

## CHAPTER ELEVEN: CONCLUSIONS AND RECOMMENDATIONS

### 11.1 INTRODUCTION

As per section 3. (1) I of Appendix 3 of the NEMA EIA Regulations, 2014 (as amended) this section of the report provides an environmental impact statement which contains a summary of the key findings of the environmental impact assessment including:

- *“a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives”*
- *“recording of proposed impact management outcomes for the development for inclusion in conditions of authorization”*
- *“any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorization”*
- *“a reasoned opinion as to whether the proposed 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 authorization”*

This section presents the conclusion on the most significant impacts identified through the EIA process, together with management actions required to avoid or mitigate the negative impacts; or to enhance the positive benefits.

The assessment of impacts is presented in the following sections:

- Ecology – potential impacts on vegetation, biodiversity patterns and processes, as well as fauna (Chapter Six)
- Aquatic – potential impacts on aquatic resources within the development footprint, as well as within a 500m radius (Chapter Seven)
- Traffic – potential impacts on condition and operation of the roads in the vicinity (Chapter Eight)
- Heritage – potential impacts on heritage resources (Chapter Ten)
- Assessment of Alternatives (Chapter Five)

The monitoring of impacts is outlined in the Environmental Management Programme (EMPr) included as Part B of this report. The key issues identified during the Scoping process, which have been the subject of separate specialist assessments during the EIA, are outlined below:

- Biophysical (Biological and Physical) site assessment including:
  - Potential project related impacts on natural vegetation and faunal habitat associated with the area under assessment.
  - The consideration of any potential impacts on the Addo Elephant National Park
  - An aquatic survey identifying, and mapping wetlands and watercourses associated with the area under assessment, as well as identifying impacts on these resources
  - Suitable buffers for aquatic resources identified on the Farm
  - Comment on the potential impact of the proposed development on Aquatic and Terrestrial CBAs, as identified in the ECBCP
  - The determination of suitable buffers associated with meeting biodiversity conservation targets specific to the vegetation types on the Farm, and in line with those targets indicated by the relevant planning frameworks for the area
- The undertaking of a Heritage Impact Assessment to identify heritage resources, materials and artefacts that occur within the area under assessment and recommendations regarding the conservation thereof.
- The undertaking of a Traffic Impact Assessment to determine the impact of the additional trip generation and the suitability of the access points.
- The undertaking of a Soil Suitability Assessment in the form of a Reconnaissance Soil Survey, to determine the suitability of the soil for the rotational planting of fruits and vegetables, to inform the proposed layout

## 11.2 IMPACTS ON ECOLOGY AND RECOMMENDED MITIGATORY MEASURES

The anticipated clearing of vegetation (~65ha) for the proposed agricultural expansion (Chapter Two) will result in the clearing of a combination of near-natural, degraded, to reversibly and irreversibly modified Sundays Thicket with low to moderate degradation. The loss of vegetation and subsequent faunal habitat will be greatest where intact vegetation is present.

Modification on the Farm reflects a combination of rural settlement and extensive livestock grazing. Irreversibly modified areas are largely due to a settlement area in the south-western corner of the farm, whilst reversibly modified areas include some lands, particularly on the floodplain areas which have been used for livestock grazing (past and present).

Notwithstanding the above, vegetation in the less dense areas does provide important faunal habitat, as dense thicket tends to exclude many faunal species. A fauna and flora search and rescue operation must be conducted before and during vegetation clearing activities. Relevant permits will also be required before search and rescue can commence.

### 11.2.1 Impacts and Management of Ecology

The key ecological impacts associated with the construction and operational phase of the development are as follows:

- Loss of vegetation due to clearing (biodiversity loss).
- Loss of Critical Biodiversity Area and Ecological Support Area due to clearing of vegetation (biodiversity loss).
- Loss of species of conservation/ special concern due to clearing (biodiversity loss).
- Fragmentation of habitat on Tregaron due to clearing (biodiversity loss).
- Loss of faunal Species of Special Concern due to vegetation clearing and poaching.
- Destruction of faunal habitat.
- Potential loss of 'riparian' systems (vegetation along the undefined drainage areas) due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss).
- Potential loss and disturbance of wetland and riparian habitat along the tributary of the Wit River due to vegetation clearing for the agricultural activities (biodiversity and hydrological process loss).
- Potential loss of floodplain and riparian system along the Wit River due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss).
- Potential modification of wetland habitat due to loss of floodplain and riparian system along the Wit River due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss).
- Potential sedimentation and erosional impacts on undefined drainage areas due to agricultural activities (hydrological processes and biodiversity loss).
- Potential sedimentation and erosional impacts on the Wit River and tributary, including dam wetland habitat, due to agricultural activities (hydrological processes and biodiversity loss).
- Potential increased water levels/ saturation in the Wit River and tributary and associated wetlands due to drip irrigation (hydrological processes and biodiversity modification).
- Potential chemical pollution in the Wit River, the tributary and associated wetlands, including groundwater (hydrological processes and biodiversity loss).
- Potential loss of Wit River floodplain and riparian area along access tracks due to maintenance (hydrological processes and biodiversity loss).

