4. APPLICANT DETAILS AND LAND OWNERSHIP

The details of the applicant in respect of which the Lalini B&Q EMPL is submitted is detailed in **Table 1**. The proposed project is located on state-owned land which is administered by Traditional Authorities. The land is therefore currently subject to communal land tenure arrangements. Under this system the State owns the land, but it is managed and allocated to community members by the Traditional Leaders. The DWS (i.e. the applicant), via the Department of Public Works, will formally acquire the land that will be directly affected by the project (e.g. footprint of the dam walls, dam basin and pipeline servitudes). Relevant Traditional Authorities have been consulted during the feasibility stage of the project and throughout the EIA process for the Mzimvubu Water Project. In view of the above, landowner notification was not conducted. **Table 2** identifies the Traditional Authorities notified during the public participation process.

Table 1: Applicant Details

ITEM	Applicant Contact Details
Name	**Department of Water and Sanitation Affairs (DWS)**
Tel No.	**012-326 6838**
Fax No.	**012-336 7399**
Postal Address	**Private Bag X313, Pretoria 0001**

Table 2: Local Authorities

Traditional Authorities	Tel:	Email:
Chief Tyali	072 013 5104	gcobanit0@gmail.com
Chief Mabandla	079 397 7131	
Chief Veco	083 720 1973	
Siyanda Madolo	078 950 3595	
Councilor Gaqu	082 551 0477	
Councilor Dawedi	083 430 2159	metrodawedi@gmail.com

5. DESCRIPTION OF THE ENVIRONMENT

5.1 GEOLOGY AND SOILS

The study area is underlain by sedimentary rocks of the Tarkastad Subgroup of the Beaufort of the Karoo Supergroup and post Karoo dolerite intrusive. The Karoo Supergroup consists of light brownish grey, fine to medium grained sandstones and subordinate thinner bluish to reddish grey mudrocks. There are also traces of mudflake congloromates. These sediments were deposited by north flowing braided river systems **(Figure 2).**

There is a low level of tectonic deformations in this region. Dolerite Sills and Dykes are found with thermally metamorphosed adjacent sediments. The dykes are only a few meters wide but stretch for long distances. Dolerite is a dark basic intrusive igneous rock consisting of plagioclase, feldspar and pyroxenes and its soils generally have high potential for both rain fed and irrigated crops and forestry. Beaufort sediments are characteristically erodible.

The bedrock is the main constituent in the study area with some thick colluvial soil deposits covering it. The upper right flank, however, has been weathered exposing hard dolerite outcrops and sub outcrops.

Alluvial sand occurs in the course of the Tsitsa River and major tributary rivers and streams. Due to the steep and incised nature of the rivers, sand is mainly confined to the river channel, with few and only localised over-bank deposits (DWA, 2013b).

The area has Hutton 2200 salm and Hutton 2100 salm soil types. Orthic topsoils overlie red apedal subsoils. Topsoil texture is sandy loam becoming sandy clay loam in the subsoil. Soils thus have luvic character as clay has moved from top to subsoil over time. Textural transition from top to subsoil is gradual providing free root penetration. Soil structure is apedal tending to weak crumb (DWA, 2013a).

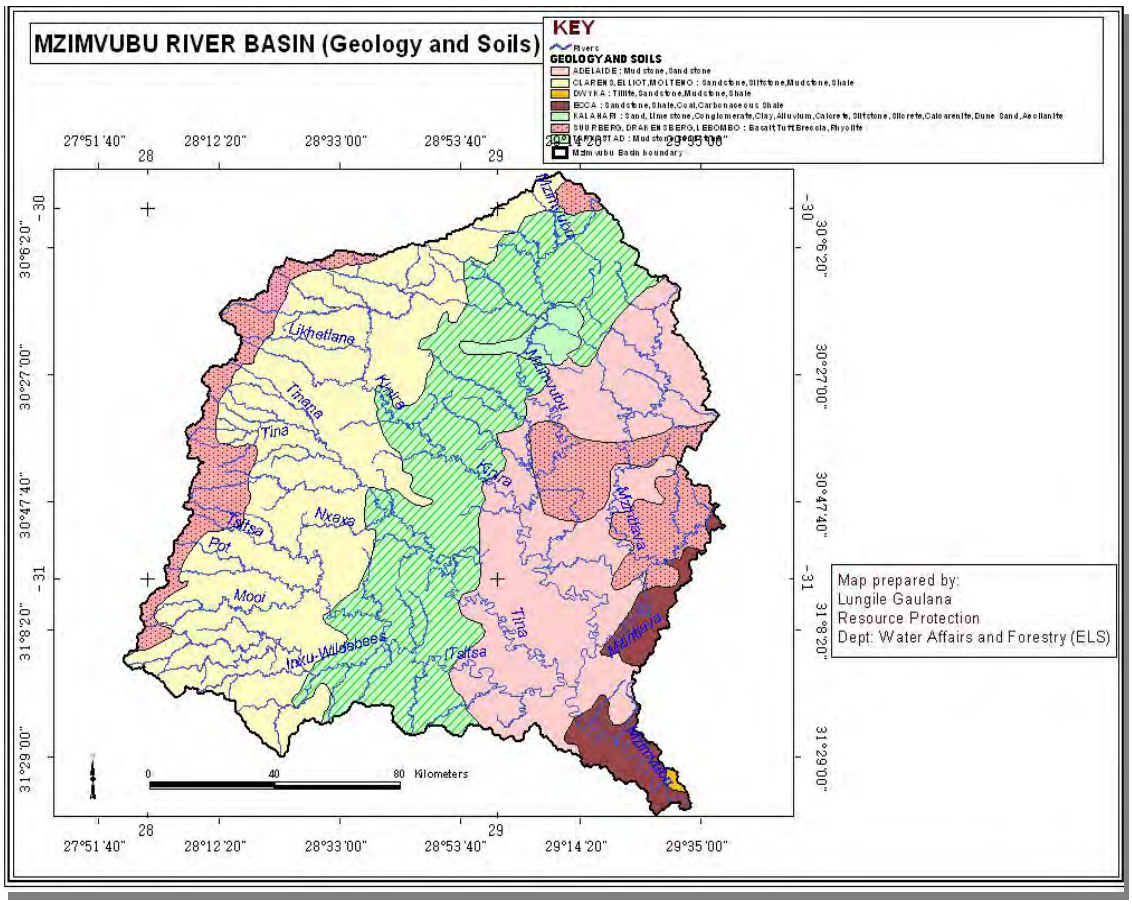


Figure 2: Geology and Soils

Soil erosion

There are extensive areas of severe gulley erosion on the inter-fluvial areas adjacent to stream channels. The erosional and piping characteristics are suggestive of the presence of dispersive soils (DWA, 2013b).

In the Mzimvubu and Tsitsa River catchments, soil erosion is an outcome of high rainfall intensities, steep slopes, erodible soils and land use practices that are conducive to erosion. The latter include overgrazing and cultivation on unsuitable thin soils with sloping terrain, which causes grass to not recover, a loss of root structure and sheet erosion.

Structures placed in the way of water flow paths have caused the interception of flood paths and springs, cutting off recharge to wetlands and the formation of artificial flood barriers, thereby also causing erosion, as well as sedimentation, and damage to the structures themselves.

Erosion and land degradation affect ecosystem health and negatively impact on the majority of downstream rivers, which are characterised by high turbidity and increased siltation. The high sediment loads in rivers will increase water treatment costs and decreases the lifespan of any dams or hydropower schemes.

Good care and management of the way a catchment is used will reduce soil loss due to erosion, improve water quality and quantity in the river, and also increase the efficiency and sustainability of land use in the catchment, which will have environmental and economic benefits. Water treatment costs will be reduced and the lifespan of dams and hydropower infrastructure increased.

A catchment rehabilitation and management programme, aimed at restoring eroded land and thereby reducing the levels of sedimentation that are expected to impact on the yield of the dams, has been initiated in the Mzimvubu River catchment. A budget of R 450 million over the next 10 years has been allocated to the programme. The work has begun in the Tsitsa River catchment in order to synchronise with the proposed new dams currently under investigation. The programme is being implemented by DEA. It will include alien vegetation eradication, the phased restoration of eroded areas and future erosion preventative measures such as sediment trapping and reuse, planting of erosion reducing vegetation, improving land-use practices by rotational usage regime including rotational fencing of grazing areas for protection purposes.

The benefits of the programme include the restoration of wetlands and productive land, reduction of future erosion and land loss, and the reduction of sediment released into the river resulting in improved water quality, reduced water treatment costs and longer operational lifespan of proposed dams and hydropower plants. Improved runoff and river flow regulation via wetlands will improve base flow and reduce peak flood events. The programme will create temporary and permanent jobs.

While this project will impact positively on the Mzimvubu Water Project, its activities are not a part of the EIA conducted for the Mzimvubu Water Project EIA.

5.2 TERRESTRIAL ECOLOGY

The study area falls within the Sub-escarpment Grassland and Sub-escarpment Savanna Bioregions (Mucina and Rutherford, 2006**) (Figure 3)**

