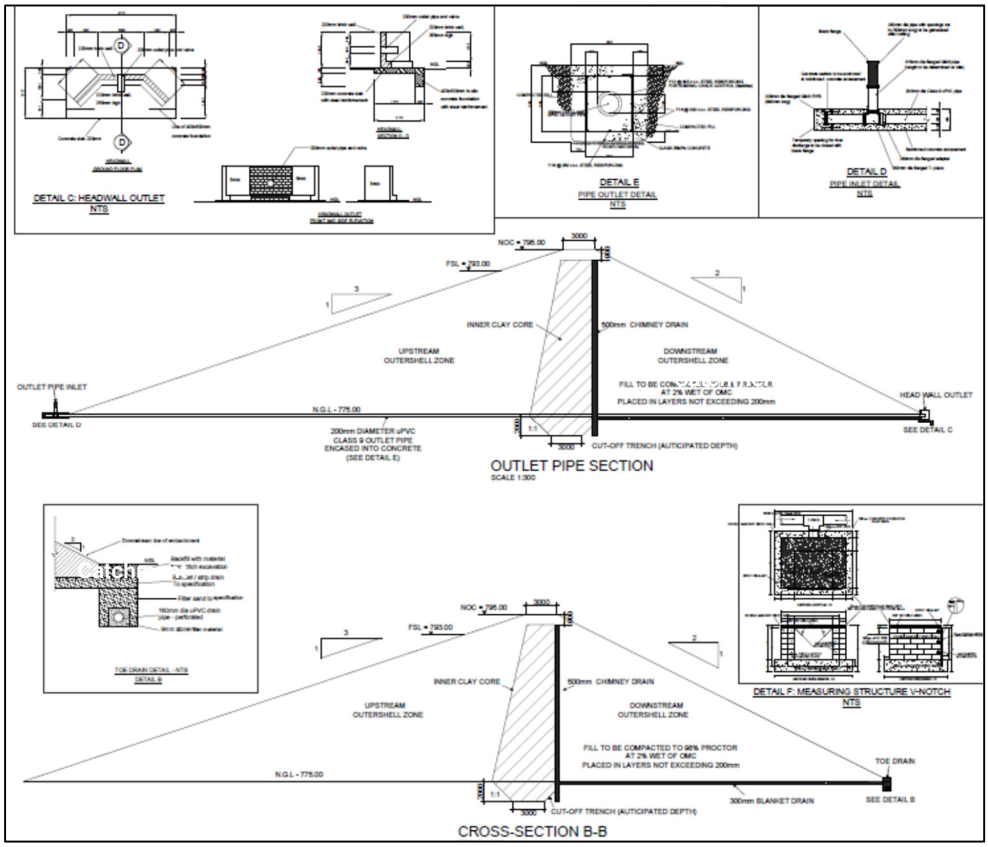
APPLICANT: FAEROES PROPERTIES (PTY) LTD

WATER USE LICENCE APPLICATION:
PROPOSED ESTABLISHMENT OF TWO DAMS ON THE REMAINING EXTENT OF THE FARM FAIRVIEW 605-LT, AGATHA, TZANEEN, LIMPOPO PROVINCE



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ABBREVIATIONS

CBA	Critical Biodiversity Area
CMS	Catchment Management Strategy
DAFF	Department of Agriculture, Forestry and Fisheries
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ELU	Existing Lawful Use
EMPR	Environmental Management Programme
ESA	Ecological Support Area
GTM	Greater Tzaneen Municipality
Ha	Hectares
IBA	Important Birding Area
I&AP	Interested and/or Affected Party
ISP	Internal Strategic Perspectives
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
l/s	Litres per second
m^3	Cubic metre (1 000 litres)
m/s	Metres per second
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act (1998)
PES	Present Ecological State
WMA	Water Management Area
WUL	Water Use Licence
WULA	Water Use Licence Application

CONTACT DETAILS

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ACKNOWLEDGEMENTS

Background on the project was received from the applicant. Technical information was supplied by Element Consulting Engineers.

ASSUMPTIONS

This report is based on the assumption that all information received from other parties is complete and accurate.

1. INTRODUCTION

Polygon Environmental Planning has been appointed by **Faroes Properties (Pty) Ltd** to undertake a Water Use Licence Application (WULA) process through the Department of Water and Sanitation (DWS) for the proposed construction of two in-stream balancing dams, for use in irrigation of avocado and macadamia nut orchards. The dams are proposed to be fed from an existing dam on the adjacent property.

Existing Lawful Use (ELU) has already been confirmed for surface water abstraction on both this site and the adjacent property, as well as for the existing dam on the adjacent property, from which these proposed balancing dams are to be fed. The authorised volume is sufficient for the irrigation needs on the property.

Approximately 130ha of orchards are planned, on land occupied by Eucalyptus plantations which have taken up the bulk of the newly purchased property (and proposed project site) for several decades. The Eucalyptus trees are currently being removed and the soil prepared for the orchards. The new crops of avocados and macadamia nuts will need to be irrigated for optimal production and to sustain the trees during drought periods, but the existing dam onsite has a small capacity and the applicant is currently unable to utilise his full surface water allocation, hence the proposal for these two dams.

The areas to be inundated by the proposed dams currently consist mostly of degraded indigenous vegetation. Remaining pockets of indigenous vegetation not affected by the dams will be left intact.

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:

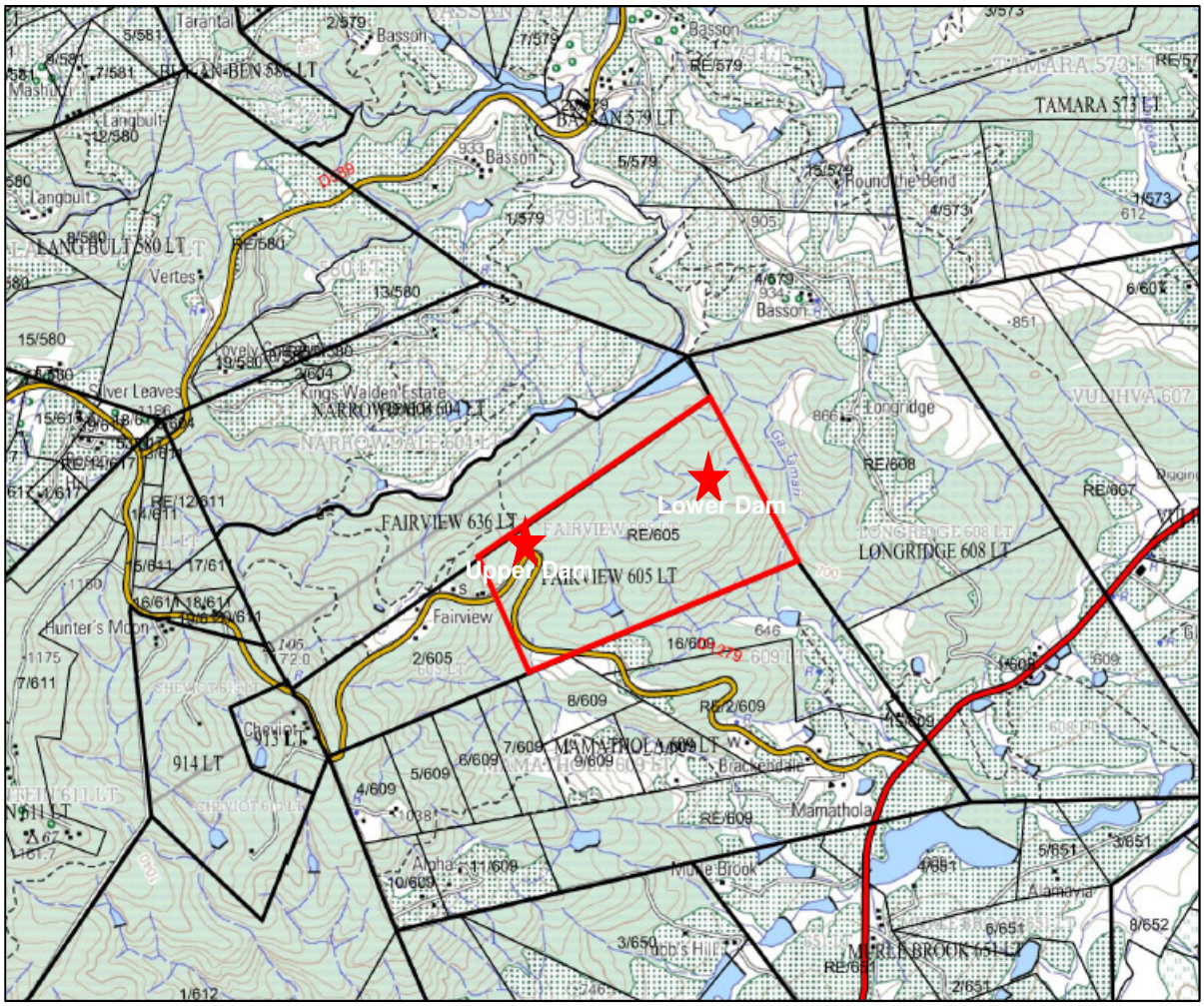
- 21(b): Storage of water.
- 21(c): Impeding or diverting the flow of water in a watercourse.
- 21(i): Altering the beds, banks, course or characteristics of a watercourse.

