<table>
<thead>
<tr>
<th>Raised by</th>
<th>Event</th>
<th>Issue / Concern / Comment</th>
<th>Reply / Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agnes Mzobothsi (Mzintlava Quarry)</td>
<td>Registered as I&amp;AP during EIR public review period</td>
<td>I am interested because I own a valid licenced quarry in the area in question. I was born in Lusikisiki and I also reside in Lusikisiki (Ingquza Municipality) and there is no other woman-owned mine around that can supply material for the construction of the project in question.</td>
<td>Noted.</td>
</tr>
</tbody>
</table>
10 IMPACT ASSESSMENT

In terms of Section 31(2) of the EIA Regulations (2010), an Environmental Impact Assessment Report must include–

(k) A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issues could be addressed by the adoption of mitigation measures;

(l) An assessment of each identified potentially significant impact, including-

(i) Cumulative impacts;
(ii) The nature of the impact;
(iii) The extent and duration of the impact;
(iv) The probability of the impact occurring;
(v) The degree to which the impact can be reversed;
(vi) The degree to which the impact may cause irreplaceable loss of resources; and
(vii) The degree to which the impact can be mitigated.

The impact assessment for the proposed LRWSS was conducted in two parts:

- General Impact Assessment
- Specialist Impact Assessment

The general impact assessment and specialist impact assessments were combined into one table per phase and a detailed assessment of all impacts and mitigation measures is available in Appendix B.

10.1 General Impact Assessment

The general impact assessment identified and assessed impacts across three phases of development:

- Planning & Design Phase
- Construction Phase
- Operational Phase

Issues identified were not covered in the specialist studies such as:

- Waste management
- Traffic and Transport
- Socio-economic impacts
- General construction impacts
- Stormwater management
- Visual impacts (Visual desktop study)

10.2 Specialist Impact Assessment

The specialist impact assessment covered issues identified by the following specialist studies:

- Ecological Impact Assessment
- Aquatic Impact Assessment
- Paleontological Impact Assessment
- Heritage Impact Assessment
- Social Impact Assessment
10.3 Summary of findings

The various impacts that were identified are summarised in Table 10-1 and Table 10-2 below.

Table 10-1. General Impacts Identified

<table>
<thead>
<tr>
<th>PLANNING AND DESIGN PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with relevant environmental legislation and policy</td>
</tr>
<tr>
<td>Failure to adhere to existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies/legislation.</td>
</tr>
<tr>
<td>Traffic and transport</td>
</tr>
<tr>
<td>During the planning and design phase, inadequate planning for the transportation of construction equipment to site could result in traffic congestion.</td>
</tr>
<tr>
<td>The integrity of the existing roads may be compromised by the heavy vehicle traffic delivering materials and components to site.</td>
</tr>
<tr>
<td>Road modifications which may be necessary to allow for the delivery of materials and components to site via heavy vehicles could have long lasting traffic benefits.</td>
</tr>
<tr>
<td>Visual intrusion</td>
</tr>
<tr>
<td>During the planning and design phase, inadequate planning for the construction of infrastructure associated with the Zalu Dam, such as a car park or buildings, could result in the loss of scenic quality.</td>
</tr>
<tr>
<td>During the planning and design phase inappropriate consideration of the design of the Zalu Dam wall could result in a visually intrusive dam wall structure.</td>
</tr>
<tr>
<td>The removal of indigenous vegetation from the inundation area will result in the degradation of the aesthetic quality of the area surrounding the dam.</td>
</tr>
<tr>
<td>Loss of land due to Zalu Dam construction</td>
</tr>
<tr>
<td>Loss of an existing foot path through the inundation area.</td>
</tr>
<tr>
<td>Proposed reticulation layout</td>
</tr>
<tr>
<td>During the planning and design phase, a lack of environmental consideration in the infrastructure layouts could result in the unnecessary degradation of areas of high environmental/social sensitivity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual intrusion</td>
</tr>
<tr>
<td>During the construction phase, construction activity on site and the presence and use of large machinery on site and along access roads will result in a visual disturbance of the landscape.</td>
</tr>
<tr>
<td>Socio-economic</td>
</tr>
<tr>
<td>The construction phase will create temporary jobs for local communities.</td>
</tr>
<tr>
<td>During construction, impeding the existing flow of the Xura River will limit the volume of water available to downstream users.</td>
</tr>
<tr>
<td>Nuisance dust</td>
</tr>
<tr>
<td>During the construction phase, generation of dust from heavy vehicles and machinery could impact on nearby communities.</td>
</tr>
<tr>
<td>Construction camp</td>
</tr>
<tr>
<td>During the construction phase, unnecessary disturbance of vegetation due to sprawl of campsites can cause loss of biodiversity.</td>
</tr>
<tr>
<td>Alien and invasive plants</td>
</tr>
<tr>
<td>During construction, unnecessary disturbance of the areas within the site could increase the risk of spreading noxious weeds, invasive and alien plants.</td>
</tr>
<tr>
<td>Fire</td>
</tr>
<tr>
<td>During the construction phase, runaway fires from cooking or other activities in the construction camp might lead to the burning of surrounding vegetation and threaten the local community.</td>
</tr>
<tr>
<td>Noise</td>
</tr>
<tr>
<td>During construction adverse noise effects will occur, e.g. from the movement of heavy vehicles through community areas to site.</td>
</tr>
<tr>
<td>Stormwater management</td>
</tr>
<tr>
<td>During construction, sediment created as a result of construction activities could be washed</td>
</tr>
</tbody>
</table>
into nearby drainage lines.

**Soil erosion**
- During construction, disturbance of highly erosive soils and vegetation removal on steep slopes could exacerbate soil erosion.

**Management of general waste**
- During construction littering on site may attract vermin, detract from the visual appeal of the area, and pollute the surrounding areas.

**Hazardous substances**
- During construction onsite maintenance of vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water.
- Spillage of diesel, lubricants, cement, etc. could result in surface and groundwater pollution.

**Management of construction waste**
- During the construction phase, waste from construction activities e.g. excess concrete and cement mixture, empty paint containers, oil containers, etc., could cause pollution of ground and surface water when they come into contact with run-off water.

**OPERATION PHASE**

**Visual intrusion**
- During the operational phase, if grassing and tree planting screens are deemed necessary but not implemented correctly and/or maintained, the dam wall could negatively impact the aesthetic quality of the landscape surrounding the dam wall.
- During the operational phase the Zalu Dam could become an attractive destination for tourists.
- During the operational phase, if the associated infrastructure is not maintained it may become degraded and visually obtrusive.
- During the operational phase if the indigenous vegetation, planted within the offset area, is not maintained correctly it could result in sections of the site becoming visually obtrusive.

**Maintenance**
- During the operational phase, insufficient maintenance of pipelines could result in damage to the pipeline and leaks.

**Socio-economic**
- During the operational phase there will be a reliable water supply throughout the study area.
- During the operational phase there will be employment opportunities for maintenance of the dam wall, pipelines and other infrastructure.
- During the operational phase, there may be a reduced volume of water available to downstream users.

**Hazardous chemical storage**
- During the operational phase inappropriate storage of chemicals, herbicides, diesel and other hazardous substances on site could result in soil and water contamination.

**Increased stormwater run-off**
- During the operational phase, failure to follow the stormwater control measures could result in damage to the landscape, flooding and increased sheet erosion.

