CHAPTER THREE: DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section of the report provides an overview of the affected environment as well as a brief description of surrounding land use activities. It includes desktop level information regarding the biophysical, socio-economic and heritage attributes of the site, which aid in the process of identifying project activities which may have potential impacts on the environment and require further investigation. This information also highlights potential constraints the affected environment may place on the development. The information presented in this chapter is based on a desktop review of available literature, maps, planning frameworks, web based information resources, as well as a site visit to the affected property.

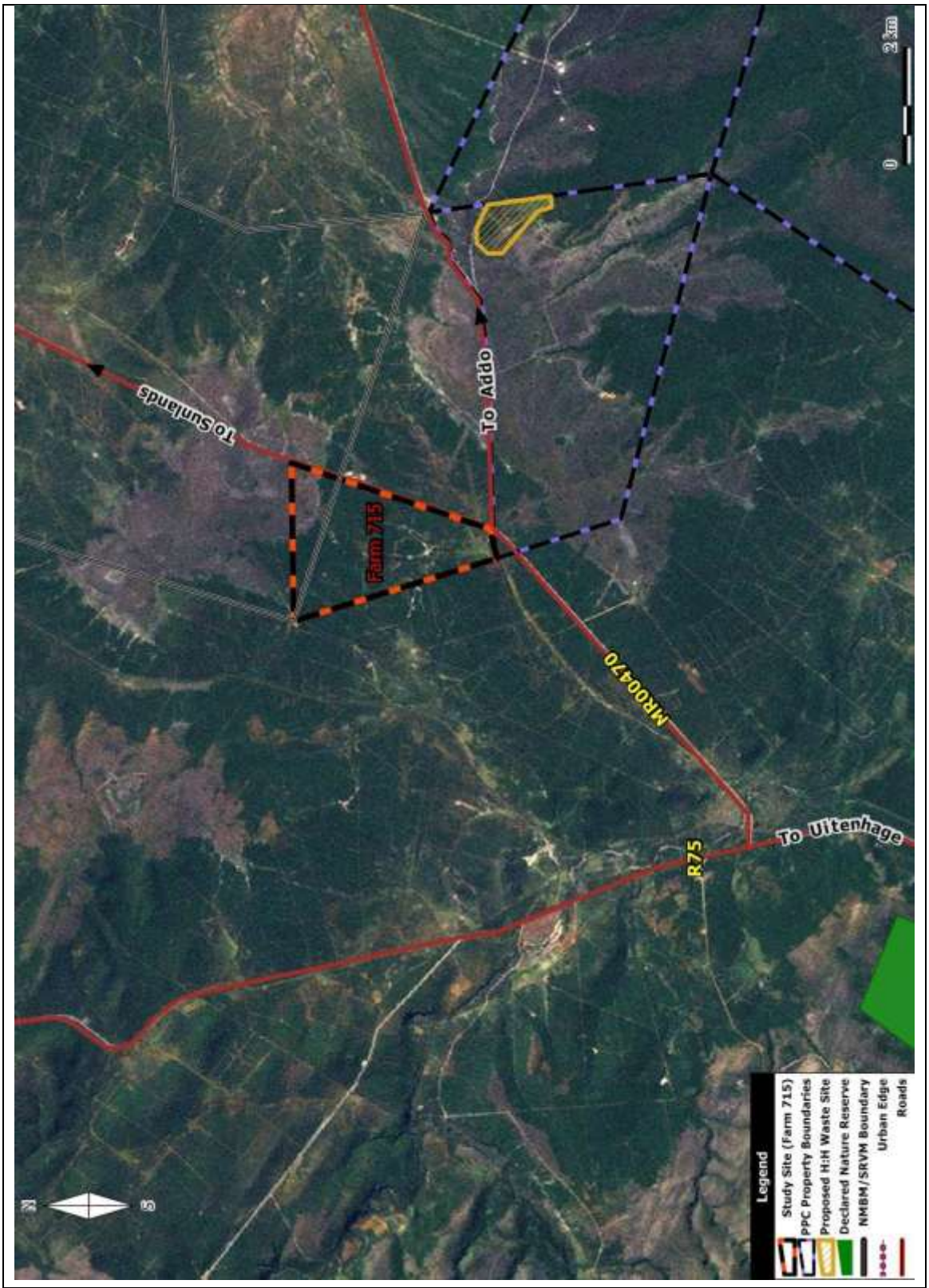
The proposed development will entail the establishment and operation of a composting and fertiliser processing plant (including associated infrastructure) of approximately 10.5 hectares on Farm 715 Division Uitenhage which is approximately 377 hectares in total extent. The process entails firstly, composting the poultry litter in windrows for a period of two to four months using an aerobic process on an area of about 10ha. Thereafter the composted litter (now referred to as fertiliser) can either be sold directly to users in bagged or bulk form; or be processed further (pelletised) before being sold. The applicant proposes a phased approach to the bagging, bulk storage; and further processing of the fertiliser. In the short term the fertiliser will be stored in a roofed structure (storage and collection area of the fertiliser processing plant) both in bagged and bulk form for distribution to users. However in the medium to long term, the roofed structure will be expanded to provide for the processing and pelletising of the fertiliser, before it is bagged or stored in bulk. Once fully developed, the footprint of the roofed structure will be approximately 2400m² (more detail in Chapter 2).

3.2 SITE LOCALITY AND OVERVIEW

Farm 715 Division Uitenhage is in the Grassridge area and straddles the boundary between the Sundays River Valley Municipality, and Nelson Mandela Bay Metropole. Access to the site can be gained by turning east off the R75 (Uitenhage / Graaff Reinet Road), approximately 14km from the town of Uitenhage, onto the MR00470 (Sunlands road). The site is located west of the intersection of the MR00470 (Sunlands) and P1958 roads, approximately 6km's north east from the turn off from the R75.

The farm is approximately 377 hectares in extent and is currently being used as rangeland for livestock and game. The existing farmhouse, outbuildings and work shed are located in the southern portion of the site. Irrigation dams are located in the central part of the site and are surrounded by indigenous vegetation (Sundays Thicket), which has been degraded and fragmented, to varying degrees. The northern extent of the property is covered largely by indigenous vegetation, which has also been degraded and fragmented. Informal vehicle tracks, cut-lines and animal paths traverse the property which is fully enclosed by a fence. An Eskom electrical servitude runs along the length of the western property boundary and the gravel Sunlands Road (MR00470) passes along the eastern property boundary.