2. LOCATION AND SITE DESCRIPTION

2.1. Location

The site is located on the Remainder of the farm Fairview 605-LT in the Agatha area within the Greater Tzaneen Municipality, approximately 17 km south of the town of Tzaneen, Limpopo Province (refer to the locality map below).

Figure 2.1: 1:50 000 topocadastral map of the location



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

- Upper dam: 23°55'46.86"S and 30°10'0.36"E
- Lower dam: 23°55'35.21"S and 30°10'42.06"E

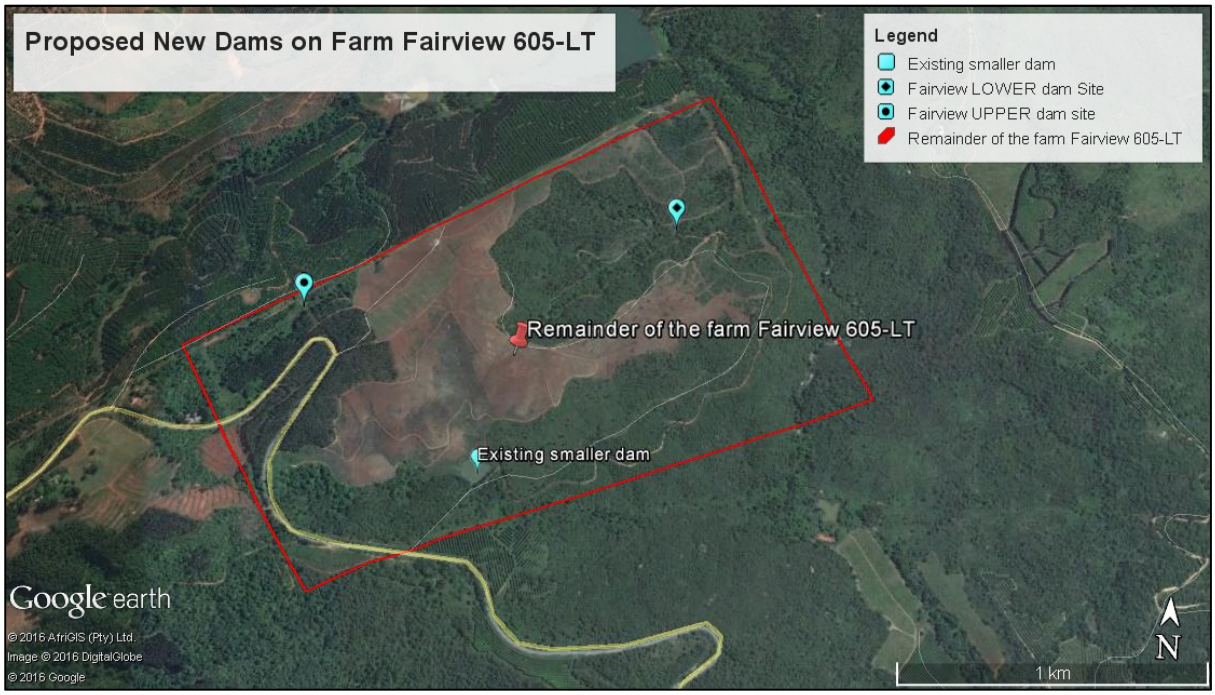
The site is under the jurisdiction of the Greater Tzaneen Local Municipality which falls within the Mopani District Municipality, it is approximately 190 hectares (ha) in extent.

2.2 Site Description

The Remainder of the farm Fairview 605-LT currently consists mostly of old Eucalyptus plantations, which are being cleared to make way for proposed avocado and macadamia nut orchards. Some natural areas remain in the alleys on the property, although the majority of these areas have been invaded by exotic vegetation. The property is drained by tributaries of the Ga-Tamari River, and a small dam exists in the southernmost section of the property. The Old Coach Road (a public secondary road) and small grave farm roads traverse the property.

Properties around the site are predominantly utilised for commercial timber and fruit plantations.

Figure 2.2: Aerial (Google Earth, accessed 2016) view showing the location and boundaries of the property and proposed new dam sites



The following table summarises general information with regards to the site. The aspects listed are expanded upon in the following sections.

Table 2.1: General information pertaining to the site

Local municipality	Greater Tzaneen Local Municipality
District municipality	Mopani District Municipality
Water authority	Department of Water and Sanitation (Bronkhorstspruit regional office)
Property description	Remaining Extent of the farm Fairview Farm 605-LT
Ownership	Faeroes Properties (Pty) Ltd
Zoning	Agriculture
Land use	- Existing dam - Forestry: Dilapidated Eucalyptus plantations (Secondary growth plantations) - Natural areas which are not cultivated along watercourse and in expanses too steep to be used for agriculture
Water Management Area	Olifants WMA (previously the Levuvhu-Letaba WMA, which has recently been integrated into the Olifants WMA)
Sub-Area	Groot Letaba Key Area
Quaternary catchment	B81D
Approximate coordinates	Upper dam: 23°55'46.86"S and 30°10'0.36"E Lower dam: 23°55'35.21"S and 30°10'42.06"E

3. PROJECT BACKGROUND AND DESCRIPTION

3.1. Project background and overview

The owner and applicant has for decades been farming Avocado and Macadamia orchards on the neighbouring property (the Remainder of the farm Fairview 636-LT). The remainder of Fairview 605-LT was purchased by the applicant in 2015 with the aim of increasing avocado and macadamia nut production, and to link with the adjoining operational avocado and macadamia farm, where farming logistics are already in place.

It is the owner's intent to increase avocado and macadamia nut production by planting 130ha of orchards on this property, on areas until recently occupied by Eucalyptus plantations. These orchards will require irrigation, and while sufficient water abstraction allocation is available (confirmed ELU through the Validation and Verification process), there is insufficient storage capacity for this volume of water – there is currently only one very small dam on the property. The two currently proposed dams will address the need for additional storage capacity.

3.2. Project description

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.

(a) The **upper dam** is proposed to have a dam wall of maximum 16m high and an embankment length of 120m (excluding spillway). Gross storage capacity will be 119 000m^3 with a water surface area of 2,23ha at full supply level. An open side channel spill-way with a base width of 6m and available freeboard of 2m is proposed on the left bank, where suitable shallow rock was found.

(b) The **lower dam** is proposed to have a dam wall of maximum 20m high, and an embankment length of 158m (excluding spillway). Gross storage capacity will be 215 000m^3 with a water surface area of 3,3ha at full supply level. An open side channel spill-way with a base width of 10m and available freeboard of 2m is proposed on the right bank.

Both are proposed to be zoned earthfill embankments, 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. 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.

Because of the sizes, heights and expected classifications of the dams, a chimney, blanket and toe drain system needs to be implemented within the embankments in order to manage seepage. It is furthermore recommended that proper toe drains with V-notch measuring structures be installed at the deepest section on the downstream sides. The expected length of the toe drain a both dams is estimated at approximately 80m.

Both dams will be equipped with a 200mm uPVC outlet pipe with a downstream gate valve closing mechanism to enable the release of water for downstream needs by other water users and ecological requirements that may be required by DWS (reserve determination still to be conducted by DWS to determine the volume required to be released). Both outlet pipes will be 72m long.

Fishways have not been incorporated into the design, as the dam sites are situated in the steep upper reaches of a headwater catchment, on non-perennial tributaries which only exhibit surface flow for brief periods following rainfall events. Tributaries of this nature are not expected to support fish populations and fish migration would be non-existent in these tributaries prior to dam construction. There is therefore not considered to be any need to implement fishways or other engineering designs for fish migration.

