

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT



FOR THE PROPOSED MIXED-USE DEVELOPMENT PROJECT REFERRED TO AS *MOGALE EXT 42, 43 AND 44*: SITUATED ON PORTIONS 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 AND 135 OF THE FARM NOOITGEDACHT 534-JQ, MULDRSDRIFT, MOGALE, GAUTENG PROVINCE.

For *PUBLIC REVIEW*

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

APPLICANT:	Nooitgedacht Land Assembly Members (property owners)
ENVIRONMENTAL CONSULTANT:	Batho Earth Environmental Consulting Primary Author: Diana Verster
GDARD PROJECT REFERENCE:	Gaut 002/20-21/E2623
DATE:	March 2021

PROJECT DETAILS

 <p>Batho Earth <i>Social and Environmental Consultants</i></p>		<p>Title: The proposed mixed-land use development, referred to as Mogale Ext 42, 43 and 44 and situated on Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135 of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province.</p>	
<p>Date: February 2021</p>		<p>Report Status: Draft Environmental Impact Assessment Report and Environmental Management Programme</p>	
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Verification	Capacity	Name	Signature and Date
Author	EAP	Diana Verster	16 March 2021

INVITATION TO COMMENT ON THIS DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The release of this Draft Environmental Impact Assessment (EIA) Report provides stakeholders with the opportunity to ensure that the comments that they have provided thus far have been recorded and adequately considered within this EIA Process. All comments received during the previous 30-day Public Participation Periods (on the Draft Scoping Report) have been considered and taken into account when compiling this Draft Environmental Impact Assessment Report and formulating the development description. *Please also refer specifically to the Comments & Response Table to view the response to each comment received.*

This Draft EIA Report is now available for a 30 days Public Participation Period. All comments received on this Draft EIA Report will be considered when compiling the Final EIA Report and responded to in the Comments and Response Table that will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) for their final decision making.

The Draft EIA Report and EMPr will be available for public review from 18 March 2021 to 23 April 2021

The public, local communities and interested and affected parties (I & AP's) are invited to comment on this Draft EIA Report which is available for download and review (for a 30 day period only) on our website (www.bathoearth.co.za) under the public documents tab.

Hardcopies and / or electronic copies of this Draft EIA document has also been sent to key I & AP's (landowners and Authorities) that have already registered as I & AP's in this EIA Process. If you would like a copy to be posted /e-mailed to you, or if you have any comments on this Draft EIA please submit in writing (post or email) to the following person:

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EXECUTIVE SUMMARY

Introduction

Batho Earth Environmental Consultants has been appointed by the applicant “the Nooitgedacht Land Assembly Members” to undertake the environmental services required for the proposed establishment of a mixed land use development to be situated on Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135 of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province: Referred to as “Mogale Ext 42, 43 and 44 Development”..

The proposed project includes activities that are listed under the Environmental Impact Assessment Regulations (GN R.325 Listed Notice 2) that were promulgated in terms of the National Environmental Management Act (Act 107 of 1998) (‘NEMA’). The presence of these Listed Activities has triggered the need to apply for Environmental Authorisation, subject to an Environmental Impact Assessment Process.

The process was registered for an EIA (Scoping) process with the Gauteng Department of Agriculture and Rural Development (GDARD) under Regulation 982 to 985 as amend by 324 to 327 of the National Environmental Management Act (Act No 107 of 1998) and was assigned the reference number GAUT: 002/20-21/E2623

Project Description:

The study area is located within the jurisdiction of the Mogale City Local Municipality, within the Nooitgedacht Agricultural Holdings area, near Muldersdrift, Gauteng Province.

The site under investigation is situated approximately 360m northwest of the N14 National Highway. The R114 borders the site to the north, while Marina Street traverses through the central portion of the site from north to south. Cosmo City Extension 6 borders the site to the east. Zandspruit is approximately 2km to the north east, and Kya Sands approximately 3km to the south east..

The mixed land-use development will incorporate, residential 3 and 4 zoning, business and commercial uses together with a educational component. Further land uses catered for include roads, and public open space. The proposed development will entail a mixed-use township establishment with the following uses:

Zoning Schedule for Mogale Extension 42.

Erf	Zoning	Maximum density	Area (hectares)	Maximum of units	FAR	Height	Coverage
Erven 1-6	Residential 3	80 dwelling units per hectare	8,9196 ha	714	0,60	3 storeys	40%
Erven 7 - 10	Residential 4	100 dwelling units per hectare	21,5920 ha	2 159	1,80	3 storeys	60%
Erven 11-14	Business 2		5,8488		0,80	2 storeys	60%
Erven 15- 19	Commercial		5,4630	-	0,85	2 storeys	65%

Erven 20 -21	Undetermined		3,1939	-	n/a	n/a	n/a
Erf 22	Educational		5,7032	-	0,20	3 storeys	40%
Erf 23	Special for residential and place of public worship	80 dwelling units per hectare	2,8621	229	0,80	3 storeys	50%
		-		-			
Erven 24-25	Private Open Space		12,4451	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		10,2103				
		Total	63,78ha	3 102			

Zoning Schedule for Mogale Extension 43.

Erf	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7,9	Residential 3	80 dwelling units per hectare	21,5629	1 718	0,60	3 storeys	40%
Erven 8, 11	Business 2		2,36	-	0,80	2 storeys	60%
Erf 10	Undetermined		0,1960	-	n/a	n/a	n/a
Erven 12, 13	Private Open Space		7,3128	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		3,1080				
		Total	27,20 h	1 718			

Zoning Schedule for Mogale Extension 44

Erf #	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7	Commercial		5,4747	-	0,85	3 storeys	65%
Erven 8,9	Undetermined		0,6056	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		2,4850				
		Total	8,5653				

The development will aim to have a total of 4280 houses on the property, together with a large commercial component on all three sites.

Mogale Ext 42 and 43 is affected by a Channelled Valley Bottom Wetland (CVB) System, running through the western portion of the site and draining in a northerly direction. No development will be allowed within this system and its regulated 30m buffer zone. These areas will be zoned Private Open Space.

An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. Portion 93 forms part of Mogale Ext 42 and will be zoned special. No development is currently proposed for this area.

The total size of the development (as per the EIA application) is approximately 100ha, and the development footprint of the proposed activities on site is approximately 99ha.

The proposed layout plan accommodates on site storm water, sufficient open space areas, and affordable service provision, please also refer to **Appendix C and B** for the Site plans.

The Muldersdrift area was previously excluded from the urban edge, with only limited development opportunities available. Since its inclusion in the urban development boundary, the area had seen a marked increase in varied development applications. The type of development occurring throughout the Muldersdrift area differs, depending on the locality and use.

The existence of urban support facilities on directly adjoining properties, the natural expansion of the urban function, with due consideration for environmentally sensitive areas, qualifies the development as infill development / urban expansion within a serviced area.

Overall Findings of Specialist Impact Assessments

Traffic Impact Assessment – Key Findings:

Hamatino Consulting Engineers conducted a Traffic impact assessment for the proposed development. It has been found that:

Access to the applicable development will be provided mainly from three access points from Marina Road (D1410).

The study indicates that, at present, the intersections investigated are operating at unacceptable levels of service. Accordingly, the TIA recommends that Gautrans prioritise the upgrade of the following intersections:

- R114 / Marina Road
- R114 / Malibongwe Drive
- R114 / Beyers Naudé Drive
- Marina Road / Jubilee Road

The combined development is anticipated to generate over 3,000 additional peak hour trips, necessitating substantial upgrade on the following intersections, as outlined in the report:

- R114 / Marina Road

- R114 / Malibongwe Drive
- R114 / Beyers Naudé Drive
- Marina Road / Jubilee Road

Key Impacts Identified:

- All of the analysed intersections are currently (2020) prior to development operating at an un
- Acceptable level of service and need to be upgraded in order to be able to accommodate the existing 2020 background traffic demand prior to development;
- The trip generation of the development is expected to be as follow:
 - 3522 AM trips (1646 in; 1876 out);
 - 3015 PM trips (1637 in; 1379 out);
- All of the analysed intersections are expected to be operating at un-acceptable levels of service after development completion;
- All of the analysed intersections are expected to be operating at an acceptable level of service by the horizon year 2025, provided that the existing intersections be upgraded in accordance with the this report;
- The access arrangements (as per latest township layout plan) does not meet the requirements of access intersection spacing in accordance with TRH 26 (South African Road Classification and Access Management Manual Ver 1.0);
- The site development plan makes no provision for public transportation.

Recommended Mitigation:

- That the development be supported from a traffic engineering point of view;
- That all of the analysed intersections be upgraded in accordance with the Traffic report;
- That the township access localities be incorporated as identified in the traffic impact assessment report in order to better align with road access management principles as well as the latest Mogale Roads Master Plan of the Muldersdrift Area;
- That all of the proposed access intersections be signalised and be designed in accordance with, the traffic assessment report;
- That bus lay by be provide downstream of each of the new access intersections along Marina Street. The above-mentioned bus lay by shall be designed in accordance with the Gautrans standard detail drawings.

Terrestrial faunal and floral Assessment – Key findings

Scientific Terrestrial Services (STS) was appointed to conduct an investigation into the terrestrial faunal and floral ecology as part of the Environmental Impact Assessment (EIA) and Authorisation process.

Floral Key Findings:

- During the field assessment five broad habitat units were identified, i.e. Secondary Grassland, Freshwater Habitat, Rocky Ridge, Woodland and Transformed Habitat. The secondary Grassland Habitat was further subdivided into the Eragrostis Secondary Grassland, and the Degraded Secondary grassland, based on the floral species diversity, and habitat available for floral SCC;
- During the field assessment it was evident that the study area is utilised as agricultural small holdings, with a variety of anthropogenic activities associated with each portion, which has resulted in severe floral habitat degradation and AIP proliferation throughout the study area. The floral species composition between pockets of a single habitat unit did differ in areas due to differences in land uses of each small holding. Habitat units were grouped together based on similarities in attributes such as habitat integrity, floral species diversity, habitat for floral SCC and habitat provided for faunal species, and not on floral species encountered within a habitat unit only;
- Due to habitat degradation of the study area no viable remnant patches considered representative of the original Egoli Granite Grassland as defined by Bredenkamp et al. (2006) were observed. The study area, therefore, with the exception of the freshwater resource, which is excluded from development, holds no developmental constraints for the proposed development; and
- The floral SCC *Boophone disticha* and *Hypoxis hemerocallidea* were however observed throughout the study area, and care should be taken during the construction of the development, not to destroy individuals of these species. Individuals of *Eucomis autumnalis* were also historically planted within an ornamental garden. Where individuals of any floral SCC are situated within the development footprint, they should be rescued and relocated to similar suitable habitat. This process should be overseen by a suitable qualified specialist. An individual of the protected tree *Podocarpus henkelii* was also planted within the woodland habitat. This species is protected within the NFA (1998, updated 2001), and destruction/ removal/ relocation of this individual will require a permit from the DAFF.

Habitat Sensitivity:

From an ecological perspective, habitat sensitivities range from intermediate to low sensitivities. The impact of the proposed development on the floral habitat and diversity is considered to be of medium low to low significance for all impacts during all phases of the development prior to the implementation of mitigation. With mitigation fully implemented, with emphasis on the rescue and relocation of floral SCC, all impacts can be reduced to low and very low significance.

Faunal Key Findings:

During the site assessment it was ascertained that six habitat units were present within the study area namely the Degraded Secondary Grassland, the Eragrostis Secondary Grassland, the Freshwater Habitat, the Rocky Ridge, Woodland and the Transformed Habitat. The study area is spread across an area that is associated with urban expansion as well as small scale agricultural practices and, as such has been subjected to varying levels of impacts and habitat degradation. At the time of assessment, it was clear that anthropogenic activities, livestock grazing and crop cultivation has had a significant impact

on the herbaceous layer (faunal habitat) and consequently food resources for faunal species. In addition, due to the locality of the study area, it is highly likely that domestic dogs and cats from the resident households and neighbouring community will actively move through the study area hunting faunal species, notably avifauna, small reptiles and small mammals. In addition to this, there is an increased probability that community members are actively placing snares in open space areas, targeting small mammals and avifauna such as *Numida meleagris* (Helmeted Guineafowl).

Due to the layout of the study area, it is recommended that efforts to develop open space areas be focused on the western portions that are associated with the Freshwater Habitat, as these areas currently have the lowest household density and offer the greatest habitat provision for faunal species.

It is recommended that, in order to ensure the continued survival of faunal species in the study area, which is considered imperative in the ever-growing urban landscape, the Freshwater Habitat, zone of regulation and portions of the adjacent Secondary Grasslands be excluded from development activities. In so doing, under suitable management and through controlled site access, this open space area will not only provide habitat for common faunal species, but also for faunal SCC expected to occur within the study and surrounding areas. These SCC include *Atelerix frontalis* (Southern African Hedgehog, NT), *Mystromys albicaudatus* (White-tailed Mouse, EN) and *Pyxicephalus adspersus* (Giant Bull Frog, NT). These SCC rely on intact grassland and wetland habitats in order to forage and breed, which are rapidly being lost as a result of urban development. Pairing well thought out development plans with conservation initiatives will ensure that developmental and conservation targets can be met in a sustainable manner.

Recommended Mitigation:

The following should be ensured for all individuals of floral SCC encountered during the site assessment:

- Should it be deemed necessary to remove the *Podocarpus henkelii* individual, a permit will have to be obtained from DAFF prior to vegetation clearing taking place.
- During the surveying and site-pegging phase of surface infrastructure, all floral SCC and protected species that will be affected by surface infrastructure must be marked;
- All individuals situated within the development footprint should be rescued and either relocated to:
 - Suitable similar habitat within the study area but outside the development footprint,
 - Used within the landscaping plan of the development or
 - Relocated to a registered nursery, the ARC or SANBI;
- It should be noted that any individuals removed from the study area and not relocated to an area/facility listed above, permits might be required from GDARD,
- The rescue and relocation plan should be overseen by a suitably qualified specialist;
- Should any other floral SCC, however, be encountered during the construction of the development all activities should be stopped immediately, and a suitably qualified

specialist be consulted as to the possibility of rescue and relocation of the species encountered;

- No collection of floral SCC, protected floral species or medicinal floral species must be allowed by construction personnel. Moreover, the number of floral SCC removed for construction of the infrastructure should be kept to a minimum and no plants should be needlessly destroyed;
- Edge effect control needs to be implemented to ensure no further degradation and potential loss of floral SCC outside of the proposed development footprint area occurs;
- No dumping of waste on site should take place. As such it is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste;
- If any spills occur, they should be immediately cleaned up. In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced preventing the ingress of hydrocarbons into the topsoil. It should be ensured that no spills leak into the Freshwater resource associated with the central portion of the study area,
- Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed;
- Removal of vegetation should be restricted to what is absolutely necessary;
- Alien vegetation, as listed in section 3.8 of this report, must be removed from the study area during both the construction and operational phases, with specific mention of Category 1b and 2 species in line with the NEMBA Alien and Invasive Species Regulations (2016);
- Edge effects of all construction activities, such as erosion and alien and invasive plant species proliferation, which may affect the sensitive habitat areas as stipulated in this report, as well as adjacent grassland and freshwater resource habitat within surrounding areas, need to be strictly managed adjacent to the proposed development footprint areas. Specific mention in this regard is made to Category 1b and Category 2 species identified within the development footprint areas (refer to section 3.7 of the fauna report); and
- Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species be used to revegetate the disturbed area. Recommended seed mix: Mayfort Biosome Grassland seedmix: <http://mayford.co.za/veld-grass/>.

Recommendations for Loss of *faunal habitat*:

- The optimised footprint of the proposed development must be fenced/ demarcated off to prevent vegetation clearing and footprint creep into the sensitive Freshwater Habitat and associated buffers, as stipulated in the freshwater report (SAS, 2019) as well as into any areas demarcated as future open space/greenbelt areas. This fence should, however, allow for small terrestrial faunal species to move through away from construction activity. A post and wire game type fence is considered ideal.

- No construction vehicles are to drive through the Freshwater Habitats, except on existing designated road, as this will lead to further unnecessary habitat degradation;
- Vegetation clearance should occur in a phased manner to allow for faunal species to naturally disperse out of the areas. In this regard, vegetation clearance activities should ideally start in the areas furthest from the Freshwater Habitat. This will allow faunal species to naturally relocate to this habitat unit and ensure that for as long as possible there remains grassland areas between the cleared areas and the Freshwater Habitat. This will help minimise sediment runoff and sedimentation of the Freshwater Habitat;
- Revegetation of remaining open space areas that have been disturbed should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; When rehabilitating disturbed areas, it is recommended that natural indigenous vegetation be used so that faunal species that were displaced by vegetation clearing activities are able to utilise and inhabit these areas during the operational phase;
- Spills and/or leaks from construction equipment must be immediately remedied and cleaned up so as to ensure that these chemicals do not enter into the soil later or freshwater habitat; Each construction team/site should have an individual that has undergone a snake handling course so as to safely catch and release any snakes within the site;
- Construction personnel are to be informed and educated with about general faunal species that may be encountered on site, notably of snakes and faunal SCC. Personnel are to be instructed that, if encountered they are not to kill these faunal species but let them either move off on their own or call the nominated construction personnel who is to safely catch and release such species;
- No hunting/trapping or collecting of faunal species is allowed;
- Should any faunal SCC be encountered/observed during construction activities in that area are to be halted and a biodiversity specialist consulted to determine the best way forward; Construction edge effects, notably stormwater runoff, are to be actively managed so as to ensure that the downslope freshwater habitat is not impacted upon;
- No informal fires by construction personnel are allowed; and
- Initiate an alien and invasive plant control plan.

Freshwater and Wetland Delineation – Key Findings

During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment.

An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is

considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. This feature was not assessed, since it is apparent from historical and current digital satellite imagery as well as observations made during the site assessment that this feature was likely formed because of water runoff from the upgradient and adjacent plant nursery and thus, would not persist under “normal circumstances” as per the definition of a wetland in the National Water Act, 1998 (Act No. 36 of 1998).

Following the ecological assessment of the wetland, the Department of Water and Sanitation (DWS) Risk Assessment Matrix (2016) as it relates to activities as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act 36 of 1998) was applied to ascertain the significance of possible impacts which may occur as a result of the proposed development. The risk assessment was based on that no development will take place within the wetland or the associated 30m GDARD setback area. It is anticipated that all activities will be situated upgradient of, and within close proximity to, the delineated wetland.

Key Recommendations:

- If feasible, construction must be scheduled for the drier winter period in order to minimise the risk of sediment-laden runoff reaching the wetland as a result of the construction activities; The use of Sustainable Drainage Systems (SUDs) to manage stormwater is considered important for the proposed development;
- Areas which are to be cleared of vegetation, including contractor laydown areas, must remain as small as possible to reduce the risk of proliferation of alien vegetation, and in order to retain a level of protection to the wetland during construction (e.g. sediment trapping, slowing of stormwater runoff etc.). Contractor laydown areas are to remain outside of the delineated wetland and the associated 30m GDARD setback area, and as much as feasible no natural/indigenous freshwater vegetation is to be cleared;
- It is highly recommended that an alien vegetation management plan be compiled during the planning phase and implemented concurrently with the commencement of construction;
- A topsoil management plan must be compiled during planning and implemented when construction commences. It is essential that the following be included in the topsoil management plan:
 - All exposed soils are to be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) in order to prevent erosion and sedimentation of the wetland; and
 - No stockpiling of soils is to take place within the wetland or the 30m GDARD setback area, and stockpiles may not exceed 2m in height.

Geotech Assessment -Key findings

The site characteristics, soil conditions and site geology were assessed in terms of the recent geotechnical survey completed by J. Arkert Engineering Geologist. The study divides the development area into five categories, based on the anticipated consolidation settlement.

Geotechnical Zone 1A (Area underlain by collapsible soil less than 750mm thick.)

- All single storey residential structures placed within Geotechnical Zone 1A can be placed on conventional foundation. Foundation options may include strip footings or concrete slabs placed on the ground, with thickening for internal and external walls. Particular attention must be paid to good site drainage.

Geotechnical Zone 2A (Area underlain by collapsible soil greater than 750mm thick)

Greater than 10mm consolidation and collapse settlement is anticipated within this zone and therefore the potential founding solutions for all of the units to be constructed within this zone should ensure:

- Compaction of soils below individual footing.
- Soil raft.
- Concrete raft.

Geotechnical Zone 1A2F (Area underlain by collapsible soil less than 750mm thick and difficult excavation conditions anticipated with 10% to 50% rock or hardpan ferricrete expected within 1.5m of the surface.)

- All single storey residential structures placed within Geotechnical Zones 1A2F can be placed on modified normal (re-enforced) strip footings. Good site drainage must be adopted.

Geotechnical Zone 3F (Area underlain by difficult excavation conditions with greater than 50% rock or hardpan ferricrete expected within 1.5m of the surface.)

- The exposures of outcrop and shallow bedrock will render the entire area more difficult to develop. Service trenches and foundation excavations may require blasting within the upper 1.5m and the routing and construction of roads will encounter difficult conditions. All single storey residential structures placed within Geotechnical Zones 3F can be placed on modified normal (re-enforced) strip footings. Good site drainage must be adopted.

Due to the potentially collapsible properties of the soils encountered within *zones 2A* it is recommended that the following precautions are implemented when designing the buried water bearing services:

- No plumbing and drainage should be placed under floor slabs as far as practicable.
- The fall of all trenches should be directed away from buildings.
- All service trenches should be located at least 1.5m away from buildings and should be backfilled with in situ materials to not less than 88% Mod AASHTO density.
- Sewer and drain pipes and fittings should be provided with flexible joints.
- Water pipe entries into buildings should be provided with flexible piping to allow for movement.
- Pipes through walls should be provided with sleeves to permit relative movement.

Recommendations:

- **ADDITIONAL INVESTIGATIONS:** Without detailed knowledge of the structures to be erected on the site, comments regarding the most appropriate foundation solutions

have been based on typical residential structures usually found in such developments. The following table sets out the National Home Builders Registration Council (2016) classification for each of the zones mapped. It must be emphasised however that these recommendations are not detailed and it is essential that site specific investigations are conducted for individual structures.

Heritage Assessment – Key findings:

The Heritage Assessment was undertaken by J A van Schalkwyk

- Three houses, on Plot 94, Plot 95 and Plot 130 have been identified to be of significance and a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.
- Three informal burial sites have been identified on Plot 28, Plot 59 and Plot 97, and a valid permit should be obtained from SAHRA, the police and the Department of Health before they can be relocated.

Recommendations:

- For this proposed project, the assessment has determined that the identified buildings have a significance rating of: Generally Protected 3B: Medium significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.
- For this proposed project, the assessment has determined that the identified burial sites have a significance rating of: Generally Protected 4A: Medium significance, and therefore valid permits should be obtained from SAHRA, the police and the Department of Health before they can be relocated.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Services

Recommendations on the Stormwater Management Plan:

- The stormwater runoff from the proposed development will be safely channeled from the higher lying areas to the lower lying area and discharged in the natural drainage course.
- New attenuation ponds will be constructed on each erf to ensure that the pre development runoff for a 1:25 year storm event is not exceeded. Storage will be provided in the order of 215 to 259 m³/ha.
- Stormwater inlets will be constructed at strategic positions to catch runoff from the site and conveyed in an underground stormwater drainage system consisting of interlocking joint concrete pipes.
- The proposed network will have sufficient capacity to accommodate the stormwater runoff from a 1:10 year storm event. Major storm events will be channelled overland towards the natural drainage course.

Social Environment (Sense of Place and Land-Use)

The study area is fairly rural with some residential development pressure already present to the east of the proposed development and east of Marina Drive. Astral Operations Ltd. has a poultry facility to the west of the proposed development.

The Crane Valley development is proposed to be situated below the R114 and between Beyers Naude and Malibongwe Drive. Approximately 9 600 to 20 000 residential units are anticipated. The overall sense of place in the study area will thus be impacted by the proposed Mogale Extension 42,43 and 44 as well as other residential developments proposed in the area.

The residential developments are in line with the spatial planning for urban development of Mogale City focused on the southern side of the N14. The area is thus earmarked for densification.

Recommendations:

- Buffer zones based on environmental considerations e.g. for wetland areas or watercourses, must be implemented as this would also assist in mitigating the possible negative impact on the sense of place of the area.
- The buffer zone for the wetland areas or watercourses must be used as a buffer zone between the proposed development and the Astral Operations;
- Retain existing vegetation throughout the development area as far as possible e.g. within 'green' zones and adjacent watercourses to lessen the visual impacts;
- Make prospective buyers aware of Astral's operations and include information in this regard.
- A thorough communication process undertaken through e-mails and pamphlets distributed to nearby communities must be undertaken to communicate any possible blasting activities during the construction phase. Pro-active communication with representatives of the Astral Operations in this regard would be required.
- Any possible regulations and/or specifications with regards to buffer zones around poultry facilities must be implemented.

General Mitigation

Establish a Community Forum or Working Group to monitor compliance and provide advice on the implementation of the Environmental Management Plan (EMP). It is recommended that such a working group could consist of local community representatives, local property owners, representatives of the Astral Operations and other surrounding farms, representatives from the Mogale Local Municipality and representatives from the GDARD and DWS.

Additional aims of such a forum or working group would be to create a platform where construction related issues can be discussed and resolved, as well as to ensure ongoing monitoring of environmental issues such as noise, dust and groundwater pollution during the construction phase, and for an agreed upon timeframe once the overall development has been completed.

Environmental Management Programme

Overall, the broad consensus from all impact assessment specialists is that the impacts expected to occur as a result of this development certainly can be either avoided entirely or reduced to an acceptable level of impact (in the low to low - medium range of significance) if all of their recommendations are implemented. The applicant therefore is committed to conducting the construction and operation phase of this facility in line with the Environmental Management Plan (See **Appendix N**), which includes the impact mitigation measures recommended by all of the specialists and the Environmental Assessment Practitioner.

TABLE OF CONTENTS

1	INTRODUCTION.....	24
1.1	Scope and Contents of the Environmental Impact Report.....	24
2	DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS.....	30
2.1	Role and Competence of the EAP	30
2.2	Proponent Identification	31
2.3	Registered Owners	31
2.4	Professional Team.....	32
2.5	Terms of Reference	32
2.6	Assumptions and Limitations	33
3	ACTIVITY INFORMATION	35
3.1	Project Title.....	35
3.2	Project Location.....	35
3.3	Proposed Activity Description	40
3.4	Land Use for the study area.....	47
3.5	Provision of Access.....	48
3.6	Provision of Services	50
3.7	Description of the Phases of the proposed Development.....	55
4	LEGISLATIVE ASPECTS.....	57
4.1	National Environmental Management Act, Act No. 107 of 1998 (NEMA).....	57
4.2	Applicable Listed Activities.....	57
4.3	National Environmental Management: Waste Act, Act 59 of 2008.....	59
4.4	The National Water Act (Act 36 of 1998).....	60
4.5	The National Heritage Resources Act (Act 25 of 1999)	60
4.6	National Environmental Management: Biodiversity Act, Act 10 of 2004.....	61
4.7	Government Notice 864 Alien and Invasive Species Regulations as published in the Government Gazette 40166 of 2016 as it relates to the National Environmental Management Biodiversity Act (NEMBA), 1998 (Act 107 of 1998);	62
4.8	Conservation of Agriculture Resources Act, 1983 (Act No. of 1983)	62
4.9	National Veld and Forest Act, 1998 (Act No 101 of 1998).....	63
4.10	National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004)..	63
4.11	Provincial and Local Policies and Guidelines.	64
5	NEED AND DESIRABILITY.....	78
5.1	Project Need: Mixed Land Use.....	78

5.2	Expansion of the residential sector of Mogale City Local Municipal area.....	78
5.3	Project Desirability	79
6	DESCRIPTION OF THE BASELINE ENVIRONMENT	81
6.1	Physical Features and Characteristics	81
6.2	Natural Ecosystems and Habitats	82
6.3	Traffic.....	84
6.4	Floral Assessment	88
6.5	Faunal Assessment	92
6.6	Aquatic Ecosystem Delineation.....	97
6.7	Historical and Archaeological Characteristics.....	101
6.8	Socio –economic environment	103
6.9	Mogale City Municipality	103
7	ALTERNATIVES	108
7.1	Layout Alternatives	108
7.2	Activity/Land-Use Alternative	111
7.3	Technology Alternative	112
7.4	No -Go Option.....	113
8	PUBLIC PARTICIPATION	115
8.1	Introduction	115
8.2	Objectives	115
8.3	Approach and Methodology	115
8.4	Recording of Issues	119
8.5	Public Participation during the EIA Phase	119
9	ENVIRONMENTAL IMPACTS IDENTIFICATION.....	120
9.1	Summary of Impacts Identified.....	120
9.2	Site Inspection.	124
9.3	Public Participation	124
9.4	GDARD Policies, Review / Terms of Reference GDARD	124
9.5	Methodology for assessing the significance of impacts	124
9.6	Summary of Key Findings & Recommendations	129
9.7	Environmental Impacts and Mitigation Measures	138
9.8	Construction Phase.....	139
9.9	Operational Phase	170
9.10	Cumulative Impacts	181
10	ENVIRONMENTAL IMPACT STATEMENT	182
10.1	Conclusion	182
10.2	Key Issues	182

10.3	Recommendations for Conditions of the Environmental Authorisation	184
11	REFERENCES	186
12	APPENDICES	187

LIST OF FIGURES

- Figure 1: Overview of the Environmental Impact Assessment Process
- Figure 2: Map Regional Setting
- Figure 3: Locality Map
- Figure 4: Adjacent Landowners Map
- Figure 5: Site Development Plan: Mogale Ext 42
- Figure 6: Site Development Plan: Mogale Ext 43
- Figure 7: Site Development Plan Mogale Extension 44
- Figure 8: Position of the Valley Bottom Wetland situated within the study area.
- Figure 9: Locality of Astral Poultry and Mogale Ext 42 Study Area.
- Figure 10: Proposed Access layout.
- Figure 11: CBA and ESA associated with the study area according to the Gauteng Conservation Plan V3.3 (2011).
- Figure 12: Perennial River associated with the study area according to the Gauteng Conservation Plan V3.3 (2011).
- Figure 13 Gauteng Environmental Management Framework
- Figure 14: Max and average wind speed and wind Gust for Muldersdrift
- Figure 15: Floral SCC encountered in the study area. Top: *Hypoxis hemerocallidea* (left), and *Boophae disticha* (right); Bottom: Floral SCC that has historically been planted, namely *Eucomis autumnalis* (left), and *Podocarpus henkelii* (right).
- Figure 16: Sensitivity map for the study area.
- Figure 17: Field assessment results pertaining to insect species within the study area
- Figure 18: Faunal Sensitivity map for the study area.
- Figure 19: The delineated wetlands associated with the study area.
- Figure 20: Conceptual presentation of the zones of regulation in terms of GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), and the relevant GDARD setback area in relation to the wetland delineation.
- Figure 21: Mogale City Local Municipality
- Figure 22: Option A Original Mogale Ext 42, 43 and 44 Layout (dated March 2018)
- Figure 23: Option B Site Layout Plan (Preferred Layout)
- Figure 24: Agricultural Potential (taken from the Muldersdrift Precinct Plan, 2011)
- Figure 25: Site Notice 1A and B

Figure 26: Site Notice 2A and B

Figure 27: Site Notice 3A and B

Figure 28: Site Notice 4A and B

LIST OF TABLES

Table 1: Table 1. Content of an EIA/EMPr Report According to 2014 NEMA EIA Regulations.

Table 2: Name and contact details of the EAP who prepared this report:

Table 3: Landownership

Table 4: Location of the Activity

Table 5: Zoning Schedule for Mogale Extension 42.

Table 6: Zoning Schedule for Mogale Extension 43.

Table 7: Zoning Schedule for Mogale Extension 442

Table 8: Electricity Demand

Table 9: NEMA listed activities

Table 10: Provincial and Local context

Table 11: Krugersdorp Weather by Month.

Table 12: Summary of results of the field assessment of the wetland associated with the study area.

Table 13: Population and Household Growth

Table 14: Municipal Infrastructure Delivery

Table 15: The percentage of households in different annual income categories, 2011

Table 16: Zoning Schedule for Mogale Extension 42.

Table 17: Zoning Schedule for Mogale Extension 43.

Table 18: Zoning Schedule for Mogale Extension 44

Table 19: Quantification of impacts related to construction activities.

Table 20: Quantification of impacts related to the operational phase.

APPENDICES

Appendix A: Curriculum Vita of EAP

Appendix B: GDARD Correspondence

Appendix C: Maps of the study area

Appendix D: Site Layout Plans.

Appendix E: Engineering Civil and Electrical Services Report

Appendix F: Letter Mogale on Provision of Services

Appendix G: Stormwater Management Plan

Appendix H: Heritage Assessment

Appendix I: Ecology Assessment

Appendix J: Freshwater and Wetland Assessment

Appendix K: Geotechnical Report

Appendix L: Traffic Assessment

Appendix M: Public Participation

Appendix N: EMPr

NOMENCLATURE

ACRONYMS

BEE:	Black Economic Empowerment
BID:	Background Information Document
CAPEX:	Capital Expenditure
DEA:	Department of Environmental Affairs
DSR:	Draft Scoping Report
DWA:	Department of Water Affairs
DEA:	Department of Environmental Affairs
EAP:	Environmental Assessment Practitioner
EIA:	Environmental Impact Assessment
EIAR:	Environmental Impact Assessment Report
EMP:	Environmental Management Plan
EMPR:	Environmental Management Programme Report
FGM:	Focus Group Meeting
FSR:	Final Scoping Report
GDP:	Gross Domestic Product
GGP:	Gross Geographic Product
GN:	Government Notice
HIA:	Heritage Impact Assessment
HRD:	Human Resource Development
IAIA:	International Association of Impact Assessment
IDP:	Integrated Development Plan
IFC:	International Finance Corporation
IRR:	Issues and Response Register
I&APs:	Interested and Affected Parties
LED:	Local Economic Development
NEMA:	National Environmental Management Act, Act No. 107 of 1998
NEM:AQA:	National Environmental Management: Air Quality Act, Act No 39 of 2004
NEM:WA	National Environmental Management :Waste Act, Act No 59 of 2008
NGO:	Non Government Organisation
NWA:	National Water Act
PPP:	Public Participation Process
R:	Regulation
RE:	Remaining Extent
SACNSP:	South African Council for National Scientific Professions
SANS:	South African National Standards
SAWQG:	South African Water Quality Guidelines

SIA:	Social Impact Assessment
SDP	Site Development Plan
SLP:	Social and Labour Plan
SMME:	Small, Medium, Macro Enterprises
ToR:	Terms of Reference
WBG:	World Bank Group

MEASUREMENTS

g/t:	grams/ton
ha:	hectares
km:	kilometres
ktpa:	kilo tonnes per annum
ktpm	kilo tonnes per month
m:	metre
m ³ :	cubic metres
mamsl:	metres above mean sea level
m/mo:	metres per month
mm:	millimetre
MW:	Megawatt
tpm:	tons per month
k/l:	kilo litres
kV:	kilo volts
MI:	Mega litres
Mt:	Million tons
MVA:	Mega volt ampere
MW:	Mega Watt

1 INTRODUCTION

The applicant “the Nooitgedacht Land Assembly Members” proposes the establishment of a mixed land use development to be situated on Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135 of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province: Referred to as “Mogale Ext 42, 43 and 44 Development”.

The proposed mixed land-use development will impact an area, bigger than 20ha, which triggers specific environmental listed activities and will require an Environmental Authorisation from the Gauteng Department of Agricultural and Rural Development (GDARD).

This draft Environmental Impact Assessment (EIA) report for the Mogale Ext 42, 43 and 44 Development mixed land use development has been prepared in compliance with the requirements of the following legislation:

- The National Environmental Management Act, 1998 (Act No. 107 of 1998) [“NEMA”];
- The Environmental Impact Assessment (“EIA”) Regulations contained in Government Notice (GN) No. R983, 984 and 985 of 2014 as promulgated in terms of the NEMA [“EIA Regulations”] as amended up to and including GN 327, 325 and 324 in GG 40772 of 07 April 2017.

The purpose of these Regulations is to regulate procedures and set criteria as contemplated in Chapter 5 of the Act to enable the submission, processing, consideration and decision-making regarding applications for environmental authorization of activities and matters pertaining thereto.

1.1 Scope and Contents of the Environmental Impact Report

An Environmental Impact Assessment (EIA) is defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. The aim of the EIA is to prevent substantial damage to the environment. The objectives of this study are:

- To comply with the requirements of NEMA and its associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of the construction, operation and closure of the proposed project. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMPr;
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development and set conditions that must be adhered to.

An EIA is conducted in two phases. The first is the Scoping phase (submitted to GDARD in October 2020) and the second is the EIA phase (active phase). GDARD accepted the Final Scoping report on 04 February 2021 and indicated that the application can proceed with undertaking the environmental impact assessment phase of the project (Attached to **Appendix B** is the acceptance letter from GDARD).

The objectives of the EIA phase are in line with Regulation 2, Appendix 3 of GNR 982 published in terms of NEMA as listed in the report.

Stakeholder engagement is a key element of the environmental decision-making process, and stakeholder engagement formed part of the Scoping Phase and formed part of the Impact Assessment Phase. Figure 1 provides an illustration of the proposed EIA process that is being followed.

