



Environmental  
Management Group  
(PTY) LTD.

January 2026

# **SITE SENSITIVITY AND TERRESTRIAL ECOLOGICAL ASSESSMENT REPORT**

COMPILED FOR THE  
PROPOSED WWTW AND  
ACCOMPANYING  
INFRASTRUCTURE, ON  
PORTION 7 OF FARM  
DOORNFONTEIN 12,  
MAGARENG LOCAL  
MUNICIPALITY, NORTHERN  
CAPE PROVINCE

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## Report details section

| Issue/revision              | Draft Report                                                                                                                                                                                 | Final Report                                                                        |
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| Date                        | December 2025                                                                                                                                                                                | January 2026                                                                        |
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|                             | SACNASP Pr Eco Sci 144943<br>SAAB No 200                                                                                                                                                     |                                                                                     |
| Signature                   |                                                                                                             |                                                                                     |
| <b>Project Title</b>        | Terrestrial ecological assessment compiled for the proposed WWTW and accompanying infrastructure, on Portion 7 of Farm Doornfontein 12, Magareng local municipality, Northern Cape Province. |                                                                                     |
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| <b>Applicant</b>            | BVI                                                                                                                                                                                          |                                                                                     |
| <b>Report Status</b>        | Final                                                                                                                                                                                        |                                                                                     |
| <b>Broad-scale locality</b> | Northern Cape Province                                                                                                                                                                       |                                                                                     |
| <b>Fine-scale locality</b>  | Magareng local municipality                                                                                                                                                                  |                                                                                     |

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Declaration of independence:

I, the above-mentioned specialist investigator responsible for conducting this particular specialist ecological study, declare that:

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development, except for financial compensation for work done in a professional capacity.
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part.
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience, and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I have the necessary qualifications and guidance from professional experts (registered Pr. Nat. Sci.) in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity.
- This document and all information contained herein are and will remain the intellectual property of Environmental Management Group. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the respective specialist investigator.



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I, the above-mentioned specialist investigator responsible for conducting this particular specialist ecological study, declare that:

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- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part;
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Ricus Nel

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## **Executive summary:**

A WWTW and associated pipeline development is proposed within a 5 km radius of Warrenton. The proposed development requires environmental authorisation in terms of the National Environmental Management Act (Act No. 10 of 1998), 2014.

As per the DFFE screening tool, the proposed development area will affect an area with a low-medium sensitivity for the plant species theme and very high sensitivity for the terrestrial biodiversity theme. This report found the site to be of low sensitivity. Thus, a terrestrial biodiversity compliance statement is required however due to the perceived high sensitivity of the WWTW area the report will be adjusted to form a full assessment.

The WWTW and associated irrigation areas will affect roughly 142 ha of vegetation. The pipeline is proposed to occur from 5 km East of Warrenton to within the boundaries of the town. The proposed development passes through the Kimberly Thornveld vegetation type.

An ecological survey was performed as part of a Botanical Impact Assessment. The topography of the study area is relatively uniform, undulating plains. Due to the occurrence of Warrenton, the area is dominated by a built-up environment.

Overall, the tree layer is well developed with sparse occurrences of grass layers in few areas, while absent in others. The shrub layer is moderately developed throughout the site. The overall vegetation is not a good representation of the vegetation type in which they are located (Mucina and Rutherford, 2006; SANBI, 2006-2018; Skowno et al., 2018).

The DFFE screening tool has indicated the Plant Species Theme to be of low-medium sensitivity and Terrestrial Biodiversity Theme to be of very high sensitivity. The medium part of the plant sensitivity theme is due to the possible presence of an SCC although no individuals of this species were found within this ecological report's study area there is still a possibility of occurrence however unlikely with the present disturbances.

Anticipated environmental impact evaluation has overall indicated that the development would have a very low anticipated environmental impact. A very low environmental impact was influenced by the proposed developments overall ecological condition and associated disturbances. As per the EIA species guidelines, minimisation mitigation alternatives should be implemented.

## **1. Introduction:**

Ecological infrastructure refers to the natural functioning ecosystems which provide essential services to people. An ecosystem functions as a collective of components, living and non-living, interacting with one another (Wohlitz, 2016). Humans benefit from healthy functioning ecosystems in the utilisation of the services they provide. Ecosystem services include provisioning services (food, raw materials, freshwater), regulating services (climate and air quality, carbon sequestration, water purification), supporting services (habitats and genetic diversity), and cultural services (recreation, tourism and spiritual) (Costanza et al., 1997; Fy et al., 2015; Wohlitz, 2016). Ecosystems can't provide these services when in a poorly functioning, unhealthy state. An ecosystem's health is largely threatened by anthropogenic influences such as habitat fragmentation, pollution and unsustainable harvesting. These anthropogenic activities destabilise ecosystems and will ultimately result in an ecological breakdown, which ultimately raises the costs of living. In terms of biological diversity, South Africa ranks third globally with a high level of endemism (found only in South Africa) (Hoveka et al., 2020). Because of this, South Africa's vegetation is highly localised and experiences a greater threat of extinction. Thus, it is our responsibility to protect South Africa's rich biodiversity.

Despite the seeming homogeneity and low diversity of vegetation, an area may contain endangered and rare species. Red data species presence may make the development unfeasible at that specific location. If this occurs, the project should be moved to an alternative location or cease immediately. Development is a necessity, especially for a developing country such as South Africa. New developments create job opportunities, increase capital growth, and overall create a better country. However, these developments should not come at the cost of pristine ecosystems as they produce invaluable services humans reap for free. For this reason, sustainable development practices should balance the need for development and the conservation of natural resources (Wohlitz, 2016). In a developing country, development is closely linked to electricity generation, transmission and utilization (Akinbami et al., 2021). Renewable energy generation provides the same benefits of sustainable development to the economy (Lekavicius et al., 2019; Akinbami et al., 2021).

### 1.1. Project background:

The proposed WWTW, attached gravity main and irrigation plan development is located on Farm Portion 7/12 Doornfonteyn, west of Warrenton (Figure 1). As the crow flies, the proposed WWTW development is located 3km West of Warrenton.

Surrounding broadscale vegetation is largely influenced by agricultural practices, anthropogenic development or remains natural (as is the case with the WWTW area). Within the study area, the land has previously been (and currently is being) disturbed by agricultural practices.

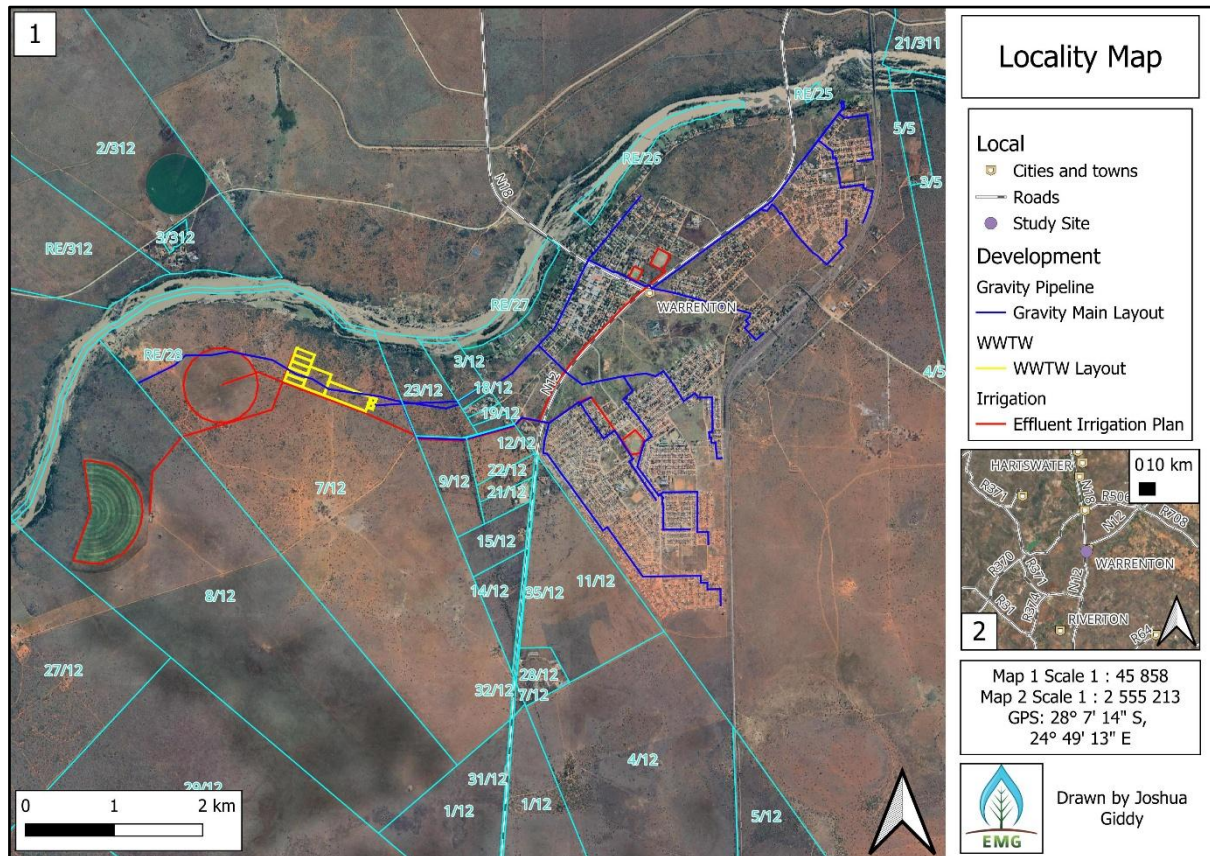


Figure 1: Locality map of the proposed WWTW and associated pipeline/irrigation areas.

### 1.2. Terms of reference:

In accordance with the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2017, a site sensitivity verification has been undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

Procedures and minimum criteria to be met in the site verification have been reported on in accordance with the Procedures for the Assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, When applying for Environmental Authorisation (GNR 320, 20 March 2020).

### 1.3. DFFE screening tool identified theme sensitivities:

As per the DFFE screening tool, the proposed development area will affect an area with a low-medium (map vs. table) sensitivity for the Plant Species theme and a very high sensitivity for the Terrestrial Biodiversity theme. One sensitive species was identified under the Plant Species theme; Sensitive species 257.

According to the Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2006-2008), the proposed development is majorly located in the Kimberley Thornveld (SVk 4) vegetation type. The Kimberley Thornveld vegetation type was identified under the Terrestrial Biodiversity theme, which is of low sensitivity.

| Theme                                      | Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|--------------------------------------------|-----------------------|------------------|--------------------|-----------------|
| Agriculture Theme                          | X                     |                  |                    |                 |
| Animal Species Theme                       |                       |                  | X                  |                 |
| Aquatic Biodiversity Theme                 |                       |                  |                    | X               |
| Archaeological and Cultural Heritage Theme |                       |                  |                    | X               |
| Civil Aviation Theme                       |                       | X                |                    |                 |
| Defence Theme                              |                       |                  |                    | X               |
| Paleontology Theme                         |                       | X                |                    |                 |
| Plant Species Theme                        |                       |                  | X                  |                 |
| Terrestrial Biodiversity Theme             | X                     |                  |                    |                 |

Figure 2: Environmental screening results and assessment outcomes according to the DFFE screening tool.

### 1.4. DFFE screening tool outcomes:

A medium sensitivity for the Plant Species Theme was identified in the DFFE screening tool. The medium sensitivity for the terrestrial biodiversity theme identified by the DFFE screening tool requires a site inspection to validate whether or not the identified SCC is present (or likely to be present). Dependant on the site inspection a Terrestrial Plant Species Specialist or a Compliance Statement should be conducted to confirm or dispute the environmental sensitivity highlighted in the DFFE screening tool. A very high sensitivity for the Terrestrial Biodiversity Theme was identified in the DFFE screening tool. With the site sensitivity identified as very high for the Terrestrial Biodiversity theme a Terrestrial Biodiversity Specialist Assessment is required.

For the reasons mentioned above, it is necessary to conduct a Terrestrial Ecology verification assessment to assess the possible environmental impacts generated by developmental activities. Recommendations and mitigation measures provided in this report should be used to minimise the effects of development.

The findings of this report **disagree** with that of the DFFE screening tool report's **low-medium sensitivity** due to the low likelihood of SCC presence. The findings of this report disagree with the **very high sensitivity of the terrestrial biodiversity theme** in the DFFE screening tool.



## **2. Scope and limitations of the study:**

- Perform a site inspection to determine the presence or likely presence or confirmed absence of SCC.
- Perform a site sensitivity verification and evaluation for the study area's "*in situ*" environment.
- Identifying and assessing possible environmental impacts the proposed development could generate.