3.3. Project phases and work method statement

The activities are proposed to consist of the following:

(a) **Planning**, which has been mostly completed and consisted of the following:
- Survey (land surveyor) (completed)
- Selection of dam sites (completed)
- Preliminary engineering design and costing (completed)
- Environmental Impact Assessment and WULA (underway), including the following:
  - Assessment of the receiving environment. Topography, climate, visual and noise impacts and socio-economic impacts were assessed at desk-top level, whilst specialist ecological, heritage, wetland and soil studies were undertaken.
  - Identification of potential impacts and assessment of the significance thereof
  - Development of measures for the prevention or mitigation of impacts and the monitoring and reporting of compliance
  - Public participation process
- If and when Environmental Authorisation and a Water Use Licence have been obtained, detailed design

(b) **Construction**, which is proposed to be carried out as follows:
- Excavation and backfilling of cut-off core trenches
- Forming of new embankments. Earth fill is proposed to be excavated from within the dam basin.
- Excavation and forming of flood spillways (open side channels)
- Installation of 200mm diameter uPVC outlet pipes encased in reinforced concrete, equipped with closing mechanisms on the downstream sides
- Installation of toe drains with V-notch measuring structures
- Grass establishment (hydro-seeding) on entire embankments after construction
- An Environmental Control Officer (ECO) will monitor compliance with the EMPR, WUL and EA during the construction phase and report to both LDEDET and DWS on compliance

(c) Operation and maintenance, which will be undertaken in accordance with an Operation and Maintenance (O&M) manual to be compiled by the engineers. This will include periodic inspections by the engineers to check aspects such as structural integrity, and repairs if necessary.

(d) **Potential decommissioning**, though the dams are planned as long-term to permanent structures. Should a decision be taken at a later stage to decommission the dams, the project team (including engineer, environmental consultant and any other relevant team member) will draw up a detailed decommissioning plan and accompanying Environmental Management Programme according to which the decommissioning will be undertaken.

Please refer to the attached preliminary design report and drawings, as compiled by Element Consulting Engineers (Appendix F).

4. LEGISLATIVE CONTEXT

4.1. National Water Act (1998)

A WULA is currently being undertaken for the following water uses, which will be triggered by the proposed project:

- 21(b): Storage of water.
- 21(c): Impeding or diverting the flow of water in a watercourse.
- 21(i): Altering the beds, banks, course or characteristics of a watercourse.

The Department of Water and Sanitation (DWS) is the competent authority.

4.2. National Environmental Management Act (1998)

In terms of the EIA regulations (2014), promulgated in terms of the National Environmental Management Act (NEMA 1998, as amended), a full Environmental Impact Assessment (EIA) is required and is currently being undertaken, with the Limpopo Department of Economic Development, Environment and Tourism (LDEDT) as the competent authority.

4.3. Other legislation

Other legislation that is or may be applicable includes the following:

Table 4.1: 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	Schedule 2, 3,	Lists of protected animals and plants

Management Act	11 and 12	
National Environmental Management Act (No 107 of 1998, as amended) 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) and Regulations (GN466 of 2009)	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 (Sect 21-55)	Governs water use
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

5. CONSULTATION WITH DWS

The pre-application meeting and site inspection with DWS did not take place as the Luvuvhu-Letaba WMA was at that time being integrated with the Olifants WMA, and confounding logistical and administrative duties caused time constraints on DWS's side which did not allow the meeting to take place. However, Polygon Environmental Planning consulted with the relevant official at DWS's Bronkhorstspruit office telephonically and via e-mail and was given the green light to continue with the application as per the process set out to DWS by e-mail.

A meeting was undertaken with DWS on 14 October 2016, at which time the WULA was also submitted. During the meeting, the project was discussed and the application presented (refer to Appendix M for the minutes and attendance register). This was followed by a site inspection on 25 November 2016 (attendance register attached under Appendix M).

Comments on the WULA were received from DWS's Instream Flow Requirements (IFR) division on 11 April 2017 and from the Dam Safety division on 2 May 2017. Please refer to Appendix M for the comments and our responses.

6. ALTERNATIVES

6.1. 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 in line with surrounding land use, which mostly consists of timber plantations, orchards and associated infrastructure.

6.2. Location alternatives

No other properties were investigated as alternatives, as the applicant already owns this property and it is located adjacent to another property of his, on which agriculture is already practised and where logistical infrastructure such as storerooms and offices are already in place; farming on this property (the proposed development site) will therefore be able to easily tie into the existing neighbouring farming operation. Furthermore, a water abstraction allocation (Section 21(a) water use) is already in place for the property, and the property was found to be suitable for dam construction from an engineering perspective as well as environmentally. The proposed activities are also in line with surrounding land use. The investigation of location alternatives therefore focused on the selection of suitable dam sites on the subject property.

The option of establishing only one, large dam was considered but swiftly rejected as it was found that a single dam with sufficient storage capacity for the irrigation needs onsite would inundate part of the public road traversing the site (the proposed position would be approximately where the currently proposed "upper dam" is planned. Planning therefore focused on selecting suitable sites for two dams, which together would have sufficient storage capacity for the farm's needs, within the constraints of the available abstraction rights.

Site selection on the property was done firstly by a civil engineer (specialised as a dam engineer) based on available contour lines and a site inspection. Likely sites were then surveyed in detail by a land surveyor, and preliminary planning was done on the sites initially selected. It was then found that the site originally selected for the upper dam was not ideal, and the land surveyor proceeded to survey another site pinpointed by the engineer. This second site was found to be much better suited, as described below.

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 figure 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.

Polygon as the Environmental Assessment Practitioner was also involved in giving the green light for further planning to be done on the selected sites, to ensure that the dams were not planned on sites fatally flawed from an environmental perspective. Once the initial vetting of the sites had been done by the relevant project team members, the environmental investigations and engineering designs thenceforth focussed on the two preferred sites for the upper and lower dams, respectively.

Figure 6.1: Alternative "upper dam" sites investigated

6.3. Design 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 / feasible option from an engineering perspective.

6.4. 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. Commercial agricultural development on the site would also not be viable without the proposed dams, hence impacts that may be associated with agriculture on the site would also not come to pass – or at least be greatly reduced – if the dams are not established.

Impacts that can be expected to be experienced in case of the no-go alternative being selected include the following:

Table 6.1: Potential impacts that may be associated with the no-go option

POTENTIAL IMPACT	STATUS	EXTENT	MAGNITUDE	LIKELI-HOOD	SIGNIFI-CANCE
No compaction of wetland soil by construction machinery	Neutral	Local	Very low	Definite	Low
No disturbance of aquatic fauna and flora by construction activities	Neutral	Local	Low-medium	Definite	Low
No risk of ingress of foreign matter into streams and wetlands, or concomitant impacts on fauna and flora	Neutral	Local	Unknown	Definite	Low
Water abstraction remains roughly unchanged	Neutral	Local	Low	Highly probable	Low-medium
No destruction or fragmentation of wetlands	Neutral	Local	Low	Definite	Medium
No intercepting and retention of sediment load	Neutral	Local	Medium	Definite	Medium
No creation of new habitat for water-dependent fauna	Neutral	Local	Low	Definite	Low
No habitat destruction or fragmentation	Neutral	Local	Low	Definite	Medium
Water quality trends remain unchanged	Neutral	Local	Unknown	Definite	Low-Medium
No veld fire risk associated with construction activities	Neutral	Local	Very low	Definite	Very low
No contribution to further spreading of alien plant species or encroachment by indigenous trees due to disturbance of natural vegetation	Neutral	Local	Low	Highly probable	Low
No disruption of the activities of fauna on and around the site due to construction activities	Neutral	Local	Very low	Definite	Very low
In-stream flow regime and hydrological regime downstream of the dam remains unchanged	Neutral	Local	Low	Highly probable	Low-Medium
No job creation, whether direct or indirect, during either construction or operational phase	Neutral	Local	Low	Definite	Low

No contribution to local economy during either construction or operational phase	Neutral	Local	Low	Definite	Medium
No risk of damage to downstream property, crops or infrastructure in case of failure of the dam	Neutral	Local	Unknown	Definite	Medium
No construction-related noise	Neutral	Local	Very low	Definite	Very low
Visual landscape remains unchanged	Neutral	Local	Very low	Highly probable	Very low

7. RECEIVING ENVIRONMENT: BIO-PHYSICAL ASPECTS

7.1. Climate

The site is situated on the foot slopes and hills of the great north-eastern escarpment, in a sub-tropical rainfall area that receives high rainfall in summer while incurring dry winters. Summers are hot and humid, with an average summer midday temperature of 29.1℃ in Tzaneen in January; winters are mild with very rare frost, and the average winter midday temperature is 21.9℃ in July. The region experiences its coldest temperatures during July when average evening temperature are 6.3℃.