**Waste management**
- During the operational phase maintenance workers and security personnel could litter on site.
Table 10-2. Specialist Impacts Identified

<table>
<thead>
<tr>
<th>PLANNING &amp; DESIGN PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loss of indigenous vegetation, sensitive areas</strong></td>
</tr>
<tr>
<td>- The construction of the Zalu Dam and associated infrastructure will result in the loss of 100 Ha of degraded Ngonigoni Veld.</td>
</tr>
<tr>
<td>- During the planning and design phase the inappropriate routing of pipelines, access roads and other structures through sensitive areas could result in degradation of these areas.</td>
</tr>
<tr>
<td>- Sensitive areas (scarp forest, riparian areas and wetlands) in the planned inundation area will be completely lost.</td>
</tr>
<tr>
<td>- During the planning and design phase the inadequate assessment of the planned route of pipelines, positioning of the dam, and the compilation of the dam operating rules could lead to widespread degradation and loss of potentially sensitive aquatic habitats.</td>
</tr>
<tr>
<td><strong>Scheduling of construction</strong></td>
</tr>
<tr>
<td>- Planning/scheduling of construction that does not take into account the seasonal requirements of the aquatic environment could lead to short-term impacts such as excessive sediment mobilization.</td>
</tr>
<tr>
<td><strong>Changes to fluvial geomorphology</strong></td>
</tr>
<tr>
<td>- Incorrect placement and/or design of bridge pilings or culverts may result in scouring of the river bed in areas immediately surrounding the pilings or culverts.</td>
</tr>
<tr>
<td>- Insufficient planning for erosion prevention along the banks of the river alongside the Palmerton bridge structure will result in erosion that may eventually impair the safety of the structure.</td>
</tr>
<tr>
<td><strong>Flood attenuation</strong></td>
</tr>
<tr>
<td>- During the planning and design phase failure to account for the 1:100 year flood event may compromise the integrity of the Palmerton bridge structure.</td>
</tr>
<tr>
<td><strong>Heritage features</strong></td>
</tr>
<tr>
<td>- Inappropriate planning of the pipeline route and other reticulation infrastructure through sensitive areas could result in the destruction of heritage features.</td>
</tr>
<tr>
<td><strong>Loss of land due to Zalu Dam construction</strong></td>
</tr>
<tr>
<td>- Acquisition of the dam inundation area, currently used for grazing, could lead to dissatisfaction from the current land users especially if they are not compensated.</td>
</tr>
<tr>
<td>- Inundation of the dam will result in a loss of access to natural resources – livestock grazing, fuel wood, etc.</td>
</tr>
<tr>
<td><strong>Disturbance of grave sites</strong></td>
</tr>
<tr>
<td>- During the planning and design phase inappropriate routing of the pipeline could result in disturbance of grave sites.</td>
</tr>
<tr>
<td><strong>Stimulation of economic growth</strong></td>
</tr>
<tr>
<td>- Planning and design should take into account potential spin-off economic opportunities (aquaculture, irrigation, recreation and tourism)</td>
</tr>
<tr>
<td><strong>CONSTRUCTION PHASE</strong></td>
</tr>
<tr>
<td><strong>Loss of sensitive vegetation during construction</strong></td>
</tr>
<tr>
<td>- During construction there might be a loss of plant species of conservation concern due to vegetation clearing.</td>
</tr>
<tr>
<td>- During construction, indiscriminate removal of riparian vegetation may lead to disturbance of the aquatic ecosystem.</td>
</tr>
<tr>
<td><strong>Disturbance to surrounding vegetation and fauna</strong></td>
</tr>
<tr>
<td>- During construction vehicular movement, noise and habitat destruction will disturb animals in the area.</td>
</tr>
<tr>
<td>- During construction an influx of contractor staff could result in poaching of wild animals.</td>
</tr>
<tr>
<td>- During construction, inappropriate disturbance beyond the development/construction footprint could result in excessive damage and loss of vegetation/fauna.</td>
</tr>
<tr>
<td><strong>Soil erosion and environmental degradation due to poor rehabilitation</strong></td>
</tr>
<tr>
<td>- During construction clearing and excavation will result in exposed soil. If not rehabilitated, this may result in severe topsoil erosion, bank destabilisation, downstream sedimentation and colonization by invasive alien plant species.</td>
</tr>
<tr>
<td><strong>Water quality</strong></td>
</tr>
</tbody>
</table>

EOH Coastal & Environmental Services 112 Department of Water and Sanitation
Environmental Impact Assessment Report – August 2015

- During construction, wet concrete (highly alkaline) could result in flash kills of macroinvertebrates and fish species in the vicinity.
- During construction of the pipelines, accidental chemical spills in the vicinity of watercourses will result in water pollution.
- During construction of the pipelines, mobilisation of soil into the streams via erosion will cause sedimentation of ecological habitats downstream of construction. This could decrease the diversity of macroinvertebrate communities.

**Hydrology**
- During construction of the Palmerton bridge, coffer dams have the potential to permanently change the flow dynamics in a river, exacerbating scour and enhancing sedimentation. Both of these changes can impact negatively on the aquatic ecosystem.

**Channel banks and soils**
- During construction of the dam wall, construction activities could result in localised erosion and jeopardise bank stability. Associated vegetation removal could also destabilise banks.

**Sedimentation**
- During construction excavations within the inundation area for material for dam construction, if undertaken without proper precautions, could mobilise large volumes of sediment into the Xura River, reducing aquatic habitat and decreasing water quality.

**Water quantity**
- During construction impeding the existing flow of the river will result in the degradation of the aquatic environment downstream of the dam, essentially halting all of the ecosystem functions of the river.

**Destruction of underlying fossils**
- During construction of the Zalu Dam wall and spillway deep excavations may expose/destroy underlying fossils.

**Damage to heritage features**
- During construction there could be accidental damage to already identified heritage features.
- During construction there is a risk of damage to potential heritage features.

**Influx of job seekers**
- During the construction phase there may be increased community conflicts between local labour and outside workers.
- During construction there may be a change in social behaviour - elevated crime, increased prostitution, increased substance abuse and risky sexual behaviour.
- During construction there may be an increased risk of the spread of HIV/AIDS and other communicable diseases.
- During the construction phase there will be an increase in economic stimulation and investment into business and enterprise due to an increase in demand for local services.

**Stimulation of economic growth**
- During the construction phase, if proper labour recruitment practices are not used and the use of local resources is not prioritised the project may garner negative sentiment with local communities.
- During the construction phase, if local businesses and SMMEs (Small Medium and Micro Enterprises) are not supported and their development is not stimulated, the economic benefit of the LRWSS would be considered a missed opportunity.
- During the construction phase, if a skills development programme is not developed this would be a missed opportunity to improve the livelihoods of the local community.

**Impact on health and general quality of life**
- During the construction phase a number of the existing roads will be upgraded. This will be beneficial to the region and will have long term benefits for affected communities.
- During the construction phase there could be an increased demand on the existing infrastructure facilities and social services due to the influx of people wanting to take advantage of the economic opportunities associated with the LRWSS.
- During the construction there could be an increase in noise and dust generated from construction activities.
- During the construction phase, the safety of local community members could be reduced as a result of high vehicle activity and potential run-away fires (resulting in injuries).

