ASPHALT PLANT – ECOLOGICAL ASSESSMENT

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THE RECTIFICATION OF THE UNLAWFUL COMMENCEMENT OF A LISTED ACTIVITY: THE ESTABLISHMENT OF AN ASPHALT PLANT.

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A SPECIALIST STUDY: AN ECOLOGICAL EVALUATION TO ASSIST IN THE RISK ASSESSMENT PROCESS

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Abbreviations

AEL	Atmospheric Emission License
BGIS	Biodiversity Geographic Information System
^{0}C	Degrees Celsius
CBA	Critical Biodiversity Areas
cm	Centimetre
Cr	Chromium
DARDLEA	Department of Rural Development, Land and Environmental Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
E	East
Ecoclassification	Ecological classification
EcoStatus	Ecological Status
EIA	Environmental Impact Assessment
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Areas
ha	Hectare
HFO	Heavy Fuel Oil
km	Kilometre
l	Litre
LUDS	Land-Use Decision Support Tool
mamsl	Metres above sea level
m	Meter
mm	Millimetre
MTPA	Mpumalanga Tourism and Parks Agency
NEM:AQA	National Environmental Management: Air Quality Act
Ni	Nickel
NFEPA	National Freshwater Ecosystem Priority Areas
PES	Present Ecological State
PESEIS	Present Ecological State, Ecological Importance and Ecological Sensitivity
Pty (Ltd)	Proprietary limited company
S	South

1. Introduction

1.1 Project description

Locality:

The development was established on Portion 57 of the farm Strathmore 214, Nelspruit District, Mpumalanga at the following coordinates: 25°31'55.52"S and 31°27'2.48"E

Please refer to the map attached hereto (Figure 1) for an indication on the location of the activities (BID, 2020).

Although the Asphalt Plant has been established on site, it is not yet in operation (no asphalt is being produced yet). It is planned that operation will start middle August 2020. The Asphalt Plant has the capacity to store approximately 296 000 L dangerous goods on site in the form of diesel (1 × 23 000L tank), Paraffin (1 × 23 000 L tank), bitumen (approximately 204 000 L) and Heavy Fuel Oil (HFO) (2 × 23 000L tanks).

The basic operation of the Asphalt Plant includes heating raw aggregate inside a dryer bin using a paraffin burner. This heated aggregate is then screened and separated and stored in different bins according to size. The aggregate then gets weighed and discharged into a mixing unit where it gets mixed with heated bitumen. The final product (asphalt) then gets discharged into silos to be stored or into trucks to be transported to site.

It should be noted that this project is of national importance, as the asphalt produced by the Asphalt Plant will be used to upgrade the N4 National Road.

Site Description:

The site has an approximate footprint of 1.4 ha. However, no indigenous vegetation was cleared for the establishment of the Asphalt Plant, as the site is located on a Magnesite mine. Thus, the site was significantly disturbed prior to the establishment of the Asphalt Plant.

The site is located approximately 250 m from a NFEPA wetland. The Crocodile River is located approximately 3 km north of the site.

The Asphalt Plant uses municipal water on site.

The site falls within the Baberton Serpentine Sourveld and the Kaalrug Mountain Bushveld vegetation types. These vegetation types are classified as Least Concern according to the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). Please refer to the Sensitivity map in Figure 7.

Turn 180 Environmental Consultants was appointed by the applicant (i.e. At Road Construction (Pty) Ltd) as Environmental Assessment Practitioner to manage the required authorisation processes on their behalf. An application will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (“DARDLEA”) to obtain EA. An application will also be submitted to the Ehlanzeni District Municipality to obtain an AEL.

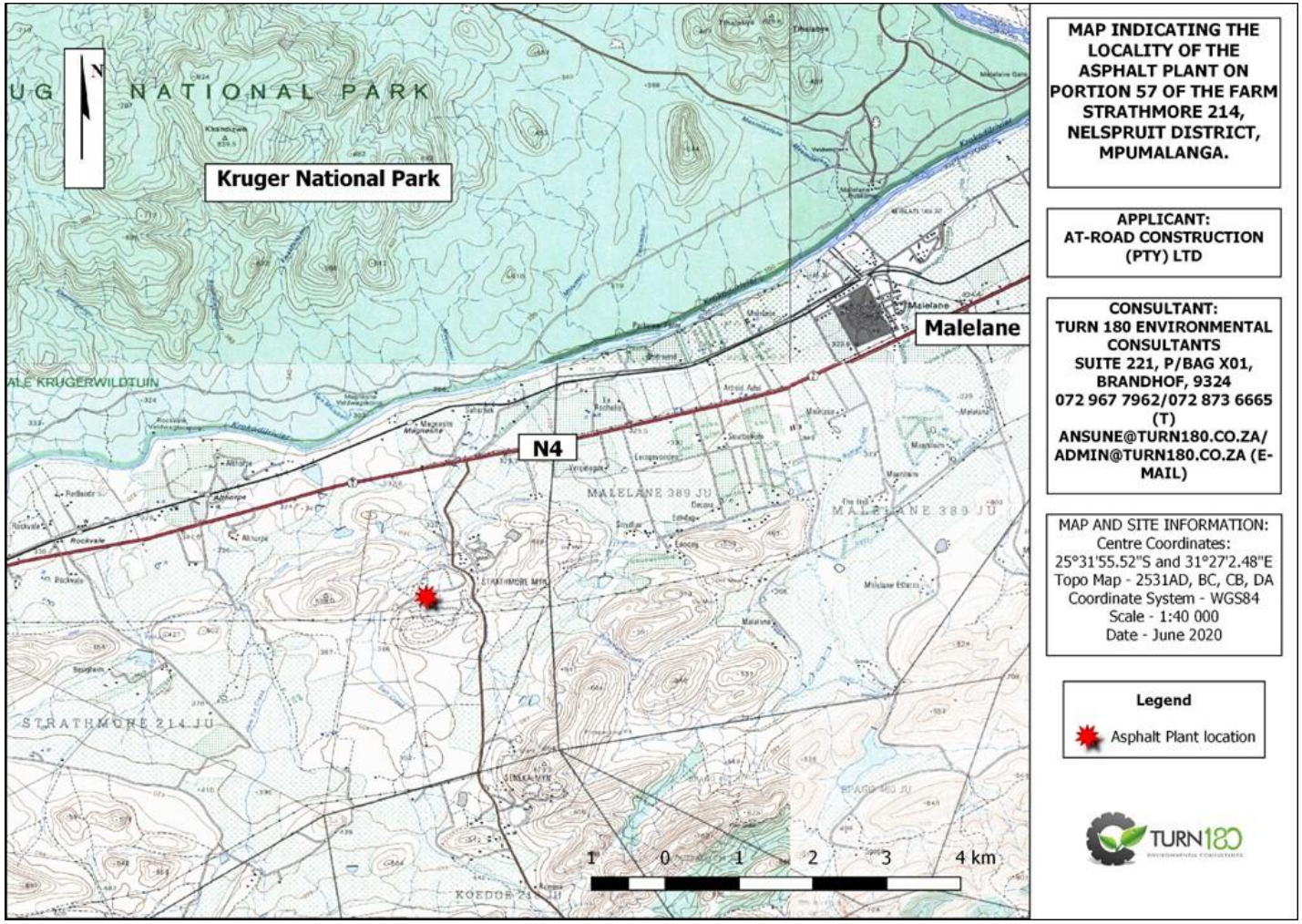

Figure 1: Asphalt Plant locality.