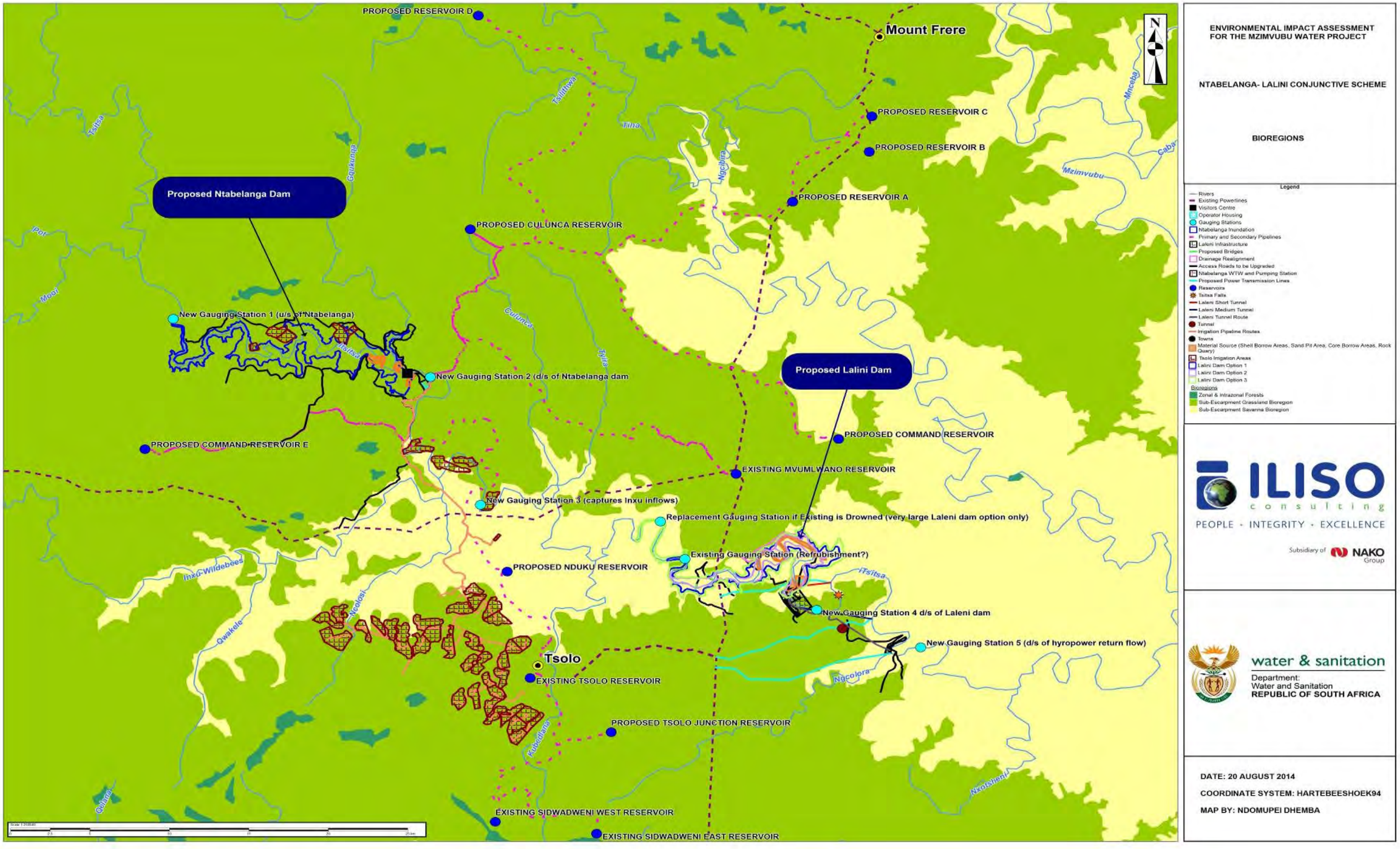


Figure 3: Bioregions

Specialist Flora and Fauna Impact Assessment was carried out as part of the Environmental Impact Assessment (EIA) for the MWP and informs the sub-sections that follow. This section describes the fauna and flora habitat relative to the Lalini Dam basin and associated infrastructure.

5.2.1 Flora Habitat

The habitats at the proposed Lalini Dam basin have been exposed to high levels of anthropogenic activities. These habitats vary from being anthropogenically transformed open grassland areas to largely natural rocky ridge habitats and secluded riparian areas. Four habitat units have been identified within the study area, namely the Mountain / Rocky Outcrops habitat unit, Grassland / *Acacia* Thornveld habitat unit, Riparian / Wetland habitat unit and the Transformed (Grassland) habitat unit. These habitat units are discussed below **(Figure 4).**

Mountain/ Rocky Outcrop Habitat

The Mountain / Rocky Outcrop habitat unit is limited to small sections within the Lalini Dam study area. The eastern section of the dam where the largest section of this habitat unit is located comprises of a *Euphorbia* forest and other indigenous tree species.

The Euphorbia trees which grow in a relatively dense forest, provides a unique ecological system for avifaunal and small mammal species. The Euphorbia forest comprises areas of natural vegetation, which have remained largely undisturbed by historic agricultural activities, overgrazing and vegetation clearance from rural communities due to the relative inaccessibility of these areas.

Species located in the western section of the Lalini Dam were the same as the Euphorbia forest section, although not as diverse as the eastern section close to the proposed dam wall. More bush encroached areas and alien invader species were located along the eastern section.

Although the construction of the dam will most likely affect the immediate floral biodiversity and possibly the surrounding area by decreasing the floral species, it is important to note that the most significant impact on this vegetation type will be as a result of the inundation of the valley and a significant amount of this vegetation will be drowned once the dam reaches the FSL.

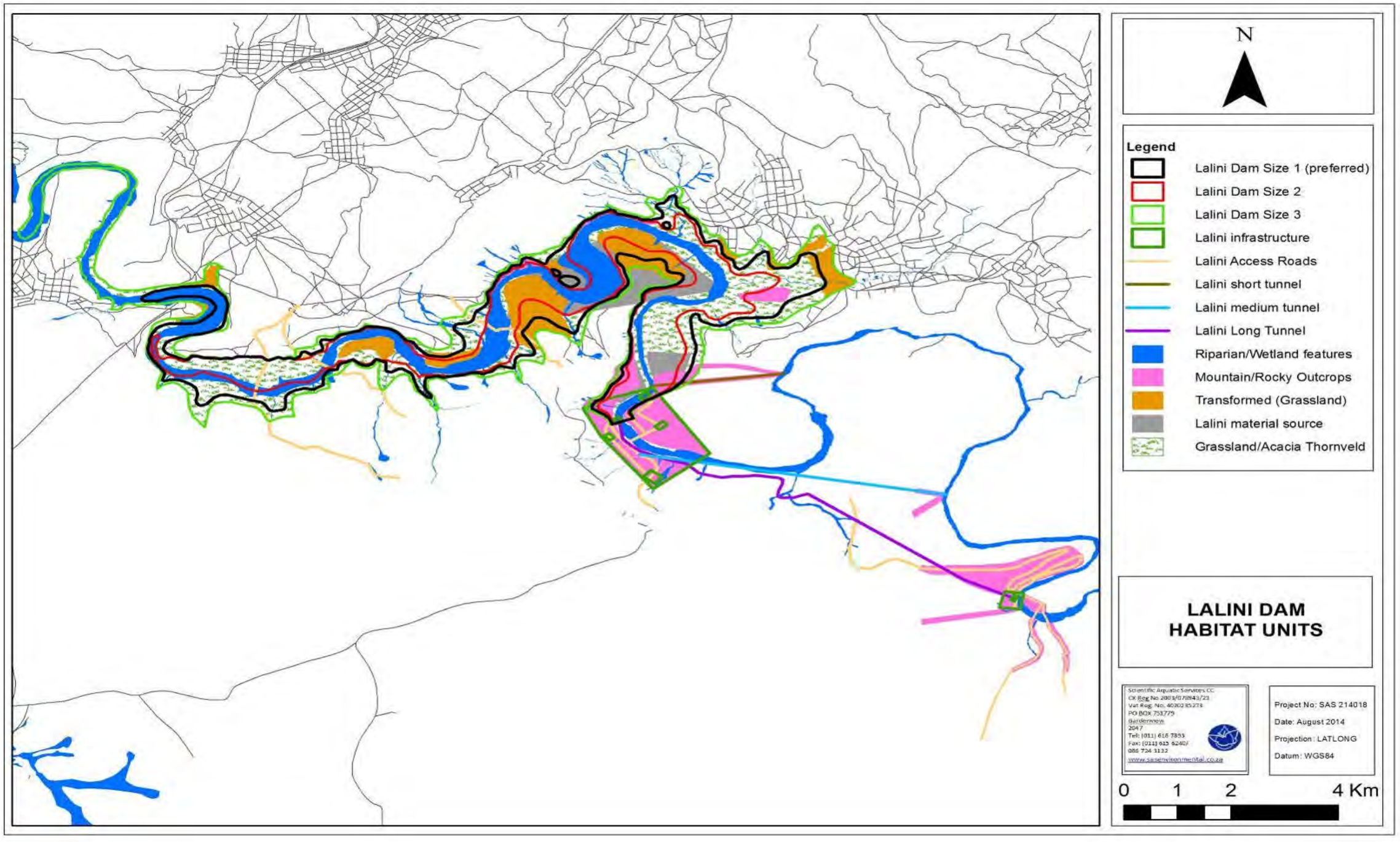


Figure 4: Habitat unit identified within the Lalini Dam basin

The section located within the Mountain / Rocky Outcrop where material will be mined for the construction of Lalini Dam and associated Infrastructure will be taken into account before any mining activities commence, since possible protected tree species or other floral conservational species of concern could occur within this area. The aspect of search, rescue and relocation of indigenous flora, species of concern and/or red data species will be covered in the MWP EMPR.

Grassland / Acacia Thornveld Habitat

This habitat unit is found bordering the Mountain / Rocky Outcrop habitat, as well as being found in the central sections of the proposed Lalini dam. *Acacia* species predominate this habitat unit and are regularly harvested by the local community members for firewood. This habitat unit proved to have a medium diversity of avifauna, most notably in the areas further away from the rural settlements as well as the sections that closely border the Mountain / Rocky Outcrop habitat units. There was very little sign of other faunal and flora species occurring within this habitat unit, as a result of overgrazing, trampling by livestock and vegetation clearance causing severe soil erosion.

The Grassland / *Acacia* Thornveld habitat unit is considered to have a medium to low ecological sensitivity and conservation value due to the change in floral species composition and vegetation structure as a result of the above mentioned impacts. This habitat unit is furthermore well represented within the region, and loss thereof as a result of the dam construction will not be significantly affect floral conservation in the region.

Transformed Grassland Habitat

This habitat unit represents the remnants of old agricultural lands that spread out along the river course and stretched far inland. Very few trees if any in areas exist in this unit, and it is predominated by hardy pioneer grasses. A few grassland bird species were observed in this habitat zone, but it is mostly devoid of faunal species. This area is used for grazing of the local herds of goats and cattle, and small scale crop production.

Riparian Habitat

This habitat unit is located along the river edge, and is characterized by its location as well as the dominant woody component. This habitat unit provides refuge and breeding sites for many avifaunal species, as well as reptile species associated with

riparian areas and semi-aquatic mammals that inhabit the river system. In many places the riparian habitat was disturbed, but in a few key locations where either distance from human habitation or lack of accessibility exists, intact riparian habitat can be found. This habitat unit will be completely inundated with the rising waters of the proposed dams, and as such important faunal habitat for a diverse range of species will be permanently lost.

5.2.2 Fauna

Mammals

The mammal species observed within and surrounding the proposed Lalini Dam basin are considered to be mostly common species, found throughout South Africa, that are adaptable to changing and transformed habitats, as well as being known to occur around human settlements. None of the observed species are considered to be threatened on a national level or provincial level

Avifauna

Avifauna represents the largest faunal community observed within the study area. The majority of avifauna observed was within the mountain bushveld, rocky outcrop and riparian habitat zones. The mountain bushveld habitat unit located near the dam wall of the Lalini dam is a unique habitat with a varying number of woody species, providing a large diversity of avifaunal species breeding habitat.