Due to the fact that the entrance to the site is just off the intersection of a municipal and a provincial road it will be necessary to conduct a traffic impact assessment due to the anticipated increase in traffic created by the delivery vehicles to and from the site and the impact of these vehicles on the condition of these roads. Map 3.1 below indicates the locality of the property under assessment.



Map 3.1 Locality of the property under assessment.

Photo 3.1 Entrance to the site off the MR00470.

Photo 3.2 The existing farmhouse at the site.

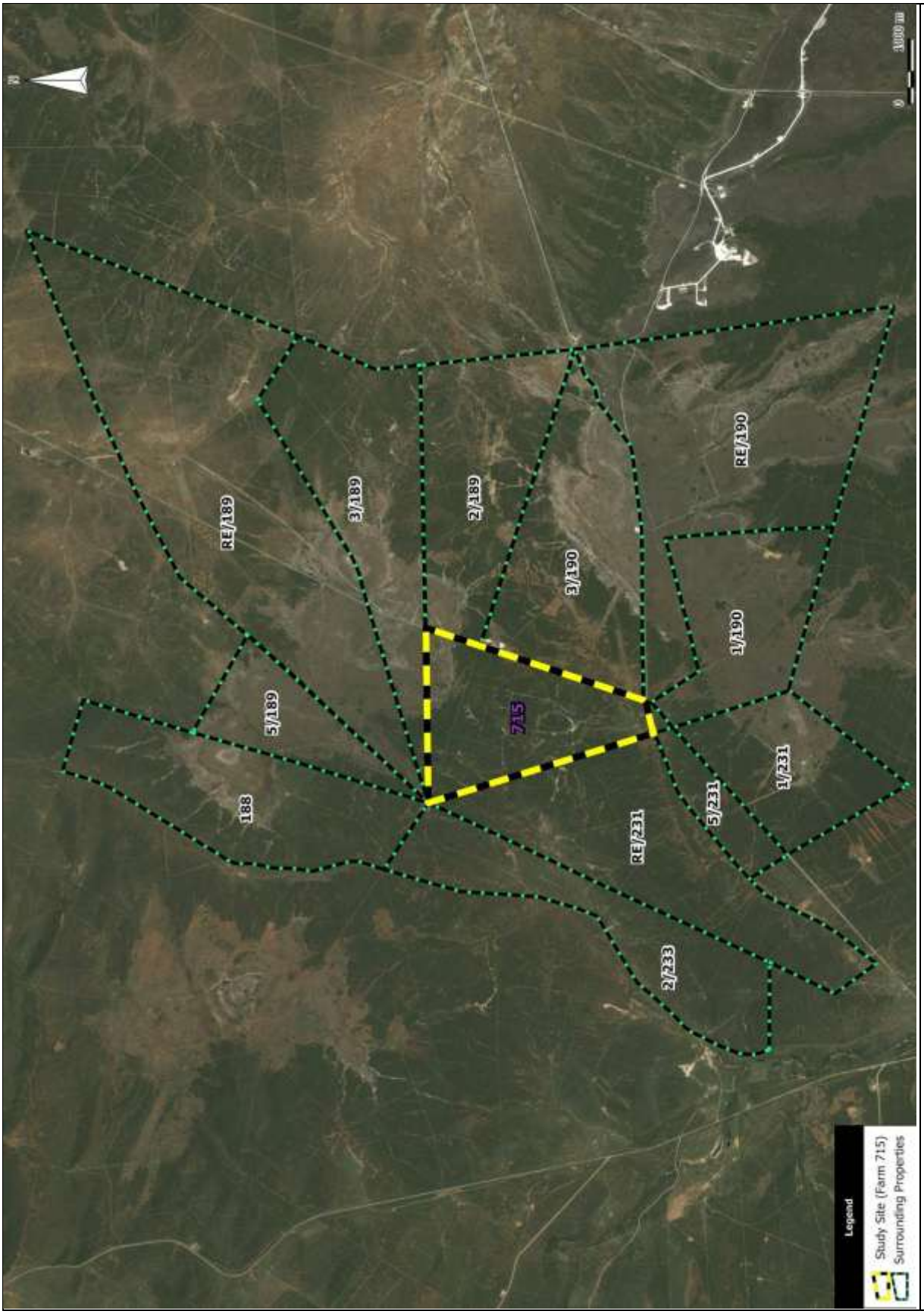
3.3 SURROUNDING LAND USES

The property is predominantly surrounded by farming activities, predominantly game and/or stock farms, with the PPC mine located immediately south east of the site. Activities on the land surrounding the study site identified to date include:

Adjacent Landowner	Farm Portions Owned	Land Use
Arthur Rudman	Farm 188	Livestock and Game Farming
Gideon van Eck	Portion 2 of farm 233	Livestock, Poultry and Game Farming
William Killian	Portion 3 of farm 189	Livestock and Game Farming
Johan Swart	Portion 3 of farm 190 and Remainder of Portion 2 of farm 189	Game Farming
Johannes Potgieter	Remainder of farm 189 and Portion 5 of farm 189	Livestock and Game Farming
Mike Muller	Portion 5 of farm 231 and Remainder of farm 231	Livestock and Game Farming
Gideon Barnard	Portion 1 of farm 231	Livestock, Birds and Game farming
PPC Mines (Bernard Venter)	Portion 1 of farm 190 and Remainder of farm 190	Mining

Located on the southern boundary of the site is the PPC owned land (calcrete mine) and the Grassridge Private Nature Reserve. Within the boundary of the PPC site, approximately 3.8 km east of Farm 715, is the site for the proposed Regional Hazardous Waste Site (H:H). The Springs Local Authority Nature Reserve is located approximately 8km's south west of the site, while the Addo Elephant National Park is approximately 25 km's away from the proposed site.

Map 3.2 on the following page provides an overview of the key surrounding land uses within proximity of the site. It has been noted in the section above that the site falls within an area designated for agriculture in terms of the NMBM Rural Land Use Management Policy.



Map 3.2: Study area (Farm 715) and surrounding properties (Portion No. / Farm No.).