Potential Cumulative Impacts on the N40C catchment as a result of the proposed development include:

- Loss of vegetation due to clearing for agricultural activities in the N40C catchments (biodiversity loss).
- Potential cumulative loss of Critical Biodiversity Area and Ecological Support Area due to clearing of vegetation in the N40C catchments (biodiversity and hydrological process loss).
- Potential cumulative loss species of special concern due to clearing of vegetation in the N40C catchment (biodiversity loss).
- Cumulative loss and modification of wetland habitat in the larger catchments
- Cumulative impacts on hydrological process of rivers and associated riparian areas in the N40C catchments (flow, water quality, erosion, sedimentation etc.).

All these impacts can be reduced by implementing the mitigation and management recommendations found in Chapter Six.

### **Vegetation, Biodiversity Patterns and Processes**

The following recommendations are made with regards to the mitigation and management of impacts on vegetation:

- Adoption of the Biodiversity Target, No-Go and Offset areas indicated in Chapter Six and in the layout map attached as Appendix H, will ensure that all CBA, remaining ESA and Other Natural Areas on Sylvania are not cultivated in the future.
- Remove only the required amount of vegetation for citrus/ crop cultivation activities i.e. minimize the extent of bare and exposed soils.
- If windbreaks are to be planted, plant indigenous windbreaks, if possible.
- Maintain the other natural areas on Sylvania.
- Rehabilitation of disturbed areas post establishment with indigenous species.
- Plant species of special concern must be transplanted from the disturbance footprint to refuge areas on the site (e.g. remaining intact thicket) by suitably qualified individuals.
- Permit applications to the Department of Economic Development, Environmental Affairs and Tourism for the protected species.
- An alien plant control program should be implemented which ensures that all invasive exotic plants (*Opuntia ficus-indica* and *O. aurantiaca*) must be removed from the site and alien plant control must take place on an ongoing basis.
- The Environmental Control Officer to approve development footprints (based on the no-go areas), prior to clearing and to monitor clearing within demarcated areas.

### **Fauna**

The vegetation on the area proposed for development provides suitable habitat for a range of faunal species. However, given the transformed nature of the surrounding landscape – cultivation to the south, east and west – as well as the town of Bersheba to the north, it is likely that faunal species diversity and abundance will be low.

The artificial wetlands created by the numerous irrigation dams on the farm and the Wit River and associated drainage areas, are providing habitat for a variety of avifaunal species. It is anticipated that most of the faunal species remaining on the farm will in all likelihood move off to undisturbed portions of the site as soon as site preparation commences.

The following provides recommendations for the management of impacts on fauna:

- The mobile fauna which may be occurring on the site are expected to vacate the area that is to be developed once vegetation clearing and other site preparation activities commence and will seek refuge in intact natural or near-natural areas that are not proposed for development.

- Measures should be implemented to ensure that fauna on site are not harmed during site preparation or operational phase activities associated with the development, e.g. environmental induction process for construction personnel and / or farm workers.
- Before site preparation and vegetation clearing commences, affected areas should be thoroughly searched for fauna that can be relocated. This is to be undertaken by a professional faunal specialist (with the necessary permits) and released into no-go areas or other suitable refuge areas.
- A professional reptile remover needs to be contacted to remove dangerous reptiles when in conflict with the workers.
- Search and rescue operations before and during the site preparation phase will decrease the impacts considerably.
- No fauna encountered on site to be intentionally harmed.

### ***Aquatic Features (artificial and natural)***

The field survey concluded that eight artificially created wetland habitats, occur within the within the 500m radius of the area under assessment. Two of these include large irrigation dams for cultivation purposes and one large water supply dam for potable water. The remaining artificially created wetlands include a small dam and depressions due to excavations. The Wit River, with extensive riparian floodplain and a tributary, flows through the farm along the western boundary of the potential cultivation area. Two natural drainage areas or surface water run-off areas, not indicated on the 1:50 000 topographical map, were digitized for this assessment. The river is comprised of three functional zones, namely: (1) Wit River channel, (2) active channel riparian; and (3) riparian floodplain.

The Wit River channel comprised of the defined channel with channel banks; with marginal and non-marginal zones. The channel was largely comprised of cobbles, with a few large pools. It is therefore classed as an upper foothill river. Riparian hydrophytes included *Eleocharis limosa*, *Cyperus sphaerospermus*, *Cyperus textilis*, *Juncus acutus*, *Paspalum distichum*, *Phragmites australis*, *Samolus valerandi* and *Pycnus polystachyos*. A few smaller *Salix mucronata* trees and sapling *Vachellia (Acacia) caffra* also occurred within the channel, amongst the cobbles. Several weedy species also occurred in the channel e.g. *Argemone ochroleuca*, *Datura ferox*, *Gamochoaeta pensylvanica*, including *Cotula turbinata* which is associated with moist conditions. *V. caffra* was the dominant species along the banks, but other riparian species included *V. karroo*, *Combretum caffrum*, *Acalypha glabrata*, *Searsia pyroides var. gracilis* and *Salix mucronata*.

