthworks, off-loading of material from trucks, etc., as well as with construction vehicles moving to and from the site, and vehicles transporting construction workers. These impacts will be short-term in duration, occurring only whilst construction is underway, and will be very low in magnitude. The significance of the impacts will be further reduced by the absence of sensitive local noise receptors.

Given the short-term nature of construction phase noise impacts and the distance of the site from dwellings or other noise-sensitive receptors, noise impacts potentially associated with construction of the dam are anticipated to be of very low significance.

By its very nature, the dam will not generate any noise once completed. No operational-phase noise impacts are expected.

**Table 9.4:** Potential impacts in terms of noise

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | **Likelihood** | **Significance** |
| Noise associated with construction activities and heavy vehicles during construction | Negative | Local | Short term | Very low | Highly probable | Very low |
| ***OPERATIONAL PHASE*** | | | | | | |
| No operational-phase noise impacts are expected. | | | | | | |

## Indirect and cumulative impacts

The nature of the project is such that it is anticipated to result in various indirect impacts associated with the agriculture which it is proposed to support. Without the dams, large-scale commercial agriculture would not be possible on the site, hence the impacts associated with such agriculture can be indirectly linked to the proposed dams.

Furthermore, as is the case for any activity, impacts are not limited to those directly or even indirectly associated with the proposed activity – potential cumulative impacts need to be considered as well, so that activities can be seen not as stand-alone entities but as part of the larger picture.

The following tables highlight potential indirect and cumulative impacts of the proposed dams:

**Table 9.5:** Potential indirect and cumulative impacts – BIOPHYSICAL ASPECTS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | | **Magnitude** | **Likelihood** | **Significance** |
| Habitat loss and fragmentation, including wetlands | Negative | Local | Long term | | Medium-High | Definite | Medium-High |
| ***OPERATIONAL PHASE*** | | | | | | | | |
| Disruption of the stream’s free flow, including disruption of movement of aquatic fauna | Negative | Local | | Long term | Medium | Definite | Medium |
| Increased water abstraction, with reduced water availability downstream | Negative | Local | | Long term | Low | Highly probable | Low-medium |
| Risk of contamination of water resources by agricultural chemicals in the associated farming operation | Negative | Local | | Long term | Unknown | Possible | Medium |

**Table 9.6:** Potential indirect and cumulative impacts – SOCIO-ECONOMIC ASPECTS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***CONSTRUCTION PHASE*** | | | | | | | | |
| **Potential impact** | **Status** | **Extent** | **Duration** | **Magnitude** | | **Likelihood** | **Significance** |
| Job creation | Positive | Local | Short term | Medium | | Definite | Low |
| Visual impacts | Negative | Local | Long term | Low | | Definite | Low |
| Noise | Negative | Local | Short term | Very low | | Highly probable | Very low |
| ***OPERATIONAL PHASE*** | | | | | | | | |
| Job creation | Positive | Local- sub regional | Long term | | Medium | Definite | Low-medium |
| Contribution to local economy | Positive | Local | Long term | | Medium | Definite | Low-medium |



# PUBLIC PARTICIPATION PROCESS



## Advertisement of Commencement of EIA Process

The commencement of the EIA process was advertised for a period of 30 days (19 February to 20 March 2016) in the following ways (please refer to Appendix E for copies of newspaper advertisements, photographs of site notices and the list of stakeholders who were directly notified):

* Placement of a notice (English and SePedi) in the local newspaper, the Letaba Herald, on 19 February 2016;
* Display of site notices (each containing both the English and the SePedi adverts) at the project site as well as at other areas deemed significant to potential I&APs;
* Direct notification of identified stakeholders via fax, e-mail and/or post.

## Public Meeting

A Public Meeting was held on 01 March 2016 at the site. The purpose of the Public Meeting was to afford stakeholders and members of the public the opportunity to interface with the project team to obtain information about the proposed project and to have their comments, queries and/or concerns addressed. The project team wanted to present the proposed project and the EIA process being followed. Unfortunately, the meeting had no attendees, thus no presentation could take place.

## Issues Raised

No comments were received from I&APs during the initial public comment period, hence no issues trail (comments and responses report) has been compiled at this stage.

## Availability of Draft ESR for Review and Comment

This draft ESR is currently available for public review and comment for a period of 30 days, from 22 July to 22 August 2016. Copies of the report are available at the Faeroes Properties office adjacent to the site (entrance AH29 off the Agatha road) and Polygon’s offices at 21C Peace Street, Tzaneen, during this period. Electronic copies on CD are also available from Polygon upon request and copies (whether in hard copy or on CD) have been submitted directly to a number of stakeholders for their comment (notably DWS, SAHRA and GTM). All comments received with regards to the report within the comment period will be incorporated into the final ESR for submission to LDEDET.

# PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT



## Approach to Undertaking the Impact Assessment Phase of the Project

The impact assessment phase of this project will comprise a more in-depth assessment of potential impacts and development of detailed impact mitigation measures, specifically when the engineering designs for the dams are finalised. It will also include an extension of the public participation process in order to make the findings of the entire EIA available to I&APs and to obtain their comments.

## Assessments to be conducted as part of the Environmental Impact Assessment phase

During the ESS phase of this project, the following aspects **were** assessed to determine the status quo and to identify potential impacts of the proposed development:

Bio-physical aspects

* Climate
* Topography, Soils, Agriculture and Geology
* Surface hydrology and wetlands
* Ecology

Socio-economic aspects

* Phase 1A Heritage Impact Assessment (HIA)
* Social aspects
* Visual aspects
* Noise

The following **will be** looked at in more detail during the impact assessment phase of this project:

As the engineering designs are developed, a more detailed assessment will be done of potential impacts in terms of all the aforementioned aspects, as the details of construction methodology, dimensions of the infrastructure, etc will affect the detailed assessment.

No additional investigations will be undertaken, but the engineering report and designs will be provided to the ecological, wetland and heritage specialists for review, so that their reports can be updated or refined where necessary, and to inform the development of more specific and detailed impact mitigation measures.

## Assessment of impacts

Impacts that may be associated with the proposed project will be assessed according to the following methodology:

* **Status:**
* *Positive* – the proposed project is to have a positive impact in terms of the particular parameter;
* *Negative* – the proposed project is to have a negative impact in terms of the particular parameter;
* *Neutral* – the proposed project is to have neither a positive nor a negative impact in terms of the particular parameter.
* **Extent:**
* *Local* – the impact is to be felt on the site and in its immediate surroundings, up to a radius of 50km from the site);
* *Sub-regional* – the impact is to be felt at a distance of up to 100km from the site;
* *Regional* – the impact is to be felt in the Limpopo Province;
* *National* – the impact is to be felt across provincial boundaries.
* **Duration:**

Refers to the period of time over which impacts can be expected to be experienced.

* *Short term* – 0 to 5 years;
* *Medium term* – more than 5 years, up to 15 years;
* *Long term* – more than 15 years;
* *Permanent* – the impact is irreversible.
* **Magnitude:**

Refers to the intensity of the potential impact, if it is experienced.

* *Negligible* – the impact will barely be felt, if at all. No mitigation required;
* *Low* – the parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
* *Medium* – the parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
* *High* – functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.
* **Likelihood:**
* *Improbable* – it is unlikely that the impact will be experienced;
* *Possible* – the impact may be experienced. Monitoring required; mitigation may also be required based on the type of impact and its significance;
* *Highly probable* – the impact will most likely be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact;
* *Definite* – the impact will be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact.
* **Significance:**

Significance is based on a consolidation of the anticipated extent, duration, magnitude and likelihood of the potential impact.

* *Negligible* – The impact will barely be felt, if at all. No mitigation required;
* *Low* – The parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
* *Medium* – The parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
* *High* – Functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

## Public Participation Process

### Public Meeting

Just as during the ESS phase, a Public Meeting will be conducted during the EIA phase of the project. It is proposed that the EIA-phase public meeting be held during the public review period of the draft Environmental Impact Report (EIR) and Environmental Management Programme (EMPR). The findings of the investigations conducted during the EIA will be presented at the meeting, and I&APs and members of the public will have the opportunity to discuss queries or concerns directly with the project team.

### Issues Trail

All comments, queries or issues raised during the public participation process will be recorded in the issues trail along with the response given by the consultant and/or specialists, and comments raised during the impact assessment phase of the process will be distinguished from those raised during the scoping phase. The issues trail will provide a comprehensive overview of the issues around the project, and will be submitted to LDEDET along with the EIR. The issues trail will also be available for public review and comment as part of the draft EIR.

### Availability of draft reports for public review

The draft EIR and EMPR will be made available for public review and comment for a period of 30 days before the final report will be submitted to LDEDET for their decision-making.

## Environmental Impact Report and Environmental Management Programme

Based upon the specialist investigations and public participation process conducted during the impact assessment phase of the project, the **EIR** will be compiled, in which potential environmental impacts, identified during the ESS phase of the project, will be weighed in terms of their status, probability, extent, duration and significance. In addition, the EIR will contain the findings of all investigations conducted during both the ESS phase and the impact assessment phase, as well as the results of all public participation undertaken during both these phases, in the form of proof of advertisement of the various stages of the EIA process, minutes of all public and stakeholder meetings and copies of all correspondence with stakeholders.