Key surrounding land uses are as follows:

- Game farming and stock farming – the predominant activities on the northern, western and eastern boundary of the site are game farming and stock farming, with most landowners farming a combination of game and stock.
- Mining – immediately south east of the boundary of the site is the PPC mining area, with the Private Nature Reserve section of PPC immediately adjacent to the southern boundary of the site.
- Proposed Regional Hazardous Waste Site – approximately 3.8 km east of the boundary of the site, located on PPC land.
- Proposed Poultry Facility – approximately 4.5 km east of the boundary of the site is a proposed broiler facility (Farm 191 Coega Kammaskloof).
- Nature Reserve – the closest declared nature reserve to the site is the Springs Nature Reserve approximately 5.5 km south west of the boundary of the site.

3.4 BIOPHYSICAL ENVIRONMENT

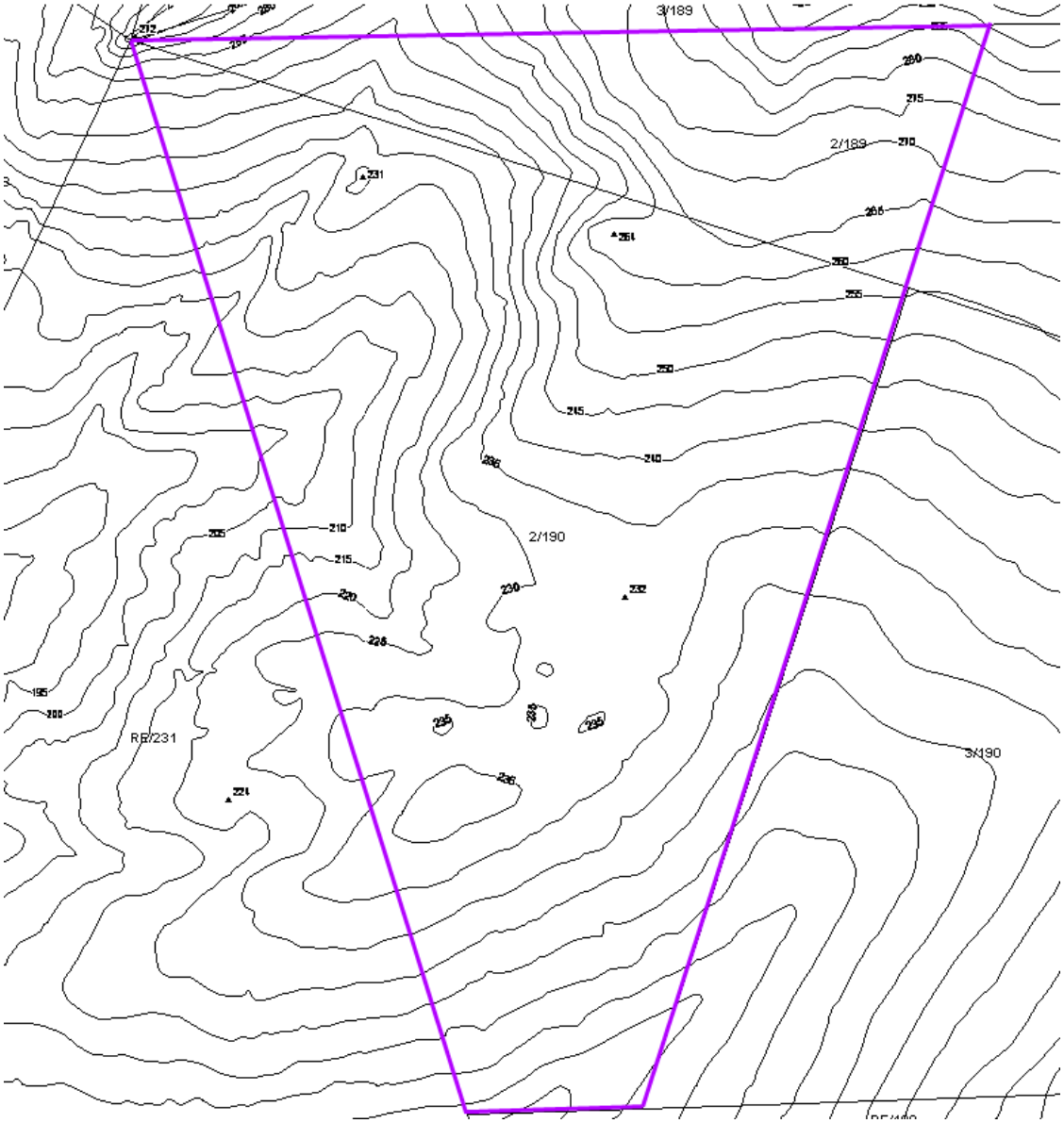
3.4.1 CLIMATE

The study area generally has a hot and dry climate, however winters can be cold. Average summer maximum and minimum temperatures are approximately 32°C and 15°C, with temperatures of 18°C and 5°C in winter. However minimum temperatures as low as -2°C have been recorded in winter months, while summer temperatures have been known to exceed 45°C. The area has a low rainfall and receives an average rainfall of less than 445 mm per year, with rainfall peaks in March and October.

3.4.2 LANDSCAPE AND GEOLOGY

Topography

The topography of the landscape within the study area (Farm 715 Division Uitenhage) is generally flat, sloping gently from the north east to the south west. The elevation of the area ranges from approximately 290 meters (above sea level) in the north eastern corner of the property to approximately 190 meters (above sea level) in the south western corner (See Map 3.3). The central portion of the site is relatively flat (at *ca*. 230 msl), while in the north there are a few gently sloped valleys.



Map 3.3: Topography of the study area (5m contours)

Drainage

The site lies between the Coega and Sundays Rivers, and falls within the M30A catchment which drains into the Coega River system. Surface runoff from the site is likely dictated by the topography of the site. Therefore it is presumed the northern portion of the site would drain to the south west, towards the Coega River. From the flat central portion southwards it appears the site drains to the south east, towards a non-perennial stream that cuts across the south eastern corner of the site, also eventuating in the Coega River system.

Geology

According to the geological map (*3325CB Uitenhage (North) and 3325DA Addo*) for the area the site is underlain by mudstone and sandstones of the Kirkwood Formation (Shown as J-Kk on geological maps). In the northeastern portion of the site these are covered, by quaternary sediments of the Nanaga and Alexandria formations (shown as T-Qa and Ta respectively on the geological maps).