Although none were observed during the time of assessment, National Freshwater Ecosystem Priority Area (NFEPA) has indicated that the study area is a recognized breeding and foraging area for protected crane species, namely *Anthropoides paradisea* (Blue crane) and *Grus carunculatus* (Wattled crane). Both these species are listed as Vulnerable by the Union for Conservation of Nature (IUCN), and are listed protected species by National Environmental Management Biodiveristy Act (Act 10 of 2004) (NEMBA). *A. Paradisea* (secretary bird) is of particular concern as it is indigenous to South Africa, as well as being South Africa's national bird.

Reptiles

Reptiles are notoriously hard to detect in the field due to the shy nature, and as such an intensive search was undertaken within suitable reptile habitat, specifically in the mountain bushveld and rocky outcrop habitat units. Due to the habitat availability and

study areas location, a high diversity of reptiles was not expected to occur. The reptiles that were observed are commonly occurring species in the region.

Amphibians

A very low diversity of amphibians was observed at Ntabelanga Dam and surrounding areas. The fairly isolated nature of the study areas from surrounding amphibian populations in other active rivers, as well as the Titsa waterfall presenting an unsurpassable obstacle may be contributing factors to the low species diversity in the rivers. The mountains surrounding the river system and the waterfall would have limited amphibian colonisation of the river systems, resulting in only a few of the hardier and more far ranging common species being present in the river systems. The inundation of the surrounding land as the dams fill up will not have a significant effect on amphibian species within the two study areas, and will in all likelihood provide a greater expanse of habitat for the increase in amphibian numbers.

Invertebrates

A wide variety of invertebrates was observed at Ntabelanga Dam locations, and to a lesser extent along the proposed pipelines and power line routes as these predominantly followed existing roads. No NEMBA or Eastern Cape SoER (2004) listed invertebrates were observed during the site visit. As expected, the mountain bushveld, rocky outcrops and riparian zones provided the highest diversity of invertebrate species, with the transformed grassland areas providing habitat for common grasshoppers and locusts that are better suited to those habitats.

Spiders and scorpions

Four species of spiders were observed during the site visit; however it is expected that more species do inhabit the study areas. Due to their reclusive nature when faced by a threat as well as their ability to camouflage themselves well, they are very hard to locate. None of the spider species observed are considered to be threatened or of conservation value, nor are any endangered species thought to persist within the study areas. One scorpion was located in the mountain bushbveld habitat near the dam wall of the Lalini dam. The scorpion belongs to the Genus *Hadogenes* (Rock scorpion), of which all species in this genus are listed under NEMBA (Act10 of 2004). *Hadogenes* sp fall under the category of nationally protected species, and are an indigenous species of high conservation value or national importance that require national protection. The mountain bushveld habitat located by the Lalini dam wall will

invariably provide habitat for many of these scorpions, as well as other scorpion species.

5.2.3 Threatened Ecosystems

According to the National List of Threatened Terrestrial Ecosystems (2011), sections of the proposed infrastructure, excluding areas demarcated for the proposed mining activity, fall into a vulnerable ecosystem in terms of the original and remaining extent of the associated vegetation types **(Figure 5).**

5.2.4 Conservation Importance

The environment in much of the catchment, particularly in the riverine areas, is considered to merit particular protection. The Eastern Cape Biodiversity Conservation Plan (ECBCP) (2007) is a broad scale-biodiversity plan based on identifying Critical Biodiversity Areas (CBAs) and associated land use guidelines. It recommends limits to the total amount of land transformation that should be allowed if biodiversity is to be conserved. The approach rests on the concept of Biodiversity Land Management Classes (BLMCs). Each BLMC sets out the desired ecological state that an area should be kept in to ensure biodiversity persistence. Only land use types that are compatible with maintaining this desired state should be allowed.

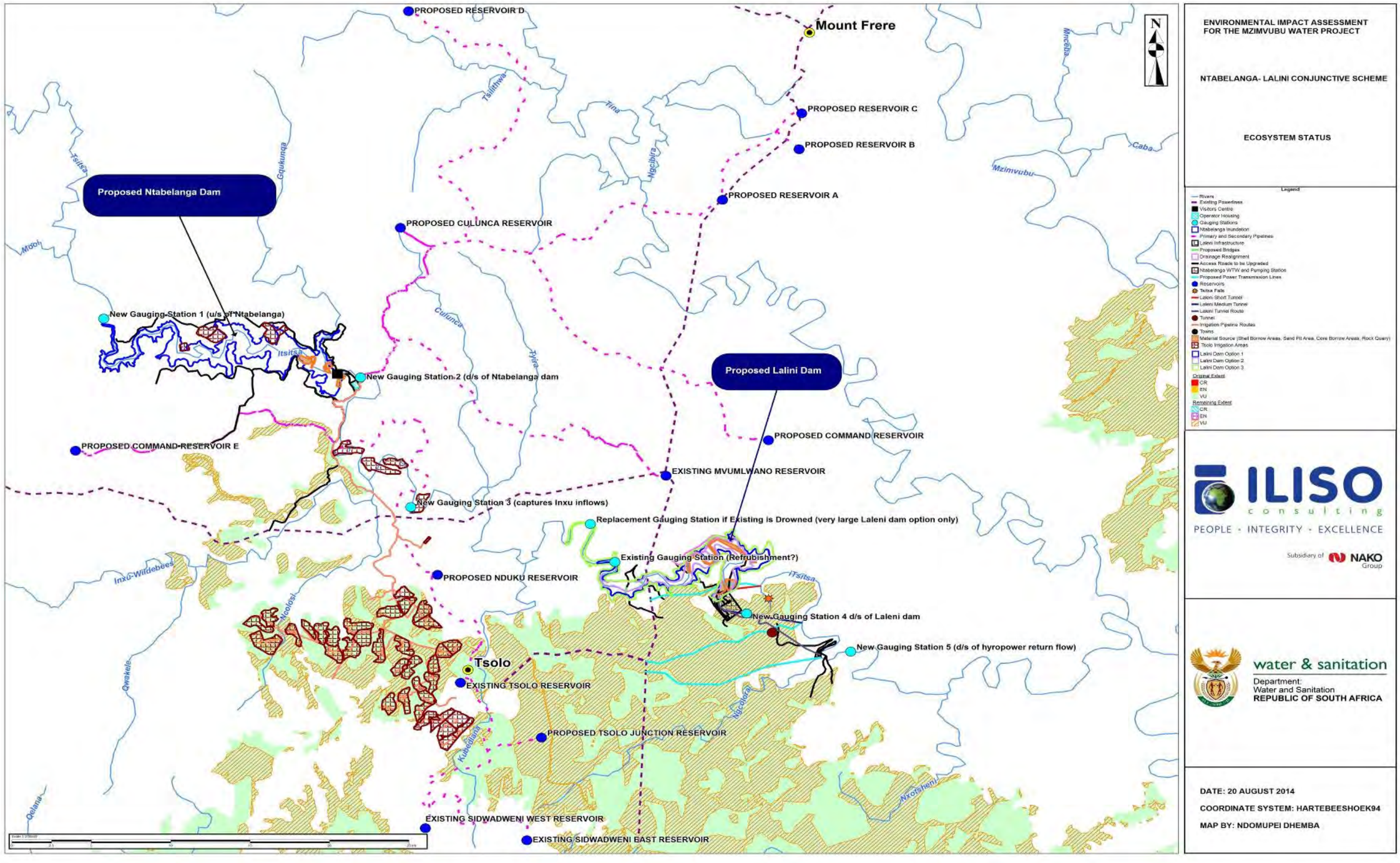


Figure 5: Ecosystem Status

5.3 DRAINAGE

The study area falls within the Mzimvubu to Kieskamma Water Management Area (WMA). Each WMA is divided into several sub-Water Management Areas (subWMA). The subWMA indicated for the study area is Mzimvubu. The Mzimvubu River is one of South Africa's largest rivers (accounting for 5.5% of total river flow in the country). It has four major tributaries, namely the Mzintlava, Kinira, Tina and Tsitsa Rivers. Rivers in this catchment possess water surpluses.

The proposed Ntabelanga and Lalini Dams are both situated on the Tsitsa River, a perennial river classified as a Category C (Moderately modified). The pipelines in the northern part of the project area cross the Tina River which is classified as being in Category C condition (moderately modified). The Tina River is regarded as an important fish sanctuary, translocation and relocation zone and is classified as being a fish support area according to the National Freshwater Ecosystem Priority Areas (NFEPA) Database (2011).

The Mzimvubu subWMA is indicated as an upstream management area; and is important with regards to fish corridors for movement of threatened fish between habitats. Effective management of activities near and between corridors is therefore of upmost importance. The subWMA is also important for the conservation of crane species.

The wetland vegetation group in the Lalini Dams' footprint are identified as Sub-escarpment Grassland Group 6 and Sub-escarpment Savannah respectively. The wetland in the Lalini Dam footprint is classified as a channelled-valley bottom wetland in Category Z1 condition (critically modified).

According to the NFEPA Database (2011), the wetland is classified as a NFEPA system, with a rank of 2 indicating that the majority of its area is within a sub-quaternary catchment that has sightings or breeding areas for threatened *Bugeranus carunculatus (*Wattle Crane), *Balearica regulorum (*Grey Crowned Crane) and *Anthropoides paradiseus (*Blue Crane).

The Mzimvubu subWMA is not considered to be a high groundwater recharge area.

5.4 CLIMATE

Climate data is provided for the towns of Tsolo and Maclear, which are considered to be representative of the general study area. Both towns have sub-tropical climate with moderate rainfall.

Tsolo receives an average annual rainfall of about 749 mm, with most rainfall falling in summer. The lowest (15 mm) average rainfall is experienced in June and the highest (108 mm) in January. The coldest month is July with an average minimum temperature of 3.2°C and January being the hottest month with an average maximum temperature of 26.5°C.

Maclear receives an average annual rainfall of 786 mm, with the wettest month being January receiving an average monthly rainfall of 130 mm. The driest months are June and July both with 13 mm average rainfall. The hottest temperatures are experienced in summer with average maximum temperature of 20.1°C in January. July is the coldest month with temperatures as low as 0°C.

The variations in temperature and rainfall in the two towns is due to the difference in elevation: Maclear lies at an elevation of 1 280 m above mean sea level whereas Tsolo is at an elevation of 945 m.

5.5 HERITAGE IMPACT

Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representation of a particular time period; their rarity; and their sphere of influence.