Rainfall falls mostly during the summer months, averaging 781mm of rain per year. Mean annual rainfall for the catchment, based on figures acquired at the rainfall station nearest the property (New Agatha) is estimated at 1186mm (Element, 2016).

7.2. Topography

The upper and lower dam sites are located at 882m and 802m above sea level (mamsl) respectively, within steeply undulating foot slopes of the Wolkberg mountains near Tzaneen. The topography varies greatly over the unit, however, the Business Case for the Olifants Catchment Management Area (2013) describes this particular area (Letaba) as high mountains with deeply incised valleys.

7.3. Geology

The potassium-poor gneisses of the Goudplaats gneiss (Swazian Erathm) and the Archaean granite dyke underlie most of the area. Shales and quartzite from the Wolkberg Super group are also present, however, these are uncommon (Mucina and Rutherford, 2006).

The Olifants-Letaba Environmental Management Framework (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).

7.4. Surface hydrology and wetlands

The following information was mostly gleaned from the wetland/riparian delineation and functional assessment conducted by Limosella Consulting, 2016.

7.4.1. Status quo

Surface hydrology

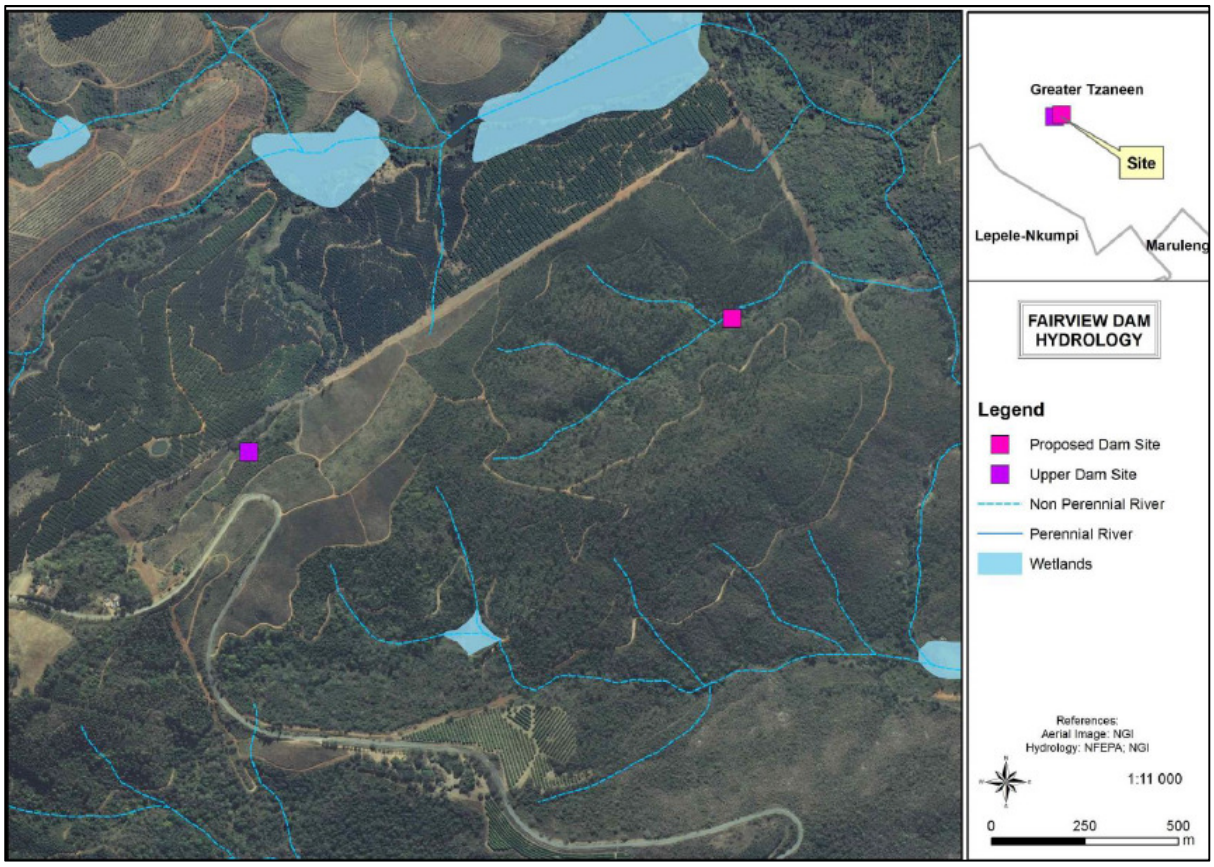
The proposed project site is located in the upper slopes of the surrounding catchments within the B81D Quaternary Catchment which forms part of the Groot Letaba Sub Area of the Luvuvhu and Letaba Water Management Area (WMA). This sub-area is currently being incorporated into the Olifants WMA. The dams are proposed on tributaries of the Ga-Tamari River, which drains into the Letsitele River, which in turn drains into the Letaba River.

The dam sites are situated in the steep upper reaches of a headwater catchment, on non-perennial tributaries which only exhibit surface flow for brief periods following rainfall events (The Biodiversity Company, 2017).

In this specific catchment, the precipitation rate is lower than the evaporation rate with a Mean Annual Precipitation (MAP) to Potential Evapotranspiration (PET) ratio 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 7.1.).

Figure 7.1: 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. 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 7.1: 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	Valley Floor	Unchannelled Valley Bottom	n/a	n/a

	Highlands	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 7.2: Level 5 classification of the wetlands recorded on the study site (adapted from Ollis *et al*, 2013).

Level 5: 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 Inundated	4	0	0	0	0	0	5
Seasonally Inundated	3	4	4	4	4	4	3
Intermittently Inundated	3	4	4	4	4	4	2
Never/Rarely Inundated	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		

Level 5: Hydroperiod and depth of inundation							
							n/a

Table 7.3: 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 (Tale 7.4).

Figure 7.2: The results of the wetland delineation of the proposed dam sites (Limosella 2016)

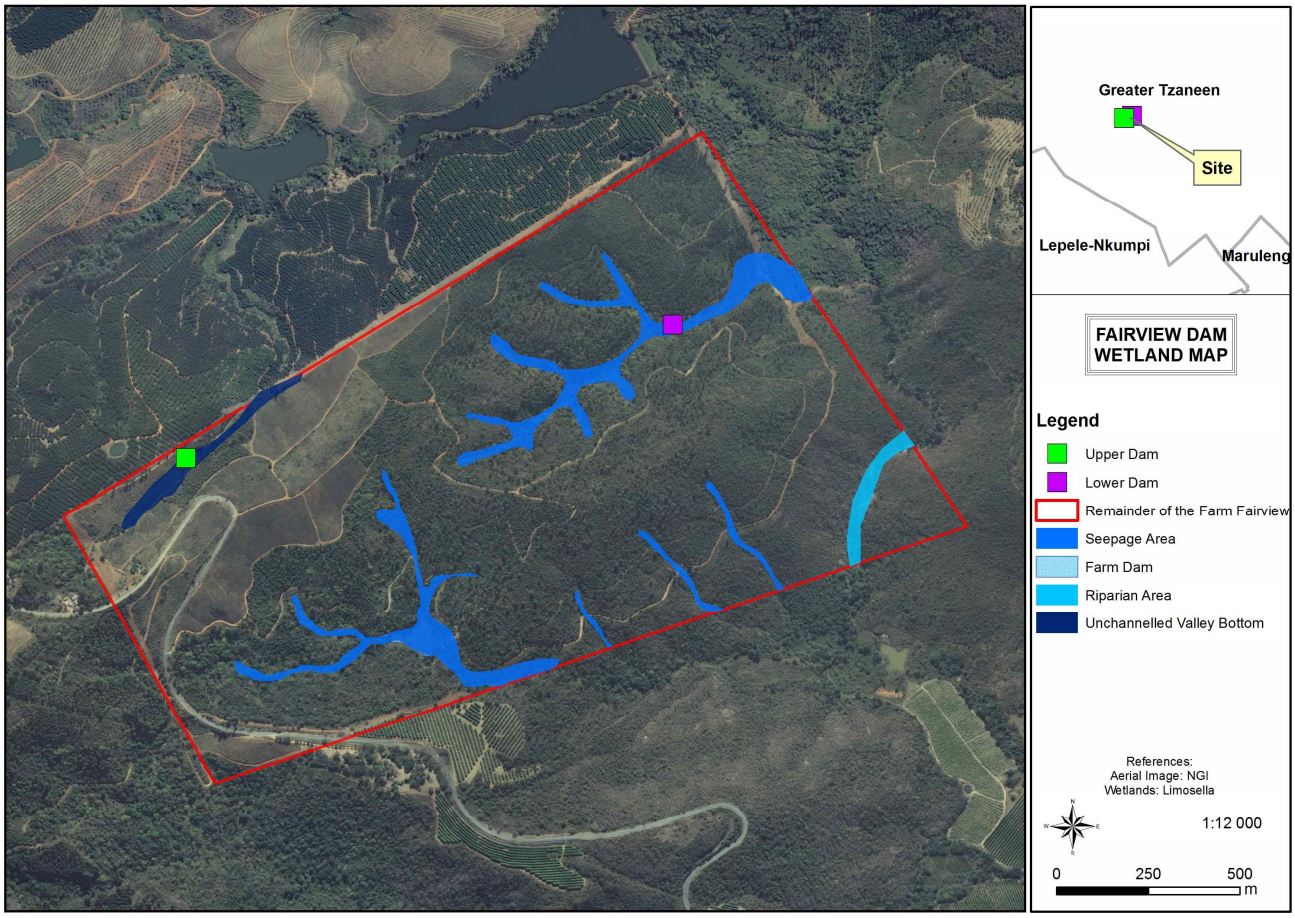


Table 7.4: Summary of hydrology, geomorphology and vegetation health assessment for the wetlands located on the proposed dam sites (Limosella 2016)