### **2.1. Assumptions and limitations:**

- This report assumes the vegetation type description was unbiased and all relevant botanical/ ecological related information was accurately described.
- Not all plants have the same growth and/or flowering period; thus, it is likely that the survey could have occurred outside of a specific species' growth and/or flowering period.
- Some geophytic and succulent plants have specialised in mimicking their surrounding habitat. Thus, some of these plants might have been overlooked due to their cryptic nature.
- Species of conservation concern (SCC) are generally uncommon and/or localised. Thus, locating such species can be challenging when attempts to locate such species occur outside the SCC's flowering season.
- Some aspects may have been overlooked because ecology is vast, dynamic, and highly complex. However, most floral communities have been accurately assessed and considered. Therefore, the information within this report is sufficient to allow informed decision-making.
- Most plant species in central northern South Africa experience summer rainfall, which allows for spring growth periods and summer-spring flowering season. The growing and flowering periods allow for the presence of identifiable characters. The presence of identifiable characters increases the accuracy and possibility of species identification, making vegetation community interpretation more thorough. Thus, spring is an optimal season in which to perform vegetation surveying for this study region.

### 3. Methodology:

#### 3.1. Literature review:

The desktop literature review aimed to gather and evaluate existing ecological information about key biodiversity and conservation elements within the Project's area of influence. This included identifying protected or significant conservation areas, understanding key ecological processes and functions, and assessing the probable composition and structure of local aquatic biodiversity.

- Field guides used for **species identification** (van Wyk and Malan, 1998; Botha, 2001; Bromilow, 2010; van Wyk and van Wyk, 2013; van Oudtshoorn, 2014; Manning, 2019).
- **Vegetation type descriptions** were obtained from Mucina and Rutherford (2006),
- The region's **conservation** status was defined according to provincial and national policies, informed by the Free State Biodiversity Sector Plan (2019), the National List of Threatened Ecosystems (NEMBA Threatened Ecosystems, 2011), the South African Protected Areas Database (SAPAD), the South African Conservation Areas Database (SACAD) and the national protected area expansion strategy (NPAES);
- Site **sensitivity verification** for the wetland and riparian habitats was informed by the South African National Wetland Map version 5 (NWM5) and the National Freshwater Ecosystem Priority Area database.

#### 3.2. Survey:

Before visiting the site, a desktop study commenced where the following information was determined:

- Vegetation type.
- Climatic conditions.
- Probable rare- endemic- and protected species.
- Relatively homogenous vegetation units in which surveying will commence.
- Probable environmental impacts of the proposed development.
- The [iNaturalist](#) website was also consulted to obtain probable species presence as identified by the general public and other specialists.

The survey was performed by means of transects traversed on foot. The use of an unmanned aerial vehicle (UAV drone) was used to aid the delineation of relatively homogenous vegetation units. Plant species observed were recorded with particular emphasis on rare-, endemic-, protected- and dominant species. Attention was given to the current state of the environment regarding grazing impacts, anthropogenic disturbances, erosion and the presence of alien or invasive species. Observed animal species and evidence of their existence (dung, habitat requirements, excavations, animal tracks, burrows, and nests) were recorded. The vegetation surveying took

place on the 26<sup>th</sup> of September and 25<sup>th</sup> of November 2025, which is within the optimal season for vegetation surveying, and was surveyed for a duration of 10hrs (10h30-16h30 and 10h00-14h00).

### **3.3. Assessment criteria**

#### **Unit sensitivity assessment**

As per the SANBI (2020) Species Environmental Assessment Guidelines, site ecological importance (SEI) was calculated. The fulfilling criteria of the conservation importance, functional integrity and resilience is not an exhaustive list, and the guidelines allow for adding additional, conditional aspects which were not included in the fulfilling criteria. Where the addition of additional, conditional aspects was required, the reasoning for the applicable addition was required to be stipulated.

Conservation importance (CI) concerns the sites' ability to support biodiversity features or species of conservation concern through largely natural processes. CI was calculated using internationally acceptable, recognized and established biodiversity value determination principles and criteria utilized in evaluating conservation importance (IUCN KBA, 2016; SANBI, 2020), as shown in the table below.

Table 1: Criteria that fulfil the requirements for the ratings of conservation importance (CI).

| Conservation importance (CI) rating | Fulfilling criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very high                           | <p>Confirmed or high likelihood of occurrence of SCC with a global EOO of &lt;10km<sup>2</sup>.<br/> <u>and/or</u></p> <p>Any environment featuring characteristics of a natural habitat of a CR vegetation type or a large area (&gt;0.1% of total vegetation type extent) of natural habitat of an EN vegetation type.<br/> <u>and/or</u></p> <p>Natural habitat featuring a unique combination of biophysical characteristics rarely seen in the surrounding environment.<br/> <u>and/or</u></p> <p>A significant or unusually high population occurrence of protected/endemic species.</p>                                                                                                                                                                                                       |
| High                                | <p>Confirmed or highly likely occurrence of SCC species with a global EOO of &gt;10km<sup>2</sup>. SCC must be listed under any criterion other than A and if only listed under A, should be included for species with reported occurrences of &lt;10 localities or &lt; 10 000 individuals.<br/> <u>and/or</u></p> <p>Small area (&gt;0.01% but &lt;0.1% of total vegetation type extent) of natural habitat of an EN vegetation type or a large area of natural habitat of a VU vegetation type.<br/> <u>and/or</u></p> <p>Natural habitat featuring a unique combination of biophysical characteristics and may also occur in the surrounding environment.<br/> <u>and/or</u></p> <p>Any area hosting a unique combination of protected species not occurring in the surrounding environment.</p> |
| Medium                              | <p>Confirmed or high likely occurrence of SCC which have been observed in more than 10 locations or more than 10 000 reported mature individuals.<br/> <u>and/or</u></p> <p>Any area of natural habitat of a VU vegetation type.<br/> <u>and/or</u></p> <p>Confirmed species which exhibits a restricted range.<br/> <u>and/or</u></p> <p>&gt;50% of the unit contains natural habitat with potential to support SCC.<br/> <u>and/or</u></p>                                                                                                                                                                                                                                                                                                                                                         |



|          |                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | A fairly high species richness of naturally occurring species. Some protected species may also occur.                                                                                                                                                                                                                                                                                                  |
| Low      | <p>No confirmed observations of, or low probability of SCC occurrence.<br/><u>and/or</u></p> <p>No confirmed observations or low probability of species with a restricted range.<br/><u>and/or</u></p> <p>&lt;50% of unit contains natural habitat with a limited potential to support SCC.<br/><u>and/or</u></p> <p>Poor to moderate species richness. Some alien and invasive species may occur.</p> |
| Very low | <p>No confirmed observations or very low probability of SCC occurrence.<br/><u>and/or</u></p> <p>No confirmed observations or very low probability of species with a restricted range.<br/><u>and/or</u></p> <p>Very little to no natural habitat remaining.</p>                                                                                                                                       |

Functional integrity refers to the site's ecological condition, where it's able to maintain its structure and functionality with regard to habitat connectivity and pristineness. The ecological condition of the vegetation units was determined by considering the remaining functional area, habitat connectivity and level of disturbance which influences the ecological processes of the site.

The ecological functioning of a large, uninterrupted, undisturbed natural area is considered intact and functional with high functional integrity. On the other hand, a small, fragmented, poorly connected, very disturbed site is inhibited and has a very low functional integrity. Site functional integrity was determined using the fulfilling criteria as tabulated below in Table 2.

Table 2: Criteria that fulfil the requirements for the ratings of functional integrity (FI).

| Functional integrity (FI) | Fulfilling criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very high                 | <p>Very large (&gt;100 ha) intact habitat<br/><u>and/or</u></p> <p>High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches.<br/><u>and/or</u></p> <p>No or minimal current negative ecological impacts with no signs of major past disturbance</p>                                                                                                                                                                                                                                                            |
| High                      | <p>Large (&gt;20 ha but &lt;100 ha) intact area for any conservation status of vegetation type or &gt; 10 ha for EN vegetation type.<br/><u>and/or</u></p> <p>Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.<br/><u>and/or</u></p> <p>Only minor current negative ecological impacts (e.g., few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.</p>                                                         |
| Medium                    | <p>Medium (&gt; 5 ha but &lt; 20 ha) semi-intact area for any conservation status of vegetation type or &gt; 20 ha for VU vegetation type.<br/><u>and/or</u></p> <p>Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.<br/><u>and/or</u></p> <p>Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.</p> |
| Low                       | <p>Small (&gt; 1 ha but &lt; 5 ha) area<br/><u>and/or</u></p> <p>Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential.<br/><u>and/or</u></p> <p>Several minor and major current negative ecological impacts.</p>                                                                                                                                                                                                                    |
| Very low                  | <p>Very small (&lt; 1 ha) area.<br/><u>and/or</u></p> <p>No habitat connectivity except for flying species or flora with wind-dispersed seeds.<br/><u>and/or</u></p> <p>Several major current negative ecological impacts.</p>                                                                                                                                                                                                                                                                                                                                                  |

Biodiversity importance concerns the site's ability to support biodiversity features or species of conservation concern with its current ecological condition in terms of functional size, connectivity and level of disturbance. Using the determined conservation importance and functional integrity of the vegetation units, biodiversity importance was determined using the following simple matrix (SANBI, 2020), as seen in table 3 below.

*Table 3: Matrix in calculating biodiversity importance (BI) using conservation importance and functional integrity.*

| Biodiversity importance |           | Conservation importance (CI) |           |          |          |          |
|-------------------------|-----------|------------------------------|-----------|----------|----------|----------|
|                         |           | Very high                    | High      | Medium   | Low      | Very low |
| Functional integrity    | Very high | Very high                    | Very high | High     | Medium   | Low      |
|                         | High      | Very high                    | High      | Medium   | Medium   | Low      |
|                         | Medium    | High                         | Medium    | Medium   | Low      | Very low |
|                         | Low       | Medium                       | Medium    | Low      | Low      | Very low |
|                         | Very low  | Medium                       | Low       | Very low | Very low | Very low |

Site resilience is the site's natural ability to overcome or recover from negative influences of disturbance without human intervention. A site's recovery to a specified level of restoration with respect to the site's original ecological functionality in an estimated time is the baseline evaluation criteria. Justification of the resilience rating with respect to estimated recovery time was required. Particular disturbances and impacts, as well as the time of year these impacts are expected to occur, are often associated with resilience and were considered (SANBI, 2020).

Site resilience was determined using the fulfilling criteria as indicated below (Table 4).

*Table 4: Criteria that fulfil the requirements for the ratings for resilience (R).*

| Resilience category | Fulfilling criteria                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very high           | Habitat that can recover rapidly (~ less than five years) to restore > 75% of the original species composition and functionality of the receptor functionality or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.                                               |
| High                | Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.                                                        |
| Medium              | Will recover slowly (~ more than 1ten years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.                                                             |
| Low                 | Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed. |
| Very low            | Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.                                                                                                                                                                                            |

Site ecological importance (SEI) concerns the site's biodiversity importance in its ability to support biodiversity features or SCC and its natural resilience ability to recover from negative influences.

SEI for each vegetation unit was determined through the simple matrix (SANBI, 2020) below (Table 5) by using the vegetation units' biodiversity importance (CI x FI) and resilience. SEI was determined for each relatively homogenous vegetation unit (VU) and should be used to inform sustainable development practices.

Table 5: Matrix for determining site ecological importance (SEI) using biodiversity importance and resilience.

| Site ecological importance |           | Biodiversity importance |           |          |          |          |
|----------------------------|-----------|-------------------------|-----------|----------|----------|----------|
|                            |           | Very high               | High      | Medium   | Low      | Very low |
| Receptor resilience        | Very low  | Very high               | Very high | High     | Medium   | Low      |
|                            | Low       | Very high               | Very high | High     | Medium   | Very low |
|                            | Medium    | Very high               | High      | Medium   | Low      | Very low |
|                            | High      | High                    | Medium    | Low      | Very low | Very low |
|                            | Very high | Medium                  | Low       | Very low | Very low | Very low |

Site ecological importance is specific to the proposed development activities and is not comparable to different proposed development activities (SANBI, 2020). Interpretation of the ratings of site ecological importance in relation to the activities associated with the proposed development is indicated in Table 6 below.

Table 6: Interpretation of the ratings of site ecological importance in relation to proposed development activities.

| Site ecological importance | Interpretation in relation to proposed development activities                                                                                                                                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very high                  | Avoidance mitigation – no destructive development activities should be considered. Offset mitigation is not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains. |
| High                       | Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high-impact activities.                                                                       |
| Medium                     | Minimisation and restoration mitigation – development activities of medium impact are acceptable, followed by appropriate restoration activities.                                                                                                                                                                                                |
| Low                        | Minimisation and restoration mitigation – development activities of medium to high impact are acceptable, followed by appropriate restoration activities.                                                                                                                                                                                        |
| Very low                   | Minimisation mitigation – development activities of medium to high impact are acceptable, and restoration activities may not be required.                                                                                                                                                                                                        |

*Anticipated environmental impact assessment.*

Anticipated impacts of the proposed development on the receiving environment at the proposed location were determined using the impact assessment and significance evaluation forms which are available in Appendix D and E.