Past Heritage Impact Assessments (HIAs) in the area have typically focussed on archaeological sites (and sometimes traditional burial places) to the exclusion of other heritage resources. Literature and database reviews indicate that the following heritage resource types are likely to be present in the study area:

- **Places associated with oral traditions or living heritage**

  Communal areas in Southern Africa typically include places (such as mountains, river pools and forests) that are associated with cultural tradition; oral history; performance; ritual; popular memory; traditional skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships. Such places may be known to and utilised by entire communities, or only certain individuals, such as traditional healers. They may be visited regularly or only periodically, and their heritage significance could vary from low to high along a local to a national scale.

- **Landscapes and natural features**

  The project area is largely undeveloped and rural with nucleated dispersed settlements (*amalali*) and associated infrastructure within a formalised subsistence agriculture landscape. *Amalali* are grouped as clusters of small family-sized homesteads located across the undulating interfluves between steeply incised drainage basins. The introduction of a dam within this landscape will alter the character considerably due to the size and scale of it. The Visual Impact assessment undertaken as part of the EIA for the MWP determined that the dam will considerably alter the sense of place and *Genius Loci* of the study area. However, the change in character of the landscape is not considered to be significantly negative and aesthetically unpleasing.

- **Traditional burial places**

  Numerous traditional burial places are known to occur within and adjacent to the project area. Such burials comprise one or more ancestral graves, typically located within or close to homestead precincts, rather than in formal cemeteries managed by a local authority. Graves usually comprise stone-packed mounds, with or without a headstone, although older graves may be less readily identifiable due to the deflation of the mound and scattering of the stone covering.

- **Archaeological sites**

  Due to low survey coverage very few archaeological sites have been recorded within the immediate project area. However, Late Stone Age and Rock Art sites, Early and Later Iron Age and historical sites have been recorded and investigated within the wider Mzimvubu Basin (Prins and Granger, 1993).

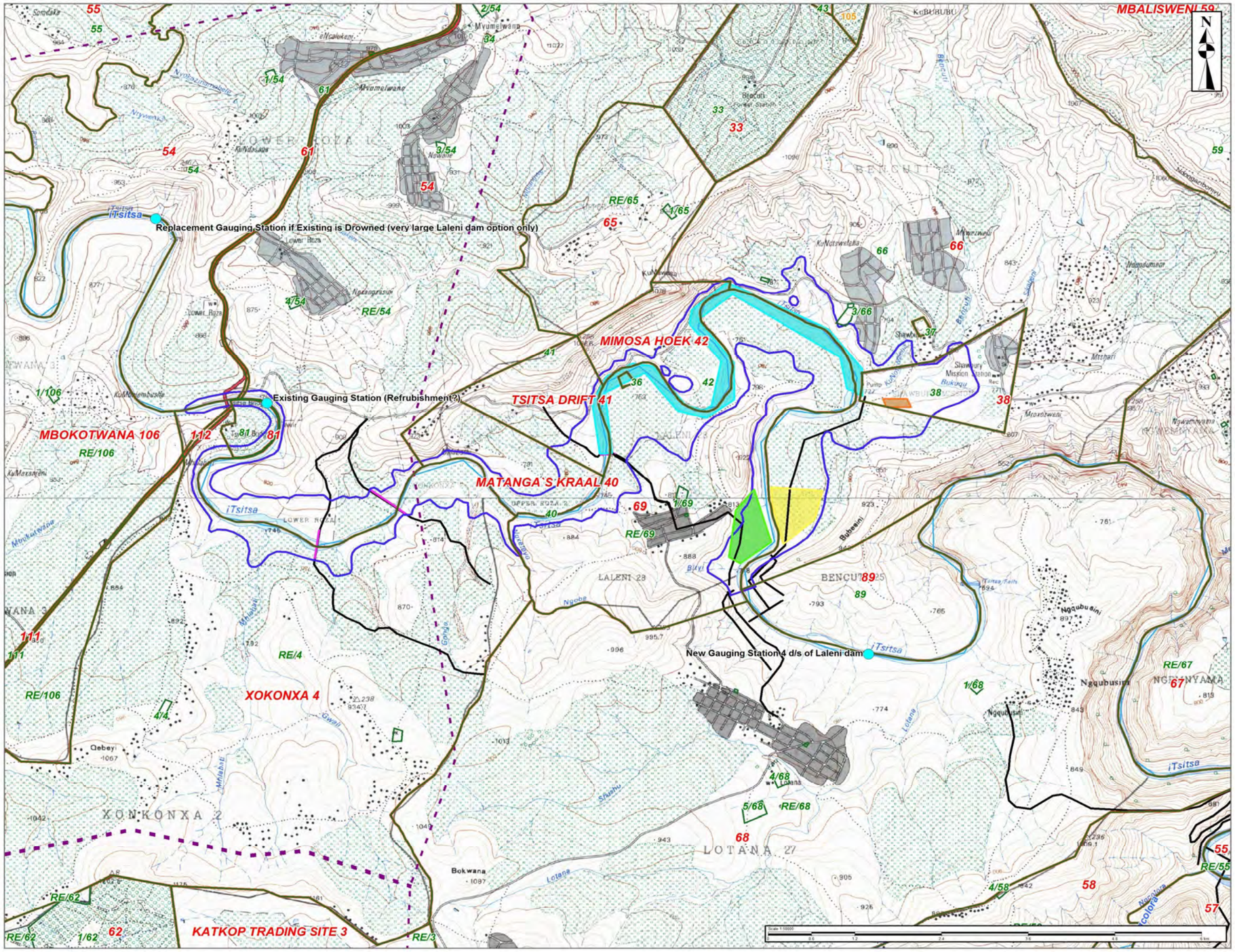
6. DESCRIPTION OF THE PROPOSED MINING OPERATION

A supplementary investigation was carried out to verify suitability of materials required. It is proposed that three borrow areas and one rock quarry will be required for the construction of Lalini Dam and associated works. Borrow areas for clay core material, fill material and sand as well as a rock quarry have been identified to source the required materials. Sand required for the production of concrete will be obtained from borrows areas in the dam basin and blended with sand from commercial sources to achieve the required grading. Stone for concrete production will be obtained from rock quarried in the dam basin and crushed to the required size in a crushing plant.

The proposed borrow areas and rock quarry are located within the expropriation line of the dam basin, upstream of the dam wall and in most cases below the Full Supply Level (FSL) **(Figure 6 and Figure 7). Table 3** details the estimated area and volumes of material required from the borrow areas and the rock quarry for Lalini Dam. **Appendix D** provides the co-ordinates for all the borrow pits and quarry areas.

Table 3: Estimated Volumes and Areas for Lalini Borrow Pits and Quarry

No.	Material to be Mined	Estimated Area (m^2)	Estimated Volume (m^3)
1	Fill Borrow Pit	370 000	740 000
2	Core Borrow Pit Site	400 000	1 000 000
3	Sand Borrow Pit Site	900 000	1 000 000
4	Rock Quarry Site	52 500	750 000



ENVIRONMENTAL MANAGEMENT PLAN FOR THE MZIMVUBU WATER PROJECT

FIGURE 6

LALINI DAM MATERIAL SOURCES

Legend

- Rivers
- Proposed Bridges
- Access Roads to be Upgraded
- Existing Powerlines
- Reservoirs
- Proposed Lalini Dam

Material Source

- Fill Borrow
- Sand Borrow Area
- Rock Quary
- Core Borrow Area

Eastern Cape Cadastral

- Erven
- Parent farms
- Farm portions

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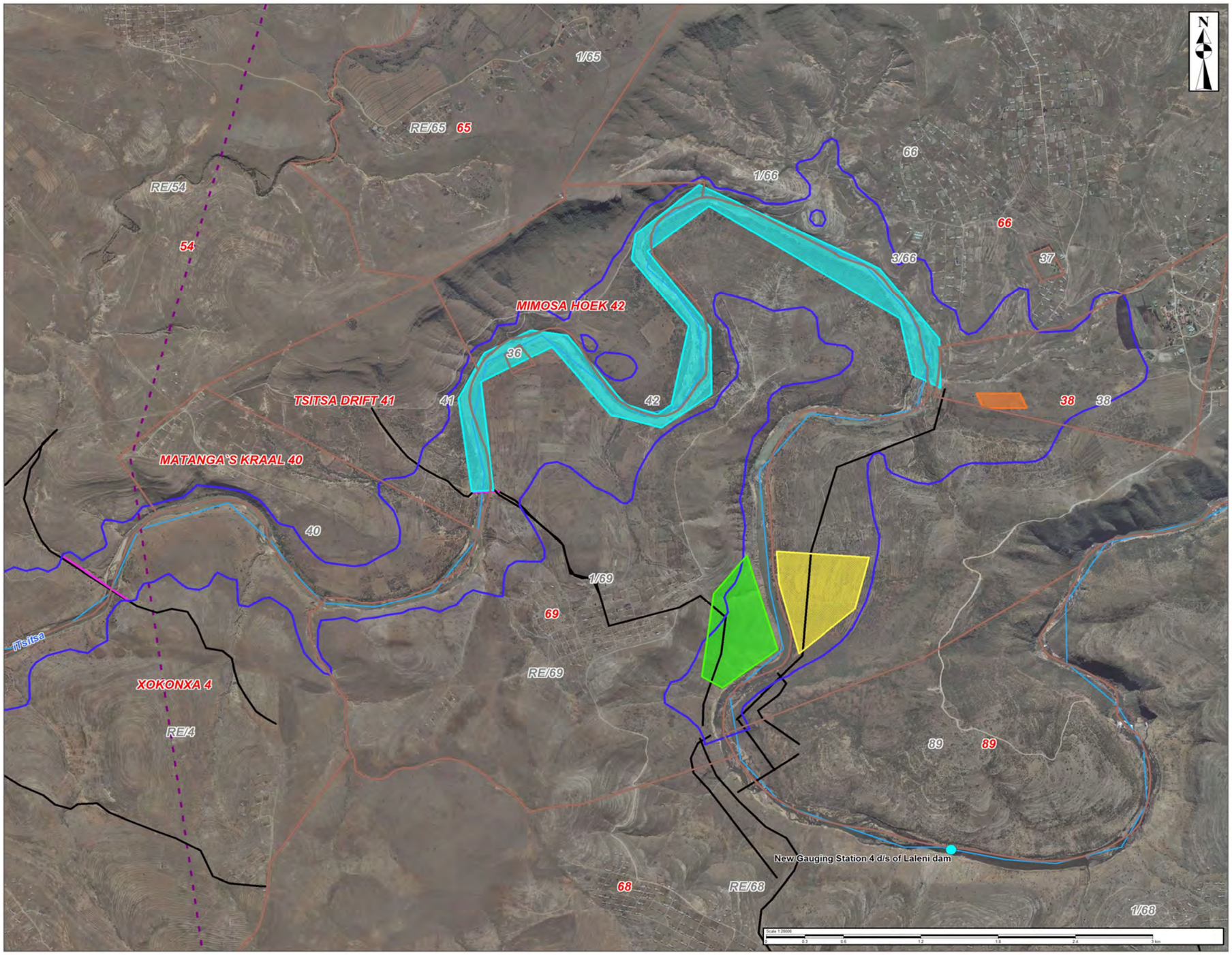
REPUBLIC OF SOUTH AFRICA