**OPERATION PHASE**
### Alien vegetation
- During the operational phase, failure to monitor rehabilitation initiatives post construction, can lead to infestation by alien plant species.

### Water quality
- Dams typically act as nutrient “sinks”. This may improve the quality of the water downstream of the dam.

### Geomorphology
- During the operational phase the condition of the river geomorphology in the scour zone will degrade since sediment will be trapped in the dam, causing clear water (sediment free) releases to the downstream reach.
- During the operational phase, at the abstraction weir, the baseflows released from the dam will be abstracted from the river. This will result in the reach immediately downstream of the weir experiencing very low baseflows.
- During the operational phase reduced floods are likely to cause a degradation of the riparian and in-channel habitat conditions through reduced scour abilities of the river.

### Riparian vegetation
- During the operational phase sediment-free water releases and the resultant scour will decrease the availability of any riparian habitat (Instream and Marginal).
- The potential reduction in baseflows, due to abstraction at the weir, would impact on the potential availability of water to supply the adjacent riparian zones and could reduce the overall extent of these habitats.

### Fish
- During the operational phase there could be reduced breeding success of the Transkei barb, a new species. The number of spawning events could also be reduced by the capture of the high flow events by the dam.
- During the operational phase the dam wall and reduction in flow may disrupt the normal migratory behaviour of eels.

### Macroinvertebrates
- During the operational phase reduction in the sediment content of water downstream of the dam could reduce both the availability of food and habitat for macroinvertebrates.

### Hydrology and sediment dynamics
- Once the pipelines are in position, the new infrastructure will possibly cause a permanent change to the flow dynamics of the watercourses. This could result in loss of habitat and an associated loss in aquatic biodiversity.

### Impact on health and general quality of life
- During the operational phase the unusual presence of a large water body may pose a drowning risk.
- During the operational phase there could be an increased demand on the existing infrastructure facilities and social services due to the influx of people wanting to take advantage of the economic opportunities associated with the LRWSS.
- Alleviation of water shortages.

### Stimulation of economic growth
- The construction of the Zalu Dam could result in potential spin-off economic opportunities associated with aquaculture, irrigation schemes, recreation and tourism.

### 10.4 Comparative assessment of impacts

Below is an assessment of the impacts in terms of the number of impacts identified for each phase. The breakdown of the impact assessments in Table 10-3 – 10-9 below provide insight into the key issues of all phases of the proposed LRWSS development.

#### 10.4.1 GENERAL IMPACT ASSESSMENT

An analysis of the distribution of General impacts identified indicates that the bulk of the mitigation effort should be placed on the Construction Phase. The Construction Phase was assessed as the highest impacting phase with one HIGH and one VERY HIGH pre-mitigation impact.
In the Construction Phase the VERY HIGH pre-mitigation impact related to potential runaway fires from construction camps.

Both HIGH and MODERATE identified impacts can be significantly reduced through the recommended mitigation measures resulting in predominantly LOW post-mitigation impacts.

Five impacts were identified as being positive impacts. These impacts related to the socio-economic benefit of the proposed water supply scheme for communities in the study area.

Table 10-3 Impact Assessment for General Impacts occurring in all phases of the proposed development (+ = beneficial impact)

<table>
<thead>
<tr>
<th>Phase</th>
<th>LOW</th>
<th>MODERATE</th>
<th>HIGH</th>
<th>VERY HIGH</th>
<th>LOW</th>
<th>MODERATE</th>
<th>HIGH</th>
<th>VERY HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning &amp; Design</td>
<td>3 (+1)</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>8 (+1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Construction</td>
<td>2</td>
<td>8 (+1)</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>3 (+1)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Operation</td>
<td>1</td>
<td>6 (+1)</td>
<td>1 (+2)</td>
<td>0</td>
<td>8</td>
<td>(+1)</td>
<td>(+2)</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>6 (+1)</td>
<td>18 (+2)</td>
<td>3 (+2)</td>
<td>1</td>
<td>25 (+1)</td>
<td>3 (+2)</td>
<td>(+2)</td>
<td>0</td>
</tr>
</tbody>
</table>

10.4.2 ECOLOGICAL IMPACT ASSESSMENT

The Ecological Impact Assessment identified impacts in all phases of the development. HIGH impacts mostly related to disturbance of sensitive/indigenous vegetation and fauna as well as an increased growth of alien vegetation. The VERY HIGH ecological impact identified in the Planning and Design Phase relates to loss of sensitive areas (scarp forest, riparian areas and wetlands) in the inundation area. This impact is still HIGH after mitigation.

An analysis of the distribution of impacts illustrated that the bulk of the mitigation effort should be placed on the Construction Phase as this is the highest impacting phase.

HIGH and MODERATE pre-mitigation impacts can be reduced through the recommended mitigation measures to predominantly LOW post-mitigation impacts.

Table 10-4 Impact Assessment for impacts identified by the Ecological Impact Assessment

<table>
<thead>
<tr>
<th>Phase</th>
<th>LOW</th>
<th>MODERATE</th>
<th>HIGH</th>
<th>VERY HIGH</th>
<th>LOW</th>
<th>MODERATE</th>
<th>HIGH</th>
<th>VERY HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning &amp; Design</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Operation</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

10.4.3 AQUATIC IMPACT ASSESSMENT

The bulk of the aquatic impacts identified were in the Construction Phase. However, two VERY HIGH impacts were identified in the Planning and Design phase. These VERY HIGH impacts related to loss of sensitive aquatic habitat and flood attenuation.

Other HIGH impacts identified related to destabilisation of channel banks, changes in fluvial geomorphology, hydrology, changes in water quantity and the impact on fish species. A positive impact identified during the Operational Phase related to a possible improvement in water quality downstream of the proposed Zalu Dam.

All HIGH and VERY HIGH pre-mitigation impacts can be reduced through the recommended mitigation measures to LOW or MODERATE post-mitigation impacts.
Table 10-5. Impact Assessment for impacts identified by the Aquatic Impact Assessment.

<table>
<thead>
<tr>
<th></th>
<th>PRE-MITIGATION</th>
<th>POST-MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW</td>
<td>MODERATE</td>
</tr>
<tr>
<td>Planning &amp; Design</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Construction</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Operation</td>
<td>2</td>
<td>5(+1)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7</td>
<td>15(+1)</td>
</tr>
</tbody>
</table>

10.4.4 HERITAGE IMPACT ASSESSMENT

The Heritage Impact Assessment only identified impacts in the Planning and Design and Construction Phases of development.

Pre-mitigation impacts identified were rated as MODERATE, with one HIGH impact in the construction phase. The HIGH impact relates to damage of potential heritage features. All impacts can be reduced using the recommended mitigation measures to MODERATE/LOW post-mitigation impacts.

Table 10-6. Impact Assessment for impacts identified by the Heritage Impact Assessment.

<table>
<thead>
<tr>
<th></th>
<th>PRE-MITIGATION</th>
<th>POST-MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW</td>
<td>MODERATE</td>
</tr>
<tr>
<td>Planning &amp; Design</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Operation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

10.4.5 PALEONTOLOGICAL IMPACT ASSESSMENT

Only one paleontological impact was identified in the Construction Phase. This impact was rated as MODERATE and can be reduced using the recommended mitigation measure to a LOW post-mitigation impact.

Table 10-7. Impact Assessment for impacts identified by the Paleontological Impact Assessment.