1.2 Legal considerations

The rectification of the unlawful commencement of a listed activity: The establishment of an Asphalt Plant on Portion 57 of the farm Strathmore 214, Nelspruit district, Mpumalanga (BID, 2020).

Notice is given of an application for Environmental Authorisation ("**EA**") in terms of Section 24(G) and 24(F) of the National Environmental Management Amendment Act (Act No.62 of 2008) for rectification of the unlawful commencement of a listed activity – the establishment of an Asphalt Plant on Portion 57 of the farm Strathmore 214, Nelspruit District, Mpumalanga.

The activity commenced with is Activity 14 of GN R. 327 of the Environmental Impacts Assessment ("**EIA**") Regulations of 2014 as amended – "*The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres"*.

An Asphalt Plant is also scheduled as a Macadam Preparation Process which normally requires an Atmospheric Emission License ("AEL") in terms of the National Environmental Management: Air Quality Act ("NEM:AQA")(Act No. 39 of 2004). However, a letter was issued by the Ehlanzeni District Municipality (Competent Authority for the AEL) exempting the facility from complying with the provisions of Chapter 5 of NEM:AQA, because the facility is currently a mobile, temporary emitter that was planned to operate on the site for less than 2 years.

However, the applicant intends to tender for more road construction projects in the area and would in this case need to extend the operating period of the Asphalt Plant. Therefore, application for an AEL will also be lodged.

Related Activities

The following activities will be applied for:

GN. R. 327 of the 2014 EIA Regulations as amended:

- Activity 14 – "*The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."*

GN. R. 325 of the 2014 EIA Regulations as amended:

- Activity 6 – "*The development of facilities or infrastructure for any process or activity which requires a permit or license or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent".*

GN. R. 893 of the NEM:AQA 2013 Regulations:

- *Category 5: Mineral Processing, Storage and Handling, Subcategory 5.10: Macadam Preparation - "Permanent facilities used for mixtures of aggregate; tar or bitumen to produce road-surfacing materials."*

1.3 Project brief

This project proposal was prepared for a Specialist Study: An ecological assessment relating to an asphalt plant on a mine situated on Portion 57 of the farm Strathmore 214, Nelspruit district, Mpumalanga. The assessment will include a survey to establish the ecological setup of the remaining vegetation at the mine and the nearby creek, and the possible impact of the asphalt plant operation on these systems.

It is expected that, if there are adverse impacts stemming from the operation, the most important habitats to be impacted on will be the remaining pockets of vegetation in the mining area and the creek in the valley adjacent to the mining area.

The study will attempt to establish possible impacts by the operation which will include the following services/specialist components:

Task 1: The receiving environment

1. Describe, within context to the area of potentially impact, aspects associated with the facility and current operations:

- Composition, sensitivity and associated habitats of the remaining pockets of vegetation;
- Topography and drainage associated with the facility connecting the operational area with the lower lying areas and valley containing the creek;
- The ecology of the creek wetland including riparian and aquatic screening.

Task 2: Ecological risk assessment

In order to evaluate the possible impacts on the receiving valley bottom, it is proposed that the Ecological Risk Assessment Matrix of the Department of Water and Sanitation should be utilized. This assessment will indicate the level of probable influence of the operation on the system in the valley. The risk assessment will finally be rated as having a low, medium or high ecological impact.

2. Biophysical Background of the Catchment

2.1 Vegetation & Landscape Features

The vegetation type of the project area consists of Barberton Serpentine Sourveld **(**SV 13; Mucina & Rutherford, 2006).

Distribution: Mpumalanga Province: Occurs in fragmented patches on the exposed ultramafic substrates in a triangular region extending from Malalane in the east, to Badplaas, Barberton and eastern Swaziland in the south and to west of Nelspruit in the north. Altitude 350-1 400 m.

Vegetation & Landscape Features: Often hilly, but very varied terrain. The southern ultramafic outcrops support herbaceous grasslands with stunted woody vegetation with more woody vegetation apparent within the lower-lying Noordkaap area and towards Malelane.

Geology & Soils: Soils derived from ultramafic lavas (including komatiites and serpentinites), predominantly of the Onverwacht Group of the Barberton Supergroup (Barberton Greenstone Belt). The ultramafic geology gives rise to soils with unusually high magnesium: calcium ratios. These soils are associated with high concentrations of heavy metals such as Ni and Cr, which are generally toxic to most plants.

Climate Summer rainfall with dry winters. MAP about 600- 1 150 mm. Frost infrequent. See also climate diagram for SVI 13 Barberton Serpentine Sourveld.

Conservation: Vulnerable. Target 24%. Almost 6% statutorily conserved in the Songimvelo and Barberton Nature Reserves, amongst others. Almost 2% conserved in addition in private reserves including Queensriver and Boondocks. More than one quarter of the area has been transformed, mainly by plantations and cultivation.

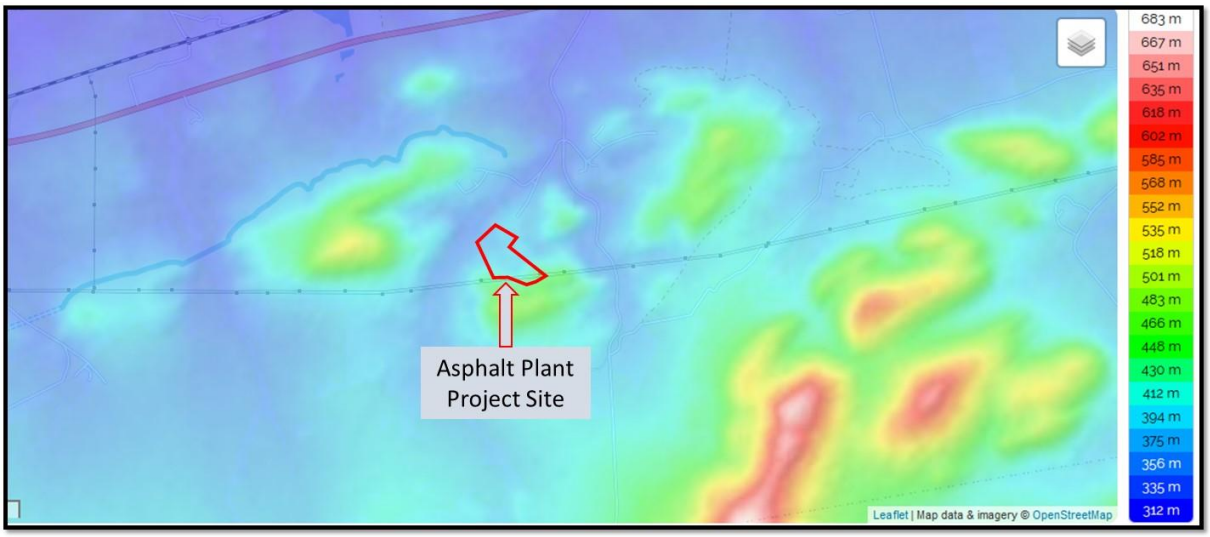

Figure 2: Altitude in the project area varies from *c*. 394 to 412 mamsl and comprises a hilly area to the south of the farm, draining down the slope to the Salt Creek valley to the north of the farm.