DATE: 14 NOVEMBER 2014

SYSTEM: HARTEBEESHOEK94

MAP BY: NDOMUPEI DHEMBA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37
MIMOSA HOEK 42
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TSITSA DRIFT 41
41
42
38
38
MATANGA`S KRAAL 40
40
1/69
69
RE/69
Tsitsa
XOKONXA 4
RE/4
89
89
New Gauging Station 4 d/s of Laleni dam
68
RE/68
1/68
N
ENVIRONMENTAL MANAGEMENT PLAN FOR THE MZIMVUBU WATER PROJECT
FIGURE 7
LALINI DAM MATERIAL SOURCES
Legend
Rivers
Existing Powerlines
Proposed Bridges
Access Roads to be Upgraded
Reservoirs
Proposed Lalini Dam
Material Source
Fill Borrow
Sand Borrow Area
Rock Quary
Core Borrow Area
Eastern Cape Cadastral
Erven
Parent farms
Farm portions
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DATE: 14 NOVEMBER 2014
SYSTEM: HARTEBEESHOEK94
MAP BY: NDOMUPEI DHEMBA

6.1 CORE MATERIAL BORROW PIT

General Description

The core material borrow pit is located upstream of the dam wall on the left bank of the river. As detailed in chapter 5 of this report the area exhibits transformed vegetation and there is no infrastructure or servitude areas within the vicinity of the proposed borrow area. The current access road will have to be upgraded.

Access

The access/haul roads to the borrow area will be established as part of the dam construction and associated infrastructure. This aspect and management thereof will be covered in more detail in the MWP EMPR. In general access roads will be constructed to acceptable standards and in consultation with the Engineer.

Site Preparation

The borrow area will be clearly demarcated by means of beacons at its corners and/or by fencing off the mining area to prevent unauthorized access of both humans and animals. The mining of and prospecting for material will only take place within the demarcated area. Areas will also be demarcated for storage of topsoil and overburden (stored separately). These materials will be stored in suitable areas for reuse as fill and rehabilitation of areas above the FSL.

Experienced and trained equipment operators will be used during the clearing and grubbing stage of the mining process so that soil disturbance, compaction and displacement are only on those areas ready for immediate use. Only land needed for the immediate term will be cleared and grubbed to limit environmental impact from surface water runoff, dust and to limit the cost to control runoff from the mining site. Site preparation will consist of the stripping of topsoil and overburden into stockpiles, which are to be stored separately within the demarcated areas. Topsoil and stockpile management will take place in accordance with mitigation measures detailed in chapter 8 of this EMPL. Excavations of the borrow area will be in accordance with the drawing produced by the Engineer and only to the limits approved.

During the course of borrow operations and especially when excavating near the floor and outer boundaries of the borrow area, the Contractor will plan his operations in such a way that the amount of work that will be necessary for the reinstatement of

the borrow pit side slopes to 1 V: 3 H is reduced as far as possible. Indiscriminant excavation without due regards for the desired final shape of the borrow pit will not be permitted, and shall be rectified by the Contractor. Care shall also be taken to ensure that all excavations to develop the borrow pit are below the FSL of the dam.

Bulldozers, loaders, and excavators will be used in the excavation of the borrow pit. The material excavated from the borrow pit will, if possible, be loaded directly onto haul trucks. It is proposed that the extent of the area to be mined will be approximately 400 000 m^2.

Drainage

The Contractor will ensure that during exploitation and after reinstatement the borrow pit is kept adequately drained and provision is made to divert surface runoff away from the borrow areas to ensure that pooling of water does not occur.

Storm water cut-off berms will be constructed to divert up-slope water to protect the active mining area, topsoil and overburden stockpiles from erosion. The storm water will then be channeled towards the natural drainage area. A diversion berm with dissipation beds or the erection of silt fences will be installed down slope of the borrow area to filter out any sediment washed off the site during heavy rainfall. All precaution will be taken to prevent siltation of the river.

Re-instatement of Core Material Borrow Pit Area

The borrow pit, or portions therefore, located upstream of the dam wall and below the FSL of the dam will be reinstated by trimming the side slopes to an even slope not steeper than 1 V: 3 H. The re-instated surfaces will be in line and levels that conform visually to those of the surrounding natural ground. The storm water berms and dissipation beds will be retained on closure. This borrow area lies below the FSL and will be inundated therefore no hydro-seeding is required.

6.2 FILL MATERIAL BORROW AREA

General Description

The fill material borrow pit is located upstream of the dam wall on the right bank of the river. As detailed in chapter 5 of this report the area exhibits transformed vegetation and there is no infrastructure or servitude areas within the vicinity of the proposed borrow area.

Access

The access/haul roads to the borrow area will be established as part of the dam construction and associated infrastructure. This aspect and management thereof will be covered in more detail in the MWP EMPR. In general haul roads will be constructed in accordance with acceptable Engineering standards and approved by the Engineer.

Site Preparation

The borrow area will be clearly demarcated by means of beacons at its corners and/or by fencing off the mining area to prevent unauthorized access of both humans and animals. The mining of and prospecting for material will only take place within the demarcated area. Areas will also be demarcated for storage of topsoil and overburden (stored separately). These materials will be stored in suitable areas for reuse as fill and rehabilitation of areas above the FSL

Experienced and trained equipment operators will be used during the clearing and grubbing stage of the mining process so that soil disturbance, compaction and displacement are experienced only on areas ready for immediate use. Only land needed for the immediate term will be cleared and grubbed to limit environmental impact from surface water runoff and to limit cost to control runoff from the mining site. Site preparation will consist of the stripping of topsoil and overburden into stockpiles, which are to be stored separately within the demarcated areas. Topsoil and stockpile management will take place in accordance with mitigation measures detailed in chapter 8 of this EMPL. Excavations of the borrow area will be in accordance with the drawing produced by the Engineer and only to the limits approved.

During the course of borrow operations and especially when excavating near the outer boundaries of the borrow area, the Contractor will plan his operations in such a way that the amount of work that will be necessary for the re-instatement of the borrow pit side slopes to 1 V: 3 H is reduced as far as possible. Indiscriminant excavation without due regards for the desired final shape of the borrow pit will not be permitted, and shall be rectified by the Contractor. Care shall also be taken to ensure that all excavations to develop the borrow pit are below the FSL of the dam.

Bulldozers, loaders, and excavators will be used in the excavation of the borrow pit. The material excavated from the borrow pit will, if possible, be loaded directly onto haul trucks. It is proposed that the extent of the area to be mined will be approximately 370 000 m^2.

Drainage

The Contractor will ensure that during exploitation and after reinstatement the borrow pit is kept adequately drained and provision is made to divert surface runoff away from the borrow areas to ensure that pooling of water does not occur.

Stormwater cut-off berms will be constructed to divert up-slope water to protect the active mining area, topsoil and overburden stockpiles from erosion. The storm water will then be channeled towards the natural drainage area. A diversion berm with dissipation beds or the erection of silt fences will be installed down slope of the borrow area to filter out any sediment washed off the site during heavy rainfall. All precaution will be taken to prevent siltation of the river.

Re-instatement of Fill Material Borrow Pit Area

The borrow pit, or portions therefore, located upstream of the dam and below the FSL of the dam will be reinstated by trimming the side slopes to an even slope not steeper than 1 V: 3 H. The reinstated surfaces will be in line and levels that conform visually to those of the surrounding natural ground. The storm water berms and dissipation beds will be retained on closure. Care shall be taken to ensure that all excavations for the borrow pit are below the FSL of the dam and no reinstatements is required.

For parts of the borrow pit that fall above the FSL these areas will be re-instated by first dozing back any unsuitable overburden to an even slope not steeper than 1 V : 5 H on the excavated banks and sides of the areas left undisturbed within the borrow area. The stockpiled topsoil will then be placed and spread over the area to a uniform thickness, as directed by the Engineer. If topsoil reserves are not sufficient topsoil will have to be imported. The area will be hydro-seeded using an indigenous grass mix. Monthly inspections will be undertaken during the re-instatement phase and the one year liability period by the Engineer and ECO to ensure that no erosion has taken place and to monitor success of the re-vegetation. The intention will be to achieve an acceptable grass cover. Acceptable grass cover shall mean that not less

than 75% of the area grassed or hydro-seeded shall be covered with grass and that no bare patches exceeding

0.25m^2 in an area of 1m x 1m shall occur. In the case of sodding, acceptable cover shall mean that the entire areas shall be covered with live grass at the end of any period not less than three months after sodding. The Contractor will be responsible to ensure that acceptable grass cover is achieved.

6.3 SAND BORROW AREA

General Description

The area demarcated for the sand borrow pit is located upstream of the dam wall across the left and right banks of the river. The mining operations will take place within the riverine environment. The Mzimvubu subWMA is important with regards to fish corridors for movement of threatened fish between habitats. In this regard the riverine environment is considered to merit particular protection.

This activity forms part of the water use license application to the DWS for the MWP. The best practice guideline for small scale mining developed by DWS is attached hereto **(Appendix A)** and will be adhered to as a minimum requirement together with any other conditions that DWS may impose.

Access

Access/haul roads to the borrow areas will be established as part of the dam construction and associated infrastructure. This aspect and management thereof will be covered in more detail in the MWP EMPR. In general haul roads will be constructed to acceptable standards and in consultation with the Engineer. One of the haul roads between the possible borrow pit for sand and the Lalini Dam construction site will go through the Lalini village while another access road for construction vehicles traverses Lotana. Due to increased traffic hazards, dust and noise, this would increase the level of health and safety risks. Consequently a proposed mitigation measure is to identify alternative routes for those roads.

Access to the riverbed for the purpose of conducting excavations in the riverbed, shall as far as possible, be through the use of only one access at a time. The location of the access to the river channel across the river-bank shall, be at a point of the riverbank where the least excavation and damage to vegetation will occur and shall

not be wider than is reasonably required. The position of the river access, together with all planned future access points, must be indicated on the layout plan.