Generalised EIA Process Flowchart

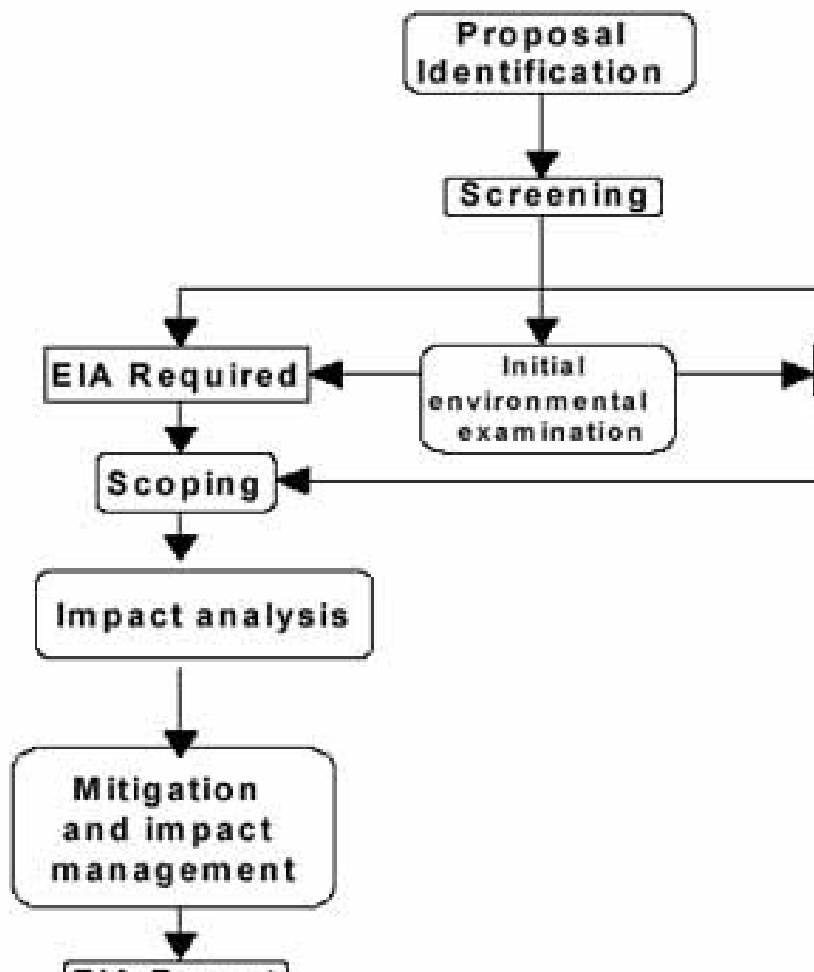


Figure 1: Overview of the Environmental Impact Assessment Process

Appendix 3 of Government Notice 326 of the National Environmental Management Act No.107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations (2014), as amended, states the requirements for the content of an Environmental Impact Assessment Report. This report strives to address all these requirements as per the regulations.

For ease of reference we have noted in the table below where this required information can be found. Table 1 below indicates the regulations that have been addressed and the section of the EIA where these requirements can be found.

Table 1: Content of an EIA/EMPr Report According to 2014 NEMA EIA Regulations.

2014 Regulations	EIA	Description of EIA Regulations Requirements for Scoping Reports	Location in the EIA/EMPr
Appendix Section 3 (a)	2,	Details of – (i) The EAP who prepared the report; the expertise of the EAP; (ii) The expertise of the EAP, including a curriculum vitae.	Section 2 Appendix A
Appendix Section 3 (b)	2,	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 3 AND Table 4 Appendix B
Appendix Section 3 (c)	2,	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 5.3. Figure 15 Appendix 2
Appendix Section 3 (d)	2,	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure	Section 5 3 and Section 6
Appendix Section 3 (e)	2,	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Section 6
Appendix Section 3 (f)	2,	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 7
Appendix Section 3 (g)	2,	A motivation for the preferred development footprint within the approved site	Section 8
Appendix Section 3 (h)	2,	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the	Sections 8.3 Section 9

2014 EIA Regulations	Description of EIA Regulations Requirements for Scoping Reports	Location in the EIA/EMPr
	<p>Regulations, including copies of the supporting documents and inputs;</p> <p>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</p> <p>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-</p> <p>(aa) can be reversed;</p> <p>(bb) may cause irreplaceable loss of resources; (cc) can be avoided, managed or mitigated;</p> <p>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>	
Appendix 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- a description of all environmental issues and risks that were identified during the EIA process; an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 13
Appendix 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 13 Section 14 Section 17
Appendix 3 (l)	An environmental impact statement which contains- i.	Section 18.1

2014 EIA Regulations	Description of EIA Regulations Requirements for Scoping Reports	Location in the EIA/EMPr
	a summary of the key findings of the EIA; ii. a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	
Appendix 3 (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.	Section 14 Section 18.3 Section 33.9
Appendix 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Section 20
Appendix 3 (o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 21
Appendix 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 22
Appendix 3 (q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 23
Appendix 3 (r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Section 24
Appendix 3 (s)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 41 Appendix 1
Appendix 3 (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Section 35 Appendix 16
Appendix 3 (u)	An indication of any deviation from the approved scoping report, including the Plan of study, including- v. any deviation from the methodology used in determining the significance of potential; vi.	n/a

2014 EIA Regulations	Description of EIA Regulations Requirements for Scoping Reports	Location in the EIA/EMPr
	environmental impacts and risks; vii. a motivation for the deviation.	
Appendix 3(v)	Any specific information that may be required by the competent authority.	Section 40
Appendix 3(w)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA	n/a

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

2.1 Role and Competence of the EAP

The role of the Environmental Assessment Practitioner (“EAP”) is to manage the application for an Environmental Authorization on behalf of the applicant. The EAP must adhere to all relevant legislation and guidelines, ensuring that the reports contain all the necessary and relevant information required by the competent authority to make a decision. It is the responsibility of the EAP to perform all work relating to the application in an objective, appropriate and responsible manner. The EAP must comply with Regulation 13 of the EIA Regulations R982 of 2014 as amended by GN 326, detailing the requirements for an EAP

BATHO EARTH Environmental Consulting is a dynamic environmental consultancy business offering technical support, assistance with planning applications and developer advice on a range of environmental issues to clients throughout South Africa. The company, which is located in Gauteng, was established in 2008 and the principal consultant has over 10 years’ experience in the Environmental Consulting profession.

The EAP has the appropriate professional qualifications and relevant experience to undertake the EIA process, to compile the required project documentation and review specialist study documentation for inclusion in the EIA/EMP. The EAP obtained her professional registration from the Environmental Assessment Practitioners Association of South Africa (practice number: 2020/997) on 07 February 2020.

The EAP has undertaken a number of EIA studies for South African and international companies of which a number of these studies were conducted based on international performance standards and requirements as stipulated by the World Bank Group (WBG) and the International Finance Corporation (IFC) as well as all relevant national acts and guidelines. EIA studies were undertaken for projects located in South Africa and Mozambique. All EIA studies were approved by the relevant government authorities overseeing the project.

The EAP is currently registered with the International Association of Impact Assessment (IAIA) and has obtained a MA Degree in Geography and Environmental Management, from the Rand Afrikaans University. Please find attached as **Appendix A** the CV from Ms Verster.

Batho Earth will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and Batho Earth understands that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Table 2: Name and contact details of the EAP who prepared this report

EAP	Qualifications & Professional affiliations	Experience at environmental assessments	Contact details
Ms Diana Verster	BA (Geography and Environmental Management), Rand Afrikaans University (RAU) - 2001 BA Hons (Geography and Environmental Management), Rand Afrikaans University (RAU) - 2002 MA (Environmental Management) Rand Afrikaans University (RAU) - 2003 Registered Environmental Assessment Practitioner Number: 2020/997 Member of IAIA SA	15 years' experience in the environmental industry	Batho Earth Environmental Consulting: Postnet Private Suit 415, Private Bag x8, ELARDUSPARK, 0047 Fax: 087 807 4536 Mobile: 073 157 7362 (Diana) and E-mail: diana@bathoearth.co.za

2.2 Proponent Identification

The contact information of the project proponent is listed below:

Name of Company: "Nooitgedacht Land Assembly Members" represented by Steenkamp Incorporated Law Firm.

Physical Address: 37 Louise Road, Monavoni, Centurion, 0157.

Postal Address: P.O Box 11599, Wierdapark South, 0057.

Telephone: 012 668 3192

2.3 Registered Owners

As part of the public participation process consultation with all the affected landowners and adjacent landowners are conducted in order to obtain inputs and comments. Please refer to Figure 3 which provides a visual presentation of the landowners and adjacent landowners within the study area. The property details for the landowners are presented in table 3 below.

Table 3: Landownership

Farm	Portion	Owner
Farm Nooitgedacht 534 JQ	Portion 1	Mr Friedel Weihe
Farm Nooitgedacht 534 JQ	Portion 11	Mr John Heyns
Farm Nooitgedacht 534 JQ	Portion 59	Mr Jean Snyders
Farm Nooitgedacht 534 JQ	Portion 62	Beau Pienaar
Farm Nooitgedacht 534 JQ	Portion 91	Mr Friedel Weihe
Farm Nooitgedacht 534 JQ	Portion 93	Mr David Webb
Farm Nooitgedacht 534 JQ	Portion 94	Mr and Mrs Christine and Jan de Fouw
Farm Nooitgedacht 534 JQ	Portion 95	Mrs Maryanne Adelson
Farm Nooitgedacht 534 JQ	Portion 130	Mr and Mrs Peter and Jean Davidson
Farm Nooitgedacht 534 JQ	Portion 132	Mr George Rettermayer
Farm Nooitgedacht 534 JQ	Portion 134	Mr Johann Muller
Farm Nooitgedacht 534 JQ	Portion 135	Mr Eddie Visser

2.4 Professional Team

The following are the project team members:

- Batho Earth Environmental and Social Consultants (Diana Verster - Environmental Assessment Practitioner (author));
- Consulting Engineer: Ilifa Engineering
- Traffic Engineer: Hamatino Consulting Engineers
- Faunal and Floral Ecologist: Scientific Terrestrial Services
- Freshwater Consultant: Scientific Aquatic Services
- Town and Regional Planner: Synchronicity Town Planners
- Heritage Consultant: J A van Schalkwyk

2.5 Terms of Reference

Batho Earth is appointed as environmental consultant with the following Terms of Reference:

- Undertake an environmental evaluation of the applicable options and sites to get an understanding of biophysical characteristics and natural processes prevailing and to assess the proposed development proposals in terms of environmental characteristics by assessing the constraints and opportunities of the situation;

- Identify any anticipated impacts that might be considered at this early stage of the EIA process to suggest any specialist studies that may be required to provide additional information on the significance of these impacts and mitigation that may be necessary to reduce negative impacts and enhance positive impacts of the proposed development;
- Co-ordinate the early start of the recommended specialist studies with the view to informing the compilation of the initial Environmental Opportunities and Constraints;
- In association with the specialist consultants, assist the appointed consulting Engineers with the development of the optimum Site Development that will have the least impact on the both the biophysical and social environments. It is understood that as more detailed information is provided by the various specialist studies and I&APs, that the Environmental Opportunities and Constraints may need revision, and similarly, the SDP may need to be adapted;
- Undertake the applicable Scoping and EIA Process in terms of the Regulations of the NEMA to provide the relevant information for the DEA&DP, and any other government officials, to be able to make informed decisions and to issue an Environmental Authorisation for the proposed development;
- As part of the Scoping and EIA Process, a comprehensive public participation process must be entered into. This process is to provide all the relevant information to the public, NGO's, CBO's and government officials, and to allow for adequate time for the public to respond to such information. The issues as raised by I&AP's must be taken into consideration in assessing the impacts of the proposed development and, making amendments to the proposed development;
- Assess alternative development options for the property in order to reduce any significant impacts that may arise. Prescribe the necessary mitigation to enhance any positive impacts and reduce any negative impacts that may arise as a result of the proposed development must be suggested;
- Facilitate any additional specialist studies that may be required to assist with the planning and future management of the proposed development; and
- Make the necessary environmental management recommendations (mitigation/enhancement) for the construction and the operational phases of the proposed development, to ensure a sustainable development in the future.

2.6 Assumptions and Limitations

The findings of this report are subject to the following limitations:

- All information received from sources contributing to this project is assumed to be correct, unbiased and has been conducted by independent specialists;
- The development footprint for the proposed pipeline infrastructure has been estimated to be between 160mm to 900mm wide for the various diameter pipelines. The average development footprint width is therefore calculated as the requirement and this has been assumed to be the average width required for the pipeline infrastructure proposed.

- The proposed site layout is at this stage only a conceptual layout, although fairly accurate, that has taken various constraints to development into account in order to avoid impacting on the environment. The detailed design phase will include far more detail in terms of the proposed infrastructure to be development (detail design plans), which may include minor changes.
- There may also be slight route adjustments to the pipeline based on on-site surveying during the detailed design phase. Detailed designs must be prepared and submitted for approval to all relevant service providers before implementation of these services

3 ACTIVITY INFORMATION

3.1 Project Title

The proposed establishment of a mixed-land use development, to be situated on Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135, of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province: The project will be referred to as the “*Mogale Ext 42, 43 and 44 Development*”

3.2 Project Location

3.2.1 Regional Setting

The study area is located within the jurisdiction of the Mogale City Local Municipality, within the Nooitgedacht Agricultural Holdings area, near Muldersdrift, Gauteng Province. Please refer to Figure 2 below.

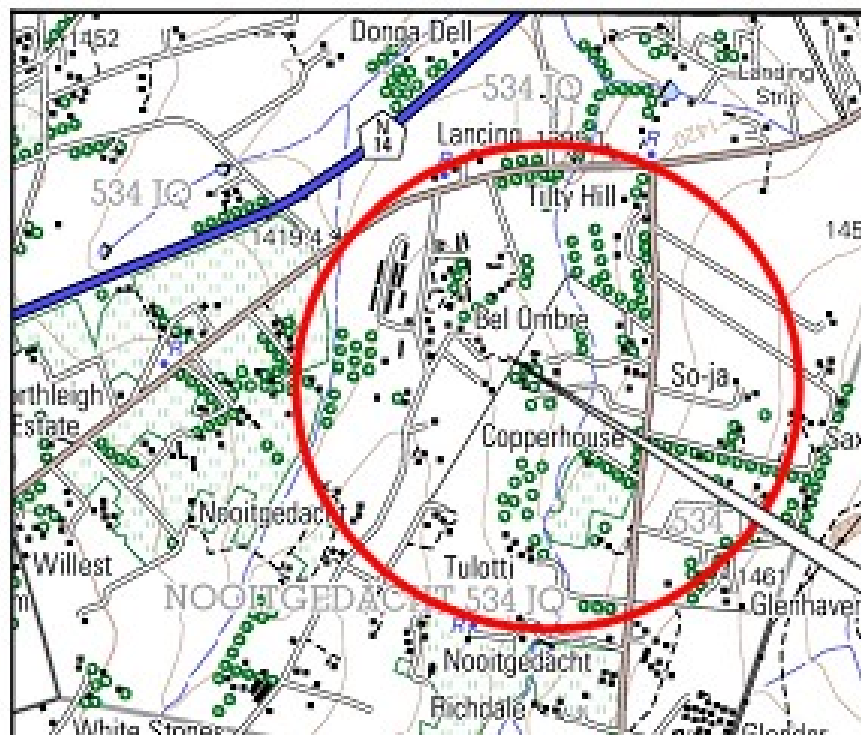


Figure 2: Map Regional Setting.

3.2.2 Local Setting

The proposed application is situated on Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135, of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province. The site under investigation is situated approximately 360m northwest of the N14 National Highway. The R114 borders the site to the north, while Marina Street traverses through the central portion of the site from north to south. Cosmo City Extension 6 borders the site to the east. Zandspruit is approximately 2km to the north east, and Kya Sands approximately 3km to the south east (refer to Figure 3 and 4).

The location of the activity, including the 21-digit Surveyor General code of each cadastral land parcel and the coordinates for the farm portions are depicted in Table 4.

Table 4: Location of the Activity

Name of Township	Farm Name / Location / Description	21-digit Surveyor General code	Size of the Farm and Coordinates
Mogale Ext 42 Township	Remainder of Portion 1 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400001	6,4190 hectares • 26°0'16.64S • 27°54'24.58E
	Portion 11 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400011	7,9449 hectares • 26°0'55.43S • 27°54'41.18E
	Portion 59 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400059	8,0750 hectares • 26°1'0.27S • 27°54'34.05E
	Portion 91 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400091	20,8013 hectares • 26°0'30.21S • 27°54'28.27E
	Portion 93 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400093	7,9450 hectares • 26°0'49.25S • 27°54'41.08E
	Portion 94 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400094	7,9449 hectares • 26°0'57.53S • 27°54'54.43E
	Remaining Extent of Portion 95 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400095	8,5426 hectares • 26°0'41.78S • 27°54'26.31E
	Portion 130 of the Farm Nooitgedacht 534 JQ	T0JQ0000000053400130	8,5653 hectares • 26°1'3.61S • 27°54'46.72E

Mogale Ext 43	Portion 62 of the Farm Nooitgedacht 534 JQ	T0JQ00000000053400062	8,5873 hectares <ul style="list-style-type: none"> • 26°1'3.51S • 27°54'8.58E
	Portion 134 of the Farm Nooitgedacht 534 JQ	T0JQ00000000053400134	13,2908 hectares <ul style="list-style-type: none"> • 26°1'7.26S • 27°54'20.67E
	Portion 135 of the Farm Nooitgedacht 534 JQ	T0JQ00000000053400135	12,6604 hectares <ul style="list-style-type: none"> • 26°1'15.58S • 27°54'19.95E
Mogale Ext 44	Portion 132 of the Farm Nooitgedacht 534 JQ	T0JQ00000000053400132	8,5653 hectares <ul style="list-style-type: none"> • 26°1'17.389S • 27°54'49.719E

Attached as **Appendix C** is the copy of the adjacent land parcels and the 21-digit Surveyor General Code of each cadastral land parcel, together with additional locality maps for the area.

The size of the development site is approximately *100ha in extent*. Portion of the properties have been identified as a wetland system and has been excluded from any development and will be zoned as private open space.

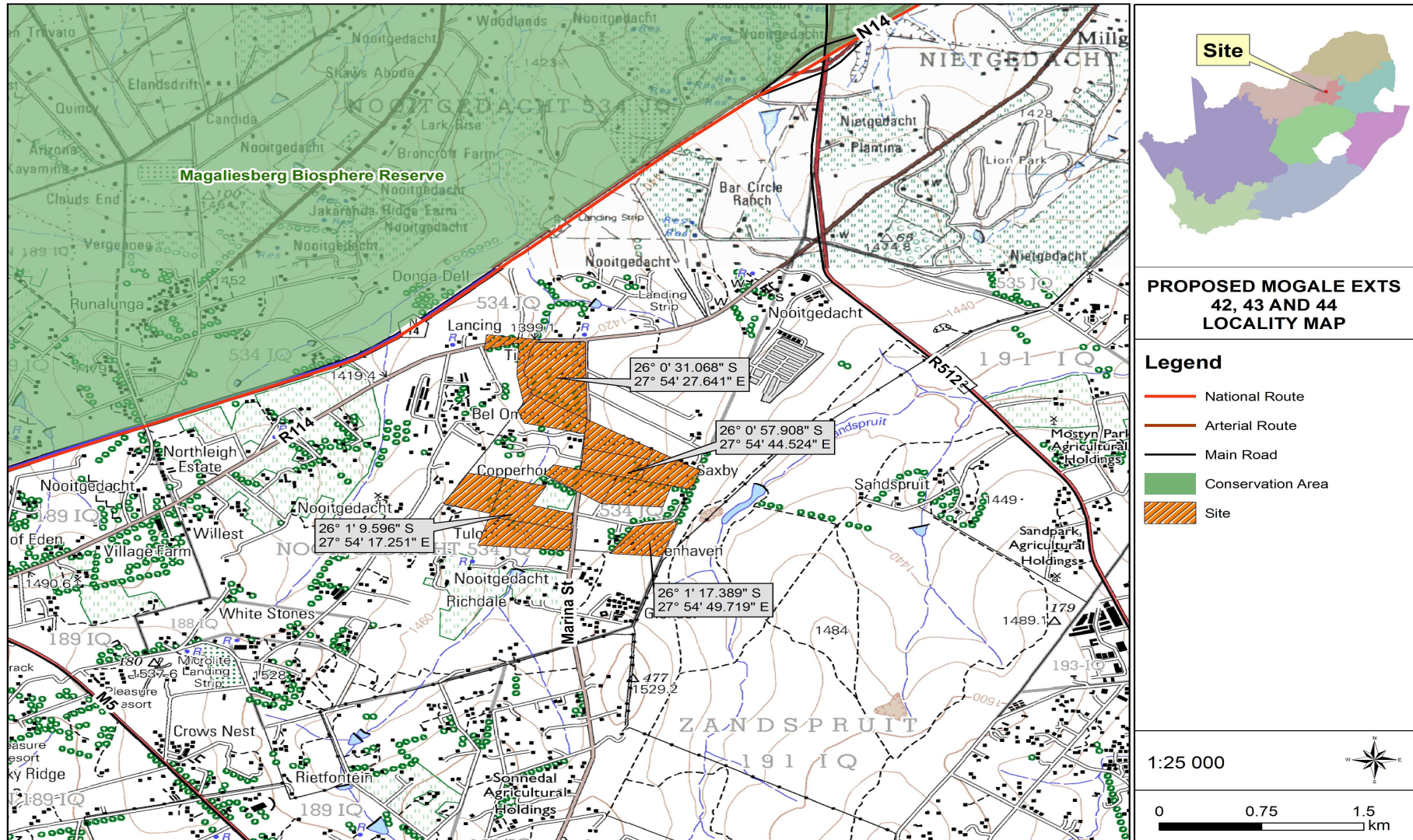


Figure 3: Locality Map

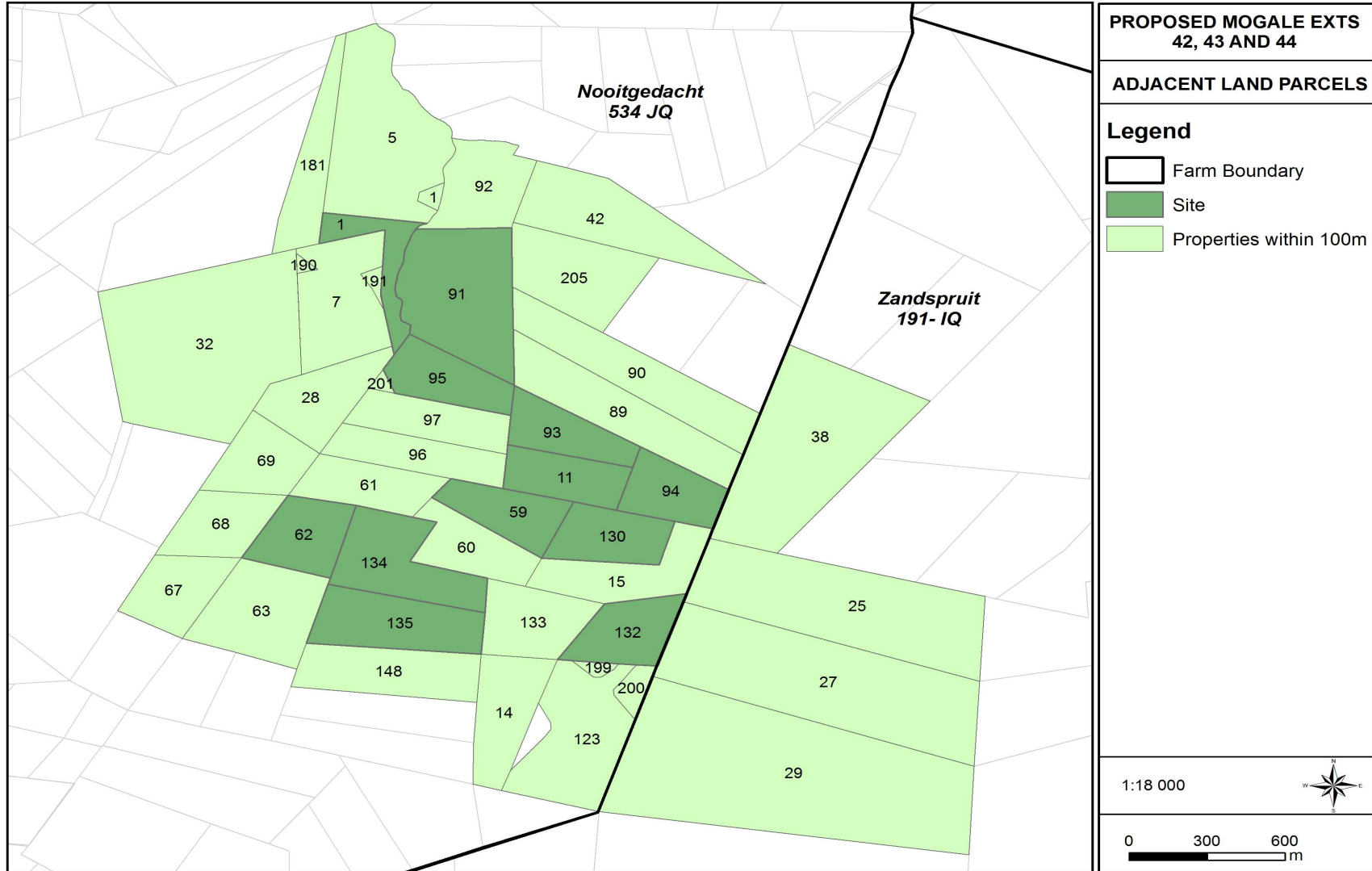


Figure 4: Adjacent Landowners Map

3.3 Proposed Activity Description

The Mogale Ext 42, 43 and 44 development area are divided into three separate township application as part of the town planning submissions, however for the EIA application all three land parcels are assessed as one development application as seen in Figure 3.

The study site is currently zoned agricultural in terms of the Krugersdorp Town Planning Scheme of 1980, situated within the urban edge of Mogale. A Town planning application will be lodged with the Mogale City Local Municipality. The Three sperate “town planning applications” are referred to as:

- [Mogale Extension 42](#) is situated on Portions 1, 11, 59, 91, 93, 94, 95 and 130 of the Farm Nooitgedacht 534-JQ;
- [Mogale Extension 43](#) is situated on Portions 62, 134 and 135 of the Farm Nooitgedacht 534-JQ;
- [Mogale Extension 44](#) is situated on Portion 132 of the Farm Nooitgedacht 534-JQ

Please refer to table 5 and figures 5 for the zoning schedule and different land uses proposed on Mogale Extension 42. The signed flood line delineation layouts from the Engineer are Attached to **Appendix D**.

Table 5: Zoning Schedule for Mogale Extension 42.

Erf	Zoning	Maximum density	Area (hectares)	Maximum of units	FAR	Height	Coverage
Erven 1-6	Residential 3	80 dwelling units per hectare	8,9196 ha	714	0,60	3 storeys	40%
Erven 7 - 10	Residential 4	100 dwelling units per hectare	21,5920 ha	2 159	1,80	3 storeys	60%
Erven 11-14	Business 2		5,8488		0,80	2 storeys	60%
Erven 15- 19	Commercial		5,4630	-	0,85	2 storeys	65%
Erven 20 -21	Undetermined		3,1939	-	n/a	n/a	n/a
Erf 22	Educational		5,7032	-	0,20	3 storeys	40%
Erf 23	Special for residential and place of public worship	80 dwelling units per hectare	2,8621	229	0,80	3 storeys	50%
		-		-			
Erven 24-25	Private Open Space		12,4451	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		10,2103				
		Total	63,78ha	3 102			

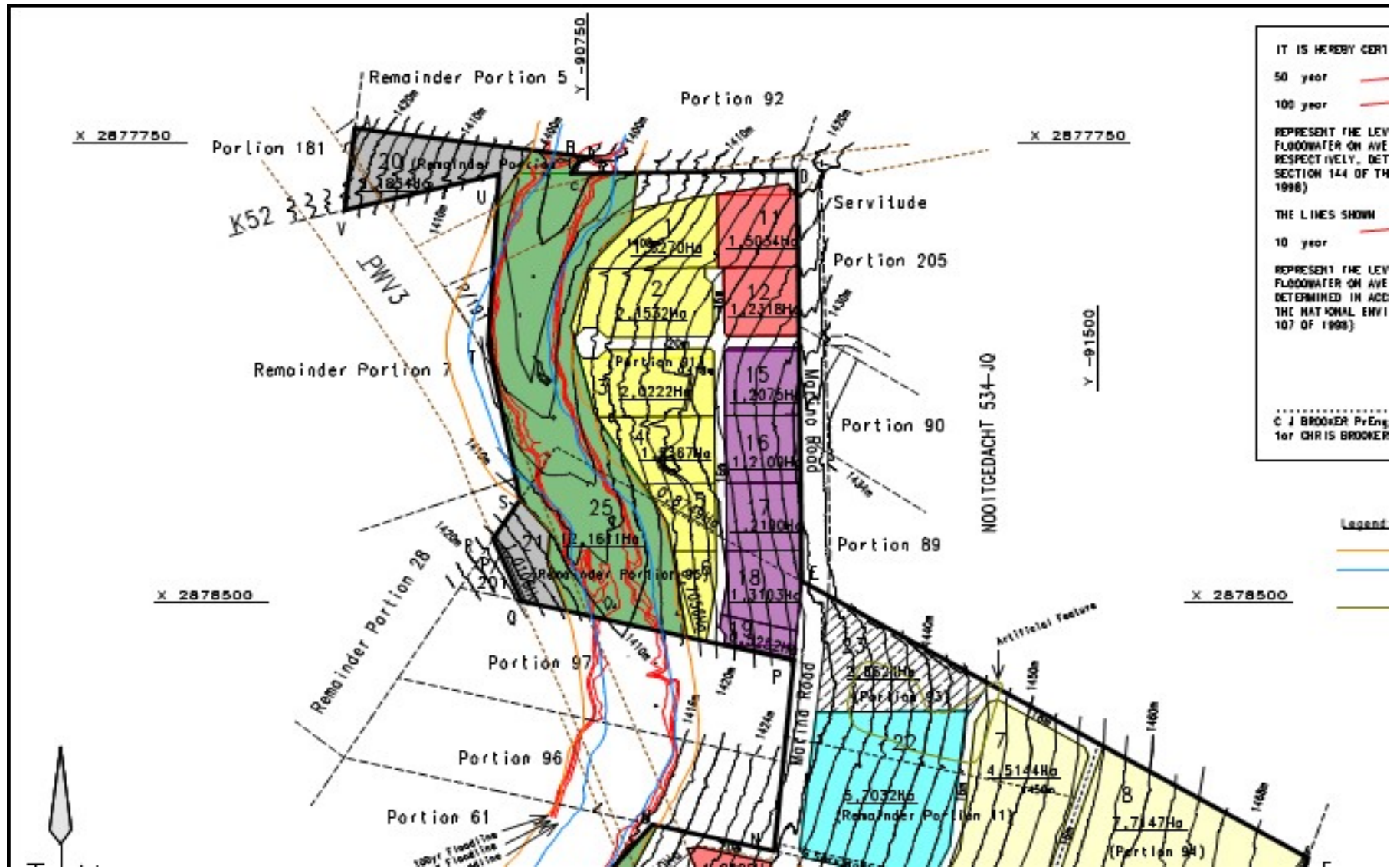


Figure 5: Site Development Plan: Mogale Ext 42

Please refer to the table 6 and figures 6 for the zoning schedule and land use parcels proposed for Mogale Extension 43. The signed flood line delineation layouts from the Engineer are Attached to **Appendix D**.

Table 6: Zoning Schedule for Mogale Extension 43.

Erf	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7,9	Residential 3	80 dwelling units per hectare	21,5629	1 718	0,60	3 storeys	40%
Erven 8, 11	Business 2		2,36	-	0,80	2 storeys	60%
Erf 10	Undetermined		0,1960	-	n/a	n/a	n/a
Erven 12, 13	Private Open Space		7,3128	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		3,1080				
		Total	27,20 h	1 718			

FLOOD LINE CERTIFICATION

It is hereby certified that the proposed township as shown is AFFECTED / NOT AFFECTED by a 1:100 year flood line, as per the provisions of Section 144 of the National Water Act, 1998 (Act 36 of 1998).

(Pr Eng) (Reg No)

Y -90750

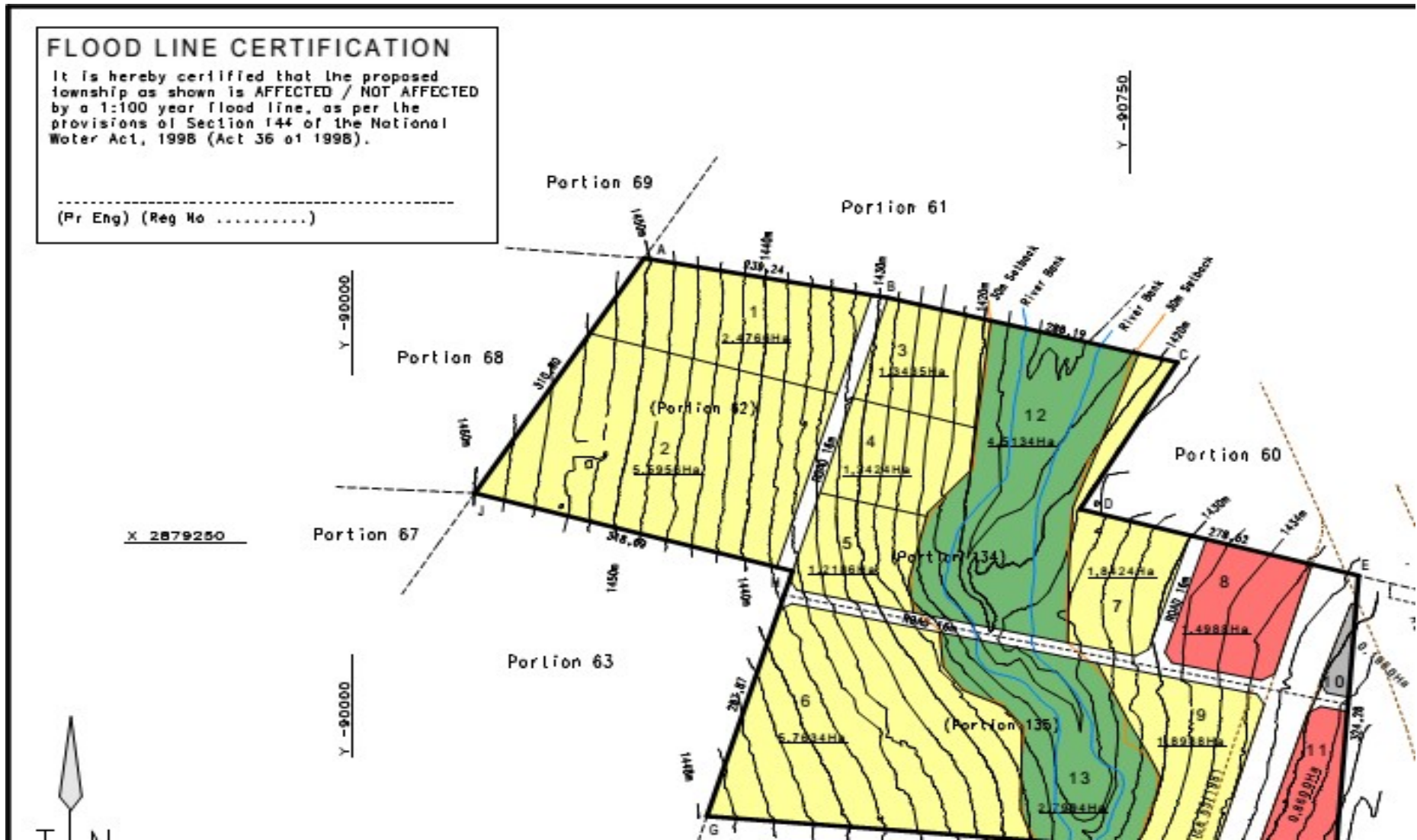


Figure 6: Site Development Plan: Mogale Ext 43

Please refer to the table 7 and figures 7 for the zoning schedule and landuse parcels proposed for Mogale Extension 44. The signed flood line delineation layouts from the Engineer are Attached to **Appendix D**.

Table 7: Zoning Schedule for Mogale Extension 44

Erf #	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7	Commercial		5,4747	-	0,85	3 storeys	65%
Erven 8,9	Undetermined		0,6056	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		2,4850				
		Total	8,5653				

The development will aim to have a total of 4280 houses on the property, together with a large commercial component on all three sites. Mogale Ext 42 will have a ratio of 20% for the use of education facilities. The zoning category "Undetermined" as provided for in terms of the Krugersdorp Town Planning Scheme, 1980, allows for a portion of land to be included in a township development, where the land use is not pre-determined. The zoning does not allow any development on the erf - i.e. no primary or secondary land use rights are associated with this zoning. The future development of these portions of land would require them to be rezoned from "Undetermined" to the required zoning.

Mogale Ext 42 and 43 is affected by a Channelled Valley Bottom Wetland (CVB) System, running through the western portion of the site and draining in a northerly direction. No development will be allowed within this system and its regulated 30m buffer zone. These areas will be zoned Private Open Space.

An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. Portion 93 forms part of Mogale Ext 42 and will be zoned special. No development is currently proposed for this area.

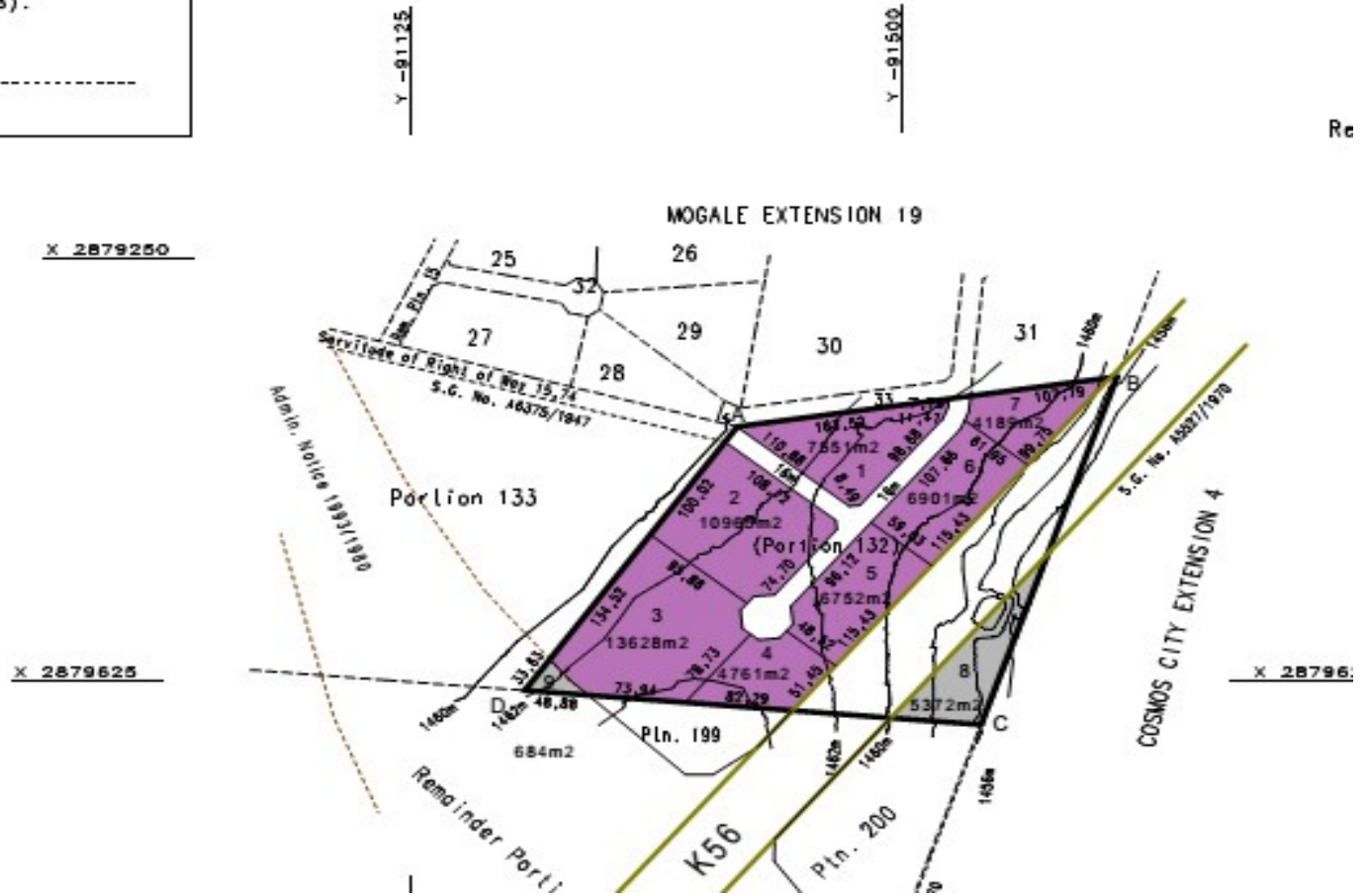
The total size of the development (as per the EIA application) is approximately 100ha, and the development footprint of the proposed activities on site is approximately 99ha. The entire site will thus be developed.