2.2 Catchment and Wetland Setting

Portion 57 of the farm Strathmore 214, is situated in the Crocodile River Sub-Water Management Area which form part of the Inkomati drainage system, and the project site is located in quaternary catchment X24D (Figure 3).

Ecoregion and River Characteristics

Ecoregions are groups of rivers within South Africa, which share similar physiography, climate, geology, soils and potential natural vegetation. For the purposes of this study, the ecoregional classification presented by Department of Water Affairs and Forestry in 1999 (DWAF, 1999), which divides the country's rivers into ecoregions, was used. The project site is located in quaternary catchment X24D with the development taken place within the catchment of the Salt Creek, a first order, naturally seasonal tributary of the Crocodile River, draining the Lowveld (3.07) Ecoregion.

The Salt Creek runs past the Strathmore Magnesite Mine and it is dammed by the Strathmore Dam in the valley directly north-west of the mine (Figure 5). Due to the fact that the Salt Creek drainage line is not a significant tributary and thus not addressed by the Department of Water and Sanitation Desktop PESEIS assessment, alternative ways of obtaining the PES will be used.

EIS/PES data provides an indication whether the river reach is in a health category that is commensurate with its ecological importance and sensitivity. This relates to the determination of the eco-status of the river which refers to its overall condition or health and is based on its biophysical characteristics.

The Salt Creek is classified as a Seasonal Upper Foothill Stream (Ollis et al, 2013): Lower gradient, mixed-bed alluvial channel with sand and gravel dominating the bed, locally may be bedrock-controlled. Reach types typically include pool-riffle or pool-rapid, sand bars common in pools. Pools of significantly greater extent than rapids or riffles. Floodplain often present.

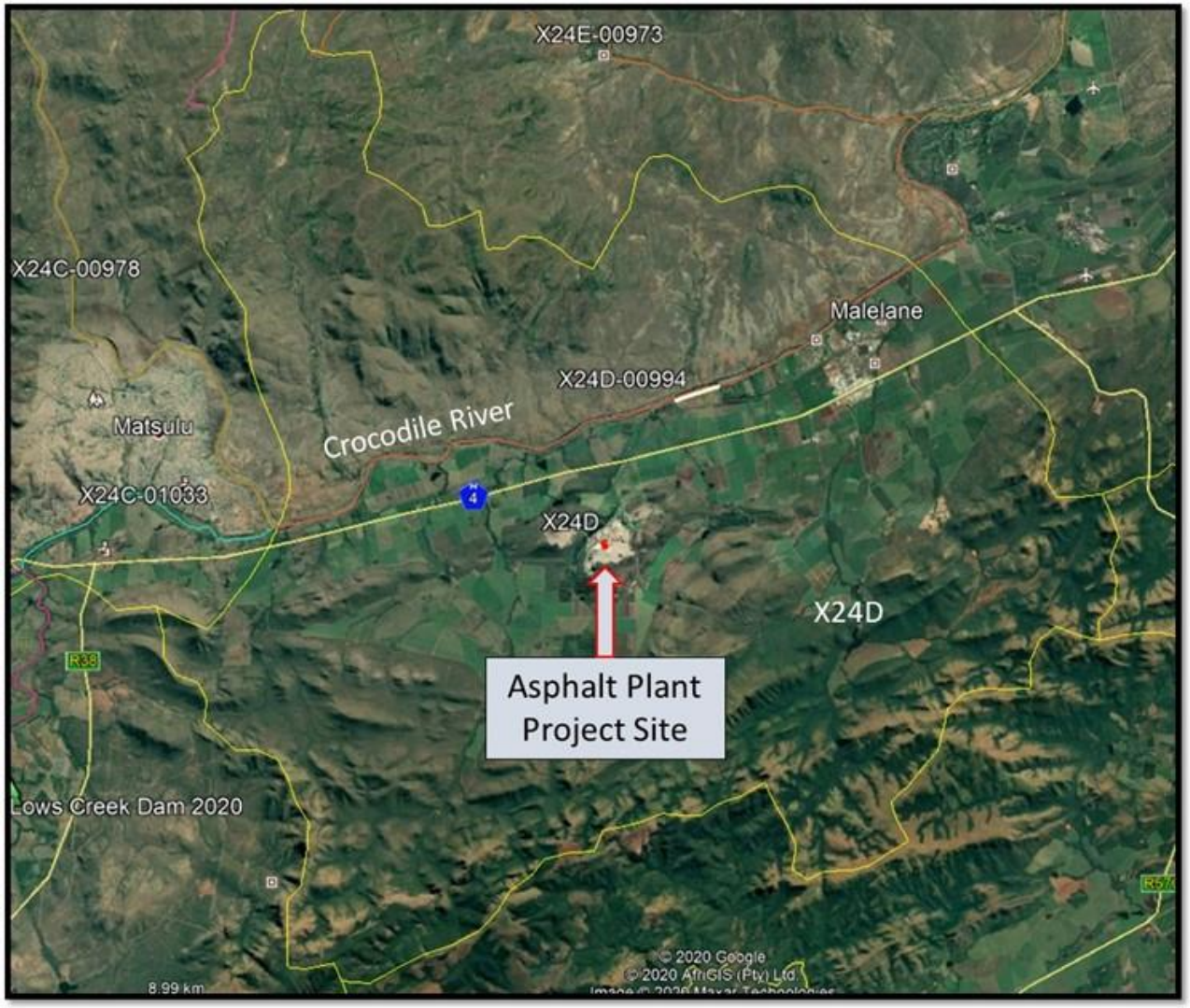

Figure 3: The project site is located in quaternary catchment X24D with the development taken place within the catchment of the Salt Creek.