Site Preparation

It must be noted that this entire area will not be excavated and sand borrow pits within the proposed 900 000 m^2 area will be verified during the construction phase of the project. Only land needed for the immediate term will be cleared and grubbed to limit impact on the riverine environment. The river sand will be mined from a seasonal drainage channel for the construction purpose. The depth of the mining operations will be less than 1.5m as sand is not expected to be deeper.

Drainage/ Water Management

Mining will be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to stormwater management, erosion and sediment control and waste management, developed by the DWS and any other conditions which that Department may impose.

To reduce sedimentation downstream of the mining activity, silt curtains will be erected at strategic positions across the river banks as determined by the Engineer. A minimum of three silt curtains along the river will be used for the duration of this mining activity to trap sediment and lessen the impact on downstream uses. These silt curtains will be cleaned regularly as determined by the Engineer in consultation with the ECO. The Contractor will take care not to wash silt curtains along the river banks where deposition of silt can be washed back into the river. The cleaning/ maintenance of silt curtains will be phased to ensure this mitigation measure is always in place.

Re-instatement of Riparian Zone

Backfilling is not an option as all material in the form of river sand will be removed. The goal of rehabilitation of the area where mining has taken place in the riverbed is to leave the area level and even, and in a natural state containing no foreign debris or other materials and to ensure the hydrological integrity of the river by not attenuating or diverting any of the natural flow. All scrap and other foreign materials will be removed from the bed of the river and disposed of as in the case of other refuse whether these accrue directly from the mining operation or are washed on to the site from upstream. It must be noted that this area falls below the FSL and will be

inundated, and the measures described above are to mitigate the impact of sand mining during the construction period.

6.4 ROCK QUARRY

General Description

The rock quarry is located upstream of the dam wall on the left bank of the river. As detailed in chapter 5 of this report the area exhibits transformed vegetation and there is no infrastructure or servitude areas within the vicinity of the proposed quarry area.

Access

Access/haul roads to the proposed quarry area will be established as part of the dam construction and associated infrastructure. This aspect and management thereof will be covered in more detail in the MWP EMPR. In general haul roads will be constructed to acceptable standards and in consultation with the Engineer.

Site Preparation

The quarry area will be clearly demarcated by means of beacons at its corners and/or by fencing off the mining area to prevent unauthorized access of both humans and animals. The mining of and prospecting for material will only take place within the demarcated area. Areas will also be demarcated for storage of topsoil and overburden (stored separately). These materials should be stored in suitable areas for reuse as fill and rehabilitation of areas above the FSL.

Experienced and trained equipment operators will be used during the clearing and grubbing stage of the mining process so that soil disturbance, compaction and displacement are only on those areas ready for immediate use. Only land needed for the immediate term will be cleared and grubbed to limit environmental impact from surface water runoff and to limit the cost to control runoff from the mining site. Site preparation will consist of the stripping of topsoil and overburden into stockpiles, which are to be stored separately within the demarcated areas.

For construction purposes the quarry will be drilled and blasted to remove overburden. Further drilling and blasting will proceed to obtain the quality of rock required for construction. Measures will be employed as per blasting contractor's legal obligations. A pre-blast survey will be conducted of all structures (if present) in a 500 m radius of the blast zone. Adequate warnings will be given to all

neighbours/residents in close proximity to the quarry. Unsuitable overburden, which cannot be reused, will be treated as spoil and will be stockpiled separately below the dead storage level of the dam.

Topsoil and stockpile management will take place in accordance with mitigation measures detailed in chapter 8 of this EMPL. Excavations of the quarry area will be in accordance with the drawing produced by the Engineer and only to the limits approved.

During the course of quarry operations and especially when excavating near the outer boundaries of the quarry area, the Contractor will plan his operations in such a way that the amount of work that will be necessary for the reinstatement of the quarry slopes at 1 V: 3 H is reduced as far as possible. This can be achieved by developing the quarry in terraces and varying the depth of the blast holes to achieve the required final side slopes. Indiscriminant excavation without due regards for the desired final shape of the quarry will not be permitted, and shall be rectified by the Contractor.

Bulldozers, loaders, and excavators will be used in the excavation of the quarry. The material will be excavated from the face and floor of the quarry and if possible loaded directly onto haul trucks. The material mined will be rock aggregate. It is proposed that the extent of the area to be mined will be approximately 750 000 m^2.

Drainage

The Contractor will ensure that during exploitation and after reinstatement the quarry area is kept adequately drained to ensure that pooling of water does not occur and provision is made to divert surface runoff.

Stormwater cut-off berms will be constructed to divert up-slope water to protect the active mining area, topsoil and overburden stockpiles from erosion. The storm water will then be channeled towards the natural drainage area. A diversion berm with dissipation beds or the erection of silt fences will be installed down slope of the quarry area to filter out any sediment washed off the site during heavy rainfall.

Re-instatement of the Quarry Area

The quarry area, or portions thereof, located upstream of the dam wall and below the FSL of the dam, will be re-instated by blasting any remaining vertical side slopes to

not steeper than 1 V: 3 H. The reinstated slopes will be in line and levels that conform visually to those of the surrounding natural ground. The storm water berms and dissipation beds will be retained on closure.

For parts of the quarry that fall above the FSL these areas will be re-instated by first placing fill material to an even slope not steeper than 1 V: 5 H. The stockpiled topsoil will then be placed and spread over the area to a uniform thickness, as directed by the Engineer. If topsoil reserves are not sufficient topsoil will have to be imported.

The area will be hydro-seeded using an indigenous grass mix. Monthly inspections will be undertaken during the re-instatement phase and one year maintenance period by the Engineer and ECO to ensure that no erosion has taken place and to monitor success of the re-vegetation. The intention will be to achieve an acceptable grass cover. Acceptable grass cover shall mean that not less than 75% of the area grassed or hydro-seeded shall be covered with grass and that no bare patches exceeding 0.25m^2 in an area of 1m x 1m shall occur. In the case of sodding, acceptable cover shall mean that the entire areas shall be covered with live grass at the end of any period not less than three months after sodding. The Contractor will be responsible to ensure that acceptable grass cover is achieved.

7. REGULATION 52 (2) (b): ASSESSMENT AND SUMMARY RATING OF THE POTENTIAL IMPACTS OF THE PROPOSED OPERATION ON THE ENVIRONMENT

7.1 CRITERIA USED FOR THE SIGNIFICANCE RATING

The criteria used for the significance rating is highlighted below and applied to activities applicable to the mining activity in **Table 4**

- All surface disturbances are rated high
- Dust is rated low if only minimal dust is expected to accumulate over the permit period, medium if it is expected to require dust suppression such as watering, and high if there is a risk that it will migrate beyond the permit area.
- Noise is rated low if no machinery is to be used, medium if machinery is to be used, and high if there is a potential for complaints from public and neighbours.
- All drainage is rated high
- All blasting is rated high
- All dust and noise from loading, hauling and transport is rated high
- Drainage from ablution facilities are rated high.

Table 4: Significance Rating

ACTIVITY Mark with X which activities are applicable			POTENTIAL IMPACT	SIGNIFICANCE RATING		
				LOW	MEDIUM	HIGH
Excavations		**X**	Surface disturbance			X
			Dust	X		
			Noise	X		
			Drainage			X
Blasting		**X**	Fly Rock			X
Stockpiles		**X**	Surface disturbance			X
			Dust	X		
			Drainage			X
Loading, hauling and transport		**X**	Noise	X		
			Dust	X		
Offices, ablution, stores, etc.		**X**	Surface disturbance			X
			Drainage			X
OTHER (Specify)	Riparian Zone		Surface Disturbance			X
			Siltation of the river			X

8. REGULATION 52 (2) (c): PROPOSED MITIGATION MEASURES TO MINIMISE ADVERSE IMPACTS

Prior to commencement of the mining activity the Contractor will submit to the Engineer a Method Statement for the proposed borrow pits and quarry area. The Method Statement will contain mitigation measures proposed in **Table 5** and at least the following:

- Detailed Layout plan with position of the beacons/fences to be erected;
- Positions and approximate dimensions of topsoil stockpiles, unsuitable/spoil stockpiles, overburden, material stockpiles;
- Position and approximate dimensions of all working areas required, including crusher and haul road layouts and positions;
- Detail and positions of storm water controls, site drainage measures etc.;
- Method adopted to erect silt curtains and cleaning and maintenance thereof;
- Final forms slopes and approximate dimensions of excavation; and
- Details of reinstatement and hydro-seeding where applicable;

Table 5: Mitigation Measures

ACTIVITY **Mark with X which measures are applicable**		**MITIGATION MEASURE**	**DESCRIPTION OF THE MEASURE TO BE PUT IN PLACE**
Excavations	**X**	Site preparation	• The borrow area will be clearly demarcated by means of beacons at its corners and/or by fencing off the mining area to prevent unauthorized access of both humans and animals. • The mining of and prospecting for material will only take place within the demarcated area. • Areas will also be demarcated for storage of topsoil and overburden (stored separately). These materials will be stored in suitable areas for reuse as fill. and rehabilitation of areas above the FSL • Experienced and trained equipment operators will be used during the clearing and grubbing stage of the mining process. • Only land needed for the immediate term will be cleared and grubbed to limit environmental impact from surface water runoff, dust and to limit the cost to control runoff from the mining site

	X	Storm Water Controls	• Stormwater cut-off berms will be constructed to divert up-slope water to protect the active mining area, topsoil and overburden stockpiles from erosion. • The storm water will then be channeled towards the natural drainage area. A diversion berm with dissipation beds or the erection of silt fences will be installed down slope of the quarry area to filter out any sediment washed off the site during heavy rainfall. • Operations will be planned in such a way that if the borrow pit lies above the water table it will be self-draining. Where this is not possible, the borrow pit shall be dewatered using suitable filtration measures. • In gaining materials from borrow areas below the water table, disturbed water within the borrow pit shall not be contaminated.
	X	Reinstatement	• The borrow pit and quarry area will be reinstated by trimming the excavated slopes to the required slope. • The stockpiled topsoil will then be placed and spread over the whole area to a uniform thickness on areas above the FSL of the dam. • The reinstated surfaces shall be in line and levels that conform visually to those of the surrounding natural ground. • The storm water berms and dissipation beds will be retained on closure. • For parts of the excavation that fall above the FSL the area will be hydro-seeded using an indigenous grass mix. • Monthly inspections will be undertaken during the one year liability period by the Engineer and ECO to ensure that no erosion has taken place and to monitor success of the re-vegetation. • The intention will be to achieve an acceptable grass cover. • Acceptable grass cover shall mean that not less than 75% of the area grassed or hydro-seeded shall be covered with grass and that no bare patches exceeding 0.25m^2 in an area of 1m x 1m shall occur. • In the case of sodding, acceptable cover shall mean that the entire areas shall be covered with live grass at the end of any period not less than three months after sodding.