The active channel riparian zone extended from the Wit River channel banks, where there was a distinct increase in elevation i.e. above the channel bank. Within this zone there was a mix of riparian indicator species and terrestrial species. Riparian indicator species included *V. caffra*, *V. karroo*, *C. caffrum*, *Searsia pyroides var. gracilis* and *Acalypha glabrata*. These species, apart from *V. karroo*, decreased in density and coverage further inland, from the active channel. Terrestrial species comprised of *Dovyalis caffra*, *Gymnosporia buxifolia*, *G. heterophylla*, *Lycium ferocissimum*, *Hypoestes aristata* and *Azima tetraacantha*. Grasses comprised of *Tragus berteronianus*, *Cynodon dactylon*, *Panicum maximum*, *Eragrostis curvula*, *E. lehmannia*. Grass coverage dominated in the disturbed areas, with *Drimia altissima* and the odd tree, such as *A. tetraacantha* and *L. ferocissimum*.

The floodplain is extensive, measuring up to approximately 360m from the active channel and instream habitat in places, with mostly very steep inclines. The riparian floodplain area was dominated by *V. karroo*, and only the odd *C. caffrum* and *V. caffra* occurred in this zone. The other terrestrial species, as indicated above, were intermixed with *V. karroo*. The riparian floodplain area is distinguished from the active channel riparian area due to dominance of *V. karroo* and elevation.

In terms of elevation, a foot path is located just to the west of the active channel riparian area. The riparian floodplain area is distinguished from the terrestrial vegetation, Sundays Spekboom Thicket, due to species composition and elevation, where the riparian floodplain terminates roughly around the 80m – 85m contour (for most of the outer boundary), and the absence of *V. karroo* can be discerned.

The following mitigation and management is recommended to protect the aquatic resources on site:

- Adopt the recommended biodiversity No-Go areas including the 20m buffer around the Wit River riparian floodplain and active channel riparian area, including around the tributary and natural drainage areas.
- Further comment from the Department of Water and Sanitation with regards to requirements of Section 21c and 21i of the National Water Act (36 of 1998).
- Compliance with regulations pertaining to the Conservation of Agricultural Resources Act (43 of 1983), which does not permit cultivation within the flood area of a watercourse or within 10m horizontally outside the flood area of a watercourse.
- In order to reduce surface water run-off from orchard areas, establish stormwater management measures, including trenches (with indigenous grasses, not concrete lined) to encourage increased infiltration.
- Limit vegetation removal during the construction/ establishment phase to the proposed development footprint.
- As an additional precautionary measure, a shallow trench should be placed strategically, to trap surface run-off (with fertilizer and herbicide substances) i.e. parallel along the outer edge of the 20m buffer. Ideally these should be grassed (indigenous) for absorption of chemicals.
- Fertilizer applications should be used at the right time and at the required rates (i.e. excess fertilization can increase available nitrogen or phosphates entering aquatic features).
- Use of slow release nitrogen fertilizers are encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen.
- Avoid over irrigation. Drip irrigation is encouraged/ supported (as is the standard practice to reduce loss or over-use of water).
- The use of organic fertilizers and mulching is encouraged, as much as possible.
- Strict use and management of potential sources of chemical pollution (e.g. pesticides, fertilizers, hydrocarbons from vehicles and machinery, etc.) i.e. waste management procedures.
- Chemical pesticides and insecticides used should be the safest and least harmful to the environment. Biodegradable products should be used as far as possible.
- International standards to be complied with.
- Chemicals and hazardous waste storage areas should be in the existing storage buildings (as proposed).
- Hazardous and chemical wastes (includes old containers) should be disposed of at registered landfill sites.
- Implement appropriate measures and soil drainage to prevent increase in the salinity of groundwater and surface water features i.e. Wit River and tributary etc.
- Mulching, if feasible, to increase retention of soil moisture in-situ/ at tree.
- Minimizing bare and exposed soils and implementing drip irrigation (as proposed/ standard practice).
- Audit reporting by the Environmental Control Officer during establishment of orchards.
- These buffers and mitigation measures should be maintained and monitored by the Applicant/ Farm Manager.
- The Applicant, and Farm Manager, to ensure that no work activities or deposition of gravel should occur outside of the existing tracks in the floodplain or riparian habitat, i.e. to prevent widening of the tracks and indiscriminate clearing (associated with the low-level water crossing).

