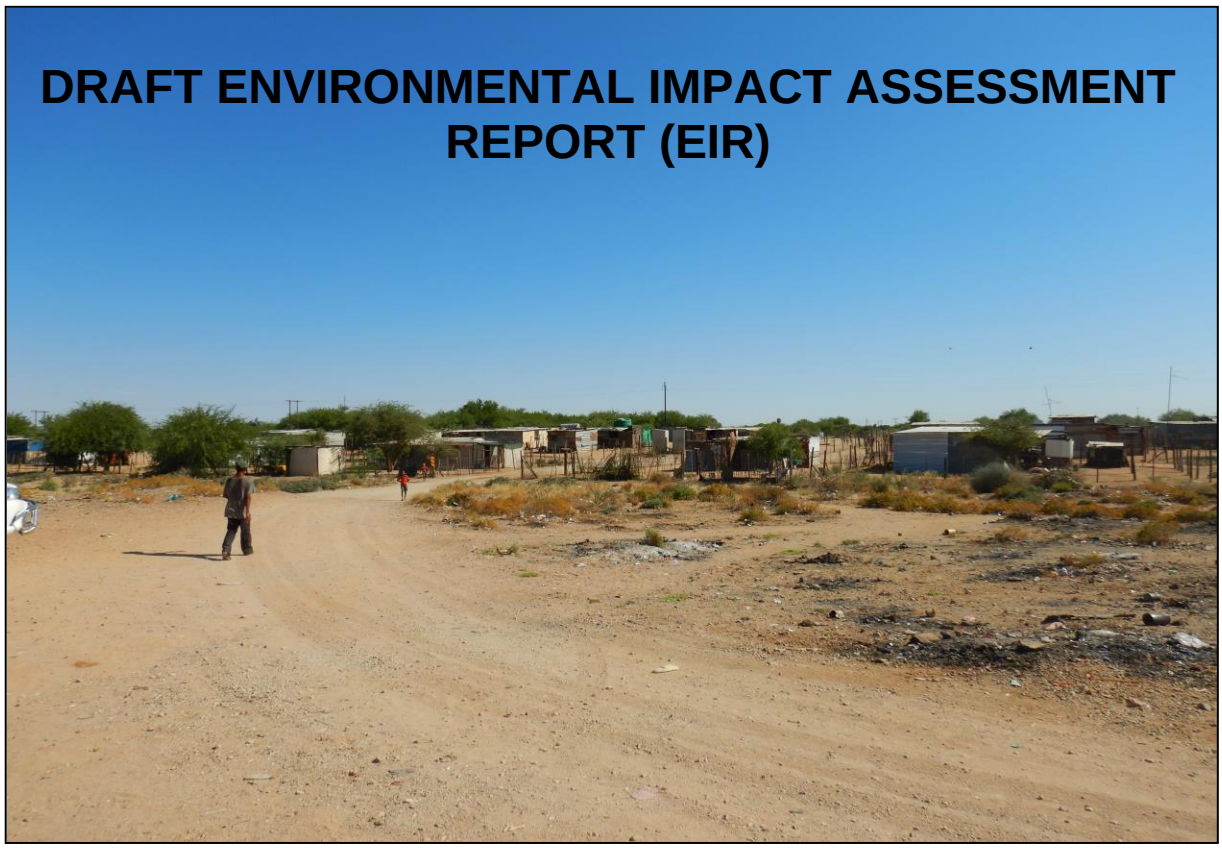
PROPOSED FORMALISATION OF BLAAUWSKOP SETTLEMENT LOW COST HOUSING DEVELOPMENT ON PORTION 30 OF FARM BLAAUWSKOP NO. 36, BLAAUWSKOP SETTLEMENT, KENHARDT ROAD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE



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KAI !GARIB LOCAL MUNICIPALITY

MARCH 2021

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EXECUTIVE SUMMARY

Introduction

Consideration is being given to the development of a new township, consisting of low-income housing, at Portion 30 of Farm Blaauwskop No. 36, Blaauwskop Settlement, Kenhardt Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape. The development proposal will have a development footprint of approximately 50 (fifty) ha and will be rezoned and subdivided into approximately 500 erven, mainly for residential purposes. According to the Draft SPLUMA Application (Appendix 4A), the erven are broken down as follows:

- **500 x Residential Zone I units:** dwelling house/ residential house containing one residential unit - a self-contained interlinking group of rooms for the accommodation and housing of a single family, or a maximum of four persons;
- **2 x Institutional Zone I units**: place of instruction / education
- **1 x Institutional Zone II units**: place of worship
- **3 x Institutional Zone II units:** place of worship (e.g. places for practising religion);
- **22 x Open Space Zone II units:** public open space
- **1 x Open Space Zone III unit:** private open space
- **1 x Authority Zone I unit:** municipal use
- **3 x Business Zone I units:** business building / premises
- **1 x Transport Zone I unit:** public street

The site is located approximately 13km east of Keimoes and approximately 25km south-west of Upington (as the crow flies). The site is located within Ward 8 of the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape. The proposed site is located at the following location: 28°40'7.98"S; 21°06'7.89"E.

The current zoning of the site is Agricultural Zone I. A Spatial Planning Land Use Application ("SPLUMA") application (Draft SPLUMA Application - Appendix 4A) was submitted for the rezoning and subdivision of land, and the rezoning to various land uses including public streets and any other land uses needed for the community of Blaauwskop Settlement. The project includes the associated infrastructure such as water, electricity, sewage, and solid waste removal.

The applicant is Kai !Garib Local Municipality who will undertake the activity should this application be approved. EnviroAfrica CC has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The NEMA Application Form and Draft Scoping Report were submitted to DE&NC on the **14th August 2020**. EnviroAfrica, as the appointed Environmental Assessment Practitioner ("EAP"), received the acknowledgement letter for the NEMA Application Form and Draft Scoping Report on the **27th August 2020**. Scoping Process was undertaken to identify potential issues. The Final Scoping Report was submitted on the **19th October 2020**. As per section 22 of the EIA Regulations (as amended), the Draft EIR (this report) was submitted once the formal letter of approval/ acceptance of the Final Scoping Report was received from the competent authority. The Letter of Acceptance / Approval was received on the **11th March 2021**.

Environmental Requirements

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorization from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment. According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed agricultural development:

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed housing development:

Government Notice R327 (Listing Notice 1) listed activities:

9 The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;

(i) with an internal diameter of 0,36 metres or more; or

(ii) with a peak throughput of 120 litres per second or more;

excluding where;
a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or
b) where such development will occur within an urban area.

10 The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes
(i) with an internal diameter of 0,36 metres or more; or
(ii) with a peak throughput of 120 litres per second or more;

excluding where;
a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or
b) where such development will occur within an urban area.

12 The development of;
(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
(ii) infrastructure or structures with a physical footprint of 100 square metres or more;

where such development occurs;
(a) within a watercourse;
(b) in front of a development setback; or

(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
(a) will occur behind a development setback;
(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

24 The development of a road -
(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or
(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;

but excluding a road—
(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;
(b) where the entire road falls within an urban area; or
(c) which is 1 kilometre or shorter**.**

28 Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:
(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or
(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;
excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.

Government Notice **R325** (Listing notice 2) listed activities:

15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;
(i) the undertaking of a linear activity; or
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice **R324** (Listing notice 3) listed activities:

4 The development of a road wider than 4 metres with a reserve less than 13.5 metres

12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

g. Northern Cape

i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;

ii. Within critical biodiversity areas identified in bioregional plans;

iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or

iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.

14 The development of;

(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;

(ii) infrastructure or structures with a physical footprint of 10 square metres or more;

where such development occurs;

(a) within a watercourse;

(b) in front of a development setback; or

(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

Need and Desirability

Housing is a national need, including in the Kai Garib Local Municipality.

According to the Kai Garib Municipality, the proposed development represents a significant step towards service delivery and housing objectives within the municipality and the broader Keimoes area. As such, this initiative is a positive step towards better governance and service delivery and will benefit the broader Keimoes community. Furthermore, this development will not only meet the pressing needs of adequate housing within the municipality but will also be in line to support the municipal IDP objectives of (i) providing housing for the poor, (ii) decreasing the city's housing backlog, and (iii) fulfil the Constitutional mandate to provide adequate housing and basic services to citizens.

According to the Kai !Garib Municipality's Integrated Development Plan (IDP 2020-21), … *there is a pressing need for houses, especially low-cost houses, as well as serviced plots within all of the communities within the Kai !Garib area. However, it is quite satisfying to see that a great deal of progress was made in the delivering brick houses to communities since 1994. Unfortunately, the communities need for houses exceed the speed at which houses are built on individual erven.*

According to the Census 2011 (Stats SA), *88.4 % of the population live in formal dwellings where 43.1% of households are comprised of houses which they own and have fully paid off. However, according to service delivery data from the Municipality, the number of informal settlements is growing overnight and the demand for service provision in these areas pose great challenges.*

The demand for housing in the Kai !Garib Municipality includes the total number of households in the municipal area. The Municipality had a total of 6 500 very formal dwellings and 9 720 formal dwellings whereas the number of informal dwellings increased from 6 500 (in 2012) to approximately 9 698 units (currently). This highlights the growing backlog of housing required within the Kai !Garib Municipality and the need for housing within the Municipality.
The proposed location is considered a viable option as the proposed site allows for accessibility and linkage to the existing services infrastructure. The main environmental issues, as detailed in the Kai !Garib Municipality Integrated Development Plan (IDP), 2020-21[1], include sanitation and sewerage (associated with the informal settlements), littering, river pollution, and lack of sufficient cemeteries. Sanitation has been identified as a key challenge by the Kai !Garib Municipality, where the current state of sewerage infrastructure in many settlements have reached capacity and pose health risks to the affected communities. Therefore, the socio-economic, as well as the environmental issues, must be incorporated in determining the desirability of the location of the site. Moreover, as per the IDP (2020/21), the sewerage systems within the formal areas of Keimoes, Kakamas, and Kenhardt are currently under strain and need to be upgraded.

Desirability

The following factors determine the desirability of the area for the proposed development.

2.2.1 Location and Accessibility

The proposed location is considered to be a viable option. The proposed site is located to the east of the R359 Road in Blaauwskop Settlement and allows for access and provides a link to the existing services infrastructure (Figure I). Any upgrades or additional services infrastructure that will be required are addressed in the Draft Environmental Impact Report (EIR) (this report). As per the Draft SPLUMA Application, *the area that comprise the community of Plangeni is included in an urban edge, since provision for this community has been made during the compilation of the Kai !Garib SDF in 2012.*

2.2.2 Compatibility with the Surrounding Area

The proposed site is located within the agricultural area of Blaauwskop Settlement and is surrounded by agricultural land uses and existing informal settlement. The area on which the site is located is in a degraded state, was previously used for livestock grazing and some informal dwellings are present on site which needs to be formalised as part of this EIA application. The Orange River is located approximately 750m north west of the site and the R359 Road is located approximately 400m west of the site. As stated above, the site would provide accessibility and allow the proposed development to link to the existing services infrastructure.

[1] Kai !Garib Municipality Integrated Development Plan (IDP), 2020-21. Accessed at: http://www.kaigarib.gov.za/idp-2020-2021/

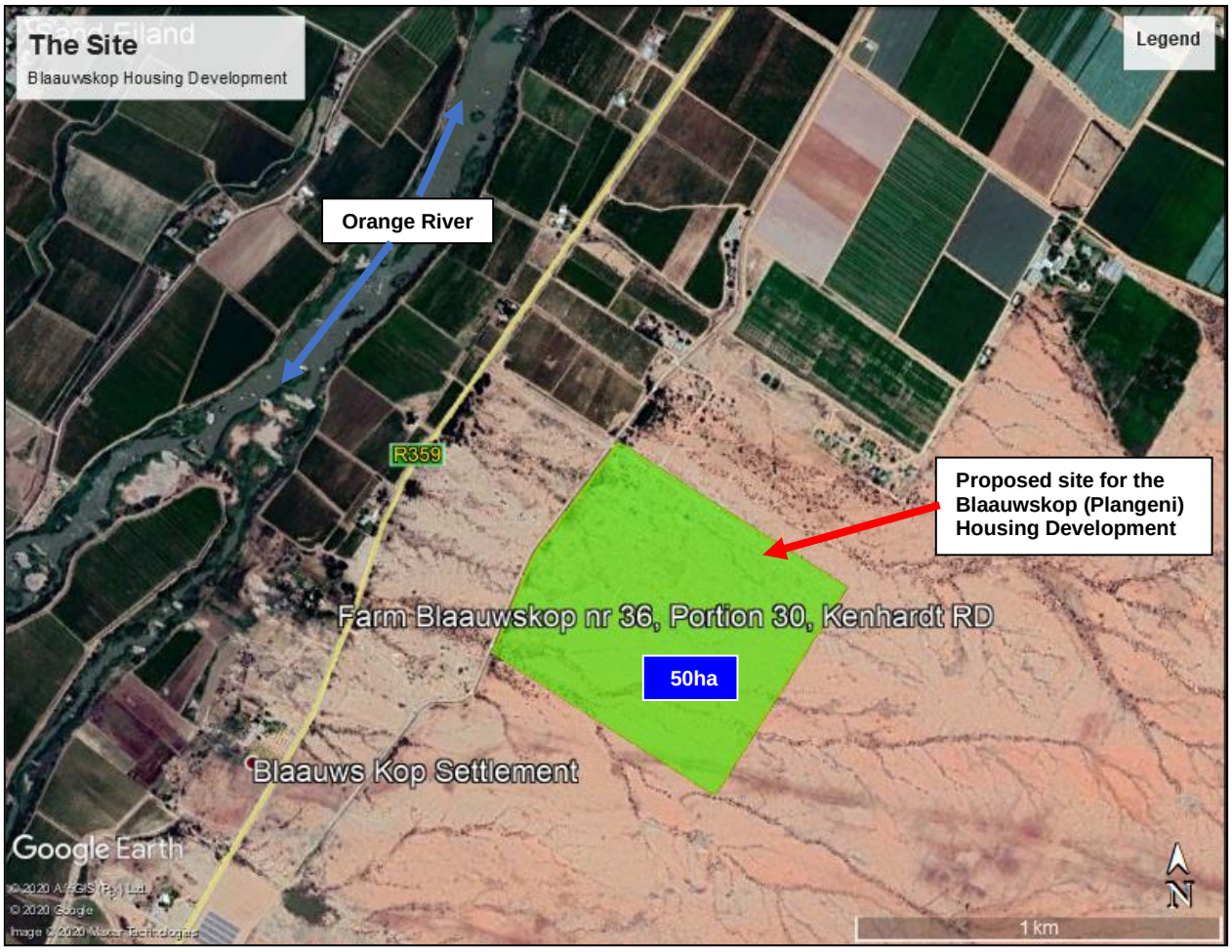

Figure I: Google Earth image showing the locality of the site. The proposed development will entail the formalization of informal dwellings located on site. The Orange River is located approximately 750m west of the site and the R359 Road is located approximately 400m west of the site.

Site Description

Approximately 23ha (46%) of the proposed site for development is disturbed / transformed. Of the 23ha of disturbed / transformed land, approximately 22ha are disturbed / transformed due to the erection of informal housing (and associated impacts) whereas the remaining 1ha has been transformed into an open sports field. Remaining natural veld is utilized for livestock grazing by the local community. The areas (and its immediate surroundings) had been cleared of vegetation in the areas already settled. In these areas only a few hardy indigenous species (e.g. *Tetraena decumbens* and *Senegalia mellifera*) and the alien invader *Prosopis* remains. The remainder of the site (approximately 27ha) supports a dry version of the Bushmanland Arid Grassland vegetation type (classified as Least Threatened), along with denser vegetation cover associated with drainage lines present within the proposed development footprint (refer to Figures 6-11, pages 20 - 23).

Alternatives

Site Alternative

The proposed site is the only viable site available at this stage and the only one that will be investigated in this application. Housing is a constant need in the municipality, with other sites possibly earmarked for residential development that will not form part of this application. The current land use, namely the existing Blaauwskop Settlement, is in line with the nature of the proposed development. The construction of the proposed housing development in another location would increase the construction footprint and therefore, the impact on the environment.

Layout Alternatives

Three (3) design layouts were proposed of which Alternative 3 was the preferred layout. Alternative 3 was preferred due to this layout being in line with recommendations and information received from the Botanical Impact Assessment (Appendix 6A), Heritage Impact Assessment (Appendix 6B), Freshwater Impact Assessment (Appendix 6C), Geotechnical Investigation (Appendix 6D), Draft SPLUMA Application (Appendix 4A), and Civil Services Report (Appendix 4B). Alternative 3 is also the preferred layout due to information received from the municipal infrastructure departments in relation to existing services infrastructure, requirements for additional land uses/ changes to proposed land uses (by the local municipality) as well as specific spacing of these land uses. This alternative also provides sufficient erven and housing opportunities, as well as providing for Municipal and Government land use opportunities, more Open Space and sufficient buffer zones, recommended by the Botanical and Freshwater specialists, relative to the watercourse identified within the proposed development footprint. According to the Draft SPLUMA Application (Appendix 4A), the erven of the preferred layout are divided as follows:

- **500 x Residential Zone I units;**
- **2 x Institutional Zone I units;**
- **1 x Institutional Zone II units;**
- **3 x Institutional Zone II units;**
- **22 x Open Space Zone II units;**
- **1 x Open Space Zone III unit;**
- **1 x Authority Zone I unit;**
- **3 x Business Zone I units; and**
- **1 x Transport Zone I unit**

Activity Alternatives

Activity alternatives are also limited with no feasible alternatives besides residential development to assess. Due to the need for housing in the Kai !Garib Local Municipality, the housing development and associated infrastructure on the property is therefore the only activity considered.

No-Go Alternative

This is the option of not developing the proposed housing development. The site is located adjacent to the established and existing Blaauwskop Settlement. Although the no-go development may result in no potential negative environmental impacts, the direct and indirect socio-economic benefits (such as housing shortages as well as loss of potential employment and skills-development opportunities during the construction phase) associated with the construction of the residential development will not

be realised. The need for additional housing in the Kai !Garib Local Municipality will not be realised. The expected increase in the population within the Blaauwskop area and its surrounds may lead to illegal settlements being constructed in areas adjacent to the existing Blaauwskop Settlement and in environmentally sensitive areas (i.e. in close proximity to watercourses).

Tasks to be undertaken during the EIA Phase

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) for public comment based on specialist information;
- Distribute and/or make the Draft EIR available to registered Interested and Affected Parties for viewing and comment;
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR); and
- Preparation of a Final EIR for submission to DENC for consideration and decision-making.

Specialist Studies

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- Botanical Impact Assessment (**Appendix 6A**)
- Heritage Impact Assessment (**Appendix 6B**)
- Freshwater Assessment (**Appendix 6C**)
- Geo-technical Assessment (**Appendix 6D**)

Botanical Impact Assessment

According to the Botanical Impact Assessment (**Appendix 6A**), the proposed site for development is located within the Bushmanland Arid Grassland, a vegetation type classified as Least Threatened. The site falls within a Critical Biodiversity Area (CBA), however, any alternative site on this property will be situated within a CBA. It must also be noted that approximately 35ha of the site will be permanently transformed whereas 23ha of the proposed site has already been impacted by informal settlement. The most significant botanical aspect of this site is the presence of two nationally protected trees namely *Vachellia erioloba* and *Boscia albitrunca*) which are protected under the NFA, as well as four (4) plant species (*Aloe claviflora, Aloe gariepensis, Boscia albitrynca,* and *Boscia foetida*), protected under the NCNCA. As per the Botanical Impact Assessment (Appendix 6A), the proposed development is likely to result in a **Medium-Low** impact, which can be reduced to a **Low** impact with good environmental control during construction. The Botanical Specialist stated that with the implementation of the proposed mitigation measures, the proposed development is unlikely to significantly impact (i) vegetation type and associated habitat, (ii) ecological processes (including but not limited to migration patterns, pollinators, and river function) due to construction and operational activities, (iii) local biodiversity and threatened plant species, and (iv) ecosystem connectivity. In conclusion, the Specialist stated that, "*with the available information, it is recommended that the project be approved with the approved mitigation measures*".

Heritage Impact Assessment

According to the Heritage Impact Assessment (**Appendix 6B**), five (5) incidences of lithic material (formal tools, predominantly untrimmed flakes, cores, stone working debris, and few scrapers made from the highly utilised banded ironstone formation (BIF)) of low heritage significance were recorded within the proposed development footprint. No other heritage resources were identified. No formal or informal graves were observed / identified within the proposed development footprint. Therefore, no

further mitigation is required, and from a heritage aspect, the Specialists concluded that the proposed development can continue. From a paleontological aspect, the site has zero palaeontological significance. Due to the zero palaeontological significance of the area, no further palaeontological studies, ground truthing, and / or specialist mitigation are required. It is considered that the development of the proposed development will detrimentally impact palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).

Freshwater Impact Assessment

The proposed site is situated within the D73D quaternary catchment. A watercourse (non-perennial drainage line) was located within the development footprint – with existing houses located on the banks, without any buffer zone. The drainage line passes over the irrigation canal where concrete slabs have been previously constructed over the canal at each crossing (preventing stormwater from entering the irrigation canal). The beds associated with the watercourse are dry, sandy, with little vegetation present (where Swarthaak trees (*Senegalia mellifera*) and invasive *Prosopis* trees form the riparian vegetation). Solid waste has been illegally dumped within the watercourse.

The Present Ecological State (PES) of the watercourses were classified as Class D (instream and riparian), indicating that the drainage lines are largely modified with a significant loss of natural habitat, biota, and ecosystem function. The instream and riparian areas associated with the drainage line located outside of the proposed site for development was classified as Class C (Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged) The Ecological Importance (EI) is based on the presence of fish species that are endangered on a local, regional or national level. Due to the non-perennial nature of the watercourse, no fish were present within the in the drainage line and thus, the drainage line is not considered ecologically important. As per the Ecological Sensitivity (ES) of the drainage lines, the Specialist noted that the drainage lines may take numerous years to recover due to the environmental factors associated with the site – namely the site being located within a semi-arid region where re-growth of vegetation may take a lot of time to recover. From this point of view the drainage line can be considered as ecologically sensitive. No other endangered species, either plant or animal, were detected in or near the drainage line. Main impacts associated with the proposed development on the freshwater features includes (i) the destruction of drainage lines (**Medium significance**), and (ii) solid waste and sewage, generated during the operational phase, entering the drainage lines and Orange River (**Medium Impact**). These impacts can be reduced to a **Low** impact should the proposed mitigation measures be implemented. These measures include (i) construction taking place during the dry season, limiting the construction footprint, maintaining an adequate buffer zone, connecting drainage lines to stormwater infrastructure over the irrigation canal, and (ii) the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility and associated infrastructure. As per the Resource Economic Footprint, the drainage line associated with the proposed site, has a small economic footprint where the loss of the drainage line will not represent a mentionable loss of environmental good sand services.