Anticipated environmental impacts of the proposed development on the receiving environment were determined for the following components: habitat, indigenous floral and faunal, floral SCC and provincially protected flora.

## 4. Findings:

### 4.1. The physical environment:

The proposed development is located within **Warrenton** and extends to within a **5 km radius of Warrenton**, in the **Northern Cape Province**. The proposed development area is located in various areas which are considered natural, have been agriculturally transformed or have been anthropogenically developed.

The areas which will become irrigation zones are majorly transformed with both areas not representing the surrounding vegetation type (SVk 4). The area which is proposed to become the WWTW is largely natural with evidence of widespread disturbance.

The proposed development area's landscape is relatively flat with minimal elevation difference between the area's Eastern and Western parts with an altitude between 1172 m and 1199m.

The physical landscape features of the Kimberley Thornveld (SVk 4) are typically slightly irregular plains. The vegetation type occurs between 1 050-1 400 m.

The description of the physical environment observed on site more or less agree with that of the vegetation type of Mucina and Rutherford (2006) in which the study area is located (SANBI, 2006-2018).

### 4.2. Vegetation type and bioregional areas:

The proposed development is located in the Kimberley Thornveld vegetation type (Figure 3) (Dayaram, 2018; Mucina and Rutherford, 2006).

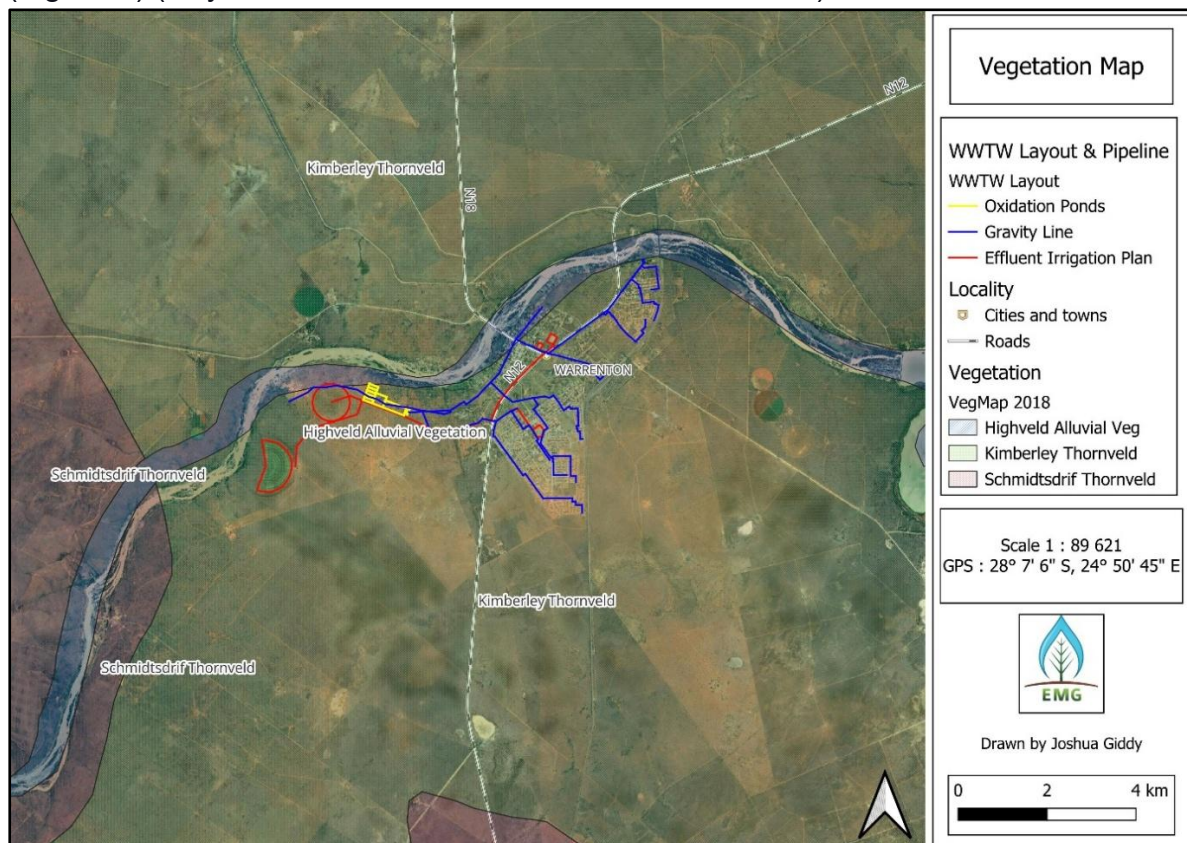


Figure 3: The regional vegetation type in relation to the study area.



The Kimberley Thornveld vegetation type has a well-developed tree layer, which is dominated by *Vachellia erioloba*, *V. tortilis*, *V. karroo* and *Boscia albitrunca*. The vegetation type also contains a well-developed shrub layer dominated by dense stands of *Senegalia mellifera* and *Tarchonanthus camphoratus*. The grass layer is often open with patches of bare soil. This description matches about 20% of the vegetation present in the area (in particular the WWTW area) with the rest of the vegetation being altered by means of agricultural or anthropogenic development or so badly degraded it no longer resembles the vegetation type. The overall vegetation observed within the study area is therefore classed as **largely transformed with some areas of natural vegetation**. Within the WWTW area indigenous elements have returned or remain amongst the seemingly slightly disturbed natural vegetation. Within the area there are visible disturbances in the form of cattle feeders and grazing lawns.

In order to determine the likelihood of SCC occurrence the current environment needs to be assessed. According to SANBI's Red list of South African plants Sensitive Species 257 has limited data due to its cryptic nature. However, of the few recorded species found, three specimens were localized to salt pans which may explain its rarity as suitable habitat areas would be generally small in extent and widely scattered. Habitat descriptions of the species indicates that they grow on deep, alluvial soils. The site assessment showed that the dominant soil type in the area is chromic cambisols – distinct red-brown soils. Without more information on the favoured soil types of Sensitive Species 257 it can be assumed that the site has incompatible soil. Due to the presence of grazing lawns in areas where the grass layer is present and the general lack of herbaceous vegetation it can be assumed that there is a low likelihood of SCC presence or survival within the area due to current agricultural disturbances.

According to the findings of the DFFE Screening tool report indicate the WWTW site was found to be within an area mapped as CBA 1 which resulted in a biodiversity theme sensitivity of very high. This CBA 1 only extends over the WWTW area covering approximately 26-ha of the 142-ha total project area. The affected area has the vegetation type Kimberley Thornveld (SVk 4). The Kimberley Thornveld (SVk 4) vegetation type has a conservation status of Least Concern (LC) according to the Mucina and Rutherford (2006) and did not appear in the Red List of Terrestrial Ecosystems of South Africa June 2021 (SANBI & DEFF, 2021). Additionally, the irrigation area (and partially the WWTW) has been utilised for high intensity agricultural practices for decades and have remained in use in most areas. Thus, the findings of this report **disagree** with that of the DFFE screening tool report's **low-medium sensitivity** in lieu of a lower sensitivity of **low**. The findings of this report disagree with the **very high sensitivity of the terrestrial biodiversity theme** in the DFFE screening tool and rather suggests a sensitivity of **low-medium** as the area affected within CBA 1 is relatively small (26-ha) and the “irreplaceable elements” (sensitive species 257) was not found and is unlikely to occur.

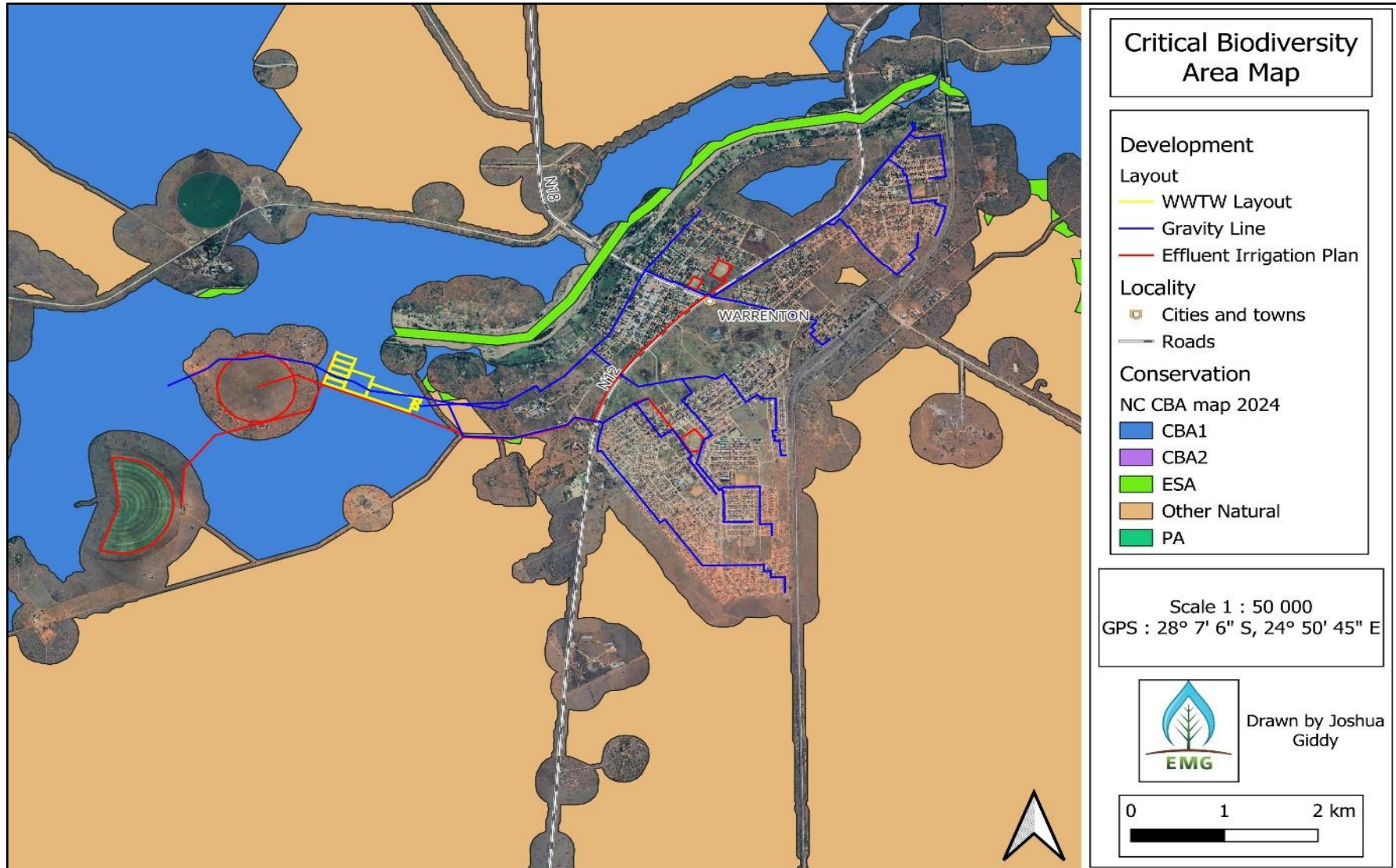


Figure 4: A map of the study area in relation to the map of the Northern Cape province's biodiversity spatial plan map (Oosthuysen & Geldenhuys, 2024).



### 4.3 Previous land use:

Historically, the proposed development has been utilised for agricultural land uses, specifically that of cultivation and grazing (Figure 2). Figure 2 contains satellite and aerial photographs of the approximate study area (Size on image may vary) dating to 2000 (1), 2006 (2), 2014 (3) and 2019 (4).