The proposed layout plan accommodates on site storm water, sufficient open space areas, and affordable service provision, please also refer to **Appendix C and B** for the Site plans.

FLOOD LINE CERTIFICATION

It is hereby certified that the proposed township as shown is AFFECTED / NOT AFFECTED by a 1:100 year flood line, as per the provisions of Section 144 of the National Water Act, 1998 (Act 36 of 1998).

 (Pr Eng) (Reg No)



Re

Figure 7: Site Development Plan Mogale Extension 44

3.4 Land Use for the study area

The study area itself is associated with medium density residential urban development together with a small component of commercial activities, as the area comprises of various small holdings predominantly utilised for small scale farming such as agricultural crop production, and for grazing purposes such as cattle and horses. Please refer to **Appendix C** for the Land-use map of the study area.

A single watercourse, identified within the study area, namely a channelled valley bottom (CVB) wetland located to the west of the site. The watercourse and its associated buffer zones will be excluded from the development. Please see figure 8 below for the location of the vally bottom wetland.

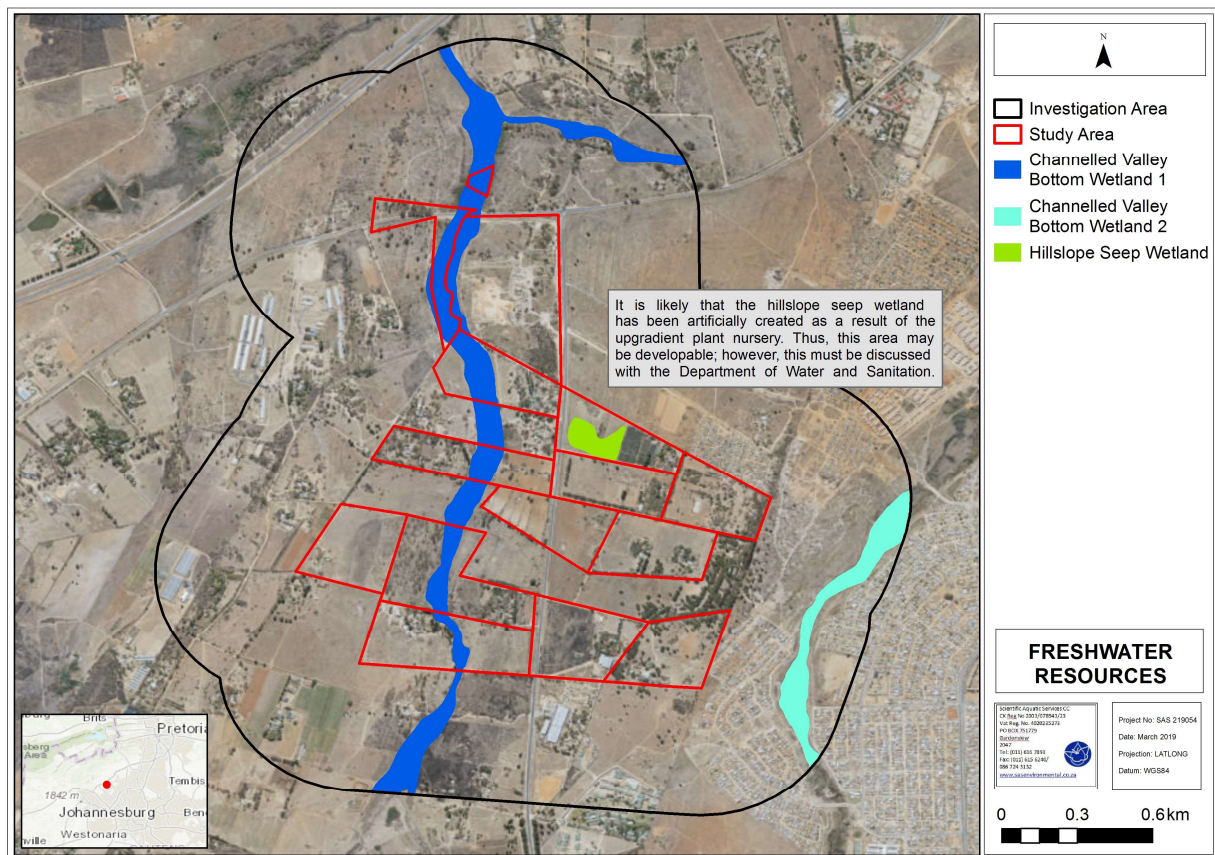


Figure 8: Position of the Valley Bottom Wetland situated within the study area.

The site is also affected by the proposed Mogale Roads Master Plan of the Muldersdrift Area, a small part of the development is affected by the PWV3. The proposed PWV 3 affects the eastern section of the Mogale x 42 study area. The areas affected by the proposed PWV3 road reserve are excluded from the development. The Provincial Road K 56 is adjacent to the proposed Mogale Ext 42 Township development. The road reserve for K56 has been accommodated in the township layout.

The *surrounding* land use for the area is quite diverse. The high-density residential development of Cosmo City borders the development to the east. Approximately 300m to the north-west of the proposed development site is the Astral Operations Limited Poultry Facility situated in Portion 32 of the farm Rietfontein. Please see figure 9.

The site also borders to the west, the approved Crane Valley Residential Estate, which obtained environmental approval in 2008 (GAUT REF: 002/06-07/N0561) and is located to the west of the proposed development on a portion of portions 32, Portion 67, 68 and 69 of the farm Nooitgedacht 534 JQ.

Various additional developments within the bigger Magaliesburg area surrounding the site have also been approved and earmarked for development. The area around Nooitgedacht 534 JQ is also earmarked for densification. Mogale Ext 16 is a Mogale Council development focused on low cost housing. To the east of Marina Road, between Marina Road and Cosmo City is the proposed Mogale Ext 10 initiated by a Dutch firm. Umnotho for Empowerment (Mogale Ext 28) has already been approved.

According to Mogale Spatial Development Framework (2011) the proposed study area is earmarked as a Densification Priority Zone (Map of the SDF is attached as **Appendix C**). The Muldersdrift Precinct Plan places the site in a medium density residential zone (map of the precinct plan is attached to **Appendix C**).

Based on the above the proposed new land uses being introduced through the Mogale Ext 42, 43 and 44 development will not have a conflict of interest to the surrounding land uses which is existing residential and commercial in nature.

However, the location of the existing Astral Operations Limited Poultry Facility in close proximity to Portion 1, 91 and 95 of the Farm Nooitgedacht 534JQ, may create a conflict in land-use. However, these two land-uses can co-exist, if all parties adhere to the relevant regulations applicable.

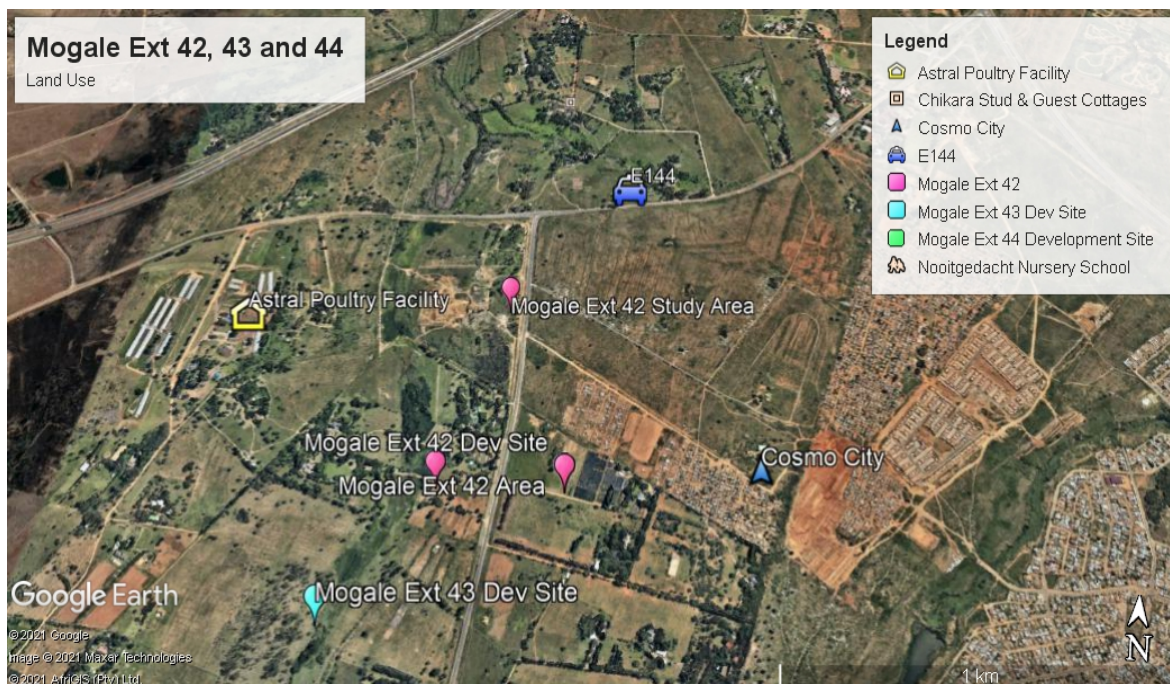


Figure 9: Locality of Astral Poultry and Mogale Ext 42 Study Area.

3.5 Provision of Access

Access to the development will be provided at three separate access locations from Marina Street (D1410) in accordance with the latest township layout plan.

The development will also need to align with the road access management principles as well as the latest Mogale Roads Master Plan for the Muldersdrift Area.

It is proposed that three access points be provided along the Mogale Roads Master Plan, marked as ac (access) in figure 10 below and that roads marked with a red line be relocated or closed.

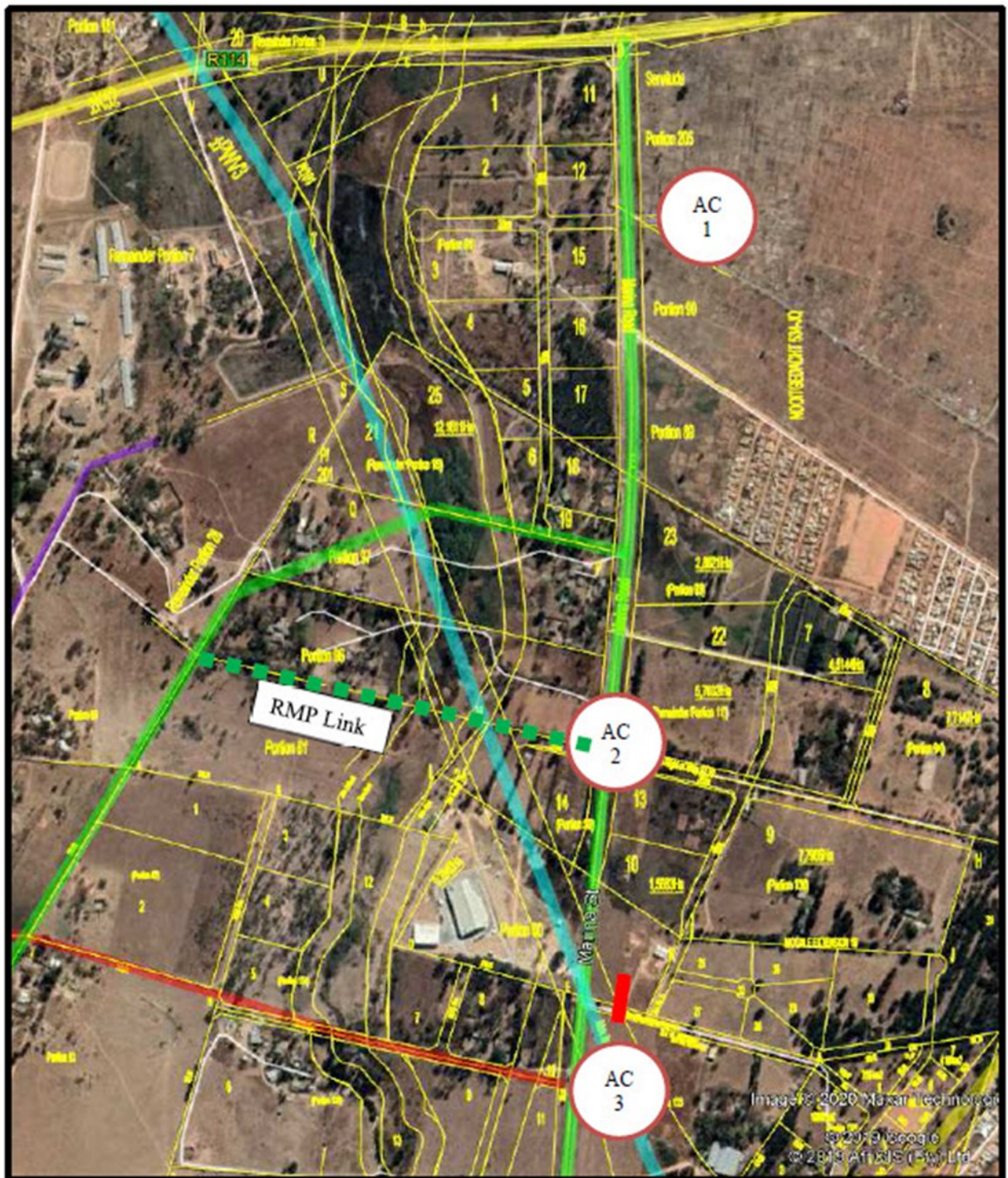


Figure 10: Proposed Access layout to the site.

Further to the access locality marked as AC 1. Although this access is located less than preferred intersection spacing in accordance with access management principles (TRH 26 – South African Road Classification and Access Management Manual), an access to the approved Mogale Extension 16 has already been approved at this locality.

The position has been chosen as to form one intersection which will provide access to Mogale Extension 16 (east of Marina Street) and the proposed Mogale Extension 42 which is located to the west of Marina Street. It is believed that the above arrangement will induce better traffic flow along Marina Street than a staggered intersection.

3.6 Provision of Services

3.6.1 Electrical Services

Lyo Emfuleni Engineers (Pty) Ltd Services was appointed to assist with the provision of electricity to site please refer to **Appendix E**. The estimated demand required for the development according to information available, is allocated as follows:

Table 8: Electricity Demand

Development	Demand kVA
Mogale Ext 42	10000
Mogale Ext 42	5200
Mogale Ext 42	2500
Total	17700

The proposed developments are within the Mogale City Local Municipality but electricity is supplied by Eskom.

3.6.2 Civil Services

Ilifa Africa Engineers (Pty) Ltd was approached to assist the applicant with the provision of services to the site please refer to **Appendix E**. The engineering reports only provide a assessment of the services available in the study area and provides management measures in order to ensure that services may become available to service the site. Please refer to the letter from Mogale City Economic Development Services in **Appendix F**. The required Engineering Services Agreement will address the provision of all municipal engineering services (electricity, water, sewer, roads and storm water) after approval of the township application is granted and prior to proclamation.

Water:

The nearest municipal water infrastructure is an existing 110mm dia. situated in Marina Street, supplying an informal settlement on Portion 89 of the Farm Nooitgedacht 534 JQ. This pipeline is supplied from the Honeydew Reservoirs (Johannesburg Water), through a bulk meter connection on the municipal boundary in Jubilee Street.

The average daily water demand for the proposed township is 3,425.1 kl/day. In accordance with the relevant Mogale City Local Municipality (MCLM) officials, the existing municipal

water network, supplied from the bulk meter connection on the municipal boundary in Jubilee Street, is under severe strain.

The engineers *propose* the construction of a new 5 MI reservoir on the North Eastern corner of Erf 8 within the development of Mogale Ext 42. A new bulk line can be constructed in Angola Ave and along South Africa Drive in Cosmo City in order to connect to the existing bulk line situated in Malibongwe Drive. Please refer to drawings K18-056-01-300 and K18-056-01-310 attached as **Appendix E**, civil services report.

No additional information pertaining to the 5 MI reservoir is available due to the current phase of the development also refer to **Appendix F** letter from Mogale City on the level of service agreement pertaining to approvals. If any activities associated with or due to the construction of the reservoir requires additional authorisation, a separate environmental application needs to be submitted. In addition the construction of the bulk water line route positioning does not form part of *this* EIA application. Batho Earth did inform the applicant that these activities will require a separate environmental authorisation process.

Sanitation:

No existing municipal sewer infrastructure is located in close proximity of the proposed developments. The existing Rietfontein Pump station is located approximately 3.3 km West of the proposed developments.

The total Dry Weather Flow (DWF) for the proposed township is 2,441.5 kl/day. A new sewer pump station will be required in order to connect to the existing municipal network. The *proposed* new pump station is located between Erf 1 and 2 within the development of Mogale Ext 42. The rising main of the new pump station will be constructed along the R114 towards Beyers Naude Drive and connecting to the existing Rietfontein outfall sewer line. The proposed pump station can in future be upgraded in order to drain a catchment area of at least 721 ha. Please refer to drawings K18-056-01-400 and K18-056-01-410 attached as **Appendix E**, civil services report.

No additional information pertaining to the `new sewer pump station is available due to the current phase of the development also refer to **Appendix F** letter from Mogale City on the provision of service to the site. If any activities associated with or due to the construction of the new pump station requires additional authorisation, a separate environmental application needs to be submitted.

3.6.3 Storm Water Management Plan

Ilifa Africa Engineers (Pty) Ltd was approached to compile the stormwater management plan for the proposed Mogale Ext 42, 43 and 44 development, please refer to **Appendix G**. No existing municipal stormwater infrastructure is located within the vicinity of the proposed township.

Design Rainfall:

The design rainfall was compiled using the procedures to estimate design rainfall in South Africa developed by JC Smithers and RE Schulze. The Mean Annual Precipitation (MAP) was calculated at the site as 667mm.

Pre-Development Run-off:

The pre development runoff was determined using the Rational method and the design rainfall. Four meaningful catchment areas were identified. Each township was considered as individual catchment areas except for Ext 42, which were divided into a Northern and Eastern section. The pre development runoff for the 1:25 year storm event is therefore 1.7, 2.0, 1.7 and 0.7 m³/s for Ext's 42 (North), 42 (East), 43 and 44 respectively.

Post-Development Run-off:

The post development runoff was also determined using the Rational method. The post development runoff for the 1:25 year storm event is therefore 7.8, 4.5, 7.6 and 2.3 m³/s for Ext's 42 (North), 42 (East), 43 and 44, respectively.

Network:

The network is designed to safely channel the runoff from a 1:10 year storm event, to the natural drainage course traversing the proposed development. The proposed roads will be provided with kerb inlets at strategic positions to catch stormwater runoff from the development. The underground system will consist of "Interlocking Joint" concrete pipes with diameters ranging between 450mm and 750mm dia. with various slopes. The maximum velocities in the network will also vary between 1.3 and 6.6 m/s. Please refer to the proposed stormwater layout attached as **Appendix G**.

Attenuation:

A stormwater attenuation analysis was conducted to obtain a storage volume per hectare by considering the four catchment areas. This rate was then applied to each individual erf assuming uniform characteristics apply.

The required attenuation storage was 9 120 m³ for a catchment area of 35.17 ha. The ratio of storage per hectare is therefore 259 m³/ha. This ratio is then applied to each erven in this catchment area to determine the required storage as indicated on the drawings attached to Appendix G.

Sustainable Urban Design Principles:

During the detail design stage and upon finalization of the site development plans of each erf, sustainable urban drainage principles will be incorporated to reduce the required attenuation and to promote stormwater infiltration. The principles to control the peak runoff at the source will include, but are not limited to, the following:

- Green roofs,
- Rainwater harvesting, and
- Permeable pavements.

Conclusion on the Stormwater Management Plan:

The engineer consultants confirmed the following:

- The stormwater runoff from the proposed development will be safely channeled from the higher lying areas to the lower lying area and discharged in the natural drainage course.

- New attenuation ponds will be constructed on each erf to ensure that the pre development runoff for a 1:25 year storm event is not exceeded. Storage will be provided in the order of 215 to 259 m³/ha.
- Stormwater inlets will be constructed at strategic positions to catch runoff from the site and conveyed in an underground stormwater drainage system consisting of interlocking joint concrete pipes.
- The proposed network will have sufficient capacity to accommodate the stormwater runoff from a 1:10 year storm event. Major storm events will be channelled overland towards the natural drainage course.

3.6.4 Waste Management

Waste, Effluent and Emission Management:

Construction Phase:

Construction material (e.g. cement and raw materials) will be stored in designated areas on the site, in a neat and orderly manner. Such areas for the storage of construction material are to be ratified by the appointed Environmental Control Officer (ECO) and are to be secured for security purposes. The volumes of raw construction material to be stored cannot be estimated at this stage.

The *solid waste* produced during the *construction phase*, will be taken and collected from site by means of skip waste containers. This will be the responsibility of the developer. The construction solid waste will be disposed of at a registered Municipal landfill site, of the Mogale City Local Municipality.

Presently, the applicant has not considered the re-use or recycling of materials as part of the development proposal. During the construction phase, waste should be managed according to the Waste Disposal Management Plan (as well as the Waste stream system presented in the EMP that will form part of the draft EIA):

The following procedures must be adhered to, in order to control and manage *builder's wastes* generated on the premises during the construction phase:

- Rubble material will be removed from the construction site frequently and disposed of at an approved dumping site.
- Sufficient containers will be on the construction site to handle the amount of litter, wastes, rubbish debris and builders' wastes generated on the site.
- These containers will be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties.
- No wastes will remain on the construction site for more than two (2) weeks.

Material to be used as backfill during a later building phase will be covered with a layer of soil to prevent litter from flying away and unhygienic conditions developing on the rubbish dumps.

Refuse Removal – Operational Phase

All access points and road reserves will be designed to accommodate the municipal refuse removal services. The service is fully operational through Mogale City. Municipal garbage includes glass, tin, paper, food residues, yard trimmings, textiles, and plastics. The operational solid waste will be collected and disposed of by the Mogale City Local Municipality.

Energy Efficiency

The following basic energy-saving techniques can be used to reduce building energy use, and as such, are brought to the attention of the developer:

- Ensure that the planned building configuration takes maximum advantage of the site and climate. Bermed, or partially buried, construction can moderate building temperature, save energy, and preserve open space.
- Reducing cooling loads by eliminating undesirable solar heat gain.
- Reducing heating loads by using desirable solar heat gain. Using day lighting through building windows can displace artificial lighting, reduce energy costs, and is associated with improved occupant health, comfort, and productivity.
- Using natural light as a substitute for (or complement to) electrical lighting.
- Using natural ventilation whenever possible.
- Using more efficient heating and cooling equipment to satisfy reduced loads.
- As the preliminary layout is refined, ensure that access to daylight continues to be optimized. Consider perimeter access to light and views, roof monitors, skylights, and light shelves.
- Develop material specifications and a building envelope configuration that maximizes energy performance. Consider window shape and placement, shading devices, differentiated façades, reflective roofing, fabric roofs, induced ventilation, night time cooling ventilation, and selective glazing.
- Continue energy analyses, including multiple runs of similar products (e.g., various glazings and insulation levels) to determine best project-specific options. In addition to first cost, consider durability and long-term energy performance.

The following recommendations regarding structural designs are brought to the attention of the developer:

- Use of building material that requires excessive amounts of energy to manufacture should be minimised.
- Use of building material originating from sensitive or scarce environmental resources should be minimised. E.g. no tropical hardwood may be used.

- Building material should be legally obtained by the supplier, e.g. wood must have been legally harvested, and sand should be obtained only from legal borrow pits and from commercial sources.
- Building material that can be recycled / reused should be used rather than building material that cannot.
- Use highly durable building material for parts of the building that is unlikely to be changed during the life of the building (unlikely to change due to e.g. renovation, fashion, changes in family life cycle) is highly recommended.

The following Architectural principles are provided to encourage the applicant and the developer, to ensure the buildings on site or both energy efficient and make effective use of alternative energy sources: Solar power should be considered for heating hot water systems. Recommendations for improving energy efficiency are provided as follows:

- building orientation,
- use of local material,
- sufficient glazing protection,
- natural ventilation principles, and
- potential rain water harvesting.

Further emphasis must be placed on indoor environmental quality (IEQ) through electrical efficiency of lighting as well as air-conditioning.

3.7 Description of the Phases of the proposed Development

3.7.1 Pre-Construction Phase

There are numerous steps with the construction process, but the very first one is called the preconstruction phase. This is when all the planning and coordination is completed prior to the start of the actual construction. During this stage the legal and administrative activities related to the Environmental Process takes place. The establishment of the development and the registration of individual erven are subject to the granting of the Environmental Authorisation.

Pro-active environmental measures minimise the chance of impacts taking place during the construction and operational phase. There is still the chance of accidental impacts taking place. However, through “thinking out” actions required to prevent identified risks during the planning phase, the necessary corrective actions can be taken thereby limiting potential impacts.

3.7.2 Construction Phase

The construction phase entails the following:

- Site Clearance
- Excavation
- Stabilisation of Slopes

- Construction of internal roads
- Installation and Upgrade of services such as water and sewerage
- The development of the erven and the construction of the relevant buildings and parking facilities

The Environmental Control Officer (ECO) must be an independent environmental consultant appointed by the applicant or contractor to act as the applicant or contractor representative, to monitor and review the on-site environmental management and implementation of this EMPr by the Contractor during the construction and operational phase.

3.7.3 Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts prevalent during the operational phase will be minimised. During the operational phase the various erven will be fully developed and functional. The mitigation measures that have been introduced and the storm water management system and landscape plan will be monitored for effectiveness through out the EMPr.

4 LEGISLATIVE ASPECTS

4.1 National Environmental Management Act, Act No. 107 of 1998 (NEMA)

National Environmental Management Act, 2006, Act 107 of 1998: the EIA Regulations of April 2017. The act determines the processes, principles and criteria for consideration of applications, i.e. it is applicable in its entirety.

The objective of NEMA is: “To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.”

4.2 Applicable Listed Activities

The listed activities that apply to this application is as follows:

Table 9: NEMA listed activities

EIA Notice and Activity Number	Listed Activity Description	Describe the portion of the proposed project to which the applicable listed activity relates
GN R.327 Listed Notice 1		
GN R.327 Listed Notice 1, (April 2017) Activity 9	<p>The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water -</p> <ul style="list-style-type: none"> • with an internal diameter of 0,36 metres or more; or • with a peak throughput of 120 litres per second or more, <p>excluding where: such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or railway line reserve.</p>	<p>Internal infrastructures will be constructed in the form of pipelines exceeding 1000 meters in length for bulk transportation of water, sewage OR storm water which is required to service the land uses <i>within the layout plan</i> associated with the mixed land use development, Mogale Ext 42, 43 and 44 development.</p> <p>The Storm Water plan requires that the system will consist of “Interlocking Joint” concrete pipes with diameters ranging between <u>450mm and 750mm</u> dia.</p>
GN R.327 Listed Notice 1, (April 2017) Activity 10	<p>The development and related operation of infrastructure exceeding 1000 metres in length for the bulk <u>transportation of sewage</u>, effluent, process water, waste water, return water, industrial discharge or slimes –</p> <ul style="list-style-type: none"> (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres 	<p>Sewage pipelines are required to service the land uses (development zones) <i>within</i> the layout plan associated with the mixed land use development, Mogale Ext 42, 43 and 44 development.</p> <p>The length of the sewage pipelines as a combined total will exceed 1000 meters in length.</p>

	per second or more; excluding where- (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.	The site is not situated within an urban area. The Storm Water plan requires that the system will consist of “Interlocking Joint” concrete pipes with diameters ranging between <u>450mm and 750mm</u> dia.
GN R.327 Listed Notice 1, Activity 12	The development of – (ii) Infrastructure or structures with a physical footprint of 100 square meters or more: Where such development occurs – c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse:	The Gauteng C-Plan indicates a non-perennial river traversing the western portion of the study area. The portion of the river buffer associated with the northern portion of the study area is associated with a wetland buffer. A 30m GDARD setback area was proposed by the freshwater specialists. Development will thus be within the 32meters of a watercourse.
GN R.327 Listed Notice 1, (April 2017) Activity 24	The development of a road – (ii) with a reserve width wider than 13.5m, or where no reserve exists where the road is wider than 8m.	The Mogale Ext 42, 43 and 44 development will require the construction of internal roads, with a reserve width wider than 13.5m.
GN R.324 Listed Notice 2		
GN R.324 Listed Notice 2, (April 2017) Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, except 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.	Clearance of vegetation of approximately 100ha of land in order to construct the Mogale Ext 42, 43 and 44 development site.
GN R.324 Listed Notice 3		
GN R.324 Listed Notice 3, (April 2017) Activity Number 12 (c):	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (c) Gauteng ii. Within critical biodiversity areas or	A portion of Ptn 94 is considered to be a CBA, important for “Red” listed plant and bird habitat and for Primary Vegetation. According to the Gauteng C-Plan an ESA traverses the western portions of the study area. The Gauteng C-Plan indicates a non-perennial river traversing the western

	Ecological Support Area (ESA) as identified in the Gauteng Conservation Plan	portion of the study area. The portion of the river buffer associated with the northern portion of the study area is associated with a wetland buffer.
GN R.324 Listed Notice 3, (April 2017) Activity Number 18 (c):	The widening of a road by more than 4m, or the lengthening of a road by more than 1km Gauteng: (iv) Sites identified as Ecological Support Areas.	Internal roads are proposed that will be wider than 8m and more than 1km in length. The width of the roads proposed are 13,5m

In order to be in a position to develop the proposed “Mogale Ext 42, 43 and 44 Development”, the Applicant needs to obtain Environmental Authorization from the Gauteng Department of agriculture and Rural Development (GDARD), to lawfully undertake the above listed activity, listed in Listing Notice 1, 2 and 3 of the Environmental Impact Assessment Regulations, 2017, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

In accordance with the requirements of Regulation 3 of GN R25, also having considered the provisions of NEMA, it was determined that a *full Scoping and EIA process* be undertaken.

This report fulfils the requirement of the EIA Regulations for the documentation in the EIA phase. The structure of this report is based on Regulation 2, Appendix 3 of GNR 982, of the EIA Regulations as amended, which clearly specifies the required content of a EIA report.

4.3 National Environmental Management: Waste Act, Act 59 of 2008

The NEM: Waste Act (NEMWA) was accented to on 10 March 2009 and came into effect on 01 July 2009. This Act repeals the sections in the Environment Conservation Act, Act 73 of 1989 that previously dealt with the licensing of general and hazardous waste storage facilities. The Act was established to regulate waste management for the protection of human health and the environment.

Section 19 of the NEMWA authorises the Minister to publish a list of waste management activities which would require an environmental assessment and waste management licence. On 3 July 2009 the Minister published a schedule of waste management activities in respect of which a waste management licence is required in accordance with section 20(b) of NEMWA (GN R718, GG 32368). Activities listed under Category A of GN R 718 for which a waste management licence is required, are equivalent to those that require a Basic Assessment process as stipulated in GN R 544 of June 2010. Category B activities are equivalent to those that require a full EIA process as stipulated GN R 545 of June 2010.

Application relevance: No activities proposed for the Mogale Ext 42, 43 and 44 Development will require a waste license.

4.4 The National Water Act (Act 36 of 1998)

Section 21(1) of the National Water Act (NWA) states that a person may only use water if the water use is authorised by a license under NWA or if the responsible authority has dispensed with a license requirement if it is satisfied that the purpose the NWA will be met by the granting of a license, permit, or other authorisation under any other law. A person may only use water without a license if the water use is permissible.

In essence, the proposed development should align to the purpose of this Act, therefore ensuring that the nation's water resources are protected, utilised, developed, conserved, managed, and controlled in ways that take the following into account:

- Meeting basic human needs of present and future generations
- Promoting equitable access to water
- Promoting efficient, sustainable and beneficial use of water in the public interest
- Reducing and preventing pollution and degradation of water resources
- Facilitating social and economic development
- Providing for the growing demand for water use

The Act requires that (where applicable) the 1:50 and 1:100-year flood line be indicated on all the development drawings that are being submitted for approval. These flood lines have been indicated, the proposed development is situated outside the 1:50 and 1:100-year floodlines. Where services infrastructure is required to cross the wetland and stream a application for a Water Use Licence will be submitted to the Department of Water and Sanitation.

Application relevance: *During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment. In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), a regulated area of a watercourse for Section 21 (c) and 21 (i) of the National Water Act, 1998 (Act No, 36 of 1998) is applicable and the development will require to apply for a Water Use Licence.*

4.5 The National Heritage Resources Act (Act 25 of 1999)

National Heritage Resources, Act, 1999, Act 25 of 1999: Sets requirements for assessment of impacts on the cultural and heritage assets, the processes to be followed in notifying the competent authority and the elements of a report on the assessment.

The protection of archaeological and palaeontological resources is the responsibility of a provincial heritage resources authority (SAHRA) and all archaeological objects, palaeontological material and meteorites are the property of the State. "Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development must immediately report the find to the responsible heritage resources

authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority”.

Application relevance: *A Phase 1 Cultural Heritage Assessment has been compiled and is attached to **Appendix H**. Three houses, on Plot 94, Plot 95 and Plot 130 have been identified to be of significance and a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out. Three informal burial sites have been identified on Plot 28, Plot 59 and Plot 97, and a valid permit should be obtained from SAHRA, the police and the Department of Health before they can be relocated. As part of the draft EIA public participation process comments from SAHRA will also be obtained.*

4.6 National Environmental Management: Biodiversity Act, Act 10 of 2004

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).
- Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Application relevance: *According to the National Threatened Ecosystems (2011) database, various scattered portions of the study area (\pm 43%) is considered to form part of the remaining extent of the Endangered Egoli Granite Grassland Ecosystem. According to the South African Conservation Areas Database (SACAD Q4, 2018) the Magaliesberg Biosphere Reserve is situated 0.4 km northwest of the study area, and the Walter Sisulu Botanical Garden \pm 8.9 km southwest.*

A portion of Ptn 94 is considered to be a CBA, important for “Red” listed plant and bird habitat and for Primary Vegetation. A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation and ridges.

*The study area falls within a Class 2 Ridge. A single patch situated immediately west of Cosmo City located on Portion 132 was classified as Rocky Ridge habitat. This habitat unit, although associated with habitat degradation and AIP proliferation as a result of edge effects from Cosmo City and the surrounding small holdings, were still associated with floral species typical of ridge habitat. Please find attached to **Appendix I** the Biodiversity Assessment.*

4.7 Government Notice 864 Alien and Invasive Species Regulations as published in the Government Gazette 40166 of 2016 as it relates to the National Environmental Management Biodiversity Act (NEMBA), 1998 (Act 107 of 1998);

NEMBA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. This act in terms of alien and invasive species aims to:

- Prevent the unauthorized introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur,
- Manage and control alien and invasive species, to prevent or minimize harm to the environment and biodiversity; and
- Eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien species are defined, in terms of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004) as:

- A species that is not an indigenous species; or
- An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Categories according to NEMBA (Alien and Invasive Species Regulations, 2017):

- Category 1a: Invasive species that require compulsory control;
- Category 1b: Invasive species that require control by means of an invasive species management programme;
- Category 2: Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- Category 3: Ornamentally used plants that may no longer be planted.

Application relevance: *The study area, particularly the freshwater habitat was severely affected by Alien Invasive Plant (AIP) proliferation, and AIP control is considered of utmost importance. This will increase the aesthetics of the feature, as well as improve the floral habitat and integrity, which in turn will provide additional habitat and food sources for an increased faunal population. This will further contribute to the sense of place, and serenity of the proposed development. Please find attached to **Appendix I** the Biodiversity Assessment.*

4.8 Conservation of Agriculture Resources Act, 1983 (Act No. of 1983)

The purpose of this act is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

Application relevance: *The study site is currently zoned agricultural in terms of the Krugersdorp Town Planning Scheme of 1980, situated within the urban edge of Mogale. A*

Town planning application will be lodged with the Mogale City Local Municipality. The National Department of Agriculture must be notified of the project during the Town Planning Application process. The Dept of Agriculture will also be notified of the draft EIA review period in order to obtain comments.

According to Mogale Spatial Development Framework (2011) the proposed study area is earmarked as a Densification Priority Zone (Map of the SDF is attached as Appendix C). The Muldersdrift Precinct Plan places the site in a medium density residential zone (map of the precinct plan is attached to Appendix C).

4.9 National Veld and Forest Act, 1998 (Act No 101 of 1998)

National Veld and Forest Fire Act, 1998, Act 101 of 1998: Determines a duty to prepare and maintain firebreaks on every owner on whose land a veld fire may start or burn or from whose land it may spread. It sets criteria for such firebreaks, amongst others that it may not lead to soil erosion and that it must be free of inflammable material capable of carrying a veld fire across it.