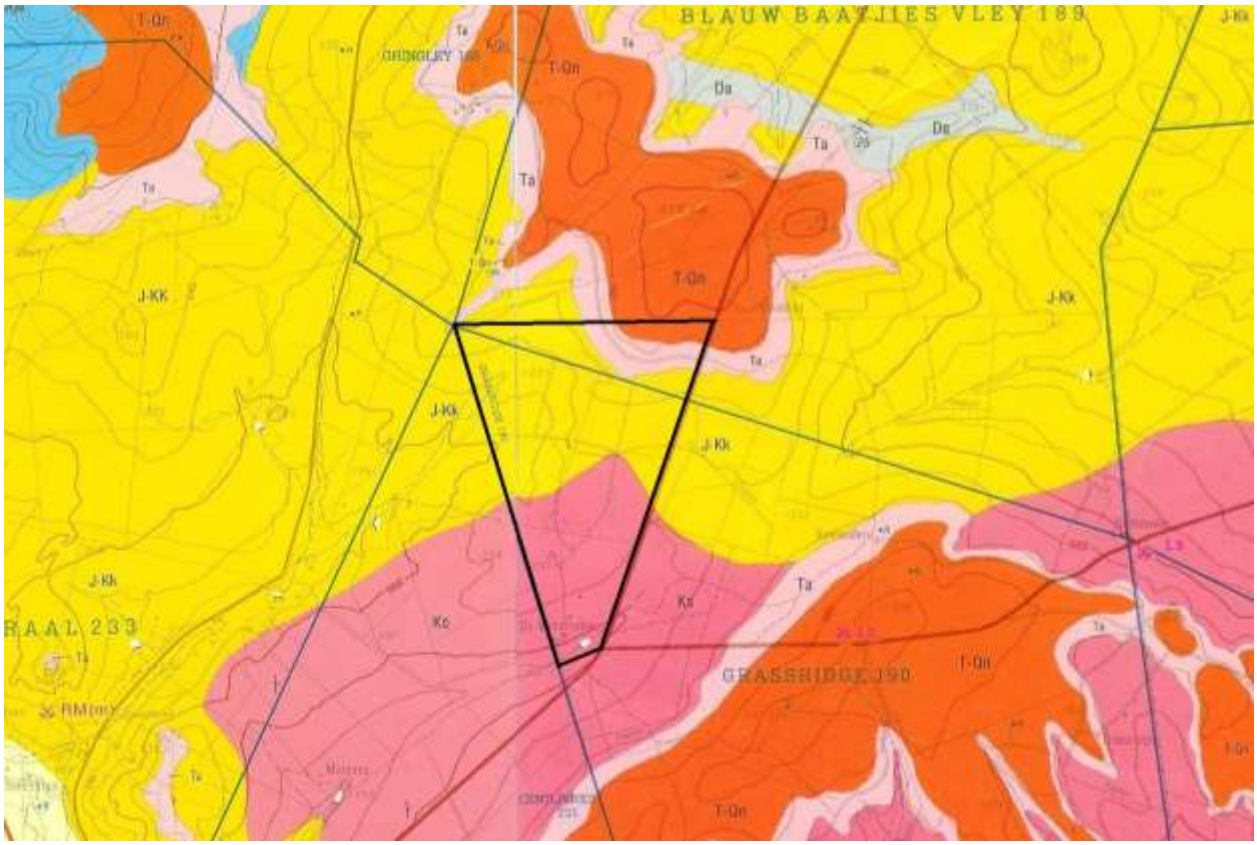
The Kirkwood Formation is thought to have originated in a fluvial depositional environment during the Cretaceous period. The formation includes silty mudstones and sandstones, as well as interbedded small pebble conglomerates. Some fossil finds have been made in these rocks, including plant, reptile and invertebrate fossils.

The Sundays River Formation consists of grey shales which were deposited in shallow marine environments during the Cretaceous period. The clay produced as a weathering product of this formation is a good source of raw material for local brick production. The formation is also reported suitable for the location of disposal sites due to the relative impermeability of these sediments which reduce the potential infiltration of polluted leachate (Rust, 1998 in Lubke & De Moor). Hence, the proposed Regional Hazardous Waste Site in close proximity to the Farm under assessment.

Approximately 90% of the site is underlain by the Sundays River and Kirkwood Formation (mudstone and shales of the Sundays River Formation). It is thus highly likely that the footprint of the composting facility will be located on either or both of these Formations. The presence of these geological formations will be confirmed through the environmental assessment process, as well as, the impermeability of these Formations.

The Alexandria Formation originates from Miocene / Pliocene beach sediments which formed sandy limestone deposits in the Eastern and Southern Cape coastal areas. The Formation is responsible for the calcrete layer which is mined from the hill tops in the Grassridge area for the production of Portland cement.

The Alexandria formation is overlain by the sandy aeolian sediments of the Nanaga Formation. In some areas these form substantial dune cordons, particularly along the coast east of the Sundays River. In the study area these are present as shallow sandy deposits on the flat elevated northeastern portion of the site.



Map 3.4 Geology of the study area: J-Kk (Yellow) - Kirkwood Formation - *Reddish and greyish mudstone and sandstone;* Ks (dark pink) – Sundays River Formation - *Grey shales*; Ta (light pink) – Alexandria Formation – *calcrete*; T-Qn (Orange) – Nanaga Formation - *sandy aeolian sediments.*

3.4.3 GEOHYDROLOGY AND SURFACE WATER

Due to the sloped nature of the site, the area is expected to have good drainage, which will follow the topography as described above. No rivers or streams with aquatic or riparian habitat were noted at the site during the site visits; however there are a number of low lying areas which would concentrate surface runoff during periods of prolonged or heavy rainfall. These are considered watercourses as these represent natural depressions in which water would flow intermittently. This intermittent flow is also evident in the small impoundments which had been created in these areas to capture water for use in agricultural activities (stock watering). While at least three such water impoundments were noted during the site visit, these did not contain any discernable indications of wetland habitat (reeds, sedges, hydrophilic vegetation).

Typical wetland habitat was however noted in the areas associated with the storage dams at the site. These reservoirs take the form of aboveground embankment dams in which groundwater from boreholes is stored. These presumably contain water for extended periods, facilitating the establishment of wetland habitat and biota. The distribution, condition and function of wetlands and watercourses on the site will need to be evaluated by the wetland specialist assessment in the EIA phase of the assessment.

	
Photo 3.3 Impoundment on a drainage line at the site – no "wetland" biota noted.	Photo 3.4 Storage (embankment) dam with wetland habitat.