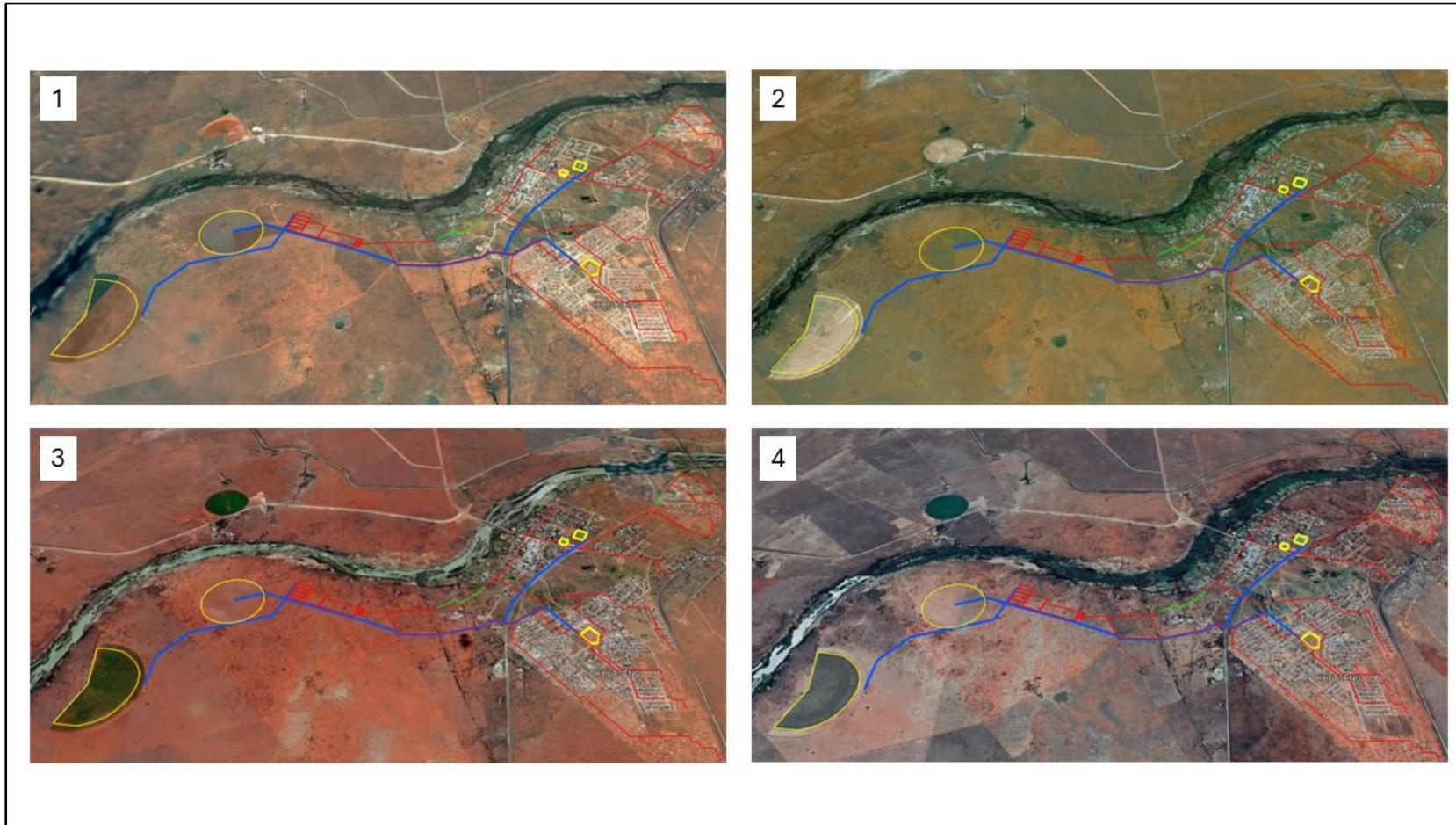
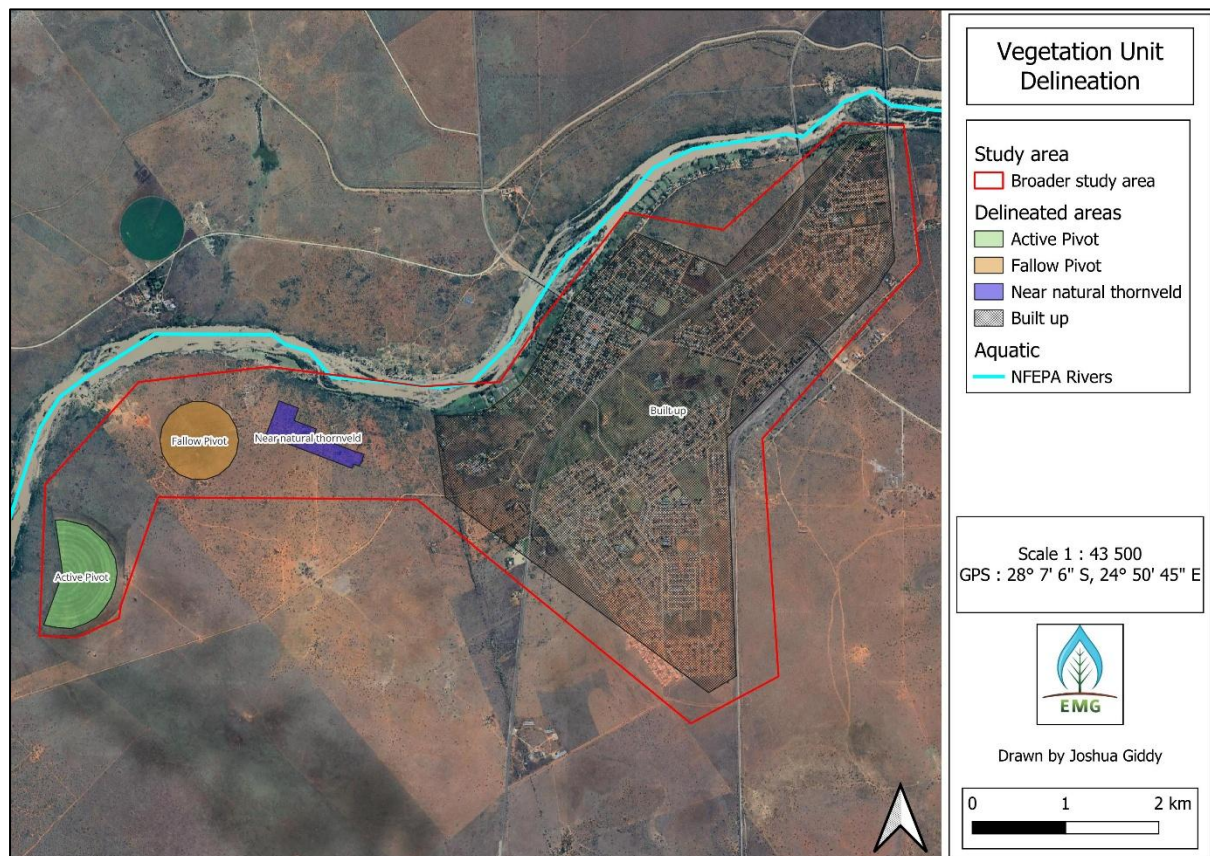


Figure 5: Location and approximate size of study area throughout history. 1). aerial view in 2000. 2). aerial view in 2006. 3). aerial view in 2014 and 4). aerial view in 2019.

#### 4.4. Vegetation features:



*Figure 6: A study area map of the various delineated areas showing a largely built-up area. Four distinct areas were identified; the active pivot, fallow pivot, near natural thornveld and a built-up area.*

The study site's physical environment more or less agrees with the physical environment description of the Kimberly Thornveld (Mucina & Rutherford, 2006). However, the vegetation composition and structure observed within majority of the study area does not match the vegetation description of Mucina and Rutherford (2006). The vegetation remaining within the study area has been moderately influenced by the high intensity agricultural practices which have occurred within the area. This study found four units; one near natural thornveld, fallow pivot area, active pivot area and the built-up area.

##### Agriculturally transformed areas (pivots)

The entirety of the proposed irrigation area shows deviation from the natural state due to agricultural influence. This influence is seen in the form of cow dung, hoof prints, trampling, low biomass, soil compaction, monoculture species and presence of livestock during the site visit. This indicates the area was used as rangeland as well as cultivation as seen in the previous land use section. The vegetation descriptions will therefore be split into the more eastern irrigation area and the more western area.



### *Western area (active pivot)*

The area deemed the more western irrigation area is the irrigation area furthest from the proposed WWTW area. The area was previously (and currently) agricultural fields (noted in figure 5.3) 2014) which is still being utilised for agricultural practices as can be seen in Figure 6. The area is therefore excluded from this ecological assessment.

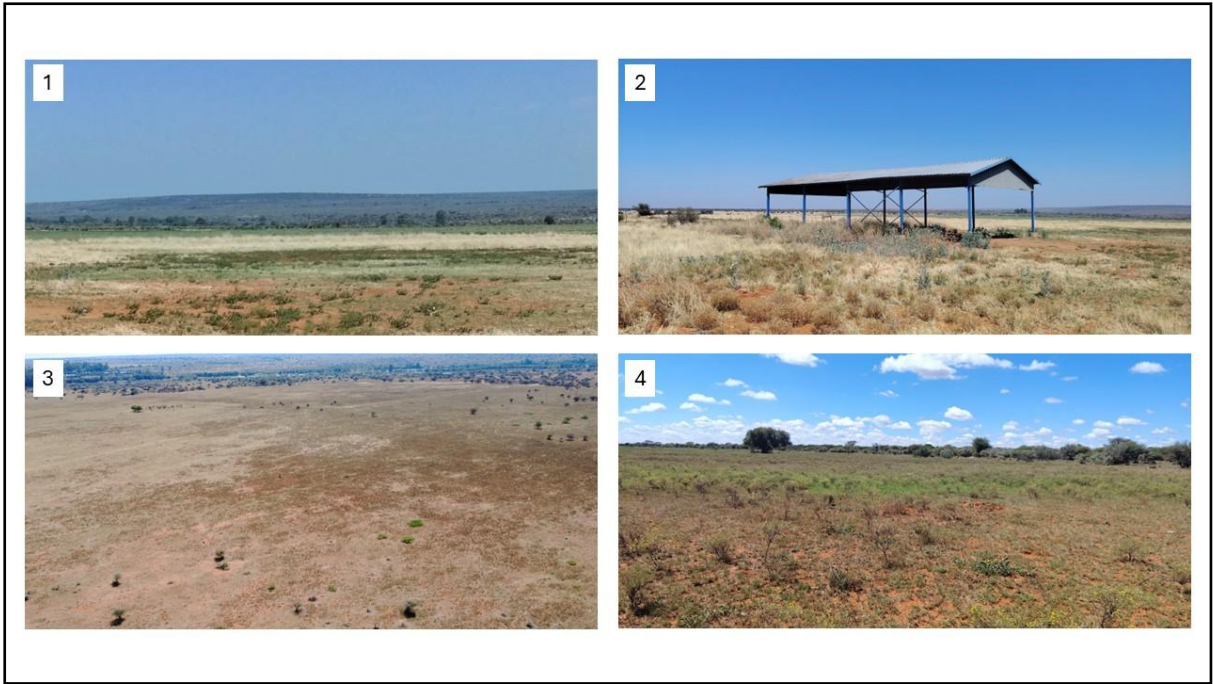


Figure 7: Active agricultural pivot as seen from an aerial drone image (28° 7' 41" S, 24° 48' 16" E).

### *Eastern area (fallow pivot)*

The area deemed the more eastern irrigation area is the area closer to the proposed WWTW area. The area was previously agricultural fields (noted in figure 5.1) 2000) which is now being utilised for grazing of livestock (goats and cattle).

The grass layer consisted majorly of *Cynodon dactylon*, with few occurrences of *Sporobolus fimbriatus* and *Eragrostis racemosa* however due to the active grazing creating a lack of inflorescence for the grasses and therefore a reduced species count. The area was majorly dominated by the shrub layer which consisted of *Selago densiflora*, *Solanum lichtensteinii*, *Tarchonanthus camphoratus* and is dominated by *Pentzia incana*. Forbs were largely present in the shrub understory with occurrences of *Senna italica*, *Salvia disermas*, *Chaenostoma* sp and *Peliostomum leucorrhizum*. Lastly, the tree layer is poorly developed with few occurrences of *Searsia lancea*. Within the area numerous alien invasive individuals of *Argemone ochroleuca* (NEM:BA Category 1b) were noted, these individuals were noted to be concentrated along the two-track path which runs the whole way through the area. As a result of historical and current agricultural disturbances, this vegetation does not resemble any form of a natural habitat. As such, the ecological functioning of this area is considered **very poor**.



*Figure 8: Ground and aerial view of the proposed irrigation development area described under the agriculturally transformed western and eastern area. 1). Active pivot area facing west ( $28^{\circ} 7'59.45''\text{S}$ ,  $24^{\circ}48'10.83''\text{E}$ ), 2). Active pivot area facing west ( $28^{\circ} 8'0.88''\text{S}$ ,  $24^{\circ}48'10.82''\text{E}$ ), 3). Fallow pivot area facing north ( $28^{\circ} 7' 27'' \text{ S}$ ,  $24^{\circ} 48' 35'' \text{ E}$ ), 4). Fallow pivot area facing southeast ( $28^{\circ} 7' 11'' \text{ S}$ ,  $24^{\circ} 48' 32'' \text{ E}$ ).*

### Near-natural area (proposed WWTW)

The proposed WWTW area shows some deviation from the natural state due to agricultural influence. This influence is seen in the form of cow dung, hoof prints, trampling, low biomass, soil compaction and presence of livestock during the site visit. These disturbances can be seen in Figure 9 and indicates the area was used as rangeland.

The grass layer consisted of *Cynodon dactylon*, *Aristida canescens*, *A. congesta*, *Eragrostis racemosa*, *Schmidtia pappophoroides* and *Sporobolus fimbriatus*. These grasses were interspersed throughout bare patches of soil which may be due to the grazing occurring in the area however according to the vegetation description by Mucina and Rutherford (2006) the grass layer is open with lots of bare soil.