As per the Freshwater Assessment, biomonitoring was conducted at eleven (11) sampling points along the Lower Orange River, namely Augrabies Lair trust, Groblershoop, Kakamas Triple D, Hopetown Sewer, Hopetown Sewer, Keimoes Housing, Upington Erf 323, Upington Affinity, Styerkraal, Grootdrink Bridge, and Turksvy Dam. These sites were sampled based on elucidating the combined impact of the propose developments on the Orange River, and was carried out according to Dickens and Graham, (2002). The PES of the Orange River (for both riparian and instream zones) were categorized as Class C (Moderately modified - a loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged), and is an Ecologically Important system (as classified by the Freshwater Specialist). Furthermore, the Orange River is Ecologically Sensitive.

In conclusion, the Specialist stated that the current solid waste and sewage issues associated with the proposed site are threats to the WUA where a General Authorisation would be in order. The current sewage and solid waste situation are threats to the WULA. The authorities may insist that these issues be resolved before a General Authorization is approved.

Geo-technical Assessment

According to the Geotechnical Report (**Appendix 6D**), the proposed site for development was regarded as being of favourable to poor suitability (Geotechnical Zones III and IV – comprising approximately 12.1% of the property) due to;

- Presence of batholitic outcrops and large corestones close to the surface (resulting in hard and boulder excavation);
- Ponding of areas in close proximity to the canal (which occurs due to the canal blocking the natural flow of the non-perennial watercourse as well as leakages from the canal itself); and
- Residual soils and calcrete are highly corrosive – especially problematic for Geotechnical Zone III.
- Founding conditions were designated as R and S (should remedial actions be implemented).

No perched groundwater was encountered on site during the geotechnical investigation and was stated that perched water is not likely to generally occur in this area. Groundwater is expected to occur at depths between 20 to 30m in fractures restricted to zone directly located below the water table. The presence of permanent water does not impact the geotechnical conditions of the site. Five (5) shallow, non-perennial gully areas were identified during the site investigation. Although these gullies are not subject to continuous flooding, flooding events may damage infrastructure not suitably designed for this purpose. Should erven be proposed within areas within Geotechnical Zone III, these areas must be rehabilitated (e.g. repairing leakages in the canal, provision of sufficient channelling) to allow safe development.

The site is divided into four separate geotechnical zones. No steep slopes were present on the property where the average slope range between 1.5 – 2.5% (but was highly variable in Geotechnical Zone IV). Overall, the slope of the land does not detract from the area's suitability for residential development.

Geotechnical Zone I

Zone classed as S (regarded as compressible to a maximum of 10mm) comprises 82.5% of the total site. The combined thickness of the strata (nodular calcrete and residual soil) will sufficiently dissipate stresses induced by the foundations. Slope across the site ranges between 1.7 – 2.2%. More than one founding design alternative has been provided (refer to Appendix 6D), where the proposed founding design can be based on financial constraints.

Geotechnical Zone II

Zone classed as R (founding is stable and expected soil movement is negligible) comprises 5.4% of the total site. Slope is less than 2.5%. More than one founding design alternative has been provided (refer to Appendix 6D), where the proposed founding design can be based on financial constraints.

Geotechnical Zone III

Zone classed as S (regarded as compressible to a maximum of 10mm if the inundation of the area is resolved) comprises 2.4% of the total site. Slope across this zone is between 1.5 – 2%. The combined thickness of the strata (nodular calcrete and residual soil) will sufficiently dissipate

stresses induced by the foundations. It must be noted that the presence of water (ponding of areas) and seepage from the canal may result in damage to the structures due to the corrosivity of the soil. Should the geotechnical condition of this particular zone be unresolved, the zone will be classed as P (Water) – where conditions associated with this classification are unfavourable for residential development. Development can only take place if remediation activities, with regards to flooding of the area, are implemented.

Geotechnical Zone IV
Zone was classed as P (Outcrops) due to the presence of boulders and outcrops which reduce the classification and detracts from the suitability of the site for residential development. This zone comprises of 9.7% of the total site. Building within this zone may be costly due to the required hard excavation and boulder excavation. It was recommended that this zone only be developed should the demand for houses exceed the availability of stands present in Geotechnical Zones I and II.

Services

Water supply
Currently, water was being transported to the site by the Municipality. Water supply from the Orange River must be abstracted and pumped to a purification plant in order to supply the proposed development with water. The total annual average daily demands are 350m^3/day. A water purification plant with a 350m^3 capacity is required where ground storage must be 1050m^3 and elevated storage for peak demand must be 117m^3. Water distribution network will be required to distribute water. Each residential site will be supplied with a metered connection where each occupied site will be supplied with water by use of a standpipe.

Sanitation
Grey water to be disposed on site whereas sewerage will be disposed on site utilizing VIPs or double put toilets. Septic tanks may be constructed however, the service cost will be expensive. Increased pressure will be put on vacuum trucks of the municipality to accommodate the additional load.

Access to site
Access to site will be via the R359 (provincial road) whereas the access road is provided with interlocking paving blocks. Internal road networks will be graded gravel roads where stormwater runoff will be accommodated for.

Stormwater infrastructure
Stormwater runoff from the development will be on-surface and in the streets. The slope, associated with the land (1:50 in a north-west direction), will be sufficient for on-surface draining system.

Solid waste removal
A small transfer facility will be required. Until this facility is established, all solid waste must be transported to the site in Kakamas (nearest registered facility).

Conclusion

The specialist studies and the information provided within the EIA Report, indicates that the proposed Blaauwskop (Plangeni) Housing development does not pose any significant impacts should the proposed mitigation measures be implemented. However, as per the specialist assessments, site visits, and comments received from registered I&APs, solid waste and sewage management remain a

key issue which must be addressed with the implementation of a proper waste management plan. The proposed project will increase the pressure placed on existing municipal services and therefore, if a waste management plan is not effectively implemented, the current lack of sewage and solid waste management may negatively impact the environment and socioeconomic development in the Blaauwskop area.

According to the Botanical Specialist (Appendix 6A), the proposed development will have a low impact, should mitigation measures be implemented. The Specialist stated that "*with the available information, it is recommended that the project be approved with the approved mitigation measures*". According to the Heritage Impact Assessment (Appendix 6B), no significant heritage resources will be impacted and thus, the proposed development can continue. From a paleontological aspect, the site has zero palaeontological significance and thus, no further palaeontological studies, ground truthing, and / or specialist mitigation are required and that the project be exempt from a full Paleontological Impact Assessment (Butler 2019). According to the Freshwater Assessment (Appendix 6C), the main impacts associated with the proposed development on the freshwater features includes (i) the destruction of drainage lines (Medium significance), and (ii) solid waste and sewage, generated during the operational phase, entering the drainage lines and Orange River (Medium Impact). These impacts can be reduced to a Low impact should the proposed mitigation measures be implemented. These measures include (i) construction taking place during the dry season, limiting the construction footprint, maintaining an adequate buffer zone, connecting drainage lines to stormwater infrastructure over the irrigation canal, and (ii) the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility and associated infrastructure. According to the Geotechnical Report (Appendix 6D), According to the Geo-technical Assessment, the proposed site for development was regarded as being of favourable to poor suitability (Geotechnical Zones III and IV) for residential development. Founding conditions were designated as R and S (should remedial actions be implemented).

In terms of the need and desirability of the proposed residential development, housing is a national need, especially in the Kai !Garib Local Municipality. The proposed development represents a significant step towards service delivery and housing objectives within the municipality and within a broader provincial and national context. The development will not only meet the pressing needs of adequate housing within the municipality but will also be in support of the municipal IDP objectives. These objectives include providing housing for the poor, decreasing the Municipality's housing backlog, as well as fulfilling the Constitutional mandate to provide adequate housing and basic services to citizens. The proposed location is considered to be the only viable option. The proposed site is adjacent to the existing residential area of Blaauwskop, allowing accessibility and linking to the existing services infrastructure. The surrounding land use, namely the existing Blaauwskop settlement, is in line with the proposed development, which is one of the reasons why this location was selected by the local authority for the purposes of this project.

Other than the presence of a watercourse (namely non-perennial drainage lines) within the proposed site for development, there are no physical characteristics of these properties or environmental constraints which would exclude the site from development. However, as per the Botanical Assessment, numerous nationally and provincially protected plant species are present within the development footprint (Appendix 6A). Moreover, the site is located within a CBA and thus, mitigation measures recommended by the Botanical Specialist must be implemented. Prior to any of these plant species being disturbed, damaged, removed, relocated, or destroyed, a permit from the relevant authority is required and must be applied for.

In terms of alternatives, **Alternative 3** is the preferred alternative. This alternative is considered a viable option and is also the Municipality's preferred layout since it provides the optimal number of erven and housing opportunities, as well as providing for more Open Space. This Alternative adequately addressed environmental sensitive areas as identified by the Specialists. The "no-go" option, which is the option of not developing the proposed housing development. Currently, the area earmarked for development is disturbed, with numerous cases of informal settlements and illegal dumping. Although the no-go development might result in no potential negative environmental impacts, especially on the vegetation on the site earmarked for development, the direct and indirect socio-economic benefits of not constructing the residential development will not be realised. The need for additional housing opportunities in the area will not be realised.

Considering all the information, it is envisaged that this proposed Blaauwskop Housing Development will have a low negative impact on the environment (after mitigation measures have been implemented). The socio-economic benefits resulting from the proposed development are expected to greatly outweigh any negative impacts, especially when the mitigation measures have been implemented. It be noted that a proper waste management plan, addressing the proposed sewerage disposal infrastructure and solid waste removal, must be added as a condition to the granting of the environmental authorisation. This waste management plan must be implemented to effectively address the expected increase in pressure on existing services, especially regarding the increase in sewage and its adequate and safe disposal.

It is therefore recommended that the proposed Blaauwskop Housing Development (Alternative 3) **be supported and be authorised with the necessary conditions of approval**, subject to the compilation and effective implementation of a waste management plan to address sewage and solid waste management and the implementation of mitigation measures proposed by the Specialists (Appendix 6A-D) and measures included in the EMPr.

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APPENDICES

ACRONYMS

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DENC	Department of Environment and Nature Conservation (Northern Cape)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
NCNCA	Northern Cape Nature Conservation (Act 9 of 2009)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NFA	National Forests Act (NFA) of 1998 (Act 84 of 1998)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
TIA	Traffic Impact Assessment
WULA	Water Use Licence Application

1. INTRODUCTION

1.1 BACKGROUND

Consideration is being given to the development of a new township, consisting of low-income housing, at Portion 30 of Farm Blaauwskop No. 36, Blaauwskop Settlement, Kenhardt Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape. The development proposal will have a development footprint of approximately 50 (fifty) ha and will be rezoned and subdivided into approximately 500 erven, mainly for residential purposes. The site is located approximately 13km east of Keimoes and approximately 25km south-west of Upington (as the crow flies). The site is located within Ward 8 of the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape. The proposed development will be comprised of approximately:

- **501 x Residential Zone I units:** dwelling house/ residential house containing one residential unit - a self-contained interlinking group of rooms for the accommodation and housing of a single family, or a maximum of four persons;
- **1 x Institutional Zone I units**: place of instruction / education
- **x Institutional Zone II units:** place of worship (e.g. places for practising religion); and
- **26 x Open Space Zone II units:** public open space to be utilized by the public as an open space, park, garden, playground, or recreational site.

The current zoning of the site is Agricultural Zone I. A Spatial Planning Land Use Application ("SPLUMA") application (Draft SPLUMA Application - Appendix 4A) was submitted for the rezoning and subdivision of land, and the rezoning to various land uses including public streets and any other land uses needed for the community of Blaauwskop Settlement. The project includes the associated infrastructure such as water, electricity, sewage, and solid waste removal.

The NEMA Application Form and Draft Scoping Report were submitted to DE&NC on the **14th August 2020**. EnviroAfrica, as the appointed Environmental Assessment Practitioner ("EAP"), received the acknowledgement letter for the NEMA Application Form and Draft Scoping Report on the **27th August 2020**. Scoping Process was undertaken to identify potential issues. The Final Scoping Report was submitted on the **19th October 2020**. As per section 22 of the EIA Regulations (as amended):

22. The competent authority must, within 43 days of receipt of a scoping report—
(a) accept the scoping report, with or without conditions, and advise the applicant to proceed or continue with the tasks contemplated in the plan of study for environmental impact assessment; or
(b) refuse environmental authorisation if—
(i) the proposed activity is in conflict with a prohibition contained in legislation; or
(ii) the scoping report does not substantially comply with Appendix 2 to these Regulations or any applicable protocol or minimum information requirements as identified and gazetted by the minister in a government notice and the applicant is unwilling or unable to ensure compliance with these requirements within the prescribed timeframe.

Therefore, the Draft EIR (this report) was submitted once the formal letter of approval/ acceptance of the Final Scoping Report was received from the competent authority (on the **11th March 2021**).

1.2 SCOPE OF WORK

The scope of this study has been determined with reference to the requirements of the relevant environment legislation (e.g. National Environmental Management Act, Act No. 107 of 1998) and undertaken in terms of the Integrated Environmental Management Information Series on Environmental Impact Reporting (2004) issued by DEAT and the Information Document on Requirements with respect to the EIA Process (January 2003), issued by the DENC.

The basic scope of work will include the following:

- Review of all information;
- Participating in the progress of the development proposal;
- Scoping (identification of significant issues);
- Assessment of anticipated impacts;
- Identification of suitable mitigation measures to reduce negative impacts and enhance positive impacts; and
- Submission for decision.

One of the crucial aims of an EIA is to ensure that the demands of sustainable development (defined as development which meets the needs of the current generation without compromising the ability of future generations to meet their own needs[2]) are met on a project level, within the context of the greater area. The definition of sustainable development, used in the context of this EIA, is development that meets the needs of the present while not compromising the needs of future generations. This EIA is therefore being undertaken with sustainable development as a goal. This EIA identifies and looks at impacts, associated with the proposed development, on the environment, assessing the significance of these impacts as well as proposed mitigation measures, as required, to reduce anticipated impacts to acceptable levels.

Moreover, the mitigation hierarchy has been applied to arrive at the best practicable environmental option. The mitigation hierarchy is comprised of four actions which are designed to be implemented sequentially[3], namely (1) avoidance, (2) minimization, (3) rehabilitation, and (4) offset (not be applicable to this project), where the following actions are applicable and have been applied in the context of this environmental process to promote the best feasible environmental option:

1 Avoidance: avoiding impacts on biodiversity within the proposed site of development and surrounding area and includes identifying potential risks and investigating alternatives[4]. Avoidance was carried out in the context of this process as environmental components (namely potential botanical and freshwater impacts) were identified and rated by specialists. Moreover, design alternatives were also investigated to incorporate and reduce the impact(s) on environmentally sensitive features (e.g. drainage lines). Due to the nature of this proposed development, no site alternatives were investigated – this also aids in avoiding any potential negative impact(s) on pristine areas;

2 Minimize potential impacts: mitigation measures and recommendations have been proposed by the Botanical, Freshwater, Heritage, and Geotechnical Specialists to mitigate and reduce identified potential impacts. These mitigation measures and recommendations have been incorporated into the

[2] As defined by the International Institute for Sustainable Development (IISD). Accessed at: https://www.iisd.org/about-iisd/sustainable-development.

[3] Arlidge, W.N., Bull, J.W., Addison, P.F., Burgass, M.J., Gianuca, D., Gorham, T.M., Jacob, C., Shumway, N., Sinclair, S.P., Watson, J.E. and Wilcox, C., 2018. A global mitigation hierarchy for nature conservation. *BioScience*, 68(5), pp.336-347.

[4] Phalan, B., Hayes, G., Brooks, S., Marsh, D., Howard, P., Costelloe, B., Vira, B., Kowalska, A. and Whitaker, S., 2018. Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *Oryx*, 52(2), pp.316-324.

EMPr and are to be implemented during the construction and operational (where applicable) phases; and

3 Rehabilitation: as per action 2 above, mitigation measures, including the need to rehabilitate areas (which also aids in reducing erosion during the operational phase) outside the construction footprint has been included in the EMPr.

1.3 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which this report is based (i.e. specialist studies, project information, information given by the applicant and client, as well as mapping tools including *CapeFarmMapper* and *BGIS*) is correct.

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the specialists, stipulated in the EMPr as well as this EIR, will be implemented on a long-term basis. This has a major bearing on the reliability of the predictions of significance of impact.

1.4 DESCRIPTION OF THE PROPOSED ACTIVITY

The Kai !Garib Local Municipality is proposing that a new township development, consisting of low-income housing, at Portion 30 of Farm Blaauwskop No. 36, Blaauwskop Settlement, Kenhardt Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape. The development proposal will have a development footprint of approximately 50ha and will be rezoned and subdivided into approximately 500 erven, mainly for residential purposes (Appendix 2B). The proposed site is located approximately 13km east of Keimoes and approximately 25km south-west of Upington (as the crow flies). The site is located within Ward 8 of the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape.

The proposed site is located at the following location: 28°40'7.98"S; 21°06'7.89"E.

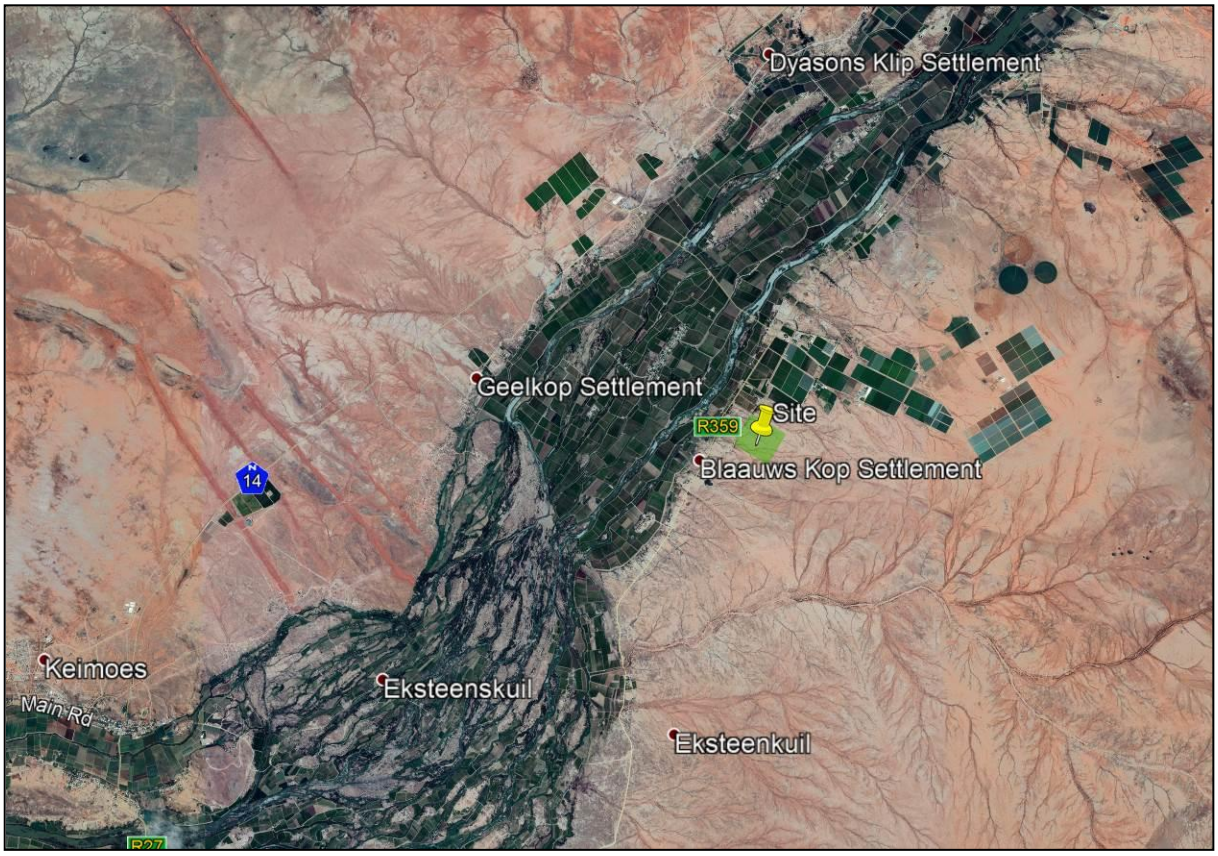


Figure 1: Locality of proposed development of the Blaauwskop Township. Source: Google Earth (2019)

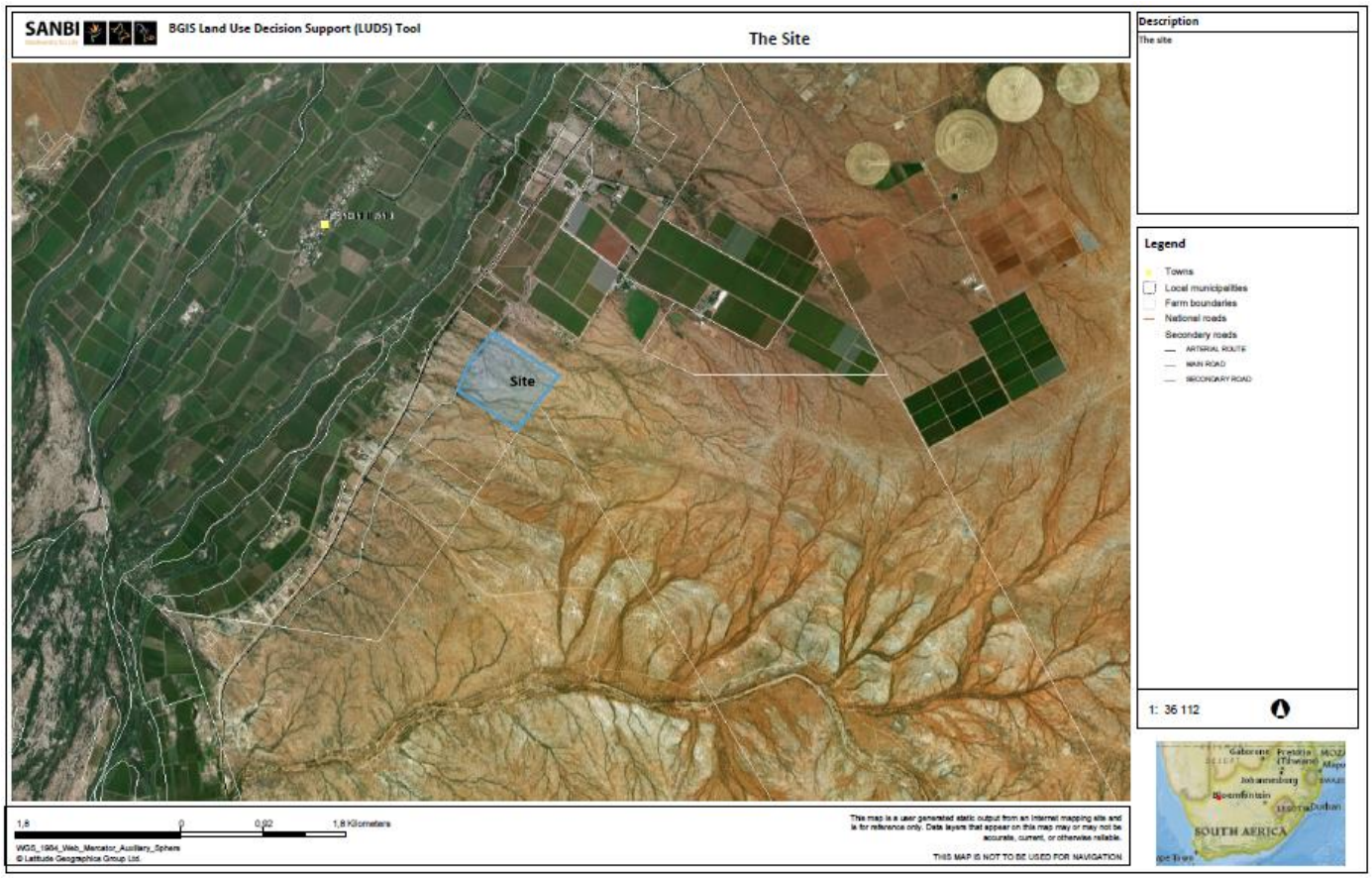


Figure 2: Overview of proposed site for development. Source: Google Earth, 2020.