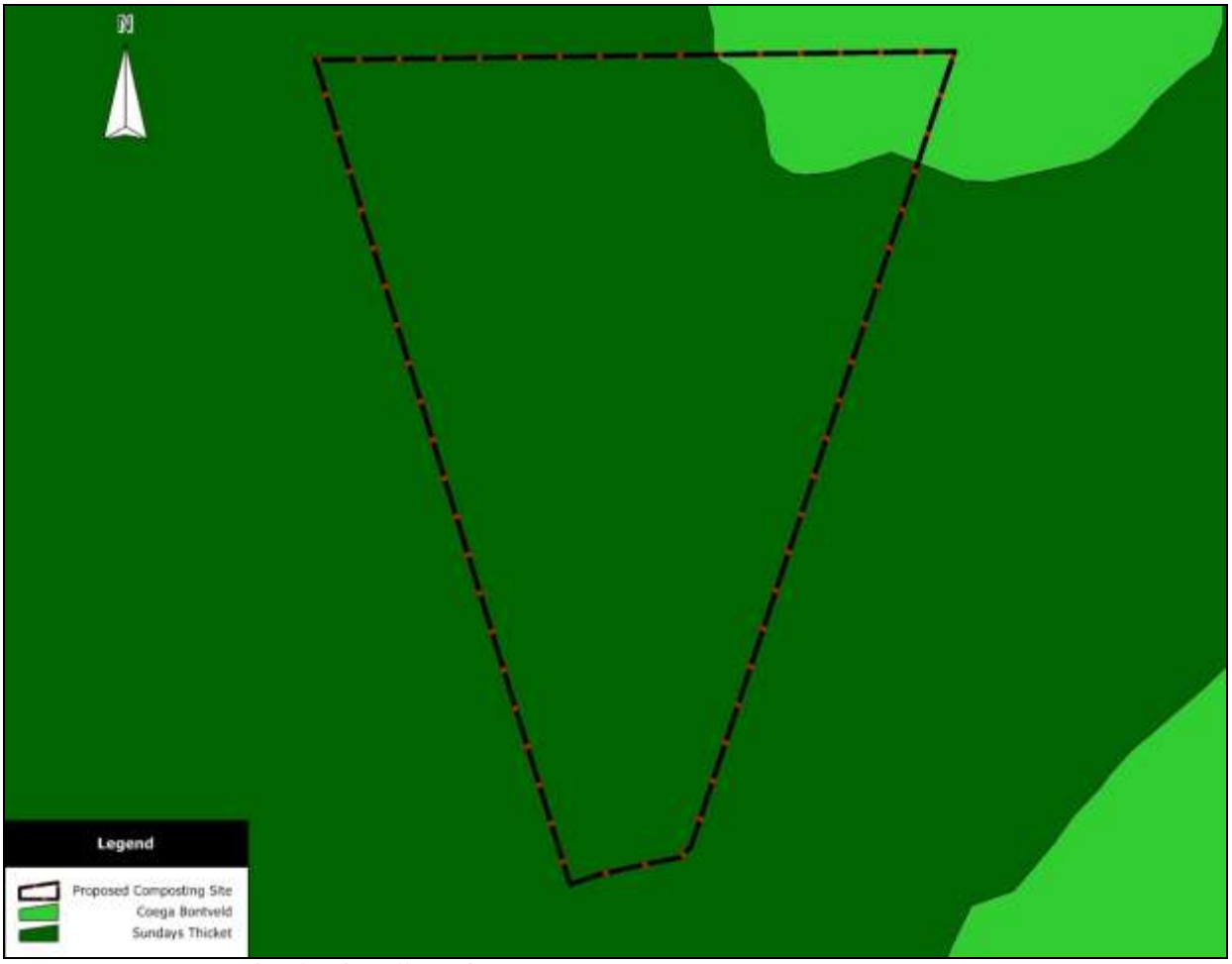
Groundwater is known to be present at the site, and is currently being utilized as a source of potable water for the farm, as well as for use in agricultural activities. A number of boreholes were noted during the site visit, not all of which are being utilized for the extraction of groundwater. The proposed use and potential vulnerability of groundwater resources at the site will need to be assessed by the Geohydrological specialist during the EIA phase of the assessment.

3.5 VEGETATION

The vegetation expected to occur at the site is described in a number of conservation planning framework documents relevant to the general area. The resolution of the planning framework mapping is limited to a landscape level, and the vegetation types and distribution on individual farms is subject to confirmation by a botanical specialist. The section below outlines the findings of the relevant conservation planning frameworks.