An **Environmental Management Programme** (EMPR) will be compiled and made available for review together with the consultation EIR. The consultation EMPR will contain detailed management and mitigation measures in order to prevent, minimise or manage potential negative impacts and to optimise potential positive impacts during the construction phase, the operational phase and the potential decommissioning phase.

The EMPR will be compiled in collaboration with the specialist sub-consultants who have been involved in various aspects of the project, to ensure that recommended measures address each particular aspect in detail, that the measures are appropriate for the relevant aspect in the context of the particular site and that measures recommended in terms of different parameters are not mutually exclusive. During the public review period, input from stakeholders and the public will also be welcomed for consideration in the EMPR.

### Public Review of the draft EIR and EMPR

The public and stakeholders will be provided with the opportunity to peruse and comment on the consultation EIR and EMPR. These documents will be made available onsite and at Polygon’s offices at 21C Peace Street, Tzaneen. Copies of the reports will also be distributed to certain key stakeholders, notably DWS, SAHRA, and GTM, at the outset of the public review period, and electronic copies of the reports will be available from Polygon upon request during the comment period. Any comments received with regards to the draft EIR and EMPR will be incorporated into the final report which will be submitted to LDEDET for decision-making following the public review period.

### Authority Review of the EIR and EMPR

Following the public review period of the consultation EIR and EMPR, these documents will be finalised and submitted to LDEDET for their review and decision-making on the proposed project.

## Authorisation

Following review of the final EIR and EMPR, LDEDET will authorise, reject or conditionally authorise the proposed project. All registered I&APs and stakeholders will be directly notified of the outcome of LDEDET’s decision; parties will also be informed regarding the appeal process that can be followed if they feel that LDEDET’s decision was wrongly issued.

## Agreement with I&APs as to Plan of Study

Should I&APs have comments on this Plan of Study, they are welcome to contact Polygon during the public comment period from 22 July to 22 August 2016. If needed, the Plan of Study can be updated to incorporate aspects that may be highlighted by I&APs; the final Plan of Study will be included in the ESR when it is submitted to LDEDET.

Polygon undertakes not to deviate from the Plan of Study in undertaking the impact assessment phase of the project, unless unforeseen circumstances necessitate material changes, in which case such changes will be discussed with LDEDET before being implemented.

# CONCLUSIONS

The Environmental Scoping Study (ESS) undertaken as part of the EIA process thus far has identified   
no fatal flaw issues associated with the proposed project. From the scoping-level specialist investigations, it was determined that the proposed development can potentially be supported on the proposed development site, on condition that the necessary impact mitigation and management measures are implemented and the relevant authorisations obtained.

The preferred dam positions were selected based on certain engineering considerations, but the ecological and wetland specialists have indicated that the preferred positions do not pose significantly greater impacts than alternative positions would, and that the proposed positions, as indicated on the aerial photo (Appendix A) can therefore be supported, on condition that impact mitigation measures are implemented. Earthfill dams are the only option in terms of technology, due to the lack of suitable founding conditions for other types of dams.

During the impact assessment phase, which will follow the scoping phase if LDEDET accepts this ESR, potential impacts will be investigated in more detail, and further stakeholder engagement will also be undertaken, wherein the findings of the studies that have been done thus far will be presented to stakeholders and the general public to give further opportunity for submission of comments with regards to the proposed project. From the findings of the various investigations as well as the stakeholder engagement process, an Environmental Management Programme will be developed, which will contain measures for the prevention, mitigation and/or management of impacts that may be anticipated to be associated with the proposed project in the preferred location and using the preferred technology.

A summary of the potential impacts identified within the ESS are contained in Table 12.1.