2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, as amended, EIA 2014 regulations the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of "need and desirability" in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

The need for and the desirability of a proposed development forms a key component of any EIA application. The consideration of proposed developments in the context of the various spatial planning tools, as well as policies applicable to the study area, form an integral part of the present environmental processes. The "need and desirability" was determined by considering the broader community's needs and interests as reflected in Integrated Development Plans (IDPs), Spatial Development Frameworks (SDF) applicable to the proposed site for development.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e. the question of what the most sustainable use of land is. The impact of development on people's health and well-being, as well as its impact on natural and cultural areas, and therefore its desirability, has been assessed in this report.

2.1 NEED

Housing is a national need, including in the Kai !Garib Local Municipality.

According to the Kai !Garib Municipality, the proposed development represents a significant step towards service delivery and housing objectives within the municipality and the broader Keimoes area. As such, this initiative is a positive step towards better governance and service delivery and will benefit the broader Keimoes community. Furthermore, this development will not only meet the pressing needs of adequate housing within the municipality but will also be in line to support the municipal IDP objectives of (i) providing housing for the poor, (ii) decreasing the city's housing backlog, and (iii) fulfil the Constitutional mandate to provide adequate housing and basic services to citizens.

According to the Kai !Garib Municipality's Integrated Development Plan (IDP 2020-21), … *there is a pressing need for houses, especially low-cost houses, as well as serviced plots within all of the communities within the Kai !Garib area. However, it is quite satisfying to see that a great deal of progress was made in the delivering brick houses to communities since 1994. Unfortunately, the communities need for houses exceed the speed at which houses are built on individual erven.*

According to the Census 2011 (Stats SA), 88.4 % of the population live in formal dwellings where 43.1% of households are comprised of houses which they own and have fully paid off. However, according to service delivery data from the Municipality, the number of informal settlements is growing overnight and the demand for service provision in these areas pose great challenges.

The demand for housing in the Kai !Garib Municipality includes the total number of households in the municipal area. The Municipality had a total of 6 500 very formal dwellings and 9 720 formal dwellings whereas the number of informal dwellings increased from 6 500 (in 2012) to approximately 9 698 units

(currently). This highlights the growing backlog of housing required within the Kai !Garib Municipality and the need for housing within the Municipality (Table 1).

Table 1: Kai !Garib Municipality IDP 2017 – 2018 - Housing Demand

WARDS	1	2	3	4	5	6	7	8	9	TOTAL
NEEDS BASED ON LAND USE SURVEY AND OUTSTANDING PROJECTS										
Informal Structures on Stands	138	39	50	0	93	0	17	0	0	337
Informal Structures in backyards & landless	83	8	185	0	62	0	54	0	2	394
LAND NEEDED										
Land needed in ha for landless and backyard dwellings (Stand size 400m²)	4.742	0.457	10.571	0	3.542	0	3.085	0	0.114	22.838ha
ADDITIONAL HOUSEHOLDS, PLANNED PROJECTS AND LAND NEEDS										
Expected additional households 2014-2019	153	95	102	84	78	86	65	89	83	835
Expected land needs (ha) based on 5 year growth (Stand size 400m²)	8.742	5.428	5.828	4.80	4.457	4.914	3.714	5.085	4.742	47.71ha
PREFFERED HOUSING PROGRAMMES in %										
Fully subsidised (low cost/rental/ Informal Settlements Upgrading Programme	10 112	7572	7984	5611	4423	6988	4447	5163	5669	57 969
Institutional/GAP/FLISP Housing/People's Housing	167	166	316	179	302	242	111	132	256	1 871
Bonded housing	1129	453	1217	565	774	455	298	256	754	5 921

Source: Kai !Garib Local Municipality, 2015

2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed residential development.

2.2.1 LOCATION AND ACCESSIBILITY

The proposed location is considered a viable option as the proposed site for development is located adjacent to the existing Blaauwskop Settlement, allowing accessibility and linkage to the existing services infrastructure (refer to Civil Services Report – **4B**). The main environmental issues, as detailed in the Kai !Garib Municipality Integrated Development Plan (IDP), 2020-21[5], include sanitation and sewerage (associated with the informal settlements), littering, river pollution, and lack of sufficient cemeteries. Sanitation has been identified as a key challenge by the Kai !Garib Municipality, where the current state of sewerage infrastructure in many settlements, including Keimoes, have reached capacity and pose health risks to the affected communities. Therefore, the socio-economic, as well as the environmental issues, must be considered when determining the desirability of the location of the site. Due to the existing settlement, namely the Blaauwskop Settlement, the proposed development will expand the housing footprint in the immediate area. The proposed development will tie into existing services, reducing costs and environmental impact associated with the construction of a new settlement / township. Other than the drainage lines and presence of protected (NFA and NCNCA) plant species, identified

[5] Kai !Garib Municipality Integrated Development Plan (IDP), 2020-21. Accessed at: http://www.kaigarib.gov.za/idp-2020-2021/

within the proposed development footprint, no physical characteristics of these properties or environmental constraints would exclude the site from development.

2.2.2 COMPATIBILITY WITH THE SURROUNDING AREA

The proposed site is directly adjacent to the existing residential area of the Blaauwskop Settlement. As stated above, this would provide accessibility and allow the proposed development to link to the existing services infrastructure. Although sections of the site are undeveloped, approximately 23ha (46%) of the development footprint has been disturbed / transformed by informal settlements with numerous incidences of informal settlements (refer to Figure 5) and illegal dumping (including general and hazardous waste). Due to the close proximity of the existing Settlement, costs and environmental impacts, associated with the impact of development on the surrounding areas, would be avoided as the proposed development will tie in with existing services and similar surrounding land uses.

2.3 INTEGRATED PLANNING

According to the Department of Environmental Affairs: Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017), when considering how the development may affect or promote justifiable economic and social development, the relevant spatial plans must be considered, including Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDF) and Environmental Management Frameworks (EMF).

According to the Northern Cape Provincial Spatial Development Framework (2019) (NCPSDF), as part of the Spatial Development Strategies for Infrastructure Investment and related objectives it is a set objective that, amongst others, the housing backlog within the province must be eradicated. It is furthermore indicated that, as part of policy alignment with the Spatial Planning Categories, adequate, safe and affordable housing (amongst other objectives) must be met by 2030.

3. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 24 (5): NEMA EIA Regulations 2014. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorization from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed Blaauwskop Housing Development:

<u>Government Notice R327 (Listing Notice 1) listed activities:</u>

9 The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;

(i) with an internal diameter of 0,36 metres or more; or

(ii) with a peak throughput of 120 litres per second or more;

excluding where;
a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or
b) where such development will occur within an urban area.

10 The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes
(i) with an internal diameter of 0,36 metres or more; or

(ii) with a peak throughput of 120 litres per second or more;

excluding where;

c) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or
d) where such development will occur within an urban area.

12 The development of;

(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
(ii) infrastructure or structures with a physical footprint of 100 square metres or more;

where such development occurs;

(a) within a watercourse;
(b) in front of a development setback; or
(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
(a) will occur behind a development setback;
(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

24 The development of a road -
(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or
(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;

but excluding a road—
(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;
(b) where the entire road falls within an urban area; or
(c) which is 1 kilometre or shorter**.**

28 Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:
(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or
(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.

Government Notice **R325** (Listing notice 2) listed activities:

15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;
(i) the undertaking of a linear activity; or
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice **R324** (Listing notice 3) listed activities:

4 The development of a road wider than 4 metres with a reserve less than 13.5 metres

12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

g. Northern Cape
i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
ii. Within critical biodiversity areas identified in bioregional plans;
iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or
iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.

14 The development of;
(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;
(ii) infrastructure or structures with a physical footprint of 10 square metres or more;

where such development occurs;
(a) within a watercourse;
(b) in front of a development setback; or
(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

The NEMA Application Form and Draft Scoping Report were submitted to DE&NC on the **14th August 2020**. EnviroAfrica, as the appointed Environmental Assessment Practitioner ("EAP"), received the acknowledgement letter for the NEMA Application Form and Draft Scoping Report on the **27th August 2020**. Scoping Process was undertaken to identify potential issues. The Final Scoping Report was submitted on the **19th October 2020**. As per section 22 of the EIA Regulations (as amended):

22. The competent authority must, within 43 days of receipt of a scoping report—
(a) accept the scoping report, with or without conditions, and advise the applicant to proceed or continue with the tasks contemplated in the plan of study for environmental impact assessment; or
(b) refuse environmental authorisation if—
(i) the proposed activity is in conflict with a prohibition contained in legislation; or

(ii) the scoping report does not substantially comply with Appendix 2 to these Regulations or any applicable protocol or minimum information requirements as identified and gazetted by the minister in a government notice and the applicant is unwilling or unable to ensure compliance with these requirements within the prescribed timeframe.

Therefore, the Draft EIR (this report) was submitted once the formal letter of approval/ acceptance of the Final Scoping Report was received from the competent authority (received on the **11th March 2021 – Appendix 1B**).

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural and social interests. The activity seeks to provide additional housing, employment and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people, especially developmental and social benefits, as well providing additional housing, employment and economic development opportunities.*
- Development will be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP*.
- Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the Environmental Management Programme (EMP) – *the EMP is included in the EIR as Appendix 9*.
- The use of non-renewable natural resources will be responsible and equitable.
- The negative impacts on the environment and on people's environmental rights will be anticipated, investigated and prevented, and where they cannot be prevented, will be minimised and remedied – *potential negative impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP*.
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process – *refer to Section 7.4 below and Appendix 3*.
- The social, economic and environmental impacts of the activity will be considered, assessed and evaluated, including the disadvantages and benefits - *refer to Section 10 below*
- The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

EIA (SCOPING AND ENVIRONMENTAL IMPACT REPORT (S&EIR) PROCESS

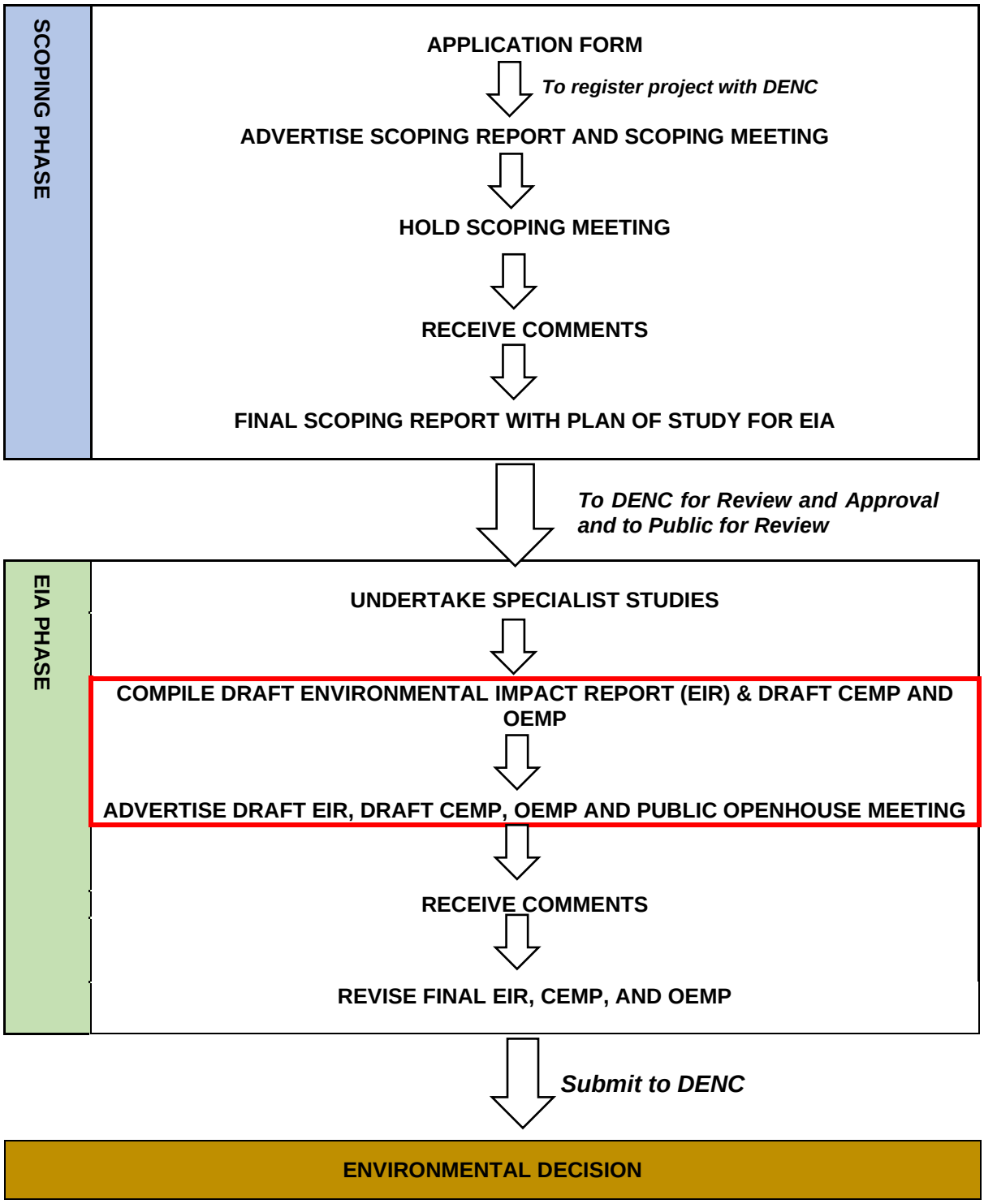


Figure 3: The EIA Process. Currently, this process is in the 'EIA Phase – Revising the Final EIR, CEMP, and OEMP', as outlined in red.

3.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEA&DP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
  - ✓ *Guideline on Transitional Arrangements*
  - ✓ *Generic Terms of Reference for EAPs and Project Schedules*
  - ✓ *Guideline on Alternatives*
  - ✓ *Guideline on Public Participation*
  - ✓ *Guideline on Exemption Applications*
  - ✓ *Guideline on Appeals*
  - ✓ *Guideline on Need and Desirability*

- Department of Environmental Affairs and Tourism (DEAT*) Integrated Environmental Management Information Series.*

3.5 NATIONAL WATER ACT

Besides the provisions of NEMA for this EIA process, the proposed development may also require authorizations under the National Water Act (Act No. 36 of 1998). The Department of Water Affairs, who administer that Act, will be a leading role-player in the EIA.

According to the Freshwater Impact Assessment (**Appendix 6C**), the NWA guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21 of the NWA), which may impact on water resources through the categorisation of 'listed water uses' encompassing water abstraction and flow attenuation within catchments as well as the potential contamination of water resources, where the DWS is the administering body in this regard.

Defined water use activities require the approval of DWS in the form of a General Authorisation or Water Use Licence authorisation. Government Notice No. 665 of 6 September 2013 provides for General Authorisations for certain specified water use activities in terms of the disposal of wastewater which then do not require a licensing process. There are restrictions on the extent and scale of listed activities for which General Authorisations apply.

Section 22(3) of the National Water Act allows for a responsible authority (DWS) to dispense with the requirement for a Water Use Licence if it is satisfied that the purpose of the Act will be met by the grant of a licence, permit or authorisation under any other law.

Potential water use activities that are of relevance to the proposed Housing Development are:

- Section 21 (a): Abstraction of water
- Section 21(c): Impeding or diverting the flow of water in a watercourse;
- Section 21(f): Discharge of waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

3.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities. The need to protect listed ecosystems is addressed (*Section 54*).

3.7 NATIONAL FORESTS ACT

The National Forests Act, 1998 (Act 84 of 1998) (NFA) makes provisions for the management and conservation of public forests.

In terms of section 15(1) of the National Forests Act, 1998, no person may -

(a) cut, disturb. damage or destroy any protected tree; or

(b) posses, collect. remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except-

(i) under a license granted by the Minister; or

(Ii) in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

3.8 NORTHERN CAPE CONSERVATION ACT, ACT 09 OF 2009

On the 12th of December 2011, the new Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect, which provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the Act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. The NCNCA is a very important Act in that it placed a whole new emphasis on a number of species not previously protected in terms of legislation.

It also put a new emphasis on the importance of species, even within vegetation classified as “Least Threatened” (in accordance with GN 1002 of 9 December 20011, promulgated in terms of the National Environmental Management Biodiversity Act 10 of 2004). Thus, even though a project may be located within a vegetation type or habitat previously not considered under immediate threat, special care must still be taken to ensure that listed species (fauna & flora) are managed correctly.

As per the comment received (dated 01 April 2020) from the Department of Agriculture, Forestry, and Fisheries (DEFF), if authorisation is granted for the development, no protected tree may be damaged or disturbed without a valid Forest Act License from the Department of Environment, Forestry and Fisheries. In addition, trees with active bird nest or other significant biodiversity features, may not be damaged or disturbed without a valid Fauna Permit from the provincial Department of Environment and Nature Conservation under the Northern Cape Nature Conservation Act (NCNCA), Act 9 of 2009 (if affected).

3.8 SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, ACT 16 OF 2013

The Spatial Planning and Land Use Management Act 16 of 2013 (**SPLUMA**) is a national law that was passed by Parliament in 2013. The SPLUMA provides a framework for spatial planning and land use management in South Africa. The subject area falls under the jurisdiction of the local municipality and the appropriate zoning and subdivision would need to be allocated to permit the development of the land for the intended purpose. Consideration of the Northern Cape Provincial Development Spatial Development Framework and the Northern Cape Provincial Growth and Development Strategy was taken. The current zoning of the site is Agricultural Zone I. A Draft Spatial Planning Land Use Application (“SPLUMA”) application (Draft SPLUMA Application - Appendix 4A) was submitted for the rezoning and subdivision of land, and the rezoning to various land uses including public streets and any other land uses needed for the community of Blaauwskop Settlement. The project includes the associated infrastructure such as water, electricity, sewage, and solid waste removal.

4. ALTERNATIVES

The proposed site is the only viable site available at this stage and the only one that was investigated in this application. Housing is a constant need in the municipality, with other sites possibly earmarked for residential development that will not form part of this application. The current land use, namely the existing Blaauwskop Settlement, is in line with the nature of the proposed development. The construction of the proposed housing development in another location would increase the construction footprint and therefore, the impact on the environment (as well as activities associated with the nature of the proposed development and surrounding land use).

Three (3) design layouts were proposed of which **Alternative 3** was the preferred layout. Alternative 3 was preferred due to this layout being in line with recommendations and information received from the Botanical Impact Assessment (Appendix 6A), Heritage Impact Assessment (Appendix 6B), Freshwater Impact Assessment (Appendix 6C), Geotechnical Investigation (Appendix 6D), Draft SPLUMA Application (Appendix 4A), and Civil Services Report (Appendix 4B).

4.1.1 ALTERNATIVE 1

Alternative 1 (**Appendix 2A**) is the first of three (3) layouts were proposed. This layout included 500 erven, over an extent of 50ha, which included:

- Residential Zone I – 500 units (average size per unit = 300-320m^2) where units will not be constructed outside areas of environmental sensitivity;
- Business Zone – 2 units
- Institutional Zone I – 2 units
- Open Space Zones – 6 units

This alternative was considered a viable option as it provided a sufficient number of housing opportunities. It was initially the municipality's preferred layout however, due to existing services and infrastructure, as well as identified environmental sensitive areas, this layout needed to be amendment (see Alternative 2 below). Although this alternative was still considered a viable option, it was not preferred as it did not fully consider the environmental sensitive areas which were identified after this layout was drafted.

4.1.2 ALTERNATIVE 2

Alternative 2 is the second of three concept layouts. The project entails the formalisation of approximately 501 erven, over an extent of 50ha, for the community Blaauwskop Settlement with the following zoning:

- **501 x Residential Zone I units:** dwelling house/ residential house
- **1 x Institutional Zone I units**: place of instruction / education
- **3 x Institutional Zone II units:** place of worship (e.g. places for practising religion); and
- **26 x Open Space Zone II units:** public open space to be utilized by the public as an open space, park, garden, playground, or recreational site;

This alternative was considered a viable option as it provided a sufficient number of housing opportunities. It was initially the municipality's preferred layout however, due to existing services and infrastructure, as well as identified environmental sensitive areas, this layout needed to be amendment (see Alternative 2 below). Although this alternative was still considered a viable option, it was not

preferred as it did not fully consider the environmental sensitive areas which were identified after this layout was drafted (see Alternative 3 below).

4.1.3. ALTERNATIVE 3

Alternative 3 is the last of three (3) concept layouts and is the preferred layout. The project entails the formalisation of approximately 500 erven, over an extent of 50ha, for the community Blaauwskop Settlement with the following zoning:

- **500 x Residential Zone I units:** dwelling house/ residential house containing one residential unit - a self-contained interlinking group of rooms for the accommodation and housing of a single family, or a maximum of four persons;
- **2 x Institutional Zone I units**: place of instruction / education which may include a school (primary, secondary, special, and private schools), college, or university;
- **1 x Institutional Zone II units**: place of worship which may include church, synagogue, mosque, temple, chapel or other place for practicing worship.
- **22 x Open Space Zone II units:** public open space where intended uses include open space, park, garden, or recreational site under ownership of the local authority.
- **1 x Open Space Zone III unit:** private open space
- **1 x Authority Zone I unit:** municipal use where land/erven and buildings utilized by local/district municipalities to undertake mandatory functions.
- **3 x Business Zone I units:** business building / premises for (intended) use as shops and/or offices and may also include financial institutions, doctors consulting rooms, etc.
- **1 x Transport Zone I unit:** public street zoning reserved for street purposes and includes facilities for public transport.

Alternative 3 was the preferred layout due to this layout being in line with recommendations and information received from the Botanical Impact Assessment (Appendix 6A), Heritage Impact Assessment (Appendix 6B), Freshwater Impact Assessment (Appendix 6C), Geotechnical Investigation (Appendix 6D), Draft SPLUMA Application (Appendix 4A), and Civil Services Report (Appendix 4B). Alternative 3 is also the preferred layout due to information received from the municipal infrastructure departments in relation to existing services infrastructure, requirements for additional land uses/ changes to proposed land uses (by the local municipality) as well as specific spacing of these land uses. This alternative also provides authority, business, and transport zoning. Furthermore, this layout provides sufficient erven and housing opportunities, as well as providing more Open Space and sufficient buffer zones recommended by the Botanical and Freshwater specialists. Moreover, the Open Spaces zoning incorporates the watercourses (i.e. drainage lines) located within the proposed site for development, providing sufficient buffer areas.