3.5.1 NATIONAL CONTEXT

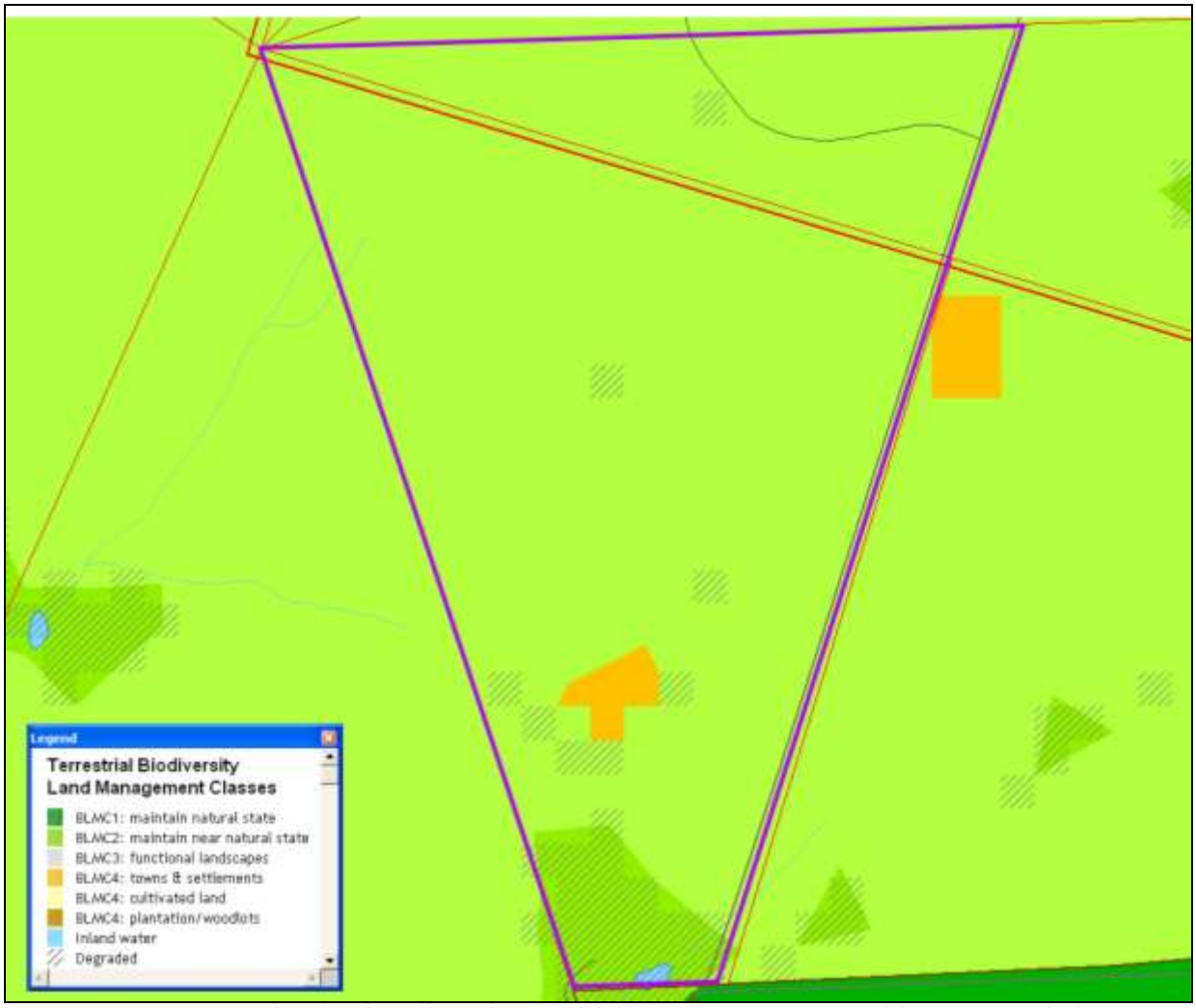
The **NSBA** (National Spatial Biodiversity Assessment) and the Vegetation Map of South Africa, Lesotho and Swaziland (VEGMAP, Mucina and Rutherford, 2006) maps show the majority of the vegetation on the property as Sundays Thicket, which is considered Poorly Protected, but has an Ecosystem Status of *Least Threatened*. It also shows there to be Coega Bontveld in the northeastern corner of the property, which is also Poorly Protected and has an Ecosystem Status of *Least Threatened* (Map 3.5).



Map 3.5: NSBA Mapping for the affected area.

3.5.2 REGIONAL CONTEXT

The **ECBCP** (Eastern Cape Biodiversity Conservation Plan) map indicates that the proposed development falls within a CBA2 (Critical Biodiversity Area 2), Corridor 1 (Map 3.6). This indicates that the area represents a portion of a biodiversity / ecological corridor in the landscape. CBA2 areas should be maintained in a near natural state (Berliner and Desmet, 2007). In addition, the ECBCP indicates that the southern portion of the site is “Degraded” and a portion towards the centre of the site is “Urban”, which is most likely intended to represent the farmhouse and outbuildings on the property, but this will be confirmed during the EIA phase of the assessment.



Map 3.6: ECBCP Mapping for the affected area. (Light Green - CBA2, Hatching – Degraded, Orange - Urban).

STEP (Subtropical Thicket Ecosystem Programme) (Pierce & Mader 2006.) - According to the STEP mapping resources the site is mostly covered by Sundays Valley Thicket, with a small portion of Grass Ridge Bontveld indicated in the north eastern corner (Map 3.7). Both of these vegetation types are classified as *currently not vulnerable*. According to the STEP Conservation Priority Map Guideline document this classification means that these areas can tolerate some disturbance from developments but that developments should preferably take place on sites that have undergone impacts, rather than on pristine sites. The STEP Transformation maps further show that most of the southern portion of the site is currently transformed.

Map 3.7: STEP Mapping for the affected area.

CAPE (Cape Action for People and the Environment) - According to the CAPE mapping resources the site is covered by Addo Xeric Succulent Thicket but it does not assign a conservation status to the vegetation. It does, however, assign a relatively low irreplaceability value.

3.5.3 LOCAL CONTEXT

The **Conservation Assessment and Plan** for the Nelson Mandela Bay Municipality (NMBM CAP) underpins the municipality's Bioregional Plan, which is in the process of being adopted by the relevant authorities.

According to the NMBM CAP, the vegetation at the site is Sundays Valley Thicket, however, unlike STEP, the NMBM CAP assigns an ecosystem status of *Vulnerable to this vegetation type*. The northern portion of the site falls within the boundary of the Sundays River Valley Municipality and thus this portion of the site that is mapped by STEP and NSBA as Grass Ridge Bontveld and Coega Bontveld respectively, has not been mapped in terms of the NMBM CAP. It is believed, however, that this portion of the site would have been mapped as Grass Ridge Bontveld (which is assigned an ecosystem status of *Vulnerable* in the NMBM CAP). This portion of the site is however not proposed for development. The NMBM CAP also shows the southern portion to be transformed (by agricultural activities), which is consistent with the STEP and ECBCP maps.

3.5.4 VEGETATION ON SITE

The initial site visit and overview of the vegetation at the site confirmed the presence of the Sundays Thicket vegetation types described above as well as the transformation and degradation indicated in the ECBCP, STEP and NMBM CAP. The southern portion of the site has been cleared historically for agricultural activities (crop farming). However, transformation is not restricted to the southern portion as the majority of the rest of the site has also been altered from its natural state by game and/or stock farming.

The vegetation that may be affected by the proposed development could include: transformed or degraded vegetation and Sundays Valley Thicket. The Grass Ridge Bontveld in the northern extent of the property is not proposed for development. The vegetation affected by the development proposal will require confirmation through the environmental assessment process.

3.5.4.1 Transformed vegetation / cultivated lands

The site has suffered varying degrees of degradation and transformation. The southern portion is practically completely transformed as it was historically cleared, presumably for crop farming and / or grazing. The vegetation on the remainder of the site, predominantly thicket, is generally somewhat degraded by previous heavy grazing, and somewhat fragmented by cutlines and vehicle tracks. Patches throughout the vegetation have been transformed by overgrazing and trampling, most notably near watering holes and dams, as well as along pathways to these areas. There are also signs of historical excavation of rock (calcrete), most likely for the construction and maintenance of vehicle tracks on the property.