Application relevance: *Implementation of open space management plan for the Mogale Ext 42, 43 and 44 Development. An individual of the protected tree *Podocarpus henkelii* was also observed within the Woodland habitat, where it was planted, and naturally occurring within the area. This species is however protected within the NFA (1998, updated 2001), and as such a permit will be required from DAFF for the removal/destruction/relocation of this individual. In order to avoid applying for a permit from the Department of Agriculture, Forestry and Fisheries (DAFF) for the *Podocarpus henkelii* individual planted within the study area, it is recommended that this individual remain planted in its current location and be incorporated into a landscaped garden.*

4.10 National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004)

National Environmental Management: Air Quality Act, Act 39 of 2004: The law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; and to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; and for specific air quality measures.

Part IV of the Act deals with dust control – “Whenever dust originating on any land in a dust controlled area is causing a nuisance to persons residing or present in the vicinity of that land, the owner or occupier may be required to take the prescribed steps or adopt the “best practicable means” for the abatement of the dust”.

Application relevance: *Based on the land uses for the Mogale Ext 42, 43 and 44 Development, no noxious emissions are associated with any of the land-uses proposed, and hence, no adverse or significantly negative impacts on air quality in the study area are envisaged. The development will thus not require to apply for an air emission licence. Separate industrial and other activities that could cause the release of emissions into the air must however apply for their own air emissions licenses where required.*

4.11 Provincial and Local Policies and Guidelines.

An environmental policy is derived from the guiding principle whereby an organization first defines the scope of its commitment to the environment. The policy is a public document that communicates the organization's overall approach to managing its interaction with the environment.

Various components of Environmental Management are strongly influenced by the environmental policies in terms of their scope and level of resource allocation. As a rule, objectives and targets are set to achieve compliance with the environmental policy, and overall environmental performance is evaluated against the organization's stated intent reflecting a level of commitment.

Policy must meet the following criteria:

- It must be relevant to the nature of an organization's activities, and the specific environmental aspects associated with those activities;
- It must consider specific local environmental conditions;
- It must consider relevant environmental legislation;
- It must define and formulate the organization's fundamental approach to environmental management; and
- It must set a precedent for communication and liaison with all stakeholders.

Policies considered in the compilation of this is listed in table 10 below and only highlights some of the most prudent issues in this regard.

Table 10: Provincial and Local Context.

Provincial and Local Policies and Guidelines	Content
Gauteng Planning and Development Act (Act No 3 of 2003) (GPDA)	<p>The GPDA states that Policy, administrative practice and law in the Province shall promote development and land use which:</p> <ul style="list-style-type: none"> • Promotes the more compact development of urban areas and the limitation of urban sprawl and the protection of agricultural resources; • Supports the correction of historically distorted spatial patterns of settlement in Gauteng • Promotes integrated land development in rural and urban areas in support of each other; • Results in the use and development of land that optimises the use of existing resources such as engineering services and social facilities; and • Owns positive development qualities, particularly with regard to public environments.

	<p>Policy, administrative practice and law in the Province shall with due regard to the principles of the National Environmental Management Act, 1998 (Act 107 of 1998) promote sustainable development that:</p> <ul style="list-style-type: none"> • Is within the fiscal, institutional and administrative means of the Province • Meets the basic needs of all citizens in an affordable way Establishes viable communities with convenient access to economic opportunities, infrastructure and social services • Optimises the balanced use of existing resources, including resources relating to agriculture, land, water, minerals, services infrastructure, transportation and social facilities • Balances environmental considerations of preserving natural resources for future generations with economic development practices and processes • Ensures the safe utilisation of land by taking into consideration its biophysical factors such as geology and undermined or hazardous areas <p>Application relevance: <i>The Mogale Ext 42, 43 and 44 development address the requirement of the GPDA Policy via its position within the urban realm adjacent to existing and proposed transport corridors, existing and proposed development and adjacent to urban amenities. Also, the mixed-use character caters for higher densities which will minimise the necessity for urban development on the outskirts of urban areas. Sustainable principles are to be incorporated as far as possible within the planning, design, construction and operational phases therefore ensuring an appropriate balance between social, economic and environmental contexts. The environmental impact assessment process ensures that sound land development practices are implemented, creating a balance between environmental, social and economic requirements.</i></p>
Gauteng Spatial Development Framework (GSDF)	<p>The purpose of the Gauteng Spatial Development Framework (GSDF) is to communicate a shared future spatial vision and structure for the Province. The GSDF is clear and unambiguous about the fact that growth and development within the province should be strategically guided and directed and not purely just a consequence of spontaneous and organic growth. The GSDF provides an overarching spatial vision for the Province and hence provides guidance and influences the Mogale City Spatial Development Framework with specific regards to the location and nature of the physical development.</p>

	<p>The primary structuring elements identified within the GSDF are those of:</p> <ul style="list-style-type: none"> • Urban mixed-use activity nodes; • Open space and green system; • Public transit and movement routes; • Urban corridors and activity spines. <p>In addition to the above the GSDF sets out to guide and structure growth, in a balanced manner, towards the notion of a “sustainable city”.</p> <p>Application relevance: <i>The proposed Mogale Ext 42, 43 and 44 development complies to the principles of the Gauteng Spatial Development Framework in light of the fact that the development concept aims to move away from the typical low-density development concepts characteristic of the area.</i></p> <p><i>Through the increase in development density the concept promotes a higher intensity development proposal whilst still acknowledging the importance of the sensitive environment within which the development is located and also preventing urban sprawl.</i></p> <p><i>Ample private open space is provided as part of the proposed development ensuring that sensitive areas are protecting and also providing recreational areas.</i></p>
<p>The Gauteng Draft Red Data Policy.</p>	<p><i>The primary purpose of the Draft Red Data Policy is to protect red data plant species in Gauteng Province. The Red Data plant policy is based on the following basic principles:</i></p> <p><i>Species endemic to the province of Gauteng must be afforded the utmost protection, as they occur nowhere else in the world. As the relevant provincial agency, this Department’s responsibility towards Gauteng endemics is absolute;</i></p> <p><i>Conservation of only one population essentially ignores the lowest level of biodiversity that is genetic diversity. It is therefore imperative that all populations of Red Data plant species are protected;</i></p> <p><i>In situ conservation is preferable to ex situ conservation. Removing a population from its natural habitat and placing it under artificial conditions results in the erosion of the inherent genetic diversity and characteristics of that species;</i></p> <p><i>In order to ensure the persistence of a population, it is imperative that the ecological processes maintaining that population persist;</i></p> <p><i>In order to ensure the persistence of a plant population, it is vital that pollinators are conserved. To conserve pollinators, the habitat</i></p>

must be managed to provide appropriate nest sites for pollinators and a seasonal succession of suitable forage and host plants. Pollinators must be protected from herbicide and pesticide application and soil disturbance must be prevented;

Translocation of Red Data species is an unacceptable conservation measure since the translocated species may have undesirable ecological effects;

Rural parts of the province should be protected from insensitive developments and urban sprawl/encroachment should be discouraged. Policy guiding developments should therefore be less lenient in rural areas;

Red Data plant species historically recorded on a site, but not located during searches within species flowering seasons may be dormant (as a seed bank or subterranean structures such as bulbs/tubers/etc.) due to unfavourable environmental conditions;

Suitable habitat adjacent to known populations of Red Data plant species has a high probability of being colonized;

In order to protect a plant population that occurs in a fragmented landscape from edge effects, it is necessary to protect it with a buffer zone that extends from the edge of the population; and

The transformation of natural vegetation to crops is considered as permanent as urbanization and may cause the extinction of Red Data plant populations and their pollinators.

Application relevance: An ecological specialist was appointed to assess the proposed development sites fauna and flora biodiversity, with specific attention to Red Data Listed species.

During the field assessment five broad habitat units were identified, i.e. Secondary Grassland, Freshwater Habitat, Rocky Ridge, Woodland and Transformed Habitat. The secondary Grassland Habitat was further subdivided into the Eragrostis Secondary Grassland, and the Degraded Secondary grassland, based on the floral species diversity, and habitat available for floral SCC.

Due to habitat degradation of the study area no viable remnant patches considered representative of the original Egoli Granite Grassland as defined by Bredenkamp et al. (2006) were observed. The study area, therefore, with the exception of the freshwater resource, which as per the recommendation of the specialists was excluded from development, holds no developmental constraints for the proposed development.

*The floral SCC *Boophone disticha* and *Hypoxis hemerocallidea* were however observed throughout the study area, and care should be taken during the construction of the development, not to destroy*

	<p><i>individuals of these species. Individuals of <i>Eucomis autumnalis</i> were also historically planted within an ornamental garden. Where individuals of any floral SCC are situated within the development footprint, they should be rescued and relocated to similar suitable habitat.</i></p> <p><i>This fresh resource area (open / green belt area) can be used for the relocation of protected floral Species of Conservation Concern (SCC) i.e. <i>Boophone. Disticha, Hypoxis hemerocallidea</i> and <i>Eucomis autumnalis</i>, which will negate the need to obtain permits for their relocation from GDARD.</i></p> <p><i>This process should be overseen by a suitable qualified specialist. If rescue and relocation is implemented for <i>H. hemerocallidea</i> and <i>Boophane disticha</i>, no other risks to their populations within the larger region, or locally, are foreseen for medicinal plants.</i></p> <p><i>An individual of the protected tree <i>Podocarpus henkelii</i> was also planted within the woodland habitat. This species is protected within the NFA (1998, updated 2001), and destruction/ removal/ relocation of this individual will require a permit from the DAFF. In order to avoid applying for a permit from the Department of Agriculture, Forestry and Fisheries (DAFF) for the <i>Podocarpus henkelii</i> individual planted within the study area, it is recommended that this individual remain planted in its current location and be incorporated into a landscaped garden.</i></p> <p><i>Please refer to Appendix I for the Biodiversity (Fauna and Flora) Assessment. Attached to Appendix J is the Freshwater and Wetland Assessment.</i></p>
<p>The Gauteng Draft Ridges Policy</p>	<p>The quartzite ridges of Gauteng are one of the most important natural assets in the northern provinces of South Africa. This is because these ridges, and the area immediately surrounding the ridges, provide habitat for a wide variety of fauna and flora, some of which are Red List, rare or endemic species or, in the case of certain of the plant species, are found nowhere else in South Africa or the world. The ridges also fulfil functions that are necessary for the sustainability of ecosystems such as the recharging of groundwater, wetlands and rivers, wildlife dispersal and providing essential habitat for pollinators.</p> <p>Ridges also have a socio-cultural role in that they provide aesthetically pleasing environments that are valued by residents, tourists and recreational users. Human activities such as urbanization, mining and the planting of alien vegetation may undermine the contribution that ridges make to the environment.</p> <p>The conservation of ridges falls within the ambit of the environmental right and this policy comprises one of the measures</p>

	<p>that GDARD has taken to give effect to the environmental right in respect of ridges, therefore ensuring that:</p> <ul style="list-style-type: none"> • The use of ridges is sustainable; • Members of the public are able to make informed decisions regarding proposals for development on ridges and the use of ridges; • Officials make consistent decisions in respect of planning and environmental applications that involve negative impacts on ridges; • The Department’s responsibility in respect of the protection of the environment is carried out in an efficient and considered manner. <p>Application relevance: <i>The study area falls within a Class 2 Ridge. A single patch situated immediately west of Cosmo City located on Portion 132 was classified as Rocky Ridge habitat. This habitat unit, although associated with habitat degradation and AIP proliferation as a result of edge effects from Cosmo City and the surrounding small holdings, were still associated with floral species typical of ridge habitat. The floral diversity of the Rocky Ridge Habitat Unit is considered to be moderately low. The ridge is considered fragmented, with only a small section of the original ridge left. Edge effects from Cosmo City and the surrounding small holdings are the most likely cause for the reduced floral diversity. Despite the degraded nature of the ridge, species often associated with rocky outcrops were observed, albeit common widespread species, and include trees such as <i>Olea europae</i>, <i>Protea caffra</i>, <i>Searsia lancea</i> and <i>Ziziphus macronata</i>, as well as herbs such as <i>Crasulla capitella</i>, <i>Gomphocarpus glaucophylla</i>, and <i>Oxalis obliquifolia</i>.</i></p> <p><i>Please refer to Appendix I for the Biodiversity (Fauna and Flora) Assessment. Attached to Appendix J is the Freshwater and Wetland Assessment.</i></p>
<p>GDARD Conservation Plan, Version 3.3 (2011)</p>	<p>A comprehensive Provincial Conservation Plan (C-Plan) was launched as a decision support tool in September 2005 to protect the province’s ecosystems and associated biodiversity and to act as an information tool for the conservation of sensitive areas. The C-Plan was an outcome of the Gauteng Biodiversity Gap Analysis Project (BGAP).</p> <p>The C-Plan system maps important biodiversity areas in Gauteng and provides information to protect important and sensitive areas within the province. This information is used by government as a decision-making tool with regard to EIA approvals. The second version (C-Plan version 2) indicated that 25 percent of Gauteng</p>

	<p>needs to be conserved to meet the Province’s biodiversity targets. The C-Plan includes protected areas, irreplaceable and important sites due to the presence of Red Data species, endemic species and potential habitat for these species to occur.</p> <p>Application relevance: <i>A portion of Ptn 94 is considered to be a CBA, important for “Red” listed plant and bird habitat and for Primary Vegetation. A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation and ridges.</i></p> <p><i>According to the Gauteng C-Plan an Ecological Support Area traverses the western portions of the study area.</i></p> <p><i>The Gauteng C-Plan indicates a non-perennial river traversing the western portion of the study area. The portion of the river buffer associated with the northern portion of the study area is associated with a wetland buffer.</i></p> <p><i>Please refer to Figure 11 & 12 & 13– GDARD Policies</i></p> <p><i>Please refer to Appendix I for the Biodiversity (Fauna and Flora) Assessment. Attached to Appendix J is the Freshwater and Wetland Assessment.</i></p>
<p>Protection of Agricultural Land in Gauteng Revised Policy (June 2006)</p>	<p>The purpose of this policy is to protect land that has been identified as high agricultural potential from development, for the exclusive use of agricultural production to:</p> <ul style="list-style-type: none"> • Feed the nation; • Provide upcoming farmers with access to productive land; and • Meet national targets set in this regard. <p>Land with high agricultural potential is a scarce non-renewable resource and the need to protect it is a high priority for GDARD.</p> <p>GDARD applies a risk averse and cautious approach when development of such land for purposes other than agricultural production is proposed. The risk averse and cautious approach should be the basis of decision- making on the transformation of high potential agricultural land and land deemed as irreplaceable in terms of meeting Agri-BBBEE and national food security targets and thus legally protected from transformation. GDARD is not in support of development on high potential agricultural land that resides outside the urban edge. Seven agricultural hubs have been identified in the Gauteng Province. All the hubs are located outside the urban edge. The hubs are regarded as areas with a large amount of high agricultural potential land that should be preserved for agricultural use and will accordingly be planned and managed</p>

	<p>as a holistic agricultural unit. Each of the hubs will be developed to align with its agricultural potential and preferred land use and will be supported by current economic indicators.</p> <p>Application relevance: <i>The proposed development site, according to the Gauteng Agricultural Potential Atlas (GAPA Version 3), is not situated within a region delineated as an Agricultural Hub; however, the GAPA information indicates that the site contains land classified as having built up to moderate-high agriculture potential.</i></p> <p><i>However, the location of the existing Astral Operations Limited Poultry Facility in close proximity to Portion 1, 91 and 95 of the Farm Nooigedacht 534JQ, may create a conflict in land-use. However, these two land-uses can co-exist, if all parties adhere to the relevant regulations applicable.</i></p>
Gauteng Province EMF 2014	<p>The Gauteng Department of Agriculture and Rural Development (GDARD) decided to produce an Environmental Management Framework for the whole of Gauteng (GEMF).</p> <p>The GEMF replaces all other EMFs in Gauteng with the exception of the Cradle of Humankind World Heritage Site which is incorporated within the GEMF.</p> <p>The objective of the GEMF is to guide sustainable land use management within the Gauteng Province. The GEMF, inter alia, serve the following purposes:</p> <ul style="list-style-type: none"> • To provide a strategic and overall framework for environmental management in Gauteng; • Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng; • Determine geographical areas where certain activities can be excluded from an EIA process; and • Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making. <p>Application relevance: <i>The proposed development falls within the <u>GEMF of Zone 1</u> and Strategic Transmission Corridors.</i></p> <p><i>The intention with Zone 1 is to streamline urban development activities in it and to promote development infill, densification and concentration of urban development within the urban development zones as defined in the Gauteng Spatial Development Framework (GSDF), in order to establish a more effective and efficient city</i></p>

	<i>region that will minimise urban sprawl into rural areas.</i>
Local Policies	
West Rand District Municipality Integrated Development Plan, 2016/2017 IDP to 2020/21	<p>The proposed Mogale Ext 42, 43 and 44 development is in-line with the principles and objectives of the IDP, 2016/17 to 2020/21; in provincial and 0national spheres, considering the following:</p> <ul style="list-style-type: none"> • The proposed development is directing private investment to the area; • The proposed development provides sustainable and viable residential opportunities in close proximity to employment opportunities; • The proposed development represents a well-planned and sustainable development which is sensitive to the needs of the socio-economic and ecological environments; and • The proposed development will ensure that the existing services infrastructure is upgraded and will contribute to the tax base of the Municipality.
Mogale City Local Municipality: Development (2011)	<p>The spatial development objectives for Mogale City are informed by the legislative and policy frameworks, as well as the contextual analysis of Mogale City itself. The current SDF (2011) allocates the Mogale Ext 42, 43 and 44 properties as Densification Priority Zone's.</p> <p>The objectives of the Mogale SDF (2011) are:</p> <ul style="list-style-type: none"> • The integration of various areas in Mogale City to form a cohesive, well-functioning space economy; • The development of sustainable human settlements and urban renewal of existing settlements; • The promotion and facilitation of economic development; • The sustainable management of the natural environmental assets and heritage; • The promotion of tourism development; • The promotion of sustainable rural development; • The development and improvement of linkages with Johannesburg, Tshwane, Madibeng, the rest of Gauteng and the broader region, and • Service delivery, specifically focusing on providing sufficient capacity in development priority areas. <p>In addition, Mogale City is also in the process of launching is</p>

	<p>updated SDF of June 2019, which is currently in a draft format. The 2019 SDF allocates the Mogale Ext 42, 43 and 44 properties as a mixed use development zone, with a section allocated to public and social housing programmes.</p>
<p>Mogale City Integrated Development plan (IDP 2017/2018):</p>	<p>After the newly elected Council took office in 2016, the political objectives were reviewed and expressed in the in alignment with the West Rand District Municipality's 14 Regional Outcomes.</p> <ul style="list-style-type: none"> ○ The strategic plan intends to set a programme in motion for the five-year IDP programme and annual reviews, with the following Strategic Objectives and KPAs. ○ New strategic objectives of Mogale City as outlined in the strategic plan includes; ○ To deliver affordable, quality and sustainable services to communities ○ To provide efficient, effective and sustainable financial resource management services for the municipality ○ To create an enabling environment that promotes inclusive, participative and broad based economic development ○ To ensure good participative governance in compliance with the Constitution. ○ To create a positive climate that ensures organizational and human resources development for effective service delivery <p>The 2017/18 IDP (review of the 5 year IDP, 2016-21) lists the following most pertinent objectives: The Spatial Development Framework (SDF) Approach Is Described in Terms of The Following:</p> <ul style="list-style-type: none"> ● Specialize activity nodes within and beyond the core development triangle; ● Optimize linkages within the core development triangle; ● Link disadvantaged communities to within the core development triangle; ● Mixed use, high-density development along corridors and at nodes; ● Structure the IRPTN to support corridors; ● Extend economic activities into PDAs;

	<ul style="list-style-type: none"> • Promote infill residential development; • Upgrading of engineering and social infrastructure in PDAs; • Maintain and upgrade residential quality in suburbs; • Formalise and protect the Municipal Open Space System; • Promote access to services through CCCs; • Implement a statutory Urban Edge; • Land reform; and • Informality <p>The proposed development is in line with the IDP 1017/18 approach, the optimizing of linkages within the core developments along the R114, the development will ensure mixed uses along corridors and at nodes, together with protecting the Municipal Open Space System.</p>
<p>Precinct Plan Muldersdrift Development Zone, 2011:</p>	<p>The current Muldersdrift Precinct Plan (2011) allocates the Mogale Ext 42, 43 and 44 properties as medium density residential zone.</p> <p>The Precinct Plan for the Muldersdrift Development Zone objectives are as follows:</p> <ul style="list-style-type: none"> • To unravel spatially the sustained resources and latent potential that the Muldersdrift Development Zone has; • To outline a set of applicable guidelines and interventions to enable the sustainable development of the Muldersdrift Development Zone as a whole; • To expedite land development in an integrated and sustainable manner; • To outline the Infrastructure Development Framework; • To outline the Environmental Management framework; • Draft guidelines and design criteria (building typologies, heights, densities, public-private interfaces, design of public spaces) to manage development of the node and; • Define strategies for improvement of environmental quality and enhanced sustainability.

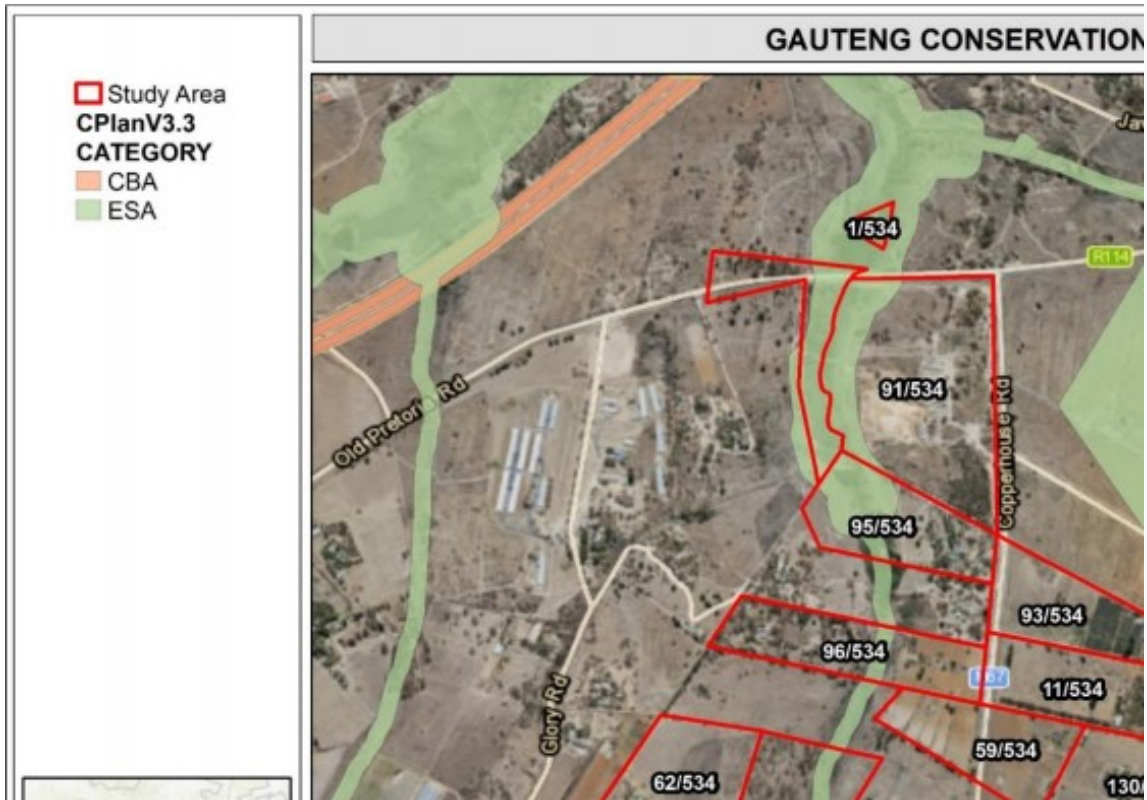


Figure 11: CBA and ESA associated with the study area according to the Gauteng Conservation Plan V3.3 (2011).

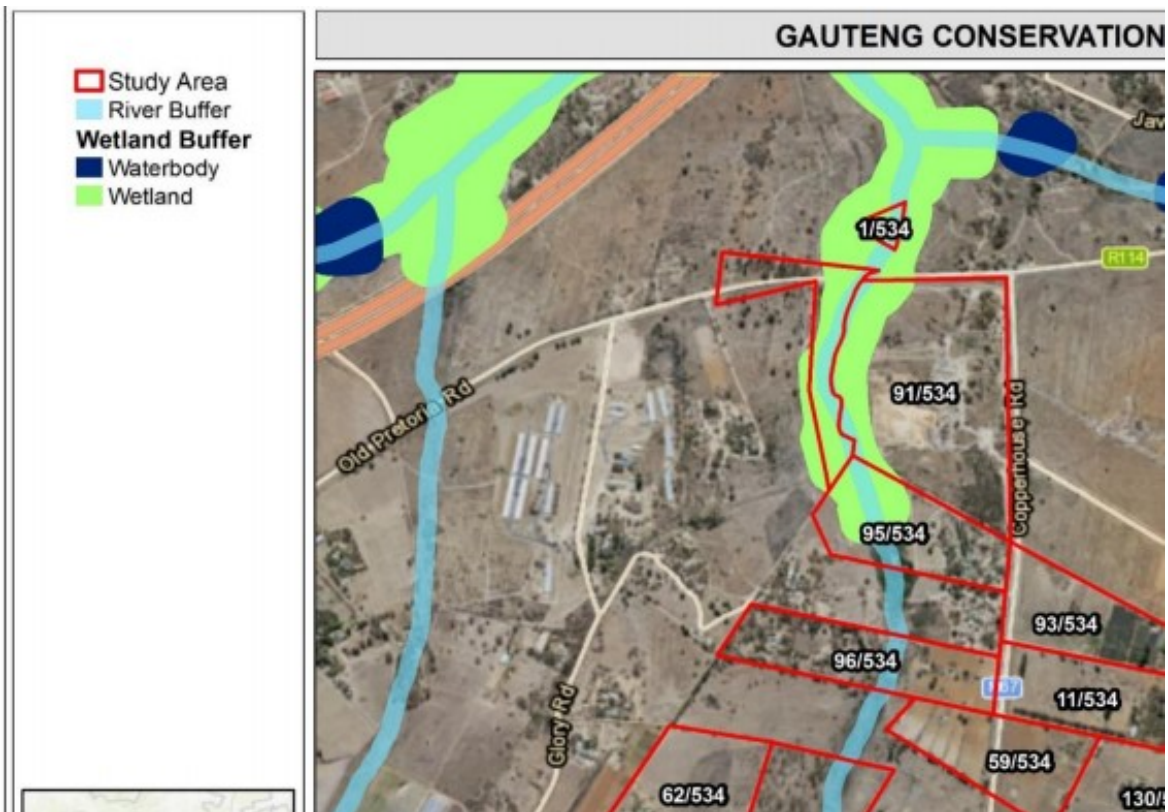


Figure 12: Perennial River associated with the study area according to the Gauteng Conservation Plan V3.3 (2011).



Figure 13 Gauteng Environmental Management Framework

Additional Frameworks that forms part of the proposed development is as follows:

- Gauteng requirements for biodiversity assessments (2012): Provides for broader landscape scale effects to be assessed, such as edge effects, altered drainage and permeation, biodiversity corridors, migration routes.
- GDARD Sustainable Development Criteria for Built Environment Projects requiring EIA in Gauteng (2010): Provides for strengthening of, and minimising damage to natural environments and ecosystems.

- The Urban Greening and Biodiversity Preservation By-Laws (2007) must be adhered to. The entire development site is situated on an Ecological Support Area, which is aligned with the Private Open Space (POS). The POS provides connectivity for ecological processes and is therefore important in terms of habitat conservation. Therefore, all the identified specialist studies including ecology must be undertaken and the recommendations thereof must be adhered to.
- In terms of the provisions of Regulation 13(2) of the Gauteng Noise Control Regulations issued in terms of the Environment Conservation Act (Act 73 of 1989), as well as the West Rand District Municipality's Air Quality Management By-Laws (Notice 717 of 31 May 2012) Ch 2 Part 1 Section 11, the application is supported subject to the following:
 - No noise nuisance or noise disturbance above threshold levels, as defined in terms of the said Act, will be allowed at any given time:
 - Permissible day time ambient noise level needs to be adhered to – level not exceeding 55Db(A).
 - Permissible night time ambient noise level needs to be adhered to – level not exceeding 45Db(A).
 - The volume of sound shall be so controlled that it will not be unreasonably loud, raucous, disturbing or a nuisance;

5 NEED AND DESIRABILITY

5.1 Project Need: Mixed Land Use

There is presently a high demand for development in the whole of Mogale but especially in the Muldersdrift area. The Muldersdrift area was previously excluded from the urban edge, with only limited development opportunities available. Since its inclusion in the urban development boundary, the area had seen a marked increase in varied development applications. The type of development occurring throughout the Muldersdrift area differs, depending on the locality and use.

An extensive part of the Muldersdrift area is included in the buffer zone to the Cradle of Humankind and is, accordingly, excluded from urban development. Apart from sections in proximity to the N14 Commercial Corridor, the development opportunities in this area are relatively limited.

The subject area represents the north-eastern boundary of the Mogale City Local Municipality's area of jurisdiction. Surrounding developments, and development pressure for expansion of facilities in the City of Johannesburg, has a significant impact on the development trends in this area.

Malibongwe Road, as well as the N14-highway, increases the accessibility of the area on a regional basis. Developments such as Cosmo City and the proposed Lion Pride Lifestyle Estate in the City of Johannesburg, are located within a 2-kilometre radius of the proposed development.

5.2 Expansion of the residential sector of Mogale City Local Municipal area

With an ever-increasing need for housing in urban areas, many of the larger municipal areas in the vicinity are reaching its capacity for the economic provision of housing opportunities of varying typologies. The area of Mogale City, by comparison, still holds large areas to accommodate the growth of new residential developments.

The SDF earmarks the area south of the R114, up to its boundary with the City of Johannesburg, for densification. By association, this includes the intensification of use to create sustainable communities. The area is, accordingly, regarded as one of the City's growth nodes.

Given the character of the Cosmo City development in the vicinity of the proposed township, the draft SDF review indicates the potential for social housing to be developed in this area. While the proposed Mogale Extensions 42, 43 and 44 are not specifically earmarked for social housing, the development provides for the necessary support facilities for social housing in this area.

5.3 Project Desirability

The proposed development is considered desirable for the following reasons:

- Various developments have been approved by the Mogale City Local Municipality in the direct vicinity of the proposed Mogale Ext 42, 43 and 44 study area. Refer to as Crane Valley, Mogale Ext 10, Mogale Ext 19 and Mogale Ext 28.
- A further township application is pending a decision by the municipality for the establishment of the proposed Mogale Extension 16 (located on Portions 88, 89, 90, 205, 206 and 370 of the farm Nooitgedacht 534 JQ). This township is a municipal low-cost housing project.
- The inclusion of the study area (Mogale Ext 42, 43 and 44 Development) to be located within the Mogale City urban edge boundary.
- Over and above the proposed developments mentioned, a mix of land-uses occurs in this area. This trend is typically associated with a transition area, where full-scale farming activities (such as poultry farms) are found in proximity to light-industrial uses and agro-industrial.
- The site is easy accessible via local and regional roads. Both the R114 and Malibongwe Drive are located in the proximity of the proposed development and provide access to Marina Road (Road D1410).
- The existing roads have a significant impact on the regional accessibility of the area. The traffic counts undertaken for the Traffic Impact Assessment (TIA), confirms the traffic volumes on Marina Road during peak hours, to exceed 1,300 vehicles per hour in one direction. The associated prominence of a business typically dependent on visibility along a busy route of this nature increases the value of the land for business and related uses of this nature. The proposed business and commercial land use rights would offer the opportunity to develop the land for a variety of uses that would benefit from such a location.
- It is expected that the business and commercial facilities would attract further investment in this area, complementing the planned residential developments. The area enjoys easy access to the Lanseria Airport. With the proposed aerotropolis development, the spill-over of which is anticipated to extend to this area, the need for additional business and commercial uses, are further enhanced.
- The proximity of the area to the neighbouring City of Johannesburg and the ease of accessibility, promote economic spending from outside Mogale City's area of jurisdiction but also encourage residents of Mogale City to localise their economic spending.
- In recent times, the focus of development moved toward more sustainable, integrated development in addition to the provision of various housing typologies. Separating work and living opportunities does not only increase the direct cost and time spent on

travelling but also places a tremendous burden on limited infrastructure. In as much as efforts are made to increase the capacity of existing roads, the challenges posed by traffic congestion cannot be solved by adding additional traffic lanes. The most effective manner of addressing this problem, therefore, remains the implementation of effective public transport systems, and the establishment of development areas where distances between job opportunities and living areas, are significantly reduced.

- Whilst the redevelopment of existing residential areas poses several challenges in addressing the need for integration of land uses, the opportunity to establish integrated development areas is found in new developments, where job opportunities could be created within proximity from residential uses.
- Several employment opportunities will result from the proposed development, both during the construction and operational phase of the project, which will benefit the residents of the Mogale City and will also result in economic upliftment, social upliftment and skills development of the local community.
- Where development is encouraged, the area as a whole is uplifted and economic growth promoted to the benefit of the immediate area and municipal area as a whole.
- The formal development of land located within the urban edge promotes due consideration for all factors of sustainable development. The risk of land invasion reduces, and processes and procedures are implemented that protect the environment and future road networks.
- The nature and extent of the proposed development will be compatible with surrounding uses and support the concept of more compact city in order to combat urban sprawl.
- The proposed land use/rights is in line with Council guidelines and National guidelines such as the IDP
- Taking into account the contextual characteristics of the area and the accessibility of the application site, the proposed township for which there is a proven need, could be regarded as desirable and strategically situated within a developing and sought-after area.
- The proposed Mogale Ext 42, 43 and 44 Development falls inline with Chapter 2, Section 7 of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) (SPLUMA) which refers to the development principles and norms and standards which apply to all aspects of spatial development planning, land development and land use management.

6 DESCRIPTION OF THE BASELINE ENVIRONMENT

6.1 Physical Features and Characteristics

6.1.1 Local Climate

The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Krugersdorp range from 16.6°C in June to 26.4°C in January. The region is the coldest during July when the mercury drops to 0.6°C on average during the night. Winters are very dry with frequent frost. There is a difference of 130 mm of precipitation between the driest and wettest months. The average temperatures vary during the year by 10.3 °C.

Table 11: Krugersdorp Weather by Month.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Avg. Temp °C	20 °	19°C	18°C	15°	12°C	10°C	9°C	13°C	16°C	18°C	19°C	19°C
Min. Temp °C	15 °C	14 °C	13°C	10°C	6°C	3°C	2°C	5°C	9°C	11°C	13°C	14°C
Max. Temp °C	25°C	25°C	23°C	21°C	19°C	17°C	17°C	20°C	24°C	25°C	25°C	25°C
Precipitation / Rainfall mm	122	112	91 (3.6)	43 (1.7)	18 (0.7)	7 (0.3)	3 (0.1)	8 (0.3)	20 (0.8)	66 (2.6)	93 (3.7)	133 (5.2)
Humidity (%)	67%	65%	64%	62%	52%	50%	44%	37%	35%	45%	55%	64%
Rainy days	12	10	9	6	2	1	1	1	2	7	10	13

6.1.2 Rainfall

The average annual rainfall for the Nooitgedacht Study area is approximately 750mm, most of which occurs as heavy, isolated thunder showers between October and March. It receives the lowest rainfall (0mm) in June and the highest (117mm) in January.

6.1.3 Wind

The dominant wind direction between November and February is a north-westerly wind. This pattern is directly associated with the Hiveld storm system that build up during the day and bring rain typically in the afternoon. Moisture laden air is brought from the Northwest sector along the axis of the tropical temperate trough. As storm build up to the southwest a wind reversal occurs. The wind changes to a south westerly direction in line with the storm movement. Wind reversal occurs after the storms have passed and come from the northeast. Please refer to figure 14 for the max and average wind speed and wind Gust for Muldersdrift, taken over a 10 year period from 2010 to 2020.

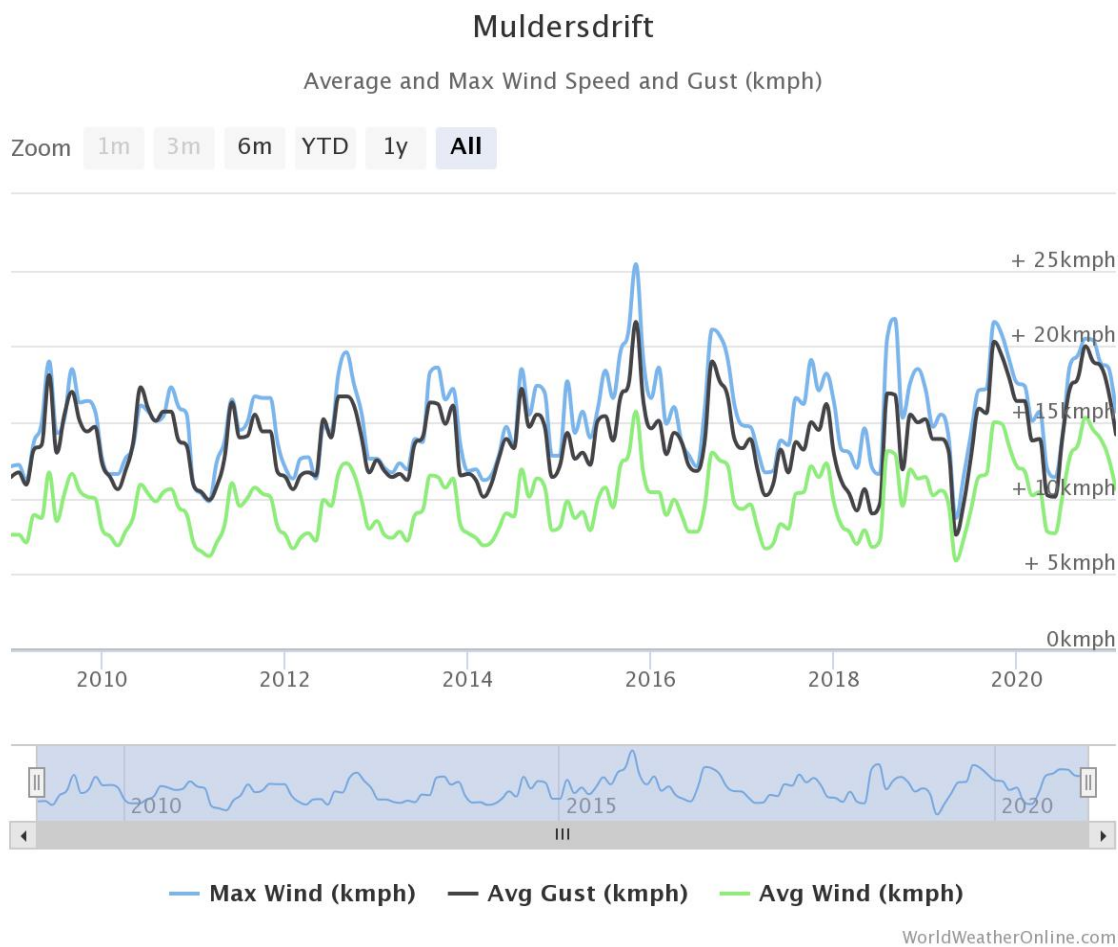


Figure 14: Max and average wind speed and wind Gust for Muldersdrift.