4.1 OTHER ALTERNATIVES

Site Alternatives

The proposed site is the only viable site available at this stage and the only one that will be investigated in this application. Housing is a constant need in the municipality, with other sites possibly earmarked for residential development that will not form part of this application. The current land use, namely the existing Blaauwskop Settlement, is in line with the nature of the proposed development. The construction

of the proposed housing development in another location would increase the construction footprint and therefore, the impact on the environment.

Activity Alternatives

Activity alternatives are also limited with no feasible alternatives other than residential development to assess. Due to the need for housing in the Kai !Garib Local Municipality, the housing development and associated infrastructure on the property was therefore the only activity considered.

4.2 NO-GO ALTERNATIVE

This is the option of not developing the proposed housing development. The site is located adjacent to the established and existing Blaauwskop Settlement. Although the no-go development may result in no potential negative environmental impacts, the direct and indirect socio-economic benefits (such as housing shortages as well as loss of potential employment and skills-development opportunities during the construction phase) associated with the construction of the residential development will not be realised. The need for additional housing in the Kai !Garib Local Municipality will not be realised. The expected increase in the population within the Blaauwskop area and its surrounds may lead to illegal settlements being constructed in areas adjacent to the existing Blaauwskop Settlement and in environmentally sensitive areas (i.e. in close proximity to watercourses).

5. SITE DESCRIPTION

5.1 LOCATION

The site is located approximately 13km east of Keimoes and approximately 25km south-west of Upington (as the crow flies). The site is located within Ward 8 of the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape. The proposed site is located at the following location: 28°40'7.98"S; 21°06'7.89"E (Table 2 and Figure 4).

Table 2. GPS coordinates of the proposed Blaauwskop Housing Development site.

	Point	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
Coordinates of corner points of study area	1	28°	39'	52.33"	21°	6'	4.31"
	2	28°	40'	1.96"	21°	5'	55.58"
	3	28°	40'	10.66"	21°	5'	51.09"
	4	28°	40'	23.66"	21°	6'	13.05"
	5	28°	40'	5.60"	21°	6'	26.79"

The GPS coordinates of the site are as follows (refer to map below – Figure 4).

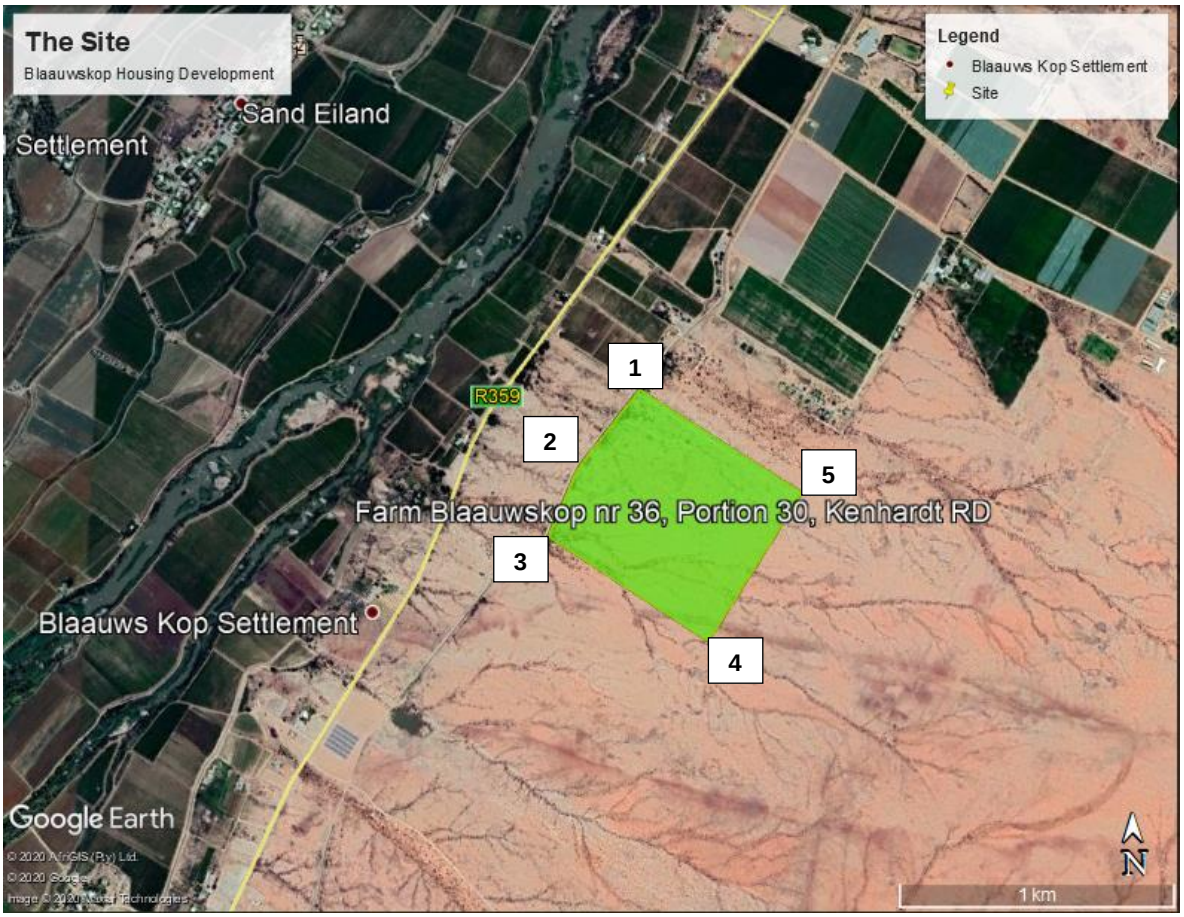


Figure 4: Coordinates of corner points of the Blaauwskop study area.

5.2 SITE DESCRIPTION

Approximately 23ha (46%) of the proposed site for development is disturbed / transformed. Of the 23ha of disturbed / transformed land, approximately 22ha are disturbed / transformed due to the erection of informal housing (and associated impacts) whereas the remaining 1ha has been transformed into an open sports field. Remaining natural veld is utilized for livestock grazing by the local community. The areas (and its immediate surroundings) had been cleared of vegetation in the areas already settled. In these areas only a few hardy indigenous species (e.g. *Tetraena decumbens* and *Senegalia mellifera*) and the alien invader Prosopis remains. The remainder of the site (approximately 27ha) supports a dry version of the Bushmanland Arid Grassland vegetation type (classified as Least Threatened), along with denser vegetation cover associated with drainage lines present within the proposed development footprint (Figure 5).

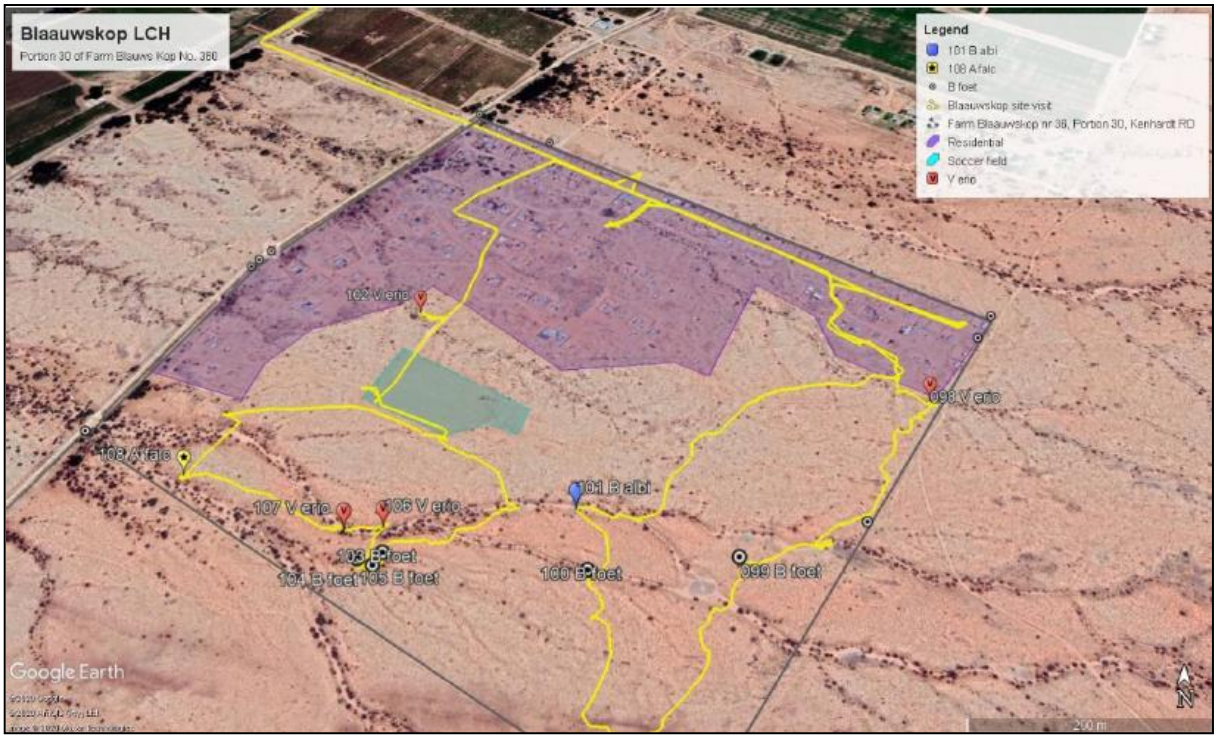


Figure 5: Site description relative to level of transformation and disturbance. Source: Botanical Assessment (Appendix 6A).

Figure 6: View of the informal dwellings on site comprising of informal dwellings with access roads.

Figure 7: Overview of transformed section of the proposed site for development.

Figure 8: A view of the informal dwellings on site. The site is transformed.

Figure 9: A view of the informal dwellings on site, looking in a southern direction.

Figure 10: View of the informal dwellings on site, looking in a north-eastern direction. The site is transformed and degraded.

Figure 11: Site as viewed from the access road, looking in a north-western direction.

5.2 VEGETATION

The proposed development footprint is located within the Bushmanland Arid Grassland (Figure 12), a vegetation type classified as *Least Threatened (LT)* as per the National list of ecosystems that are threatened and in need of protection (GN. 1002 of 9 Dec. 2011). Ecosystem types classified as Least Threatened are not considered to be of conservation concern.

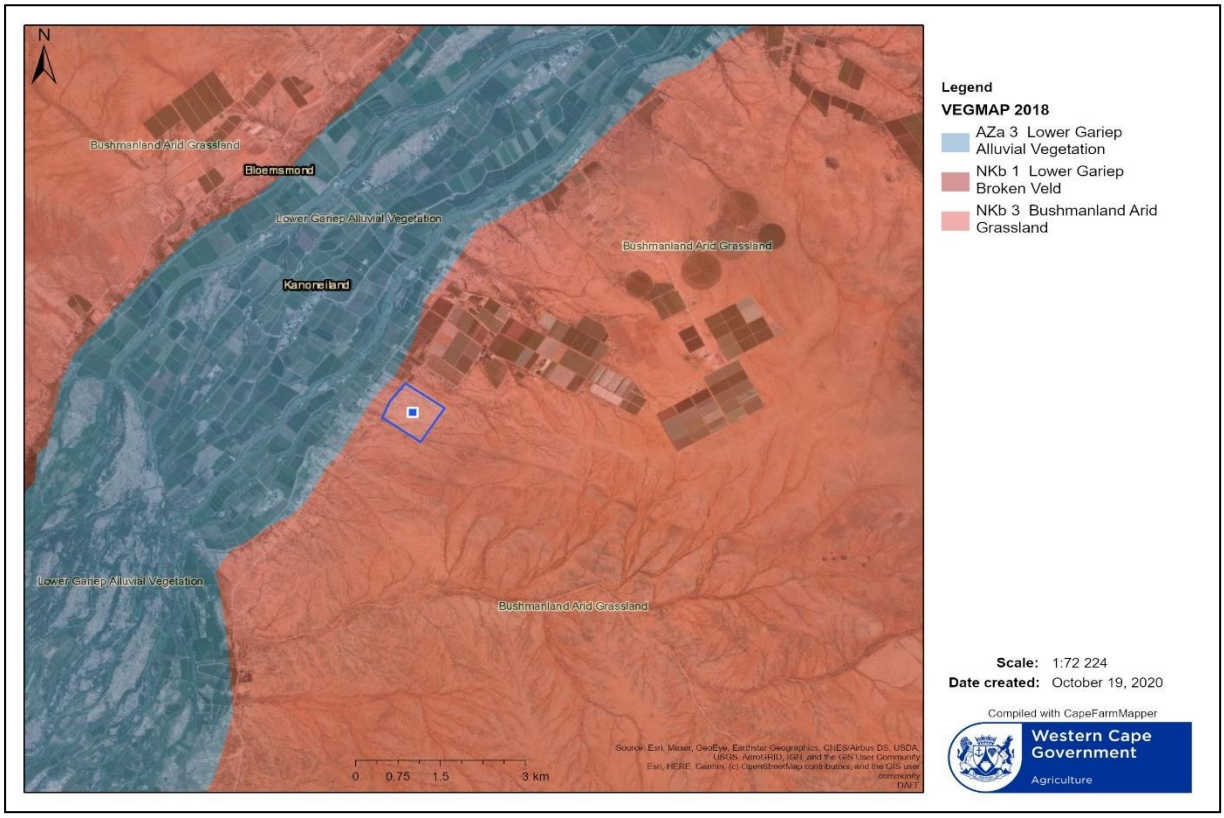


Figure 12. Vegetation type associated with the site proposed for the Blaauwskop Housing Development.

According to the Botanical Assessment (Appendix 6A), approximately 27ha of the development footprint supports a dry version (i.e. vegetation impacted by on-going drought) of the vegetation characteristic of the Bushmanland Arid Grassland vegetation type (Figure 5). According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) the Bushmanland Arid Grassland is not considered a threatened vegetation type, with more than 99% of this habitat remaining. However only 4% is formally conserved (Augrabies Falls National Park). According to the 2016 Northern Cape CBA map, the proposed development footprint is located within a Critical Biodiversity Area (CBA) (Figure 13). Unfortunately, there are no logical alternative sites available to the Kai !Garib Municipality, which will not impact on the CBA

As per the Botanical Assessment (Appendix 6C), plant species diversity within the development footprint was very low. Moreover, the majority of the vegetation was impacted by the recent drought, reducing many of the plant species to dried-out shrubs. The site will not impact on any recognised centre of endemism. Camel Thorn (*Vachellia erioloba*) and Sheppard (*Boscia albitrunca*) trees protected under the National Forest Act (NFA) were present within the proposed site for development and were associated with drainage lines (Figure 5). Four (4) plant species, namely *Aloe claviflora, Aloe gariepensis, Boscia albitrynca,* and *Boscia foetida*, protected under the NCNCA, were present within the proposed

development footprint. According to the Botanical Assessment, a Medium-Low impact, which can be reduced to a Low impact with good environmental control during construction.

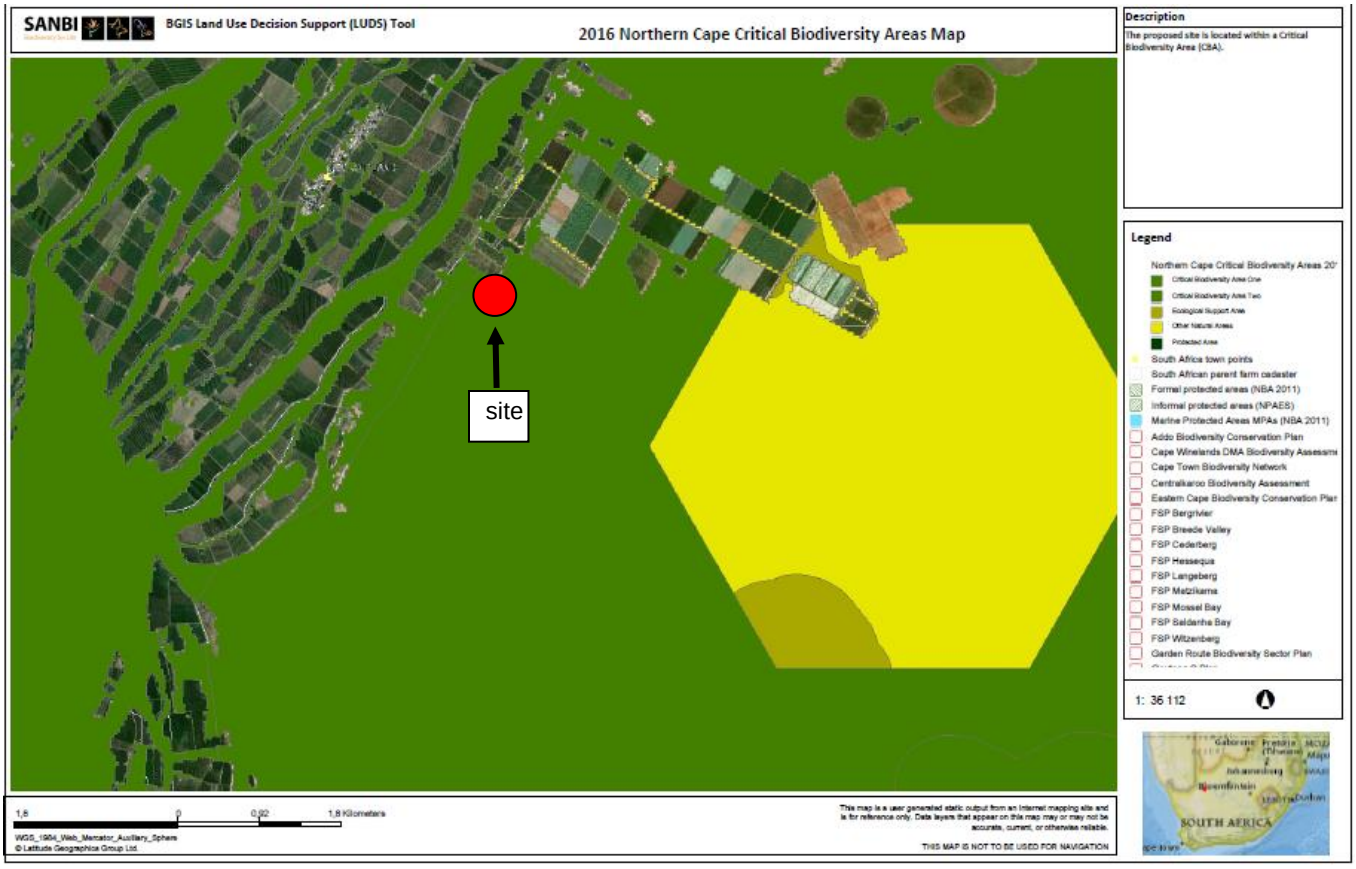


Figure 13. Critical Biodiversity Area (CBA) associated with the site proposed for the Blaauwskop Housing Development. SANBI BGIS.

The areas (and its immediate surroundings) had been cleared of vegetation in the areas already settled. The proposed site is located adjacent to the existing settlement where current land-uses include illegal dumping and livestock grazing. The vegetation associated can be classified as disturbed due to previous human-induced activities (i.e. trampling, overgrazing, illegal dumping of waste, and transformation of land leading to erosion) – impacting vegetation within the surrounding area[6]. In these areas, limited hardy indigenous species (e.g. *Tetraena decumbens* and *Senegalia mellifera*) and the alien invader *Prosopis* were present.

The condition of the veld suggests that informal settling commenced in the eastern and north-eastern sections of the property, where informal settling continued in a westerly direction. The veld, situated in the south-western section of the site was in a relatively good condition (although vegetation cover has been negatively impacted by livestock grazing and the drought). The vegetation structure of the natural veld situated in the south-western section of the site supports a homogenous appearance with low shrubland, interspersed with small trees (including *Senegalia mellifera* (Swarthaak)). However, the Botanical Specialist noted that plant species diversity was low. The bottom layer of the shrubland comprised of

[6] Chapin Iii, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E. and Mack, M.C., 2000. Consequences of changing biodiversity. *Nature,* 405(6783), pp.234-242.

Tetraena decumbens (typically observed as dried-out bushes with a few remaining leaves), patches of *Aloe claviflora* (Kraalaalwyn), *Acanthopsis hoffmannseggiana*, *Aptosimum spinescens, Blepharis furcate*, *Eragrostis regidor*, *Stipagrostis ciliata, S. uniplumis*, *Justicia australis*, *Kleinia longiflora, Monsonia cf. parvifolia* (Boesmankers), *Phaeoptilum spinosum*, *Rhigozum trichotomum, Rogeria longiflora*, *Tapinanthus oleifolius*, *Tetraena retrofracta*, and *Tetraena rigida.* Denser vegetation cover, dominated by *Senegalia mellifera* (along with *Boscia foetida*, *Boscia albitrunca*, *Parkinsonia Africana, Phaeoptilum spinosum*, *Ziziphus mucronate*, and *Vachellia erioloba*) were associated with drainage lines present within the proposed development footprint.

5.3 FRESHWATER

According to the SANBI National Freshwater Ecosystem Priority Areas ("NFEPA") map (see Figure 14 and Figure 15 below), there are no natural watercourses within the proposed site for development. The Orange River is located approximately 690m west of the proposed site. There is an irrigation channel to the west of the proposed site. However, from the site visit, Google earth images, and the Freshwater Report (**Appendix 6C**), the proposed housing development transverses a number of drainage lines.