The area was majorly dominated by the tree and shrub layer which consisted of *Searsia lancea*, *Vachellia karroo*, *Senegalia mellifera* and *Tarchonanthus camphoratus*. Forbs were largely present in the shrub understory with occurrences of *Senna italica*, *Salvia disermas*, *Chaenostoma* sp and *Peliostomum leucorrhizum*. Despite the historical and current agricultural disturbances, this vegetation does still resemble the form of a natural habitat. As such, the ecological functioning of this area is considered **moderate**.

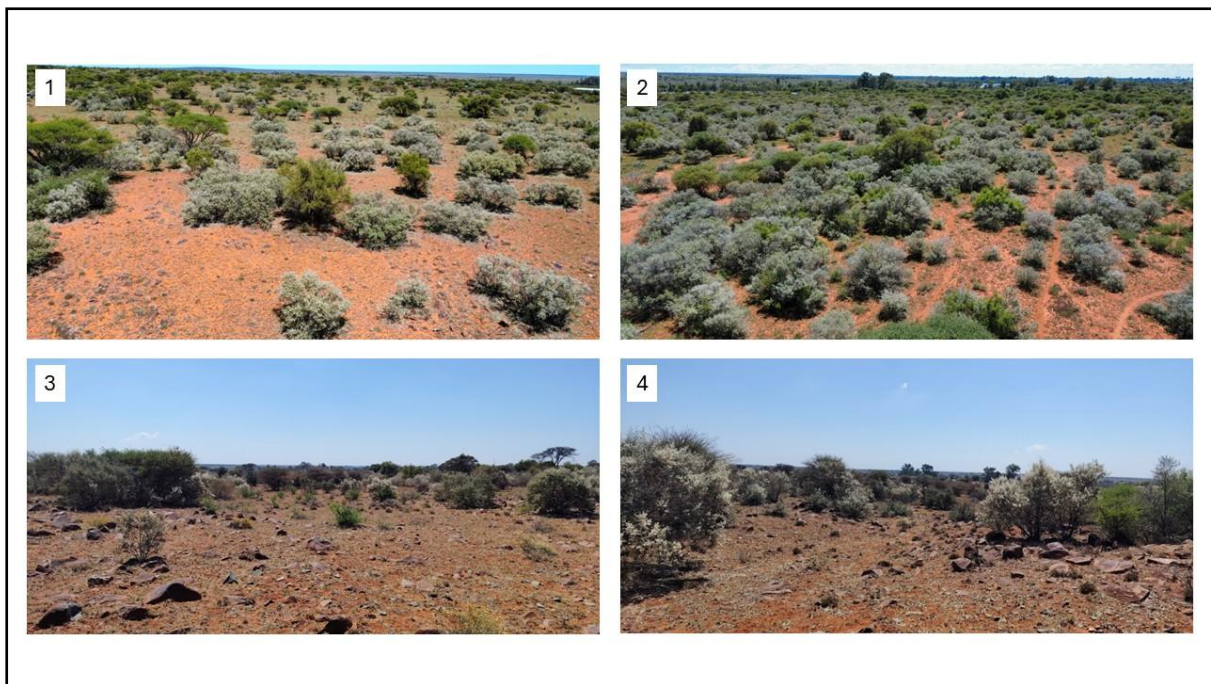


Figure 9: Ground and aerial view of the proposed WWTW development area (near natural thornveld) described under the near-natural area. 1). Drone image of the northern section of the proposed WWTW (28° 7'15.88"S, 24°49'14.43"E), 2). Drone image of the northern section of the proposed WWTW (28° 8'0.88"S, 24°49'10.77"E), 3). Ground view of the North-eastern section of the proposed WWTW (28° 7'28.52"S, 24°48'38.52"E) and 4). Ground view of the eastern section of the proposed WWTW (28° 7'24.33"S, 24°49'29.42"E)



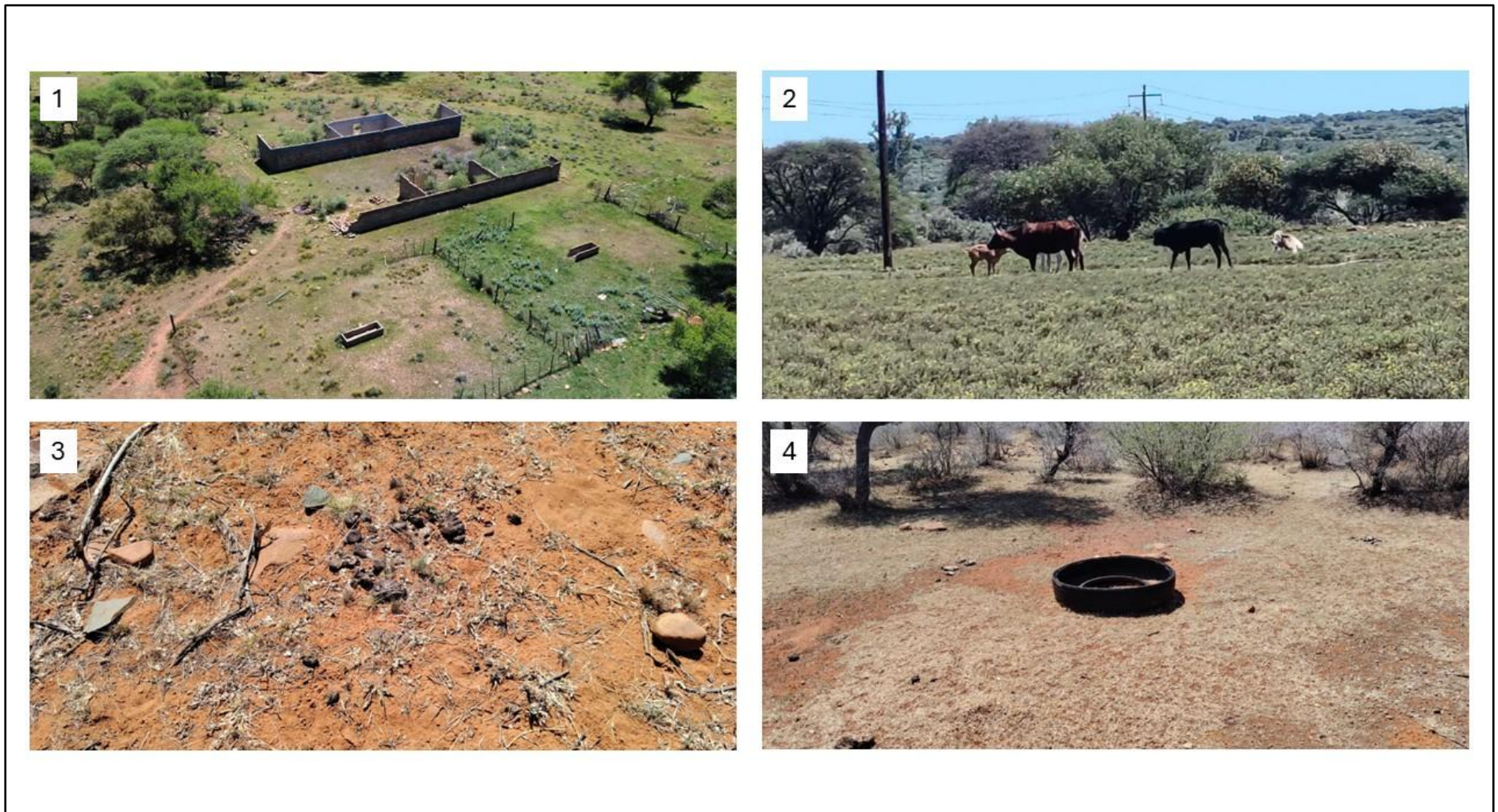


Figure 10: Ground and aerial views of the proposed WWTW development area (near natural thornveld) described under the near-natural area. 1). Drone image of dilapidated feedlots on the northern side just outside the bounds of the proposed WWTW area (28° 7' 8" S, 24° 49' 28" E), 2). Ground view of cattle present within the area, 3). Evidence of cattle found within the proposed WWTW (28° 7' 23" S, 24° 49' 30" E) and 4). Evidence of cattle feed troughs present within the proposed WWTW (28° 7' 19" S, 24° 49' 24" E). These disturbances can be seen across the whole site.



### Built up area

A comprehensive survey was not conducted for this area due to the current use of the area being a developed towns' roadside. The areas investigated contained little to no vegetation and when present the vegetation was solely invasive alien species such as those noted in the previous section. These areas were irreversibly modified (as seen in Figure 8) and no longer resembles the surrounding vegetation type or any vegetation type for that matter.

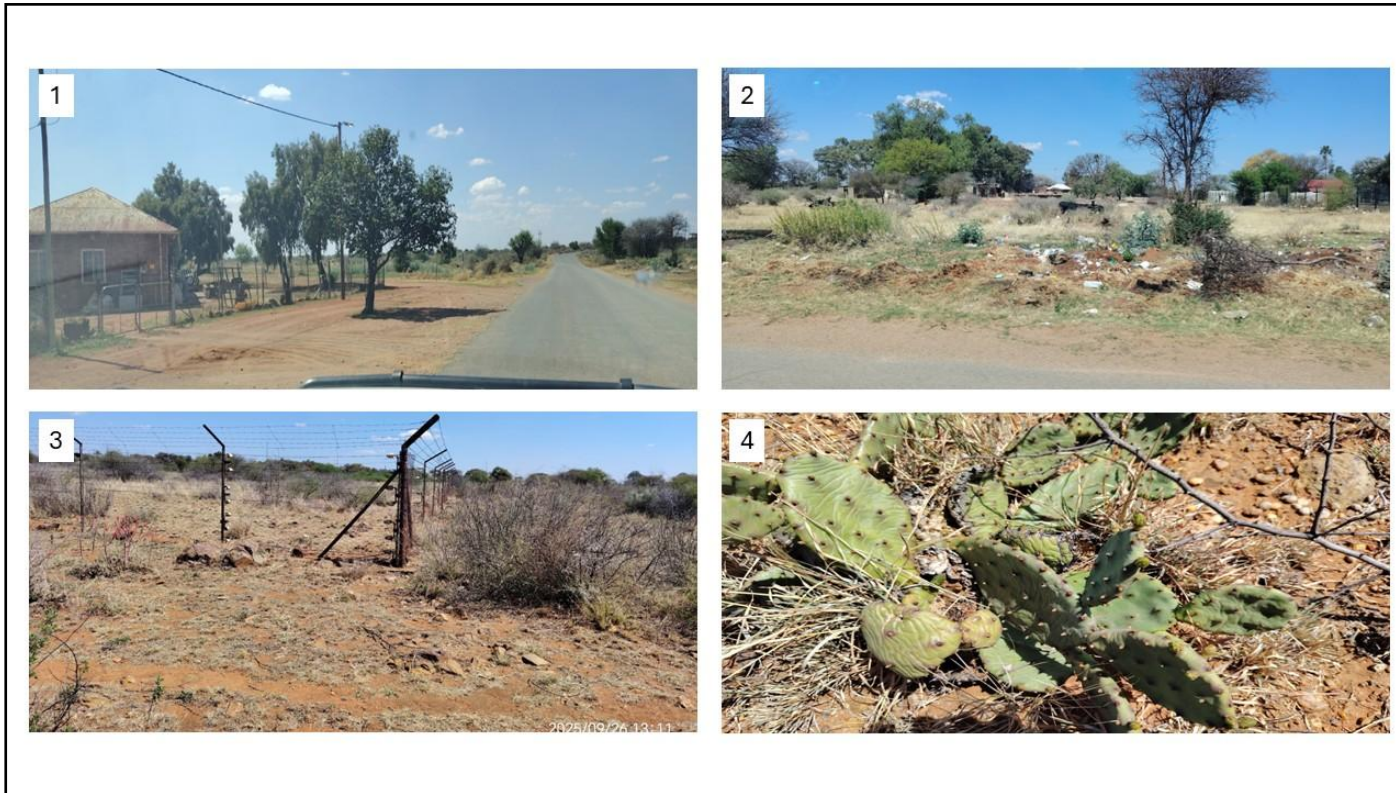


Figure 11: Ground and aerial view of the built-up area. 1). Ground view of the eastern section of the built-up area running through the developed town - depicted state represents much of the area, 2). Ground view of the eastern section of the built-up area running through the developed town – depicted represents the remaining area which has not been scrapped as seen in (1), 3). Ground view of the section which occurs just outside the town – depicted represents the majority of the small area which occurs outside the developed town, 4). Presence of one of many alien invasive species present throughout the pipelines proposed route within the built-up area.