	X	Dust control measures	• Only land needed for the immediate term will be cleared and grubbed to limit environmental impact due to dust emissions • A designated water truck/s will administer dust suppression on haul roads. • Traffic control measures such as limiting vehicle speeds will be implemented. • Haul trucks will be covered with tarps when travelling on public roads.
	X	Noise control measures	• All equipment will be kept in good working order. • Vehicles will be operated within specifications and capacity (no overloading of machines). • Equipment will be turned off when not in use. • No amplified music shall be allowed onsite.
Access Roads/Hauling of Materials	X	Establishment of Access/Haul Roads	• The access/haul road to the borrow pits and quarry area will be established in accordance with acceptable standards and in consultation with the Engineer. • Existing roads will be used as far as possible.
	X	Dust Control Measures	• Traffic control measures such as limiting vehicle speeds will be implemented. 40km/h for heavy vehicles will be strictly enforced. • Vehicles transporting spoil material must be covered or soil sprayed with water before leaving site if transportation is required in excessively windy conditions and/or on public roads. Covering of trucks transporting soil within the basin will not be required. • Haul roads will be watered down when necessary, or as determined by the Engineer/ECO from visual monitoring and dust fallout rates.
	X	Noise Control Measures	• Vehicles should be routed away from noise sensitive areas wherever possible. • Vehicles will be operated within specifications and capacity (no overloading). • No amplified music shall be allowed onsite. • Equipment will be turned off when not in use.

Blasting (Quarry only)	**X**	General	• Measures to be employed as per blasting contractor's legal obligations.
			• Traffic movements to be restricted during the blast.
			• Adequate warnings to be given to all workers on site and neighbours/residents in close proximity to the quarry.
			• A warning system that may be implemented includes the following:
			  • Warning siren;
			  • Bulk SMS for notifying residents of blast times;
			  • Signage on site warning workers of blast times.

Stockpiles	**X**	Stripping	• Striping of topsoil must be undertaken in all areas where physical disturbance of the surface will occur. • Areas from which the topsoil is to be removed shall be cleared of any foreign material which could reduce the quality of the topsoil. • Topsoil must be kept separate from subsoil and must not be used for building or maintenance of access roads or as backfill. • To the greatest extent possible topsoil and subsoil should be handled only twice, once during removal and the second when it's being reinstated. • All soil stockpiles shall be positioned that they are not in any way impacted or compacted upon by vehicular movements, other materials storage or construction activities in general. • Topsoil stockpiles must be stored in designated areas and shall not exceed two (2) metres in height. • Soil stockpiles shall not be positioned so that they obstruct any water drainage line or area of concentrated runoff. • Where stockpiles are necessarily positioned along any sloped area, diversion berms or rock packs shall be constructed around their uphill sides to prevent scouring of the stockpile. • Soil conservation measures must be implemented to stockpiles to prevent erosion and invasion of weeds. Stockpiles must be kept free of weeds.
	X	Dust Control Measures	• Stockpiles will be watered down when necessary, or as determined by the Engineer/ECO from visual monitoring and dust fallout rates.

	X	Storm water system	• Stormwater cut-off berms will be constructed to divert up-slope water to protect the topsoil and overburden stockpiles from erosion. • Where stockpiles are necessarily positioned along any sloped area, diversion berms or rock packs shall be constructed around their uphill sides to prevent scouring of the stockpile. • Soil stockpiles shall not be positioned that they obstruct any water drainage line or area of concentrated runoff.
Accommodation, offices, ablution, stores, workshops etc.	**X**	General	• Mobile chemical toilets will be available for use during operations and will be removed at final closure. • Toilets will be provided in a ratio of one toilet for 20 people on site.
Riparian Zone	**X**	Site Preparation	• Only land needed for the immediate term will be cleared and grubbed to limit impact on the riverine environment. • The river sand will be mined from a seasonal drainage channel for the construction purpose. • The depth of the mining operations will be less than 1.5m as sand is not expected to be deeper.
		Access	• Access to the riverbed for the purpose of conducting excavations in the riverbed, shall be through the use of only one access at a time. • The location of the access to the river channel across the river-bank shall be at a point of the riverbank where the least excavation and damage to vegetation will occur and shall not be wider than is reasonably required. • The position of the river access together with all planned future access points, must be indicated on the layout plan.
		Sediment Control	• Mining will be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the DWS and any other conditions which that Department may impose. • Silt curtains will be erected at strategic positions across the river banks as determined by the Engineer/ECO. • A minimum of three silt curtains along the river will be used for the duration of this mining activity to trap sediment and lessen the impact on downstream uses as a phased approach. • The silt curtains will be cleaned regularly as determined by the Engineer or as directed by the ECO.

			• The Contractor will take care not to wash silt curtains along the river banks where deposition of silt can be washed back into the river. • The cleaning/maintenance of silt curtains will be phased to ensure this mitigation measure is always in place.
		Re-instatement	• Backfilling is not an option as all material in the form of river sand will be removed. • The area will be leveled and left in a natural state containing no foreign debris or other materials and to ensure the hydrological integrity of the river by not attenuating or diverting any of the natural flow. • All scrap and other foreign materials will be removed from the bed of the river and disposed of as in the case of other refuse whether these accrue directly from the mining operation or are washed on to the site from upstream. • It must be noted that this area falls below the FSL and will be inundated.

9. MINIMUM OPERATIONAL STANDARDS THAT WILL BE ADHERED TO FOR ENVIRONMENTAL MANAGEMENT

This chapter details the minimum operation standards required by DMR as stated in the EMP template for small scale mining. The sub-sections that follow must be read in conjunction with details provided in previous chapters of this EMPL as well as the MWP EMPR and Water use Licence conditions.

9.1 DEMARCATION OF THE MINING AREA AND RESTRICTIONS

- The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- The mining of and prospecting for any mineral shall only take place within this demarcated mining area.

9.2 TOPSOIL

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- The removed topsoil shall be stored in a bund wall or similar structure on the high ground side of the mining area outside the 1:50 year flood level within the boundaries of the mining / prospecting area or other demarcated area.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of access roads.
- The topsoil stored in the bund wall shall be adequately protected from being blown away or being eroded.

9.3 ACCESS ROADS ON THE SITE

- The access/haul road to the mining area and the camp site/ site office must be established in consultation with the landowner/tenant and existing roads shall be used as far as practicable.
- The design, construction and location of access to provincial roads will be in accordance with the requirements laid down by the provincial or controlling authority.

- Should a portion of the access road be newly constructed the route shall be selected that a minimum number of bushes or trees are felled and existing fence lines shall be followed as far as possible. Water courses and steep gradients shall be avoided as far as is practicable. Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary.
- The erection of gates in fence lines and the open or closed status of gates in new and existing positions shall be clarified in consultation with the landowner/tenant and maintained throughout the operational period.
- No other routes will be used by vehicles or personnel for the purpose of gaining access to the site.

9.4 MAINTENANCE OF ACCESS ROADS

- In the case of dual or multiple users of access roads arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit.
- Newly constructed access roads shall be adequately maintained so as to minimize dust, erosion or undue surface damage.

9.5 DUST CONTROL ON THE ACCESS AND HAUL ROADS

- The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.

9.6 SATELLITE OFFICE SITES

- Should satellite office sites be required for the mining activity, these offices must be established, as far as is practicable, outside the flood plain, above the 1 in 50 year flood level and within the boundaries of the mining/ prospecting area.
- The area chosen for these purposes shall be the minimum reasonably required and which will involve the least disturbance to vegetation.
- No camp or office site shall be located closer than 100 metres from a stream, river, spring, dam or pan.
- No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.

- Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break shall be cleared around the perimeter of the camp temporary office sites.
- Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner/tenant/persons lawfully living in the vicinity shall be kept to a minimum.

9.7 TOILET FACILITIES AND WASTE WATER

- Chemical toilet facilities or other approved toilet facilities shall be used on the site in such a way that they do not cause water or other pollution.
- In cases where facilities are linked to existing sewerage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to.
- Spills will be cleaned up immediately by removing the spillage together with the polluted soil and by disposing of them at a licensed facility to receive such waste.

9.8 VEHICLE MAINTENANCE YARDS, STORAGE AREAS AND EQUIPMENT

- The vehicle maintenance yard and secured storage area will be established as part of the Dam Construction and will form part of the MWP EMPR. In general as far as is practicable, such facilities will be established outside the flood plain, above the 1 in 50 year flood level and within the boundaries of the construction domain.
- The area chosen for these purposes will be the minimum reasonably required and involve the least disturbance to tree and plant life.
- The storage area shall be securely fenced and all hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored therein. Drip pans/trays, a thin concrete slab or a facility with PVC lining, shall be installed in such storage areas with a view to prevent soil and water pollution.
- The location of both the vehicle maintenance yard and the storage areas are to be indicated on the construction layout plan for the Dam campsite.
- No vehicle may be extensively repaired in any place other than in the maintenance yard. If the vehicle is unable to move from a particular area, spill prevention measures must be implemented before a repair of the vehicle can take place.
- Equipment used in the mining process will be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.

- Machinery or equipment used on the mining area will not be allowed to constitute a pollution hazard in respect of the above substances.
- The Engineer may order such defective equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and/or irreparable.

9.9 WASTE DISPOSAL

- Suitable covered receptacles shall be available at all times and conveniently placed for the disposal of waste.
- All used oils, grease or hydraulic fluids shall be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility to receive hazardous waste.
- All spills must be cleaned up immediately to the satisfaction of the Engineer by removing the spillage together with the polluted soil and by disposing of them at a registered or licensed disposal facility to receive hazardous waste.

9.10 LIMITATIONS ON MINING

- The mining of materials shall take place only within the approved demarcated mining or prospecting area.
- Mining will be limited to the areas indicated as excavations on the plan provided herein **(Figure 7).**
- Operations will not be conducted closer than one and a half times the height of the bank from the edge of the river channel, and undertaken in such manner that the stability of the bank of the river is not affected.
- Precautions shall also be taken to ensure that the bank of the river is adequately protected from scouring or erosion due to the mining activities.
- Damage to the bank of the river caused by the operations, will be rehabilitated to a condition acceptable to the Engineer and ECO.
- Restrictions on the disturbance of riverine vegetation in the form of reeds or wetland vegetation must be adhered to.