3.5.4.2 Sundays Thicket

Most of the site is dominated by Sundays Valley Thicket which is invaded to varying degrees by Prickly Pear (*Opuntia ficus-indica*). The thicket has also been impacted by cut-lines and vehicles tracks, as well as clearing in patches as a result of trampling by livestock. The thicket on the site is reasonably open possibly due to past heavy grazing. This alteration of the thicket structure is more marked towards the southern portions of the site, near the livestock enclosures. The species composition and condition of the Thicket vegetation will be confirmed by a biodiversity specialist in the EIA phase of the assessment.

Photo 3.5 Transformed area (pasture) in the southern portion of the site.

Photo 3.6 Sundays Thicket dominating the greatest part of the site.

3.5.4.3 Grass Ridge Bontveld

The vegetation in the north-eastern corner of the site resembles Grass Ridge Bontveld, i.e. thicket bush-clumps in a matrix of grasses and small fynbos shrubs. This vegetation type is considered Vulnerable, however it is known to be habitat for the Critically Endangered Albany Adder, as well as the Endangered plant *Syncarpha recurvata*, and the Vulnerable Blue Crane (*Anthropoides paradisea*). The composition and condition of this vegetation type on the site will be confirmed by the biodiversity specialist in the EIA phase of the assessment. It is also recommended that the specialist consider the potential occurrence of the above mentioned species of special concern in the assessment. However, this portion of the site is not proposed for development.

3.5.4.4 Wetland Habitat

There is some wetland habitat on the property most notably that which is associated with the earthen embankment ponds used to store groundwater on the site, which perennially contain water. The occurrence, locality and importance of wetlands on the site will be confirmed by a wetland specialist during the EIA phase of the process. (Also see section 3.4.3. of this chapter).

Photo 3.7 Coega Bontveld in the north-eastern corner of the site.

Photo 3.8 Wetland habitat associated with the storage dams on site.

3.5.5. CRITICAL ECOLOGICAL PROCESS AND BIODIVERSITY AREAS

The Biodiversity Planning Resources for the area do not show any Critical Ecosystem Process (NMBM CAP) areas or Ecological Corridors (STEP) on the site.

3.5.6 CONCLUDING REMARKS

The findings and recommendations of the conservation planning frameworks for the area should be confirmed by a biodiversity / vegetation specialist in the EIA phase of the assessment. If necessary, suitable recommendations should be made for the incorporation of the requirements of the conservation planning frameworks into the development. It is recommended wetland and vegetation specialist assessments are undertaken during the EIA phase of the assessment to, inter alia:

- Identify and assess vegetation on the site
- Identify and assess wetlands on the site

3.6 FAUNA

The extensively transformed southern portion of the site is not expected to contribute meaningfully as faunal habitat. Faunal numbers on this portion of the site are generally expected to be low.

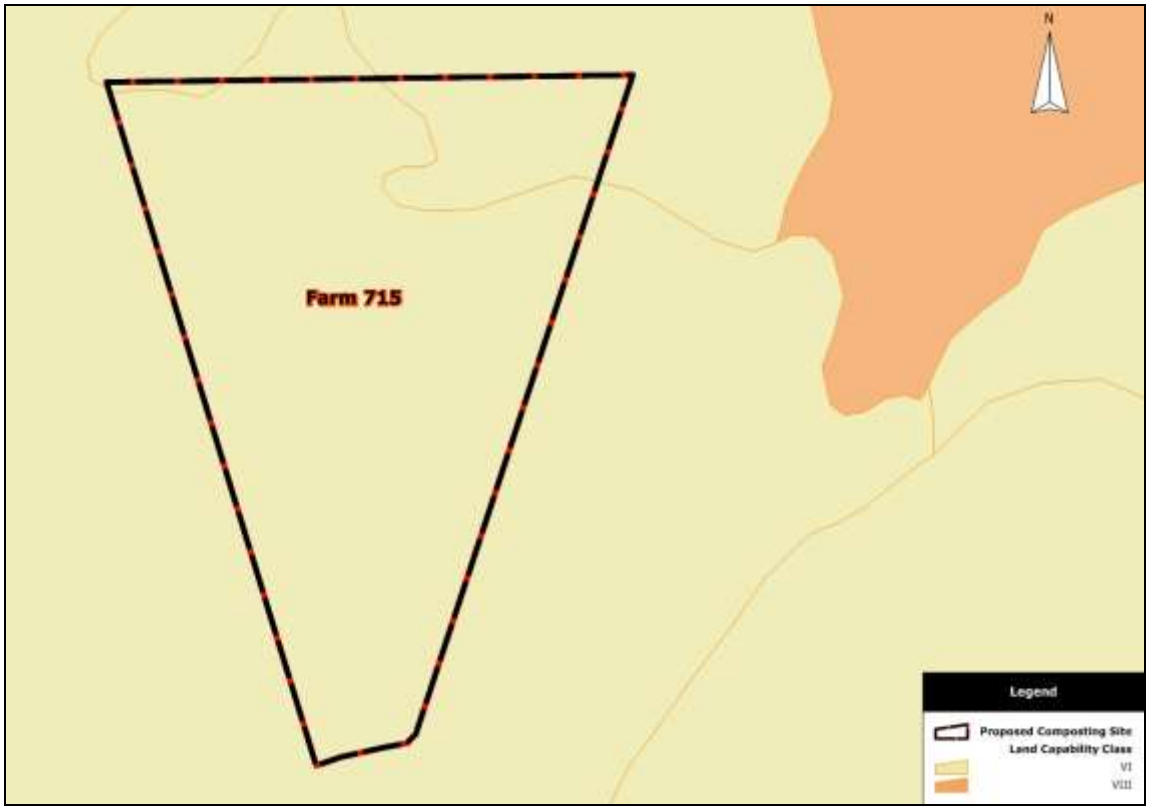
The rest of the site which is covered by less transformed thicket vegetation and/or Bontveld is likely to have resident populations of a diverse range of thicket fauna. These could include large and small mammals such as kudu, bushbuck, blue duiker and monkeys, as well as a variety of bird and reptile species.