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 7.5: 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 7.6: 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 7.7: 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**	

The wetland report 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.

7.4.2 Potential impacts

The construction of dams has 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 7.8: 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

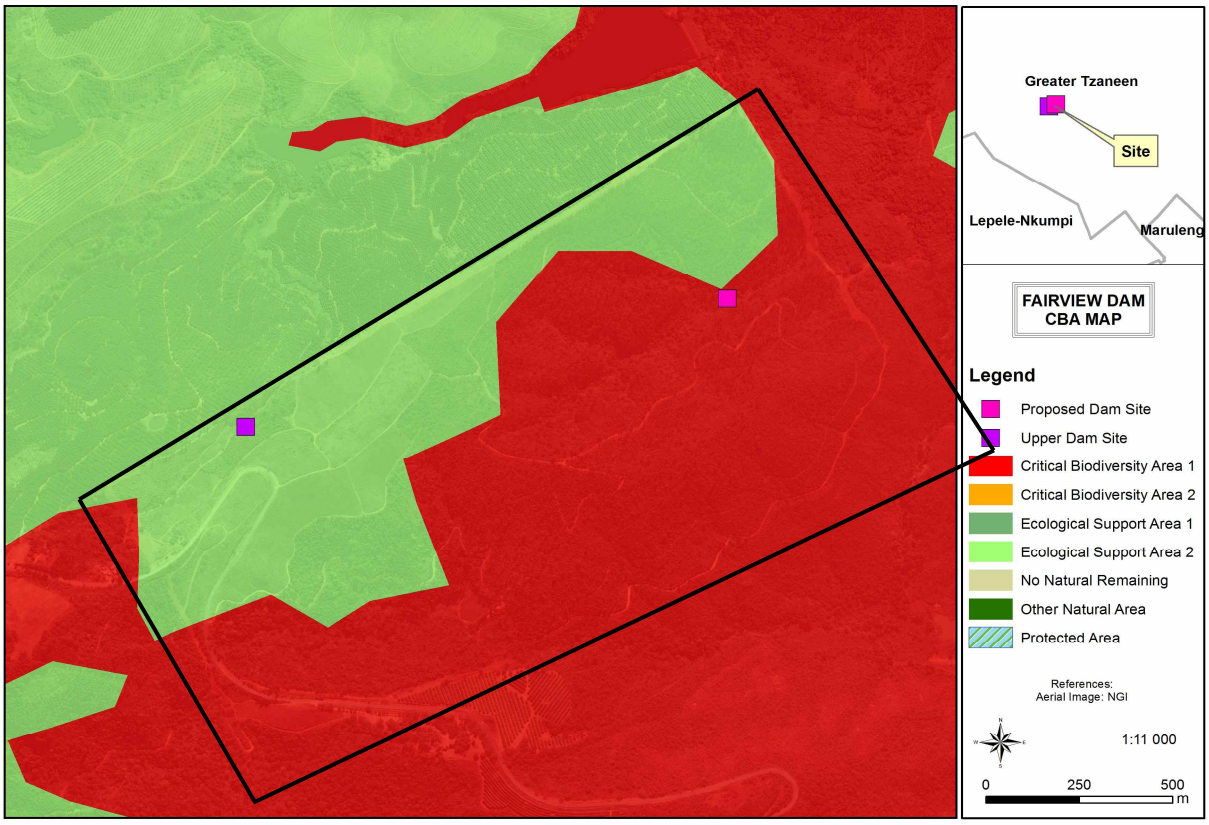
7.5. Ecology

The following information was mostly gleaned from the ecological specialist study conducted by Bateleur Environmental Services, 2016.

7.5.1. Status quo

According to the Limpopo Conservation Plan version 2 (2013), the site is situated partly within an Ecological Support 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 (image: Limosella Consulting, 2016)



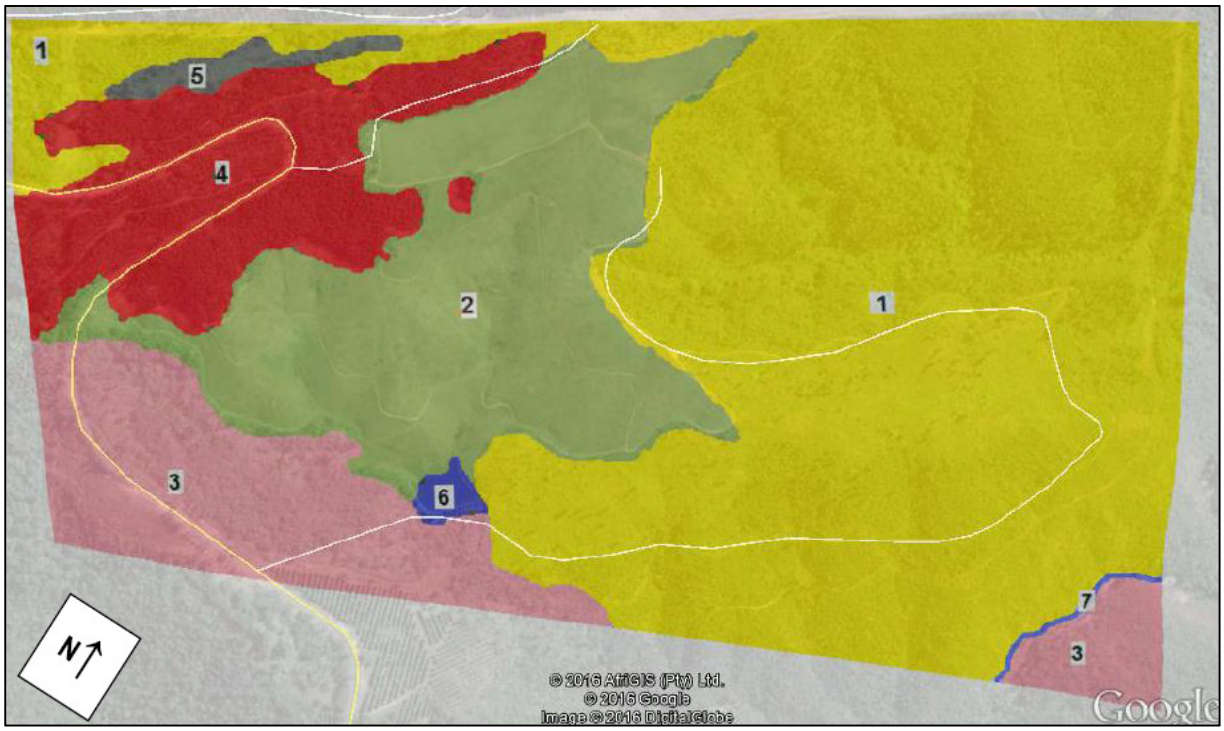
Vegetation

The proposed location forms part of the Savannah Biome and more specifically the SVI 8 Tzaneen Sour Bushveld vegetation unit (Mucina and Rutherford, 2006).

For the field assessment, five survey sites were identified according to aerial photographs using the homogenous stratification method. The sites were then 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 7.4 below, which should be read with the comments on the vegetation units which follow the figure:

Figure 7.4: Vegetation unit map of the Remainder of the farm Fairview 605-LT (Bateleur Environmental Services 2016)



- *Vegetation Unit 1:* This unit comprises 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 *Chromolaena 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:* This unit represents 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:* The vegetation in this unit comprises *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:* This unit was classified as a wetland. It starts off as a drainage line and then transforms into a wetland with waterlogged soils with sedge species *Cyperus dives* and *Schoenoplectus corymbosus* yielding the highest frequency of species recorded.