<table>
<thead>
<tr>
<th></th>
<th>PRE-MITIGATION</th>
<th>POST-MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW</td>
<td>MODERATE</td>
</tr>
<tr>
<td>Planning &amp; Design</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Operation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

10.4.6 SOCIAL IMPACT ASSESSMENT

An analysis of the distribution of impacts in the Social Impact Assessment illustrated that the bulk of the mitigation effort should be placed on the Construction Phase as this is the highest impacting phase.

The VERY HIGH negative pre-mitigation impact identified relates to disturbance of grave sites along the pipeline route. This impact is HIGH even after mitigation.
HIGH negative pre-mitigation impacts relate to the increase and spread of HIV/AIDS, increased demand on existing infrastructure, reduced safety of residents in the study area and the risk of drowning in the Zalu Dam.

VERY HIGH and HIGH positive impacts relate to the stimulation of economic growth through possible spin off economic opportunities, employment of local labour, supporting local businesses and skills training opportunities.

Table 10-8. Impact Assessment for impacts identified by the Social Impact Assessment.

<table>
<thead>
<tr>
<th></th>
<th>PRE-MITIGATION</th>
<th></th>
<th>POST-MITIGATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW (+)</td>
<td>MODERATE (+1)</td>
<td>HIGH (+1)</td>
<td>LOW (+1)</td>
</tr>
<tr>
<td>Planning &amp; Design</td>
<td>0</td>
<td>2 (+1)</td>
<td>1</td>
<td>1 (+1)</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
<td>5 (+2)</td>
<td>4 (+1)</td>
<td>3 (+1)</td>
</tr>
<tr>
<td>Operation</td>
<td>1 (+1)</td>
<td>1 (+1)</td>
<td>1 (+1)</td>
<td>1 (+1)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1 (+1)</td>
<td>7 (+3)</td>
<td>5 (+1)</td>
<td>5 (+1)</td>
</tr>
</tbody>
</table>

10.4.7  NO-GO IMPACT ASSESSMENT

The negative impacts identified when assessing the NO-GO alternative related to communities in the project area (possibly 32 800 households) not having sufficient access to potable water. Socio-economic development in the study area would also be inhibited.

Positive impacts identified from the NO-GO alternative relate to the preservation of the existing vegetation and wildlife and agricultural/grazing land if the LRWSS does not go ahead.

Table 10-9. Impacts associated with the NO-GO alternative

<table>
<thead>
<tr>
<th></th>
<th>PRE-MITIGATION</th>
<th></th>
<th>POST-MITIGATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW (+1)</td>
<td>MODERATE (+2)</td>
<td>HIGH (+2)</td>
<td>LOW (+1)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>(+1)</td>
<td>1 (+2)</td>
<td>0</td>
<td>1 (+2)</td>
</tr>
</tbody>
</table>

10.5  Overall site sensitivity

The entire site has been assessed by various specialists, and this information has been analysed spatially and then used to inform the most environmentally acceptable layout for the water supply scheme. This layout will be based on an overall sight rate of LOW sensitivity with small localised areas of MODERATE and HIGH sensitivity (refer to sensitivity maps in Chapter 8). The final layout will be based on the sensitivity maps and impacts and mitigation measures identified throughout the process.
11 CONCLUSIONS AND RECOMMENDATIONS

In terms of Section 31(2) of the EIA Regulations (2010), an Environmental Impact Assessment Report must include—

(m) A description of any assumptions, uncertainties and gaps in knowledge;
(n) A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised; any conditions that should be made in respect of that authorisation;
(o) An environmental impact statement which contains—
(i) A summary of the key findings of the environmental impact assessment; and
(ii) A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.

In line with the above-mentioned legislative requirement, this Chapter of the LRWSS EIR provides the EAP’s opinion as to whether or not the activity should be authorised and the reason(s) for this opinion. This chapter also includes an Environmental Impact Statement which summarises the environmental impact assessment findings. The various alternatives investigated in this report are also summarised below.

11.1 Description of Proposed Activity

The LRWSS has been under consideration since the 1970’s when it was recommended that a regional water supply scheme based on a dam on the Xura River and a main bulk supply reservoir close to Lusikisiki would provide potable water for the entire region between Lusikisiki and the coast, extending from the Mzimvubu River in the south west to the Msikaba River in the north east. Some areas up to 15 km inland of Lusikisiki would also be supplied.

The proposed water supply scheme consists of the following components:

- Construction of the Zalu Dam on the Xura River
- Upgrade of the Lusikisiki water treatment works
- Possible upgrade of the abstraction weir on the Xura River
- Upgrade of pump station
- Upgrade and expansion of bulk distribution infrastructure
- Groundwater abstraction and reticulation

11.2 Assumptions, Uncertainties and Gaps

The following assumptions have been made during the EIA process:

- The information provided by DWS and their respective consultants (AECOM) is assumed to be correct.
- The layout provided by DWS is preliminary, and will undergo changes in response to the recommendations contained in this report.

11.3 Environmental Impact Statement

The HIGH and VERY HIGH negative impacts that were identified are summarised in Table 11.1 below. The majority of these impacts can be reduced through the recommended mitigation measures to LOW or MODERATE post-mitigation impacts.
### Table 11-1: High and Very High pre-mitigation impacts identified.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with relevant environmental legislation and policy</td>
<td>• Failure to adhere to existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies, legislation etc. This could result in a lack of institutional support for the project, overall project failure or delays in construction and undue disturbance to the natural environment.</td>
</tr>
<tr>
<td>Stormwater Management and Erosion</td>
<td>• Inadequate planning for stormwater management at any construction site could result in damage, pollution and potential flooding of the site.</td>
</tr>
<tr>
<td>Management of general waste</td>
<td>• Inappropriate planning for management and disposal of waste e.g. storage and disposal, could result in surface and ground water contamination.</td>
</tr>
<tr>
<td>Alien and invasive plants</td>
<td>• During construction, unnecessary disturbance of areas within the site could increase the risk of spreading noxious weeds, invasive and alien plants.</td>
</tr>
<tr>
<td>• During the operational phase, failure to monitor rehabilitation initiatives post construction, can lead to infestation by alien plant species.</td>
<td></td>
</tr>
<tr>
<td>Loss of sensitive areas</td>
<td>• Sensitive areas (scarp forest, riparian areas and wetlands) in the planned inundation area will be completely lost.</td>
</tr>
<tr>
<td>Loss of sensitive aquatic habitat</td>
<td>• During the planning and design phase the inadequate assessment of the planned route of pipelines, positioning of the dam, and the compilation of the dam operating rules could lead to widespread degradation and loss of potentially sensitive aquatic habitats in both the inundation area, downstream of the dam and along pipeline routes.</td>
</tr>
<tr>
<td>Flood attenuation</td>
<td>• During the planning and design phase failure to account for the 1:100 year flood event may compromise the integrity of the bridge structure.</td>
</tr>
<tr>
<td>Changes to fluvial geomorphology</td>
<td>• Insufficient planning for erosion prevention along the banks of the river alongside the Palmerton bridge structure will result in erosion that may eventually impair the safety of the structure.</td>
</tr>
<tr>
<td>Disturbance of grave sites</td>
<td>• During the planning and design phase inappropriate routing of the pipeline could result in disturbance of grave sites.</td>
</tr>
<tr>
<td>Heritage features</td>
<td>• During construction there is a risk of damage to potential heritage features.</td>
</tr>
<tr>
<td>Visual intrusion (Zalu Dam construction)</td>
<td>• Visual disturbance of the landscape during construction caused by the construction activity on site, and the presence and use of large machinery on site and along access routes.</td>
</tr>
<tr>
<td>Fire</td>
<td>• During the construction phase, runaway fires from cooking or other activities in the construction camp might lead to the burning of surrounding vegetation and threaten the local community.</td>
</tr>
<tr>
<td>Disturbance to surrounding vegetation and fauna</td>
<td>• During construction an influx of contractor staff could result in poaching of wild animals.</td>
</tr>
<tr>
<td>• During construction inappropriate disturbance beyond the development/construction footprint could result in excessive damage and loss of vegetation/fauna.</td>
<td></td>
</tr>
<tr>
<td>Disturbance of sensitive aquatic areas</td>
<td>• During construction unnecessary disturbance caused by construction of the dam wall, reticulation pipelines and access roads could result in erosion and degradation of water courses and associated riparian habitats.</td>
</tr>
<tr>
<td>Soil erosion and environmental degradation due to poor rehabilitation</td>
<td>• During construction clearing and excavation will result in exposed soil. If not rehabilitated, this may result in severe topsoil erosion, bank destabilisation, downstream sedimentation and colonisation by invasive alien plant species.</td>
</tr>
<tr>
<td>Channel banks and soils</td>
<td>• During construction of the dam wall construction activities could result in localised erosion and jeopardise bank stability. Associated vegetation removal could destabilise banks.</td>
</tr>
<tr>
<td>Water quantity</td>
<td>• During construction of the dam impeding the existing flow of the river will result in the degradation of the aquatic environment downstream of the dam, essentially halting all of the ecosystem functions that the river plays.</td>
</tr>
<tr>
<td>Hydrology</td>
<td>• During construction of the bridge and pipelines, coffer dams have the</td>
</tr>
</tbody>
</table>
potential to permanently change the flow dynamics in a river, exacerbating scour and enhancing sedimentation. Both of these changes can impact negatively on the aquatic ecosystem.