The Ecological Specialist Assessment that will form part of the EIA phase of the assessment should consider the potential occurrence of Rare and Endangered fauna on the site within the context of the type and extent of faunal habitat on the site.

3.7 AGRICULTURAL POTENTIAL

The AGIS mapping resources were used to obtain information on the Land Capability of the site (www.agis.agric.za). The area proposed for development falls into Land Capability Class VI (see map 3.8). Land Capability classification takes into consideration the terrain, soil conditions and climate in the area and is a means of determining the agricultural potential of the site. Land in Class VI has severe limitations that make it generally unsuited for cultivation and limits its use largely to pasture and range, woodland or wildlife food and cover. Land in Class VI has continuing limitations that cannot be corrected, such as:

- Steep slope
- Severe erosion hazard
- Effects of past erosion
- Stoniness
- Shallow rooting zone
- Excessive wetness or flooding
- Low water-holding capacity
- Salinity or sodicity
- Severe climate



Map 3.8: Agricultural Land Capability (Light Yellow - Land Capability Class VI, Orange - Land Capability Class VIII).

The proposed development will thus not result in the loss of high grade agricultural land. Current farming practices (game farming) may continue to take place on the remaining portions of the farm (±366.5 ha).

3.8 HERITAGE RESOURCES

Certain cultural and heritage resources are protected under the National Heritage Resources Act, No 25 of 1999. These may include structures older than 60 years; archaeological and palaeontological sites and materials, and meteorites; certain burial grounds and graves; declared heritage objects; and declared heritage sites.

No graves, burial site, or structures older than 60 years were noted at the site during the site visit. However the site should be surveyed for the presence of graves or burial grounds and the potential impacts on these addressed in the EIA phase of the assessment.

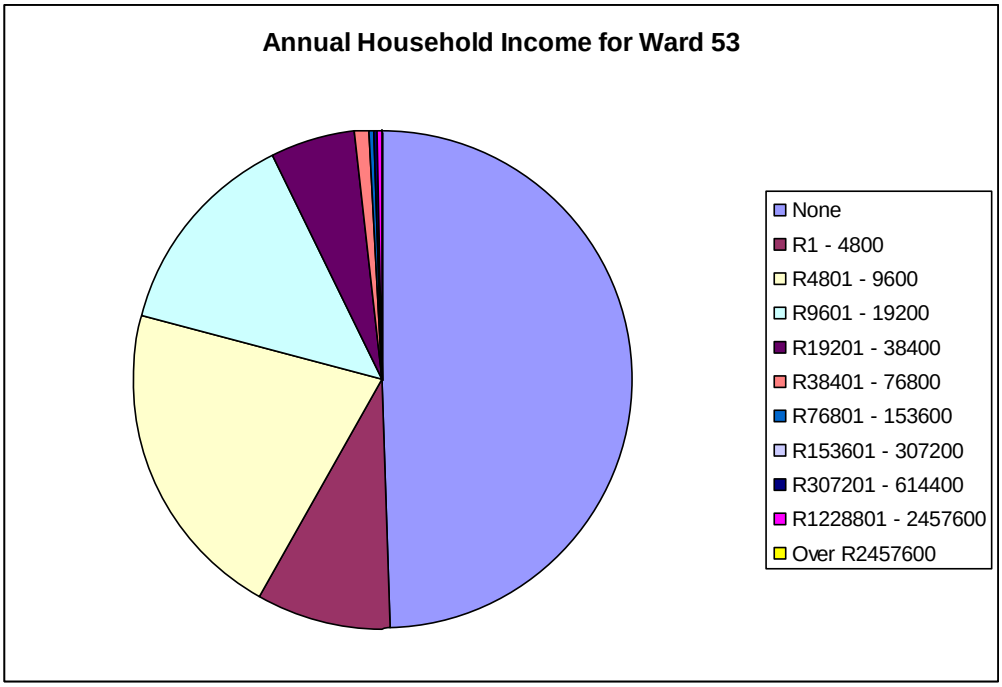
The Sundays River and Kirkwood Formations are known to be fossil bearing strata. While deep excavations are not planned at the site, it is likely that some excavation and earthworks will be required for the establishment of the proposed fertiliser processing facility.

It is recommended that a desktop Palaeontology assessment and a phase 1 Archaeological Impact Assessment is undertaken during the EIA phase of the assessment in order to address the above.

3.9 SOCIO- ECONOMIC

The study site is located in Ward 53 of the Nelson Mandela Bay Municipality. The Ward is approximately 70 000 hectares in extent and consists mostly of the Uitenhage Farms. Its spans the entire width of the metro from the western boundary to Colchester and extends as far south as Despatch and as far north as the northern metro boundary.

Population statistics from the 2001 Census, indicate that Ward 53 has a predominantly black population, with a large proportion of low income earners. The greatest majority (over 75%) of the population earns below R10000.00 annually, and the ward has a high unemployment rate (approximately 50%).



The 2009 SDF for the NMBM indicates that 44% of the economically active population is unemployed and 38% of the total households are indigent. The proposed composting and processing facility will create temporary employment during the construction phase and permanent employment for approximately 9 individuals from nearby settlements in the operational phase, thereby contributing to the reduction of unemployment for the metro.

3.10 CONCLUSION AND RECOMMENDATIONS

Key issues identified thus far, which require specialist assessment in the EIA phase of the assessment, are:

- Biophysical site assessment to include:
  - Mapping of sensitive features and assigning appropriate no development buffers
  - Identification and verification of Critical Biodiversity Areas on the site
  - Potential project related impacts on natural vegetation and faunal habitat need to be considered
- Wetland specialist assessment
  - The occurrence, locality and importance of wetlands on the site will be confirmed by a wetland specialist assessment.

- Heritage specialist Assessment
  - It is recommended that a desktop Palaeontology assessment and a phase 1 Archaeological Impact Assessment is undertaken.
- Air quality specialist assessment
  - A specialist Air quality assessment will need to determine the air quality impacts of the composting process and the fertiliser plant
- Geohydrological assessment
  - To establish suitable placement of the composting site relating to soil infiltration and groundwater contamination
  - Assessment of the borehole yield
- Stormwater Management Plan
  - Provision of stormwater infrastructure to manage and treat stormwater runoff from the composting facility and fertiliser plant
- Traffic Impact Assessment
  - To determine the impacts of the development-related traffic on the condition of the roads in the vicinity.