9.11 MINING OPERATIONS WITHIN A RIVERINE ENVIRONMENT

- The mining of materials in the river or the banks of the river will be undertaken only:
  - if DWS has been consulted;

- if the best practice guideline for small scale mining developed by DWS is attached hereto; and
- In accordance with such guideline, and any additional conditions that DWS may impose.

- The canalisation of a river will not be undertaken unless the necessary permission has been obtained from the DWS. Over and above the conditions imposed by the said Department, which conditions shall form part of this EMPL, the following will also apply:

  - The canalisation of the flow of the river over different parts of the river bed shall be constructed in such a manner that the flow of the river may not be impeded in any way and damming upstream may not occur.
  - The canalisation of the flow may not result in scouring or erosion of the river-bank.
  - Well points or extraction pumps in use by other riparian users may not be interfered with and canalisation may not impede the extraction of water at these points.
  - Access to the riverbed for the purpose of conducting excavations in the river-bed, shall be through the use of only one access at a time. The location of the access to the river channel across the river bank shall be at a point of the river-bank where the least excavation and damage to vegetation will occur and shall not be wider than is reasonably required. The position of the river access together with all planned future access points, must be indicated on the layout plan.

9.12 ESTABLISHING THE EXCAVATION AREAS

- Whenever any excavation is undertaken for the purpose of locating and/or extracting ore bodies of all types of minerals (materials), the following operating procedures shall be adhered to:

  - Excavations shall take place only within the area indicated;
  - Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation,
  - If practicable, the overburden to be used as backfill material; and
  - Trenches shall be backfilled immediately if no suitable material can be located.

10. REGULATION 52 (d): FINANCIAL PROVISION

10.1 INFORMATION FOR QUANTUM CALCULATION

Table 6 details estimated volumes and the estimated areas demarcated to source material for the construction of Ntabelanga Dam and associated infrastructure. It must be noted that most of these areas are below the FSL of the dam and will be inundated

Table 6: Re-instatement areas for Lalini Borrow Pits and Quarry

No.	Material to be Mined	Estimated Area (m^2)	Estimated Volume (m^3)
1	Fill Borrow Pit	370 000	740 000
2	Core Borrow Pit Site	400 000	1 000 000
3	Sand Borrow Pit Site	900 000	1 000 000
4	Rock Quarry Site	52 500	750 000

10.2 UNDERTAKING TO PROVIDE FINANCIAL PROVISION

The Memorandum of Understanding between the DWS and DMR concerning the financial provision associated with rehabilitation of borrow and quarry areas used for the construction of water resource infrastructure is attached as **Appendix B**.

11. REGULATION 52 (2) (g): PLANNED MONITORING FOR EMP

IDENTIFICATION	Mark with an X where applicable	
	YES	NO
Have the interested and affected parties identified that noise must be monitored?		X
Have the interested and affected parties identified that dust must be monitored?		X
Have the interested and affected parties identified that water quality must be monitored?	X	

All aspects of construction will be monitored in accordance with the Environmental Authorisation, the MWP EMPR and the Water Use Licence conditions.

11.1 ENVIRONMENTAL AWARENESS PLAN

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensure that environmental accidents are minimized and environmental compliance maximized. Environmental awareness will be fostered in the following manner:

- A specific tool box talk for all workers on site involved in the mining activity will be administered;
- Refresher courses will be conducted as and when required; and
- Displaying of information posters and other environmental awareness material.

The goal of training is to enable a shared understanding and common vision of the environment, the impact of a mining operation on the environment (and why this is important) and the role of mining/ construction personnel in terms of environmental management and compliance.

The tool box talk will comprise the following steps:

- The first step will include background discussion of the environment concept: of what it comprises and how we interact with it;
- The second step will be a description of the components and phases of the specific mining operation;

- The third step will be a general account of how the mining operation and its associated activities can affect the environment, giving rise to what we call Environmental Impacts; and
- The fourth and most important step will be a discussion of what staff can do in order to help prevent the negative environmental impacts from degrading our environment. This is known as Environmental Impact Management.

12. REGULATION 52 (2) (g): RECORD OF THE PUBLIC PARTICIPATION PROCESS

12.1 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

As part of the Environmental Impact Assessment for the MWP a Public Participation Process in accordance with GN 543 regulations 54 – 57, was undertaken. A letter notifying I&APs of the application for the environmental authorisation of the Mzimvubu Water project, as well as the applications for the Water Use Licence, heritage permits, quarry and borrow areas approval, was sent to all registered stakeholders together with a Background Information Document (BID). Both the English and isiXhosa versions were distributed by the local facilitators as well as placed on the DWS website. The BID covers all the applications that form part of the project. A newspaper advertisement was published in both local and provincial newspapers announcing the EIA process for this project and providing contact details for I&APs to register as a stakeholder. An on-site notice was also posted providing a brief background on the project and contact details in order for I&APs to request further information and/or to register as a stakeholder. All documents are available in **Appendix C.**

12.2 IMPACT OF THE PROPOSED MINE ON INTERESTED AND AFFECTED PARTIES

As part of the Public Participation Process a formal and integrated record of all the issues raised by Interested and Affected Parties (I&APs) at the meetings or by letters, e-mails or telephone were recorded. Responses provided by DWS and technical team during the public participation process are also documented. This information can be found in the Issues and Responses Report (IRR) (**Appendix C (6)**.

12.3 INFORMATION REGARDING OBJECTIONS

No I&AP's have objected to the application.

13. REGULATION 52 (2) (h): UNDERTKAING TO EXCECUTE THE EMP

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, I herewith confirm that the above report comprises the EMP compiled in accordance with directive, in terms of sections 29 of the Act contained herein, and that the Environmental management plan will be executed as proposed should the permit be issued. I acknowledge that since this Environmental Management Plan is specific to the scale of the mining operation in the hands of the applicant/holder, the operation of the mine specifically by the holder in the manner and scale proposed in the applicable financial and technical ability report and in this Environmental management plan constitute material terms and conditions of the permit, and any change in the scope of the work or the party operating the mine, albeit on a subcontracting or subletting basis, will constitute a contravention contemplated in section 47(1) of the Act.

Full Name and Surname	Menard Mugumo
Identity Number	6903295837180

14. REFERENCES

Department of Water Affairs, South Africa (2013a) *Feasibility Study for the Mzimvubu Water Project: Irrigation Development*. DWA Report No: P WMA 12/T30/00/5212/9. Prepared by Jeffares & Green (Pty) Ltd.

Department of Water Affairs, South Africa (2013b) *Feasibility Study for the Mzimvubu Water Project: Geotechnical Investigations*. DWA Report No: P WMA 12/T30/00/5212/10. Prepared by Jeffares & Green (Pty) Ltd.

Department of Water Affairs, South Africa (2014). *Environmental Impact Assessment for the Mzimvubu Water Project: Floral Impact Assessment Report.* DWA Report No: P WMA 12/T30/00/5314/10

Department of Water Affairs, South Africa (2014). *Environmental Impact Assessment for the Mzimvubu Water Project: Fauna Impact Assessment Report.* DWA Report No: P WMA 12/T30/00/5314/11

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APPENDIX A

DWS Guideline for Small Scale Mining

APPENDIX B

DWS and DMR Memornadum of Understanding

APPENDIX C

PUBLIC PARTICIPATION PROCESS (PPP) INFORMATION

Please refer to Appendix B EIAR

B1: Newspaper advertisement

B2: Background Information Document (BID)

B4: List of Interested and Affected Parties

B6: Notification letter

B7: Site notice

B8: Issues and Responses Report

APPENDIX D

Borrow Pits and Quarry Area Coordinates

Lalini Borrow Pit and Quarry Area Boundary Coordinates						
Core Material Borrow Pit						
Name	**Lat: S Deg**	**Lat: S Min**	**Lat : S Sec**	**Long : E Deg**	**Long : E Min**	**Long : E Sec**
C1	31	14	55.82	28	55	31.35
C2	31	14	57.48	28	55	58.29
C3	31	15	11.02	28	55	54.18
C4	31	15	22.98	28	55	37.88
C5	31	15	4.18	28	55	32.06
Estimated Area		**400,000**	m^2			
Estimated Volume		**1,000,000**	m^3			
Fill Material Borrow Pit						
Name	**Lat: S Deg**	**Lat: S Min**	**Lat : S Sec**	**Long : E Deg**	**Long : E Min**	**Long : E Sec**
F1	31	14	56.92	28	55	22.65
F2	31	15	21.86	28	55	31.6
F3	31	15	32.19	28	55	15.41
F4	31	15	29.19	28	55	9.47
F5	31	15	6.9	28	55	12.97
Estimated Area		**370,000**	m^2			
Estimated Volume		**740,000**	m^3			
Rock Quarry						
Name	**Lat: S Deg**	**Lat: S Min**	**Lat : S Sec**	**Long : E Deg**	**Long : E Min**	**Long : E Sec**
Q1	31	14	13.72	28	56	29.73
Q2	31	14	13.66	28	56	42.38
Q3	31	14	17.63	28	56	44.43
Q4	31	14	17.71	28	56	31.69
Estimated Area		**52,500**	m^2			
Estimated Volume		**750,000**	m^3			
Sand Borrow Area						
Name	**Lat: S Deg**	**Lat: S Min**	**Lat : S Sec**	**Long : E Deg**	**Long : E Min**	**Long : E Sec**
P-1	31	14	39.81	28	54	2.24
P-2	31	14	15.15	28	53	58.26
P-3	31	14	2.89	28	54	5.9
P-4	31	13	56.8	28	54	19.38
P-5	31	13	58.17	28	54	30.16
P-6	31	14	16.53	28	54	46.88
P-7	31	14	19.29	28	54	56.46
P-8	31	14	16.71	28	55	0.58
P-9	31	13	55.7	28	55	5.55
P-10	31	13	37.99	28	54	48.95
P-11	31	13	31.31	28	54	50.09
P-12	31	13	18.2	28	55	8.74
P-13	31	13	40.42	28	56	1.39
P-14	31	13	59.15	28	56	18.86
P-15	31	14	12.32	28	56	19.21
P-16	31	14	8.76	28	56	11
P-17	31	13	53.74	28	56	7.38
P-18	31	13	23.76	28	55	11.48
P-19	31	13	35.97	28	54	53.47
P-20	31	13	56.2	28	55	11.97
P-21	31	14	13.92	28	55	12.36
P-22	31	14	22.93	28	54	57.61
P-23	31	14	19.5	28	54	42.92
P-24	31	14	1.26	28	54	25.72
P-25	31	14	10.69	28	54	4.9
P-26	31	14	39.5	28	54	8.6
Estimated Area		**900 000**	m^2			
Estimated Volume		**1,000,000**	m^3			