| Impact on health and general quality of life | • During the construction phase there could be an increased demand on existing infrastructure facilities and social services.  
| • During the construction phase, the safety of local community members could be reduced as a result of high vehicle activity and potential run-away fires (resulting in injuries).  

| Maintenance | • During the operational phase, insufficient maintenance of pipelines could result in damage to the pipeline and leaks.  

| Impact on fish species | • During the operational phase there could be reduced breeding success of the Transkei barb, a new species. The number of spawning events could also be reduced by the capture of the high flow events by the dam.  
| • During the operational phase the dam wall and reduction in flow may disrupt the normal migratory behaviour of eels.  

| Impact on health and general quality of life | • During the operational phase the unusual presence of a large water body may pose a drowning risk.  

### 11.4 Consideration of Alternatives

#### 11.4.1 Zalu Dam alternative

**Location**

A number of investigations have been undertaken since the 1970’s to determine the best position of the proposed dam. The preferred dam site is located where the water resources of the Xura River could be developed as a reliable source for meeting estimated water requirements of the study area. Construction materials are readily available close to the preferred site. In light of the considerable amount of work already undertaken to determine the position of the proposed dam, no location alternatives were considered in this EIR.

**Size**

The preferred dam size is a 1.5 MAR dam with a FSL of 622.6 masl. This dam size will accommodate a larger population than a 0.6 MAR dam. The environmental impacts associated with a 1.5 or 0.6 MAR dam are the same. Only a 1.5 MAR dam was assessed in the EIR.

**Dam Type**

The preferred dam type, based on availability of construction materials and cost implications is an Earth Core Rockfill (ECR) Dam. This is the only dam type that was assessed in the EIR.

The Zalu Dam alternatives are deemed environmentally acceptable based on the findings in this report provided that the mitigation measures recommended in the general and specialist impact assessments are considered and implemented.
11.4.2 Pipeline alternatives

**Layout**

The preferred pipeline layout alternative (based on the feasibility study) is to decommission the existing pipelines and build a new extended system in its place which will follow the same routes of the original system as well as spread out further.

**Technology**

Three technology alternatives for the proposed pipelines were assessed in this EIR, i.e. buried pipelines (trenching), above ground pipelines and trenchless buried pipelines (horizontal directional drilling).

The pipeline alternatives are deemed environmentally acceptable provided that the mitigation measures recommended in the general and specialist impact assessments (particularly the Aquatic Report) are considered and implemented.

11.4.3 Reservoir alternatives

The preferred reservoir layout alternative (based on the feasibility study) is refurbishment of the existing reservoirs with additional new storage reservoirs. Only this reservoir layout alternative was assessed in this EIR.

The reservoir alternative is deemed environmentally acceptable provided that the mitigation measures recommended in the general and specialist impact assessments are considered and implemented.

11.4.4 Water Treatment plant alternative

The preferred water treatment plant (WTP) layout alternative (based on the feasibility study) is the refurbishment of the existing WTP and construction of a new WTP adjacent to the existing facility. Only this WTP layout alternative was assessed in this EIR.

The WTP alternative is deemed environmentally acceptable provided that the mitigation measures recommended in the general and specialist impact assessments are considered and implemented.

11.4.5 The NO-GO or no development option

The No-Go option would mean abandoning the proposed development with the following implications:

- Lack of socio-economic development in the study area.
- Communities in the study area (approximately 32,800 households) will not have access to potable water.

11.5 Opinion of the EAP

Although a number of significant impacts are associated with the proposed LRWSS and associated infrastructure, it is the professional opinion of EOH CES and the specialists that:

- The vast majority of environmental impacts identified can be adequately mitigated to reduce the impacts to an acceptable level, provided mitigation measures recommended in this report are implemented and maintained throughout the life of the project.
- The implementation of mitigation measures and recommendations must be consistently monitored by an independent Environmental Control Officer (ECO) during construction.
• The recommendations made by all specialists and the EAP in the EMPR (Appendix D) must be implemented.
• The information in the report is sufficient to allow DEA to make an informed decision.

It is the opinion of EOH Coastal & Environmental Services (EOH CES) that NO FATAL FLAWS are associated with the proposed LRWSS.

11.6 Recommendations of the EAP

It is the opinion of EOH CES that the proposed development should be approved provided that appropriate mitigation measures are implemented and that the Environmental Management Programme (EMPr) is implemented, maintained and adapted to incorporate relevant legislation, standard requirements and audit reporting, throughout the life of the LRWSS project.

The mitigation measures for all impacts identified in the EIA are provided in the detailed impact assessment in Appendix B and have been incorporated into the EMPr (Appendix D).

The EMPR must be implemented by the relevant parties during all phases of development of the project i.e. Planning & Design, Construction and Operational phase.

Inclusions, additions and adaptations of the EMPR, as well as all final plan drawings and maps must be submitted to DEA (Pretoria) for final approval.

11.7 Recommended mitigation measures

11.7.1 Planning and design phase

Table 11-2: Planning and design phase mitigation measures.