### 11.2.2 Summary and Additional Recommendations

The proposed agricultural expansion is not deemed to be a fatal flaw on condition that the areas recommended as biodiversity No-Go areas, as indicated in the preferred layout in Chapter Two, are adopted. This includes the 20m buffers around the Wit River riparian floodplain, its tributary and the natural drainage areas (surface water run-off areas), as well as retaining both vegetation types and all the recommended mitigation measures.

By adopting the recommended biodiversity no-go areas and all proposed mitigation measures, the hydrological/ ecological process areas (includes process targets), associated with the aquatic features; as well as biodiversity pattern target area for both vegetation types, should be safeguarded, noting that all remaining Albany Alluvial Vegetation will be retained.

The following provides a summary of the key direct and indirect impacts associated with the development. Only impacts that are rated as having a potential *Medium to High or Very High* negative impact are listed below:

ENVIRONMENTAL IMPACT	DEVELOPMENT PHASE	PRE-MITIGATION	POST MITIGATION
Loss of vegetation due to clearing (biodiversity loss)	Establishment	HIGH	MEDIUM
Loss of Critical Biodiversity Area and Ecological Support Area due to clearing (biodiversity loss)	Establishment	HIGH	MEDIUM
Loss of species of conservation/special concern due to clearing (biodiversity loss).	Establishment	HIGH	LOW
Fragmentation of habitat due to clearing (biodiversity loss)	Establishment	MEDIUM	LOW
Loss of 'riparian' systems (vegetation along the undefined drainage areas) due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss).	Establishment	MEDIUM	NEUTRAL
Loss and disturbance of wetland and riparian habitat along the tributary of the Wit River due to vegetation clearing for the agricultural activities (biodiversity and hydrological process loss)	Establishment	LOW	NEUTRAL
Loss of floodplain and riparian system along the Wit River due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss)	Establishment	HIGH	LOW
Modification of wetland habitat due to loss of floodplain and riparian system along the Wit River due to clearing of vegetation for agricultural activities (biodiversity and hydrological process loss)	Establishment	MEDIUM	LOW
Potential sedimentation and erosional impacts on undefined drainage areas due to agricultural activities (hydrological processes and biodiversity loss)	Establishment	MEDIUM	LOW
Potential sedimentation and erosional impacts on the Wit River and tributary, including dam wetland habitat, due to agricultural activities (hydrological	Establishment and Operational	HIGH	LOW

processes and biodiversity loss)			
Potential increased water levels/saturation in the Wit River and tributary and associated wetlands due to drip irrigation (hydrological processes and biodiversity modification)	Operational	MEDIUM	LOW
Potential chemical pollution in the Wit River, tributary and associated wetlands, including groundwater (hydrological processes and biodiversity loss).	Operational	HIGH	LOW
Potential loss of Wit River floodplain and riparian area along existing access tracks due to maintenance (hydrological processes and biodiversity loss)	Operational	LOW	NEUTRAL
Loss of faunal Species of Special Concern due to vegetation clearing	Establishment	MEDIUM	LOW
Destruction of faunal habitat	Establishment	MEDIUM	LOW
Loss of faunal Species of Special Concern due to poaching	Establishment and Operational	MEDIUM	LOW
<b>CUMULATIVE IMPACTS</b>			
Potential cumulative loss of vegetation due to clearing for agricultural activities in the N40C catchment (biodiversity loss)	Establishment	HIGH	LOW
Potential cumulative loss of CBA and ESA due to clearing of vegetation in the N40C catchments (biodiversity and hydrological process loss)	Establishment	MEDIUM	LOW
Potential cumulative loss of species of special concern due to clearing of vegetation in the larger catchments (biodiversity loss)	Establishment	HIGH	MEDIUM
Cumulative loss of Critical Biodiversity Area and Ecological Support Area buffers due to clearing of vegetation in the larger catchments (biodiversity and hydrological process loss)	Establishment	HIGH	LOW
Cumulative loss and modification of wetland habitat in the N40 C larger catchments	Establishment	HIGH	MEDIUM
Cumulative impacts on hydrological process of rivers and associated riparian areas in the N40C catchments (flow, water quality, erosion, sedimentation etc.)	Operational	(Sylvania) MEDIUM	(Sylvania) MEDIUM
		(N40C Catchments) MEDIUM	(N40C Catchments) LOW

It is recommended that the following are included as conditions in the Environmental Authorisation:

- No-go areas for development (including aquatic and ecological buffer areas) must be demarcated on site before vegetation clearing commences.
- Any lay-down areas must be contained within the proposed disturbance area and may not encroach on any no-go areas on the site.
- Before site clearing commences, the development area must be surveyed for plant and faunal SSC by a suitably qualified specialist. Plant species of special concern must be translocated to the remaining patches of intact vegetation or buffer areas on the property. Permits must be obtained from the relevant authorities for the removal or transfer of protected flora and faunal species.
- No fauna encountered on site to be intentionally harmed.