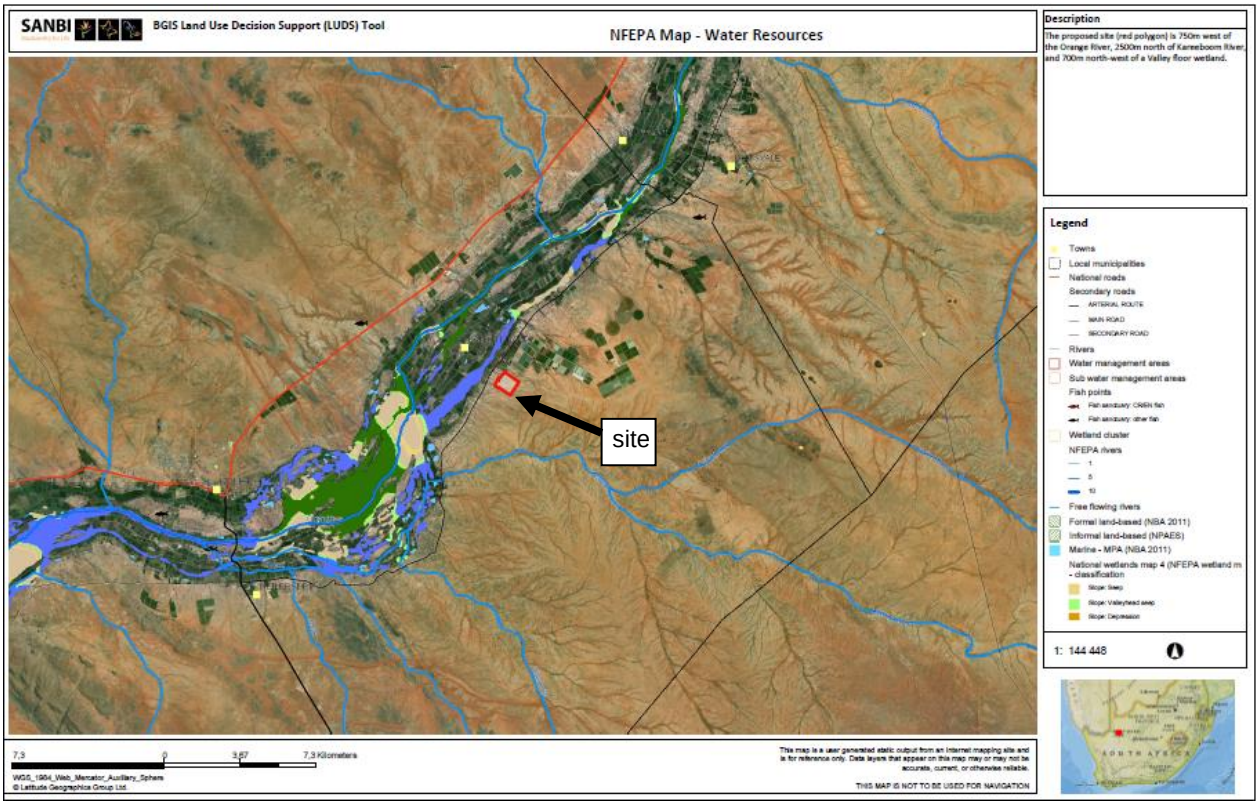


Figure 14. SANBI BGIS NFEPA map of the area.

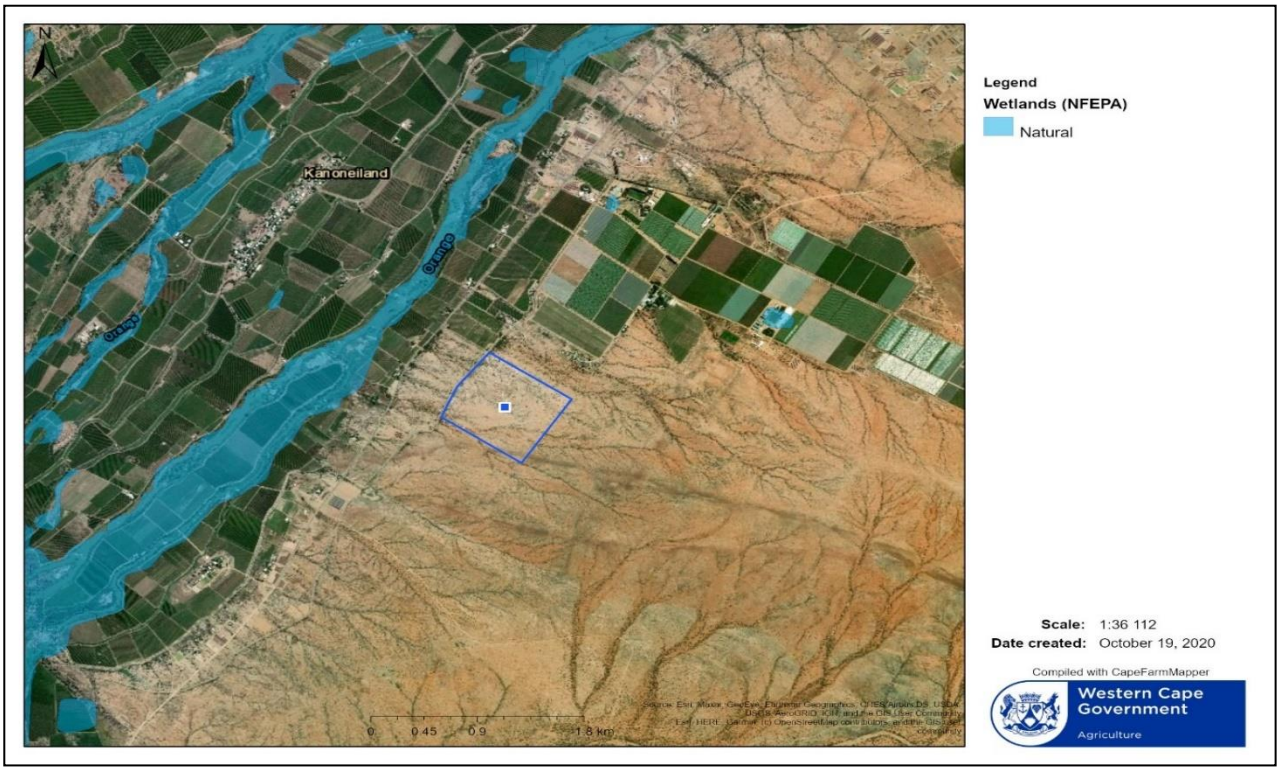


Figure 15. Natural Freshwater Priority Area (

The drainage lines are classified as non-perennial where uncommon rainfall events result in drainage line flooding. These flooding events maintain the morphological integrity of these drainage lines. Agricultural activities in areas around the Orange River, as well as the Sak and Hartbees River, have resulted in the alteration of drainage lines into drainage channels whereas the upper reaches are less impacted due to the inability to undertake intense agricultural activities (see **Appendix 6C**).

Non-perennial drainage lines, present in sub-catchments 2 and 3, traverse the proposed development footprint (Figure 16). These drainage lines, mostly dry, pass over irrigation canals where concrete slabs (and concrete walls) have been constructed at each watercourse crossing to prevent stormwater runoff from entering the irrigation canal. Drainage lines, present in sub-catchments 1 and 4, are located adjacent to the proposed site. Please refer to the Freshwater Assessment (Appendix 6C) for more information.

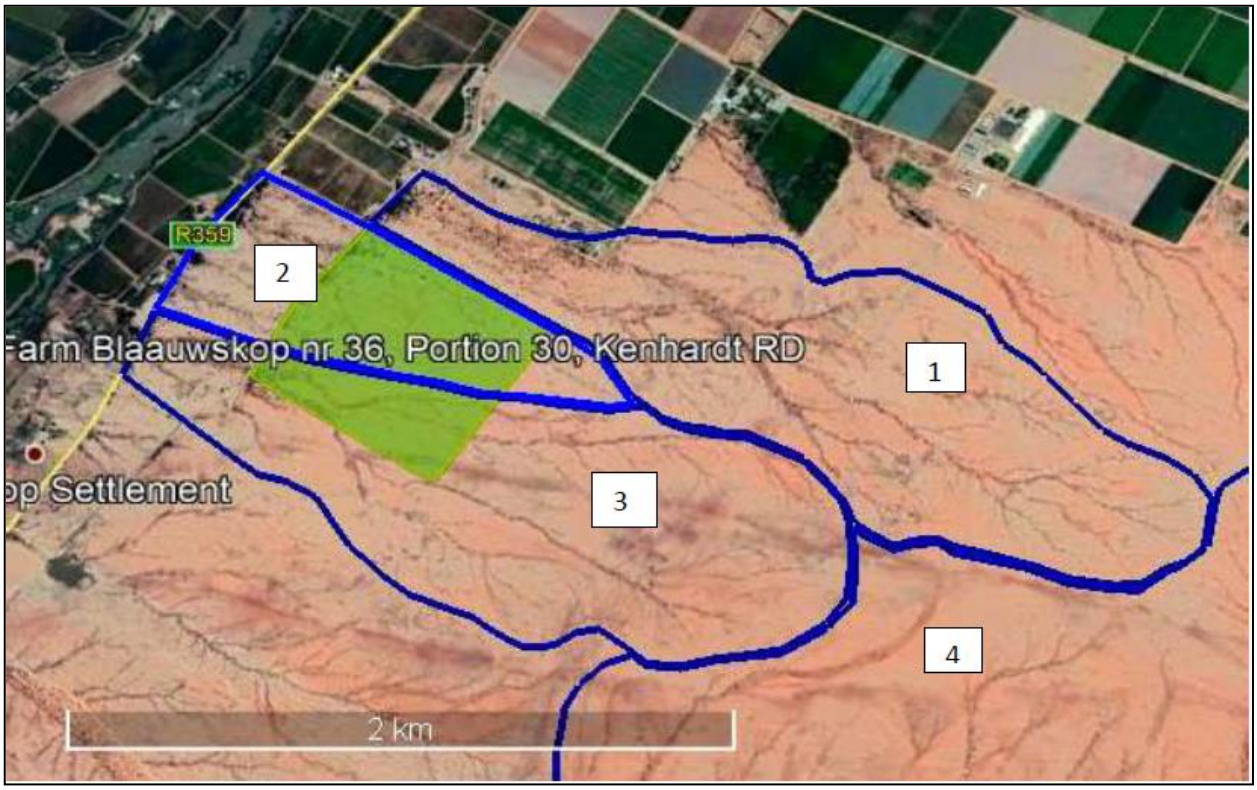


Figure 16. Catchment areas associated with the proposed site for the Blaauwskop Housing Development. Source: Freshwater Assessment (Appendix 6C).

5.4 GEOLOGY

The proposed Blaauwskop site earmarked for development is located within the Keimoes Suite (Figure 17). As per the Geotechnical Investigation (Appendix 6D), the site for the proposed development is located between the lithology of the Kaapvaal Craton and Namaqua-Natal mobile belt where the remaining, original geology is comprised of Kakamas Terrane (located on the Kanoneiland granite of the Keimos Suite). Granite is dark grey, speckled white rock with a high biotite content. The soil profile of the site is comprised of colluvium (surface horizon between 100 – 600mm thick, consisting of pale light brown fine sands to coarse sand with contents of gravels and granite cobbles), alluvium (horizon extends between 300 – 1300mm thick, distribution is limited to debris deposited by the non-perennial watercourses coardering the canal), residual granite (occurs between depths of 100 – 1300mm thick but extends to a thickness of 1900mm, residual granite varied between dense and very dense consistency), pedogenic deposits [comprised of nodular calcrete (underlying transported surface deposits, present between 0 – 500mm depth where consistency varied between medium dense to very dense), and unconsolidated calcrete (underlies transported surface deposits, occurring between 300 – 900mm depth with a medium dense consistency)].

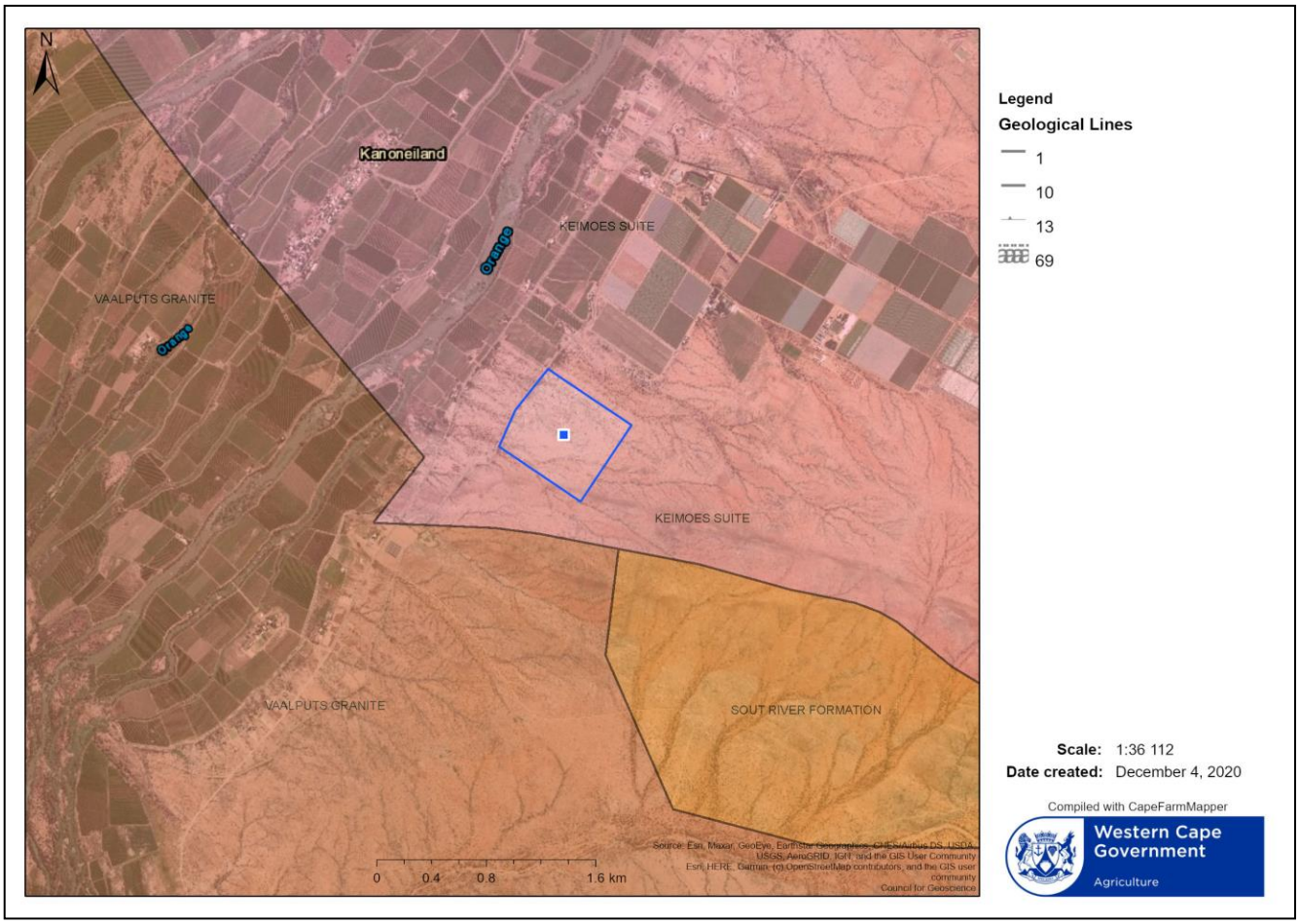


Figure 17. Geological features associated with the Blaauwskop site.

5.3 GEOHYDROLOGY

According to the Geo-technical Investigation (**Appendix 6D**), no perched groundwater was encountered on site during the geotechnical investigation and was stated that perched water is not likely to generally occur in this area. Groundwater is expected to occur at depths between 20 to 30m in fractures restricted to zone directly located below the water table. The presence of permanent water does not impact the geotechnical conditions of the site. Five (5) shallow, non-perennial gully areas were identified during the site investigation. Although these gullies are not subject to continuous flooding, flooding events may damage infrastructure not suitably designed for this purpose. Should erven be proposed within areas within Geotechnical Zone III, these areas must be rehabilitated (e.g. repairing leakages in the canal, provision of sufficient channelling) to allow safe development.

5.4 CLIMATE

Keimoes, the closest locality to Blaauwskop Settlement with on-line climate data, receives only 154mm of rain annually, which categorized this area as semi-arid. The rainfall is entirely inadequate for growing crops. The large-scale agriculture in the district is for all its needs dependent on irrigation out of the Orange River. Most of the rain is during summer. Rainfall is highly variable, with occasional (i.e. once every couple of years) high rainfall events. Droughts are common, with dry periods lasting for years. The summers are hot and dry, with midday temperatures often exceeding 40°C.

5.5 SOCIO-ECONOMIC CONTEXT

Kai !Garib Local Municipality

Socio-economic issues prioritized by communities within the Municipality include, but are not limited to, (i) lack of basic services (e.g. adequate sewerage systems, access to potable water, and access to electricity), lack of housing (where contributing factors include poverty and level of unemployment within the municipality), and (iii) the level of unemployment as a whole (leading to crime, drug and alcohol abuse, lack of socio-economic development within the municipality).

According to the Kai !Garib Municipality Integrated Development Plan (IDP 2020 – 2021), approximately 70 500 people live within the Municipality (housing approximately 0.1% of South Africa's population). Population growth within the Municipality increased at an average rate of 0.87% per annum from 2008 – to – 2018, approximately half the growth rate of ZF Mgcawu District Municipality (~1.53%) and South Africa (~1.57%) (Table 3). The population is estimated to increase from 70 500 (in 2018) to 73 900 in 2023. The population projection of the Kai !Garib Local Municipality shows an estimated average growth rate of approximately 0.9% from 2018 to 2023. This is however slightly lower compared with the predicted annual population increase in the ZF Mgcawu District Municipality (1.2%), Northern Cape Province (1.3%), and South Africa (1.3%).

Table 3. Population within the Kai !Garib Local Municipality and estimated population growth over time. Note, average annual increase of approximately 1%. Source: Kai !Garib IDP (2020/21).

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2018	70,500	266,000	1,250,000	57,400,000	*26.5%*	*5.6%*	*0.12%*
2019	71,100	269,000	1,270,000	58,100,000	*26.4%*	*5.6%*	*0.12%*
2020	71,800	273,000	1,290,000	58,900,000	*26.3%*	*5.6%*	*0.12%*
2021	72,400	276,000	1,300,000	59,600,000	*26.2%*	*5.6%*	*0.12%*
2022	73,100	279,000	1,320,000	60,400,000	*26.2%*	*5.5%*	*0.12%*
2023	73,900	282,000	1,340,000	61,100,000	*26.2%*	*5.5%*	*0.12%*
Average Annual growth							
2018-2023	***0.95%***	***1.21%***	***1.33%***	***1.27%***			

As per the Kai !Garib IDP, the number of houses required are increasing at a faster rate than the rate of population increase. This infers that household size is decreasing, and vice-versa (Table 4). In 2018, the Kai !Garib Local Municipality comprised of 18 400 households. This equates to an average annual growth rate of 0.24% in the number of households from 2008 to 2018. With an average annual growth rate of 0.87% in the total population, the average household size in the Kai !Garib Local Municipality is

consequently increasing. This is confirmed by the data where the average household size in 2008 increased from approximately 3.6 individuals per household to 3.8 persons per household in 2018. The average annual growth rate in the number of households for all the other population groups has increased with 0.09%.

Table 4. Number of households present in the Kai !Garib Local Municipality.

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2008	17,900	61,300	287,000	13,400,000	*29.3%*	*6.2%*	*0.13%*
2009	17,400	61,800	288,000	13,700,000	*28.2%*	*6.1%*	*0.13%*
2010	17,100	62,500	291,000	13,900,000	*27.3%*	*5.9%*	*0.12%*
2011	16,800	63,800	298,000	14,200,000	*26.4%*	*5.6%*	*0.12%*
2012	17,100	65,300	306,000	14,500,000	*26.2%*	*5.6%*	*0.12%*
2013	17,400	66,900	314,000	14,700,000	*26.0%*	*5.5%*	*0.12%*
2014	17,500	67,800	319,000	15,000,000	*25.8%*	*5.5%*	*0.12%*
2015	17,500	68,500	323,000	15,400,000	*25.6%*	*5.4%*	*0.11%*
2016	17,800	69,800	331,000	15,700,000	*25.5%*	*5.4%*	*0.11%*
2017	18,100	71,500	341,000	16,100,000	*25.3%*	*5.3%*	*0.11%*
2018	18,400	73,000	349,000	16,400,000	*25.2%*	*5.3%*	*0.11%*
Average Annual growth							
2008-2018	***0.24%***	***1.76%***	***1.96%***	***2.02%***			

Source: Kai !Garib IDP (2020/21).

The demographic profile of the Kai !Garib Local Municipality is detailed in Table 5. These data, and other data present within the Kai !Garib IDP, suggests that many people migrate into Kai !Garib who were looking for better opportunities from surrounding areas and abroad.

Table 5. Demographic profile of Kai !Garib Local Municipality.

	African		White		Coloured		Asian	
	Female	Male	Female	Male	Female	Male	Female	Male
00-04	497	492	107	157	1,840	1,880	63	58
05-09	226	218	116	139	2,020	2,070	45	39
10-14	209	214	140	110	2,090	2,180	51	57
15-19	679	1,020	109	133	2,110	2,070	21	22
20-24	1,880	2,690	127	115	1,890	2,040	26	16
25-29	1,450	2,080	124	140	1,760	1,850	49	21
30-34	1,060	1,770	156	126	1,920	1,800	45	23
35-39	686	1,380	183	217	1,640	1,510	40	47
40-44	407	842	139	160	1,300	1,250	15	53
45-49	273	590	164	131	1,290	1,100	26	30
50-54	137	339	211	177	1,190	1,160	17	24
55-59	91	250	183	206	1,020	951	10	7
60-64	82	114	190	135	1,040	642	9	9
65-69	69	80	172	140	634	552	9	5
70-74	34	57	170	130	520	377	8	7
75+	55	75	279	150	579	387	5	7
Total	**7,830**	**12,200**	**2,570**	**2,360**	**22,800**	**21,800**	**439**	**426**

Source: Kai !Garib IDP (2020/21).

Table 6. Social and Economic Aspect

Anticipated CAPEX value of the project on completion	To be confirmed
What is the expected annual income to be generated by or as a result of the project?	To be confirmed
New skilled employment opportunities created in the construction phase of the project	Construction phase of the project yet to commence. However, it is expected that new skilled employment opportunities will be created for local community during the construction phase.
New skilled employment opportunities created in the operational phase of the project	None
New un-skilled employment opportunities created in the construction phase of the project	Estimated ±100 employment opportunities
New un-skilled employment opportunities created in the operational phase of the project	None
What is the expected value of the employment opportunities during the operational and construction phase?	To be confirmed
What percentage of this value that will accrue to previously disadvantaged individuals?	±85%
The expected current value of the employment opportunities during the first 10 years	Unknown at this stage
What percentage of this value that will accrue to previously disadvantaged individuals?	To be confirmed

5.6 HERITAGE FEATURES

As per the Heritage Impact Assessment (**Appendix 6B**), the following key findings were identified within the proposed site for development:

1. Five (5) occurrences of lithic material (formal tools, predominantly untrimmed flakes, cores, stone working debris, and few scrapers made from the highly utilised banded ironstone formation (BIF)) were recorded and identified within the development footprint. Three (3) incidences of lithic material were recorded and identified outside the proposed development footprint. These recorded lithic materials were classified as having a low significance (Field Rating IV C). No other heritage resources were recorded. No mitigation is required.
2. No (formal or informal) graves were identified. Therefore, no mitigation is required.
3. Proposed site for development has a zero palaeontological significance. Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).

6. SERVICES

Due to the nature and size of the proposed development, an investigation into the status and availability of existing bulk services to supply the development was required. Stabilis Development (Pty) Ltd compiled a Civil Services Report (**Appendix 4B**), investigating the status of existing services that were identified to potentially supply the proposed area on the external services for the proposed development.

A brief description of the bulk services is given below (**please refer to Appendix 4B for more information**).

6.1 WATER

Currently, water was being transported to the site by the Municipality. Water supply from the Orange River should be abstracted and pumped to a purification plant in order to supply the proposed development with water. The total annual average daily demands are 350m^3/day. A water purification plant with a 350m^3 capacity is required where ground storage must be 1050m^3 and elevated storage for peak demand must be 117m^3. Moreover, a water distribution network will be required to distribute water to the proposed development. Each residential site should be supplied with a metered connection where each occupied site will be supplied with water by use of a standpipe.