### Vegetation overview

The site can be split between the 116-ha developed irrigation (active severe agricultural disturbances), the built-up anthropogenic development (Warrenton) and the 26-ha near-natural WWTW area which has a moderate number of grazing livestock resulting in minimal disturbance. The vegetation observed within the near-natural area is untransformed however disturbed and contains relatively high species richness representative of the present vegetation type. The species found agree with those of the Kimberly Thornveld with somewhat of an exception of the grass layer as it is believed some species were not noted due to grazers removing the inflorescences. Overall, the entire study area has been influenced by long term agricultural practices and anthropogenic development. Thus, the majority of the site is in a **poor and severely modified ecological condition**. However, this is not an accurate representation of each component and should therefore be broken into the four areas; fallow pivot, active pivot, near natural thornveld and the built-up area. The fallow pivot area has been influenced by past and present agricultural impacts and can therefore be considered **poor and severely modified ecological condition**. The active pivot area is entirely modified due to its current agricultural use and can therefore be considered **poor and severely modified ecological condition**. The near natural thornveld is as its description states, near natural due to its minimal disturbances and can therefore be considered to be in good and near natural ecological condition.

**One** nationally (and provincially) protected flora was observed on site. One SCC was expected to occur according to the DFFE screening tool however no individuals were confirmed, and it is unlikely occur due to the agricultural disturbance. No range-restricted species were recorded for the site. The proposed development is expected to largely affect an area influenced by grazing livestock, agricultural fields and anthropogenically developed areas. The proposed area's resilience is expected to be **low** due to the loss of more than 80% of the natural vegetation. Thus, the site ecological importance is **low**. **Minimisation mitigation** is acceptable.

## 4. Sensitivity assessment

The calculation of unit sensitivity is performed in accordance with the Species Environmental Assessment Guidelines for Site Ecological Importance (SEI) as outlined by the South African National Biodiversity Institute (SANBI, 2020). Unit sensitivity is determined by utilizing resilience (R) and biodiversity importance (BI), which is calculated as the sum total of conservation importance (CI) and functional integrity (FI). The table below indicates the unit sensitivity classification for each delineated Vegetation Unit (VU). However, although each vegetation unit has been assigned a sensitivity, there are areas in those vegetation units which may be higher or lower than the prescribed sensitivity of the vegetation unit. This was done in association of anthropogenic impacts having a radiating effect on areas of a vegetation unit more in directly influenced areas and less so in the indirectly affected areas.

| Vegetation Unit        | Conservation importance | Functional integrity | Biodiversity importance | Resilience category | Unit Sensitivity |
|------------------------|-------------------------|----------------------|-------------------------|---------------------|------------------|
| Near natural thornveld | Low                     | High                 | Medium                  | High                | Low              |

Near Natural Thornveld: This vegetation unit was given a **low** conservation importance rating due to no confirmed observations of, or low probability of SCC occurrence. A **high functional integrity** rating was given due to this site having good habitat connectivity with surrounding habitats and connection with a major river system, the Vaal River. In addition, the site is large (>20-ha) and intact with only minor current negative ecological impacts and no signs of major past disturbances. Thus, a **medium biodiversity importance** has been assigned. Recovery of this habitat to major impacts will likely be quick considering the climate, available broadscale habitat connectivity, and the nature of the species found on site. Though, this habitat may be susceptible to invasions for the same reasons. Thus, the receptor habitat is likely to have a **high receptor resilience**. Together, the biodiversity importance rating of **medium** and resilience rating of **high** for this vegetation unit results in a unit sensitivity rating of **low**.

Conservation importance of the proposed development area is therefore **low-medium** due to the **minimal natural habitat remaining on site** and the **current disturbances**. Site functional integrity for the proposed development area is **low-medium** due to the site's locality having **good habitat connectivity (half)** and **no connectivity (other half)** and **low-medium rehabilitation potential** as well as due to the **several minor and major current negative ecological impacts** observed on site. These impacts include, but are not limited to, cultivation, grazing, loss of species diversity, unintentional introduction of alien and invasive species, intentional introduction of agricultural species, intentional introduction of selective grazers (cattle and sheep), trampling and soil compaction. Alien and invasive species were observed on site. Biodiversity importance is thus **low**.

## 5. Impact assessment and recommendations:

Overall, the proposed development is expected to influence less than the potential 142 ha of vegetation indicated by the size of the WWTW and associated pipeline. The following section provides a breakdown of the impacts imposed on the receiving environment due to the development and operation of the proposed development.

*Table 7 Summary of anticipated impacts associated with the proposed development. It's important to note that this table is not all-inclusive but merely provides perspective concerning the types of activities that contribute to the deterioration of concerned ecological aspects.*

| Concerned aspect                                          | Activities directly contributing to the concerned aspect                                                                                                                                                                                                                                                                                                                        | Secondary activities which may contribute to the concerned aspect                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Habitat loss                                              | <ul style="list-style-type: none"> <li>Physical clearance of vegetation</li> <li>Habitat fragmentation leading to edge effects</li> <li>Trampling</li> <li>Accidental events such as fire</li> <li>Loss of protected species</li> </ul>                                                                                                                                         | <ul style="list-style-type: none"> <li>Introduction of alien and invasive species</li> <li>Soil compaction reducing re-establishment success</li> <li>Soil erosion</li> <li>Reduced biodiversity</li> <li>Disrupted general animal behaviour</li> </ul>                                                                                                            |
| Loss of CBA and ESA's                                     | <ul style="list-style-type: none"> <li>Physical clearance of vegetation</li> <li>Loss of protected species</li> <li>Habitat fragmentation</li> <li>Accidental events such as fire</li> <li>Increased anthropogenic movement</li> <li>Loss of biomass and biodiversity</li> </ul>                                                                                                | <ul style="list-style-type: none"> <li>Introduction of alien and invasive species</li> <li>Soil compaction reducing re-establishment success</li> <li>Soil erosion</li> <li>Thinning of local genetic diversity</li> <li>Increased ecological disturbance</li> <li>Loss in ecological functionality</li> </ul>                                                     |
| Loss of indigenous floral and faunal diversity            | <ul style="list-style-type: none"> <li>Physical clearance of vegetation</li> <li>Loss of protected species</li> <li>Trampling</li> <li>Habitat fragmentation</li> <li>Accidental events such as fire, oil spills etc</li> <li>Unlawful harvesting of plants</li> <li>Unlawful hunting/ poaching of animals</li> <li>Accidental entrapment</li> <li>Accidental injury</li> </ul> | <ul style="list-style-type: none"> <li>Introduction of unnatural competitors, i.e. alien and invasive species</li> <li>Reduced fecundity through reduced reproductive ability and success</li> <li>Reduced survivability</li> <li>Disrupted general animal behaviour</li> <li>Disrupted circadian rhythms</li> <li>Noise pollution (construction phase)</li> </ul> |
| Loss of floral and faunal species of conservation concern | <ul style="list-style-type: none"> <li>Clearance of vegetation</li> <li>Loss of protected species</li> <li>Habitat fragmentation</li> <li>Poaching, unlawful hunting and gathering of plants and animals</li> <li>Careless and reckless behaviour</li> <li>Trampling</li> <li>Accidental events such as fire</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Thinning of local genetic diversity</li> <li>Reduced fecundity through reduced reproductive ability and success</li> <li>Disrupted circadian rhythms</li> <li>Interruption of lifecycle patterns due to noise pollution.</li> </ul>                                                                                         |



## Concerned terrestrial ecological aspects:

### Habitat loss

Habitat loss and fragmentation is the leading cause of the global biodiversity crisis. The removal of crucial environmental units will lead to the destabilisation of the entire ecosystem and, eventually, ecological breakdown.

This project will result in an overall loss of biodiversity through habitat destruction and reduction of species diversity. Site location across one vegetation type, Kimberly Thornveld which is Least Conservation Concern (Mucina and Rutherford, 2006; SANBI 2006-2018; Government Gazette no. 34809, 2011; Department of Environmental Affairs, 2016).

Relatively large areas of the overall area have experienced direct, severe disturbances in the past with some area experiencing ongoing disturbances. Direct disturbances as a result of the past development of infrastructure, daily anthropogenic movements, agricultural activities, alien invasion and few agriculturally based infrastructure developments can be reported. Despite this, a small proportion of the proposed development area has experienced little to no disturbance besides grazing.

Overall, the expected disturbance is expected to influence a relatively small area of vegetation considering the existing two track and development allowing access and the new pipeline requiring relatively few localised areas for equipment and material storage which can be placed in an already disturbed area. The expected level of disturbance caused by the proposed development is relatively low, resulting in slight vegetation and habitat transformation within the terrestrial area of the study area. This development will cause loss of habitat with the overall impact thereof on the receiving environment being low. However, the expected low levels of disturbance will only be for if all appropriate mitigation measures are met. The receiving environment's overall landscape is not considered unique regarding vegetation type and broadscale vegetation structure.

The impacts associated with habitat loss are evaluated to be of low significance since the new pipeline is a linear development, which is majorly occurring on previously severely modified areas with the WWTW occurring on a near-natural area only covering 25-ha. The efficient implementation of the proposed mitigation measures will lower the impact significance on habitat loss. However, **minimisation mitigation** must be implemented (SANBI, 2020).

*Table 8 The anticipated impact on habitat loss for fauna during the construction phase. Post-mitigation significance is also indicated.*

| <b>Construction phase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |                       |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------|------------------------|
| <b>Concerned aspect:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Impact characteristic</b> | <b>Pre mitigation</b> | <b>Post mitigation</b> |
| Habitat loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Geographical extend          | 1                     | 1                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Probability                  | 2                     | 1                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Duration                     | 2                     | 2                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reversibility                | 4                     | 4                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Cumulative impacts           | 2                     | 1                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Intensity                    | 1                     | 1                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>TOTAL</b>                 | <b>11</b>             | <b>9</b>               |
| Significance rating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              | Very Low              | Very Low               |
| General mitigation: <ul style="list-style-type: none"> <li>• Removal of indigenous flora should be kept at a minimum.</li> <li>• No collection of plants other than for holding for use in rehabilitation is allowed.</li> <li>• Disturbance-related activities may only occur in the authorised area.</li> <li>• Vehicle movement should strictly be kept on designated dirt/gravel roads and/or bypasses.</li> <li>• Soil erosion mitigation measures need to be implemented.</li> <li>• Post-development open/barren areas should be revegetated and kept free of exotic plant species.</li> <li>• Vehicles may only move within the demarcated space of the development area.</li> <li>• Any other relevant recommendations listed in this report should be implemented.</li> </ul> |                              |                       |                        |
| <b>Operation phase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                       |                        |
| Not applicable due to loss of definitive characteristics of habitats in the construction phase.<br>Additionally, no greater impact during operation can occur than those impacts occurring during construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |                       |                        |

### Loss of CBA and ESA areas

According to the Technical Guidelines for CBA Maps, CBAs are areas which must remain largely in a natural ecological condition whilst ESAs require at least semi-natural ecological condition (SANBI, 2017). The crossing of the study area and areas mapped ESA / CBAs is largely limited and localised and these areas were noted to have been disturbed by agricultural activities.

The CBA and ESA areas for the proposed development is closely associated with the presence of a close by watercourse, which should be discussed fully in the Aquatic Specialists report. The proposed development runs adjacent to this waterbody.

Considering the proposed development's occurrence on top of an existing development, gravel/dirt roads and bordering spaces, part of the area to be influenced has previously been negatively affected. The overall area covered by the development within CBA/ESA areas is minimal compared to the extent of the entire CBA/ESA areas. As such, the proposed development is likely to have a significantly lessened negative effect of loss of CBA and ESA areas.

Due to this, the anticipated impact on this aspect without mitigation is considered **very low**. Mitigation is necessary and would be easily achieved. After mitigation measures are implemented, the anticipated impact on the loss of CBA and ESA areas is very low.

*Table 9: The anticipated impact on Critical Biodiversity Areas and Ecological Support areas during the construction phase. Post-mitigation significance is also indicated.*

| Construction phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                      |                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|-----------------------|
| Concerned aspect:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Impact characteristic | Pre mitigation score | Post mitigation score |
| Loss of CBA and ESA areas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Geographical extend   | 2                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Probability           | 2                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Duration              | 2                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reversibility         | 3                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Cumulative impacts    | 2                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Intensity             | 1                    | 1                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>TOTAL</b>          | <b>11</b>            | <b>5</b>              |
| Significance rating:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       | <b>Very Low</b>      | <b>Very Low</b>       |
| Recommended mitigation measures:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                      |                       |
| General Mitigation: <ul style="list-style-type: none"> <li>• Limit the removal of vegetation in these CBA/ESA areas.</li> <li>• Vegetation and topsoil must be kept for use in rehabilitation.</li> <li>• Holding areas for plants must be demarcated and utilised.</li> <li>• Topsoil storage must be prevented from contamination and invasion by alien and invasive species.               <ul style="list-style-type: none"> <li>○ The excavated ground should be separated into piles of topsoil, subsoil and other material.</li> </ul> </li> <li>• General works should, where possible, take place from the edge of the existing road to the side opposite a watercourse.</li> <li>• No heavy machinery or material storage should occur on the side closest to a water course or within 100m of a watercourse.</li> <li>• A comprehensive fire management plan needs to be drafted prior to construction</li> <li>• Removal of indigenous flora should be kept at a minimum.</li> <li>• Disturbance related activities may only occur in the authorised area.</li> <li>• No unnecessary clearance of vegetation or topsoil may take place outside of the development area.</li> <li>• No other activity than that authorised may be taken within the authorised area.</li> <li>• Post-development open areas should be revegetated and kept free of exotic plant species.</li> <li>• Vehicles may only move within the demarcated space of the development area.</li> <li>• Any other relevant recommendations listed in this report should be implemented.</li> </ul> |                       |                      |                       |

| Operation phase                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Not applicable due to loss of definitive characteristics of CBA or ESA areas in the construction phase.<br>Additionally, no greater impact during operation can occur than those impacts occurring during construction. |

### Loss of indigenous floral diversity

Indigenous flora have a far greater conservation value compared to exotic species. Indigenous species have adapted to the surrounding environment and have established many stable networks of energy transfer. The removal or disruption of indigenous species disrupts this balance that has formed over many years.