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
</table>
| **Compliance with relevant environmental legislation and policy** | • Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy.  
• These should include (but are not restricted to): Local and District Spatial Development Frameworks, Eastern Cape Biodiversity Conservation Plan (ECBCP), Local Municipal bylaws.  
• In addition, planning for the construction and operation of the proposed water supply scheme should consider available best practice guidelines.  
• All legal matters pertaining to permitting must be completed prior to construction. |
| **Traffic and transport** | • Project planning should include a plan for traffic control that will be implemented, especially during the construction phase of the dam and associated infrastructure.  
• Careful planning of the routes taken by heavy vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified, these areas must be upgraded if necessary.  
• One of the areas that will likely require upgrading is the bridge near Palmerton Mission. This will also require a WULA. |
| **Visual intrusion** | • During the planning and design phase, any buildings or structures should be painted, tiled, etc. using neutral colours such as grey, beige or dark green (roof only).  
• The planning and design phase should, where possible, plan for buildings and structures to be constructed in low lying areas to reduce their visual intrusion on the surrounding landscape.  
• The planning and design of the Zalu Dam wall should include a plan for grassing large barren areas of the dam wall and planting trees to screen the dam wall from nearby dwellings.  
• Ensure that plans are made to replant indigenous vegetation (that is removed during the construction phase) nearby to reduce the effect of vegetation removal on the aesthetic quality of the inundation area. |
**Environmental Impact Assessment Report – August 2015**

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of land due to Zalu Dam construction</td>
<td>- An alternative site for the existing foot path must be planned around the inundation area. The local community must be consulted to assist in deciding on a new position for the footpath.</td>
</tr>
</tbody>
</table>
| Impact of proposed layout on sensitive environments | - Sensitive environments described in the EIA must be taken into account when planning the route of infrastructure.  
- For example, a 20 m buffer should be kept between the edge of a grave and the edge of the pipeline. |

**SPECIALIST MITIGATION MEASURES**

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Loss of indigenous and sensitive vegetation | - All species of special concern, protected or vulnerable must be avoided or transplanted.  
- The existing roads must be utilised for access.  
- New access roads must only be constructed if there is no alternative, and the width of existing roads and tracks must be kept to a minimum.  
- Where feasible the pipeline must be located in areas that are already impacted on and degraded.  
- A relocation and search and rescue plan for sensitive plant species must be developed.  
- Existing roads must be used where feasible;  
- Align roads and pipelines within a single corridor and keep this as narrow as feasible;  
- Where practical and feasible, avoid locating linear infrastructure (such as roads and pipelines) through areas of high and moderate sensitivity.  
- Where feasible, avoid locating the pipeline and access road alongside streams and wetlands. |
| Loss of sensitive areas | - A relocation and search and rescue plan for sensitive plant and animal species must be developed.  
- Consideration should be given to establishing a possible conservation area near the inundation area for relocated plant species (for e.g. Scarp forest). |
| Loss of sensitive aquatic habitat | - Planning of the location and routing of infrastructure must be undertaken with suitable regard for the environment.  
- Suitably qualified specialists MUST be consulted during the planning and design phase. |
| Scheduling of construction | - Wherever possible, construction activities must be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc.  
- When not possible, suitable stream diversion structures must be used to ensure that rivers/streems are not negatively impacted by the activity. |
| Changes to fluvial geomorphology | - Ensure that scour countermeasures are incorporated into the design of the bridge  
- Adequate bank stabilisation measures must be incorporated into the design of the bridge. |
| Flood attenuation | - The bridge must be designed to accommodate the risks associated with the 1:100 flood wherever possible  
- Flood attenuation plans must be drawn up by a qualified engineer and approved by DEA and DWS. |
| Destruction of heritage features due to incorrect placement of pipelines and associated infrastructure | - The recommendations of the Heritage specialist must be considered in the routing of the pipeline and associated infrastructure.  
- For example, a 20 m buffer should be kept between the edge of a grave and the edge of the development footprint. |
| Loss of land due to Zalu dam construction | - The process for land acquisition by DWS must be conducted through the traditional authorities operating in the areas as they have jurisdiction over land allocations.  
- Individual land users must be identified and engaged.  
- Current landowners and land users should be sufficiently compensated.  
- Compensation must be equitable across gender and age. |
| Disturbance of grave sites | - Pipeline routes need to be planned around grave sites as specified in the Heritage Specialist report (20m buffer around grave sites) |
- The community should be consulted before pipeline routes are established to ensure any grave sites that were not identified in the Heritage Specialist report are identified, mapped and taken into account in the pipeline layout.

**Stimulation of economic growth**

- DWS should, in their consideration of water use applications, consider the benefit to local communities.
- DWS should readily facilitate water use activities that will benefit the community.
- Construction camps and settlements can be converted into tourism or recreation facilities.
- DWS, ORTDM and the LED (Local Economic Development) sector should give consideration to promoting potential economic activities such as aquaculture, tourism, etc.

### 11.7.2 Construction Phase

**Table 11-3: Construction phase mitigation measures.**

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-economic</strong></td>
<td>During construction all care should be taken to ensure that the ecological reserve volume of water is always released into the river downstream of the dam.</td>
</tr>
</tbody>
</table>
| **Nuisance dust**               | Nuisance dust should be reduced by implementing the following:  
  - Damping down of exposed areas;  
  - Retention of vegetation where possible;  
  - Excavations and other clearing activities must be restricted to agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;  
  - Implementing a speed limit of 30km/h on dirt roads;  
  - Attending to complaints emanating from the lack of dust control. |
| **Construction camp**           | The ECO must assist in the siting of structures and supervise any bush clearing (although this is not anticipated) for the construction camp.  
  - Construction camp should be fenced to avoid sprawl. |
| **Alien and invasive plants**   | Alien plants should be removed from the site through appropriate methods e.g. hand pulling, chemical, cutting, etc. under supervision of the ECO.  
  - Disturbed areas must be rehabilitated. |
| **Fire**                        | Fire extinguishers should be available on site  
  - There should be no burning of construction waste or debris onsite. |
| **Noise**                       | Machinery that causes noise must only be operated at appropriate times (during the day and at normal working hours). |
| **Stormwater management**       | Stormwater control measures must be implemented to avoid soil erosion and siltation of drainage lines. |
| **Soil erosion**                | Vegetation must be retained where possible to avoid soil erosion.  
  - If slopes are cleared during construction, these must be rehabilitated as soon as possible to minimize soil erosion losses using local indigenous vegetation. |
| **Management of general waste** | Littering must be avoided and litter bins must be made available at various strategic points on site. Refuse from the construction site must be collected on a regular basis and deposited at an appropriate landfill site.  
  - The ECO should monitor the neatness of the work sites as well as the Contractor campsite. |
| **Hazardous substances**        | The storage of fuels and hazardous materials must be located away from sensitive water resources.  
  - All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a bunded area or other secured areas.  
  - Stormwater control measures must be implemented during construction. |
| **Management of construction waste** | All construction materials must be stored in a central and secure location with controlled access and an appropriate impermeable surface.  
  - All excess waste must be disposed of at an appropriately licensed landfill site.  
  - Stormwater control measures must be implemented to mitigate the risk of... |
runoff water causing pollution.