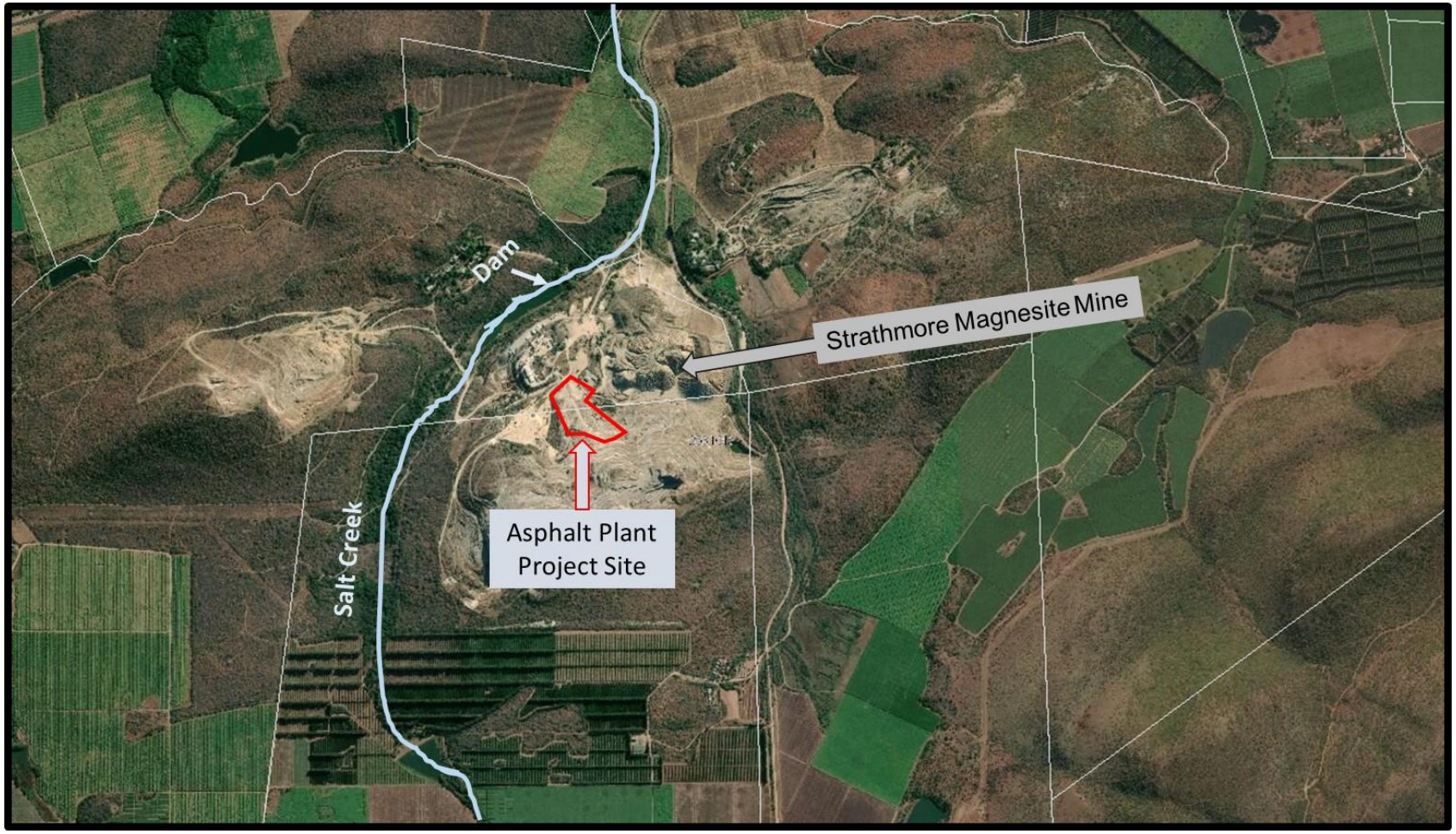

Figure 4: The area surrounding the Strathmore Magnesite Mine, showing the location of the Asphalt Plant Project Site and the Salt Creek drainage to the west of the mine.

Figure 5: The Strathmore Magnesite Mine, showing the location of the Asphalt Plant Project Site and the Salt Creek drainage dammed by the Strathmore Dam to the north-west of the mine.

2.3 Present Ecological State of the Water Course

The determination and categorisation of the Present Ecological State (PES) takes place during the process of the Ecological Classification process. The purpose of the EcoClassification process is to gain insights and understanding into the causes and sources of the deviation of the PES of biophysical attributes from the reference condition. This provides the information needed to derive desirable and attainable future ecological objectives for the river.

During the EcoClassification process, the EcoStatus is also determined. EcoStatus represents an ecologically integrated state representing the **drivers** (hydrology, geomorphology, physico-chemical) and **responses** (fish, aquatic invertebrates and riparian vegetation). The EcoStatus refers to the integration of physical changes by the biota and as reflected by biological responses.