- Exotic plants present on the site, which are listed in CARA (Conservation of Agricultural Resources Act 43 of 1983) should be progressively removed from the site. In addition, regular follow-up clearing should be conducted for the duration of the project lifetime to ensure that the No-go areas are kept free of these plants.

### **11.3 HERITAGE IMPACTS AND RECOMMENDATIONS**

#### **11.3.1 Palaeontological, Archaeological and Historical Background**

Heritage resources that have been recorded within a 10km radius of the site include one Provincial Heritage Site which is located approximately 6 km to the south-east of the proposed development, called The Lookout Kirkwood District. Several burial grounds were recorded approximately 6.5 km to the west, while four archaeological sites and one palaeontological site have been recorded within the 10 km radius. The palaeontological site is Grade IIIb, while two of the archaeological sites are Grade IIIb, and two Grade IIIc. None of these known heritage resources will be impacted by the proposed citrus expansion.

The fossil sensitivity of the area under assessment is potentially high, as it is largely underlain by the Kirkwood Formation comprising non-marine, fluvial to estuarine mudstone and sandstone sediments of Early Cretaceous age (Almond, 2012). These deposits can contain important examples of Mesozoic land plants (ferns, cycads, conifers etc) and fossil bones, including large and small dinosaurs, as well as non-marine, and occasional marine, molluscs. There are also isolated patches of Pliocene Kudus Kloof alluvial terrace gravels which, may contain peats, palynomorphs (pollens, spores) and other microfossils as well as the bones and teeth of mammals and other fauna (Almond, 2016). Despite this potentially high fossil sensitivity, local conditions would seem to reduce the likelihood of encountering fossil finds during the establishment of this development. The local area is thickly mantled by low sensitivity alluvium (Almond, 2016) and unfossiliferous topsoils, as recorded in the soil analysis performed for this development (Fraenkel, 2017). The Kudu's Kloof Formation in this region would also appear not to yield significant fossil material (Almond, 2016). Furthermore, the nature of the proposed development is unlikely to result in deep excavations into bedrock.

The previous heritage studies that have been conducted in the area have identified isolated and scattered artefacts of the Early, Middle and Later Stone Age (Binneman, 2010). Generally, archaeological artefacts in this region are found in road cuttings, tracks and paths as the dense vegetation of the area largely obscures their presence elsewhere. ESA material known from the area includes handaxes and cleavers that are usually found in river gravels, although in situ ESA tools have been found in spring deposits near Addo (Binneman, 2016). MSA flake and blade tools are similarly usually found in secondary contexts, and may be found with associated fossil bone material (Binneman, 2010). LSA sites, though present, are usually obscured by the dense vegetation in this region. When found, they are usually represented by limited numbers of stone tools and bone fragments, and organic preservation is generally poor (Binneman, 2016). In contrast, cave sites in the nearby mountains, often contain well-preserved deposits and rock paintings. Khoekhoen sites, dating to the past 2 000 years, also occur in the area, and their sites are marked by the presence of indigenous ceramics and bones of domesticated animals. These groups were also responsible for the creation of large middens of freshwater mussels, sometimes associated with human burials, that can be found on the banks of the Sunday's River (Binneman, 2016). Burials and graves associated with pre-colonial as well as historic communities are also to be found in the area (Binneman, 2013). Historic period remains are also found in the area, with early farmhouses and several farm burial grounds having been noted in the area, ranging from formal, enclosed graves to informal stone-packed burial mounds (Van Ryneveld, 2016).

### 11.3.2 Heritage Resources Identified

A number of heritage resources were identified during the field survey (Table 10.4), although these were limited to the very restricted areas accessible to the archaeologist. Of these 21 sites, 14 were archaeological, and of MSA or ESA origin, while three related to built structures, all of which were in a ruined state; a single graveyard, associated with the structures, was identified. The graveyard consisted of more than 25 stone packed graves in an east-west alignment. Most of the graves appeared to have headstones of either stone or metal. The recent dates noted on some graves (approximately a decade old) would indicate that the graveyard was still in use until recently. The end of use of the graveyard probably coincides with the demolition of the settlement (Figure 10.3 and 10.4). All of these sites were determined to be Grade IIIc (of low local significance), with the exception of the graveyard, which was accorded Grade IIIa status (of high local significance). Two geological cuttings were identified which provided insight into the substrate in the area, and the presence of a possible palaeosol was noted; these features are not conservation worthy.

The foot survey that was undertaken provided a sufficient characterisation of the heritage resources in the area and our findings were consistent with those of other studies in the immediate vicinity. However, it is clear from the relative frequency of artefacts in the disturbed, open areas, that more artefacts are likely to be present in the undisturbed, heavily vegetated areas. It is further possible that there might be settlement or activity sites, given the presence of smaller chips and flakes in the assemblage.