6.2 Natural Ecosystems and Habitats

6.2.1 Natural Topography

The topography of the area forms part of a rural area with a relatively steep slope downwards of approximately 5 to 7%, towards the Crocodile tributary traversing the proposed developments. The longitudinal slope of the natural drainage course is approximately 1.4%. The site is located on the Eastern boundary of the A21E quaternary catchment.

6.2.2 Geology

The Geotechnical assessment was undertaken by J. Arkert Engineering Geologist (**Appendix K – Geological Investigation Report**). The results of this investigation is included in the report attached.

From the available literature as well as the observations during geological investigations conducted in the vicinity of the site, it is evident that the site is underlain by granitic rocks of the Basement Complex, as exposed in the Johannesburg-Pretoria Dome. Typically, these Archaean intrusive igneous rocks are cross cut by diabase dykes of various ages, and may contain a prominent structural fabric.

Though usually referred to broadly as “granite” these rocks in fact constitute a complex suite ranging from true granite to gneiss, granodiorite and migmatite. Veins of pegmatite, aplite and quartz are common. The other geotechnical problem associated with these rocks is the presence of core stones of hard granite within the residual soil. The problem is particularly acute where the soil possesses a collapsible fabric and the core stones are too large to be removed.

6.2.3 Surface Water

Due to the slopes on the property, storm water runoff will be in the form of sheetwash, with localised concentration in shallow gullies that occur on the site. The area under investigation is located within a valley that traverses from south to north through the site and is occupied by an un-named non-perennial stream. Stormwater run off from the site will be concentrated in the valley and the stream will be susceptible to seasonal flooding. The positions of the 1 : 50 and 1: 100 year flood lines were determined by a hydrological engineer, and no development will be take place within the flood line.

6.2.4 Groundwater and Water Table

During the site investigation done by J. Arkert Engineering Geologist, thirty six test pits were excavated by means of a TLB (on 9 and 10 May 2021) and the holes were excavated to an average depth of 1.6m and hard digging conditions was encountered in all the test pits. Shallow groundwater seepage was recorded in test pits 1, 2 and 3 at an average depth of 1.1m.

6.2.5 Air Quality

No readily available data exist on air quality in the area. The air quality can be said to be typical of a rural and semi-urban environment. Approximately 300m to the north-west of the proposed development site is the Astral Operations Limited Poultry Facility situated in Portion 32 of the farm Rietfontein. The location of the existing Astral Operations Limited Poultry Facility in close proximity to Portion 1, 91 and 95 of the Farm Nooigedacht 534JQ may create a conflict in the existing status of the air quality in the area. However, these two land-uses can co-exist, if all parties adhere to the relevant regulations applicable.

The air quality is impacted upon by: veld fires, vehicular emissions and the adjacent residential areas of Cosmo City.

6.2.6 Noise

The proposed high-density residential and commercial development will most likely bring about additional vehicular traffic on the roads in the immediate vicinity of the development. The morning and afternoon peak period traffic volumes, in particular, will increase tangibly.

The proposed development should not have a negative impact on noise levels within the area.

6.3 Traffic

Hamatino Consulting Engineers conducted a traffic impact assessment for the proposed application in April 2020 (**Appendix L**).

Methodology

The methodology undertaken in conducting the traffic assessment was as follow:

- Discussion of the project with the Client;
- Conduct weekday morning (06h00 to 09h00am) and afternoon (15h00 to 18h00) peak hour traffic counts in order to determine the existing background traffic volumes;
- Analyse the existing intersection levels of service;
- Determine the number of trips that will be generated by the development. Trip generation was calculated by using trip generation rates for typical land uses, with specific reference to the South African Trip Data Manual (TMH 17);
- Determine the trip distribution, using the existing trip distribution pattern of the area;
- Determine the impact of the proposed development on the adjacent road network during peak traffic hour periods for both the 2020 as well as future year 2025 development scenarios;
- Propose mitigation measures if applicable;
- Analyse existing intersection safety and sight distances;
- Determine Access Intersection layout;
- All of the above to be included in a single volume report, for approval by the local authority & Roads Authority.

Traffic Status Quo

It was found that all of the analysed intersections are currently operating at un-acceptable levels of service without the development traffic added.

The following intersections need to be upgraded as soon as possible as described below (note that the upgrading proposal included below will also be able to accommodate the 2025 horizon year with an assumed 3.0% annual compounded background traffic growth):

R114 / Marina Street.

Immediate upgrading (as soon as possible- not as a result of the development). This intersection is currently (2020) operating at an un-acceptable level of service during both the am as well as pm peak periods. It is proposed that this intersection be signalised by the Gauteng Provincial Government: Roads and Transport subject to the following:

- A formal signal plan containing at least four different stages be compiled by a traffic engineer in accordance with the South African Road Traffic Signs Manual Volume 3;

Upgrading prior to development completion (By developer). The intersection (signalised as above) level of service will deteriorate to a level of service F with the addition of the anticipated development traffic demand. It is proposed that this intersection be upgraded as follow in order to accommodate the development traffic demand:

1. Add northbound left turn slip lane (100m long);
2. Add an eastbound right turn auxiliary lane (145m long);
3. Increase length of existing right turn auxiliary lane to 145m;
4. Add a southbound weaving lane in order to accommodate the dual eastbound right turn lanes (100m long)

R114 / Malibongwe Drive

Immediate upgrading (as soon as possible). The R144 / Malibongwe Drive intersection is currently (2020) operating at a level of service F during all of the analysed peak periods. It is proposed that this intersection be upgraded by the Gauteng Provincial Government: Roads & Transport as soon as possible as follow (all lengths exclude tapers):

- Provide an additional northbound right turn auxiliary lane (30m in length);
- Provide a westbound left turn slip lane (90m in length);
- Provide dual westbound right turn auxiliary lanes (40m in length);
- Provide an eastbound left turn slip lane (90m in length);
- Provide dual eastbound right turn auxiliary lanes (45m in length);
- Provide an additional southbound right turn auxiliary lane (40m in length).

Upgrading prior to development completion. No further upgrading other than the above mentioned is required for both the after development as well as horizon year (2025).

Beyers Naude / R114 Intersection

Upgrading as soon as possible (By Gautrans). Beyers Naude Drive (D374 - K31) shall be upgraded in accordance with the latest finalised Roads Master Plan and detail design of this road as compiled by Ilifa Consulting Engineers. The above does entail the widening of Beyers Naude Drive to a 4 lane Dual carriageway road (two lanes per direction with median).

Upgrading by horizon year 2025. No further upgrading other than the above is required. 6 lanes (three per direction may be required within 10 years due to background traffic growth).

Marina / Jubilee Intersection

Upgrading as soon as possible (By Gautrans). This intersection is currently (2020) operating at an un-acceptable level of service during both the am as well as pm peak periods.

It is proposed that this intersection be signalised by the Gauteng Provincial Government: Roads and Transport subject to the following:

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- A formal signal plan containing at least four different stages be compiled by a traffic engineer in accordance with the South African Road Traffic Signs Manual Volume 3;

Upgrading prior to development completion (By developer). The intersection (signalised as above) level of service will deteriorate to a level of service F with the addition of the anticipated development traffic demand. It is proposed that this intersection be upgraded as follow in order to accommodate the development traffic demand:

- Add northbound right turn auxiliary lane (45m long);
- Add a westbound left turn slip lane (60m long);
- Add north and southbound through lanes

Marina Street / Beyers Naude to R144

It is expected that Marina Street between Beyers Naude and R114 will become under pressure after development completion. It is accordingly advised that Marina Street be upgraded to a double lane per direction – single carriageway road between Beyers Naude Drive and R114.

Hamatino Consulting Engineers made the following conclusions:

- All of the analysed intersections are currently (2020) prior to development operating at an un acceptable level of service and need to be upgraded in order to be able to accommodate the existing 2020 background traffic demand prior to development;
- The trip generation of the development is expected to be as follow:
 - 3522 AM trips (1646 in; 1876 out);
 - 3015 PM trips (1637 in; 1379 out);
- All of the analysed intersections are expected to be operating at un-acceptable levels of service after development completion;
- All of the analysed intersections are expected to be operating at an acceptable level of service by the horizon year 2025, provided that the existing intersections be upgraded in accordance with the section 7 of this report;
- The access arrangements (as per latest township layout plan) does not meet the requirements of access intersection spacing in accordance with TRH 26 (South African Road Classification and Access Management Manual Ver 1.0);
- The development access intersection is expected to be operating at an acceptable level of service by the horizon year 2025;
- All three of the proposed development accesses will be signalised intersections. Sufficient sight distance is available at all three new access intersections in accordance with the South African Road Traffic Signs Manual Volume 3;

- The access intersection level of service (with geometry as depicted in figure 7) is expected to be operating at an acceptable level of service during all analysed peak traffic hours;
- The site development plan makes no provision for public transportation.

The following recommendations have been incorporated into the site specific EMPr:

- That the development be supported from a traffic engineering point of view;
- That all of the analysed intersections be upgraded in accordance with Traffic Impact Assessment;
- That the township access localities be amended in accordance with Traffic Impact Assessment in order to better align with road access management principles as well as the latest Mogale Roads Master Plan of the Muldersdrift Area.
- That all of the proposed access intersections be signalised and be designed in accordance with the Traffic Impact Assessment.
- That bus lay-by be provide downstream of each of the new access intersections along Marina Street. The above-mentioned bus lay by shall be designed in accordance with the Gautrans standard detail drawings.

6.4 Floral Assessment

Scientific Terrestrial Services (STS) was appointed to conduct a faunal and floral ecological assessment (**Appendix I**) as part of the Environmental Impact Assessment (EIA) process. A site visit was undertaken on the 14th and 15th of March 2019 (summer season) to determine the ecological status of the study area. A reconnaissance 'drive around' followed by a thorough 'walk through' on foot was undertaken.

The biodiversity assessment revealed that the study area encompasses six habitat units, namely the Eragrostis Secondary Grassland, Degraded Secondary Grassland, Freshwater Habitat, Rocky Ridge, Woodland and Transformed Habitat. The study area can no longer be described as original Egoli Granite Grassland defined by Bredenkamp et al. (2006). The study area, therefore, with the exception of the freshwater resource, which is recommended to be excluded from development, holds no developmental constraints for the proposed project.

Eragrostis Secondary Grassland: This habitat unit is considered to be of Intermediate Ecological importance and sensitivity, as the largest abundance of floral Species of Conservation Concern (SCC) individuals were recorded within this habitat unit. The floral species composition of this habitat was representative of anthropogenic derived Egoli Granite Grassland as defined by Bredenkamp et al. (2006) and cannot be defined as viable remnants of the original Egoli Granite Grassland. There are therefore no development constraints associated with this habitat unit. It is however imperative that all floral Species of Conservation Concern (SCC) individuals be rescued and relocated to suitable similar habitat outside of the development footprint or be used within the landscaping of the project.

Freshwater Resources: The freshwater resource habitat unit although severely degraded and associated with AIP proliferation, still provide niche habitat for floral species adapted to saturated soil conditions, as well as provide habitat connectivity to the surrounding areas. This habitat unit furthermore provide important ecosystems services in the landscape, and it is therefore recommended that this habitat unit be excluded from the development and serve as a green open space. An alien floral control plan should be designed and implemented at the onset of construction and be maintained throughout the life of the proposed development.

Degraded Secondary Grassland: As all areas classified as degraded secondary grassland were historically utilised in different capacities, the species composition between pockets differ. These areas were however grouped into a single habitat unit as it was evident that these areas have only recently been allowed to return to a grassland state, and as such floral species, diversity within pockets were low. These areas were furthermore considered to be of similar ecological importance and sensitivity, as pockets were dominated by either one or two grass/and or herb species, with AIP proliferation also evident.

Rocky Ridge: A single patch situated immediately west of Cosmo City located on Portion 132 was classified as Rocky Ridge habitat. This habitat unit, although associated with habitat degradation and AIP proliferation as a result of edge effects from Cosmo City and the surrounding small holdings, were still associated with floral species typical of ridge habitat.

Woodland and Transformed Habitat: The woodland habitat comprises all areas where Alien invasive trees such as Eucalyptus and Pinus species have become proliferate. Also included are those areas not associated with infrastructure, but where it was evident that garden ornamental trees, have historically been planted. These were furthermore associated with a limited diversity of grass and herb species and can no longer be considered as a grassland habitat due to the altered species composition.

This habitat unit is of low ecological sensitivity due to severe habitat transformation. The placement of infrastructure within the transformed areas will have no significant impacts on the floral ecology and conservation targets of the area. However, to reduce opportunities for AIPs to be exchanged between the Transformed habitat and adjacent natural areas during construction activities, it is recommended that an AIP management plan be implemented for the clearance of listed alien species before construction commences. The individuals of *E. autumnalis* planted within an ornamental garden should also be rescued and relocated to suitable similar habitat outside the development footprint or used within the landscaping of the project.

6.4.1 Floral Species of Conservation Concern Assessment

Threatened/protected species are species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) is a threatened species. Furthermore, SCC are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare and Declining. An assessment considering the presence of any floral SCC, as well as suitable habitat to support any such species, was undertaken. The GDARD conservation lists were acquired for the Quarter Degree Square (QDS) 2627BB. All SCC listed for the QDS, together with their calculated Probability of Occurrence (POC) ratings are tabulated in Appendix I.

From this list provided in Appendix I, three floral SCC obtained a POC of more than 60%, with all three species encountered within the study area. *Hypoxis hemerocallidea* was recorded throughout the study area, while *B. disticha* was predominantly observed within the *Eragrostis* Secondary Grassland habitat. Four individuals of the species *E. autumnalis* were observed within a garden associated with Portion 96, where they have clearly been planted as garden ornamentals, with no naturally occurring individuals observed within the study area. Please note that since the ecological assessment Portion 96 have been excluded from the development and will not require nay relocation. Although all individuals and colonies of the above-mentioned species were marked by means of GPS during the field assessment, it

is considered highly likely that a higher abundance of individuals are associated within the study area, than what was recorded during the current assessment. All individuals should, therefore, be rescued and relocated by a suitably qualified specialist and either relocated to similar suitable habitat within the study area, but outside the development footprint, utilised within the landscaping plan of the project, or moved to registered nurseries, the Agricultural Research Council (ARC) or the South African National Biodiversity Institute (SANBI).

An individual of the protected tree *Podocarpus henkelii* was also observed within the Woodland habitat, where it was planted, and naturally occurring within the area. This species is however protected within the NFA (1998, updated 2001), and as such a permit will be required from DAFF for the removal/destruction/relocation of this individual.



Figure 15: Floral SCC encountered in the study area. Top: *Hypoxis hemerocallidea* (left), and *Boophane disticha* (right); Bottom: Floral SCC that has historically been planted, namely *Eucomis autumnalis* (left), and *Podocarpus henkelii* (right).

6.4.2 Alien and Invasive Plant (AIP) Species

Alien and invasive floral species are floral species of exotic origin which are invading previously pristine areas or ecological niches (Bromilow, 2001). Not all weeds are exotic in origin but, as these exotic plant species have very limited natural “check” mechanisms within the natural environment, they are often the most opportunistic and aggressively growing species within the ecosystem. Therefore, they are often the most dominant and noticeable within an area. Disturbances of the ground through trampling, excavations or landscaping often leads to the dominance of exotic pioneer species that rapidly dominate the area. Under natural conditions, these pioneer species are overtaken by sub-climax and climax species through natural veld succession. This process, however, takes many years to occur, with the natural vegetation never reaching the balanced, pristine species composition prior to the disturbance. There are many species of indigenous pioneer plants, but very few indigenous species can out-compete their more aggressively growing exotic counterparts.

During the floral assessment, dominant alien invasive floral species were identified and are listed in **Appendix I**. Of the alien species recorded during the site visit, 24 are listed as NEMBA Category 1b, four as NEMBA Category 2 and five as NEMBA Category 3. The remainder are not listed but are still considered problem plants in South Africa (Bromilow, 2001). The majority of alien species encountered are predominantly woody tree species associated with the transformed and woodland areas, with a moderately high diversity of forb AIPs also observed, particularly within the freshwater resource, *Eragrostis* secondary grassland and degraded secondary grassland habitat units.

Alien species located within the proposed development areas need to be removed on a regular basis as part of maintenance activities according to the National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Regulations, GN R864 of 2016.

6.4.3 Medicinal Floral Species

Medicinal plant species are not necessarily indigenous species, with many of them regarded as alien invasive weeds. **Appendix I** presents a list of dominant plant species with traditional medicinal value, plant parts traditionally used and their main applications, which were identified during the field assessment.

The species listed in **Appendix I** above are common, widespread species and not confined to the study area; nor are they unique within the region. *Hypoxis hemerocallidea* and *Boophane disticha* are however classified as declining in the Gauteng Province, mainly due to the rapid urbanisation in Gauteng, which has caused a decline in available natural habitat. Several *H. hemerocallidea* and *Boophane disticha* species were found throughout the study area particularly within the *Eragrostis* Secondary Grassland habitat. These species would need to be rescued and relocated to suitable habitat outside of the disturbance footprint area, which should be undertaken by an aptly qualified specialist. Thus, if rescue and relocation is implemented for *H. hemerocallidea* and *Boophane disticha*, no other risks to their populations within the larger region, or locally, are foreseen for medicinal plants.

6.4.4 Sensitivity Map

The figure 16 below conceptually illustrates the ecological sensitivity of the various habitat units identified during the floral assessment, as well as locations where floral SCC has been identified. The areas are depicted according to their sensitivity in terms of the presence or potential for floral SCC, habitat integrity and levels of disturbance, threat status of the habitat type, the presence of unique landscapes and overall levels of diversity.

6.5 Faunal Assessment

Scientific Terrestrial Services (STS) was appointed to conduct a faunal ecological assessment (**Appendix I**) as part of the Environmental Impact Assessment (EIA) process. During the site assessment it was ascertained that six habitat units were present within the study area namely the Degraded Secondary Grassland, the Eragrostis Secondary Grassland, the Freshwater Habitat, the Rocky Ridge, Woodland and the Transformed Habitat.

At the time of assessment, it was clear that anthropogenic activities, livestock grazing and crop cultivation has had a significant impact on the herbaceous layer (faunal habitat) and consequently food resources for faunal species. In addition, due to the locality of the study area, it is highly likely that domestic dogs and cats from the resident households and neighbouring community will actively move through the study area hunting faunal species, notably avifauna, small reptiles and small mammals. In addition to this, there is an increased probability that community members are actively placing snares in open space areas, targeting small mammals and avifauna such as *Numida meleagris* (Helmeted Guineafowl).

Due to the layout of the study area, it is recommended that efforts to develop open space areas be focused on the western portions that are associated with the Freshwater Habitat, as these areas currently have the habitat provision for faunal species.

It is recommended that, in order to ensure the continued survival of faunal species in the study area, which is considered imperative in the ever-growing urban landscape, the Freshwater Habitat, zone of regulation and portions of the adjacent Secondary Grasslands be excluded from development activities.

In so doing, under suitable management and through controlled site access, this open space area will not only provide habitat for common faunal species, but also for faunal SCC expected to occur within the study and surrounding areas. These SCC include *Atelerix frontalis* (Southern African Hedgehog, NT), *Mystromys albicaudatus* (White-tailed Mouse, EN) and *Pyxicephalus adspersus* (Giant Bull Frog, NT). These SCC rely on intact grassland and wetland habitats in order to forage and breed, which are rapidly being lost as a result of urban development. Pairing well thought out development plans with conservation initiatives will ensure that developmental and conservation targets can be met in a sustainable manner.

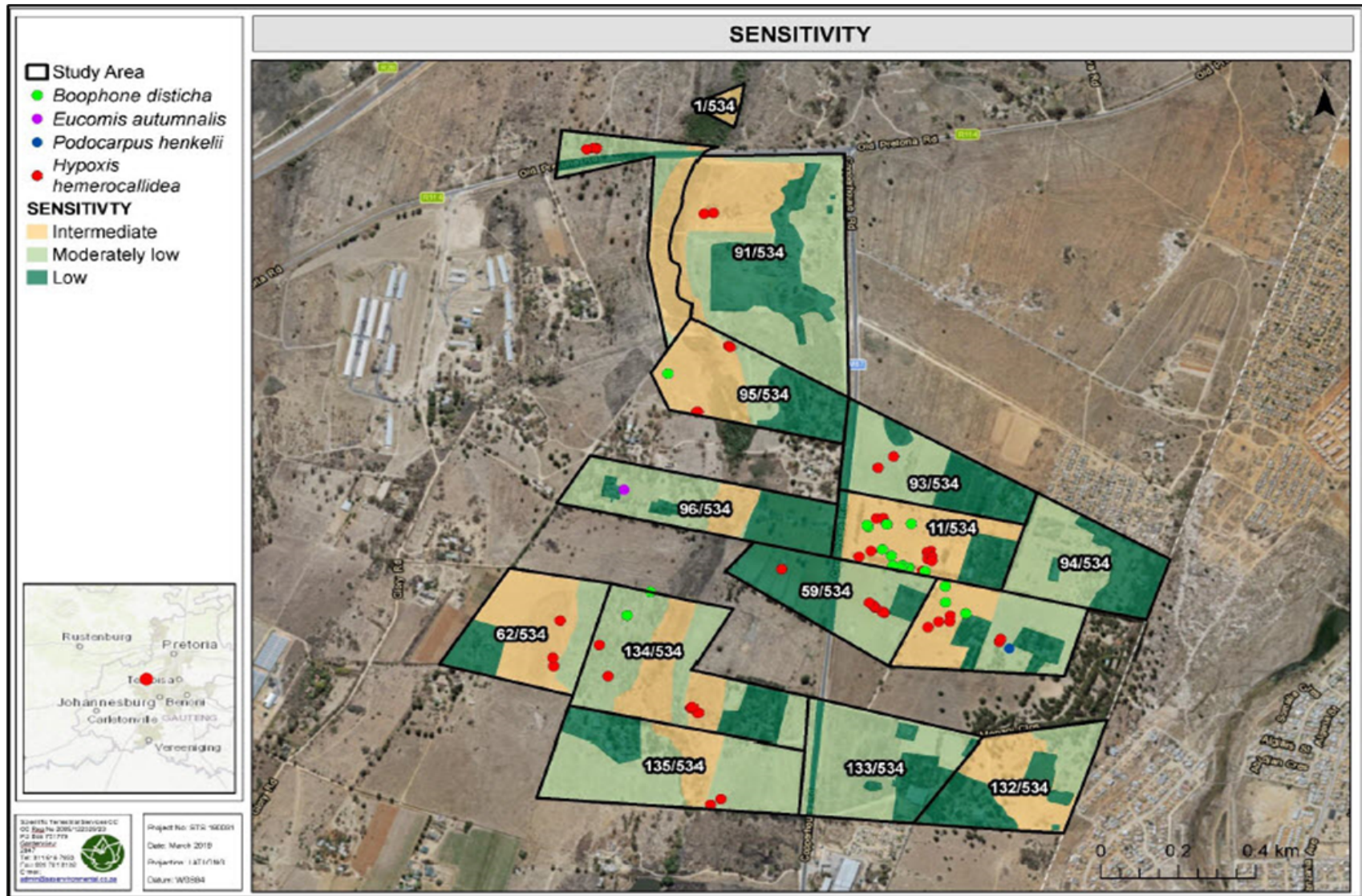


Figure 16: Floral Sensitivity map for the study area.

6.5.1 Mammals

Mammal diversity has been negatively affected within the study area as a result of anthropogenic activities that have led to the increased level of persecution from both man and domestic animals (dogs and cats). Anthropogenic activities have additionally led to the loss of habitat, directly impacting upon species diversity. Only field signs of *Cryptomys hottentotus* (Common Mole Rat) were observed within the ecotone of the Wetland Habitat unit and the Secondary Grasslands. Although not observed, species such as *Lepus saxatilis* (Scrub Hare), the *Mastomys* sp. (Multimammate Mice), *Rhabdomys pumilio* (Xeric Four striped Grass Mouse) and *Herpestes sanguineus* (Slender Mongoose) are also likely to occur within the study area.

6.5.2 Avifauna

The avifaunal diversity associated with the study area was intermediate and comprised mainly of common species that are known to persist within modified and degraded habitats, notably those in close proximity to urban areas. Species encountered during the field assessment include common avifaunal species such as *Streptopelia capicola* (Cape Turtle Dove), *Ardea melanocephala* (Black-headed Heron), *Ploceus velatus* (Southern Masked weaver), *Acridotheres tristis* (Common Myna), *Lanius collaris* (Common Fiscal) and *Bostrychia hagedash* (Hadedda Ibis) amongst others.

6.5.3 Amphibians

A single amphibian was observed within the study area during the field assessment, namely *Sclerophrys gutturalis* (Guttural Toad). The Freshwater Habitat and adjacent Secondary Grasslands are likely to have the highest amphibian diversity, with species such as *Cacosternum boettgeri* (Common Caco), *Schismaderma carens* (Red Toad), *Sclerophrys capensis* (Raucous Toad), *Xenopus laevis* (Common Platanna) and *Amietia delalandii* (Delalande's River Frog) utilising the habitat.

6.5.4 Reptiles

The study area is expected to have an intermediate reptile diversity, with the majority of species expected to be those that are common and widespread. Reptile species which are adept at surviving in and around disturbed habitats as a result of anthropogenic activities and within degraded habitats will likely thrive in this environment. Common species e.g. *Trachylepis punctatissima* (Montane Speckled Skink) and *Panaspis wahlbergi* (Wahlberg's Snake-eyed Skink) were observed during the field assessment. In addition, species such as *Crotaphopeltis hotamboeia* (Red-lipped Snake), *Hemachatus haemachatus* (Rinkhals), *Pachydactylus affinis* (Transvaal Gecko), *Pachydactylus capensis* (Cape Gecko) and *Boaedon capensis* (Brown House Snake) are also expected to occur within the study area.

6.5.5 Insects

Overall, insect diversity of the study area is considered to be moderately high. Although habitat disturbance has occurred, insect are, to a degree, tolerant of such disturbances and habitat alterations provided suitable food resources are still available. This combined with

the various habitat units within the study area allows for an increased diversity of insect species to thrive.



Figure 17: Field assessment results pertaining to insect species within the study area.

6.5.6 Arachnids

Whilst no arachnid species were observed, it is expected that the study area will support an intermediate diversity as there is suitable habitat and food resources available. The study area is likely to be inhabited by a number of common arachnid species, such as *Olurunia ocellate* (Grass Funnel-web Spider), *Palystes* sp. (Rain spiders), *Nephila fenestrata* (Black legged golden orb-web spider), Family Lycosidae (Wolf Spiders), Family Nephilidae (Golden orb-web spiders), *Opisthophthalmus pugnax*, *Uroplectes triangulifer* and *Pseudolychas ochraceus* amongst other.

6.5.7 Faunal Species of Conservational Concern Assessment

During field assessments, it is not always feasible to identify or observe all species within an area, largely due to the secretive nature of many faunal species, possible low population numbers or varying habits of species. As such, and to specifically assess an area for faunal SCC, a Probability of Occurrence (POC) matrix is used, utilising a number of factors to

determine the probability of faunal SCC occurrence within the study area. Species listed in **Appendix I** whose known distribution ranges and habitat preferences include the study area were taken into consideration.

Although no SCC as listed in Appendix C were observed within the study area at the time of assessment, it is considered possible that following species may still occur within and utilise the study area, namely *Atelerix frontalis* (Southern African Hedgehog, NT), *Mystromys albicaudatus* (White-tailed Mouse, EN) and *Pyxicephalus adspersus* (Giant Bull Frog, NT). These above-mentioned species are most likely to occur within and utilise the Freshwater Habitat Unit as well as the portions of the Degraded and Eragrostis Secondary Grasslands adjacent to the CVB wetland both permanently and periodically.

6.5.8 Sensitivity

The figure 18 below conceptually illustrate the areas considered to be of increased faunal ecological sensitivity. The areas are depicted according to their sensitivity in terms of the presence or potential for faunal SCC, habitat integrity, levels of disturbance and overall levels of diversity.

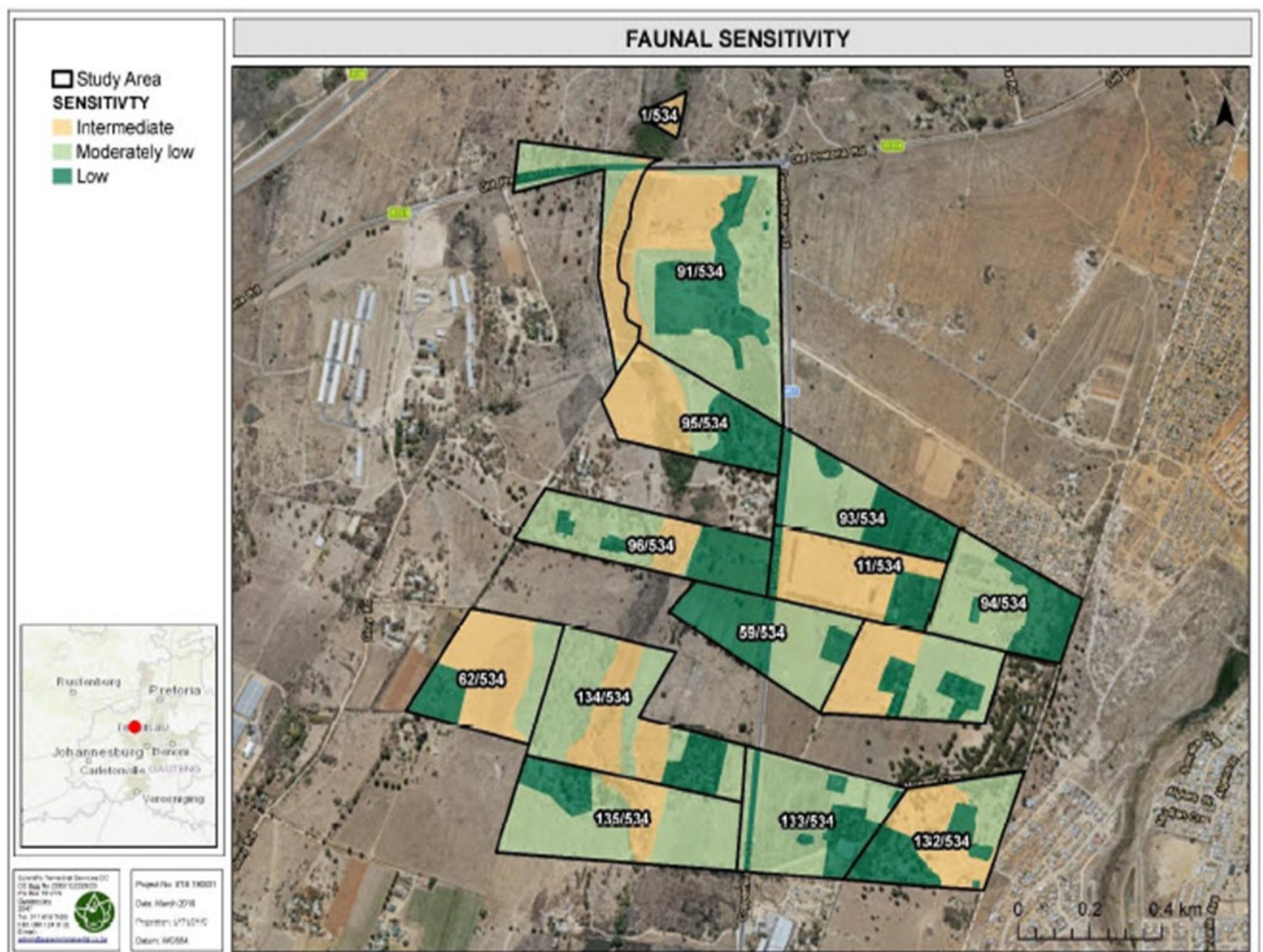


Figure 18: Faunal Sensitivity map for the study area.

6.6 Aquatic Ecosystem Delineation

Scientific Aquatic Services (SAS) was appointed to conduct a freshwater ecological assessment (**Appendix J**) as part of the Environmental Authorisation.

During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment (see Figure 19). A summary of the assessment of the wetland is provided in Table 12 below:

Table 12: Summary of results of the field assessment of the wetland associated with the study area.

Watercourse	PES	Ecoservices	EIS	REC and RMO
CVB Wetland	D (Largely modified)	Moderately Low	Moderate	REC: D (Largely modified) RMO: Maintain

An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. This feature was not assessed, since it is apparent from historical and current digital satellite imagery as well as observations made during the site assessment that this feature was likely formed as a result of water runoff from the upgradient and adjacent plant nursery and thus, would not persist under “normal circumstances” as per the definition of a wetland in the National Water Act, 1998 (Act No. 36 of 1998).

Due to the freshwater assessment portion 93 was zoned special with no district land-use associated with the property, meaning that currently the site will be kept vacant.

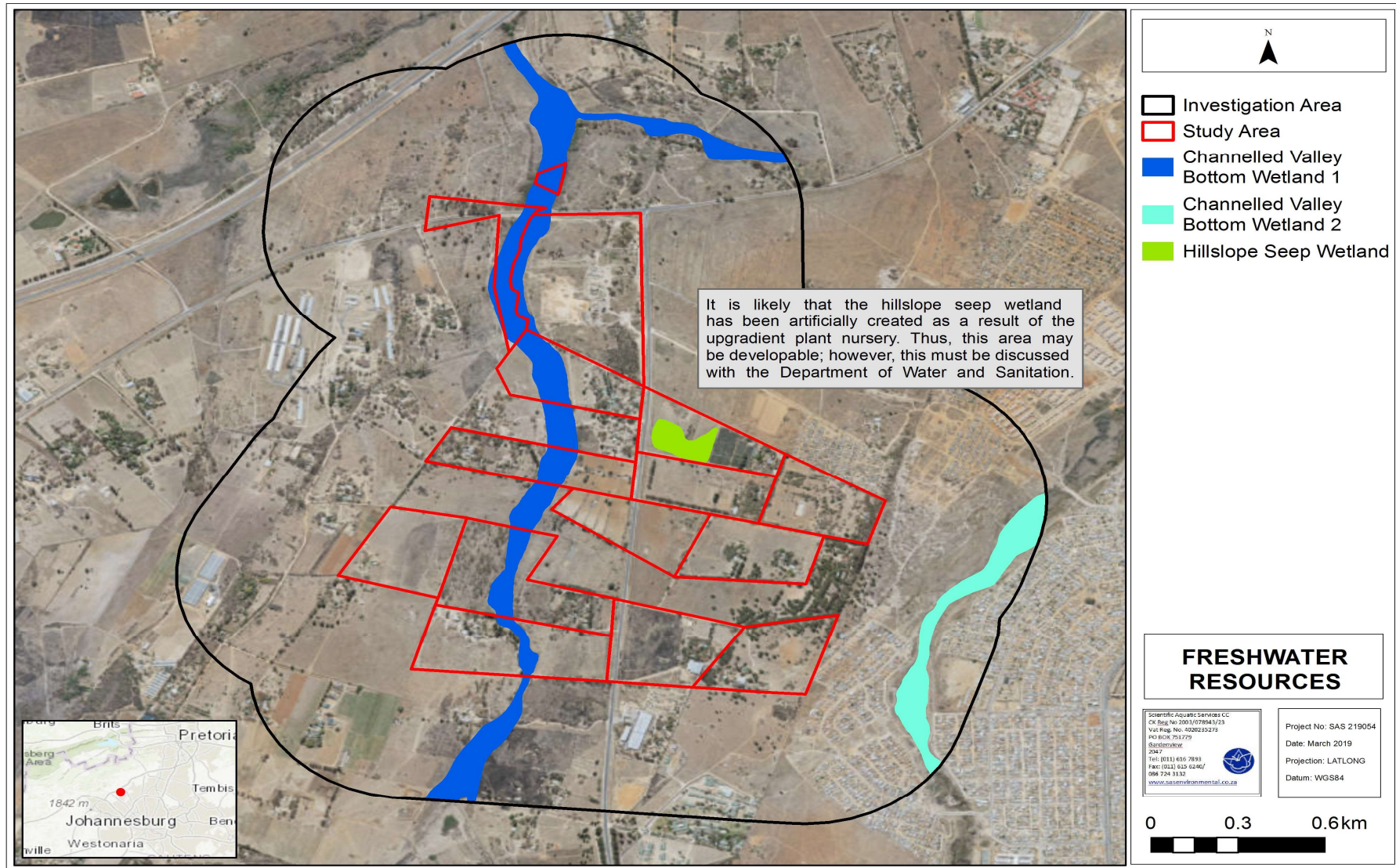


Figure 19: The delineated wetlands associated with the study area.

6.6.1 Delineation

Due to the degree to which the site has been disturbed, the watercourse delineation as presented in this report is regarded as a best estimate of the watercourse boundary based on the site conditions present at the time. During the assessment, the following indicators were used to delineate the boundary of the temporary freshwater zone:

- Topography/elevation was used to determine in which parts of the landscape the watercourse was most likely to occur;
- Obligate and facultative wetland species were used in conjunction with terrain units as well as the point where a distinct change in the vegetation composition was observed to determine the wetland zone boundary; and
- Soil form indicator was used to determine the presence of soils that are associated with prolonged and frequent saturation with key indicators including gleying, mottling, organic streaking and increased clay content.