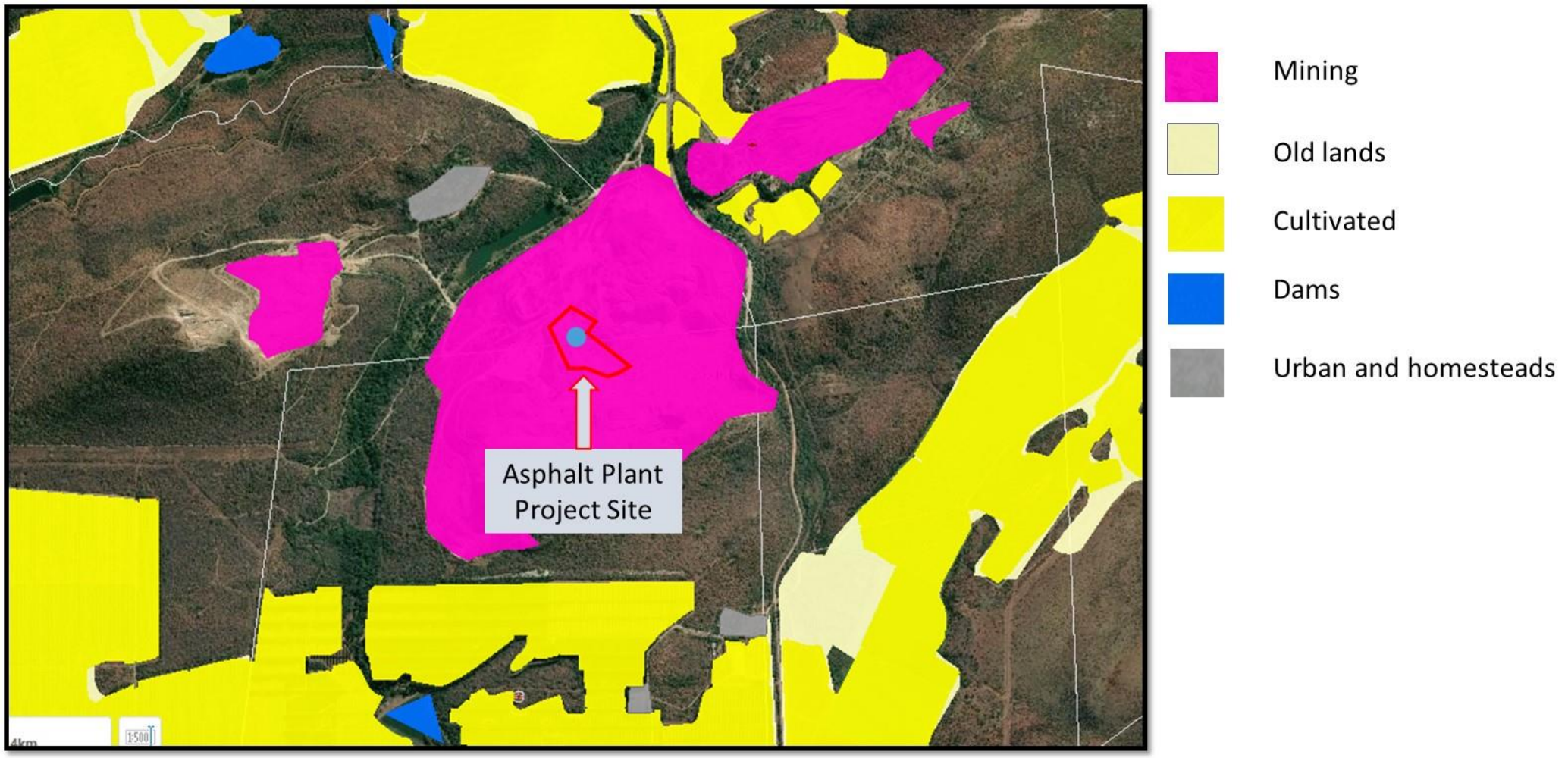

Figure 6: The land cover map supplied by the LUDS Report of the Asphalt Plant project site and the surrounding area.

The Mpumalanga Biodiversity Sector Plan Terrestrial Assessment classifies the project site as “Mining” and “Heavily Modified” (Figure 6). The project site is surrounded by Other Natural Areas and cultivated lands. Land Use in the catchment comprises of untransformed natural vegetation (55%), and cultivation (45%) (Figure 4). Cultivation comprised a mix of crops, including sugar cane, mangoes, macadamia nuts and citrus.

The Asphalt Plant site is constructed on an approximate footprint of 1.4 ha, and during the construction no indigenous vegetation was cleared for the establishment of the Asphalt Plant, as the site is located on a Magnesite mine. Thus, the site was significantly disturbed prior to the establishment of the Asphalt Plant.

Present Ecological State

For the purposes of this report, the Asphalt Plant Project site was assessed during 13 July 2020. However, the Salt Creek has been assessed during a biodiversity study at the Stentor Farm upstream of the Plant during 2018 (Deacon, 2018, unpublished report). The results of the ad hoc study will be used to establish the Present Ecological Status of the drainage line, as well as its Ecological importance and sensitivity.

Parameter	**Category**	**Main reasons for Category**
Present Hydrological State	D	Farm dams and farm roads
Present State of Water quality	C	Impoundments, seepage from mining area and farm roads
Habitat Integrity	D	Alien invasive plants, impoundments, sediment deposition and fragmentation of riparian corridor.
Present Ecological State of riparian	C	Alien invasive plants and fragmentation of riparian corridor.
Present Ecological State of aquatic biota	C	Farm dams, migration obstructions and alien species (especially fish).
Final Present Ecological State	D	Largely modified.

The Present Ecological State of the Salt Creek is rated as Largely Modified (Category D). The main cause of degradation is attributed to existing impacts on aquatic ecosystems which comprise the following:

- Existing farm dams. These structures restrict upstream migration of fish and also likely to have altered flow patterns and sediment transport patterns in Salt Creek.
- Irrigation Canal and associated irrigation areas – polluted return flows and sediment.
- Open cast operations at Strathmore Magnesite Mine and effluent from the mine.
- Farm roads and stream crossings, erosion of soil and sedimentation into the river.
- Alien invasive vegetation.

Table 1: Generic ecological categories for PES.

ECOLOGICAL CATEGORY	DESCRIPTION	SCORE (% OF TOTAL)
A	Unmodified, natural.	90-100
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-89
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions have occurred.	40-59
E	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions are extensive.	20-39
F	Critical/Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	0-19

3. Habitat sensitivity assessment

The purpose of producing a habitat sensitivity map is to provide information on the location of potentially sensitive biodiversity features in the study area, including areas of natural vegetation, habitat types supporting important biodiversity features or high diversity, areas supporting important ecological processes and habitat suitable for any species of conservation concern.

3.1 Sensitive environments in proximity to the project locality

The Project Area is situated in the Nkomazi (MP324) Local Municipality, Mpumalanga Province. The development was established on Portion 57 of the farm Strathmore 214, Nelspruit District, Mpumalanga at the following coordinates: 25°31'55.52"S and 31°27'2.48"E.

To establish how important the site is for meeting biodiversity targets, the Land-Use Decision Support Tool (LUDS) was used to compile the LUDS Report (BGIS, 2016). LUDS was developed to facilitate and support biodiversity planning and land-use decision-making at a national and provincial level. Its primary objective is to serve as a guide for biodiversity planning but should not replace specialist ecological assessments.

Critical Biodiversity Areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. If these areas are not maintained in a natural or near-natural state, then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.

Before the field study, the team will establish how important the site is for meeting biodiversity targets. To do this, it is necessary to answer the following three simple but fundamentally important questions:

- How important is the site for meeting biodiversity objectives (e.g. is it in a CBA or Ecological Support Area (ESA)?
- Is the proposed land-use consistent with these objectives or not (to be checked against the land-use guidelines)?
- Does the sensitivity of this area trigger the MTPA's requirements for assessing and mitigating environmental impacts of developments, or in terms of the listed activities in the EIA regulations?

The key results of the LUDS Report are summarized in Table 2. The information is extracted for the area from national datasets available on the Biodiversity Geographic Information System (BGIS).

Table 2: The key results of the LUDS Report, as extracted for the Asphalt Plant project area, are obtained from the national datasets available on the BGIS website.

National Data Set	**Aspect**	**Present**
National terrestrial information: Portion 57 of the farm Strathmore 214, Nelspruit District, Mpumalanga.		
South African District	Ehlanzeni	
South African municipal boundaries	Nkomazi	MP324
Quarter-degree grid square		2531CB
Terrestrial CBAs		
Bioregion	**National vegetation map**	**Status**
Bioregion	Lowveld	
Savanna Biome (Lowveld)	SVI 13 Barberton Serpentine Sourveld	Threatened ecosystem status: Vulnerable
Terrestrial CBA	Ecological Support Area: Protected buffer	Kruger National Park
Aquatic Critical Biodiversity Areas		
Water Management Area (WMA)	Inkomati WMA	FEPA WMA
Sub Water Management Area	Crocodile Catchment	X24D
Ecoregion 1	Lowveld	
Ecoregion 2	3.07	
Ecological Support Areas	ESA: Important subcatchments	ESA: FEPA subcatchments
NFEPA river FEPAs – sub-quaternary catchments	FEPA sub-quaternary catchment	
FEPA status	FishSA	Fish support area
Drainage line	Salt Creek	Lowveld Group 9_Channelled valley-bottom wetland
	Final Present Ecological State = D	Largely modified.