Despite the presence of the potentially highly fossiliferous, Early Cretaceous Kirkwood Formation, the thick mantling of these deposits by low sensitivity, Late Caenozoic alluvium in this area mitigates against the likelihood of this development impacting on significant palaeontological deposits (Almond, 2016). Similarly, the small relict patches of Pliocene Kudu's Kloof Formation tend locally to be of low palaeontological significance (Almond, 2016). Interesting geological features noted during the field assessment included two geological cuttings observed in the eastern part of the study area that revealed the cobble substrate at between 0.40m and 1.2m below the topsoil and a potential palaeosol.

### 11.3.3 Impacts and Management of Heritage Resources

The only heritage site of significance located within the area under assessment is the graveyard, while all other identified sites are either Not Conservation Worthy or Grade IIIc. It is likely that more similar archaeological resources will be located in the dense bush thickets that cover the property while the presence of further burials can also not be discounted. Impacts to the identified graves can be mitigated by instituting buffer zones around the graveyard and ensuring that no development activity takes place within that buffer zone. While most of the proposed interventions are of low impact, the vegetation clearing and the dam, depending on the nature of the dam construction, will have a significant, and permanent, impact on heritage resources in this area.

The development of the preferred layout has taken the presence of the graveyard in the south of the property into account and a no development zone is proposed within 20 metres of the outer perimeter of the graves.

The following actions are recommended:

- A Fossil Finds Protocol must be implemented during the construction phase;
- The areas indicated by the archaeologist should be monitored by a suitably qualified archaeologist during vegetation clearing.

- The graveyard should be avoided by all development activities. To ensure this, a suitable fence should be erected around the graveyard, at a distance of no less than 5m from the outer perimeter of the graves. This fence should include entry gates to allow visits from relatives and family friends, and access to the graveyard must be allowed in perpetuity. This area should be treated as a no-go area, and its location should be marked on all development maps. No development should occur within 15 meters of the proposed fence line (ie a 20m buffer area is maintained around the graveyard).
- If *in situ* archaeological resources or human burials are found, work must cease and these findings must be reported to the Eastern Cape PHRA and SAHRA, and a suitably qualified archaeologist must be contacted.

#### 11.4 TRAFFIC IMPACTS AND RECOMMENDATIONS

The following conclusions can be drawn from the traffic specialist study:

- Access to the new orchard areas can be provided directly from DR01999 via existing access points;
- During periods when the river is impassable, preventing access to DR01999, emergency access will be provided from DR02006 through Enon via the municipal road network onto the Canal access road as indicated on Figure 8.2;
- A maximum of 28 trips per day generated at full development for three one-week periods during harvesting season will have minimal impact on the operational capacity of the adjacent road network;
- The proposed access points are via existing access points.

The following provides a summary of the key direct and indirect impacts associated with the development that have been identified by the traffic specialist. Only impacts that are rated as having a potential *Medium to High* or *Very High* negative impact are listed below:

ENVIRONMENTAL IMPACT	DEVELOPMENT PHASE	PRE-MITIGATION	POST MITIGATION
Traffic Safety Impact due to slow moving traffic	Establishment	HIGH	MEDIUM
Traffic Safety Impact due to additional traffic	Operational	HIGH	MEDIUM
Deterioration of Public Road Network	Operational	HIGH	LOW
Generation of Dust	Operational	MEDIUM	MEDIUM POSITIVE

In view of the findings of this study, it is recommended that:

- This TIS be approved by the Eastern Cape Department of Roads and Public Works;
- Access to the new orchards be provided via the proposed access points on DR01999;
- During periods when access across the river is not possible, emergency access be gained through Bersheba;
- The route through Bersheba should be upgraded by the developer in order to minimise damage to the road;
- Traffic calming measures be provided along the route through Bersheba to control vehicle speed;
- Suitable warning signage be erected on the approaches to the proposed access points.

#### 11.5 ASSESSMENT OF ALTERNATIVES

The following alternatives were identified for consideration in this assessment:

- No-go alternative - No agricultural development

- Property/ Location alternatives (reason for elimination)
- Land-Use alternatives
  - Grazing/ game
  - Citrus orchard establishment
- Layout alternatives - Alternative layouts based on various site constraints

The preferred alternatives from the list above as contemplated in detail in Chapter five are summarized below.

### 11.5.1 No-Go Option

The no-go option would result in the loss of potentially productive agricultural land in an area known for citrus production and at a site that is largely surrounded by agricultural development. The no-go option would result in the loss of a capital investment estimated to be approximately R17 million. The operational phase of the project will result in the creation of 4 permanent employment opportunities with an annual income of approximately R154 000 and 28 seasonal employment opportunities with an additional annual income of R470 000. The no-go option would result in a loss of these economic opportunities, as well as the increased production of food for local and international markets, which is considered to be a negative impact. While the no-go option will have no significant negative biophysical environmental impacts, it will result in the loss of positive social and economic benefits which are associated with the go option. Finally, the no-go option will result in the Farm not being optimally utilized for agriculture, for which it is zoned and well-positioned.