6.6.2 Legislative Requirements, National and Provincial guidelines pertaining to the application of buffer zones.

According to Macfarlane et al. (2015) the definition of a buffer zone is variable, depending on the purpose of the buffer zone, however in summary, it is considered to be “a strip of land with a use, function or zoning specifically designed to protect one area of land against impacts from another”. Buffer zones are considered to be important to provide protection of basic ecosystem processes (in this case, the protection of aquatic and wetland ecological services), reduce impacts on water resources arising from upstream activities (e.g. by removing or filtering sediment and pollutants), provision of habitat for aquatic and wetland species as well as for certain terrestrial species, and a range of ancillary societal benefits (Macfarlane et. al, 2015).

It should be noted however that buffer zones are not considered to be effective mitigation against impacts such as hydrological changes arising from stream flow reduction, impoundments or abstraction, nor are they considered to be effective in the management of point-source discharges or contamination of groundwater, both of which require site-specific mitigation measures (Macfarlane et. al, 2015).

Legislative requirements were taken into consideration when determining a suitable buffer zone for the watercourse.

The delineated wetland and the applicable zones of regulation in terms of GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) and the relevant GDARD setback area are conceptually depicted in Figure 20 below.

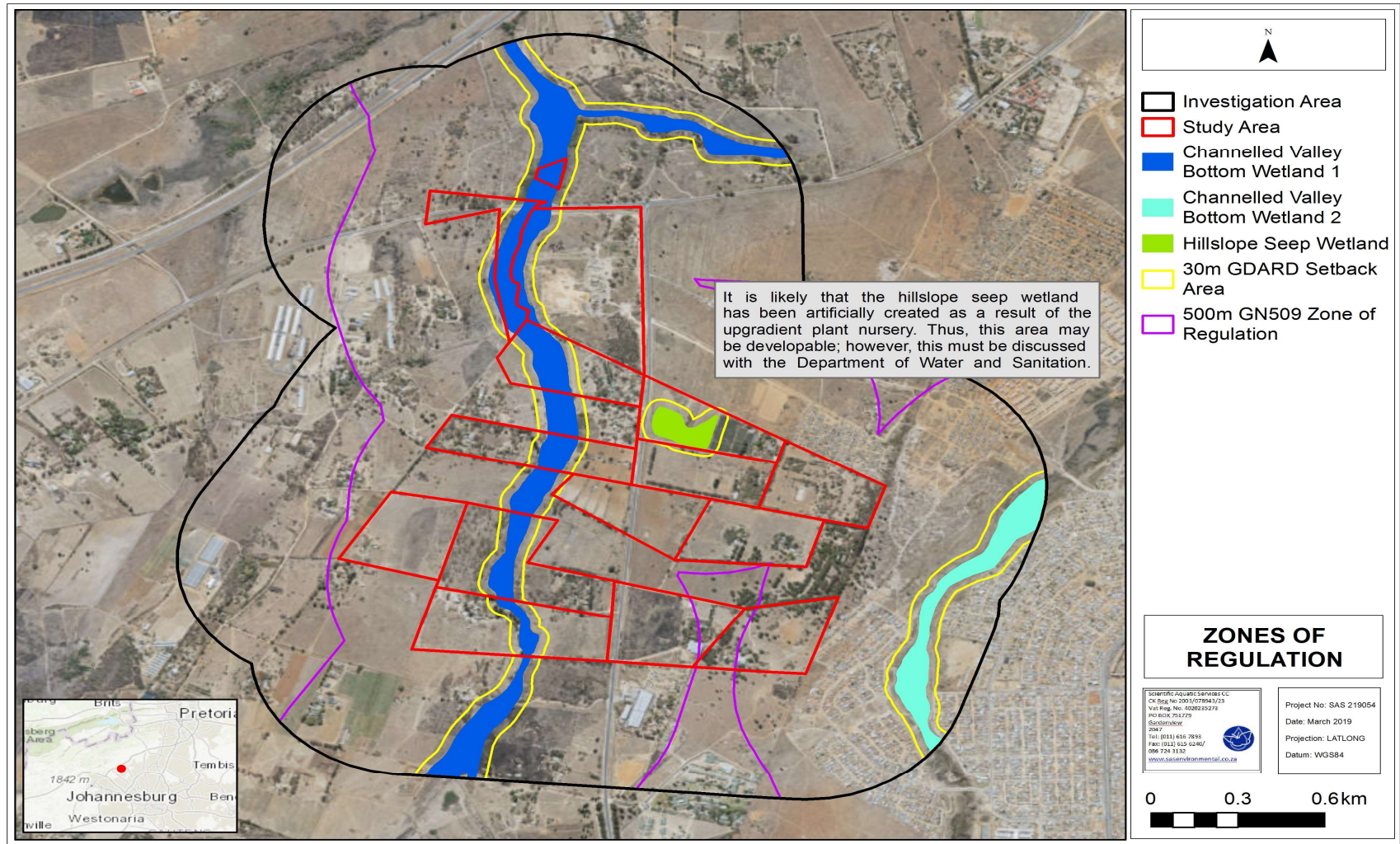


Figure 20: Conceptual presentation of the zones of regulation in terms of GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), and the relevant GDARD setback area in relation to the wetland delineation.

6.7 Historical and Archaeological Characteristics

The Heritage Assessment was undertaken by J A van Schalkwyk (**Appendix H**). The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is a semi-urban one, in which large farms were divided up into smallholdings, which, in turn, are now rapidly overtaken by urban densification.

Stone Age

The larger Mogale City area has been inhabited by different hominids since early Pliocene times, but it was only from about 2.5 million years ago that they started to produce stone tools, effectively beginning the Early Stone Age (ESA) (Pollarolo et al 2010). During Middle Stone Age (MSA) times (c. 150 000 - 30 000 BP), people became more mobile, occupying areas formerly avoided.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Also, for the first time we now get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA. A number of sites dating to this period have been studied by Wadley (1987) in the Magaliesberg area. In the case of the LSA people, they have also left us with a rich legacy of rock art, which is an expression of their complex social and spiritual beliefs.

Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom, dating to AD 470, located south of Hartebeespoort Dam just outside of the WHS area (Mason 1974; Huffman 1990). Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area.

The occupation of the region by Iron Age communities did not start much before the 1500s. Due to climatic fluctuations, bringing about colder and drier conditions, people were forced to avoid this area. Following a dry spell that ended just before the turn of the millennium the climate became better again until about AD 1300. This coincided with the arrival of the ancestors of the present day Sotho-, Tswana- and Nguni-speakers in southern Africa, forcing them to avoid large sections of the interior (Dreyer 1995; Mason 1986).

Historic period

Originally the trekkers who settled in the region occupied themselves with farming. After the discovery of gold on the Witwatersrand, exploration also started in this area, e.g. the wellknown Harry and Fred Struben were exploring in the Sterkfontein area during 1884. One

of the oldest gold mines was established in 1874 at Blaauwbank and another in 1891 on the farm Kromdraai. By this time the fossil-bearing caves were already known, and lime quarrying started about 1895. However, it was more than forty years later, in 1936, that Robert Broom first identified the remains of a number of fossil hominids.

Current State

As some properties changed ownership many times during the past few decades, there is very little coherent, long term memory regarding the different plots of land. However, by reviewing the history of the region as well as using available aerial photographs and maps, it is possible to determine to a certain extent what changes/developments took place over time. The study area indicated on the 1938 version of the aerial photograph (**Appendix H**) shows a largely rural area with agricultural activities (fields) as the most dominant development to be seen. Although a number of smaller features can be seen on some of the properties, their nature and function are difficult to determine. It is only on Plot 97 and Plot 134 that substantial built developments can be seen. This is also confirmed by the 1943 version of the topographic map (**Appendix H**).

However, about ten years later a number of new developments can be seen on Plot no. 97, 93, 11, 130 and 132. The rest are still empty of built features.

As most of the properties changed ownership many times during the past few decades, there is very little coherent, long term memory or documentation regarding any of the different plots of land. Over time, most of the properties developed in an 'organic' manner, i.e. new buildings were added by original or consecutive owners. As this was, in old terms, a peri-urban region, building plans were not necessarily drawn up and submitted to local authorities. These new developments in most cases incorporated elements of older structures, most of which were comprehensively altered, or were even replaced in toto.

Identified heritage sites.

Three houses, on Plot 94, Plot 95 and Plot 130 have been identified to be of significance and the following statements can be made about them:

- Some houses contain architectural elements that are older than 60 years and therefore enjoy general protection under the National Heritage Resources Act, No. 25 of 1999;
- The older architectural elements represent a style of life that is transitional between the farm and urbanisation – large houses with much open spaces surrounding it;
- Some of the house shows some unique, if eccentric/rustic characteristics and should be documented as an example of a 'landed gentry' rural style of living;
- None of the houses can be related to any significant individual or event.

Based on the investigation, the structures identified to have significance have been evaluated to have the following significance rating:

- Generally protected 3B: Medium significance
 - The implication of this is that the structures should be recorded before its destruction/alteration. For this, a suitably qualified architectural historian should be appointed.

Three informal burial sites have been identified on Plot 28, Plot 59 and Plot 97 and have been evaluated to have the following significance rating:

- Generally protected 4A: High/medium significance
 - The implication of this is that these features should be mitigated, i.e. relocated before development takes place.

6.8 Socio –economic environment

6.9 Mogale City Municipality

The Mogale City Local Municipality is a Category B municipality located within the West Rand District in the Gauteng Province (see figure 12). It lies directly south and west of the City of Tshwane and City of Johannesburg Metropolitan areas respectively. To the north, south and west it borders onto the Madibeng, Rand West City and Rustenburg Local Municipalities respectively.

The northern part of Mogale City comprises the bulk of the Cradle of Humankind World Heritage Site. Mogale City's strongest functional urban linkage is with the City of Johannesburg. Krugersdorp and the greater Kagiso area, Mogale City's primary urban complex, forms part of a band of development stretching from the Johannesburg Inner City westwards along the mining belt up to Krugersdorp. The strongest east-west transport linkages between Mogale City and Johannesburg are along the R512, as well as the east-west railway line. Mogale City is linked to the City of Tshwane via the R28/N14 highway.

The largest part of Mogale City is rural, with a specific urban concentration in the south-eastern part of the municipality where it interfaces with the Gauteng urban complex. The rural environment is characterised by prominent features: the Magaliesburg and Witwatersberg Ranges in the north-west. Rural towns in Mogale City are Tarlton, Magaliesburg and Hekpoort, located in the west.

An urban concentration is found in the south-eastern part around Krugersdorp and Kagiso. The Krugersdorp CBD is the main business, social and administration centre and fulfils a regional function. The areas around Krugersdorp are established middle-to-high income residential areas with the full range of urban amenities, services and facilities.

The areas to the south of Krugersdorp, namely Kagiso, Azaadville and Rietvallel (referred to as the Kagiso complex), are predominantly disadvantaged settlements with more limited access to service and facilities. The Kagiso complex is physically separated from

Krugersdorp's urban areas by an extensive mining belt that runs roughly in an east-west direction through the area.

The proposed development is situated within the north eastern section of the Mogale City Municipality (Muldersdrift area) and is to the south of the N14 and R114, between the M5 and R512, and just west of the Cosmo City Development of the City of Johannesburg Municipality. Lanseria Airport is to the north of the proposed development. The study area falls within Ward 33 of the Mogale Local Municipality.



Figure 21: Mogale City Local Municipality

6.9.1 Social Profile

Population Figures

According to Stats SA Census of 2011, about 8 279 people resided in Ward 33 of Mogale City (refer to Table 10). As a semi-urban ward on the north eastern sections of MCLM, the population density is 60.1 people/km² compared to 286 people/km² in MCLM on average and 737 people/km² in Gauteng Province (Stats SA, 2011 and 2017).

The average age of the population of Ward 33 is 30 years of age. As within the rest of South Africa, the majority of the population in this ward falls within the 18 to 64 age category (73%).

Table 13: Population and Household Growth

Area	Population		Growth p.a.	Households		Growth p.a.	Average household size	
	2011	2016	2011-2016	2011	2016	2011-2016	2011	2016
MCLM Ward 33	8 279			3 721			2.2	
Mogale City	362 420	383 864	1.2%	123 377	147 154	3.6%	2.9	2.6
Gauteng	12 272 263	13 399,726	1.8%	4 164 641	4 951 138	3.5%	2.9	2.7
South Africa	51 770 561	55 653 654	1.5%	15 065 018	16 923 309	2.4%	3.4	3.3

Source: Stats SA 2011 and Community Survey 2016 as in <https://wazimap.co.za/>

Housing in the local area

Within Ward 33, 60% of the households live in formal dwellings. This figure compares lower if compared with the number of households living in a formal dwelling within the MCLM which stands at 63%. Ward 33 has 13% of households that live in informal shacks. The rooms or flatlets (5.9%) refer to backyard dwellings or where sub-letting is taking place. One could argue that those people renting or living in a room or backyard flat also require improved housing conditions.

The MCLM has developed a new 5 year housing development plan in order to address the housing challenge. The strategic plan seeks to pursue partnerships with other private and public entities in order to address the housing backlog (Mogale City Local Municipality, 2018). Housing and the provision of sustainable human settlements that would include allocation of stands and serviced sites has been set as a priority of the Mogale City Local Municipality.

Municipal Infrastructure

The following table 11 provides an outline of the state of municipal infrastructure delivery in the MCLM and in Ward 33:

Table 14: Municipal Infrastructure Delivery

Service	MCLM	MCLM Ward 33
	Households Serviced %	Households Serviced %
Housing (formal dwellings)	63%	60%
Water from formal service provider	91.3%	19.2%
Sanitation (flush toilet)	90.2%	64.2%
Electricity	87%	N/A
Refuse removal	84%	35.2%

Source: Stats SA (2011) as in <https://wazimap.co.za/> and Mogale City LM (2018)

Only 19.2% of the households are serviced by a formal water service provider with a large percentage (63%) still making use of boreholes. In terms of sanitation 64.22% have access to a flush toilet, but also probably due to the semi urban characteristics, 18% of the households still make use of pit latrines. It is therefore also likely that there is no sewer network within the study area. 35.2% of households are serviced by a formal service provider in terms of waste removal, while 47% of households have their own dumps.

Roads and Transport Services

The total road network of Mogale City is 1,100 km and made up of 960 km of paved roads and 140 km of gravel roads within the rural areas and a small number of unpaved roads in the older townships. The objectives are to continue with the paving of gravel roads in the peri-urban areas, such as Tarlton, Magaliesburg, Hekpoort, Kromdraai and Muldersdrif. Various of the rural roads that connect to tourist facilities also need to be improved and maintained although tarring does not seem to be necessary.

The proposed development is in close proximity to the intersection of the R114 and Marina Street. Marina Street also traverses the proposed properties that forms part of the overall development. The N14 is situated further to the north with the site situated between the M5 and R512. The strongest east-west transport linkages between Mogale City and City of Johannesburg are along the R512 as well as the railway line.

Income Levels

The Table 14 below shows the percentage of households that earned R20 000 and less in 2011. This poverty rate roughly equates to the upper bound poverty income line¹ of Stats SA. While unemployment rates in Ward 33 are low (11%), only 6% of households in the area earned an annual income higher than R 150 000 in 2011.

Table 15: The percentage of households in different annual income categories, 2011

AREA	MCLM Ward 33	MCLM	Gauteng	SA
Less than R 20 000	37.0%	40.0%	37.0%	45.0%
R20 000 - R75 000	42.0%	33.0%	31.0%	32.0%
R75 000-R150 000	6.0%	10.0%	11.0%	9.0%
R 150 000- R 300 000	6.0%	8.0%	9.0%	7.0%
More than R300 000	4.0%	9.0%	12.0%	7.0%
Unspecified	5.0%			
Total	100.0%	100.0%	100.0%	100.0%

Source: Stats SA 2011 as in <https://wazimap.co.za/>

7 ALTERNATIVES

The concept of Integrated Environmental Management suggests that an Environmental Impact Assessment process, to determine the possible impact of the proposed activity, should incorporate the consideration of feasible alternatives. A reasonable number of possible proposals or alternatives, to achieve the same objective should be assessed. The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process. Alternatives should be considered as a norm within the Environmental Process. These should include, as applicable, the demand alternative, scheduling alternative, land use alternative (including the NO-GO option), location alternatives and service alternatives.

The alternatives considered for this project are described below.

7.1 Layout Alternatives

A number of layout alternative have been considered. Initially the first layout that was created in November 2018, included additional properties and the layout did not consider any environmental sensitivities.

Please see below *option A (figure 22)*, which provides a description of the first round of layouts that were created. This layout also included Pnt 96 of the farm Nooitgedacht 534 - JQ. Due to the ecological assessment this option has been excluded for the development footprint.

In addition, Portion 93 of the Farm Nooitgedacht 534 -JQ. An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. Due to this Portion 93 has been zoned as “special” with no development zoning schedule or linked to this portion and hence no development will currently take place on this portion.

SUMMARY OF NOOITGEDACHT 528 JQ LAND ASSEMBLY
11 NOVEMBER 2018

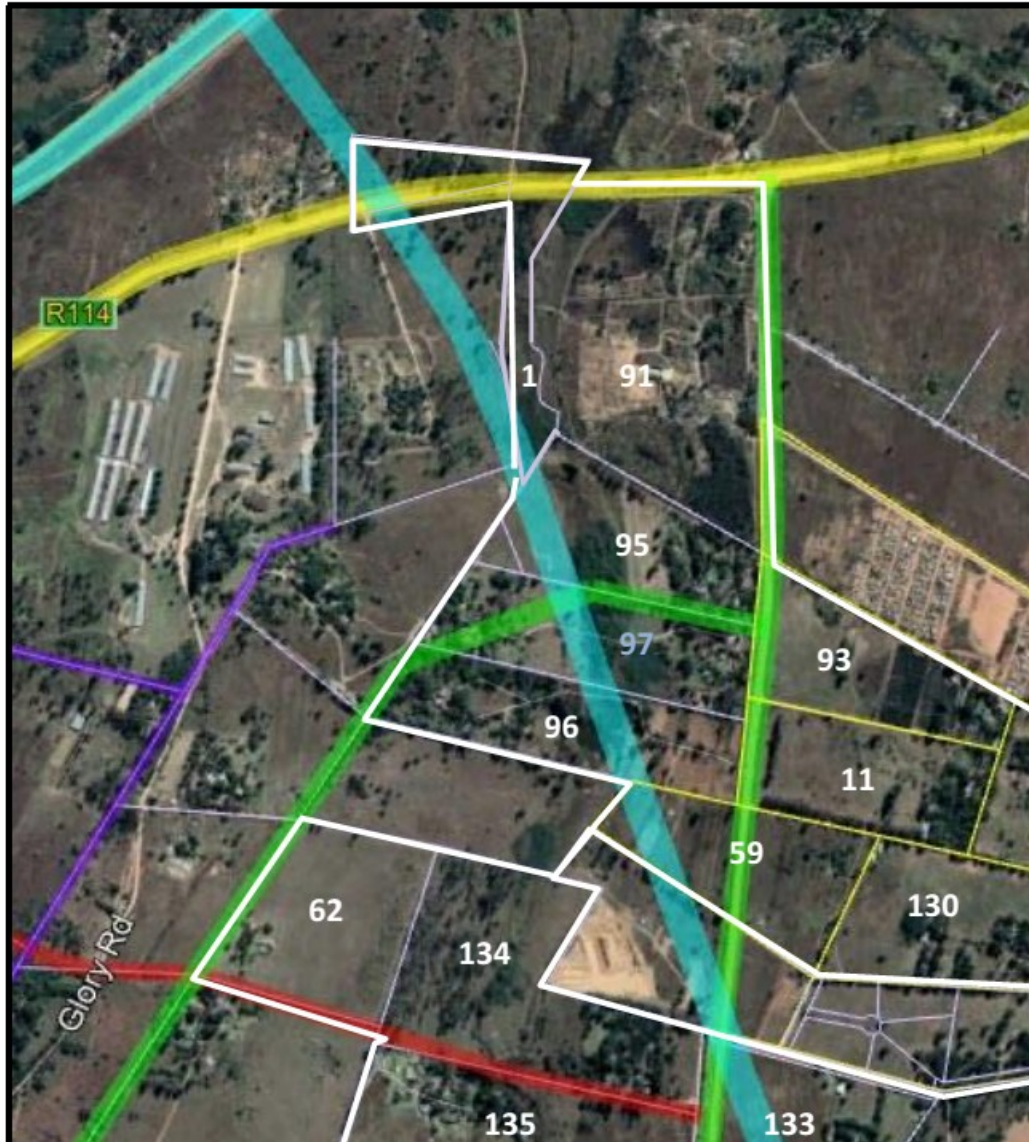


Figure 22: Option A Original Mogale Ext 42, 43 and 44 Layout (dated March 2018)

During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment.

Please see below *option B* (figure 23) no development will take place within the wetland or the associated 30m GDARD setback area, the updated site layout plan has thus taken this into account.

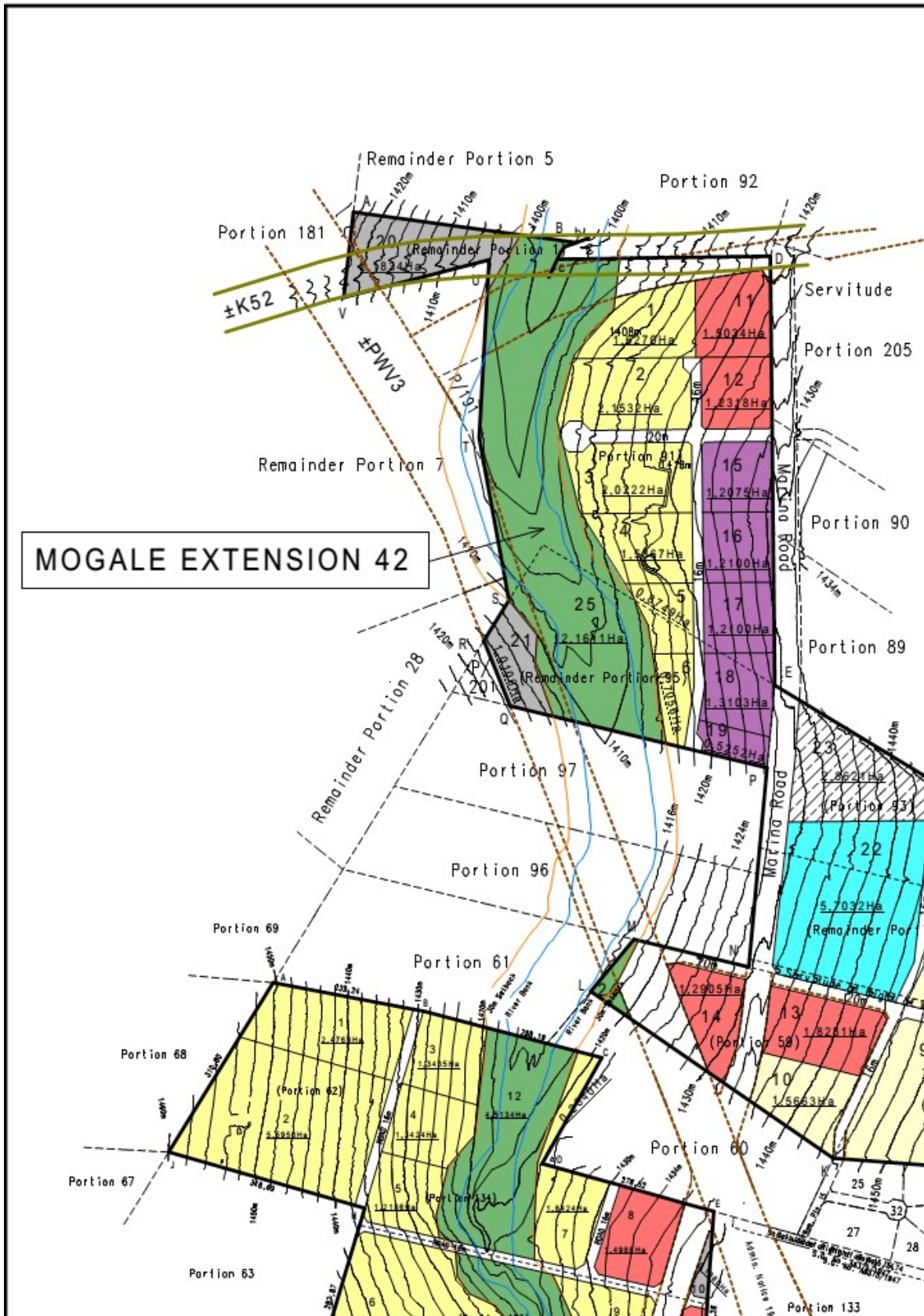


Figure 23: Option B Site Layout Plan (Preferred Layout)

7.2 Activity/Land-Use Alternative

- *Option A: Current Land-use Agricultural*

The current zoning for the site is Agricultural. The Muldersdrift Precinct Plan indicates part of the proposed development to have a high agricultural importance rating, with the remaining area classified as having a low agricultural importance rating. See Figure 24 below.

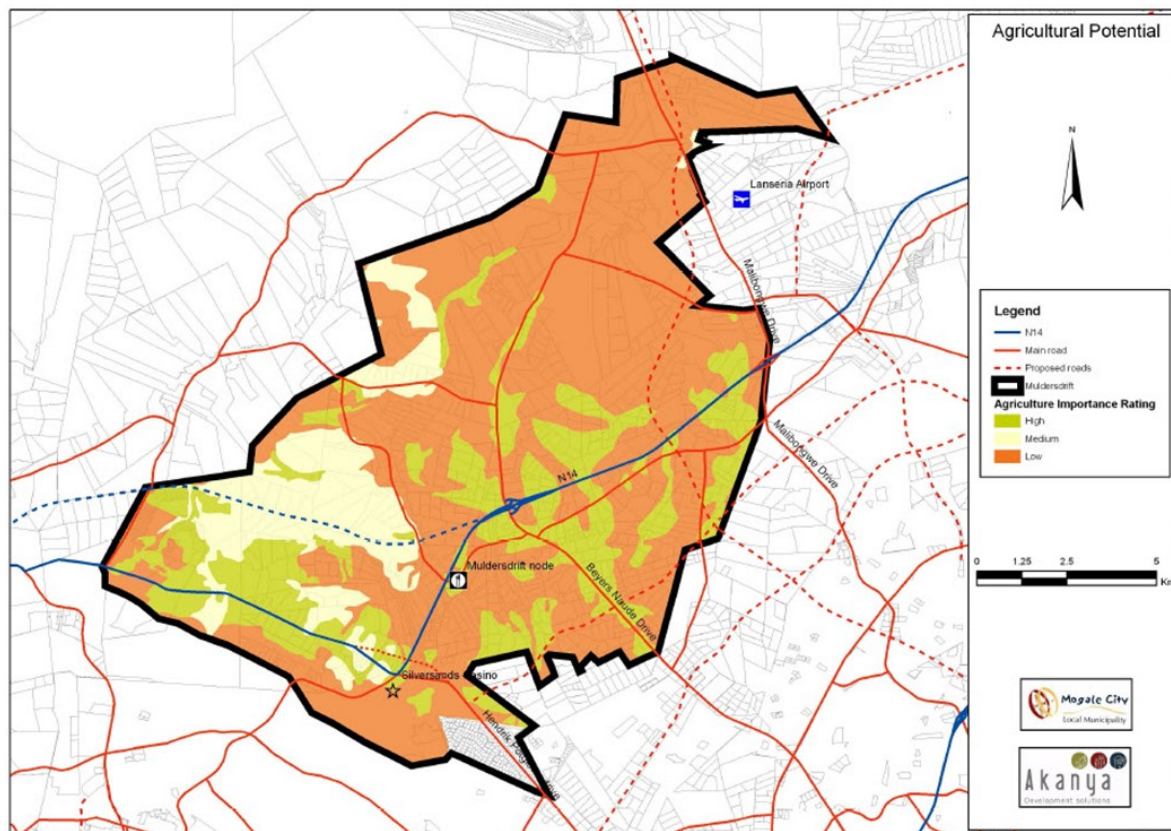


Figure 24: Agricultural Potential (taken from the Muldersdrift Precinct Plan, 2011)

During the scoping phase a meeting was held between Astral Operations Limited Poultry and the Nooitgedacht project team. Approximately 300m to the north-west of the proposed development site is the Astral Operations Limited Poultry Facility situated on Portion 32 of the farm Rietfontein. The proposed Mogale Extension 42 does not border onto Portion 32 the western boundary of the proposed township comprises the private open space area created around the environmentally sensitive wetland area. The current alignment for the proposed PWV-3 is located to the west of the wetland area, creating an additional buffer between the proposed Mogale Extension 42 and the existing poultry farm.

One of the concerns raised by the existing poultry farm is the potential impact of the development on the farm, and its impact on the proposed development.

The Nooitgedacht area is currently in transition from a predominantly agricultural area to an urban area. The area within the Mogale City urban development boundary is of significant importance, both for the economic growth of the municipality and the provision of housing opportunities in Gauteng. It is, accordingly, anticipated that with additional development

pressure, the necessary services infrastructure would be developed in the near future, unlocking further development opportunities. It is, therefore, anticipated that the character of the area would change significantly.

Regardless of the disparities, it is believed that the farming operations and urban uses *can co-exist* if all the management measures as stated in the draft EIA and EMP are adhered to. The proposed development adheres to the required environmental buffers.

- *Option B: Propose Mixed-Land use (preferred option)*

Even though the area was, traditionally, earmarked for agricultural purposes, the inclusion of the land in the *urban development boundary*, changed the development priority of the land. None of the land parcels included in the proposed development is currently utilised for commercial agricultural purposes. The development of these portions would, accordingly, not have an impact on current food production.

The majority of the subject properties are utilised for rural residential purposes, leaving large tracts of land underutilised. Furthermore, many of the landowners are nearing retirement age, and have lost interest in the burdens brought on by maintenance and security requirements of large tracts of land.

The cost of keeping and maintaining land that is not optimally developed is becoming increasingly expensive and may result in neglect and deterioration of the land. Such potential deterioration could detrimentally affect the environment, which may potentially impact negatively on land value in the area.

South Africa is experiencing severe housing shortages, increasing the occurrence of informal settlements. Where land is not optimally utilised, or secured, there is an increased risk of the land being unlawfully occupied, with an associated impact on the environment and amenity of an area.

The proposed new Mogale Ext 42, 43 and 44 development will create both an economic and social improvement to the area, in terms of job creation and providing a new service to the community. Compared to the current activities/landuse, vacant / agricultural land, the new land use is seen as a feasible alternative.

7.3 Technology Alternative

The energy requirements of the development will be reduced by the introduction of the following energy saving methods, where possible:

1. All units will be provided with energy saving compact fluorescent lamps (CLF's).
2. All electric geysers should be insulated with geyser blankets.
3. All electric geyser thermostats should be set at the most optimal temperature.
4. All fitted appliances should have an energy rating and the most efficient models will be considered.
5. Energy efficient streetlight technology should be used as far as possible to reduce the energy requirements of the streetlight network

7.4 No -Go Option

- *No-Go Alternative*

The No-Go Alternative implies that the site be left as is and that no development or alteration be done. If this alternative is pursued, the existing habitat on the site will be retained as no development will take place. This option has the following drawbacks:

- The potential to provide additional mixed-use township, which appears to be in accord with the prevailing land use regime in the area and the thinking of the local municipality to the population, will be lost;
- A very viable opportunity to creating jobs and income for the local market will be negated;
- If not developed, the owners will derive no income from the property and will subsequently not be able to maintain the property. This will lead the site of fall into disrepair and the protection and appropriate management of potential conservation areas will be negated.
- Agriculture is not an economically viable option due to the location of the site. Virtually surrounded by current and future urban development and the natural location to develop further.
- Illegal squatters or vagrants may move through and inhabit the site. Severe pressure exists for housing in the area. Due to the presence of extensive development throughout the greater area it is possible that undeveloped, un-managed land may be illegally settled.

The “no project option” is not considered.

- *Preferred alternative: Mix use Development*

The proposed development will entail a mixed-use township establishment with the following uses:

Table 16: Zoning Schedule for Mogale Extension 42.

Erf	Zoning	Maximum density	Area (hectares)	Maximum of units	FAR	Height	Coverage
Erven 1-6	Residential 3	80 dwelling units per hectare	8,9196 ha	714	0,60	3 storeys	40%
Erven 7 - 10	Residential 4	100 dwelling units per hectare	21,5920 ha	2 159	1,80	3 storeys	60%
Erven 11-14	Business 2		5,8488		0,80	2 storeys	60%
Erven 15- 19	Commercial		5,4630	-	0,85	2 storeys	65%
Erven	Undetermined		3,1939	-	n/a	n/a	n/a

20 -21							
Erf 22	Educational		5,7032	-	0,20	3 storeys	40%
Erf 23	Special for residential and place of public worship	80 dwelling units per hectare	2,8621	229	0,80	3 storeys	50%
		-		-			
Erven 24-25	Private Open Space		12,4451	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		10,2103				
		Total	63,78ha	3 102			

Table 17: Zoning Schedule for Mogale Extension 43.

Erf	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7,9	Residential 3	80 dwelling units per hectare	21,5629	1 718	0,60	3 storeys	40%
Erven 8, 11	Business 2		2,36	-	0,80	2 storeys	60%
Erf 10	Undetermined		0,1960	-	n/a	n/a	n/a
Erven 12, 13	Private Open Space		7,3128	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		3,1080				
		Total	27,20 h	1 718			

Table 18: Zoning Schedule for Mogale Extension 44

Erf #	Zoning	Maximum density	area (hectares)	maximum # of units	FAR	Height	Coverage
Erven 1-7	Commercial		5,4747	-	0,85	3 storeys	65%
Erven 8,9	Undetermined		0,6056	-	n/a	n/a	n/a
Public Roads	PUBLIC ROAD		2,4850				
		Total	8,5653				

8 PUBLIC PARTICIPATION

8.1 Introduction

Public participation is an integral part of the environmental assessment process, and affords potentially interested and affected parties (I&APs) an opportunity to participate in the EIA process, or to comment on any aspect of the development proposals. The public participation process to be undertaken for this project complies with the requirements of the EIA Regulations. The description of the public participation process as included below itemizes the steps and actions undertaken to date and as appropriate at this stage of the project.

8.2 Objectives

The main objectives of the public participation process (PPP) are to:

- Supply any and all identified I&APs with sufficient information on the proposed project in such a way that the I&APs are empowered to actively participate in the decision-making process, and
- Create an entity point for I&APs to raise their viewpoints (issues, comments and concerns) with regard to potential impacts, benefits and drawbacks related to the proposed project.

The PPP would thus ensure that the I&APs' input is considered and integrated into the proposed development, to be situated on the remainder of Portions 1, 11, 59, 62, 91, 93, 94, 95, 130, 132, 134 and 135, of the Farm Nooitgedacht 534 JQ, Muldersdrift, Mogale, Gauteng Province: The project will be referred to as the "Mogale Ext 42, 43 and 44 Development". The PPP has been structured in such a way that the broader public and more specifically local I&APs are informed about the proposed project by disseminating factual and transparent information.

8.3 Approach and Methodology

The PPP consisted of the following activities:

- Initial consultation with regulatory authorities and municipal authorities;
- Consultation with surrounding landowners;
- The identification and engagement with the general public;
- Placement of notifications and advertisements in local newspaper;
- Placement of posters and notifications on site;
- Compilation and distribution of the Background Information Document (BID) to I&APs;
- Public review of the draft Scoping Report; and

The PPP will be an ongoing activity and will only be concluded once the outcome of the EIA application has been issued. All I&APs will be informed as to the decision taken by Gauteng Department of agriculture and Rural Development (GDARD).

8.3.1 Identification of and Engagement with I&APs

Identification of I&APs

Identification of I&APs commenced on 12 February 2020. The identification process was undertaken by means of the following:

- Newspaper advertisement;
- Site Notices;
- Direct Notifications (e-mails), and
- Hand delivered notifications.

Newspaper Advertisements

The formal announcement of the proposed project was done by placing an advert in the following newspapers on 12 February 2020 to invite all I&APs to register:

- Krugersdorp News

Refer to **Appendix M** to view the copy of the advertisement placed in the local newspapers.

Site Notices

In order to inform surrounding communities and adjacent landowners of the proposed project, three (4) site notices were erected on site and at visible locations close to the site. Photographs of the site notices were also taken and are presented below.

Site Notice 1 was placed at the entrance to Plot 135 of the farm Nooitgedacht 534-JQ, Muldersdrift, along Marina Drive.



Figure 25: Site Notice 1A and B

Site Notice 2 was placed at the entrance to Plot 93 of the farm Nooitgedacht 534-JQ, Muldersdrift, along Marina Drive.



Figure 26: Site Notice 2A and B
 Site Notice 3 was placed at the southwestern corner of the M67/Ruimsig Road and Marina Drive.



Figure 27: Site Notice 3A and B
 Site Notice 4 was placed at the entrance to Plot 72 (formely known as Mabulani) of the farm Nootgedacht 534-JQ, Muldersdrift, along the M67/Ruimsig Road.



Figure 28: Site Notice 4A and B

Direct Notification of Identified I&APs

Key stakeholders, which included the following sectors, were directly informed of the proposed development by e-mail and fax:

- Authorities;
- Municipalities;
- Ward Councillor;
- Non-governmental organisations;
- General Public;
- Parastatals / Service providers, and
- Adjacent Landowners.

Nock and Drop

Batho Earth Environmental Consulting has informed the residents located directly adjacent to the site of the proposed new development and presented the landowners with a copy of the BID.

8.3.2 Public Review of Document Draft Scoping Report.

As per the requirements of Regulation 43 of GN R982 of 2014 as amended, the draft Scoping Report was made available for a 30-day commenting period.

The report was included for statutory comment with the written notice as sent to the commenting organs of state.

Electronic copies were made available to Aall I&AP. The draft Scoping Report was made available for review from 07 July to 07 August 2020. The draft scoping report was submitted to GDARD on 14 October 2020 and the final Scoping report was submitted on 07 December 2020. All comments received on the document was submitted to the authorities.

8.3.3 Focus Group Meeting.

Focus Group Meetings to discuss the project and contents of the draft Scoping Report was held on *28 September 2020* with Astral Foods Operations Limited and Bokamoso Landscape Architects and Environmental Consultants CC, together with representatives from Cliffe Dekker Hofmeyer Inc. Minutes of these meetings, is included in **Appendix M**.

8.4 Recording of Issues

The public, including government and non-governmental organisations were afforded the opportunity to register as I&AP's to the project. In doing so, BIDs were supplied to them via fax, email, post and by hand. I&AP's were given the opportunity to raise issues and concerns in writing to the PPP Consultant. These issues were recorded as received and dated. As part of the PPP process, an Issues and Response Table was compiled.