Ecological Support Areas: Those areas that play a significant role in supporting ecological functioning of Critical Biodiversity Areas and/or delivering ecosystem services, as determined in a systematic biodiversity plan. A Critical Biodiversity Area map is a map of Critical Biodiversity Areas and Ecological Support Areas based on a systematic biodiversity plan.

Critical Biodiversity Areas and Ecological Support Areas are areas that require safeguarding to ensure the continued existence of biodiversity, ecological processes and ecosystem services. A Critical Biodiversity Area map, often developed at provincial level, provides the basis for a biodiversity sector plan.

The site is 3 km south of the Kruger National Park southern boundary (Figure 3). The upper reaches of the Salt Creek catchment forms part of the Kaalrug Mountainlands which is classified as a Threatened Ecosystem (Government Gazette, 9 December 2011).

Freshwater Ecosystem Priority Areas (FEPAs) were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries.

According to Figures 6 to 8, the project site and surrounding area, the following features of the Asphalt Plant project site can be listed:

- The Asphalt Plant project site is heavily modified by mining (Figure 6);
- The project area is situated in an Ecological Support Area, a buffer of 10 km established for the Kruger National Park (Figure 7);
- The project area is surrounded by Other Natural Areas (Figure 7);
- The areas surrounding the Magnesite mine area is classified by the Freshwater CBAs and ESAs section as Ecological Support Areas (Figure 8);
- And the dam in the Low's Creek is classified as a Non-Fepa Wetland situated in an Ecological Support Area (Figure 8).

The Mpumalanga Biodiversity Sector Plan Freshwater Assessment classifies the catchment of the Salt Creek as an Ecological Support Area: Important sub-catchment. The remainder of the catchment is classified as "Heavily Modified."

Therefore, although the Salt Creek Asphalt Plant project site is surrounded by an Ecological Support Area buffer of 10 km (established for the Kruger National Park) and a Freshwater ESA, it is situated on the Strathmore Magnesite mine footprint which is heavily modified by mining activities with practically zero intact natural habitat present.

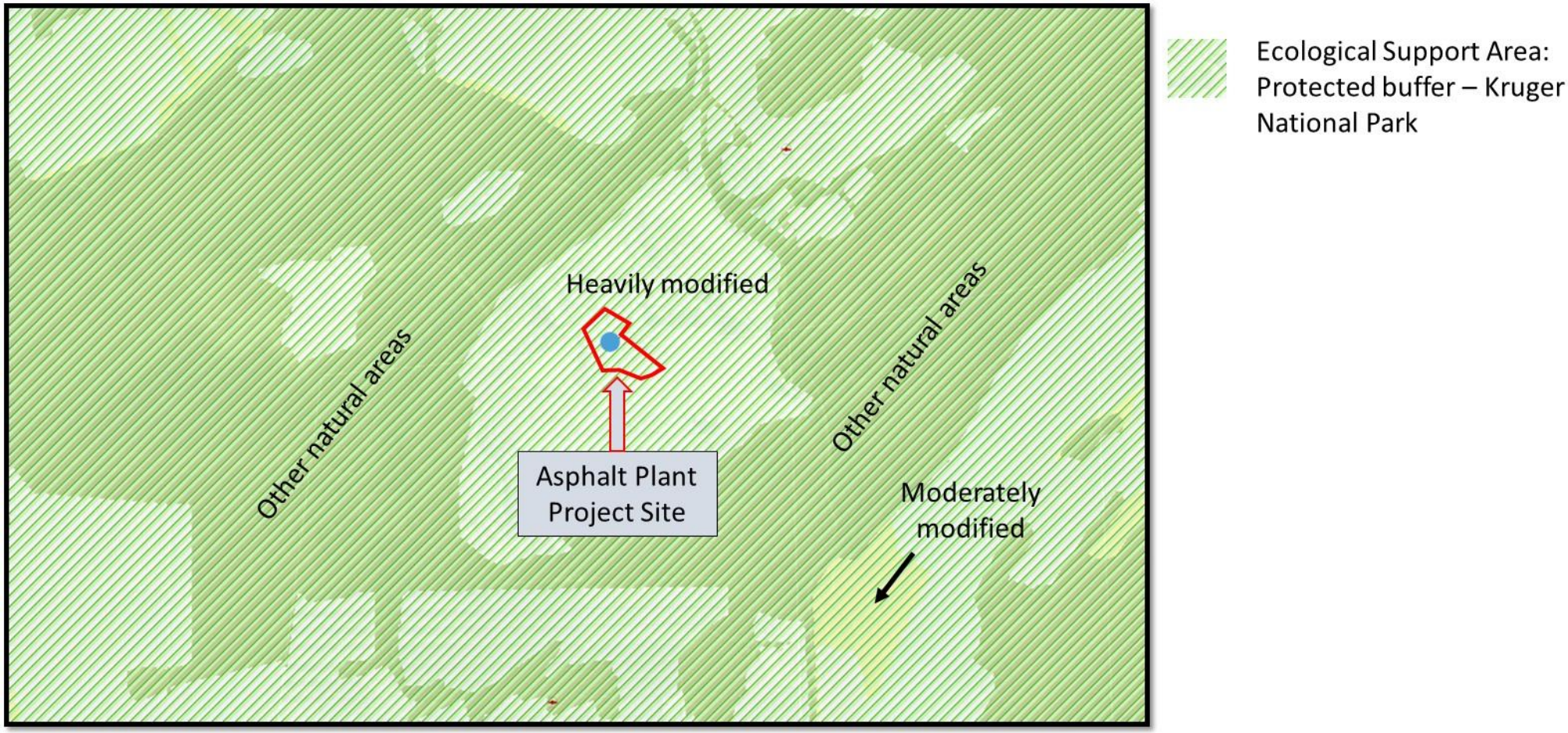

Figure 7: A map obtained from the 2014 Mpumalanga Biodiversity Sector Plan to indicate the Terrestrial CBAs and the location of the Asphalt Plant project site (red polygon). Green shaded stripes = Ecological Support Area Reserves (Kruger National Park).

Figure 8: A map of the Asphalt Plant project site, indicating the project locations (red circles) to illustrate the Freshwater CBAs and ESAs (Mpumalanga Biodiversity Sector Plan, 2014).