### 11.5.2 Property/ Location Alternatives

Portion 2 of Farm 92, known as Sylvania, is owned by the applicant, San Miguel Fruits SA (Pty) Ltd and is currently zoned for agricultural use. The area under assessment is bordered by existing agricultural development to the west and east. Approximately 49% (~120ha) of the farm (has been transformed for agriculture (i.e. existing citrus orchards). Therefore, ~51% (~123ha) of the farm is currently undeveloped, of which, ~115ha is the focus area for this assessment. The area proposed to be transformed within the ~115ha area under assessment, measures ~65ha in extent. Approximately 50ha of citrus is proposed to be established within the development footprint and an additional ~15ha is proposed to be cleared for associated infrastructure (roads, irrigation, dam etc.). The location of the area to be transformed has been informed by the various specialist assessments through the assessment process.

Based on the experience of the EAP, land available for cultivation, which is situated adjacent to existing agricultural areas and which is zoned for agricultural use, have existing water use rights, suitable soils, and is near the LSRWUA canal system, is becoming increasingly scarce in the Sundays River Valley. The area proposed for cultivation is located on the existing, working Sylvania Farm, which has sufficient facilities that meet the requirements previously mentioned, and which will be required to service the additional area proposed for cultivation.

For the reasons mentioned above, **no other reasonable or feasible property/ location alternatives** have been assessed. Layout/ development footprint alternatives within Sylvania have, however, been assessed.

### 11.5.3 Land Use Alternatives: Citrus Production

Sylvania is a working farm, which is currently utilized for the commercial production of citrus for the local and international markets. The applicant has existing water use rights for irrigation purposes

from the Lower Sundays River Water Users Association (LSRWUA). See Appendix G for existing water use entitlements. Micro or drip irrigation is proposed to supply water within the orchards.

Aside from the existing agricultural operations on Sylvania, its western, southern and south-eastern boundaries are adjacent to existing agricultural areas. In addition, Bersheba is located to the north of the farm and therefore, the land adjacent to the northern boundary has been largely modified by livestock grazing and browsing. Based on the surrounding land uses, which are discussed in detail in Chapter Three of this report, the proposed agricultural expansion on Sylvania is not likely to cause a significant change in character of the surrounding landscape, as the surrounding area is currently predominantly agricultural in nature.

Some of the key elements contributing to the sustainability of the agricultural potential of the farm is access to arable land, suitable soils, the topography of the site and the availability of water. Based on the experience of the independent EAP in the area, access to such land in the Sundays River Valley, which meet the abovementioned requirements, is becoming increasingly scarce. The reason being that, suitable land with sufficient access to water is already being utilized for commercial citrus and crop production. Potentially suitable land parcels do not always have ready access to canal water from the LSRWUA. As a result of the distance to water, development often requires a larger capital investment, to ensure a reliable irrigation water supply. At present, Sylvania meets the abovementioned criteria and is, therefore, considered to have a high agricultural potential and is potentially suitable for the proposed development.

The agricultural expansion on Sylvania will potentially create several temporary construction, as well as permanent, operational and seasonal employment opportunities. In addition to the direct employment opportunities related to the farming operations, a number of indirect jobs will also be created by the proposed development, particularly within the packaging and logistics industries, amongst others. The citrus to be produced within the proposed expansion area will be for the local, as well as international markets. International markets generate income from foreign currency, thus, contributing to local economic growth. Some of the citrus produced will also be sold locally to vendors or juicing factories which will assist in stimulating local markets.

For the reasons outlined above **this is the preferred alternative**, which has been assessed in detail during the EIA phase of the assessment, and which includes the preferred layout/development footprint alternatives within the preferred site.

#### 11.5.4 Layout alternatives

The EIA phase of the assessment has assessed layout alternatives on the site, based on the detailed specialist studies as well as technical input, namely:

- Soil suitability
- Ecological – faunal and floral species of special concern, ecological corridors, vegetation conservation targets
- Aquatic – buffer zones
- Heritage features – including Archaeological and Paleontological features on the farm
- Traffic – access and egress from the farm on the DR01999 and DR02006

The final layout for the project has been determined by the specialists, as well as technical input in the EIA phase of the assessment (see Chapter Two).

The preferred layout alternative, as outlined in detail in Chapter Two of this report, was developed based on the outcome of the specialist studies and technical input, in order to mitigate potential negative biophysical impacts on the critical biodiversity areas (CBAs), threatened vegetation types and aquatic features (particularly the Wit River and associated riparian and wetland habitat) identified on Sylvania. This preferred layout alternative within the approved site proposes to clear ~65ha of indigenous vegetation for the establishment of citrus orchards, as well as internal unpaved service roads, windbreaks (if needed), the construction of a new balancing dam, the installation of irrigation pipelines of varying capacities, the upgrading of an existing access road, and the upgrading of an existing low-level crossing of the Wit River and associated approach roads.