Large amounts of alien and invasive plant species were recorded within parts of the study area. The receiving environment's structure and species composition are primarily non-natural with the exception of the WWTW area. Therefore, the construction phase of the proposed development will result in the localized removal of mostly indigenous vegetation (WWTW) or the removal of non-natural vegetation (most other areas) and the loss of local floral diversity. Due to this, the anticipated impact on this aspect without mitigation is considered very low. Mitigation is necessary and would be easily achieved. After mitigation measures are implemented, the anticipated impact on the loss of floral diversity is very low.

During the construction and operational phases, the anticipated impact on the loss of indigenous floral diversity will be of very low significance whether or not mitigation measures are implemented. However, the implementation of mitigation measures is required for minimisation mitigation.

*Table 10 The anticipated impact on the loss of indigenous floral and faunal diversity. The impacts were calculated for both the construction and operational phases. Post-mitigation significance is also indicated.*

| Construction phase                             |                       |                |                 |
|------------------------------------------------|-----------------------|----------------|-----------------|
| Concerned aspect:                              | Impact characteristic | Pre mitigation | Post mitigation |
| Loss of Indigenous floral and faunal diversity | Geographical extend   | 2              | 1               |
|                                                | Probability           | 2              | 1               |
|                                                | Duration              | 2              | 1               |
|                                                | Reversibility         | 3              | 3               |
|                                                | Cumulative impacts    | 2              | 1               |
|                                                | Intensity             | 1              | 1               |
|                                                | <b>TOTAL</b>          | <b>11</b>      | <b>8</b>        |
| Significance rating                            |                       | Very Low       | Very Low        |

General mitigation:

- Development may only occur within the clearly demarked area.
- Monitoring for the emergence of exotic species should be conducted.
- Vehicle movement should remain within the authorised boundary.
- A comprehensive rehabilitation plan must be adhered to.
- No unnecessary destruction or removal of vegetation is allowed.
- Wildlife elements such as nests and burrows should be carefully inspected, and animals responsibly removed by a relevant specialist.
- Post-development open areas should be revegetated and kept free of exotic plant species by way of an alien and invasive management plan (AIMP). The AMP should be developed to avoid the possibility of invasions and supply eradication techniques should they arise in the development area.
- Quarterly alien and invasive species monitoring should take place according to the AIMP.
- Any other relevant recommendations listed in this report should be implemented.

**Operational phase**

Mitigation measures:

- Care should be taken to reduce edge effects caused by anthropogenic movement.
- On going maintenance should be done with consideration for their effects i.e. vegetation burning or clearance within the WWTW may affect the surrounding vegetation by causing fires etc.
- Quarterly alien and invasive species monitoring should take place according to the AIMP.
- Any other relevant recommendations listed in this report should be implemented.

**Loss of floral species of conservation concern**

The loss of rare, threatened and or protected species should always evoke a conservative approach regarding land use management. These species have been declared as species of conservation concern due to various population declining factors such as urban expansion, the loss of species-specific symbiotic relationships, innate small population sizes, habitat loss, etc. The further loss of these species should be prevented at all costs.

The proposed development is expected to affect one provincially and nationally protected floral component with one floral SCC having been identified by the DFFE Screening Tool. This species was not found on site and due to present disturbances isn't expected to occur.

Anticipated environmental impacts on the loss of faunal SCC during the construction phase and operational phase is expected to be very low. After the efficient implementation of mitigation measures during the construction phase the anticipated impact on the loss of faunal and floral SCC is expected to be very Low. Strict mitigation measures are required to lower the overall impact.



Table 11 The anticipated impact on the loss of floral SCC. The impacts were calculated for both the construction and operational phases. Post-mitigation significance is also indicated.

| Construction phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                |                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------|-----------------|
| Concerned aspect:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Impact characteristic | Pre mitigation | Post mitigation |
| Loss of floral and faunal species of conservation concern                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Geographical extend   | 1              | 1               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Probability           | 1              | 1               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Duration              | 4              | 4               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reversibility         | 4              | 4               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Cumulative impacts    | 1              | 1               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Intensity             | 1              | 1               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>TOTAL</b>          | <b>11</b>      | <b>11</b>       |
| Significance rating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | Very Low       | Very Low        |
| General mitigation:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                |                 |
| Prior to development                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                |                 |
| <ul style="list-style-type: none"> <li>Due to the confidential nature of the SCC, only trained specialists briefed under nondisclosure should be responsible for identifying SCC individuals during site clearance.</li> <li>Specialist led searches should be done in order to possible locate and apply the recommended buffer area for that SCC/protected species.</li> <li>If SCC/protected species are confirmed present, then vegetation removal should not be started without a qualified botanist present.</li> <li>Protected plant species should be located and demarcated.</li> <li>Removal or relocation of the SCC are prohibited without the appropriate permits.</li> <li>DAERL should be consulted with regard to the feasibility of transplanting or removing provincially protected species.</li> <li>Removal or transplant permits from DAERL must be obtained for all provincially protected flora.</li> <li>If DAERL indicates transplant or relocation of some of the provincially protected flora, a formal relocation management plan should be drafted and implemented.</li> </ul> |                       |                |                 |
| Construction phase:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                |                 |
| <ul style="list-style-type: none"> <li>All construction staff should be informed on SCC and protected species or species of special conservation concern.</li> <li>A relevant specialist should be notified when the mentioned SCC and protected flora are observed during construction.</li> <li>All disturbance-related activities must be restricted to the authorised development boundary.</li> <li>No illegal harvesting of plant material is allowed.</li> <li>Any other relevant recommendations listed in this report should be implemented</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                |                 |
| Operational phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                |                 |
| Not applicable due to the negligible impact of operation as no diversity will be lost as a result of operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                |                 |
| Additionally, no greater impact during operation can occur than those impacts occurring during construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                |                 |

### Overall anticipated environmental impacts

The anticipated environmental impact evaluation indicated that the proposed development's construction phase would have an overall very low impact on the receiving environment. The anticipated environmental impact generated through the facility's operational phase will have a very low impact. Any deviation from the proposed development plan will significantly influence this score. The developer and the appointed contractor should remain mindful of low-impact developmental practices. The recommended mitigation measures should be strongly enforced.

*Table 12 Overall anticipated environmental impact pre- and post-mitigation.*

| Concerned aspect                                       | Score pre-mitigation | Rating pre-mitigation |  | Score post-mitigation | Rating post-mitigation |
|--------------------------------------------------------|----------------------|-----------------------|--|-----------------------|------------------------|
| <b>Construction phase</b>                              |                      |                       |  |                       |                        |
| Habitat loss                                           | 11                   | Very low              |  | 9                     | Very Low               |
| Loss of CBA and ESA areas                              | 11                   | Very low              |  | 5                     | Very Low               |
| Loss of indigenous floral and faunal diversity         | 11                   | Very low              |  | 8                     | Very low               |
| Loss of floral species of special conservation concern | 11                   | Very low              |  | 11                    | Very Low               |
| <b>Overall impact:</b>                                 | <b>11</b>            |                       |  | <b>8.25</b>           |                        |
| <b>Significance rating:</b>                            | Very Low             |                       |  | Very low              |                        |

## 6. Recommendations to be included in the EMPr:

- Limit the removal of indigenous vegetation.
- Low impact transplanting techniques must be utilised.
- Vegetation and topsoil must be kept for use in rehabilitation.
- Holding areas for plants must be demarcated and utilised.
- Topsoil storage must be prevented from contamination and invasion by alien and invasive species.
- No heavy machinery or material storage should occur on the side closest to a water course or within 100m of a watercourse.
- Should a SCC be found during construction a thorough walk-through of the study area by a qualified specialist should occur to locate any potential SCC/protected species.
- Protected or SCC plant species (should they occur) should be located and demarcated prior to development.
- Removal or relocation of the SCC/protected species are prohibited without the appropriate permits.
- No protected flora may be removed or harmed without the necessary permits.
  - Prior to development, DAERL should be consulted with regard to the feasibility of transplanting or removing provincially protected species.
  - Removal or transplant permits from DAERL must be obtained for all provincially protected flora prior to development.
  - If DAERL indicates transplant or relocation of some of the provincially protected flora, a formal relocation management plan should be drafted and implemented prior to development.
- On-site environmental and health and safety officers must report any observations of SCC/protected species to a qualified botanist/ zoologist/ avifaunal specialist and apply the recommended buffer area for that SCC/protected species.
- During development, care should be taken to not unnecessarily clear or destroy indigenous vegetation.
- An alien invasive management plan is a recommended requirement for monitoring the invasion of alien and invasive species found in areas affected by disturbance. Early detection of alien invasion is recommended to lower the development's environmental impact as well as overall project costs.
  - The presence of alien and invasive species needs to be monitored quarterly.
- Vehicle movement should be restricted to the authorised site boundary.
- Excavated topsoil should be stockpiled for rehabilitation efforts and kept clean of exotic vegetation.
- It is recommended that contractors install a temporary wire fence around excavations to prevent faunal access of the area.
  - Should any fauna become trapped in excavations, a qualified individual must be responsible for their safe relocation and release.

- A designated construction waste/debris area should be placed on site and located as far as possible from sensitive habitats.
- Waste should be removed from the site on a regular basis and not allowed to pile up to start polluting the environment.
- All construction-related waste/material should be appropriately disposed of after the construction has ceased.
- A comprehensive fire management plan should be implemented to prevent any fire outbreaks.

## 7. Conclusion:

The proposed development will influence 142-ha of an agricultural or anthropogenically developed environment. The proposed development will affect **one** nationally (and provincially) protected flora and is not expected to significantly impact the overall status of the occurring protected species. Total vegetation clearance is expected to influence all of the 142-ha, majority of which has been influenced by long-term agricultural use and anthropogenic development in the form of the town Warrenton. Strict monitoring and the effective implementation of all the mentioned mitigation measures will reduce the overall impact on the receiving environment.

Vegetation found on site showed signs of severe agricultural and anthropogenic disturbances, which lead to poor site functionality and overall poor species richness in the affected areas. The proposed development has a history of agricultural land use up to date and is located in a developing agricultural environment as well as an anthropogenically developed environment. Roughly 80% of the site has been transformed through previous agricultural land use practices or anthropogenic development. Less than 20% of the proposed development area consists of near natural vegetation. However, this remaining natural vegetation has been impacted by surrounding agricultural practices. The vegetation composition for the proposed development area is mostly lacking in respect to its original form of the Kimberly Thornveld vegetation type, with species diversity consisting mostly of alien and invasive species, naturalised alien species and monoculture cultivation with the exception of the species present in the WWTW area which are an accurate representation of the affected vegetation type. Few indigenous species remain, with no floral SCC and one nationally protected species observed within the proposed development area. One provincially protected species (same species as the nationally protected) was observed on site. In the vegetations current state, with little ecological functioning, the occurrence of floral SCC or protected species is low.

The environmental impact assessment in terms of habitat and floral components is expected to be very low, with or without mitigation measures. Therefore, the proposed development is not expected to have a significantly negative impact on the environment at the site. However, these influences will be permanent, and care must be taken to minimise the long-term effect of the development on the environment.



## 8. References:

- Manning, J., 2019. Field Guide to Wildflowers of South Africa. Struik Nature, Cape Town.
- Mucina, L., Rutherford, M.C. (Eds.), 2006. The vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. South African National Biodiversity Institute. Pretoria.
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- South African National Biodiversity Institute & Department of Environment, Forestry and Fisheries (2021) Red List of Terrestrial Ecosystems of South Africa June 2021 – version for public comments. South African National Biodiversity Institute. Pretoria, South Africa.
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- van Wyk, B., Malan, S., 1998. Field guide to the wildflowers of the Highveld. Struik Publishers, Cape Town.
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## Appendix A

### Specialist Track map

This appendix is to provide verifiable evidence of the specialists site inspection in alignment with the Amendment to the protocols for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal and Plant Species in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998. (GNR 3717 of 28 July 2023).