**SPECIALIST MITIGATION MEASURES**

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
</table>
| **Loss of sensitive vegetation during construction** | - All species of special concern, protected or vulnerable must be avoided or transplanted.  
- The existing roads must be utilised for access.  
- New access roads must only be constructed if there is no alternative, and the width of existing roads and tracks must be kept to a minimum width.  
- In the unlikely event that a protected tree species needs to be removed, a permit to do so must be obtained from DAFF.  
- Laydown areas and turning areas must be located in areas that have already been impacted or show evidence of degradation. The ECO must identify such areas.  
- The servitude of the pipeline must be kept to a minimum.  
- Where feasible the pipeline must be located in areas that are already impacted on and degraded.  
- Rehabilitation of the disturbed areas and the remaining stockpiles (if any) must take place immediately after construction.  
- Topsoil must be stockpiled separately to sub soil.  
- The dam site must be surveyed and the pipeline route should be surveyed prior to construction during spring and mid-summer in order to locate protected geophytic plant species and transplant them in the neighbouring environment.  
- During excavations for the dam foundation, a search and transplant of species of special concern found in the topsoil layer must be undertaken. |
| **Disturbance to surrounding vegetation and fauna** | - Restrict construction activities to post-dawn and pre-dusk.  
- Construction must be undertaken in the shortest time practical  
- All staff employed during construction must sign a daily register.  
- Construction workers should be cautioned against poaching.  
- No construction residence may be set up on site.  
- An independent ECO must inspect the immediate vegetation for evidence of snares.  
- Construction activities must be demarcated and vegetation clearing and top soil removal limited to these areas.  
- Dense vegetation that resembles Thicket or Forest must not be removed. In cases where this is unavoidable the ECO must be consulted and an assessment of the vegetation must be undertaken.  
- No construction must be undertaken in an area demarcated in this report as a sensitive area, or its associated buffer, unless authorised by an independent ECO.  
- Construction activities must be limited to delineated development areas. |
| **Disturbance of sensitive aquatic areas**          | - Construction through watercourses must only take place where necessary and must occur within the smallest possible construction footprint.  
- Construction through watercourses must preferably take place during the dry season, and must immediately be followed by erosion stabilisation and re-vegetation. |
| **Soil erosion and environmental degradation due to poor rehabilitation** | - Implement a rehabilitation programme.  
- Monitor success of re-vegetation. Success is considered achieved when there is 80% or more vegetation cover. |
| **Channel banks and soils**                         | - No concrete mixing will take place within 32m of the river bank  
- A serviced CO₂ fire extinguisher should be available on site in the event that wet concrete is accidentally spilled into the river.  
- During construction, all care should be taken to ensure that the ecological reserve volume of water is always released into the river downstream of the dam site. |
| **Channel banks and soils**                         | - Construction activities should take place during the driest season |
| Sedimentation | The river must be diverted away from areas where excavation within the inundation area is to take place.  
| | Excavation should take place in the drier months of the year in order to limit the influence of stormwater on the mobilization of sediment.  
| | If necessary, stabilize berms must be used to prevent stormwater from carrying sediment into the existing river channel. |
| Water quantity | During construction, all care must be taken to ensure that the ecological reserve volume of water is always released into the river downstream of the dam site. |
| Water quality | No concrete mixing will take place within 32m of the river bank.  
| | A serviced CO2 fire extinguisher (for releasing carbon dioxide gas into the affected area to neutralize pH levels) should be available on site in the event that wet concrete is accidentally spilled into the river.  
| | No machinery should be parked overnight within 50 m of a watercourse.  
| | All stationary equipment must be equipped with a drip tray to retain any oil leaks.  
| | Monitors should be stationed 50 m upstream and downstream of the crossing site on a flowing stream. They should be trained to observe and identify bentonite releases, and have the equipment capacity to rapidly relay information to the drilling team.  
| | Appropriate containment measures must be implemented to minimise the further release of slurry into the watercourse  
| | The pressure levels of the lubricating slurry must be closely monitored while drilling is in progress, as a rapid or sudden loss of pressure could indicate a potential release of slurry into a fracture.  
| | Excavation/trenching should take place during the driest season.  
| | Where possible, silt fences must be installed to collect sediments mobilized during construction.  
| | Banks must be monitored for signs of erosion, and measures must be taken to minimize the erosion as soon as possible.  
| | Pipe bridge pilings should not be placed on stream banks wherever possible. Where this is not possible, ensure that appropriate sediment collection measures are put in place. |
| Riparian vegetation | Removal of riparian vegetation should take place under the supervision of the ECO.  
| | Removal of the alien invasive vegetation should be prioritised.  
| | Banks should be artificially stabilised as soon as possible if significant riparian vegetation is removed. |
| Hydrology | Coffer dams during bridge construction must not be left in place for longer than 30 days.  
| | All work within the river should be completed during the dry season, when flows are at their lowest.  
| | Water in the river must be allowed to pass downstream of the construction. If necessary this should be achieved via a temporary diversion – this should not be in place for more than 30 days.  
| | Coffer dams must not be left in place for longer than 30 days. |
| Destruction of underlying fossils | The ECO must be informed of the possibility that trace fossils might be exposed on the bedding planes of the Ecca Group shales during deep excavations for the construction of the Zalu Dam wall and spillway.  
| | If fossils are recorded the palaeontologist, ECPHRA and SAHRA must be notified and the fossils recorded according to SAHRA specification. |
| Damage to heritage features | If any graves/heritage features are damaged during construction then construction must stop immediately.  
| | It must be reported to the ECO, Heritage Specialist and SAHRA.  
| | If human graves are uncovered during construction then all activity must stop immediately.  
| | The police and ECPHRA must to be notified immediately.  
| | If any other archaeological artefacts are uncovered during construction then construction must stop and these should be reported to the ECO, Heritage Specialist and SAHRA/ECPHRA immediately. |
Influx of job seekers

- A project steering committee consisting of the DWS, contractor (community liaison person), recruitment agency, community leaders, elders, youth, ward councillors and the IHLM LED (Local Economic Development) must be established in order to:
  - Conduct an audit of the affected communities in terms of employment capacity
  - Identify potential workers from the affected communities
  - Identify possible conflicts in and between communities
  - Recommend support programmes that would assist with conflict minimisation and resolution
- The following are mitigation measures for crime:
  - Support the Traditional Authorities role of exerting control over land allocation in order to prevent densification of people around the construction areas.
  - The DWS and contractor must encourage settlement in Lusikisiki by providing daily transport for “outside” workers who settle in the town of Lusikisiki, and from the construction to minimise the potential crime factor in the rural areas.
  - All construction workers must be clearly identifiable and wear easily recognisable uniforms. They need to carry identification cards issued by the contractor.
  - Ensure that the SAPS has access to construction sites
  - Encourage the local communities to report suspicious activity to the community liaison or nearest environmental site officer.
  - The contractor must prevent loitering around the construction camp by providing transport to and from the camp sites.
  - All construction and camp sites must be fenced and secure.
- Mitigation measures for increased prostitution and sexual behaviour:
  - Support national and local awareness programmes that discourage promiscuity, especially at schools in the project area.
  - Ensure that condoms are easily accessible to all construction workers.
- HIV/AIDS (non-discrimination, awareness, prevention and health care support) policy must be implemented.
- Condoms must be easily accessible to all construction workers.
- Develop and implement a HIV/AIDS education and behaviour change programme for all contracted construction workers. This must extend to the communities located near the construction site.
- Existing public health care centres and programmes such as TAC must be involved in the HIV/AIDS campaigns. The HIV/AIDS prevalence must be monitored through these agencies.
- Voluntary counselling and testing must be encouraged for all workers.
- DWS is limited in its capacity to enhance the benefits of this impact. The proponent must link the Provincial Department of Economic Development and Local Municipal LED (Local Economic Development) programmes with small to medium enterprises (including communities) in the area so that a state of “readiness” to optimise economic benefits is achieved. This may involve training in the following sectors: business, tourism, catering etc.
- Negotiate employment charter with LM before start of construction.