All the comments received on the draft scoping report, was included into the issues and response report. All the parties that did provided comments were informed of the said response, via formal communication between the said parties. The updated issues and response report was also e-mail to all the stakeholders.

A copy of the Issues and Response is attached as **Appendix M**.

8.5 Public Participation during the EIA Phase

Public participation during the EIA phase involves submitting the draft EIR to the registered I&AP's and Key Departments for a 30-day period to discuss the findings of the report. Once all comments have been received, the EIR will be finalised considering the comments.

The final EIR will then be submitted to the GDARD for approval. As per the requirements of GN R982 of 2014 as amended, should any additional comments be received during this stage, these will be submitted to GDARD.

This Draft EIA Report is now available for a 30 days Public Participation Period. All comments received on this Draft EIA Report will be considered when we compile the Final EIA Report and responded to in the Comments and Response Table that will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) for their final decision making.

The Draft EIA Report and EMPr will be available for public review from 18 March to 23 April 2020

The public, local communities and interested and affected parties (I & AP's) are invited to comment on this Draft EIA Report which is available for download and review (for a 30-day period only).

Hardcopies and / or electronic copies of this Draft EIA document has also been sent to key I & AP's (landowners and Authorities) that have already registered as I & AP's in this EIA Process.

9 ENVIRONMENTAL IMPACTS IDENTIFICATION

9.1 Summary of Impacts Identified

The Impact Tables in this section includes the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of impact, including the degree to which the impact can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.









Various detailed specialist assessments have been undertaken and considered when compiling this section of the EIA Report. All the legally required specialist studies were conducted (as required by GDARD as per DEA guidelines). Often more than one study was conducted in the same discipline to verify or to supplement findings. The findings of such specialist studies highlighted potential impacts on protected or endangered species and/or environments. The following shows a list of the impacts according to the specialist studies conducted:

Table 7: Possible impacts according to specialist studies

Specialist Study	Impact Identification
<p>Traffic Assessment</p>	<p>The primarily purpose of this study is to ensure that accessibility to the development is appropriate and will be able to accommodate the anticipated traffic demand in a safe and efficient manner.</p> <p>Traffic surveys were conducted on Wednesday 22 January and Thursday 23 January 2020 during the following times:</p> <p>Morning: 06h00 to 09h00 am (Thursday 23 January 2020); Afternoon: 15:00 – 18:00 pm (Wednesday 22 January 2020);</p> <p>Access to the applicable development will be provided mainly from three access points from Marina Road (D1410).</p> <p>The study indicates that, at present, the intersections investigated are operating at unacceptable levels of service. Accordingly, the TIA recommends that Gautrans prioritise the upgrade of the following intersections:</p> <p>R114 / Marina Road R114 / Malibongwe Drive R114 / Beyers Naudé Drive Marina Road / Jubilee Road</p> <p>The combined development is anticipated to generate over 3,000 additional peak hour trips, necessitating substantial upgrade on the following intersections, as outlined in the report:</p> <p>R114 / Marina Road R114 / Malibongwe Drive</p>

	<p>R114 / Beyers Naudé Drive</p> <p>Marina Road / Jubilee Road</p> <p>The development access intersection is expected to be operating at an acceptable level of service by the horizon year 2025;</p> <p>All three of the proposed development accesses will be signalised intersections. Sufficient sight distance is available at all three new access intersections in accordance with the South African Road Traffic Signs Manual Volume 3;</p> <p>The access intersection level of service (with geometry as depicted in figure 7) is expected to be operating at an acceptable level of service during all analysed peak traffic hours;</p>
<p>Terrestrial faunal and floral Assessment</p>	<p>The biodiversity assessment revealed that the study area encompasses six habitat units, namely the Eragrostis Secondary Grassland, Degraded Secondary Grassland, Freshwater Habitat, Rocky Ridge, Woodland and Transformed Habitat. The study area can no longer be described as original Egoli Granite Grassland defined by Bredenkamp et al. (2006). The study area, therefore, with the exception of the freshwater resource, which is excluded from development, holds no developmental constraints for the proposed project.</p> <p>The Freshwater Habitat forms a continuous system, connecting upstream and downstream areas, whilst also providing important ecosystem services and ecological connectivity in the landscape. As such it is recommended that the freshwater habitat be excluded from the proposed development. This habitat together with its zones of regulation as per (SAS, 2019), should be incorporated as a green open space. This green open space can be used for the relocation of protected floral Species of Conservation Concern (SCC) i.e. <i>Boophone. Disticha, Hypoxis hemerocallidea and Eucomis autumnalis</i>, (Please note that the <i>Eucomis autumnalis</i> is located on portion 96 which has been excluded from the development and will not require a permit) on which will negate the need to obtain permits for their relocation from GDARD. In order to avoid applying for a permit from the Department of Agriculture, Forestry and Fisheries (DAFF) for the <i>Podocarpus henkelii</i> individual planted within the study area, it is recommended that this individual remain planted in its current location and be incorporated into a landscaped garden. In addition to this, the green open space areas will provide suitable habitat for faunal species, notably those displaced as a result of development activities.</p> <p>Faunal SCC expected to occur in the study area, <i>Atelerix frontalis</i> (Southern African Hedgehog, NT), <i>Mystromys</i></p>

	<p>albicaudatus (White-tailed Mouse, EN) and Pyxicephalus adspersus (Giant Bull Frog, NT), will also benefit from the creation of these green open space areas.</p> <p>The study area, particularly the freshwater habitat was severely affected by Alien Invasive Plant (AIP) proliferation, and AIP control is considered of utmost importance. This will increase the aesthetics of the feature, as well as improve the floral habitat and integrity, which in turn will provide additional habitat and food sources for an increased faunal population. This will further contribute to the sense of place, and serenity of the proposed development.</p>
<p>Freshwater and Wetland Delineation</p>	<p>During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment.</p> <p>The risk assessment was based on the assumption that no development will take place within the wetland or the associated 30m GDARD setback area. It is anticipated that all activities will be situated upgradient of, and within close proximity to, the delineated wetland.</p> <p>The freshwater resource (wetland area) have been excluded from development. No development will take place within the 30m GDARD setback area not the 1:100 year flood line.</p>
<p>Geotech Assessment</p>	<p>The study divides the development area into five categories, based on the anticipated consolidation settlement. Please see diagram below of a summary of the critical foundation systems for the site.</p>

	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Geotechnical Legend</p> <p> 1A Area underlain by collapsible soil horizon, less than 750mm thick.</p> <p> 2A Area underlain by collapsible soil horizon of greater than 750mm thick</p> <p> 1A2F Area underlain by collapsible soil horizon, less than 750mm thick, and underlain by difficult excavation conditions with 10 to 50% rock expected within 1.5m of the surface.</p> <p> 3F Area underlain by difficult excavation conditions with greater than 50% rock or hardpan ferricrete expected within 1.5m of the surface.</p> <p> 3L Area potentially falling within 1: 50 year food line (to be determined by hydrologist)</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Legend</p> <p> TP 4 Test pit position</p> <p> Boundary of site investigated</p> <p> Geotechnical Soil Boundary</p> </div>
<p>Heritage Assessment</p>	<p>A Phase 1 Cultural Heritage Assessment has been compiled and is attached to Appendix H.</p> <p>Three houses, on Plot 94, Plot 95 and Plot 130 have been identified to be of significance and a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.</p> <p>Three informal burial sites have been identified on Plot 28, Plot 59 and Plot 97, and a valid permit should be obtained from SAHRA, the police and the Department of Health before they can be relocated.</p>
<p>Services</p>	<p>Communication with the applicable municipal departments will be maintained to ensure adequate supply plans without hindering the supply to the surrounding areas. Bulk services are available or will be available along with required upgrades. The appropriate links will be installed to these services.</p> <p>Referring to electricity requirements, as soon as the application process is finalised, the necessary, formal application will be lodged with Eskom to determine final costs. Quotes from Eskom are valid only for 30 days, and it, therefore, serves no purpose to obtain the quotation at this early stage of the development process.</p> <p>If any activities associated with or due to the construction any</p>

	<p>services to the development, requires additional authorisation, a separate environmental application needs to be submitted. No additional impact is expected with the implementation of the Environmental Management program.</p> <p>Ilifa Africa Engineers (Pty) Ltd was approached to compile the stormwater management plan for the proposed Mogale Ext 42, 43 and 44 development, please refer to Appendix G. No existing municipal stormwater infrastructure is located within the vicinity of the proposed township.</p> <ul style="list-style-type: none"> • The pre development runoff for the 1:25 year storm event is therefore 1.7, 2.0, 1.7 and 0.7 m³/s for Ext's 42 (North), 42 (East), 43 and 44 respectively. • The post development runoff for the 1:25 year storm event is therefore 7.8, 4.5, 7.6 and 2.3 m³/s for Ext's 42 (North), 42 (East), 43 and 44, respectively. • The required attenuation storage was 9 120 m³ for a catchment area of 35.17 ha. The ratio of storage per hectare is therefore 259 m³/ha
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9.2 Site Inspection.

The environmental consultant and specialists conduct several site visits and identified potential sensitive environments. These areas are then red-flagged to be investigated further and excluded from development.

9.3 Public Participation

Conducting public participation produces an issues list. Such a list needs to be screened for relevant impacts which then need to be addressed by specialist studies or identified for further investigation. A very comprehensive public participation process was followed

9.4 GDARD Policies, Review / Terms of Reference GDARD

C-Plan 3 as well as the policies provides the red flags that must be investigated by the specialists. Furthermore, the GDARD officials and the different sub-directorates within the department review the application and give comments to the relevant environmental officer. The issues identified are forwarded to the environmental consultant and these issues are addressed or translated as impacts.

9.5 Methodology for assessing the significance of impacts

The possible impacts of the project shall be described using specified criteria to describe the extent (spatial scale), duration, intensity and probability of occurring. These criteria would be used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.

There are different approaches that can be adopted to the undertaking of the assessment of impacts, but any approach should always be based on a methodology that includes:

- a clear process for impact identification, prediction and evaluation;

- specification of impact identification techniques;
- criteria for evaluating the significance of impacts;
- the design of mitigation measures to address impacts;
- defining types of impacts (direct, indirect or cumulative);
- specifying uncertainties; and
- the assessment of alternatives and impacts results in options that represent the minimum impact on the environment.

The potential environmental impacts of the proposed Mogale Ext 42, 43 and 44 mixed land use development project will be evaluated according to their severity, duration, extent and significance of the impact described below.

Significance of Impact

The significance of the impact has been determined through the following criteria:

Nature of Impact: This includes a brief description of how the proposed activity will impact on the environment. The nature of the impact is described as follows:

Nature	
	Description
Positive +	Impacts affect the environment in a positive manner, such that natural, cultural and/or social functions and processes are not affected or enhanced.
Negative –	Impacts affect the environment in a negative manner, such that natural, cultural and/or social functions and processes are altered, destroyed, lost, etc.

Extent: This refers to the geographic area on which the activity will have an influence and can include the following extents:

Extent (Scale)		
	Rating Value	Description
Project site	1	the immediate location of the activity
Study area	3	the proposed area and its immediate environs within a 5 km radius of the activity
Local	5	Local Municipality
Regional	6	Province
National	7	Country

Duration: This refers to the expected timeframe of an impact and can be expressed as:

Duration		
	Rating Value	Description
Short Term	2	0-5 years
Medium Term	4	5 – 15 years
Long Term	6	15 – 40 years
Permanent	8	40 + years, permanent and lasting change that will always be there

Likelihood: This considers the likelihood of the impact occurring and should be described as:

Likelihood (Probability)		
	Rating Value	Description
Improbable	2	where the impact is unlikely to occur
Probable	4	where there is a good probability, < 50 % chance, that the impact will occur
Highly Probable	6	where it is most likely, 50-90 % chance, that the impact will occur
Definite	9	where the impact will occur, > 90 % chance of occurring, regardless of any prevention measures

Severity Scale: The severity is used to evaluate how severe negative impacts would be on the environment, and is described as follows:

Severity (Magnitude)		
	Rating Value	Description
No effect	1	no impact by the proposed development
Low	3	short term impacts with mitigation being very easy, cheap, less time consuming or not necessary
Medium	4	medium term impacts that could be mitigated
High	5	long term impacts, an irreversible and permanent change that cannot be mitigated

Degree of confidence: It is necessary to indicate where the degree of confidence has been used, in determining the rating values of each criteria, ie. chosen value between 1 and 3, etc. The rating value used in the significance methodology has been predicted, based on the

availability of information, expertise of the EAP, specialist input, ground truths and authority support tools.

Significance Rating Matrix

		Consequence											
Likelihood		3	4	5	6	7	8	9	10	11	12	13	14
	2	5	6	7	8	9	10	11	12	13	14	15	16
	3	6	7	8	9	10	11	12	13	14	15	16	17
	4	7	8	9	10	11	12	13	14	15	16	17	18
	5	8	9	10	11	12	13	14	15	16	17	18	19
	6	9	10	11	12	13	14	15	16	17	18	19	20
	7	10	11	12	13	14	15	16	17	18	19	20	21
	8	11	12	13	14	15	16	17	18	19	20	21	22
	9	12	13	14	15	16	17	18	19	20	21	22	23

The significance of impacts is determined based on the evaluation of an activity's impact in terms of; consequence and likelihood. Using the sum of the evaluated ranking criteria, and the matrix in Table below, overall significance can be classified as follows:

Low	Where the impact will not have a significant influence on the environment. Management measures can be proposed to ensure that significance does not increase.	5 – 11
Medium	Where the impact could have a significant influence on the environment unless it is mitigated or managed.	12 – 17
High	Where the impact will have a significant influence on the environment regardless of any possible mitigation and hence must be either avoided or managed.	18 - 23

In addition, comments from interested and affected parties (IAP) will also influence the ranking of impacts. According to the NEMA, the applicant must consult with IAPs and record their comments and concerns. Although the significance ranking (as described above) may evaluate an impact to have a medium impact, the members of the public may consider the impact as having a high significance. The concerns raised by the public will then be indicated with the significance ranking with management measures being proposed and implemented to address all realistic concerns raised by IAPs. The additional criteria used in the evaluation of impacts for this application, is given below:

Additional criteria that influence the significance of an impact	Abbreviation used in Section G of this report
Cumulative impacts	Cml
Comments from interested and affected parties	IAP
Degree of confidence	Conf

Mitigation and monitoring

Where negative impacts are identified, mitigation measures (ways of reducing impacts) will be provided, and where positive impacts are identified, ways of enhancing these impacts will also be mentioned. Where no mitigation is feasible, this will be stated and the reasons given. Quantifiable standards against which the effectiveness of the mitigation can be measured have been set. This may include input into monitoring and management programmes included in the applications EMPr.

9.6 Summary of Key Findings & Recommendations

Traffic Impact Assessment – Key Findings:

Hamatino Consulting Engineers conducted a Traffic impact assessment for the proposed development. It has been found that:

Access to the applicable development will be provided mainly from three access points from Marina Road (D1410).

The study indicates that, at present, the intersections investigated are operating at unacceptable levels of service. Accordingly, the TIA recommends that Gautrans prioritise the upgrade of the following intersections:

- R114 / Marina Road
- R114 / Malibongwe Drive
- R114 / Beyers Naudé Drive
- Marina Road / Jubilee Road

The combined development is anticipated to generate over 3,000 additional peak hour trips, necessitating substantial upgrade on the following intersections, as outlined in the report:

- R114 / Marina Road
- R114 / Malibongwe Drive
- R114 / Beyers Naudé Drive
- Marina Road / Jubilee Road

Key Impacts Identified:

- All of the analysed intersections are currently (2020) prior to development operating at an un
- Acceptable level of service and need to be upgraded in order to be able to accommodate the existing 2020 background traffic demand prior to development;
- The trip generation of the development is expected to be as follow:
 - 3522 AM trips (1646 in; 1876 out);
 - 3015 PM trips (1637 in; 1379 out);
- All of the analysed intersections are expected to be operating at un-acceptable levels of service after development completion;
- All of the analysed intersections are expected to be operating at an acceptable level of service by the horizon year 2025, provided that the existing intersections be upgraded in accordance with the this report;
- The access arrangements (as per latest township layout plan) does not meet the requirements of access intersection spacing in accordance with TRH 26 (South African Road Classification and Access Management Manual Ver 1.0);

- The site development plan makes no provision for public transportation.

Recommended Mitigation:

- That the development be supported from a traffic engineering point of view;
- That all of the analysed intersections be upgraded in accordance with the Traffic report;
- That the township access localities be incorporated as identified in the traffic impact assessment report in order to better align with road access management principles as well as the latest Mogale Roads Master Plan of the Muldersdrift Area;
- That all of the proposed access intersections be signalised and be designed in accordance with, the traffic assessment report;
- That bus lay by be provide downstream of each of the new access intersections along Marina Street. The above-mentioned bus lay by shall be designed in accordance with the Gautrans standard detail drawings.

Terrestrial faunal and floral Assessment – Key findings

Scientific Terrestrial Services (STS) was appointed to conduct an investigation into the terrestrial faunal and floral ecology as part of the Environmental Impact Assessment (EIA) and Authorisation process.

Floral Key Findings:

- During the field assessment five broad habitat units were identified, i.e. Secondary Grassland, Freshwater Habitat, Rocky Ridge, Woodland and Transformed Habitat. The secondary Grassland Habitat was further subdivided into the Eragrostis Secondary Grassland, and the Degraded Secondary grassland, based on the floral species diversity, and habitat available for floral SCC;
- During the field assessment it was evident that the study area is utilised as agricultural small holdings, with a variety of anthropogenic activities associated with each portion, which has resulted in severe floral habitat degradation and AIP proliferation throughout the study area. The floral species composition between pockets of a single habitat unit did differ in areas due to differences in land uses of each small holding. Habitat units were grouped together based on similarities in attributes such as habitat integrity, floral species diversity, habitat for floral SCC and habitat provided for faunal species, and not on floral species encountered within a habitat unit only;
- Due to habitat degradation of the study area no viable remnant patches considered representative of the original Egoli Granite Grassland as defined by Bredenkamp et al. (2006) were observed. The study area, therefore, with the exception of the freshwater resource, which is excluded from development, holds no developmental constraints for the proposed development; and
- The floral SCC *Boophone disticha* and *Hypoxis hemerocallidea* were however observed throughout the study area, and care should be taken during the construction of the development, not to destroy individuals of these species.

Individuals of *Eucomis autumnalis* were also historically planted within an ornamental garden. Where individuals of any floral SCC are situated within the development footprint, they should be rescued and relocated to similar suitable habitat. This process should be overseen by a suitable qualified specialist. An individual of the protected tree *Podocarpus henkelii* was also planted within the woodland habitat. This species is protected within the NFA (1998, updated 2001), and destruction/ removal/ relocation of this individual will require a permit from the DAFF.

Habitat Sensitivity:

From an ecological perspective, habitat sensitivities range from intermediate to low sensitivities. The impact of the proposed development on the floral habitat and diversity is considered to be of medium low to low significance for all impacts during all phases of the development prior to the implementation of mitigation. With mitigation fully implemented, with emphasis on the rescue and relocation of floral SCC, all impacts can be reduced to low and very low significance.

Faunal Key Findings:

During the site assessment it was ascertained that six habitat units were present within the study area namely the Degraded Secondary Grassland, the *Eragrostis* Secondary Grassland, the Freshwater Habitat, the Rocky Ridge, Woodland and the Transformed Habitat. The study area is spread across an area that is associated with urban expansion as well as small scale agricultural practices and, as such has been subjected to varying levels of impacts and habitat degradation. At the time of assessment, it was clear that anthropogenic activities, livestock grazing and crop cultivation has had a significant impact on the herbaceous layer (faunal habitat) and consequently food resources for faunal species. In addition, due to the locality of the study area, it is highly likely that domestic dogs and cats from the resident households and neighbouring community will actively move through the study area hunting faunal species, notably avifauna, small reptiles and small mammals. In addition to this, there is an increased probability that community members are actively placing snares in open space areas, targeting small mammals and avifauna such as *Numida meleagris* (Helmeted Guineafowl).

Due to the layout of the study area, it is recommended that efforts to develop open space areas be focused on the western portions that are associated with the Freshwater Habitat, as these areas currently have the lowest household density and offer the greatest habitat provision for faunal species.

It is recommended that, in order to ensure the continued survival of faunal species in the study area, which is considered imperative in the ever-growing urban landscape, the Freshwater Habitat, zone of regulation and portions of the adjacent Secondary Grasslands be excluded from development activities. In so doing, under suitable management and through controlled site access, this open space area will not only provide habitat for common faunal species, but also for faunal SCC expected to occur within the study and surrounding areas. These SCC include *Atelerix frontalis* (Southern African Hedgehog, NT), *Mystromys albicaudatus* (White-tailed Mouse, EN) and *Pyxicephalus adspersus* (Giant Bull Frog, NT). These SCC rely on intact grassland and wetland habitats in order to forage and breed, which are rapidly being lost as a result of urban development. Pairing well thought out development

plans with conservation initiatives will ensure that developmental and conservation targets can be met in a sustainable manner.

Recommended Mitigation:

The following should be ensured for all individuals of floral SCC encountered during the site assessment:

- Should it be deemed necessary to remove the *Podocarpus henkelii* individual, a permit will have to be obtained from DAFF prior to vegetation clearing taking place.
- During the surveying and site-pegging phase of surface infrastructure, all floral SCC and protected species that will be affected by surface infrastructure must be marked;
- All individuals situated within the development footprint should be rescued and either relocated to:
 - Suitable similar habitat within the study area but outside the development footprint,
 - Used within the landscaping plan of the development or
 - Relocated to a registered nursery, the ARC or SANBI;
- It should be noted that any individuals removed from the study area and not relocated to an area/facility listed above, permits might be required from GDARD,
- The rescue and relocation plan should be overseen by a suitably qualified specialist;
- Should any other floral SCC, however, be encountered during the construction of the development all activities should be stopped immediately, and a suitably qualified specialist be consulted as to the possibility of rescue and relocation of the species encountered;
- No collection of floral SCC, protected floral species or medicinal floral species must be allowed by construction personnel. Moreover, the number of floral SCC removed for construction of the infrastructure should be kept to a minimum and no plants should be needlessly destroyed;
- Edge effect control needs to be implemented to ensure no further degradation and potential loss of floral SCC outside of the proposed development footprint area occurs;
- No dumping of waste on site should take place. As such it is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste;
- If any spills occur, they should be immediately cleaned up. In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced preventing the ingress of hydrocarbons into the topsoil. It should be ensured that no spills leak into the Freshwater resource associated with the central portion of the study area,
- Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed;

- Removal of vegetation should be restricted to what is absolutely necessary;
- Alien vegetation, as listed in section 3.8 of this report, must be removed from the study area during both the construction and operational phases, with specific mention of Category 1b and 2 species in line with the NEMBA Alien and Invasive Species Regulations (2016);
- Edge effects of all construction activities, such as erosion and alien and invasive plant species proliferation, which may affect the sensitive habitat areas as stipulated in this report, as well as adjacent grassland and freshwater resource habitat within surrounding areas, need to be strictly managed adjacent to the proposed development footprint areas. Specific mention in this regard is made to Category 1b and Category 2 species identified within the development footprint areas (refer to section 3.7 of the fauna report); and
- Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species be used to revegetate the disturbed area. Recommended seed mix: Mayfort Biosome Grassland seedmix: <http://mayford.co.za/veld-grass/>.

Recommendations for Loss of *faunal habitat*:

- The optimised footprint of the proposed development must be fenced/ demarcated off to prevent vegetation clearing and footprint creep into the sensitive Freshwater Habitat and associated buffers, as stipulated in the freshwater report (SAS, 2019) as well as into any areas demarcated as future open space/greenbelt areas. This fence should, however, allow for small terrestrial faunal species to move through away from construction activity. A post and wire game type fence is considered ideal.
- No construction vehicles are to drive through the Freshwater Habitats, except on existing designated road, as this will lead to further unnecessary habitat degradation;
- Vegetation clearance should occur in a phased manner to allow for faunal species to naturally disperse out of the areas. In this regard, vegetation clearance activities should ideally start in the areas furthest from the Freshwater Habitat. This will allow faunal species to naturally relocate to this habitat unit and ensure that for as long as possible there remains grassland areas between the cleared areas and the Freshwater Habitat. This will help minimise sediment runoff and sedimentation of the Freshwater Habitat;
- Revegetation of remaining open space areas that have been disturbed should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; When rehabilitating disturbed areas, it is recommended that natural indigenous vegetation be used so that faunal species that were displaced by vegetation clearing activities are able to utilise and inhabit these areas during the operational phase;
- Spills and/or leaks from construction equipment must be immediately remedied and cleaned up so as to ensure that these chemicals do not enter into the soil later or freshwater habitat;

- Each construction team/site should have an individual that has undergone a snake handling course so as to safely catch and release any snakes within the site;
- Construction personnel are to be informed and educated with about general faunal species that may be encountered on site, notably of snakes and faunal SCC. Personnel are to be instructed that, if encountered they are not to kill these faunal species but let them either move off on their own or call the nominated construction personnel who is to safely catch and release such species;
- No hunting/trapping or collecting of faunal species is allowed;
- Should any faunal SCC be encountered/observed during construction activities in that area are to be halted and a biodiversity specialist consulted to determine the best way forward; Construction edge effects, notably stormwater runoff, are to be actively managed so as to ensure that the downslope freshwater habitat is not impacted upon;
- No informal fires by construction personnel are allowed; and
- Initiate an alien and invasive plant control plan.

Freshwater and Wetland Delineation – Key Findings

During the site assessment undertaken in March 2019, a single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment.

An area where some facultative vegetation species have established, situated on portion 93 within the study area, was observed on site. Based on historical imagery, this feature is considered artificial as it is likely created by and is hydrologically driven by water runoff coming from the adjacent upgradient plant nursery, which has potentially led to the formation of wetland characteristics in this area. This feature was not assessed, since it is apparent from historical and current digital satellite imagery as well as observations made during the site assessment that this feature was likely formed because of water runoff from the upgradient and adjacent plant nursery and thus, would not persist under “normal circumstances” as per the definition of a wetland in the National Water Act, 1998 (Act No. 36 of 1998).

Following the ecological assessment of the wetland, the Department of Water and Sanitation (DWS) Risk Assessment Matrix (2016) as it relates to activities as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act 36 of 1998) was applied to ascertain the significance of possible impacts which may occur as a result of the proposed development. the risk assessment was based on that no development will take place within the wetland or the associated 30m GDARD setback area. It is anticipated that all activities will be situated upgradient of, and within close proximity to, the delineated wetland.

Key Recommendations:

- If feasible, construction must be scheduled for the drier winter period in order to minimise the risk of sediment-laden runoff reaching the wetland as a result of the construction activities; The use of Sustainable Drainage Systems (SUDs) to manage stormwater is considered important for the proposed development;
- Areas which are to be cleared of vegetation, including contractor laydown areas, must remain as small as possible to reduce the risk of proliferation of alien vegetation, and in order to retain a level of protection to the wetland during construction (e.g. sediment trapping, slowing of stormwater runoff etc.). Contractor laydown areas are to remain outside of the delineated wetland and the associated 30m GDARD setback area, and as much as feasible no natural/indigenous freshwater vegetation is to be cleared;
- It is highly recommended that an alien vegetation management plan be compiled during the planning phase and implemented concurrently with the commencement of construction;
- A topsoil management plan must be compiled during planning and implemented when construction commences. It is essential that the following be included in the topsoil management plan:
 - All exposed soils are to be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) in order to prevent erosion and sedimentation of the wetland; and
 - No stockpiling of soils is to take place within the wetland or the 30m GDARD setback area, and stockpiles may not exceed 2m in height.

Geotech Assessment -Key findings

The site characteristics, soil conditions and site geology were assessed in terms of the recent geotechnical survey completed by J. Arkert Engineering Geologist. The study divides the development area into five categories, based on the anticipated consolidation settlement.

Geotechnical Zone 1A (Area underlain by collapsible soil less than 750mm thick.)

- All single storey residential structures placed within Geotechnical Zone 1A can be placed on conventional foundation. Foundation options may include strip footings or concrete slabs placed on the ground, with thickening for internal and external walls. Particular attention must be paid to good site drainage.

Geotechnical Zone 2A (Area underlain by collapsible soil greater than 750mm thick)

Greater than 10mm consolidation and collapse settlement is anticipated within this zone and therefore the potential founding solutions for all of the units to be constructed within this zone should ensure:

- Compaction of soils below individual footing.
- Soil raft.
- Concrete raft.

Geotechnical Zone 1A2F (Area underlain by collapsible soil less than 750mm thick and difficult excavation conditions anticipated with 10% to 50% rock or hardpan ferricrete expected within 1.5m of the surface.)

- All single storey residential structures placed within Geotechnical Zones 1A2F can be placed on modified normal (re-enforced) strip footings. Good site drainage must be adopted.

Geotechnical Zone 3F (Area underlain by difficult excavation conditions with greater than 50% rock or hardpan ferricrete expected within 1.5m of the surface.)

- The exposures of outcrop and shallow bedrock will render the entire area more difficult to develop. Service trenches and foundation excavations may require blasting within the upper 1.5m and the routing and construction of roads will encounter difficult conditions. All single storey residential structures placed within Geotechnical Zones 3F can be placed on modified normal (re-enforced) strip footings. Good site drainage must be adopted.

Due to the potentially collapsible properties of the soils encountered within *zones 2A* it is recommended that the following precautions are implemented when designing the buried water bearing services:

- No plumbing and drainage should be placed under floor slabs as far as practicable.
- The fall of all trenches should be directed away from buildings.
- All service trenches should be located at least 1.5m away from buildings and should be backfilled with in situ materials to not less than 88% Mod AASHTO density.
- Sewer and drain pipes and fittings should be provided with flexible joints.
- Water pipe entries into buildings should be provided with flexible piping to allow for movement.
- Pipes through walls should be provided with sleeves to permit relative movement.

Recommendations:

- **ADDITIONAL INVESTIGATIONS:** Without detailed knowledge of the structures to be erected on the site, comments regarding the most appropriate foundation solutions have been based on typical residential structures usually found in such developments. The following table sets out the National Home Builders Registration Council (2016) classification for each of the zones mapped. It must be emphasised however that these recommendations are not detailed and it is essential that site specific investigations are conducted for individual structures.

Heritage Assessment – Key findings:

The Heritage Assessment was undertaken by J A van Schalkwyk

- Three houses, on Plot 94, Plot 95 and Plot 130 have been identified to be of significance and a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.

- Three informal burial sites have been identified on Plot 28, Plot 59 and Plot 97, and a valid permit should be obtained from SAHRA, the police and the Department of Health before they can be relocated.

Recommendations:

- For this proposed project, the assessment has determined that the identified buildings have a significance rating of: Generally Protected 3B: Medium significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.
- For this proposed project, the assessment has determined that the identified burial sites have a significance rating of: Generally Protected 4A: Medium significance, and therefore valid permits should be obtained from SAHRA, the police and the Department of Health before they can be relocated.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Services

Recommendations on the Stormwater Management Plan:

- The stormwater runoff from the proposed development will be safely channeled from the higher lying areas to the lower lying area and discharged in the natural drainage course.
- New attenuation ponds will be constructed on each erf to ensure that the pre development runoff for a 1:25 year storm event is not exceeded. Storage will be provided in the order of 215 to 259 m³/ha.
- Stormwater inlets will be constructed at strategic positions to catch runoff from the site and conveyed in an underground stormwater drainage system consisting of interlocking joint concrete pipes.
- The proposed network will have sufficient capacity to accommodate the stormwater runoff from a 1:10 year storm event. Major storm events will be channelled overland towards the natural drainage course.

Social Environment (Sense of Place and Land-Use)

The study area is fairly rural with some residential development pressure already present to the east of the proposed development and east of Marina Drive. Astral Operations Ltd. has a poultry facility to the west of the proposed development.

The Crane Valley development is proposed to be situated below the R114 and between Beyers Naude and Malibongwe Drive. Approximately 9 600 to 20 000 residential units are anticipated. The overall sense of place in the study area will thus be impacted by the proposed Mogale Extension 42,43 and 44 as well as other residential developments proposed in the area.

The residential developments are in line with the spatial planning for urban development of Mogale City focused on the southern side of the N14. The area is thus earmarked for densification.

Recommendations:

- Buffer zones based on environmental considerations e.g. for wetland areas or watercourses, must be implemented as this would also assist in mitigating the possible negative impact on the sense of place of the area.
- The buffer zone for the wetland areas or watercourses must be used as a buffer zone between the proposed development and the Astral Operations;
- Retain existing vegetation throughout the development area as far as possible e.g. within 'green' zones and adjacent watercourses to lessen the visual impacts;
- Make prospective buyers aware of Astral's operations and include information in this regard.
- A thorough communication process undertaken through e-mails and pamphlets distributed to nearby communities must be undertaken to communicate any possible blasting activities during the construction phase. Pro-active communication with representatives of the Astral Operations in this regard would be required.
- Any possible regulations and/or specifications with regards to buffer zones around poultry facilities must be implemented.

General Mitigation

Establish a Community Forum or Working Group to monitor compliance and provide advice on the implementation of the Environmental Management Plan (EMP). It is recommended that such a working group could consist of local community representatives, local property owners, representatives of the Astral Operations and other surrounding farms, representatives from the Mogale Local Municipality and representatives from the GDARD and DWS.

Additional aims of such a forum or working group would be to create a platform where construction related issues can be discussed and resolved, as well as to ensure ongoing monitoring of environmental issues such as noise, dust and groundwater pollution during the construction phase, and for an agreed upon timeframe once the overall development has been completed.

9.7 Environmental Impacts and Mitigation Measures

Refer to Table 19 which indicates the quantification of impacts related to construction activities and Table 20 which indicates the quantification of impacts related to the operational activities, as per the methodology identified above.