6.2 SEWERAGE

Grey water to be disposed on site whereas sewerage will be disposed on site utilizing VIPs or double put toilets. Septic tanks may be constructed however, the service cost will be expensive. Increased pressure will be put on vacuum trucks of the municipality to accommodate the additional load.

6.3 ROADS

Access to site will be via an existing road off the R359 (provincial road) whereas the access road is provided with interlocking paving blocks. Internal road networks will be graded gravel roads where stormwater runoff will be accommodated for. As per the Draft SPLUMA Application, DRPW has been informed of the planned formalisation, but to date no feedback has yet been received. SANRAL has been furnished with a formal notification letter (Annexure J) for review on the 15th of February 2021.

6.4 STORMWATER

Stormwater runoff from the development will be on-surface and in the streets. The slope, associated with the land (1:50 in a north-west direction), will be sufficient for on-surface draining system.

6.5 SOLID WASTE (REFUSE) REMOVAL

A small transfer facility will be required. Until this facility is established, all solid waste must be transported to the site in Kakamas (nearest registered waste disposal facility).

7. PROCESS TO DATE

The section below outlines the various tasks undertaken to date, the members of the team involved in the project, as well as the Public Participation Process.

6.1 TASKS UNDERTAKEN TO DATE

Table 7. Tasks undertaken in the EIA to date

Date	Action	Responsible Party	Completed
	Initial round of Public Participation Process (PPP)	EnviroAfrica	
17/01/2019	Advertisement placed in Kalahari Bulletin	EnviroAfrica	
15/01/2019	Initial Notification letters sent to I&APs to register	EnviroAfrica	
27/11/2018	Site Poster Placement and Maildrops	EnviroAfrica	
18/02/2019	The initial round of PPP ended on 18 February 2019	EnviroAfrica	
	Specialists Reports		
12/03/2019	Heritage Impact Assessment received	UBIQUE HERITAGE CONSULTANTS	
24/08/2020	Biodiversity Impact Assessment received.	PB Consult	
May 2020	Freshwater Impact Assessment. Fieldwork done, specialist report in process.	Watsan Africa	
NEMA Application Form & Draft Scoping Report			
14/08/2020	NEMA Application Form submitted to DENC.	EnviroAfrica	
14/08/2020	Draft Scoping Report submitted to DENC.	EnviroAfrica	
14/08/2020	Draft Scoping Report sent to I&APs and Organs of State for comment. The commenting period on the Draft Scoping Report ends on **16 October 2020**.	EnviroAfrica	
27/08/2020	Received letter from DENC dated **27 August 2020**, acknowledging receipt of the NEMA App Form and Draft Scoping Report.	DENC	
10/09/2020	Send HC of Application Form and Draft Scoping Report to DENC	EnviroAfrica	
19/10/2020	**Submit Final Scoping Report**	EnviroAfrica	
	Receive Acknowledgement of Receipt/ Approval of Final Scoping Report and Plan within 43 days of receipt of report	DENC	**Received on 11th March 2021.**
Department goes on leave (15/12/2020 – 05/01/2021)			
The following phase is subject to receipt of formal letter of approval / acceptance of the Final Scoping Report from the DENC. Therefore, dates below are subject to change. As per section 22 of the EIA Regulations (as amended): *22. The competent authority must, within 43 days of receipt of a scoping report—* *(a) accept the scoping report, with or without conditions, and advise the applicant to proceed or continue with the tasks contemplated in the plan of study for environmental impact*			**Received on 11th March 2021.**

assessment; or *(b) refuse environmental authorisation if—* *(i) the proposed activity is in conflict with a prohibition contained in legislation; or* *(ii) the scoping report does not substantially comply with Appendix 2 to these Regulations or any applicable protocol or minimum information requirements as identified and gazetted by the minister in a government notice and the applicant is unwilling or unable to ensure compliance with these requirements within the prescribed timeframe.*			
Environmental Impact Assessment Report Phase			
February 2021	Submit Draft EIR and Notify Registered I&APs (30-day comment period) ***Extension to process and invoicing dates due to (i) DEFF's response to COVID-19 (i.e. requirement to extend EIA timeframes and commenting periods)[1] and (ii) DENC on leave from 15th December 2020 – 05th January 2021 (this period of time has to be excluded from the EIA process)[7].**	EnviroAfrica	
March 2021 **Decision period ends in July 2021**	Submit Final EIR for decision within 107 days of receipt of Final EIR ***Extension to process and invoicing dates due to (i) DEFF's response to COVID-19 (i.e. requirement to extend EIA timeframes and commenting periods)[1] and (ii) DENC on leave from 15th December 2020 – 05th January 2021 (this period of time has to be excluded from the EIA process) .**	DENC	

Completed **Still to be Completed**

[7]As per section 4 of the 'Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licenses', published on the 5th June 2020 by the Department of Environment, Forestry and Fisheries (DEFF). These new directions state that any notice given after the 5th June 2020 requires an extended 30-day comment period in addition to the legislated 30-day comment period (total of 60-day comment period). If PP was conducted before the 27th March 2020, the formal comment period between 27th March and 5th June 2020 are null and void and therefore, restarted on the 6th June 2020. The initial comment period must be extended by additional 21 days (total of 51 day). Please note that we are still waiting for directives from DEFF on application timelines. These Directives published on the 5th June 2020 apply to Level 3 Lockdown Period and are subject to change. Please note: the dates above may be subject to change should the Department of Environmental Affairs, Forestry and Fisheries (DEFF) and the Department of Environment and Nature Conservation (DENC) issue any new directives and legislated timeframes. The final decision (No. 18) may be expedited on request by the applicant.

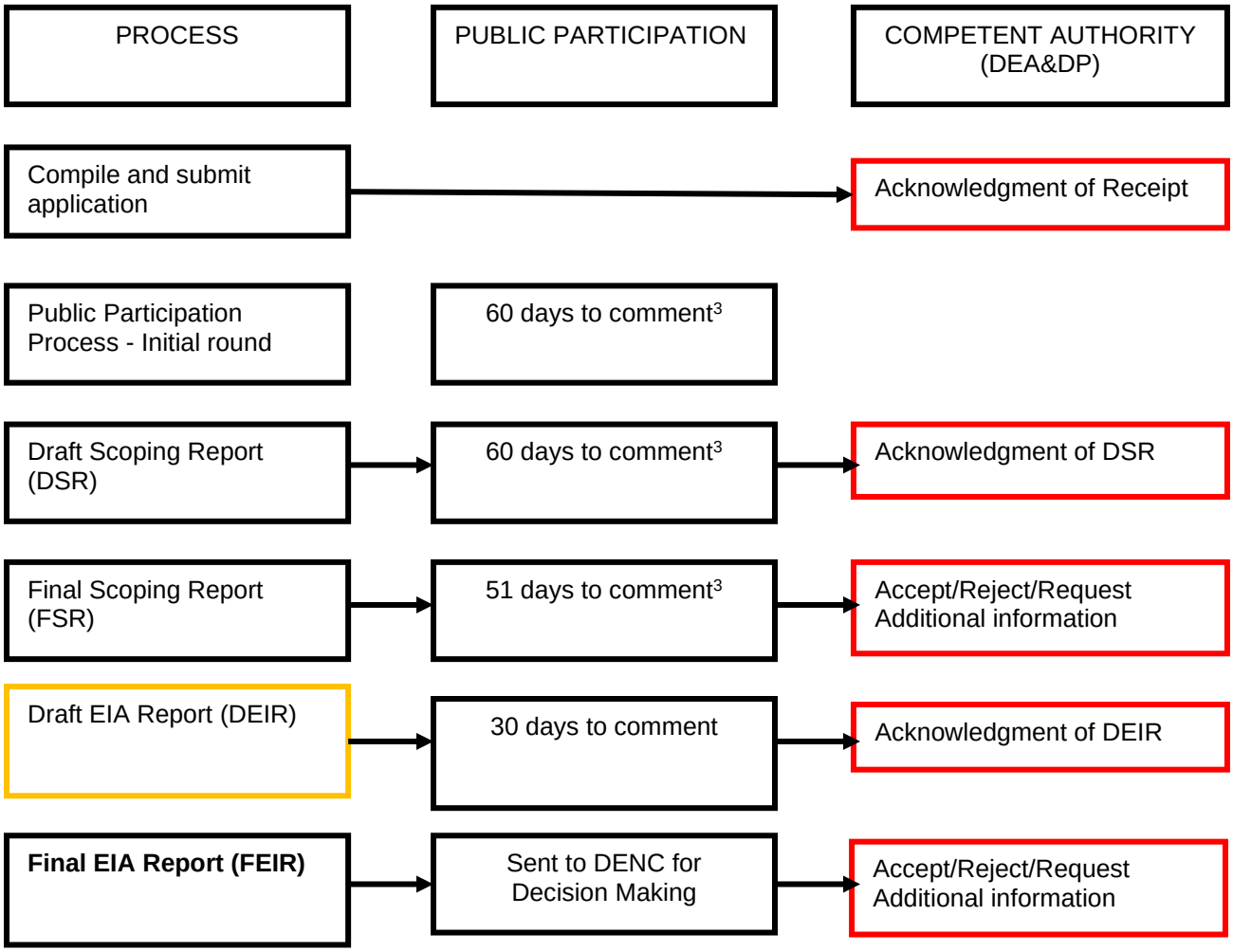


Figure 18. Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process whereas the golden outline represents current stage of process (namely the Draft EIR).

6.2 TASKS TO BE UNDERTAKEN DURING THE EIA PHASE

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) (This Document) for public comment based on specialist information;
- Advertise Draft EIR for public comment;
- Distribute and/or make the Draft EIR available for viewing and comment;
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR); and
- Preparation of a FINAL EIR for submission to DE&NC for consideration and decision-making.
- Please refer to Table 7 and Figure 18 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties were given the opportunity to comment on the Draft Final Scoping Report and on the Draft EIR. The figures also

indicate what timeframes are applicable to what stage in the process. If required, meetings with key stakeholders will be held.

- At the end of the comment period, the Draft EIR and EMPr (if necessary) will be revised in response to feedback received from I&APs. Final comment received from I&APs will be addressed in the Final EIR.
- Correspondence with I&APs was via post, telephone, email, and/ or newspaper advertisements.
- Should it be required, this process may be adapted depending on input received during the on-going process and as a result of public input. The DE&NC will be informed of any changes in the process.

6.3 PROFESSIONAL TEAM

The following professionals are part of the project team.

Table 8. Members of the professional team

DISCIPLINE	SPECIALIST	ORGANISATION
Environmental Consultants	Anthony Mader / Bernard de Witt	**EnviroAfrica**
Town Planners	Len Fourie / JP Theron	**MacroPlan Town and Regional Planners**
Civil Services Report	J. H. C. Theron	**Stabilis Development (Pty) Ltd**
Botanist	Peet Botes	**PB Consult**
Heritage	Jan Englebrecht	**Ubique Heritage Consultants**
Freshwater	Dr Dirk van Driel	**Watsan Africa**
Geo-technical Consultants	Frans Breytenbach	**Cedar Land Geotechnical Consult (Pty) Ltd**

6.4 PUBLIC PARTICIPATION

A Public Participation Process was undertaken in accordance with the requirements of the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series. *Guidelines on Public Participation 2013* and the NEMA EIA Regulations 2014 (amended). Issues and concerns raised during the Scoping phase are dealt within this report. Please note that the public participation processes are in line with the new (and subsequent) Directions, published by the Department of Environment, Forestry, and Fisheries (DEFF) on the 5th June 2020[8]. However, as per conditions stipulated in the latest circulars, the required extension to public participation ended on the 18th August 2020. In light of this, a 30-day comment period was given to I&APs for comment on the Draft EIR.

7.4.1 PUBLIC PARTICIPATION UNDERTAKEN DURING SCOPING PHASE:

Interested and Affected Parties (I&APs) have been and will be identified throughout the process. Landowners adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 3.**

Public Participation will be conducted for the Draft EIR in accordance with the requirements outlined in Regulation 41 of the NEMA EIA Regulations 2014. The issues and concerns raised during the scoping phase will be dealt with in the EIA phase of this application.

As such, each subsection of Regulation 41 contained in Chapter 6 of the NEMA EIA Regulations 2014 will be addressed separately to demonstrate that all potential Interested and Affected Parties (I&AP's) were notified of the proposed development.

R54 (2) (a):

R41 (2) (a) (i): The site notices (A2 and A3 sizes) were placed at different locations around the project site as well as at the municipality office in town (please refer to **Appendix 3D**)

The posters contained all details as prescribed by R41(3) (a) & (b) and the size of the on-site poster was at least 60cm by 42cm as prescribed by section R41 (4) (a).

R41 (2) (a) (ii): N/A. There is no alternative site.

R41 (2) b):

R41 (2) (b) (i): N/A. The Applicant is the landowner

R41 (2) (b) (ii): The Initial notification letter (**Appendix 3C**) was circulated to residents within a 200m radius of the project site. Also see **Appendix 3D** for the letter drops.

[8]As per section 4 of the 'Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licenses', published on the 5th June 2020 by the Department of Environment, Forestry and Fisheries (DEFF). These new directions state that any notice given after the 5th June 2020 requires an extended 30-day comment period in addition to the legislated 30-day comment period (total of 60-day comment period). If PP was conducted before the 27th March 2020, the formal comment period between 27th March and 5th June 2020 are null and void and therefore, restarted on the 6th June 2020. The initial comment period must be extended by additional 21 days (total of 51 day). Please note that we are still waiting for directives from DEFF on application timelines. These Directives published on the 5th June 2020 apply to Level 3 Lockdown Period and are subject to change. **Please note, conditions in this Directive ceased on the 18th August 2020.**

R41 (2) (b) (iii): An initial notification letter was sent to the municipal Ward councillor at the Kai !Garib Municipality, for the ward in which the site is situated (please refer to **Appendix 3C** for proof of notification letters sent).

R41 (2) (b) (iv): An initial notification letter was sent to the Kai !Garib Municipality as the municipality is the Applicant.

R54 (2) (b) (v): Initial notification letter (please refer to **Appendix 3C** for proof of notification letters sent) will be sent to the following organs of state having jurisdiction in respect of any aspect of the activity:

- Department of Water and Sanitation;
- Department of Agriculture and Land Reform;
- Department of Roads and Public Works;
- Department of Agriculture, Forestry and Fisheries;
- Department of Co-operative Governance, Human Settlements and Traditional Affairs;
- Department of Environment and Nature Conservation (D:E&NC);
- South African Heritage Resources Agency;
- Kai !Garib Municipality; and
- ZF Mgcawu District Municipality.

R41 (2) (c) (i): An advertisement was placed in the local newspaper, **Kalahari Bulletin**, on 1**7 January 2019** (please refer to **Appendix 3B** for proof of advertisement).

R41 (2) (d): N/A

R41 (6):
R41 (6) (a): All relevant facts in respect of the application were made available to potential I&AP's.

R41 (6) (b): I&AP's were given more than a 30-day registration and comment period on the proposed application during the first round of public participation.

R42 (a), (b), (c) and R43(2): A register of interested and affected parties was opened, maintained and is available to any person requesting access to the register in writing (please refer to **Appendix 3A** for the list of I&APs).

Please find attached in **Appendix 3**:

- Proof of Notice boards, advertisements and notices that were sent out
- List of registered interested and affected parties
- Summary of issues raised by interested and affected parties

7.4.2 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of groups and individuals were identified as Interested and Affected Parties during the initial Public Participation Process. A complete list of organisations and individual groups identified to date, as well as those I&APs that have registered are shown in **Appendix 3A.**

All Registered I&APs were notified of the EIR by means of notification letters (via preferred method of communication) (via email, sms, and / or post), informing them of the availability of the Draft EIR and will be given the opportunity to comment.

7.4.3 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) have been notified by means of an advertisement in a local newspapers (Kalahari Bulletin), letters, site notices, smses (WinSMS), and/or emails sent to registered I&APs on the project database.

A list of I&APs is included as **Appendix 3A**.

8. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Environmental issues were raised through specialist assessments, site visits, as well as informal discussions with the project team, specialists, authorities, and I&APs during the public participation period of the Scoping Report. All issues raised were addressed and assessed in the specialist reports (Appendix 6A-D) and services report (Appendix 4B) and forms part of this EIR. Any additional issues raised on the Draft EIR (this report) during the public participation will be listed and addressed in the Final Environmental Impact Report.

The following potential issues have been identified:

8.1. BIODIVERSITY

8.1.1 BOTANICAL

Botanical Impact Assessment describes and assesses the botanical sensitivity of the area. The terms of reference for this study required a baseline analysis of the flora present within the proposed site for development, as well as the broad ecological characteristics of the site. Therefore, a Botanical Impact Assessment was conducted and has been appended as **Appendix 6A**.

The Botanical Assessment includes the following:

- Description of vegetation present on site;
- Potential impacts associated with the proposed site for development;
- The significance of these potential impacts, alternatives, and related activities – with and without mitigation – on biodiversity pattern and ecological functioning at the site, landscape, and regional scales; and
- Recommended actions that should be taken to prevent or, if prevention is not feasible, to mitigate impacts.

8.1.2 FAUNA

Please note that no fauna or avi-fauna screening was done as part of this study and that the following notes are just observations with regards to status of the study area and observations made during the site visit. The proposed site is located adjacent to the existing settlement where current land-uses include illegal dumping and livestock grazing. The vegetation associated can be classified as disturbed due to previous human-induced activities (i.e. trampling, overgrazing, illegal dumping of waste, and transformation of land leading to erosion).

Faunal diversity changes through space and time and are directly influenced by anthropogenic activities, including animal husbandry (i.e. overgrazing by livestock) and human settlements (e.g. transformation of land) (Tilman *et al*., 1997[9]; Chapin *et al*., 2000[10]). Direct impacts are typically associated with urban land expansion, leading to land cover changes (and consequent loss of natural areas) and edge effects,

[9] Tilman, D. and Wardle, D.A., 1997. Biodiversity And Ecosystem Properties. *Science*, 278 (5345), pp.1865-1869.
[10] Chapin Iii, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E. and Mack, M.C., 2000. Consequences of changing biodiversity. *Nature*, 405(6783), pp.234-242.

whereas indirect impacts include impacts associated with the generation of waste (e.g. general or sewage) and its management (McDonald *et al*., 2020[11]). Edge effects have diverse impacts on biodiversity and ecological functioning (Razafindratsima *et al*., 2018[12]). Such effects contribute to a disturbance factor, which is likely to have driven most wild animals away from the proposed site for development due to activities associated with the adjacent settlement. It is considered highly unlikely that any large game remains in this area and were not observed within the development footprint during the site visit. This in turn would have affected the food chain and ultimately the density of tertiary predators, particularly mammals and larger birds of prey, while smaller predators and scavengers such as jackal and caracal may have been eradicated by community members in the existing settlement in fear of their livestock. As per the Freshwater Assessment (Appendix 6C), no endangered animal(s) was observed in or near the drainage line. Due to long-term impacts associated with human settlements, compounded by the proximity of the proposed development areas to the urban edge, no fauna are expected to occur within the development footprint.

As per the comment received (dated 01 April 2020) from the Department of Agriculture, Forestry, and Fisheries (DEFF), if authorisation is granted for the development, no protected tree may be damaged or disturbed without a valid Forest Act License from the Department of Environment, Forestry and Fisheries. In addition, trees with active bird nest or other significant biodiversity features, may not be damaged or disturbed without a valid Fauna Permit from the provincial Department of Environment and Nature Conservation under the Northern Cape Nature Conservation Act (NCNCA), Act 9 of 2009 (if affected).

6.1 HERITAGE

The possible impact on heritage resources (archaeological and palaeontological) has been identified as a possible environmental impact as a result of the proposed construction of the residential development and associated infrastructure. A Heritage Impact Assessment has been conducted as part of this application and has been appended as **Appendix 6B**.

The terms of reference for the heritage and archaeological study are as follows:

- The identification and mapping of all heritage resources in the area affected;
- An assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- An assessment of the impact of the development on heritage resources;
- An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- Plans for mitigation of any adverse effects during and after completion of the proposed development.

Also, the HIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications, and expertise of the person who prepared the report; and a statement of competency.

[11] McDonald, R.I., Mansur, A.V., Ascensão, F., Crossman, K., Elmqvist, T., Gonzalez, A., Güneralp, B., Haase, D., Hamann, M., Hillel, O. and Huang, K., 2020. Research gaps in knowledge of the impact of urban growth on biodiversity. *Nature Sustainability*, 3(1), pp.16-24.

[12] Razafindratsima, O.H., Brown, K.A., Carvalho, F., Johnson, S.E., Wright, P.C. and Dunham, A.E., 2018. Edge effects on components of diversity and above-ground biomass in a tropical rainforest. *Journal of Applied Ecology*, 55(2), pp.977-985.

6.2 FRESHWATER ASSESSMENT

Freshwater ecosystems were identified on desktop analysis as well as during the initial site visit, and due to the size and nature of the development and the unknown source of standing water within the development site, a Freshwater Impact Assessment was conducted and has been appended as **Appendix 6C**. Any potential impacts to the Orange River were also investigated.

The terms of reference for the Freshwater assessment are as follows:

- Literature review and assessment of existing information
- Site Assessment of the proposed activities and impact on the associated freshwater systems. This will include an assessment of the freshwater ecological condition, using river health indices such as in-stream and riparian habitat integrity, aquatic macro-invertebrates and riparian vegetation to determine set back lines and geomorphological condition of the streams, which will then determine the overall Ecostatus of the streams and provide data that will inform the Water Use Licence Application of the project.
- Describe ecological characteristics of freshwater systems and compile report based on the data and information collected in the previous two tasks, describe ecological characteristics of the freshwater systems, comment on the conservation value and importance of the freshwater systems and delineate the outer boundary of the riparian zones/riverine corridors.
- Evaluate the freshwater issues on the site and propose mitigation measures and measures for the rehabilitation of the site as well as setback lines for future development.
- Compilation of the documentation for submission of the water use authorisation application (WULA) to the Department of Water and Sanitation (if deemed necessary).

6.3 GEO-TECHNICAL ASSESSMENT

A Geo-technical assessment was required to provide information related to the geology, soil types, soil potential, soil stability, subsoil structure, suitability of the area to support the proposed structures and recommendation for foundations. Thus, a Geo-technical assessment was conducted and has been appended as **Appendix 6D**.

6.4 VISUAL IMPACT

The potential impact on the sense of place of the proposed residential development has also been considered. However, due to the nature of the activity (i.e. housing development), the surrounding land-uses, and the proximity to other existing residential area (namely the existing Blaauwskop Settlement), and that the sense of place is not expected to be significantly altered by the proposed residential development, no further studies were conducted.

6.5 OTHER ISSUES AND IMPACTS

The proposed Blaauwskop Housing Development may have the following additional impacts:

6.5.1 ENERGY REQUIREMENTS

Construction energy requirements:

The proposed development involves the construction of approximately 500 erven. Subsequently, the initial energy requirements of the project will basically be limited to the use of small power tools, plant such as mixers etc. typically to be powered by portable on-site generators.