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.

Two protected plant species may potentially occur on the property, and have a high probability of occurrence in the north-western corner of the site, namely *Catha edulis (*Bushman's Tea) and *Sclerocarya birrea* (Marula).

No protected trees were recorded at the proposed dam sites themselves, but if protected species are encountered during construction, they should be left intact until the appropriate permits have been obtained from DAFF and/or LDEDET in terms of the National Forests Act (1998) and/or the Limpopo Environmental Management Act (2003) respectively.

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 attached Ecological Assessment Report, which include probability ratings 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 7.9: 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.

7.5.3. Aquatic ecology

The dam sites are situated in the steep upper reaches of a headwater catchment, on non-perennial tributaries which only exhibit surface flow for brief periods following rainfall events. Tributaries of this nature are not expected to support fish populations, and fish migration would be non-existent in these tributaries prior to dam construction. There is therefore not considered to be any need to implement fishways or other engineering designs for fish migration (The Biodiversity Company, 2017).

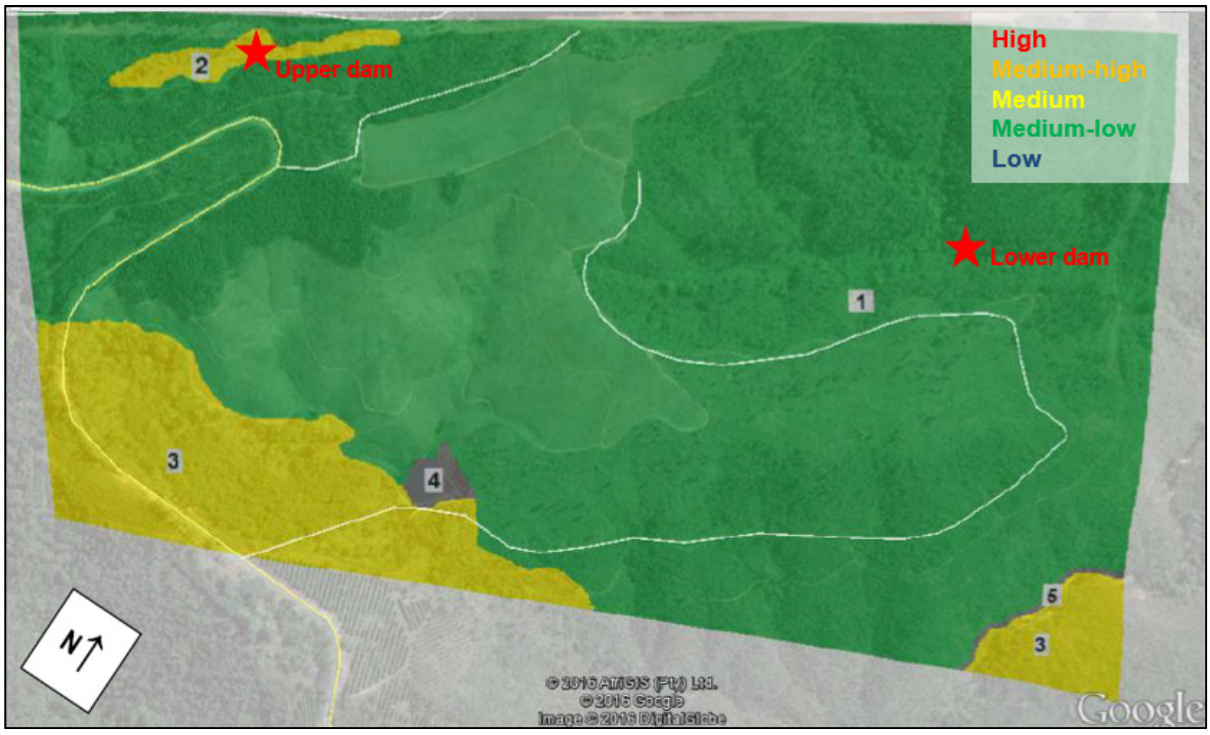
7.5.4. Ecological sensitivity

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 7.5: Aerial view showing the ecological sensitive areas of the site



7.5.5. 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 7.14: 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 7.15: 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

7.6. Sensitive areas

Sensitive areas **on** the site comprise the following:

- **Wetland and riparian areas**, as well as **streams**. These are discussed in more detail in Section 7.4 above and in the attached specialist wetland and riparian delineation and functional assessment (Appendix O)
- **Critical biodiversity area (CBA)** and **ecological support area (ESA)**. The proposed upper dam site is located within an ESA2 and the lower dam site within a CBA1, according to the Limpopo Conservation Plan version 2 (2013). Ecological impacts are assessed in more detail in Section 7.5 above and in the attached specialist ecological assessment (Appendix O)
- Pockets of **indigenous vegetation**, albeit degraded. These are mostly located along drainage lines. Refer to Section 7.5 above and to the attached specialist ecological assessment (Appendix O)

Sensitive areas in the **vicinity** of the site include the following:

- **Wetland and riparian areas**, as well as **streams** (the Ga-Tamari River and its tributaries)
- **Critical biodiversity area** and **ecological support area**. Most of the surrounding area is classified as ESA2 in terms of the Limpopo Conservation Plan version 2 (2013), whilst large areas are classified as CBA1.
- Pockets of **indigenous vegetation**, mostly along drainage lines and valleys.

- **Wolkberg Wilderness Area** (protected area). According to the Limpopo Conservation Plan version 2 (2013), the protected area is approximately 9km from the site (upstream), whereas the "National Protected Areas" layer indicates its closest point as 2.8km away. However, the additional area indicated on the latter layer, which is not included in the Conservation Plan layer, is utilised for commercial timber plantations, as evidenced by aerial photographs, and does not in fact form part of the reserve.

8. RECEIVING ENVIRONMENT: SOCIO-ECONOMIC ASPECTS

8.1. 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.

8.1.1. 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).

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

8.1.2. 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 8.1: Potential heritage impacts

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

OPERATIONAL PHASE						
None expected	-	-	-	-	-	-

8.2. Socio-economic aspects

8.2.1 Status quo: Greater Tzaneen Local Municipality (Information adapted from GTM IDP 2014/2015 and updated with GTM IDP 2016/2017)

Location

The GTM forms part of the Mopani District in the Limpopo Province.

Population

Based on the South African Statistics Census 2011, the GTM population numbered 390 092. Females represent 53% of the population and young people aged 14 –35 constitute 40% of the total population of the municipality.

Income, employment and education

The labour force survey by Statistics South Africa (first quarter 2012) indicated an unemployment rate of 21.9% in Limpopo Province in March 2012, excluding discouraged work seekers. According to the municipality's 2016/2017 Integrated Development Plan (IDP), 41% of the total population within the municipality have no source of income. A further 45% of the population have incomes which fall below the minimum living levels (R 1,600.00 as defined by Statistics South Africa).

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 (IDP 2016/ 2017).

Infrastructure and services

Water: Water supply is a concern over the long term, as both the Tzaneen and Ebenezer Dams have been over-allocated, which means that GTM have not yet been able to secure a greater water abstraction allocation from these sources for domestic supply. Furthermore, water tankers that are being used to supply water to villages that do not have access to piped water are exerting extreme stress on the financial situation of the Municipality (GTM IDP, 2016/2017).

For the past three years the GTM has maintained high water quality standards and has been awarded Blue Drop status. 44.1% of water resource in the GTM is provided through regional and local water schemes which are operated by the GTM and other water service providers. Many of the rural areas are supplied by boreholes that are managed by the Mopani District Municipality (MDM).

Sanitation: Much of the municipal area, most note ably 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.

8.1.1. Potential impacts

It is foreseen that construction will take place over a period of a couple of months, and work will be done mostly by skilled operators using machinery. Very few, if any, 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 8.2: Potential socio-economic 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	Medium

Contribution to local economy by local procurement of products and services for the farming operation	Positive	Local	Long term	Low	Highly probable	Medium
Risk of damage to downstream property, crops or infrastructure in case of failure of the dam	Negative	Local	Long term	Unknown	Possible	Medium (to be assessed in more detail in dam safety application)

8.2. Visual Aspects

8.2.1. 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.

8.2.2. 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 8.3: 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

8.3. Noise

8.3.1. Status quo

The site is situated in a relatively isolated area where ambient noise levels associated with workers' voices, neighbouring farm residents and vehicles on the Old Coach Road is low. No sensitive noise receptors (e.g. schools or dwellings) occur in close proximity to the proposed dam site. The dam sites are surrounded by agriculture and forestry which could possibly dissipate any excess noise.