3.2 Ecological sensitivity of the grove of natural woodland in the project area

During the site visit, it was established that there are two areas of concern in the project area should an accident occur at the site. A spill on the premises of the Asphalt Plant could potentially impact on the small copse of natural woodland adjacent to the plant, as well as the riverine environment of the Salt Creek, approximately 663 m further down the slope of the mining area. A plant and fauna survey were completed in the grove of natural woodland (Figures 9a-d and 10) and the following biota were observed:

Table 3: Biota observed in the project area.

Woody vegetation	**Forbs**
African wattle (*Peltophorum africanum*) Blue guarri (*Euclea crispa*) Common spike thorn (*Gymnosporia buxifolia*) Fever tree (*Vachellia xanthophloea*) Knob thorn (*Vachellia nigrescens*) Large-fruit bushwillow (*Combretum zeyheri*) Lowveld bitter tea (*Gymnanthemum colorata*) Mountain aloe (*Aloe marlothii*) Mountain karee (*Searsia leptodictya*) Red bushwillow (*Combretum apiculatum*) Robust thorn (*Vachellia robusta*) Sickle bush (*Dichrostachys cinerea*) Velvet raisin (*Grewia flava*)	Caustic vine (*Sarcostemma viminale*) **Grass** Rooigras (*Themeda triandra*) Curly-leaved dropseed (*Sporobolus nitens*) **Alien invader plants** Triffid weed (*Chromolaena odorata*)

Birds in grove of natural woodland	**Birds at Strathmore Dam**
Bronze Mannikin (*Lonchura cucullata*) Cape Starling (*Lamprotornis nitens*) Cape white-eye (*Zosterops capensis*) Dark-capped Bulbul (*Pycnonotus tricolor*) Red-billed Firefinch (*Lagonosticta senegala*) Red-eyed Dove (*Streptopelia semitorquata*) Sombre Greenbul (*Andropadus importunus*) Spectacled Weaver (*Ploceus ocularis*) White-bellied Sunbird (*Cinnyris talatala*) White-fronted bee-eater (*Merops bullockoides*) Common Waxbill (*Estrilda astrild*)	African fish eagle (*Haliaeetus vocifer*) Egyptian goose (*Alopochen aegyptiaca*) Giant kingfisher (*Megaceryle maxima*) White-breasted cormorant (*Phalacrocorax lucidus*)

According to Table 3, the plants observed in the grove were all common and local species, similar to the area surrounding the mining area. There are no threatened or rare species present, and the eleven bird species observed were also all common, local species. It is expected that more animal species will frequent the island of isolated woodland (0.53 ha), but due to the isolation and size of the area, very few species will settle in the copse.

Figure 9a-d: Different views of the small copse of natural woodland adjacent to the Salt Creek Asphalt Plant.

4. Risk assessment

During the process of surveying the area for potential impacts, the possibility of a massive spill originating from the Asphalt Plant were considered. Should all safety measures in place fail and the spill discharged into the surrounding area, four different routes of flow were identified. These routes were revealed by signs left by storm-water events, and illustrated in Figure 10 as Routes 1 to 4.

Route one (Figures 11a-b and 10) follows a drainage line along the mine dirt road, through the mining premises and a small wooded area, into an isolated hollow created in the bedrock by the mining activities.

Route 2 (Figures 12a-b and 10) will follow a storm-water chute down the embankment to the west of the plant site and the spill will be contained in a area surrounded by earthen barriers.

Route 3 (Figures 13a-d and 10) drains along the dirt road towards the northern part of the mine complex as it follows the edges of the road. The most northern boundary of the mining complex is edged by a concrete wall of approximate 30cm high. The walled edge will contain fluids and prevent it from spilling directly into the Strathmoore Dam.

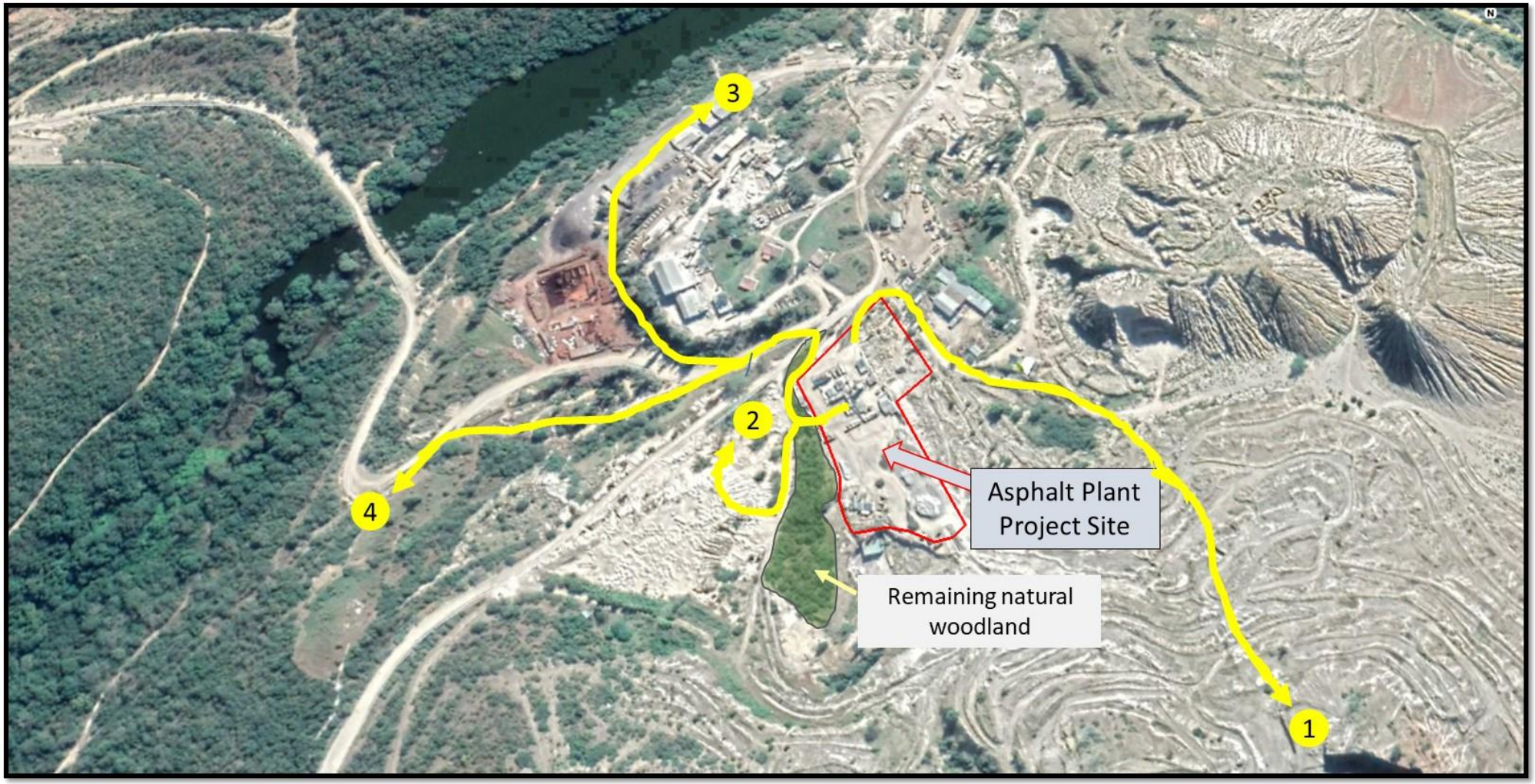

Figure 10: The location of the Salt Creek Asphalt Plant project site on the heavily modified Strathmore Magnesite mine footprint, indicating the presence of the small grove of remaining natural woodland, as well as the possible drainage routes for storm water and also pollutants should there be a spill in the Asphalt Plant.