6.1.1 WATER REQUIREMENTS

Construction water requirements:

Water requirements during the construction phase are unknown at this stage, but it is estimated that a maximum amount in the order of 100 - 150 kiloliter per day will be required for construction purposes, depending on phasing of construction.

Operational phase water requirements:

According to Civil Services Report (**Appendix 4B**), the Total Future Demand for the Blaauwskop Development would be 350m^3 / day.

6.1.1 NATURE AND QUANTITY OF RAW MATERIALS

This project comprises the construction of approximately 500 residential and other structures. Subsequently several thousands of cubic meters of crushed stone, sand and cement will be utilized together with reinforcing steel, wood and other material used in the construction of residential units, schools, businesses etc, as input materials during construction. Exact quantities can only be determined once detailed designs of the structures have been completed. This development is not expected to utilize any raw materials during the operational phase, besides water usage.

6.1.1 WASTE TYPES, QUANTITIES AND DISPOSAL METHODS

Construction Phase

It is envisaged that very little building rubble and waste will be generated during construction. Typically, losses of raw materials due to transport, stockpiling on site and conveyance losses amount to approximately 5% of the volumes required. It is not known how much solid waste will be generated during the construction period. This waste will however typically be builder's rubble, concrete debris, timber from used shutters, etc. The waste will be stockpiled on site and periodically disposed of at the nearest licensed landfill site by the contractor. The large amounts of litter presently on site will also need to be consolidated, removed from site, and disposed of at the nearest approved municipal waste disposal site (Kakamas – **Appendix 4B**).

Operational Phase

As per the Civil Services Report (**Appendix 4B**), a small transfer facility will be required. Until this facility is established, all solid waste must be transported to the site in Kakamas (nearest registered facility).

6.1.2 EMPLOYMENT OPPORTUNITIES

Please refer to Section 5.7 and Table 1 for the anticipated employment opportunities expected from the proposed development.

9. SPECIALIST STUDIES

Based on the issues raised by the I&APs and the project team, specialist studies were undertaken to provide information to address the concerns and assess the impacts of the proposed development alternatives on the environment. The specialists were provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

7.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989.

These criteria include:

- **Nature of the impact**
  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
  Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
  The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
  The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
  The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**
  The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.
- **Accumulative impact**
  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

- **Degree of confidence in predictions**
  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialist was required to assess the potential impacts in terms of the following significance criteria:

- **No significance**: the impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: the impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should at least include the following sections:

- Executive Summary
- Introduction and Description of Study
- Methodology
- Results
- Assessment of Impacts (including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Discussion
- Recommendations (Pre-Construction, Construction and Operational Phases)
- Conclusion

9.2 BRIEFS FOR SPECIALIST STUDIES UNDERTAKEN AS PARTOF THE EIA

9.2.1 BOTANICAL ASSESSMENT

Peet Botes (PB Consult) was appointed and undertook the Botanical Assessment on the proposed site – **Appendix 6A**.

The terms of reference for this study include the following:

- Evaluate the proposed site(s) in order to determine whether any significant botanical features will be impacted as a result of the proposed development.
- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require “search & rescue” intervention.
- Locate and record sensitive areas from a botanical perspective within the proposed development footprint that may be interpreted as obstacles to the proposed development.
- Make recommendations on impact minimization should it be required

- Consider short- to long-term implications of impacts on biodiversity and highlight irreversible impacts or irreplaceable loss of species.

9.2.2 HERITAGE IMPACT ASSESSMENT

Jan Engelbrecht of the Ubique Heritage Consultants was appointed to compile the Heritage Impact Assessment (HIA) – **Appendix 6B**.

The terms of reference for the heritage impact study were:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

Also, the HIA must comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency, as well the National Heritage Resources Act 25 of 1999 (NHRA).

9.2.3 FRESHWATER ASSESSMENT

Dr Dirk van Driel (Watsan Africa) was appointed and conducted the Freshwater Assessment for the proposed development – **Appendix 6C**.

The terms of reference for the Freshwater assessment are as follows:

- Literature review and assessment of existing information
- Site Assessment of the proposed activities and impact on the associated freshwater systems. This will include an assessment of the freshwater ecological condition, using river health indices such as in-stream and riparian habitat integrity, aquatic macro-invertebrates and riparian vegetation to determine set back lines and geomorphological condition of the streams, which will then determine the overall Ecostatus of the streams and provide data that will inform the Water Use Licence Application of the project.
- Describe ecological characteristics of freshwater systems and compile report based on the data and information collected in the previous two tasks, describe ecological characteristics of the freshwater systems, comment on the conservation value and importance of the freshwater systems and delineate the outer boundary of the riparian zones/riverine corridors.
- Evaluate the freshwater issues on the site and propose mitigation measures and measures for the rehabilitation of the site as well as setback lines for future development.
- Compilation of the documentation for submission of the water use authorisation application (WULA) to the Department of Water and Sanitation (if deemed necessary).

9.2.4 GEO-TECHNICAL ASSESSMENT

Cedar Land Geotechnical Consult (Pty) Ltd were appointed to conduct a Phase One Geo-technical Assessment of the proposed site - **Appendix 6D**. The primary objective of this study was to provide information related to the soil types, soil potential, soil stability, subsoil structure, suitability of the area to support the proposed structures and recommendation for foundations. This information will primarily be used by the engineer during the construction phase.

10. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in Section 8 were undertaken to determine significance of the impacts that may arise from the proposed development. The findings of the specialist studies are summarised here. Full copies of the studies are included in **Appendices 6A – 6D**.

The following specialist studies were undertaken:

10.1 BOTANICAL ASSESSMENT

Mr. Peet Botes (PB Consult) was appointed and undertook the Botanical Assessment on the proposed site – The Botanical Impact Assessment is included as **Appendix 6A**.

10.1.1 KEY FINDINGS

The proposed development footprint is located within the Bushmanland Arid Grassland (Figure 12), a vegetation type classified as *Least Threatened (LT)* as per the National list of ecosystems that are threatened and in need of protection (GN. 1002 of 9 Dec. 2011). Ecosystem types classified as Least Threatened are not considered to be of conservation concern. According to the 2016 Northern Cape CBA map, the proposed development footprint is located within a Critical Biodiversity Area (CBA) (Figure 13). Unfortunately, there are no logical alternative sites available to the Kai !Garib Municipality, which will not impact on the CBA. Moreover, the development of the proposed site will not significantly impact any recognized centre of endemism.

As per the Botanical Assessment (**Appendix 6A**), plant species diversity was very low and most of the veld had been impacted by environmental conditions, namely the prolonged drought which has resulted in the plants desiccating and reducing the vegetation to a dried version of the Bushmanland Arid Grassland. The proposed activity is expected to permanently transform approximately 35ha of land where the remaining portion of land has previously been disturbed / transformed due to informal settling. The areas (and its immediate surroundings) had been cleared of vegetation in the areas already settled, where only a limited number of hardy, indigenous plant species (e.g. *Tetraena decumbens* and *Senegalia mellifera*) and the alien invader *Prosopis* spp. Are present.

The most significant botanical aspect of this site is the presence of two nationally protected trees namely *Vachellia erioloba* and *Boscia albitrunca*) which are protected under the NFA (Table 9), as well as four (4) plant species (*Aloe claviflora, Aloe gariepensis, Boscia albitrynca*, and *Boscia foetida*), protected under the NCNCA (Table 10). The drainage lines, present within the development footprint, were usually associated with dense vegetation dominated by *Senegalia mellifera*, as well as *Boscia foetida*, *Boscia albitrunca*, *Parkinsonia africana Phaeoptilum spinosum*, *Ziziphus mucronate,* and *Vachellia erioloba*.

Table 9. Location of protected tree species in terms of the National Forest Act. Source: Appendix 6A.

NO.	SPECIES NAME	COMMENTS	RECOMMENDATIONS
098 V erio	*Vachellia erioloba* S28° 40' 09.4" E21° 06' 23.3"	Medium sized tree (1.5 m tall) in good condit ion	To be protected A NFA permit required for removal.
098	*Boscia albitrunca* S28° 40' 09.4" E21° 06' 23.3"	Small shrub 0.4 m in height (poor condition).	To be protected A NFA & NCNCA permit required for removal.
101 B albi	*Boscia albitrunca* S28° 40' 13.7" E21° 06' 09.8"	Tree (2 m tall) in relative good condition.	To be protected A NFA & NCNCA permit required for removal.
102 V erio	*Vachellia erioloba* S28° 40' 04.9" E21° 06' 03.0"	Beautiful tree (5-6 m tall) in good condition.	To be protected A NFA permit required for removal.
106 V erio	*Vachellia erioloba* S28° 40' 14.4" E21° 06' 03.1"	Beautiful tree (6 m tall) in good condition.	To be protected A NFA permit required for removal.
107 V erio	*Vachellia erioloba* S28° 40' 14.5" E21° 06' 01.7"	Beautiful tree (7-8 m tall) in good condition.	To be protected A NFA permit required for removal.

Table 10. Protected plant species in terms of the NCNCA and proposed recommendations. Source: Appendix 6A.

NO.	SPECIES NAME	COMMENTS	RECOMMENDATIONS
1.	*Aloe claviflora* **Schedule 2 protected**		Very common plant in this area. Protection through topsoil conservation.
2.	*Aloe gariepensis* **Schedule 2 protected**		A small number of plants observed, forming a patch to the west of the westernmost drainage line on the property. Unlikely to be impacted by the current draft layout proposals.
3.	*Boscia albitrunca* **Schedule 2 protected**		Refer to Table 2.
4.	*Boscia foetida* **Schedule 2 protected**	About 5 individuals observed, mostly small shrubs next to the drainage lines	By protecting the drainage lines (water courses) with a small corridor next to drainage lines almost all of the individuals will be protected as well.

10.1.2 IMPACT ASSESSMENT

Direct impacts

According to the Botanical Impact Assessment (**Appendix 6A**), the main impacts associated with the proposed development will be:

- The transformation of approximately 35 ha of indigenous vegetation within a proposed CBA; and
- The potential impact on nationally and provincially protected plant species, in terms of the NFA and NCNCA, respectively.

As the proposed site for development is in a degraded status, the cumulative impact is expected to be **Medium-Low**, but this can be reduced to **Low** by mitigation.

10.1.3 MITIGATION MEASURES

The following mitigation measures are recommended by the Botanical Impact Assessment:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies.
- Before any work is done protected tree species must be marked and demarcated. If any of these species are to be removed, the appropriate permits approvals must first be obtained.
- Lay-down areas or construction sites must be located within the construction footprint.
- No clearing of any area outside of the construction footprint may be allowed.
- All waste that had been illegally dumped within the footprint must be removed to a Municipal approved waste disposal site.
- An integrated waste management approach must be implemented during construction.
- Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
- Alien invasive *Prosopis* plants within the footprint (and immediate surroundings) must be removed in a responsible way (to ensure against regrowth).
- The Municipality must ensure that adequate waste and sewerage facilities and or services are established to service this community.

As per the comment received (dated 01 April 2020) from the Department of Agriculture, Forestry, and Fisheries (DEFF), if authorisation is granted for the development, no protected tree may be damaged or disturbed without a valid Forest Act License from the Department of Environment, Forestry and Fisheries. In addition, trees with active bird nest or other significant biodiversity features, may not be damaged or disturbed without a valid Fauna Permit from the provincial Department of Environment and Nature Conservation under the Northern Cape Nature Conservation Act (NCNCA), Act 9 of 2009 (if affected).

10.1.4 CONCLUSION

As per the Botanical Impact Assessment (**Appendix 6A**), with the implementation of the proposed mitigation measures, it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

The Botanical Specialist concluded that *with the available information, it is recommended that the project be approved with the approved mitigation measures.*

10.2 HERITAGE IMPACT ASSESSMENT

Jan Engelbrecht of the Ubique Heritage Consultants was appointed and conducted the Heritage Impact Assessment (HIA) of the proposed site. The HIA is included as **Appendix 6B**.

10.2.1 KEY FINDINGS

As per the Heritage Impact Assessment (**Appendix 6B**), the following key findings were identified;

1. Five (5) occurrences of lithic material (formal tools, predominantly untrimmed flakes, cores, stone working debris, and few scrapers made from the highly utilised banded ironstone formation (BIF)) were recorded and identified within the development footprint (Figure 19). Three (3) incidences of lithic material were recorded and identified outside the proposed development footprint;
2. No (formal or informal) graves were identified;
3. Proposed site for development has a zero palaeontological significance.

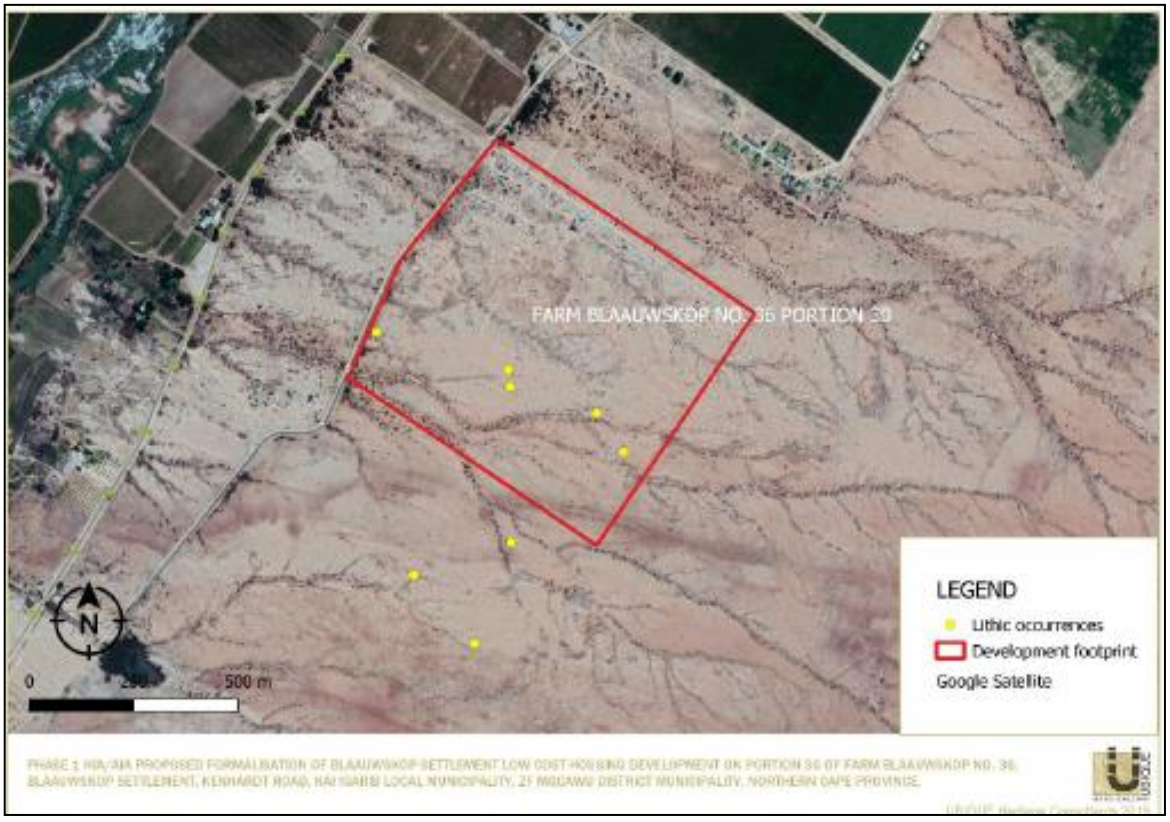


Figure 19. Location of lithic traces associated with the proposed site for the development of the Blaauwskop Housing. Source: Ubique (2020) – **Appendix 6B**.

10.2.2 IMPACT ASSESSMENT

According to the Heritage Impact Assessment (**Appendix 6B**):

- The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. No formal

or informal graves were identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue

- Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).

10.2.3 MITIGATION MEASURES

According to the Heritage Impact Assessment (**Appendix 6B**), based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

- **The lithic traces of low significance**: The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required. The Heritage Specialist recommended that the proposed development can continue;
- **No graveyards were present within the development footprint**: no mitigation is required;
- **Site has a zero palaeontological significance**: no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2018);
- It must be noted that although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.

10.2.4 CONCLUSION

As per the Heritage Impact Assessment (**Appendix 6B**), no significant heritage resources were identified within the proposed development footprint. Moreover, no archaeological, historical or cultural sites, or paleontological resources will be impacted on negatively by the proposed development.

10.3 FRESHWATER ASSESSMENT

Dr Dirk van Driel (Watsan Africa) was appointed and conducted the Freshwater Assessment for the proposed development. The Freshwater Impact Assessment is included as **Appendix 6C**.

10.3.1 KEY FINDINGS

The proposed site is situated within the D73D quaternary catchment. A watercourse (non-perennial drainage line) was located within the development footprint – with existing houses located on the banks, without any buffer zone. The drainage line passes over the irrigation canal where concrete slabs have been previously constructed over the canal at each crossing (preventing stormwater from entering the irrigation canal). The beds associated with the watercourse are dry, sandy, with little vegetation present (where Swarthaak trees (*Senegalia mellifera*) and invasive *Prosopis* trees form the riparian vegetation). Solid waste has been illegally dumped within the watercourse.

The Present Ecological State (PES) of the watercourses were classified as Class D (instream and riparian), indicating that the drainage lines are largely modified with a significant loss of natural habitat, biota, and ecosystem function. The instream and riparian areas associated with the drainage line located outside of the proposed site for development was classified as Class C (Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged) The Ecological Importance (EI) is based on the presence of fish species that are endangered on a local, regional or national level. Due to the non-perennial nature of the watercourse, no fish were present within the in the drainage line and thus, the drainage line is not considered ecologically important. As per the Ecological Sensitivity (ES) of the drainage lines, the Specialist noted that the drainage lines may take numerous years to recover due to the environmental factors associated with the site – namely the site being located within a semi-arid region where re-growth of vegetation may take a lot of time to recover. From this point of view the drainage line can be considered as ecologically sensitive. No other endangered species, either plant or animal, were detected in or near the drainage line.

As per the Freshwater Assessment, biomonitoring was conducted at eleven (11) sampling points along the Lower Orange River, namely Augrabies Lair trust, Groblershoop, Kakamas Triple D, Hopetown Sewer, Hopetown Sewer, Keimoes Housing, Upington Erf 323, Upington Affinity, Styerkraal, Grootdrink Bridge, and Turksvy Dam. These sites were sampled based on elucidating the combined impact of the propose developments on the Orange River, and was carried out according to Dickens and Graham, (2002). The PES of the Orange River (for both riparian and instream zones) was categorized as Class C (Moderately modified - a loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged), and is an Ecologically Important system (as classified by the Freshwater Specialist). Furthermore, the Orange River is Ecologically Sensitive.

Instream	Score	Weight	Product	Maximum score
Water abstraction	24	14	336	350
Flow modification	13	13	169	325
Bed modification	14	13	182	325
Channel modification	15	13	195	325
Water quality	16	14	224	350
Inundation	14	10	140	250
Exotic macrophytes	20	9	180	225
Exotic fauna	12	8	96	200
Solid waste disposal	10	6	60	150
Total		100	1402	2500
% of total			56.1	
Class			D	
Riparian				
Water abstraction	24	13	312	325
Inundation	14	11	154	275
Flow modification	13	12	156	300
Water quality	16	13	208	325
Indigenous vegetation removal	14	13	182	325
Exotic vegetation encroachment	20	12	240	300
Bank erosion	20	14	280	350
Channel modification	15	12	180	300
Total			1142	2500
% of total			45.7	
Class			D	

Figure 20. Present Ecological State (PES) of Sub-Catchments 1, 2, and 3 where drainage lines present within sub-catchments 2 and 3 traverse the proposed site for development (Freshwater Impact Assessment – Appendix 6C).

Instream	Score	Weight	Product	Maximum score
Water abstraction	24	14	336	350
Flow modification	23	13	299	325
Bed modification	22	13	286	325
Channel modification	21	13	273	325
Water quality	20	14	280	350
Inundation	21	10	210	250
Exotic macrophytes	20	9	180	225
Exotic fauna	18	8	144	200
Solid waste disposal	20	6	120	150
Total		100	1958	2500
% of total			78.3	
Class			C	
Riparian				
Water abstraction	24	13	312	325
Inundation	21	11	143	275
Flow modification	23	12	144	300
Water quality	20	13	195	325
Indigenous vegetation removal	19	13	156	325
Exotic vegetation encroachment	20	12	252	300
Bank erosion	22	14	266	350
Channel modification	21	12	168	300
Total			1636	2500
% of total			65.4	
Class			C	

Figure 21. Present Ecological State (PES) of Sub-Catchment 4 (Freshwater Impact Assessment – Appendix 6C). It must be noted that drainage line associated with sub-catchment 4 lies outside the proposed site for development.

10.3.2 IMPACT ASSESSMENT

According to the Freshwater Assessment (**Appendix 6C**), main impacts associated with the proposed development on the freshwater features includes (i) the destruction of drainage lines (**Medium significance**), and (ii) solid waste and sewage, generated during the operational phase, entering the drainage lines and Orange River (**Medium Impact**). These impacts can be reduced to a **Low** impact should the proposed mitigation measures be implemented.

10.3.3 MITIGATION MEASURES

The following mitigation measures, as per the Freshwater Impact Assessment (**Appendix 6C**) must be implemented. These measures include (i) construction taking place during the dry season, limiting the construction footprint, maintaining an adequate buffer zone, connecting drainage lines to stormwater infrastructure over the irrigation canal, and (ii) the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility and associated infrastructure. As per the Resource Economic Footprint, the drainage line associated with the proposed site, has a small economic footprint where the loss of the drainage line will not represent a mentionable loss of environmental goods and services.

10.3.4 CONCLUSION

According to the Freshwater Impact Assessment (**Appendix 6C**), the Specialist stated that the current solid waste and sewage issues associated with the proposed site are threats to the WUA. Proposed mitigation measure to address this issue includes the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility. Due to the Low Impact (with the implementation of the proposed mitigation measures), the Specialist stated that a General Authorisation would be in order. The authorities may insist that these issues be resolved before a General Authorization is approved.

10.4 GEO-TECHNICAL ASSESSMENT

Cedar Land Geotechnical Consult (Pty) Ltd were appointed to undertake the Geo-technical Assessment as part of the EIA process, and is included as **Appendix 6D**.

10.4.1 KEY FINDINGS

According to the Geo-technical Assessment, the proposed site for development was regarded as being of favourable to poor suitability for residential development due to;

- Presence of batholitic outcrops and large corestones close to the surface (resulting in hard and boulder excavation);
- Ponding of areas in close proximity to the canal (which occurs due to the canal blocking the natural flow of the non-perennial watercourse as well as leakages from the canal itself); and
- Residual soils and calcrete are highly corrosive – especially problematic for Geotechnical Zone III.