8.3.2. 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 8.4: 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.						

8.4. 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 8.5: 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	Negative	Local	Long term	Medium	Definite	Medium

movement of aquatic fauna						
Increased water abstraction, with reduced water availability downstream (though still within already authorised volume)	Negative	Local	Long term	Low	Definite	Medium
Risk of contamination of water resources by agricultural chemicals used in the associated farming operation	Negative	Local to sub-regional	Long term	Unknown	Possible	Medium

Table 8.6: 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	Medium
Contribution to local economy	Positive	Local	Long term	Medium	Definite	Medium

9. IMPACT AND RISK PREDICTION AND ASSESSMENT

Potential impacts and risks 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.

The following table summarises the potential bio-physical and socio-economic impacts and risks that may be anticipated to be associated with the proposed project during the construction and operational phases.

Table 9.1: Summary of potential impacts and risks

POTENTIAL IMPACT	STATUS	EXTENT	DURATION	MAGNITUDE	LIKELIHOOD	SIGNIFICANCE
BIO-PHYSICAL IMPACTS						
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
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
Habitat destruction in the areas to be inundated	Negative	Local	Long term	Low	Definite	Medium
Deterioration in water quality downstream	Negative	Local	Long term	Unknown	Possible	Low-Medium
Veld fire risk associated with “hot” construction activities and workers smoking etc	Negative	Local	Short term	Very low	Possible	Very low
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	Negative / Positive	Local	Long term	Low	Highly probable	Low-Medium

steadier, more predictable flow, with concomitant impacts on ecology						
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
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
SOCIO-ECONOMIC IMPACTS						
Supporting local businesses through local procurement of materials, equipment & services – construction phase	Positive	Local	Short term	Low	Highly probable	Low
Direct and indirect job creation – construction phase	Positive	Local	Short term	Low	Highly probable	Low
Contribution to job creation and job security by buffering the farm against drought – operational phase	Positive	Local	Long term	Low	Highly probable	Medium
Contribution to local economy by local procurement of products and services for the farming operation – operational phase	Positive	Local	Long term	Low	Highly probable	Medium
Noise associated with construction activities and heavy vehicles during construction	Negative	Local	Short term	Very low	Highly probable	Very low
Visual impact of construction activities and site clearing	Negative	Local	Short term	Low	Definite	Very low
Visual impact of the new dams – operational phase	Positive	Local	Long term	Very low	Definite	Very low
Risk of damage to downstream property, crops or infrastructure in case of failure of the dam	Negative	Local	Long term	Unknown	Possible	Medium (to be assessed in more detail in dam safety application)
INDIRECT AND CUMULATIVE IMPACTS (BIO-PHYSICAL AND SOCIO-ECONOMIC)						
Habitat loss and fragmentation, including wetlands	Negative	Local	Long term	Medium-High	Definite	Medium-High

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 (though still within already authorised volume)	Negative	Local	Long term	Low	Definite	Medium
Risk of contamination of water resources by agricultural chemicals used in the associated farming operation	Negative	Local to sub-regional	Long term	Unknown	Possible	Medium

10. PUBLIC PARTICIPATION PROCESS

10.1. Advertisement of Commencement of EIA and WULA Process

A 30-day public comment period was advertised for a period of 30 days (19 February to 20 March 2016) in the following ways (please refer to Appendix I 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.

10.2. 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.

10.3. Issues Raised

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

11. SECTION 27 MOTIVATION

11.1. Purpose of Activity

Avocado and macadamia orchards are planned to be established on the property to replace the previous Eucalyptus plantations. Both these crops rely on irrigation for optimal production, particularly during years with below-average rainfall, and during drought years irrigation may be needed to ensure the survival of the trees.

Currently there is only a single small dam on the property, which has insufficient storage capacity for the irrigation requirements of the planned 130ha of orchards. A sufficient surface water abstraction allocation is in place (confirmed ELU through the Validation and Verification process), but with insufficient storage capacity it would be difficult to actually utilise this full allocation, due to the non-perennial flow in the watercourses onsite. Dam/s are required in order to capture water during wetter periods, for use during dryer periods.

Two balancing dams are therefore proposed to be constructed in order to facilitate the water storage shortfall. Most of the water to be stored in the proposed dams is proposed to be pumped from the adjacent property, on which abstraction rights and storage have also already been confirmed as ELU, though a smaller volume of instream run-off will also be captured.

Without the proposed dams, the farming operations proposed on the property would not be viable, due to the dependence of avocado and macadamia cultivation on irrigation.

11.2. Existing lawful use – NWA Section 27(1)(a)

Surface water abstraction (Section 21(a)) on this property as well as the applicant's adjacent property (Remainder of Fairview 636-LT – note that although the farm name is the same, the code differs) has been confirmed Existing Lawful Use (ELU) through the validation and verification process. Please refer to Appendix G for copies of the Section 35(4) certificates which have been issued to the applicant; he is just still awaiting signed copies.

Abstraction of 206 721 m^3/year of surface water (with a river as source) has been confirmed ELU on this property, whilst abstraction of a further 968 557 m^3/year on the applicant's neighbouring property, Fairview 636-LT, has also been confirmed ELU. Though some of the water on the latter property is used for irrigation on that property, a portion is unused and is proposed to be transferred into the proposed new dams to be used for irrigation on the subject property. Sufficient water allocation is available for the irrigation needs on both the properties.

A dam on Fairview 636-LT, located on a tributary of the Ga-Tamari River and having a storage capacity of 1 216 700m^3, has also been confirmed ELU, and some of the water captured in this dam is proposed to be transferred to the proposed new dams on Fairview 605-LT for use in irrigation of the new orchards here.

Lastly, stream-flow reduction of 30 108m^3/year on Fairview 636-LT (the property neighbouring the subject property) has also been confirmed ELU.

11.3. Rectification of past racial and gender discrimination – NWA Section 27(1)(b)

The project is anticipated to create a number of jobs indirectly, as the dams will facilitate commercial agriculture on the property, which in turn will create approximately 50 long-term job opportunities as well as seasonal jobs for pickers in the orchards. These jobs will likely be filled entirely from local previously disadvantaged, rural communities, meaning that about 50 previously disadvantaged families are likely to have a livelihood as a result of the water uses hereby being applied for. The distribution between male and female workers is not known at this stage, but women usually form a large part of especially the picking workforce, which requires fine work.

The agricultural operation on the property will also contribute to the local economy by using local suppliers of materials and supporting services which form part of Tzaneen's extended network of businesses supplying the agricultural sector. In this way, the project will contribute to sustaining these businesses and the staff employed there, many of whom are also likely to be from the previously disadvantaged rural communities around Tzaneen.

11.4. Efficient and beneficial use of water in the public interest – NWA Section 27(1)(c)

The water is proposed to be used for irrigation of orchards, which will contribute to food security and also earn foreign currency from exported fruit, positively contributing to South Africa's trade balance. The water use will support approximately 50 long-term jobs in the form of permanent employees on the farm as well as annual pickers, and almost all of the employees will be hired from nearby, previously disadvantaged rural communities.

Efficient irrigation systems are planned to minimise the volume of water required for irrigation of the orchards. Drip irrigation will be used, and water application will be optimised through the use of soil moisture meters which will send readings to a computer to ensure that irrigation is done only when soil moisture content drops below a certain level. This will minimise water loss to evaporation and infiltration.

11.5. Socio-economic impact – *NWA Section 27(1)(d)*

(i) Socio-economic impacts if water use is authorised

10.3.1 Construction phase

Construction-phase socio-economic impacts, be they positive or negative, are anticipated to be of low significance.

Positive impacts are expected to relate to job creation and sustaining of jobs in businesses from which services and materials are to be procured, but this will be limited in extent due to the largely mechanised nature of dam construction. About ten people who will be involved in clearing the two dam sites as well as constructing the dams, while a further 40 people will indirectly benefit from the project through their involvement in the associated agricultural operation, in the form of site clearing, soil preparation, irrigation installation, and planting.

Negative impacts are anticipated to be limited to noise and visual impacts. No site camp will be established and no workers will stay onsite overnight; the project will therefore not cause any social disruptions. Noise and visual impacts are expected to be of low significance, as the site is on a farm, far from neighbours or sensitive receptors, with limited public visibility.

11.3.2 Operational phase

The project will not in itself create direct job opportunities during the operational phase, but the dams will be critical to sustaining the planned avocado and macadamia nut cultivation. The ±50 long term jobs which are to be created in the farming operation, will therefore indirectly result from the proposed dams. Workers are also likely to spend most of their disposable income locally, with positive impacts on the local economy.