**Table 12.1:** Summary of potential impacts

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **POTENTIAL IMPACT** | **STATUS** | **EXTENT** | **DURATION** | **MAGNITUDE** | **LIKELIHOOD** | **SIGNIFICANCE** | **REQUIREMENT FOR FURTHER STUDIES AND MITIGATION OF RESIDUAL IMPACTS** |
| **Bio-physical aspects** | | | | | | | |
| Soil erosion and associated siltation downstream (construction phase) | Negative | Local | Short term | Medium | Highly probable | Low-medium (depending on timing of construction) | * Mitigation and monitoring required * No further studies required |
| Alteration of topography within dam basins | Negative | Local | Long term | Low-Medium | Highly probable | Low | * Construction-phase mitigation and monitoring required * No further studies required |
| Contribution to unlocking the agricultural potential of the property by providing irrigation security | Positive | Local | Long term | Medium | Highly probable | Medium | * No mitigation or monitoring required * No further studies required |
| Compaction of wetland soil around the site if vehicles / machinery enter these areas | Negative | Local | Short term | Very low | Possible | Low | * Mitigation and monitoring required * No further studies required |
| Disturbance of aquatic fauna and flora by construction activities | Negative | Local | Short term | Low-medium | Highly probable | Low | * Mitigation and monitoring required * No further studies required |
| Ingress of foreign matter into streams and wetlands, with concomitant impacts on fauna and flora | Negative | Local | Short term | Unknown | Possible | Low | * Mitigation and monitoring required * No further studies required |
| Increased water abstraction, though still within existing allocation from DWS | Negative | Local | Long term | Low | Highly probable | Low-medium | * Monitoring required * No further studies required |
| Fragmentation of wetland | Negative | Local | Long term | Low | Definite | Medium | * Mitigation and monitoring required * No further studies required |
| Change in hydrological regime from non-perennial to a more constant stream flow released downstream of the dam. | Negative / Positive | Local | Long term | Medium | Highly probable | Low-medium | * Monitoring required * No further studies required |
| Intercepting sediment load and preventing its transport downstream | Negative | Local | Long term | Medium | Highly probable | Medium | * No mitigation or monitoring required * No further studies required |
| Inundation of portions of wetlands, and conversion of site from free-flowing to standing water. | Negative / Positive | Local | Long term | Low | Definite | Low-Medium | * No mitigation or monitoring required * No further studies required |
| Creation of habitat for water-loving birds and other fauna. | Positive | Local | Long term | Low-medium | Highly probable | Low-Medium | * No mitigation or monitoring required * No further studies required |
| Deterioration in water quality downstream | Negative | Local | Long term | Unknown | Possible | Low-Medium | * Monitoring required * No further studies required |
| Changing the in-stream flow regime downstream of the dam, creating a steadier, more predictable flow, with concomitant impacts on ecology | Negative / Positive | Local | Long term | Low | Highly probable | Low-Medium | * Monitoring required * No further studies required |
| Habitat destruction in the areas to be inundated | Negative | Local | Long term | Low | Definite | Medium | * Mitigation and monitoring required * No further studies required |
| Fire risk associated with “hot” construction activities and workers smoking etc | Negative | Local | Short term | Unknown | Possible | Low | * Management and monitoring required during construction * No further studies required |
| Possible further spreading of alien plant species or encroachment by indigenous trees due to disturbance of natural vegetation | Negative | Local | Long term | Low | Possible | Low | * Mitigation required * No further studies required |
| Disruption of the activities of fauna on and around the site due to construction activities, and possible trapping / hunting / killing fauna by labourers | Negative | Local | Short term | Very low | Highly probable | Very low | * Mitigation and monitoring required * No further studies required |
| Creation of habitat for water-dependent fauna, e.g. certain fish and bird species | Positive | Local | Long term | Low | Highly probable | Low | * No mitigation or monitoring required * No further studies required |
| Changing the in-stream flow regime downstream of the dam, with concomitant impacts on ecology | Negative / Positive | Local | Long term | Low | Highly probable | Low-Medium | * No mitigation or monitoring required * No further studies required |
| **Socio-economic aspects** | | | | | | | |
| Supporting local businesses through local procurement of materials, equipment & services (construction phase) | Positive | Local | Short term | Low | Highly probable | Low | * No mitigation or monitoring required * No further studies required |
| Direct and indirect job creation (construction phase) | Positive | Local | Short term | Low | Highly probable | Low | * No mitigation or monitoring required * No further studies required |
| Contribution to job creation and job security by buffering the farm against drought | Positive | Local | Long term | Low | Highly probable | Low | * No mitigation or monitoring required * No further studies required |
| Contribution to local economy | Positive | Local | Long term | Low | Highly probable | Low | * No mitigation or monitoring required * No further studies required |
| Visual impact of construction activities and site clearing | Negative | Local | Short term | Low | Definite | Very low | * Monitoring required * No further studies required |
| Visual impact of the dams | Positive | Local | Long term | Very low | Definite | Very low | * No mitigation or monitoring required * No further studies required |
| Noise associated with construction activities and heavy vehicles during construction | Negative | Local | Short term | Very low | Highly probable | Very low | * Monitoring required * No further studies required |

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