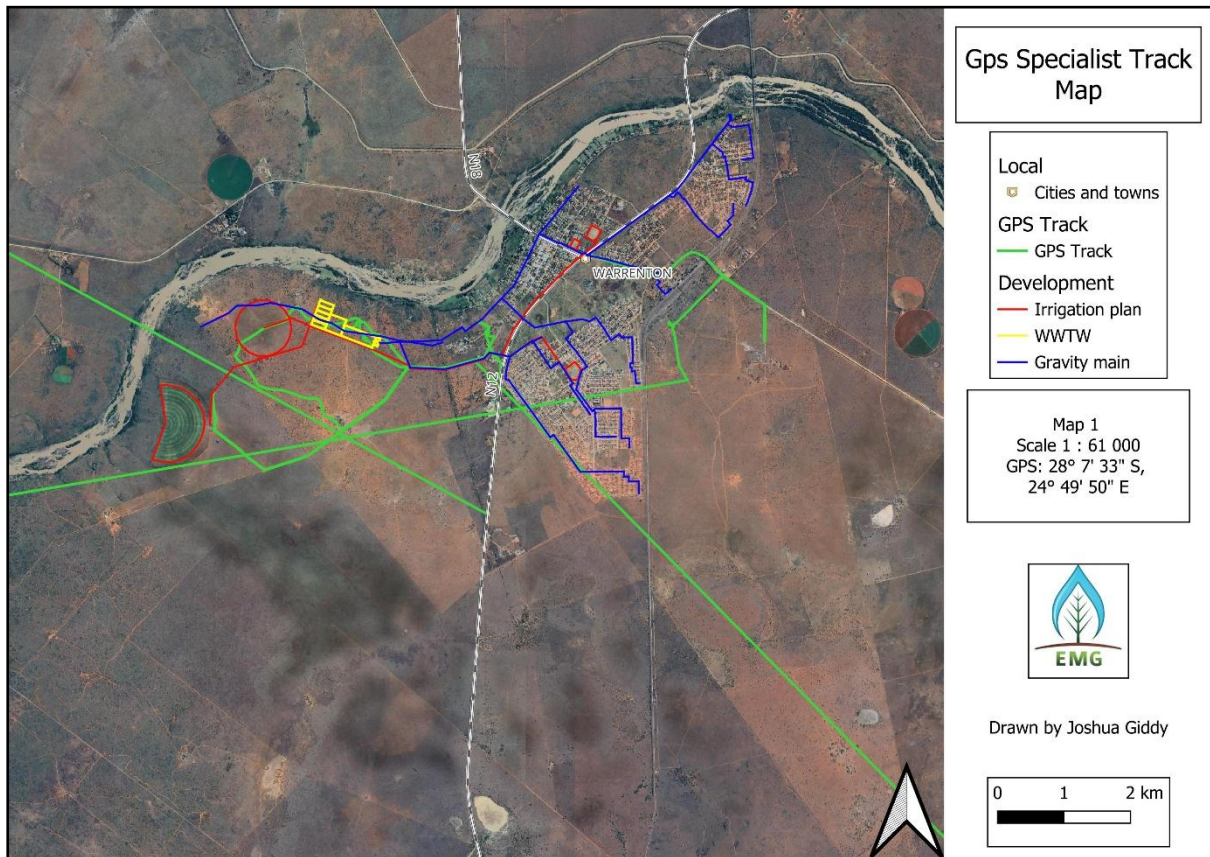


Figure 9: A map showing the specialist's GPS track in relation to the study area.

## Appendix B:

### Species list

Table 13 Faunal and Floral species recorded during the field survey. Alien invasive genus and species are noted using (\*).

| Family        | Species Name              | Indigenous Status        | Conservation Status |
|---------------|---------------------------|--------------------------|---------------------|
| Anacardiaceae | Searsia lancea            | indig                    | Least Concern       |
| Asparagaceae  | Asparagus suaveolens      | indig                    | Least Concern       |
| Asphodelaceae | Aloe grandidentata        | indig; end               | Least Concern       |
| Asteraceae    | Cotula nudicaulis         | indig; end               | Least Concern       |
|               | Pentzia incana            | indig; end               | Least Concern       |
|               | Tarchonanthus camphoratus | indig                    | Least Concern       |
| Cactaceae     | Opuntia tomentosa         | notindig; cult; nat; inv | 1b                  |
| Campanulaceae | Wahlenbergia undulata     | indig                    | Least Concern       |
| Cyperaceae    | Cyperus cristatus         | indig                    | Least Concern       |
| Fabaceae      | Senna italica             | indig                    | Least Concern       |
|               | Vachellia hebeclada       | indig; end               | Least Concern       |
|               | Vachellia karroo          | indig                    | Least Concern       |

|                  |                          |                    |                             |
|------------------|--------------------------|--------------------|-----------------------------|
| Lamiaceae        | Salvia disermas          | indig; end         | Least Concern               |
| Meliaceae        | Melia azedarach          | notindig; nat; inv | a.1b<br>b.3 in urban areas. |
| Oleaceae         | Menodora africana        | indig; end         | Least Concern               |
| Papaveraceae     | Argemone ochroleuca      | notindig; nat; inv | 1b                          |
| Poaceae          | Aristida canescens       | indig              | Least Concern               |
|                  | Aristida congesta        | indig              | Least Concern               |
|                  | Eragrostis racemosa      | indig              | Least Concern               |
|                  | Schmidtia pappophoroides | indig              | Least Concern               |
|                  | Sporobolus fimbriatus    | indig              | Least Concern               |
| Rhamnaceae       | Ziziphus mucronata       | indig              | Least Concern               |
| Scrophulariaceae | Chaenostoma hispidum     | indig; end         | Least Concern               |
|                  | Peliostomum leucorrhizum | indig              | Least Concern               |
|                  | Selago densiflora        | indig; end         | Least Concern               |
| Solanaceae       | Solanum lichtensteinii   | indig              | Least Concern               |

## Appendix C:

### Impact assessment evaluation form

*Table 14 description of the rating system used to evaluate the possible impacts concerned with the proposed development.*

|                                                                                                       |                         |                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Geographical extent:</b> This describes the spatial reach an impact might have.                    |                         |                                                                                                                                                                                                           |
| Score                                                                                                 |                         |                                                                                                                                                                                                           |
| 1                                                                                                     | Site specific           | The impacts will only affect the specific site.                                                                                                                                                           |
| 2                                                                                                     | Local                   | The impacts will affect the local area or district.                                                                                                                                                       |
| 3                                                                                                     | Provincial              | The impacts will be recognised across most of the province.                                                                                                                                               |
| 4                                                                                                     | International/ national | Will affect the entire country or other countries.                                                                                                                                                        |
| <b>Probability:</b> This describes the probability that a specific environmental impact will occur.   |                         |                                                                                                                                                                                                           |
| 1                                                                                                     | Unlikely                | Less than 25% chance of occurrence.                                                                                                                                                                       |
| 2                                                                                                     | Possible                | Between 25-50% chance of occurrence.                                                                                                                                                                      |
| 3                                                                                                     | Most likely             | 50-75% chance of occurrence.                                                                                                                                                                              |
| 4                                                                                                     | Definite                | Greater than 75% chance of occurrence.                                                                                                                                                                    |
| <b>Duration:</b> This describes the amount of time an environment will be affected by the impact.     |                         |                                                                                                                                                                                                           |
| 1                                                                                                     | Short term              | The impact will disappear very quickly, either through mitigation or through natural processes. The impact should have disappeared within 1 year.                                                         |
| 2                                                                                                     | Medium term             | The impact will endure for a short while after the construction processes and will be mitigated by either human intervention or natural processes. The impact should have disappeared between 2-10 years. |
| 3                                                                                                     | Long term               | The impact will persist through the construction phase and disappear by either human intervention or natural processes in 10-30 years.                                                                    |
| 4                                                                                                     | Permanent               | Mitigation either by man or natural processes is highly unlikely. The impact will have permanently affected the environment.                                                                              |
| <b>Reversibility:</b> Describes the potential of an impact to be entirely reversed after development. |                         |                                                                                                                                                                                                           |
| 1                                                                                                     | Entirely reversable     | The impact is entirely reversible and can be achieved with minor mitigation measures.                                                                                                                     |
| 2                                                                                                     | Possibly reversable     | The impact might be reversible. Suitable mitigation measures will increase the chances of reversibility and should be considered.                                                                         |
| 3                                                                                                     | Barely reversible       | It is unlikely that the impact will be reversed. Extreme mitigation measures might increase the chances of successful reversibility.                                                                      |



|                                                                                                                                                                                          |                            |                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4                                                                                                                                                                                        | Irreversible               | The impact is irreversible. No mitigation measures can reverse the effects on the environment.                                                                                                                  |
| <b>Cumulative impacts:</b> Describes the cumulative impacts of the proposed development, i.t.o. the development process and all activities emanating from the operation of the facility. |                            |                                                                                                                                                                                                                 |
| 1                                                                                                                                                                                        | Very low cumulative impact | The impact will result in no or minimal cumulative effects.                                                                                                                                                     |
| 2                                                                                                                                                                                        | Low cumulative impact      | The impact will result in an overall low cumulative effect.                                                                                                                                                     |
| 3                                                                                                                                                                                        | Moderate cumulative impact | The cumulative impacts will have moderate levels of impact.                                                                                                                                                     |
| 4                                                                                                                                                                                        | High cumulative impact     | The cumulative impact will result in high to very high environmental effects.                                                                                                                                   |
| <b>Intensity:</b> Describes the severity of the impact on the environment                                                                                                                |                            |                                                                                                                                                                                                                 |
| 1                                                                                                                                                                                        | Low                        | The impact's effect on the system will be hardly noticeable, if at all. Rehabilitation measures have to be in place if required.                                                                                |
| 2                                                                                                                                                                                        | Medium                     | The impact will have a recognisable effect on the environment. However, system functionality will still be present with negligible effects on ecosystem integrity. Rehabilitation measures have to be in place. |
| 3                                                                                                                                                                                        | High                       | The impact will severely affect ecosystem integrity and function. Rehabilitation will be costly, and extreme mitigation measures have to be in place.                                                           |
| 4                                                                                                                                                                                        | Very high                  | The impact will result in the entire ecological breakdown of the system or components thereof. Rehabilitation will be costly with minimal chances of success. Extreme mitigation measures must be in place.     |

## Appendix D: Impact significance on the environment

### Impact significance evaluation:

Impact significance describes the overall environmental impact resulting from the cumulation of impact characteristics. Significance gives a judgement of the effect a development will have on the environment. Significance is calculated as the total score for each criterion (geographical extend + probability + duration + reversibility + cumulative impacts) multiplied by the intensity. A greater significance score results in an overall greater environmental impact and should be avoided or allowed with extreme mitigation measures in place. A lower significance score results in an overall lesser environmental impact and may be allowed with very little or no mitigation measures needed.

*Table 15 impact significance evaluation form.*

| Score | Impact significance rating | Description                                                                                                                 |
|-------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 5-19  | Very low                   | Impact significance is of a very low order. Development is acceptable                                                       |
| 20-34 | Low                        | Impact significance is of a low order, and development is acceptable.                                                       |
| 35-49 | Moderate                   | The impact will be recognisable and may pose a problem to the development.                                                  |
| 50-64 | High                       | The impact is substantial and will significantly affect the environment. Development is unacceptable.                       |
| 65-80 | Very high                  | The impact is of the highest possible order and will cause irrefutable damage to the environment. Development unacceptable. |



agriculture, environmental affairs,  
rural development and land reform

Department:  
agriculture, environmental affairs,  
rural development and land reform  
NORTHERN CAPE PROVINCE  
REPUBLIC OF SOUTH AFRICA

## DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Application for authorization in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014 as amended.

File Reference Number:  
NEAS Reference Number:  
Date Received:

(For official use only)

1. **Project title:**  
Proposed Relocation of the Warrenton WWTW and Associated Bulk Infrastructure.

2. **Details of the specialist:**

Project Specialist:  
Trading name (if any):  
Business reg. no./ID. no.:  
Contact person:  
Physical address:  
Postal address:  
Postal code:  
Telephone:  
E-mail:  
Qualifications:  
Professional affiliation (s)  
(if any)

|                                                   |
|---------------------------------------------------|
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3. **Details of the consultant**

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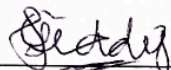
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4. Declaration by the specialist appointed in terms of the Environmental Impact Assessment Regulations, 2014 as amended.

I, Joshua Giddy, declare that --

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

**Environmental Management Group**

Name of company (if applicable):

11/06/2026

Date:



Signature of the Commissioner of Oaths:

11/06/2026

Date:

Professional Accountant

Designation:

Official stamp (below):

COMMISSIONER OF OATHS (RSA)  
**DALTON MAURITZ BAKKES**  
Professional Accountant (S.A.) ex officio  
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