Figure 11:

a. The drainage along the dirt road towards the south-east of the site.

b. The dead-end of the drainage into a isolated hollow in the mining area (see also Figure 10).

Figure 12:

a. A drainage nick created by storm water will release the spill off to the west the project site.

b. A dead-end of the drainage is created by a confined area to the west of the plant site.

Figure 13:

a. The drainage along the dirt road towards the northern part of the mine complex.

b. The drainage following the edges of the road.

c. The most northern boundary of the mining complex is edged by a concrete wall of approximate 30cm high.

d. The walled edge will contain fluids and prevent it from spilling directly into the Strathmoore Dam.

Figure 14:

a. The storm-water drainage to the east (Route 4) runs through a mine scrap yard.

b. The drainage enters a settling pool of a compost company on the Magnesite mine property.

c. The “settling pool” has no direct outflow.

d. Should the “settling pool” top its low wall or breach the wall, the effluent will be flowing down to the Salt Creek, 266 m down the road.

Route 4 (Figures 14a-d and 10) follows the storm-water drainage to the east as it runs through the mine scrap yard into a settling pool of a compost company on the Magnesite mine property. The “settling pool” is a ditch along the western haul road and has no direct outflow. However, should the “settling pool” top its low wall or breach the wall, the effluent will be flowing down to the Salt Creek, 266 m down the road.

4.1 Elements to be evaluated for the risk assessment

Risks related to the Natural Environment

These risks will be evaluated for these aspects of the project:

Potential Impacts and Mitigation Measures related to the surrounding- and downstream environment:

Natural vegetation in the surrounding area

- **Risk:** Impacts on the natural vegetation in the surrounding area.
- Operational activities will be kept to the site boundary in order to limit disturbance on natural vegetation in the surrounding area.

Soil and groundwater resources

- **Risk:** Contamination of soil and groundwater resources may occur.
- **Mitigation:** Potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.

The Salt Creek and riparian wetland

- **Risk:** Contamination of the riverine and aquatic ecosystem.
- **Mitigation:** It is not expected that there will be an impact on the nearby wetland, due to the fact that there is mine infrastructure between the Plant and the wetland. However, potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.

Risks - General

The following risks will <u>not</u> be evaluated in this report since they will be addressed in other reports:

Potential Impacts and Mitigation Measures related to other aspects:

Aesthetic impact.

- **Risk:** The plant may have a negative aesthetic impact.

- **Mitigation:** The site will always be kept clean and neat through correct housekeeping and waste disposal. However, it should be noted that the Asphalt Plant is not visible from any public roads and that it is located on a mining area.

Operational activities

- **Risk:** Operational activities, like movement of vehicles and loading and hauling of aggregate, may lead to noise and dust generation.

- **Mitigation:** Appropriate measures have already been taken to minimize this. Dust suppression measures, such as spraying water on dirt roads and operational areas, have been implemented. Dust sampling is also done monthly to ensure compliance to national standards. The Plant is also located on a mining area far from any residential areas and thus the impact of noise is expected to be low.

Cultural heritage

- **Risk:** It is not expected that there are any cultural heritage objects or sites and/or paleontological remains present on the property, and none have been observed so far.

- **Mitigation:** A Heritage and Paleontological Impact Assessment will be conducted as part of the application process.

Emissions

- **Risk:** Some emissions will be generated during operation of the Asphalt Plant, which may include NOx (Nitrogen oxides), SO2 (Sulphur dioxide), CO^2 (Carbon dioxide), CO (Carbon monoxide), Volatile Organic Compounds (VOCs) and particulate matter (PM).

- **Mitigation:** Specialist will be appointed to do an Atmospheric Impact Assessment on the Asphalt Plant.

Socio-economic structure

- The project has a positive impact on the socio-economic structure of the area, as jobs were provided to local people.

4.2 Ecological Risk Assessment

Table 4: A Risk Assessment was done for the potential impacts related to the Salt Creek water course, using the DWS Risk Matrix (Based on DWS 2015 publication).

Phases	Activity	Aspect	Potential Impact	Significance	Risk Rating	Control Measures
Operational	Operation of the Salt Creek Asphalt Plant project - Potential spill	Route 1	Pollution of the Salt Creek and Strathmore Dam environment.	**24**	**Low**	Potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance. Emergency protocol in place.
		Route 2		**28**	**Low**	
		Route 3		**28**	**Low**	
		Route 4		**32**	**Low**	

Bunding, also called a bund wall, is a constructed retaining wall around storage "where potentially polluting substances are handled, processed or stored, for the purposes of containing any unintended escape of material from that area until such time as a remedial action can be taken.

Figure 15:

a. A constructed retaining wall around storage at the Salt Creek Asphalt Plant.

b. Metal bunding encapsulating a container.

4.3 Risk Assessment summary

Phase: Operational

Activity 1: Operation of the Salt Creek Asphalt Plant project.

Aspect: A spill deriving from the premises of the Asphalt Plant.

Potential Impact 1.1: A spill deriving from the premises of the Asphalt Plant – polluting the small copse of natural woodland adjacent to the plant.

Risk rating after mitigation: Low (significance = 24; confidence 3).

Control measure: The plants observed in the grove were all common and local species, similar to the area surrounding the mining area. There are no threatened or rare species present, and the eleven bird species observed were also all common, local species. It is expected that more animal species will frequent the island of isolated woodland (0.53 ha), but due to the isolation and size of the area, very few species will settle in the copse.

Any spill from the Asphalt Plant is not expected to reach the copse of woodland as the potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.

Additionally there is a Company Emergency protocol in place for the plant.

Potential Impact 1.2: Contamination of soil and groundwater resources may occur.

Risk rating after mitigation: Low (significance = 32; confidence 3).

Control measure: Any spill from the Asphalt Plant is not expected to reach the soil and groundwater resources as the potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.

Potential Impact 1.2: A spill deriving from the premises of the Asphalt Plant - polluting the Salt Creek and Strathmore Dam riparian and aquatic environment.

Risk rating after mitigation: Low (significance = 24-32; confidence 3).

Control measure:

More important is the fact that the potentially hazardous substances are stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.

Additionally there is a Company Emergency protocol in place for the plant.

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