Stimulation of economic growth

- Equal job opportunities for women and men must be promoted.
- Employment must be managed by a recruitment agency/office that uses a selection system that ensures recruitment of semi and unskilled workers from all local, impacted communities in accordance with recent government policies related to local procurement.
- Where appropriate, employees involved in the construction phase should be incorporated in the permanent maintenance staff for the operational phase; and
- Particular attention must be paid to employment opportunities for women and disabled persons.
- Negotiate employment charter with LM before start of construction.
- The proponent must ensure that the principal of utilising local business resources (suppliers and SMMEs) in accordance with recent government...
policies related to local procurement forms part of the procurement specifications. Examples of local business resources that must be considered:

- Catering services
- Transport services
- Quarries/borrow pits (where necessary)
- Small civs
- Accommodation
- Security
- Hygiene services
- Fencing

- Implement a skills development programme which includes training in business, project management, monitoring and evaluation.

### Impact on health and general quality of life

- DWS should promote awareness of the project (with LMs, Department of Health, SAPS, etc.) and the potential pressure to provide services for new households.
- Regularly monitor the schools and clinics in order to determine whether there are sufficient resources. When resources are deemed insufficient, DWS must communicate with the relevant departments for assistance.
- Mitigation measures for noise and dust:
  - Noise and dust prevention measures must be implemented.
  - Dust along access roads must be monitored.
  - Ensure that communities have an easy grievance reporting mechanism, e.g. through a project steering or liaison committee
- Mitigation measures for traffic safety:
  - Develop and inform all affected communities of the formal construction routes.
  - All vehicle operators and drivers must undergo regular training, clearly outlining the high safety risk to local rural communities
  - Erect signage making communities aware of the high safety risk due to heavy construction vehicles on the road.
  - Traffic calming devices such as speed bumps must be considered on rural access roads.
- Mitigation measures for fire safety:
  - No fires must be lit outside construction camps.
  - Fires that are lit must be in a contained area. The fire must be monitored for cinders and extinguished when no longer needed.
  - Firefighting equipment must be stored onsite
  - The construction campsite must be surrounded by a firebreak.
  - Fire risks must form part of the construction worker training.

### 11.7.3 Operational Phase

#### Table 11-4: Operation phase mitigation measures.

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visual intrusion</strong></td>
<td>• During the operational phase, the vegetation that has been planted (grassing and/or trees) must be maintained and rehabilitated if necessary.</td>
</tr>
<tr>
<td></td>
<td>• During the operational phase, the associated infrastructure must be maintained and must adhere to the planning and design phase associated infrastructure aesthetic control recommendations.</td>
</tr>
<tr>
<td></td>
<td>• During the operational phase, the replanted indigenous vegetation in the offset area should be maintained.</td>
</tr>
<tr>
<td><strong>Socio-economic</strong></td>
<td>• The dam operating rules must stipulate that the ecological reserve volume is released at all times.</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>• Pipelines MUST be regularly monitored for leaks. If these are identified immediate actions must be taken to repair leaks.</td>
</tr>
<tr>
<td></td>
<td>• Regular maintenance and inspections of pipelines should take place.</td>
</tr>
<tr>
<td><strong>Hazardous chemical storage</strong></td>
<td>• All hazardous substances must be stored in appropriately secure locations.</td>
</tr>
</tbody>
</table>
### Environmental Impact Assessment Report – August 2015

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increased stormwater run-off</strong></td>
<td>• Stormwater control measures must be followed.</td>
</tr>
</tbody>
</table>
| **Waste management**                                | • Ensure there are sufficient containers at all operational facilities available for collecting waste.  
• No waste must be buried on site.  
• Waste must be collected on a regular basis and disposed of at a licensed landfill site.                                                                                                                                                                                    |

**SPECIALIST MITIGATION MEASURES**

<table>
<thead>
<tr>
<th>Activity/Issue</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Alien Vegetation     | • Design and Implement an Alien Vegetation Management and Monitoring Plan;  
• Eradicate alien plants as they appear; and monitor the study area for any new invasive plants.  
• Alien vegetation must be monitored for at least 6 months after construction has been completed.                                                                                                                                                                               |
| Geomorphology        | • The dam operating rules must stipulate that there be infrequent but regular releases of water from the lower section of the dam, allowing sediment to move through the system.                                                                                                                                                                                   |
| Riparian Vegetation  | • The dam operating rules must stipulate that there be regular releases of sediment from the dam.  
• The dam operating rules must stipulate that the ecological reserve volume is released at all times and that seasonality is maintained in the river downstream of the dam.                                                                                                    |
| Fish                 | • The dam operating rules must stipulate that the ecological reserve volume is released at all times and that seasonality is maintained in the river downstream of the dam.                                                                                                                                                                      |
| Macroinvertebrate    | • The dam operating rules must stipulate that the ecological reserve volume is released at all times and that seasonality is maintained in the river downstream of the dam.                                                                                                                                                                      |
| Hydrology and sediment dynamics                     | • Pipe bridge pilings on the banks or bed of the watercourse must be designed to limit the effects of scour on the sediment flows in the stream.                                                                                                                                                                                                  |
| Impact on health and general quality of life        | • Safe and controlled swimming sites should be developed.  
• A safety awareness campaign amongst the local community should be undertaken.  
• Ensure signage of drowning risks is visible in high activity areas such as the river/dam crossing.  
• The implementation of a swimming programme for local scholars should be considered.  
• DWS should promote awareness of the project (with LMs, Department of Health, SAPS, etc.) and the potential pressure to provide services for new households.                                                                                                                             |
| Stimulation of economic growth                        | • The proponent is limited in terms of their input regarding the spin-off business opportunities as these depend on investor interest and market demand. However they play a key role in permitting water use activities. DWS should therefore, in their consideration of water use applications, consider the benefit to local communities and ensure that equitable benefits are realised and readily facilitate water use activities that will benefit the community. |
12 INFORMATION REQUIRED BY COMPETENT AUTHORITY

In terms of Section 31(2) of the EIA Regulations (2010), an Environmental Impact Assessment Report must include—

(r) Any specific information required by the competent authority;

12.1 Specialists declaration

12.1.1 Heritage Specialist
12.1.2 Paleontological Specialist
12.1.3 Proof of submission of Water Use Licences to DWS
Figure 12-1: LRWSS Locality Map.
Figure 12-2. LRWSS Sensitivity Map.
13 REFERENCES


Conservation and Agricultural Resources Act (No. 43 of 1983).


Hazardous Substances Act (No. 15 of 1973).


Mineral and Petroleum Resources Development Act (No. 28 of 2002).


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

National Environmental Management: Protected Areas Act (No. 57 of 2003).

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

National Forests Act (No. 84 of 1998).


National Road Traffic Act (No. 93 of 1996).


The Department of Water and Sanitation, 2014. Feasibility Study for Augmentation of the Lusikisiki Regional Water Supply Scheme: Main Study Report, P WMA 12/T60/00/4911.


StatsSA (http://www.statssa.gov.za/).