The farming operation will also contribute to the local economy by making use of local suppliers of support services or materials such as macadamia nut processing, cartons for packaging, transportation of fruit to markets, etc. The economy in the Tzaneen area relies heavily on the agricultural sector and these agricultural support services make up a significant slice of the local economy.

The cultivation is also expected to contribute to food security, as well as earning foreign currency for South Africa through exports and thereby also positively contributing to the country's trade balance.

The success of farming operation as a whole, and the resultant jobs and stimulation of the local economy, are entirely dependent on the water uses being applied for. The orchards would not be viable without the irrigation-security to be provided by the proposed dams.

(ii) Socio-economic impacts if water use is not authorised

Should the water use not be authorised, the agricultural developments on the property would not be viable. The job creation and contribution to the local economy expected to be generated by cultivation onsite, would therefore not come to pass if the dams could not be constructed. There would also be no contribution to food security, and with no exports there would be no earning of foreign currency nor contribution to South Africa's trade balance.

However, if the water use is not authorised the potential safety risks around the dams will also not come to pass, and the potential impacts on downstream water users (such as more constant streamflow but reduced water availability due to the dams enabling the applicant to take up his existing abstraction rights) would also not come to pass.

11.6. Catchment management strategy – *NWA Section 27(1)(e)*

The site falls within the Luvuvhu and Letaba Water Management Area (WMA), which now forms part of the Olifants CMA which was established in May 2014. No Catchment Management Strategy (CMS) has not been published for this CMA yet, and the Luvuvhu Letaba WMA Internal Strategic Perspectives (ISP, 2004) is therefore still applicable.

11.7. Likely effect of water use on the resource and on other water users – NWA Section 27(1)(f)

The water use – dams – will enable the applicant to utilise his abstraction rights which are already in place in the form of confirmed Existing Lawful Use (ELU), and thereby reduce the volume of water available in the watercourse downstream of the site, with potentially negative impacts on downstream water users. However, abstraction will be limited to the authorised volume.

The dams will also affect the hydrology of the river downstream of the dam walls, by reducing flood peaks and leading to a more constant flow of water released from the dams. Water releases will likely mimic the natural cycles, but with less pronounced highs and lows. This may, in turn, affect the downstream aquatic and riparian ecology, which is adapted to non-perennial flow. While species composition might shift away from species tolerant of low to absent flows, to those requiring more constant flows, this is not expected to occur on a significant scale, due to the fact that releases from the dams will still be higher during the wet season and lower during the dry season, i.e. streamflow downstream of the dams will not be transformed to a constant year-round flow.

The dams may pose a safety risk to downstream infrastructure and structures in the event of the dams breaking. However, specialised dam engineers have designed the structures and will oversee construction work to ensure that the dams are built according to specifications. The necessary dam safety authorisation will also be applied for to DWS by the engineers.

The agricultural activities which will be made possible by the dams, may hold the risk of contamination of the watercourse as a result of runoff of agricultural chemicals such as fertilizers and pesticides, if appropriate mitigation measures are not followed.

11.8. Class and resource quality objectives of the water resource – NWA Section 27(1)(g)

The 2004 ISP for the Luvuvhu and Letaba WMA indicates in its water quality management situation assessment that water quality in the Groot Letaba sub-area is good quality. The sub-area is mainly affected by substantial infestation of invasive alien vegetation, afforestation and cultivation practices. Afforestation in the upper reaches of the Groot Letaba catchment have led to large streamflow reductions, this is further exacerbated by the infestation of large areas of land by alien invasive vegetation. Cultivation practices as well as overgrazing impact surface run-off, sediment loads and infiltration but these impacts have not been reliably quantified.

Local Water Requirements in the Groot Letaba River catchment indicate that the largest water use in the catchment is irrigation. Run-off from agricultural areas includes fertilizers (phosphate and nitrate) and pesticides. Although nitrate levels remain safely within guideline levels, phosphates often exceed the Target Water Quality Range. The most significant effect of elevated phosphorus is its stimulation of the growth of aquatic plants. Phosphate levels in the catchments generally remain within the mesotrophic range, where nuisance growth of aquatic plants and blooms of blue-green algae can occur, though the algal blooms are seldom toxic.

Based on an assessment of the water quality from existing Department of Water Affairs and Forestry gauge data and reports of studies conducted in the catchments, it was found that the water in the

Letaba and Shingwedzi catchments is of good quality and not adversely affected by the activities in the catchment. Although water quality parameters generally do not exceed the South African Water Quality Guidelines, there is evidence of deterioration of quality over time.

The proposed dams are **not** anticipated to affect water quality, though the associated agricultural activities may lead to runoff of fertilizers or chemicals into the watercourse if appropriate mitigation measures are not implemented.

11.9. Investments by water user – *NWA Section 27(1)(h)*

The applicant will directly invest approximately R12 million in the construction of the proposed dams, and a further ±R38 million in the associated agricultural activities which will depend on the dams for irrigation. The total project value is an estimated R50 million.

A large number of commercial farmers cultivate irrigated crops – mostly orchards – are visible on aerial photographs for some distance downstream of the site. These farming operations would have invested in their own infrastructure, which is dependent on the availability of water.

A number of dams exists downstream of the proposed project site in two unnamed tributaries, one of the Letsitele Rand the other of the Morudi River. Any anthropogenic disturbances to the drainage lines or further water abstraction may impact the availability of water to downstream users. However, water use authorisation for water abstraction is already in place in the form of the confirmed ELU.

11.10. Strategic importance of the water use – *NWA Section 27(1)(i)*

The water use is not considered to be of national strategic importance.

11.11. Quality of water in the water resource which may be required for the reserve and for international obligations – *NWA Section 27(1)(j)*

The proposed site falls within the B81D catchment and was included in the Letaba Catchment Reserve Determination Study (2006). The water quality in the Letaba reserve was established to be Fair-Good, however, parameters such as flow and the status of riparian vegetation are more instrumental in determining the health of a river. The major water quality issues are related to nutrient status, fluctuating temperature and oxygen levels due to flow regulation.

The proposed dams are **not** anticipated to affect water quality, though the associated agricultural activities may lead to runoff of fertilizers or chemicals if appropriate mitigation measures are not implemented.

11.12. Probable duration – *NWA Section 27(1)(k)*

The dams are planned as long-term to permanent installations, in order to supply water for irrigation purposes over the long term. Long-term use is needed to justify both the investment and impacts associated with the project.

12. RISK ASSESSMENT

This is not a waste discharge related water use and therefore does not require a risk assessment. However, environmental risks and impacts have been assessed – please refer to the matrix in Section 9 above. Individual potential impacts are discussed in more detail in Sections 7 and 8, under the relevant headings for particular environmental parameters.

13. MITIGATION AND MANAGEMENT MEASURES

Please refer to the Environmental Management Programme (EMPR) under Appendix K of this report for impact mitigation and management measures to be adhered to during the construction, operational and potential decommissioning phases.

14. MONITORING AND COMPLIANCE

An independent Environmental Control Officer (ECO) will be appointed to monitor environmental compliance during the **construction phase**. The ECO's duties will include the following:

- Fortnightly site inspections to determine whether the conditions of the WUL and Environmental Authorisation, as well as the impact mitigation and management measures contained in the EMPR, are being adhered to;
- As construction is anticipated to take less than 6 months, it is recommended that only one monitoring report be submitted to LDEDET and DWS, viz. at the end of the construction phase, detailing the level of compliance during the construction phase;
- Site inspections in case of environmental incidents in order to assess the extent and significance of such incidents;
- Reporting to DWS in case of any significant environmental incidents;
- Formulation of mitigation and management measures in case of unforeseen environmental impacts being experienced onsite.

15. CONCLUSION

The proposed project is not anticipated to impact negatively on other water users downstream, as water abstraction will be limited to the volume already authorised as ELU, and water will be released continually to meet the reserve. As the dams are on non-perennial streams with small catchment areas the impacts on the natural environment and water resources are anticipated to be of low significance, provided that relevant management and mitigation measures are adhered to. Socio-economic impacts are anticipated to be positive and to be of medium significance, as the proposed dams will enable commercial agriculture on the site, with associated job creation and stimulation of the local economy.

It is recommended that the Water Use Licence be **granted** for the two proposed dams in terms of Sections 21(b), (c) and (i) of the National Water Act, provided that water abstraction is limited to the existing allocation, and the management and mitigation measures contained in the attached EMPR are adhered to during all phases of the project.

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