Founding conditions were designated as R and S (should remedial actions be implemented). The following are the main conclusions that have been made:

- **Geology:**

The site for the proposed development is located between the lithology of the Kaapvaal Craton and Namaqua-Natal mobile belt where the remaining, original geology is comprised of Kakamas Terrane (located on the Kanoneiland granite of the Keimos Suite). Granite is dark grey, speckled white rock with a high biotite content.

- **Soil Profile**:

The soil profile of the site is comprised of colluvium (surface horizon between 100 – 600mm thick, consisting of pale light brown fine sands to coarse sand with contents of gravels and granite cobbles), alluvium (horizon extends between 300 – 1300mm thick, distribution is limited to debris deposited by the non-perennial watercourses coardering the canal), residual granite (occurs between depths of 100 – 1300mm thick but extends to a thickness of 1900mm, residual granite varied between dense and very dense consistency), pedogenic deposits [comprised of nodular calcrete (underlying transported surface deposits, present between 0 – 500mm depth where consistency varied between medium dense to very dense), and unconsolidated calcrete (underlies transported surface deposits, occurring between 300 – 900mm depth with a medium dense consistency)].

- **Hydrology:**

No perched groundwater was encountered on site during the geotechnical investigation and was stated that perched water is not likely to generally occur in this area. Groundwater is expected to occur at depths between 20 to 30m in fractures restricted to zone directly located below the water table. The presence of permanent water does not impact the geotechnical conditions of the site. Five (5) shallow, non-perennial gully areas were identified during the site investigation. Although these gullies are not subject to continuous flooding, flooding events may damage infrastructure not suitably designed for this purpose. Should erven be proposed within areas within Geotechnical Zone III, these areas must be rehabilitated (e.g. repairing leakages in the canal, provision of sufficient channelling) to allow safe development.

- **Geotechnical Classification:**

The site is divided into four separate geotechnical zones. No steep slopes were present on the property where the average slope range between 1.5 – 2.5% (but was highly variable in Geotechnical Zone IV). Overall, the slope of the land does not detract from the area's suitability for residential development.

Geotechnical Zone I

Zone classed as S (regarded as compressible to a maximum of 10mm) comprises 82.5% of the total site. The combined thickness of the strata (nodular calcrete and residual soil) will sufficiently dissipate stresses induced by the foundations. Slope across the site ranges between 1.7 – 2.2%. More than one founding design alternative has been provided (refer to Appendix 6D), where the proposed founding design can be based on financial constraints.

Geotechnical Zone II

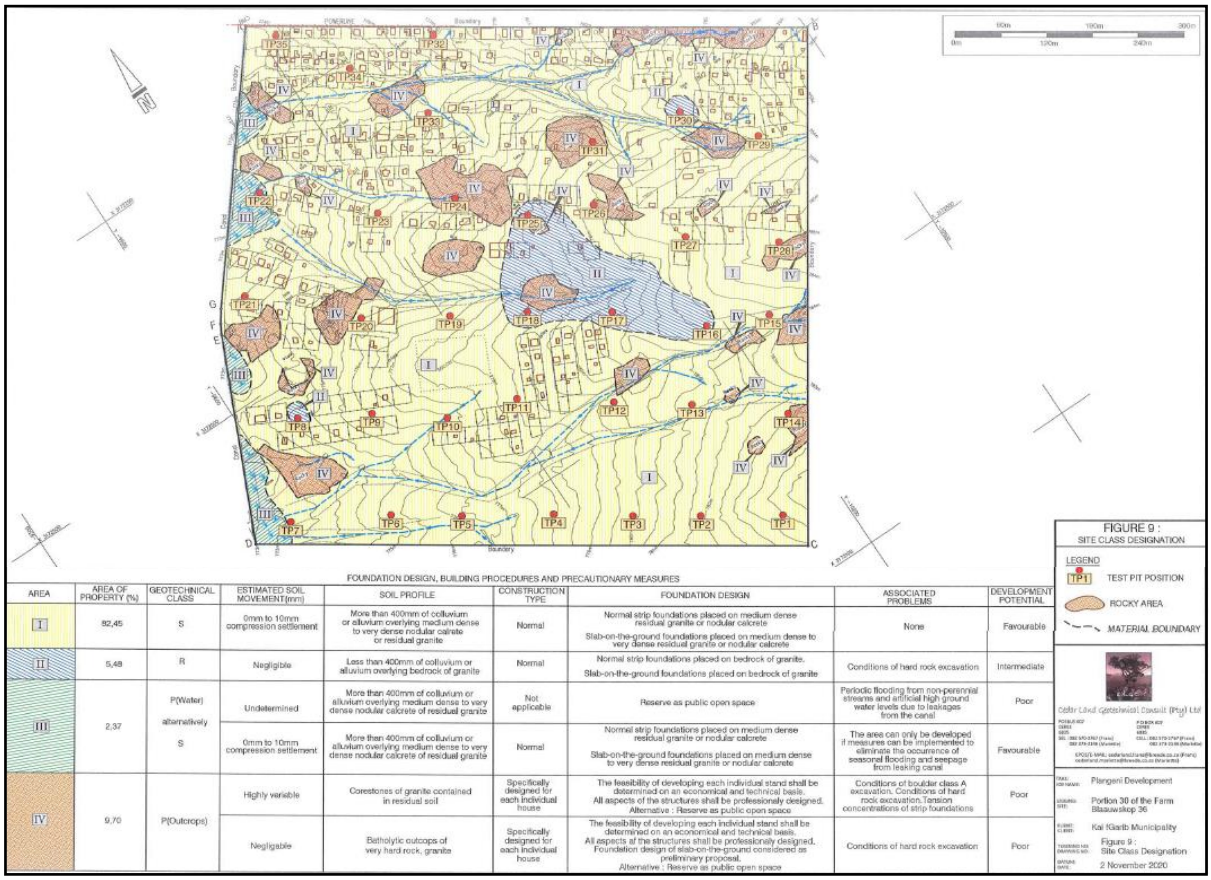
Zone classed as R (founding is stable and expected soil movement is negligible) comprises 5.4% of the total site. Slope is less than 2.5%. More than one founding design alternative has been provided (refer to Appendix 6D), where the proposed founding design can be based on financial constraints.

Geotechnical Zone III

Zone classed as S (regarded as compressible to a maximum of 10mm if the inundation of the area is resolved) comprises 2.4% of the total site. Slope across this zone is between 1.5 – 2%. The combined thickness of the strata (nodular calcrete and residual soil) will sufficiently dissipate stresses induced by the foundations. It must be noted that the presence of water (ponding of areas) and seepage from the canal may result in damage to the structures due to the corrosivity of the soil. Should the geotechnical condition of this particular zone be unresolved, the zone will be classed as P (Water) – where conditions associated with this classification are unfavourable for residential development. Development can only take place if remediation activities, with regards to flooding of the area, are implemented.

Geotechnical Zone IV

Zone was classed as P (Outcrops) due to the presence of boulders and outcrops which reduce the classification and detracts from the suitability of the site for residential development. This zone comprises of 9.7% of the total site. Building within this zone may be costly due to the required hard excavation and boulder excavation. It was recommended that this zone only be developed should the demand for houses exceed the availability of stands present in Geotechnical Zones I and II.



FOUNDATION DESIGN, BUILDING PROCEDURES AND PRECAUTIONARY MEASURES

AREA	AREA OF PROPERTY (%)	GEOTECHNICAL CLASS	ESTIMATED SOIL MOVEMENT(mm)	SOIL PROFILE	CONSTRUCTION TYPE	FOUNDATION DESIGN	ASSOCIATED PROBLEMS	DEVELOPMENT POTENTIAL
I	82,45	S	0mm to 10mm compression settlement	More than 400mm of colluvium or alluvium overlying medium dense to very dense nodular calrete or residual granite	Normal	Normal strip foundations placed on medium dense residual granite or nodular calcrete Slab-on-the-ground foundations placed on medium dense to very dense residual granite or nodular calcrete	None	Favourable
II	5,48	R	Negligible	Less than 400mm of colluvium or alluvium overlying bedrock of granite	Normal	Normal strip foundations placed on bedrock of granite. Slab-on-the-ground foundations placed on bedrock of granite	Conditions of hard rock excavation	Intermediate
III	2,37	P(Water) alternatively S	Undetermined	More than 400mm of colluvium or alluvium overlying medium dense to very dense nodular calcrete of residual granite	Not applicable	Reserve as public open space	Periodic flooding from non-perennial streams and artificial high ground water levels due to leakages from the canal	Poor
			0mm to 10mm compression settlement	More than 400mm of colluvium or alluvium overlying medium dense to very dense nodular calcrete of residual granite	Normal	Normal strip foundations placed on medium dense residual granite or nodular calcrete Slab-on-the-ground foundations placed on medium dense to very dense residual granite or nodular calcrete	The area can only be developed if measures can be implemented to eliminate the occurrence of seasonal flooding and seepage from leaking canal	Favourable
IV	9,70	P(Outcrops)	Highly variable	Corestones of granite contained in residual soil	Specifically designed for each individual house	The feasibility of developing each individual stand shall be determined on an economical and technical basis. All aspects of the structures shall be professionally designed. Alternative : Reserve as public open space	Conditions of boulder class A excavation, Conditions of hard rock excavation,Tension concentrations of strip foundations	Poor
			Negligable	Batholytic outcops of very hard rock, granite	Specifically designed for each individual house	The feasibility of developing each individual stand shall be determined on an economical and technical basis. All aspects of the structures shall be professionally designed. Foundation design of slab-on-the-ground considered as preliminary proposal. Alternative : Reserve as public open space	Conditions of hard rock excavation	Poor

Figure 22. Geotechnical conditions relative to the Geotechnical Zones (I, II, III, and IV). Source: Geotechnical Investigation (Appendix 6D).

10.4.2 RECOMMENDATIONS

Please refer to Appendix 6D, section 10 (page 31 – 36) for founding design alternatives. In terms of general measures, the following recommendations were made:

- **Undermining**: area is not subject to undermining;
- **Seismicity**: a low risk for the development of earth tremors therefore exists due to the peak ground acceleration expected in 50 years is 0.07g.
- **Dolomite:** area of investigation is not subject to any restrictions due to the presence of dolomite.
- **Trench backfill:** none of the materials are suitable for selected fill or pipe bedding however, all materials can be used for normal backfill.
- **Founding**: The development must take place according to the SANS 10400H and NHBRC Home Owner's Manual Guidelines (published in 2015).
- **Layer works:** Residual soils are suitable for the construction of *in situ* selected (and sub-base) for lightly trafficked streets;
- **Wearing course for gravel roads**: no material, present on site, is 100% suitable for gravel wearing course.
- **Soil Corrosivity:** *In situ* soils and pedocretes are highly corrosive due to the high soluble salt content;
- **Excavation conditions:** Manual excavation is possible for colluvium and alluvium (and through residual soil but to a lesser degree). Due to the consistency and composition of the soil present on site, manual excavation is not economically viable. Excavation of soils would require a TLB (rated at 55kW minimum) or a 30 ton excavator will be required for the excavation of the very dense pedocretes and granite which need to be removed. Adequate provision for hard rock and boulder class A excavations were recommended as well as provision for excavation in wet conditions be made for Geotechnical Zone III.

7. SUMMARY OF IMPACTS

Please refer to Appendix 7 for a summary of the project impact assessment and significance, including a summary of mitigation measures.

Table 5 is a summary of all the impacts assessed in the specialists reports that are associated with the construction and operational phase for the preferred alternative.

Table 11. Summary of all impacts

Study	Impact	Significance No Mitigation	Significance With Mitigation
Botanical	**Geology & soils**: Potential impact on special habitats	Insignificant (Negative impact)	Insignificant (Negative impact)
	Land-use and cover: Potential impact on socio-economic activities.	Insignificant (Negative impact)	Insignificant (Negative impact)
	Vegetation status: Loss of vulnerable or endangered vegetation and associated habitat.	Insignificant (Negative impact)	Insignificant (Negative impact)
	Conservation priority: Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	Low (Negative impact)	Insignificant (Negative impact))
	Connectivity: Potential loss of ecological migration corridors.	Insignificant (Negative impact)	Insignificant (Negative impact)
	Protected & endangered plant species: Potential impact on threatened or protected plant species.	Low (Negative impact)	Insignificant (Negative impact))
	Invasive alien plant species: Potential invasive plant infestation as a result of the activities.	Low (Negative impact)	Insignificant (Negative impact))
	Veld fire risk: Potential risk of veld fires as a result of the activities.	Insignificant (Negative impact)	Insignificant (Negative impact)
	Cumulative impacts: Cumulative impact associated with proposed activity.	Low (Negative impact)	Insignificant (Negative impact))
	The "No-Go" option: Potential impact associated with the No-Go alternative.	Low (Negative impact)	No Impact
Heritage	Five traces of lithic occurrences across the development footprint.	Low (No mitigation required)	

	No (formal or informal) graveyard was present within the development footprint.	Low (No mitigation required)	
Palaeontology	Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required.	N/A	N/A
Freshwater	**Impact on Freshwater Resources** – Construction phase. Destruction of drainage lines	Medium (Negative impact)	Low (Negative impact)
	Operational phase. Litter and sewage into the drainage lines and Orange River	Medium (Negative impact)	Low (Negative impact)
Socio-economic	Job Creation – Construction phase	Medium (Positive impact)	Medium (Positive impact)
Visual	Potential visual impact on the area	Low (Negative impact)	Low (Negative impact)
Dust	Potential impact of dust from construction activities	Low (Positive impact)	Low (Positive impact)

8. RECOMMENDATIONS

The following mitigation measures must be enforced if the proposed development were approved. These are also included in the Environmental Management Programme, EMPr (**Appendix 9**).

Construction Phase:
According to the Specialist Reports (**Appendix 6A-6C**), the following mitigation actions are recommended:

Botanical Component (Appendix 6A)
All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.

The following mitigation measures are recommended by the Botanical Impact Assessment:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies.
- Before any work is done protected tree species must be marked and demarcated. If any of these species are to be removed, the appropriate permits approvals must first be obtained.
- Lay-down areas or construction sites must be located within the construction footprint.
- No clearing of any area outside of the construction footprint may be allowed.
- All waste that had been illegally dumped within the footprint must be removed to a Municipal approved waste disposal site.
- An integrated waste management approach must be implemented during construction.
- Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
- Alien invasive *Prosopis* plants within the footprint (and immediate surroundings) must be removed in a responsible way (to ensure against regrowth).
- The Municipality must ensure that adequate waste and sewerage facilities and or services are established to service this community.

Heritage Component (Appendix 6B)

- **The lithic traces of low significance**: The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required. The Heritage Specialist recommended that the proposed development can continue;
- **No graveyards were present within the development footprint**: no mitigation is required;
- **Site has a zero palaeontological significance**: no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2018);
- It must be noted that although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-

surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.

Freshwater Component (Appendix 6C)

The following mitigation measures, as per the Freshwater Impact Assessment (**Appendix 6C**) must be implemented. These measures include (i) construction taking place during the dry season, limiting the construction footprint, maintaining an adequate buffer zone, connecting drainage lines to stormwater infrastructure over the irrigation canal, and (ii) the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility and associated infrastructure. As per the Resource Economic Footprint, the drainage line associated with the proposed site, has a small economic footprint where the loss of the drainage line will not represent a mentionable loss of environmental goods and services.

Operational Phase:
As per the Specialist Reports (**Appendix 6A-C**) and the Civil Services Report (**Appendix 4B**), sewage and solid waste management remains a key issue. One of the crucial aims of an EIA is to ensure that the demands of sustainable development (defined as development which meets the needs of the current generation without compromising the ability of future generations to meet their own needs[1]) are met on the project level as well as within the context of the greater area. Therefore, as per the Specialists, a waste management plan must be compiled and implemented to reduce impacts related to such anthropogenic activities.

Geotechnical Component (Appendix 6D)
Please refer to Appendix 6D, section 10 (page 31 – 36) for founding design alternatives. In terms of general measures, the following recommendations were made:

- **Undermining**: area is not subject to undermining;
- **Seismicity**: a low risk for the development of earth tremors therefore exists due to the peak ground acceleration expected in 50 years is 0.07g.
- **Dolomite:** area of investigation is not subject to any restrictions due to the presence of dolomite.
- **Trench backfill:** none of the materials are suitable for selected fill or pipe bedding however, all materials can be used for normal backfill.
- **Founding**: The development must take place according to the SANS 10400H and NHBRC Home Owner's Manual Guidelines (published in 2015).
- **Layer works:** Residual soils are suitable for the construction of *in situ* selected (and sub-base) for lightly trafficked streets;
- **Wearing course for gravel roads**: no material, present on site, is 100% suitable for gravel wearing course.

- **Soil Corrosivity:** *In situ* soils and pedocretes are highly corrosive due to the high soluble salt content;
- **Excavation conditions:** Manual excavation is possible for colluvium and alluvium (and through residual soil but to a lesser degree). Due to the consistency and composition of the soil present on site, manual excavation is not economically viable. Excavation of soils would require a TLB (rated at 55kW minimum) or a 30 ton excavator will be required for the excavation of the very dense pedocretes and granite which need to be removed. Adequate provision for hard rock and boulder class A excavations were recommended as well as provision for excavation in wet conditions be made for Geotechnical Zone III.

9. CONCLUSIONS

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- Botanical Impact Assessment (**Appendix 6A**)
- Heritage Impact Assessment (**Appendix 6B**)
- Freshwater Assessment (**Appendix 6C**)
- Geo-technical Assessment (**Appendix 6D**)

The specialist studies and the information provided within the EIA Report, indicates that the proposed Blaauwskop (Plangeni) Housing development does not pose any significant impacts should the proposed mitigation measures be implemented. However, as per the specialist assessments, site visits, and comments received from registered I&APs, solid waste and sewage management remain a key issue which must be addressed with the implementation of a proper waste management plan. The proposed project will increase the pressure placed on existing municipal services and therefore, if a waste management plan is not effectively implemented, the current lack of sewage and solid waste management may negatively impact the environment and socioeconomic development in the Blaauwskop area.

According to the Botanical Specialist (Appendix 6A), the proposed development will have a low impact, should mitigation measures be implemented. The Specialist stated that "*with the available information, it is recommended that the project be approved with the approved mitigation measures*". According to the Heritage Impact Assessment (Appendix 6B), no significant heritage resources will be impacted and thus, the proposed development can continue. From a paleontological aspect, the site has zero palaeontological significance and thus, no further palaeontological studies, ground truthing, and / or specialist mitigation are required and that the project be exempt from a full Paleontological Impact Assessment (Butler 2019). According to the Freshwater Assessment (Appendix 6C), the main impacts associated with the proposed development on the freshwater features includes (i) the destruction of drainage lines (Medium significance), and (ii) solid waste and sewage, generated during the operational phase, entering the drainage lines and Orange River (Medium Impact). These impacts can be reduced to a Low impact should the proposed mitigation measures be implemented. These measures include (i) construction taking place during the dry season, limiting the construction footprint, maintaining an adequate buffer zone, connecting drainage lines to stormwater infrastructure over the irrigation canal, and (ii) the implementation of a waste management plan relative to proper municipal litter and urban waste collection and removal systems and the installation of an adequate wastewater treatment facility and associated infrastructure. According to the Geotechnical Report (Appendix 6D), the proposed site for development was regarded as being of favourable to poor suitability(Geotechnical Zones III and IV – comprising approximately 12.1% of the property).

In terms of the need and desirability of the proposed residential development, housing is a national need, especially in the Kai !Garib Local Municipality. The proposed development represents a significant step towards service delivery and housing objectives within the municipality and within a broader provincial and national context. The development will not only meet the pressing needs of adequate housing within the municipality but will also be in support of the municipal IDP objectives. These objectives include providing housing for the poor, decreasing the Municipality's housing backlog, as well as fulfilling the Constitutional mandate to provide adequate housing and basic services to citizens. The proposed location is considered to be the only viable option. The proposed site is adjacent to the existing residential area of Blaauwskop, allowing accessibility and linking to the existing services infrastructure. The

surrounding land use, namely the existing Blaauwskop settlement, is in line with the proposed development, which is one of the reasons why this location was selected by the local authority for the purposes of this project.

Other than the presence of a watercourse (non-perennial drainage lines) within the proposed site for development, there are no physical characteristics of these properties or environmental constraints which would exclude the site from development. However, as per the Botanical Assessment, numerous nationally and provincially protected plant species are present within the development footprint (Appendix 6A). Moreover, the site is located within a CBA and thus, mitigation measures recommended by the Botanical Specialist must be implemented. Prior to any of these plant species being disturbed, damaged, removed, relocated, or destroyed, a permit from the relevant authority is required and must be applied for.

Considering all the information, it is envisaged that this proposed Blaauwskop Housing Development will have a low negative impact on the environment (after mitigation measures have been implemented). The socio-economic benefits resulting from the proposed development are expected to greatly outweigh any negative impacts, especially when the mitigation measures have been implemented. It be noted that a proper waste management plan, addressing the proposed sewerage disposal infrastructure and solid waste removal, must be added as a condition to the granting of the environmental authorisation. This waste management plan must be implemented to effectively address the expected increase in pressure on existing services, especially regarding the increase in sewage and its adequate and safe disposal.

It is therefore recommended that the proposed Blaauwskop Housing Development (**Alternative 2**) be supported and be authorised with the necessary conditions of approval, subject to the compilation and effective implementation of a waste management plan to address sewage and solid waste management and the implementation of mitigation measures proposed by the Specialists (Appendix 6A-D) and measures included in the EMPr.

10. DETAILS AND EXPERTISE OF THE EAP

Details of Environmental Assessment Practitioner, expertise and Curriculum Vitae

This Draft Environmental Impact Report was Report compiled by Anthony Mader -

Qualifications:
Anthony Mader: BSc, BSc (Hons), PhD (currently completing) at the University of the Witwatersrand, Johannesburg, South Africa.

Expertise:
Anthony has over three years of experience within environmental consulting and has worked on private and government projects throughout the country, including Western Cape, Northern Cape, KwaZulu-Natal, and the Eastern Cape. Anthony has facilitated Environmental (EA) and Water Use (WUA) applications whereas other duties included auditing of various types of construction types to ensure environmental compliance with the EA. The variety of projects Anthony has worked on include, but are not limited to;

- Housing developments;
- Civil engineering infrastructure projects such as water supply schemes, roads, culverts, bridges, warehouses, and a substation; and
- Auditing of water supply schemes, housing developments, warehouses, roads, bridges, and reservoirs

Anthony Mader joined EnviroAfrica CC in March 2020 and is employed as an Environmental Assessment Practitioner (EAP), working on various private and government projects throughout the Western Cape and Northern Cape.

Employment:

Previous employment as an Environmental Consultant	**:**	**EnviroPro Environmental Consultants (2017 – 2020)**
Current employment as Environmental Assessment Practitioner	**:**	**EnviroAfrica cc (2020 – present).**

Report reviewed and supervised by Bernard de Witt – The whole process and report was supervised by Bernard de Witt who has more than 30 years' experience in environmental management and environmental impact assessments. Bernard de Witt: B.Sc. Forestry (Stellenbosch); B.A. (Hons) Public Administration (Stellenbosch); National Diploma in Parks and Recreation Management; EIA Short course (UCT); ISO 14001 Auditors course (SABS)

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