For more detail regarding the alternatives that were not considered further in the assessment process due to them not being preferred, see Chapter Five of this report. For more detail on the preferred alternative assessed in detail in this assessment process, see Chapter Two of this report.

## 11.6 PERMIT REQUIREMENTS

Permission will be required from the provincial environmental authorities for the clearance of vegetation and removal of plant species protected by the relevant legislation.

- Permits from the relevant authority (Department of Economic Development Environmental Affairs and Tourism) are required for the removal, translocation or destruction of all plants and animals listed as endangered or protected in terms of the Cape Nature and Provincial Conservation Ordinance (No. 19 of 1974) as well as those listed as Threatened or Protected Species in terms of NEMBA.
- The Department of Water and Sanitation (DWS) will be required to provide feedback on the requirement for a water use licence application in terms of Section 21 (c) and (i) of the National Water Act.
- A Water Use License Application (WULA) or General Authorisation is not usually required in terms of Section 21(a) (water abstraction) where water supply is via the existing Lower Sundays River Irrigation Scheme and under an existing water use allocation. Based on previous applications, Section 21(b) (water storage) should also not apply for said reason.
- This TIS is to be submitted to the Eastern Cape Department of Roads and Public Works of the Eastern Cape for approval prior to commencement of the construction phase.
- A cultivation of virgin land permit must be applied for and obtained from the Department of Agriculture, Forestry and Fisheries prior to any earth-moving activities occurring on site.

## 11.7 OVERALL EVALUATION OF IMPACTS

Local labor is sourced from both the SRVM, as well as the NMBM, hence reference to both the SRVM Final IDP (2015/2016), the SRVM Spatial Development Plan (April 2013), as well as the NMBM Integrated Development Plan (IDP, 2016-2017). The Final IDP (2015/2016) for the Sundays River Valley Municipality (SRVM) estimates that the current unemployment rate in the municipal area is 38.54% of the economically active population. The Agricultural sector provides room for growth in terms of employment opportunities, as it currently represents approximately 11% of the employment for the SRVM area (Final SRVM IDP 2015/2016).

*“The agricultural sector is one of the key economic drivers of the Sundays River Valley Municipality.”*, according to the SRVM Spatial Development Plan (April 2013) (pg. 8).

It is the applicant’s intention to build on this economic base in the SRVM, by making optimum use of the available resources the area has to offer, i.e. the availability of a sustainable supply of irrigation water from the LSRWUA canal system; the suitability/ fertility of the soils, as well as the

available work force from local communities. The suitability of Sylvania for the proposed agricultural expansion is supported by the existing agricultural areas that have been established towards the eastern portions of the Farm.

By making use of this labor market the proposed development would also support the vision of the Sundays River Valley Local Economic Strategy as outlined in the SDF (April 2013) which indicates Agriculture as a Local Economic Development Priority and identifies the need to “...*expand the agricultural section in the region.*” as an Economic Development Objective.

It is estimated the capital investment of the development, upon completion of construction, will be ~R17 million. It is estimated that the construction phase of the development will create approximately six (6) new employment opportunities at a value of R403 200 (over a two-year period).

Upon completion of construction and during the operational phase of the development, it is estimated that four (4) new permanent employment opportunities will be created at a value of R153 600 annually, and 28 seasonal opportunities at an annual value of R470 400. Labour will be sourced locally from communities in the SRVM and Nelson Mandela Bay Municipality (NMBM).

In addition to the direct employment opportunities that are created as part of the farming operations, a number of indirect jobs will also be created by the proposed development particularly within the packaging and logistics industries, amongst others.

Approximately 49% (~120ha) of the farm (Ptn 2 of Farm 92 Tregaron) has been transformed for agriculture. The portion of Sylvania which is proposed for development measures ~65ha, which represents 27% of the farm. The additional clearance of ~65h will result in ~21% of the vegetation on the Farm remaining intact. It is recommended by the Ecological Specialist that all other Natural Areas on Sylvania should be considered CBA/ESA and should therefore be retained.

By applying the mitigatory measures proposed *Construction Phase* direct and indirect impacts of medium to high significance can mostly be reduced to impacts of *medium to low negative or neutral impacts*.

The key direct and indirect impacts associated with the *Operational Phase* of the development can, by applying the mitigatory measures proposed is reduced from negative impacts of high to medium significance to *impacts of medium to low significance*.

The Environmental Assessment process has not identified any negative impacts that should be considered “fatal flaws” from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. Taking into consideration the findings of the EIA process, it is the opinion of the Environmental Assessment Practitioner that the project benefits outweigh the negative residual environmental impacts, provided that the specified mitigation measures are applied effectively, it is proposed that the project receive environmental authorization in terms of the EIA process.