9.8 Construction Phase

Table 19: Quantification of impacts related to construction activities

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures
			L	D	E	S	Total	
Physical Impacts								
Geology	There are no expected operational related impacts on the geology of the proposed development site and surrounding areas. Special Care should be taken in terms of any structures /services located on Zone 2A.	6 4	5 3	3 1	4 2	18 10	<i>Unmanaged:</i> Medium <i>Managed</i> Low	<p>Due to the potentially collapsible properties of the soils encountered within zones 2A it is recommended that the following precautions are implemented when designing the buried water bearing services:</p> <ul style="list-style-type: none"> • No plumbing and drainage should be placed under floor slabs as far as practicable. • The fall of all trenches should be directed away from buildings. • All service trenches should be located at least 1.5m away from buildings and should be backfilled with in situ materials to not less than 88% Mod AASHTO density. • Sewer and drain pipes and fittings should be provided with flexible joints. • Water pipe entries into buildings should

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<p>be provided with flexible piping to allow for movement.</p> <ul style="list-style-type: none"> • Pipes through walls should be provided with sleeves to permit relative movement. • Additional detailed geotechnical investigations would be required for structures other than single and double storey residential units
Topography	Construction activities including levelling of road and building surfaces continued during operational phase	Erosion	6	4	3	4	17	<i>Unmanaged:</i> Medium	<ul style="list-style-type: none"> • All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur. • All surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed. • Where erosion may potentially occur, dissipaters such as gravel beds or straw bales must be installed to prevent erosion. 	
			4	2	1	3	10	<i>Managed</i> Low		
Air quality	Construction activities and vehicles on site	Dust pollution that affects adjacent	6	2	3	4	15	<i>Unmanaged:</i> Medium	<ul style="list-style-type: none"> • Dust to be minimised by spraying down (water truck) of construction site daily 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
	continued during operational phase	developments	4	2	1	3	10	<i>Managed</i> Low	<ul style="list-style-type: none"> Dust suppression should be applied on the gravel access road and internal roads during the construction phase Lower speed limits on construction site. This can reduce dust emissions by 22%. No open fires should be allowed on the construction site.
Soils and land capability	Site clearance for road construction and construction of units and other structures	Compaction of topsoil	9	2	1	4	16	<i>Unmanaged</i> Medium	<ul style="list-style-type: none"> To prevent the incidence of erosion, management measures must include berms and soil traps. The working area must be clearly demarcated before construction commences. The top (200-300mm) layer (as applicable) of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material shall be used for the rehabilitation of the site. Unnecessary/ excessive clearing of land must be avoided.
			6	2	1	3	12	<i>Managed</i> Low	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<ul style="list-style-type: none"> • Land clearing, earth moving and construction activities should not take place during heavy rains, or windy conditions. • Movement of construction workers, vehicles and machinery must be restricted to existing access roads and the demarcated working area. • Concrete must be mixed on mixing trays only, not on exposed soil. Concrete shall be mixed only in areas which have been specially demarcated for this purpose.
	Site vehicles and storage of fuel on site	Contamination by fuel and lubricant spillages from vehicles	9 6	2 2	1 1	4 3	16 12	<i>Unmanaged</i> Medium <i>Managed</i> Low	<ul style="list-style-type: none"> • Provision of proper re-fuelling and maintenance facilities and procedures will reduce the likelihood of soil contamination 	
Water quality and availability	Storage of fuel and re-fuelling of construction vehicles	Fuel or chemical spillage and pollution of surface and/or ground water	6 4	2 2	5 1	5 3	18 10	<i>Unmanaged</i> High <i>Managed</i> Low	<ul style="list-style-type: none"> • Good housekeeping by contractor • Store new and used oils in bunded areas • No co-handling of reactive liquids or solids should be allowed 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<ul style="list-style-type: none"> • Create and monitor an inventory of chemicals held on site
	There will be no construction related impact on the quantity of groundwater available to surrounding borehole users. The development will make use of municipal water.									<ul style="list-style-type: none"> • However groundwater monitoring should commence during the Construction Phase to ensure that there is no impact on the adjacent agricultural activities.
Impact on Surface Water	The alteration of the land to streets, roofs and paved areas changes the behaviour of surface water run-off. The percentage of the entire area where infiltration takes place is drastically reduced as roofs and paved areas allow no infiltration. The volume of the surface run-off for any given rainstorm is increased, and will enter into the canal.	6 4	2 2	1 1	4 3	13 10	<i>Unmanaged</i> Medium <i>Managed</i> Low	<ul style="list-style-type: none"> • Vehicles should be regularly inspected for leaks and be refuelled on sealed surfaces to prevent ingress into soils. • All spills are to be immediately cleaned up and treated accordingly. • When not in use, all vehicles must be parked on a non-permeable surface or have drip trays under to prevent any leakage into the surrounding freshwater environment. • Storm water management should be implemented. • Erosion prevention measures should be implemented to prevent erosion of soil surfaces during construction. Care 		

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures						
			L	D	E	S	Total	Rating							
										<p>should be taken that topsoil is not washed away during high rainfall events, after the removal of the trees and ground cover vegetation, and before the reestablishment of vegetation and during the installation of the infrastructure and services.</p> <ul style="list-style-type: none"> • Ensure compliance to the site-specific storm water management plan developed attached to Appendix G. 					
Biophysical Impacts															
Impact on Habitat for Floral SCC	<p>Site clearing and the removal of vegetation.</p> <p>Compaction of soils reducing floral re-establishment</p>	<p>Loss of floral diversity as a result of increased invasion of alien plant species</p>	6	2	2	2	12	Unmanaged: Medium Low	3	1	1	1	6	Managed: Low	<ul style="list-style-type: none"> • Should it be deemed necessary to remove the <i>Podocarpus henkelii</i> individual, a permit will have to be obtained from DAFF prior to vegetation clearing taking place. • During the surveying and site-pegging phase of surface infrastructure, all floral SCC and protected species that will be affected by surface infrastructure must be marked; • All individuals situated within the development footprint should be

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>rescued and either relocated to:</p> <ul style="list-style-type: none"> ○ Suitable similar habitat within the study area but outside the development footprint, ○ Used within the landscaping plan of the development or ○ Relocated to a registered nursery, the ARC or SANBI; <ul style="list-style-type: none"> • It should be noted that any individuals removed from the study area and not relocated to an area/facility listed above, permits might be required from GDARD, • The rescue and relocation plan should be overseen by a suitably qualified specialist; • Should any other floral SCC, however, be encountered during the construction of the development all activities should be stopped immediately, and a suitably qualified specialist be consulted as to the possibility of rescue and relocation of the species encountered; • No collection of floral SCC, protected

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>floral species or medicinal floral species must be allowed by construction personnel. Moreover, the number of floral SCC removed for construction of the infrastructure should be kept to a minimum and no plants should be needlessly destroyed;</p> <ul style="list-style-type: none"> • Edge effect control needs to be implemented to ensure no further degradation and potential loss of floral SCC outside of the proposed development footprint area occurs; • No dumping of waste on site should take place. As such it is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste; • If any spills occur, they should be immediately cleaned up. In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced preventing the ingress of hydrocarbons into the topsoil. It should

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>be ensured that no spills leak into the Freshwater resource associated with the central portion of the study area,</p> <ul style="list-style-type: none"> • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; • Removal of vegetation should be restricted to what is absolutely necessary; • Alien vegetation, as listed in section 3.8 of this report, must be removed from the study area during both the construction and operational phases, with specific mention of Category 1b and 2 species in line with the NEMBA Alien and Invasive Species Regulations (2016); • Edge effects of all construction activities, such as erosion and alien and invasive plant species proliferation, which may affect the sensitive habitat areas as stipulated in this report, as well as adjacent grassland and freshwater resource habitat within surrounding

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<p>areas, need to be strictly managed adjacent to the proposed development footprint areas. Specific mention in this regard is made to Category 1b and Category 2 species identified within the development footprint areas (refer to section 3.7 of the fauna report); and</p> <ul style="list-style-type: none"> Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species be used to revegetate the disturbed area. Recommended seed mix: Mayfort Biosome Grassland seedmix: http://mayford.co.za/veld-grass/.
Impact on Habitat for Faunal SCC	Site clearing and the removal of vegetation leading to habitat loss of faunal SCC	Loss of potential faunal SCC diversity due to continued habitat loss within the study and surrounding areas	7 5	3 3	3 2	3 2	17 12	<p><i>Unmanaged:</i> Medium</p> <p><i>Managed:</i> Medium</p>	<ul style="list-style-type: none"> The optimised footprint of the proposed development must be fenced/demarcated off to prevent vegetation clearing and footprint creep into the sensitive Freshwater Habitat and associated buffers, as stipulated in the freshwater report (SAS, 2019) as well as into any areas demarcated as future open space/greenbelt areas. This fence should, however, allow for small 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>terrestrial faunal species to move through away from construction activity. A post and wire game type fence is considered ideal.</p> <ul style="list-style-type: none"> • No construction vehicles are to drive through the Freshwater Habitats, expect on existing designated road, as this will lead to further unnecessary habitat degradation; • Vegetation clearance should occur in a phased manner to allow for faunal species to naturally disperse out of the areas. In this regard, vegetation clearance activities should ideally start in the areas furthest from the Freshwater Habitat. This will allow faunal species to naturally relocate to this habitat unit and ensure that for as long as possible there remains grassland areas between the cleared areas and the Freshwater Habitat. This will help minimise sediment runoff and sedimentation of the Freshwater Habitat; • Revegetation of remaining open space

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>areas that have been disturbed should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; When rehabilitating disturbed areas, it is recommended that natural indigenous vegetation be used so that faunal species that were displaced by vegetation clearing activities are able to utilise and inhabit these areas during the operational phase;</p> <ul style="list-style-type: none"> • Spills and/or leaks from construction equipment must be immediately remedied and cleaned up so as to ensure that these chemicals do not enter into the soil later or freshwater habitat; Each construction team/site should have an individual that has undergone a snake handling course so as to safely catch and release any snakes within the site; • Construction personnel are to be informed and educated with about general faunal species that may be encountered on site, notably of snakes

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>and faunal SCC. Personnel are to be instructed that, if encountered they are not to kill these faunal species but let them either move off on their own or call the nominated construction personnel who is to safely catch and release such species;</p> <ul style="list-style-type: none"> • No hunting/trapping or collecting of faunal species is allowed; • Should any faunal SCC be encountered/observed during construction activities in that area are to be halted and a biodiversity specialist consulted to determine the best way forward; Construction edge effects, notably stormwater runoff, are to be actively managed so as to ensure that the downslope freshwater habitat is not impacted upon; • No informal fires by construction personnel are allowed; and • Initiate an alien and invasive plant control plan.

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
Impact on the integrity of the watercourse within the study area.	Site clearing prior to commencement of construction activities	<p>Increased runoff and erosion leading to sedimentation of the wetland.</p> <p>Increased sedimentation of the wetland leading to smothering of freshwater vegetation and potentially altering surface water quality.</p> <p>Decreased ecoservice provision</p>	2 1	3 2	3 2	3 2	11 7	<p>Unmanaged: Medium Low</p> <p>Managed: Low</p>	<ul style="list-style-type: none"> Limit clearing of vegetation and associated soil disturbances to essential areas only (outside of the 30m GDARD setback area); Protect exposed soils by means of a geotextile such as hessian sheeting; Ensure contractor laydown areas are placed outside of the freshwater environment and the associated 30m GDARD setback area. The CVB wetland and the associated 30mGDARD setback area are to be clearly demarcated on site, and to remain off-limits to all non-essential personnel; and No indiscriminate driving of vehicles through the wetland should be permitted. All vehicles must remain on existing road crossings only.
Impact on the integrity of the watercourse within the study	Groundbreaking, excavation of foundations and other earthworks	Disturbances of soils leading to increased alien vegetation	4 2	4 2	6 4	3 2	17 10	<p>Unmanaged: High</p> <p>Managed:</p>	<ul style="list-style-type: none"> Protect exposed soils and stockpiles from wind, and limit the time in which soils are exposed, by covering with a suitable geotextile such as hessian

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
area.	outside of the wetland and associated 30m GDARD setback area, but upgradient of the wetland.	proliferation, and in turn to altered freshwater habitat. Altered stormwater runoff patterns, leading to increased erosion and sedimentation of the wetland.							Medium	<p>sheeting;</p> <ul style="list-style-type: none"> No long-term (I.e. longer than 1 month) stockpiles are to be permitted within the wetland and the associated 30m GDARD setback area. Should long-term stockpiling be required, a designated area, as approved by the Environmental Control Officer (ECO) can be utilised; Ensure no stockpiles are higher than 2m; Dust suppression measures must be implemented throughout construction to prevent excessive dust which may smother freshwater vegetation.
Impact on the integrity of the watercourse within the study area.	Construction activities associated with the proposed development within the study area, upgradient of the delineated	Loss of freshwater habitat and ecological structure as a result of edge effects associated with the development.	5 3	4 2	6 3	4 2	19 10	Unmanaged: High Managed: Medium	<ul style="list-style-type: none"> No indiscriminate movement of vehicles or personnel is allowed within the wetland or associated 30m setback. Careful planning of all construction equipment must be undertaken beforehand to ensure that the minimum impact on the wetland occurs; Any concrete mixing/temporary storage 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
	wetland.	<p>Impacts to the ecoservice provision of the wetland.</p> <p>Potential impacts to water quality as a result of oil spills/ solid wastes entering the wetland.</p> <p>Potential impacts on the hydrology and sedimentation of the wetland, leading to alteration of the flood regime.</p> <p>Proliferation of alien and invasive plant species within the wetland.</p>							<p>must be undertaken in bunded areas or on batter boards only. Care must be taken to prevent any spillage within the wetland or surrounding environment;</p> <ul style="list-style-type: none"> • Dust suppression measures must be implemented throughout construction to prevent excessive dust which may smother freshwater vegetation; • If feasible, construction must be scheduled for the drier winter period in order to minimise the risk of sediment-laden runoff reaching the wetland as a result of the construction activities.
Impact on the	Increased	Altered runoff	6	4	5	5	20	Unmanaged:	<ul style="list-style-type: none"> • An adequate stormwater management

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
integrity of the watercourse within the study area.	impermeable surfaces in the vicinity of the freshwater habitat and the catchment.	<p>patterns and increased water Inputs to the freshwater environment, resulting in altered flow regime, erosion and incision.</p> <p>Altered flow regime and possible impacts on vegetation as a result.</p>	3	2	3	3	11	High Managed: Medium	<p>plan should be incorporated into the design of the development;</p> <ul style="list-style-type: none"> • Release of stormwater into the CVB wetland must not result in further incision or erosion; • The use of Sustainable Drainage Systems (SUDs) to manage stormwater is considered important for the proposed development as there will be an increase in hardened surfaces within close proximity to the CVB wetland. SUDs will assist in preventing significant impacts on the hydrological functioning of the system, reduce the risk of flooding during high flow periods and reduce the risk of increased erosion. An example of a SUDs includes a swale with side walls lined with stones and vegetated with indigenous vegetation in order to reduce the velocity of water within the system and dissipate energy thereby reducing erosion and incision. Similarly, all attenuation ponds should be designed to function as constructed wetlands and should house various indigenous

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										wetland vegetation.
Impacts of waste generation on site to the biological environment	Poor management and disposal of solid waste	Waste Management includes the management of solid, liquid and effluent waste, produced by a facility or an activity. Ineffective management of waste could result in surface, ground water and air contamination as well as ecological and health impacts.	6 4	2 2	5 1	3 3	16 10	<i>Unmanaged:</i> Medium <i>Managed:</i> Low	<ul style="list-style-type: none"> • No waste disposal is to be permitted within the wetland or the associated 30m GDARD setback area; • All waste is to be removed from the site and disposed of at a registered facility. • Implementation of an appropriate collection and disposal strategy to ensure regular removal of waste to a permitted waste disposal facility. • Ensuring that the design of the development includes adequate facilities for the temporary storage of waste, in terms of volume, location and enclosure; • Ensuring that waste handling, storage and collection is undertaken in accordance with the relevant health and municipal legislation, practices and procedures; • Provision of adequate numbers of litter bins throughout the construction site; and 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures						
			L	D	E	S	Total	Rating							
										<ul style="list-style-type: none"> Promoting the recycling of waste, with specialist service providers appointed to remove the waste from site. Prior to the start of a shift on a daily basis, vehicles must be checked for potential leaks and ground / soil pollution (hydrocarbon spillages). Action must be taken as soon as spillages have been identified; Monitor the toilet facilities for spillages, and handle any spillages as hazardous waste; Contaminated soil must be considered to be hazardous waste and disposed of accordingly 					
Socio-economic Impacts															
Noise pollution	All construction activities	Nuisance to surrounding land owners	6	2	3	4	15	<i>Unmanaged:</i> Medium	4	2	1	3	10	<i>Managed:</i> Low	<ul style="list-style-type: none"> Locate noisy machines and equipment maintenance areas as far away from sensitive receptors as possible Adherence to acceptable working hours Noise Control Regulations such as limiting noise disturbance to between

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>08h00 to 17h00 on weekdays and Saturdays shall be adhered to.</p> <ul style="list-style-type: none"> • Adherence to Occupational Health and Safety Act • Ear protection for workers that may be affected by noise • Retain existing vegetation throughout the development area as far as possible e.g. within 'green' zones and adjacent watercourses • Consider tree planting to aid in the impact of noise; • Construction noise created by large vehicles operated as part of the construction phase of the proposed development should be limited, but ensuring that vehicles are in good working order, construction is undertaken during normal business hours and that vehicles keep to the speed limit. Roads (e.g. R114) in close proximity to the Astral operations should not be used unnecessarily by construction vehicles. • Ensure that all vehicles comply with

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<p>noise abatement regulations.</p> <ul style="list-style-type: none"> • Implement traffic controls and define vehicle routing where possible • No sound amplification equipment to be used on site, except in emergency situations • The SANS standards in terms of noise should be adhered to. • Further information will be provided in the EMPr which will be attached to the Environmental Impact Assessment Report
Visual integrity / Sense of Place	Construction activities	Visibility of dust and construction activities from surrounding roads, properties and residential areas	4 4	3 2	3 3	5 4	15 13	<p><i>Unmanaged:</i> Medium High</p> <p><i>Managed:</i> Low</p>	<ul style="list-style-type: none"> • Buffer zones based on environmental considerations e.g. for wetland areas or watercourses, must be implemented as this would also assist in mitigating the possible negative impact on the sense of place of the area. • The buffer zone for the wetland areas or watercourses must be used as a buffer zone between the proposed development and the Astral Operations; • Retain existing vegetation throughout 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>the development area as far as possible e.g. within 'green' zones and adjacent watercourses to lessen the visual impacts;</p> <ul style="list-style-type: none"> • Make prospective buyers aware of Astral's operations and include information in this regard. • A thorough communication process undertaken through e-mails and pamphlets distributed to nearby communities must be undertaken to communicate any possible blasting activities during the construction phase. Pro-active communication with representatives of the Astral Operations in this regard would be required. • Any possible regulations and/or specifications with regards to buffer zones around poultry facilities must be implemented. • Apply dust control measures diligently, especially on provincial roads • Solid waste shall be managed in accordance with the requirements of

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>relevant legislation.</p> <ul style="list-style-type: none"> • The visual impact experienced during the construction phase would be relatively short term and be mitigated by good housekeeping and regular removal of rubble on the site. • Solid waste shall be managed in accordance with the requirements of relevant legislation. • An ECO must be appointed. The EMPR must be enforced and monitored by the ECO. The site must be kept clean and tidy at all times. No stockpiles may exceed 2m in height. • Appropriate screening to be erected on site. • No activities shall be allowed outside the perimeter of the property, specifically no vegetation shall be damaged or removed outside the property as certain trees and shrubs play a role in screening the site from viewpoints; • The area of disturbance will be kept to a

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Rating	Mitigation Measures
			L	D	E	S	Total		
									<p>minimum;</p> <ul style="list-style-type: none"> • Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area; and • Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent /surrounding properties including road verges, roads or public places and open spaces during or after the construction period of the proposed developments but disposed of at an approved dumping site as approved by the Council. • Establish a Community Forum or Working Group to monitor compliance and provide advice on the implementation of the Environmental Management Plan (EMP). It is recommended that such a working group could consist of local community representatives, local property owners, representatives of the Astral Operations

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										and other surrounding farms, representatives from the Mogale Local Municipality and representatives from the GDARD and DWS.
										<ul style="list-style-type: none"> An approved EMPr shall be adhered to in order to minimize the visual impacts of construction phase activities.
Sites of cultural significance	As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development.		4 2	5 2	3 1	3 1	15 6	<i>Unmanaged:</i> Medium High <i>Managed:</i> Low	<ul style="list-style-type: none"> For this proposed project, the assessment has determined that the identified <u>buildings</u> have a significance rating of: Generally Protected 3B: Medium significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out. For this proposed project, the assessment has determined that the identified <u>burial sites</u> have a significance rating of: Generally Protected 4A: Medium significance, and therefore valid permits should be obtained from SAHRA, the police and the Department of Health before they can be relocated. 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<ul style="list-style-type: none"> Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
Safety and security	Construction workers in the area	Increase in crime in area	6	2	1	4	13	<i>Unmanaged:</i> Medium <i>Managed:</i> Low	<ul style="list-style-type: none"> Before construction commences, representatives from the local authority and community-based organisations, as well as neighbouring residents should be informed of the details of the construction company, size of the workforce and construction schedules No construction work will be allowed to sleep on site All staff will carry identification, access control will be enforced and the site will be swept and a search will be done each night A register of construction staff shall be maintained by the developer. Adequate provision must be made for sanitation for the construction workers. Chemical toilets on site are to be 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score					Mitigation Measures	
			L	D	E	S	Total		Rating
									<p>emptied weekly.</p> <ul style="list-style-type: none"> • The construction site must be kept in a clean and orderly state at all times. • The development will have 24-hour access control and security • Communicate the recruitment process and use of contractors to the local communities • The communication strategy with regards to employment should ensure that unrealistic employment expectations are not created. Jobseekers should be made aware that no on-site recruiting will take place • Strict security measures should be implemented during the construction phase with additional visible security in the area • As far as possible, the movement of construction workers should be confined to the work site to avoid any potential for impact from this variable in proximate residential areas and the poultry facility.

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<ul style="list-style-type: none"> Specify the conduct of contract workers in worker related management plans and employment contracts Develop a strategy to minimise the influx of outsiders and jobseekers to the area Maximise the use of local labour and contractors where possible Ensure safe and secure public transport access points for workers travelling to and from the construction sites. A CLO (Community Liaison Officer) should be employed
	Construction works	Migration of job seekers into the area in search of employment	6 4	2 2	1 1	4 3	13 10	<i>Unmanaged:</i> Medium <i>Managed:</i> Low	<ul style="list-style-type: none"> No on-site recruitment is to take place The CLO (Community Liaison Officer) to be consulted regarding employment of members of the surrounding communities. 	
Traffic		Increase in construction traffic	6 4	3 2	3 3	5 3	17 12	<i>Unmanaged:</i> High <i>Managed:</i> Medium Low	<ul style="list-style-type: none"> Access to the applicable development will be provided mainly from three access points from Marina Road (D1410). 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<ul style="list-style-type: none"> • That all of the analysed intersections be upgraded in accordance with the Traffic report; • That the township access localities be incorporated as identified in the traffic impact assessment report in order to better align with road access management principles as well as the latest Mogale Roads Master Plan of the Muldersdrift Area; • That all of the proposed access intersections be signalised and be designed in accordance with, the traffic assessment report; • That bus lay by be provide downstream of each of the new access intersections along Marina Street. The above-mentioned bus lay by shall be designed in accordance with the Gautrans standard detail drawings. • The access of large trucks will be investigated to provide a suitable access route that does not become a nuisance to existing residents

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures	
			L	D	E	S	Total	Rating		
										<ul style="list-style-type: none"> • Only a specified number of trucks at any one time will be allowed onto the property • Construction vehicles and activities must avoid peak hour traffic times (weekdays 7-8am and 4h30-6pm) • No construction vehicles allowed over weekends • Establish an all-weather site access and wheel wash or shake down to prevent soil and materials from being trekked onto the road
Local services	Construction activities that utilise local services	Inadequate service provision to adjacent properties and malfunctioning of services	6 4	4 2	5 3	4 3	19 12	<i>Unmanaged:</i> High <i>Managed:</i> Low	<ul style="list-style-type: none"> • The service systems are to be designed according to the minimum requirements of, and submitted to the Local authority for approval. • No construction activities must commence on site prior to obtaining the necessary approval 	
Fire	Cooking fires by construction workers	Veld Fire	4	2	1	3	10	<i>Unmanaged:</i> Low <i>Managed:</i>	<ul style="list-style-type: none"> • A designated area shall be assigned for fire making by the construction workers, so as to ensure that run-away veld fires 	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
			2	2	1	1	4	Low	<p>do not occur</p> <ul style="list-style-type: none"> This will reduce air pollution by excessive smoke
Creation of Jobs	Jobs are anticipated to be created during the construction phase and few permanent jobs thereafter. The proposed development shall bring direct and indirect economic opportunity to the region.							Positive Impact	<ul style="list-style-type: none"> Provisions to provide jobs to local (Krugersdorp/Muldersdrift-based) workers shall be maximised

9.9 Operational Phase

Table 20: Quantification of impacts related to the operational phase

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
Physical Impacts									
Geology	There are no expected operational related impacts on the geology of the proposed development site and surrounding areas								<ul style="list-style-type: none"> None, although geological monitoring should possibly commence during the Construction Phase by the Geotechnical engineer.
Topography	Construction activities including levelling of road and building surfaces continued during operational phase	Erosion	2	2	3	3	10	<i>Unmanaged:</i> Low	<ul style="list-style-type: none"> Implementation and Monitoring of the site specific stormwater management plan. All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur. All surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed. Where erosion may potentially occur, dissipaters such as gravel beds or straw bales must be installed to prevent erosion.
			2	2	3	3	10	<i>Managed:</i> Low	
Air quality	Construction	Dust	2	2	1	1	4	<i>Unmanaged:</i>	Roads will be paved and dust will be minimised

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
	activities and vehicles on site continued during operational phase	pollution that affects adjacent developments	4	2	1	1	4	Low <i>Managed:</i> Low	
Soils and land capability	There are no expected operational related impacts on soils and land capability of the proposed development site and surrounding areas								<ul style="list-style-type: none"> Weeds appearing on the area must be maintained and eradicated
Water quality and availability	General usage of water (household, business, irrigation, etc)	Water wastage	2	2	1	1	4	<i>Unmanaged:</i> Low	<ul style="list-style-type: none"> Waste water to be recycled and re-used as far as possible to ensure that minimum amounts are required for aspects like irrigation. Good monitoring and management measurements to be set in place by facilities manager
			2	2	1	1	4	<i>Managed:</i> Low	
	There will be no operational activities that should impact on the quantity of groundwater available to surrounding borehole users. Municipal water is used.								

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
Biophysical Impacts									
Impact on Habitat for Floral SCC	General human interference and impact	On-going disturbance of soils due to general operational activities leading to altered floral habitat	4	2	2	2	10	<i>Unmanaged:</i> Medium Low <i>Managed:</i> Very Low	<ul style="list-style-type: none"> All sensitive habitat excluded from the development, should remain demarcated for the life of the operation, and no entry of unauthorised personnel should be allowed; Ongoing alien and invasive plant monitoring and eradication/control should take place throughout the operational phase of the development, and the project perimeters should be regularly checked during the operational phase for alien and invasive plant proliferation to prevent further spread into surrounding natural areas. Specific mention in this regard is made to Category 1b and Category 2 species identified within the development footprint areas Indigenous vegetation should be used during the landscaping of the project, maintenance and monitoring of garden ornamentals used in the landscaping should be included in the monitoring and maintenance plan to prevent the spread of such species to habitat excluded from the development; No indiscriminate disposal of waste must be
			3	1	1	1	6		

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>permitted. Bins should be provided along the open space area, to allow for disposal of waste. Bins should be emptied twice weekly and disposed of at registered waste facilities;</p> <ul style="list-style-type: none"> • It is further recommended that the current presence of <i>Populus x canescens</i> and <i>Salvinia molesta</i> within the freshwater habitat be removed and controlled according to acceptable best-practice protocols for the life of the development; • The rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a suitable specialist. This rehabilitation plan should consider all development phases of the project indicating rehabilitation actions to be undertaken during and once construction has been completed and ongoing rehabilitation during the operational phase of the project; • Monitor the success of rehabilitation efforts seasonally; • Continue with, and update, the alien and invasive plant control plan accordingly.
Impact on	General human	Increased	7	4	2	3	16	<i>Unmanaged:</i>	<ul style="list-style-type: none"> • All sensitive habitat excluded from the

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
Habitat for Faunal SCC	interference and impact	introduction and proliferation of alien plant species leading to further transformation of remaining natural habitat	5	3	2	2	12	Medium <i>Managed:</i> Low	<p>development, should remain demarcated as open space urban conservation areas for the life of the operation. Such areas can be established as part of a mixed-use area and can be designed to be used for recreational purposes by residents/ personnel. Small pedestrian pathways and picnic areas could be incorporated (as per the guidance of a suitably qualified faunal specialist);</p> <ul style="list-style-type: none"> • Open space areas are to be suitably planned and maintained with faunal species in mind. As such habitat for faunal species should be recreated using fallen tree stumps and rocks combined with indigenous vegetation. Consideration should further be afforded to installation of owl boxes within the open space area as well as bat boxes. All plants to be used should be carefully selected so as to provide a suitable food resource to faunal species; • No hunting/trapping or collecting of faunal species is allowed; • No informal fires by construction personnel are allowed; • Monitor the success of rehabilitation efforts seasonally;

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<ul style="list-style-type: none"> Continue with and update the alien and invasive plant control plan accordingly.
Impact on the freshwater system	Small scale Rehabilitation of the wetland and 30m GDARD setback area.	Temporarily altered flow regime, leading to possible loss of recharge to downgradient areas, impacting on downgradient biota; Possible sedimentation of downgradient areas.	4 2	3 2	3 1	3 1	13 6	<i>Unmanaged:</i> Medium <i>Managed:</i> Low	<ul style="list-style-type: none"> A site-specific rehabilitation plan, including an alien invasive plant (AIP) management plan, must be compiled once the final layout of the development is available and must be implemented; The 30m GDARD setback area must be rehabilitated with indigenous vegetation and can be utilised as an open space/recreational area for the development.
Impact on the freshwater system	Routine maintenance and operational activities.	Potential for increased proliferation of alien floral species,	3 2	3 1	5 2	2 1	13 6	<i>Unmanaged:</i> Medium <i>Managed:</i> Low	<ul style="list-style-type: none"> An alien vegetation management plan should be developed and implemented; and Indigenous terrestrial and freshwater vegetation should be incorporated into a

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
		leading to reduced ability to support biodiversity, and provide ecological services such as flood attenuation.							landscape plan (if applicable).
Solid Waste Management	Additional waste generated due to the proposed development	Impact on the surrounding areas, littering and dumping	4 2	2 2	1 1	3 1	10 4	<i>Unmanaged:</i> Low <i>Managed:</i> Low	<ul style="list-style-type: none"> No waste disposal is to be permitted within the freshwater habitat and the associated 30m GDARD setback area; All waste is to be removed from the site and disposed of at a registered facility. Any vehicle spills are to be immediately cleaned up and treated accordingly. Ensure that the design of the development includes adequate facilities for the temporary storage of waste, in terms of volume, location and enclosure; Ensuring that waste handling, storage and collection is undertaken in accordance with the relevant health and municipal legislation,

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>practices and procedures;</p> <ul style="list-style-type: none"> • Provision of adequate numbers of litter bins throughout the development; and • Implementation of an appropriate collection and disposal strategy to ensure regular removal of waste to a permitted waste disposal facility
Socio Economic Impacts									
Noise pollution	As the site will be established no major impacts are expected, however, due to the phased nature of the project construction activities will continue for a lengthy period								<ul style="list-style-type: none"> • Please refer to the noise mitigation measures during construction phase (Table 19)
Visual integrity	Higher density caused by development and change in land use	Change in sense of place of the specific site, however appropriate and good design will result in a	6 4	6 2	3 3	4 3	19 12	<i>Unmanaged:</i> High <i>Managed:</i> Medium	<ul style="list-style-type: none"> • Architectural guidelines (including aspects of roof and wall finishes, colours, heights of buildings, and lighting), as well as Landscape Architectural guidelines (screening, buffering, functioning, aesthetics etc) for the development will be developed to promote the enhancement of this urban area and therefore creating new and valuable places with a modified and positive urban mixed-use sense of place that is

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
		improved urban character and will positively enhance the site and surrounding urban context potentially raising economic value of surrounding areas							vibrant and divers
Sites of cultural significance	As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development.								<ul style="list-style-type: none"> Should any potentially culturally significant artefacts or graves, etc be found during the operational phase, the development management is to be informed and a Cultural Heritage practitioner is to be contacted to decide on a way forward
Safety and security	Active operational phase with	Decrease in crime due to the creation of a more	4	2	3	3	12	<i>Unmanaged:</i> Medium - positive	<ul style="list-style-type: none"> Security provided via passive surveillance Appropriate environmental design to address

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
	variety of functions	secure environment and minimising of vacant land	6	6	5	4	21	<i>Managed:</i> High – positive	<ul style="list-style-type: none"> safety and security issues (CSIR publication) • Good accessibility for emergency and police services
Traffic increase	Increase of residents and users of the area	Additional vehicles on road	6	6	3	4	19	<i>Unmanaged:</i> High	<ul style="list-style-type: none"> • All requirements of local municipality to be adhered to • All improvements to road infrastructure as recommended by traffic engineer to be adhered to.
			4	2	1	3	10	<i>Managed:</i> Low	
Local services	Operational activities not to influence the availability of services to surrounding land owners as the service implementation was undertaken during the construction phase								<ul style="list-style-type: none"> • The engineers compiling the services report and designing services are to ensure that adequate measures are in place to ensure adequate service delivery that does not influence surrounding areas • All requirements by local municipality to be adhered to regarding service reticulation and delivery
Stormwater discharge and Management	Due to increase of built up areas, more storm water will be created.		6	4	3	4	17	<i>Unmanaged:</i> Medium	<ul style="list-style-type: none"> • The implementation of a storm water management plan. • It is good practice to implement sound storm water management around each building and it is therefore suggested that the precautions
			4	2	1	3	10	<i>Managed:</i> Low	

Environmental Component	Activity	Potential Impacts	Environmental Significance Score						Mitigation Measures
			L	D	E	S	Total	Rating	
									<p>presented are considered to limit the amount of moisture reaching the foundation and thereby reducing the risk of foundation movement occurring</p> <ul style="list-style-type: none"> In order to reduce the required attenuation, alternative technologies for stormwater management are also recommended to control the peak runoff at the source. Technologies like: <ul style="list-style-type: none"> Green roofs Rainwater harvesting Permeable pavements

9.10 Cumulative Impacts

Cumulative impacts result from actions which may not be significant on their own but which are significant when added to the impact of other similar actions. The anticipated impacts resulting from the construction and implementation of the mixed land use development on Mogale Ext 42, 43 and 44, could potentially result in cumulative negative effects when taking the following into consideration:

- The proposed development will add to existing road users in the area and will have an impact on traffic.
- The proposed development will add pressure on services in the area.
- The study area, although situated within a medium density area, is still situated within an urban setting. As such the majority of the surrounding area has been transformed to residential housing in the form of Cosmo City to the east, and small holdings to the north, south and west, roads and agriculture. The floral ecology of the area has therefore been under severe pressure from urbanisation, which has resulted in the degradation and transformation of the study area and surrounding areas. The proposed development will therefore result in further transformation of the floral ecology, habitat and diversity of the area.
- Impacts related to sedimentation and siltation are likely to increase during the construction and operational phase of the proposed development.
- Construction impacts may further lead to nuisance noise and dust impacts. It is essential that the EMPr (**Appendix K**) for the construction phase be implemented to minimise the impact of construction activities on the environment.
- The construction and subsequent operational activities will be the source of various waste streams which must be managed appropriately.
- Probable increase in crime during construction activities.

In the absence of the development, the current ecological status and sensitivity of the receiving environment cannot be guaranteed to persist, as a result of ongoing anthropogenic activities such as urban expansion.

The potential cumulative impacts are rated to be of Local extent, Temporary duration during construction, Permanent Duration during operation, Medium intensity and Probable occurrence. The significance of this impact is considered to be Medium. Mitigation can limit the significance to medium - Low.

Positive cumulative impacts that will result from the proposed development include:

- Housing Development,
- Economic land utilisation and
- Job creation.

10 ENVIRONMENTAL IMPACT STATEMENT

10.1 Conclusion

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, to make an informed decision. Potential impacts were identified in consultation with specialists and through the technical expertise and experience of the environmental team. The report sought to ascertain the impact of the proposed development on the environment, which included the social environment and the probability of impacts occurring.

The construction and operational phase of the proposed development can pose various significant risks to the environment. The issues related to the development were identified, discussed and assessed in terms of various criteria such as extent, duration, intensity and significance. Mitigation measures were listed during all phases of the project and the possible alternatives were reviewed and assessed. In addition, an Environmental Management Plan (EMPr) is included that outlines all mitigation measures to be implemented during the construction phase of the development.

10.2 Key Issues

The development proposal has no fatal flaws in terms of the institutional, bio-physical or socio-economic environments. In fact, it is believed that the proposed development complies with the required and desired balance to be achieved between socio-economic and ecological / environmental factors.

The key issue possible impact is the destruction of sensitive / significant environments. A single watercourse was identified within the study area, namely a channelled valley bottom (CVB) wetland located centrally within the study area and draining in a northerly direction. The CVB wetland associated with the study area has been impacted upon by the surrounding residential and industrial development as well as edge effects associated with urbanisation within the greater catchment. No development will be allowed on or within the required 30m GDARD setback area as depicted in the sensitivity map.

The key issue related to land use has been addressed and the preferred alternative is recommended due to the balance that is retained between ecological and socio-economic factors, which align to the Mogale City Municipality's Regional Spatial Development Framework.

Approximately 300m to the north-west of the proposed development site is the Astral Operations Limited Poultry Facility situated on Portion 32 of the farm Rietfontein. The proposed Mogale Extension 42 does not border onto Portion 32 the western boundary of the proposed township comprises the private open space area created around the environmentally sensitive wetland area. The current alignment for the proposed PWV-3 is located to the west of the wetland area, creating an additional buffer between the proposed Mogale Extension 42 and the existing poultry farm.

It is believed that the Astral operations and urban uses can co-exist if all the management measures as stated in the draft EIA and EMPr are adhered to.

The existence of urban support facilities on directly adjoining properties, the natural expansion of the urban function, with due consideration for environmentally sensitive areas, qualifies the development as infill development / urban expansion within a serviced area.

Risks and potential impacts related to the construction and operational phases have been addressed within the quantification of impacts process. The Environmental Management Program (EMPr) should be strictly adhered to, therefore mitigating impacts as far as possible.

Even though the area was, traditionally, earmarked for agricultural purposes, the inclusion of the land in the urban development boundary, changed the development priority of the land. None of the land parcels included in the proposed development is currently utilised for commercial agricultural purposes. The development of these portions would, accordingly, not have an impact on current food production.

Should the site not be developed, the owners will derive no income from the property and will subsequently not be able to maintain the property. This will lead the site of fall into disrepair and the protection and appropriate management of potential conservation areas will be negated.

Agriculture is not an economically viable option due to the location of the site. Virtually surrounded by current and future urban development and the natural location to develop further.

Illegal squatters or vagrants may move through and inhabit the site. Severe pressure exists for housing in the area. Due to the presence of extensive development throughout the greater area it is possible that undeveloped, un-managed land may be illegally settled.

Based on the findings of the EIA and the information presented by the specialists the positive impacts of the preferred alternative outweigh the negative impacts of the NO-GO alternative and therefore the development should be authorised as long as the mitigation measures listed in this Report and the Environmental Management Programme are implemented.

10.3 Recommendations for Conditions of the Environmental Authorisation

It is recommended that the “Mixed Land-Use Development” option which has been identified as the preferred alternative is used. It is further recommended that this application be approved with the following conditions:

- Establish a Community Forum or Working Group to monitor compliance and provide advice on the implementation of the Environmental Management Plan (EMP). It is recommended that such a working group could consist of local community representatives, local property owners, representatives of the Astral Operations and other surrounding farms, representatives from the Mogale Local Municipality and representatives from the GDARD and DWS.
- Before any land clearing takes place, the NO-GO zones and appropriate fencing must be installed as per the requirements of the EMP.
- Should it be deemed necessary to remove the *Podocarpus henkelii* individual, a permit will have to be obtained from DAFF prior to vegetation clearing taking place.
- During the surveying and site-pegging phase of surface infrastructure, all floral SCC and protected species that will be affected by surface infrastructure must be marked;
- All individuals situated within the development footprint should be rescued and either relocated to:
 - Suitable similar habitat within the study area but outside the development footprint,
 - Used within the landscaping plan of the development or
 - Relocated to a registered nursery, the ARC or SANBI;
- It should be noted that any individuals removed from the study area and not relocated to an area/facility listed above, permits might be required from GDARD,
- The rescue and relocation plan should be overseen by a suitably qualified specialist;
- All development footprints or structures will remain outside of the delineated wetland and the associated 30m GDARD setback area
- For the identified buildings a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.
- For the identified burial sites a valid permits should be obtained from SAHRA, the police and the Department of Health before they can be relocated.
- All requirements from the Mogale City Local Municipality be adhered to including:
 - Engineering services report addressing provision of services.
- Conditions and recommendations by the Engineering Geologists be adhered to
- Conditions of the Traffic Assessment be adhered to.

- All mitigation measures as described in this report and specialist reports are adhered to by the developer (these measures will be made part of the Environmental Management Program (EMPr)).
- The conditions of the Environmental Authorisation from the Gauteng Department of Agriculture and Rural Development (GDARD) be written into the Environmental Management Program (EMPr) and be implemented as such.
- The EMPr, as attached to this document (**Appendix N**), and as amended after the Environmental Authorisation is received, should be made part of the contractual documents of contractors. The project manager must also account for the cost of this document's implementation before construction takes place.
- An Environmental Control Officer (ECO) should be appointed to audit the Environmental Management Plan on a monthly basis during construction phase.
- A penalty system is set up for non-compliance to the Environmental Management Program (EMPr) to be severe enough to practically control construction and operational activities on site.
- The Environmental Management Program (EMPr) must be made issued to individual stand developers for implementation
- That the surrounding community be kept up date through the Town Planning Application process and during Construction Phase of the project.

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12 APPENDICES

Appendix B: GDARD Correspondence

Appendix C: Maps of the study area

Appendix D: Site Layout Plans.

Appendix E: Engineering Civil and Electrical Services Report

Appendix F: Letter Mogale on Provision of Services

Appendix G: Stormwater Management Plan

Appendix H: Heritage Assessment

Appendix I: Ecology Assessment

Appendix J: Freshwater and Wetland Assessment

Appendix K: Geotechnical Report

Appendix L: Traffic Assessment

Appendix M: Public Participation

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