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**DRAFT BASIC ASSESSMENT REPORT
DRIEFONTEIN HOUSING PROJECT
KWADUKUZA LOCAL MUNICIPALITY
EIA REF NO: DC29/0006/2019**

EVP985



This report was prepared by EnviroPro Environmental Consulting in terms of Appendix 1 to GNR 982

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Executive Summary

The KwaDukuza Local Municipality proposes to upgrade and construct subsidy housing within Ward 21 of the KwaDukuza Local Municipality, iLembe District. The project, aims to provide formal housing for the Driefontein community currently living in poor, inadequate conditions without basic service infrastructure. The housing project consists of two phases.

Phase 1 is the *insitu*-upgrade of 500 units within existing residential properties. Phase 2 is the development of approximately 1050 greenfield residential units. The Department of Economic Development, Tourism and Environmental Affairs (EDTEA) have confirmed that Phase 1 does not require environmental authorisation. This application is therefore applicable to Phase 2 of the Driefontein Housing Project. The proposed new residential unit will each be 40m² with a 1m construction apron around the house giving a total construction footprint of 80m² per unit.

The iLembe District Municipality has confirmed that the bulk supply of water and sanitation services is underway as a separate assessment in the form of 'The Driefontein Housing Sanitation Project for Bulk Infrastructure,' which is separate to this application. The internal water & sewer reticulation pipelines that will connect the bulk infrastructure to the new houses is included in this assessment. In the preferred layout, the number of watercourses crossed by the pipelines has been reduced. This Basic Assessment therefore assess the construction of the new houses and associated internal water and sewer reticulation.

The construction of 1050 residential units will result in the transformation of 5.4 hectares of land that was previously used for agriculture. The vegetation that will be cleared consists of sugarcane plantations which have been left unplanted. Approximately 18.9 hectares of degraded indigenous vegetation will also be cleared. Construction will take place within 32m of a number of watercourses/ drainage lines and on associated wetland area (approximately 67 749m² of infrastructure). Construction of the proposed internal sewer and water pipelines will result in the excavation / infilling of approximately 132m³ of material from these watercourses. Eleven (11) watercourse crossings have been identified and assessed.

The following key impacts and mitigation measures were assessed:

- **General construction impacts:** Impacts such as an increase in litter, provision of clean chemical toilets, dust suppression and noise management must be managed by the contractor using the site-specific mitigation measures provided in the attached EMPr.
- **Agricultural land loss:** Site alternative 2 should not be considered a favourable option as that section of land has high agricultural potential compared to site alternative 1. Although half the project area is already disturbed by development, the land is considered to have fertile soil with high agricultural potential. The areas surrounding the housing footprint must be protected from construction activity to protect the agricultural potential of this soil. The topsoil that is excavated for the housing construction must be kept aside for rehabilitation work and to topsoil areas that could be utilised for substance farming in the future. The loss of agricultural land within the municipality cannot be fully mitigated.
- **Clearance of 18.9ha of indigenous vegetation:** Given the proximity of the expanding Driefontein community, the vegetation is highly disturbed by subsistence farming, cattle grazing, informal dwellings and alien vegetation establishment. Vegetation cleared to accommodate the Driefontein Housing Project is therefore considered to be of low environmental impact.
- **Damage to cultural and archaeological sensitive aspects:** Two graveyards and two Shembe worship sites have been identified in the project area. The assigned buffer areas must be enforced around these areas to protect the cultural heritage of the Driefontein community. Alternatively, the relevant members of the Driefontein community are to be contacted to relocate the Shembe areas.
- **Physical damage to watercourse banks and wetlands during the excavation of pipeline trenches:** Caution must be exercised when working within the 30m wetland buffer zones. Excavated material must be stored on the side of the trench furthest from the watercourse and all construction material must be stored outside of the 30m buffer area. Heavy vehicles must use existing access routes and not traverse the watercourses.
- **Sewage leaks into the surrounding environment;** The pipeline design must prevent this impact as far as possible. uPVC pipelines will be used, which is the preferred material for waste water due to the resistant nature of the plastic. The pipelines must be monitored and maintained during operation.
- **Pipelines altering flow within the wetlands;** Due to the existing topography, this impact is unlikely, however the pipelines will be constructed according to the design drawings attached to the Engineering Services Report under Appendix B. Running the pipelines below the surface is anticipated to have less long-term impact than running them above ground and thus is the preferred technology alternative for the Driefontein Housing Development.

Construction activities must be monitored and controlled through the implementation of the attached Environmental Management Program (EMPr). Taking into consideration the above impacts and mitigation measures, it is the EAP's opinion that there are no significant environmental impacts associated with the proposal which cannot be mitigated. The formalization of the expanding Driefontein Community, including the provision of a waterborne sewer system, is a positive impact associated with the project. Therefore, it is recommended that the preferred layout of the Driefontein Housing Project (attached under Appendix A) be authorised.

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Section 1: Scope of Work and Location of Activity

1.1 Project Title

The Driefontein Housing Project within the KwaDukuza Local Municipality.

1.2 A Description of the Activities to Be Undertaken Including Associated Structure and Infrastructure As per Section 3(d) (ii)

The KwaDukuza Local Municipality proposes to upgrade and construct subsidy housing within Ward 21 of the KwaDukuza Local Municipality, iLembe District. The project aims to provide formal housing for the Driefontein community currently living in inadequate conditions without basic service infrastructure.

The housing project consists of two phases. Phase 1 is the *insitu*-upgrade of 500 units within existing residential properties. Phase 2 is the development of approximately 1050 greenfield residential units. The Department of Economic Development, Tourism and Environmental Affairs (EDTEA) have confirmed that Phase 1 does not require environmental authorisation. This application is therefore applicable to Phase 2 of the Driefontein Housing Project. The proposed new residential unit will each be 40m² with a 1m construction apron around the house giving a total construction footprint of 80m² per unit.

The construction of 1050 residential units will result in the transformation of 5.4 hectares of land that was previously used for agriculture. The vegetation that will be cleared consists of sugarcane plantations which have been left unplanted. Construction will take place within 32m of a number of watercourses/ drainage lines. The sewer pipelines will cross watercourses/ drainage lines in 11 locations resulting in the excavation / infilling of approximately 132m³ of material from a watercourse.

The iLembe District Municipality has confirmed that the bulk supply of water and sanitation services is underway (as a separate assessment) in the form of 'The Driefontein Housing Sanitation Project for bulk infrastructure'. The internal sewer reticulation pipelines that will connect the bulk reticulation to the new houses have been included in this assessment. Sewer pipe diameters will range from 110 – 200mm in diameter with the water pipelines ranging from 25 - 110mm in diameter. A map showing the layout of the proposed sewerage and water reticulation is included under Appendix A. There is currently no existing sewage infrastructure in place at Driefontein and therefore the construction of these pipelines is viewed as a positive socio-economic impact associated with the project.

1.3 Description of Feasible Alternatives as Per Section 3(h)(i)

Site Alternatives

Two site alternatives have been considered for this project. Site alternative 1 (the preferred alternative) is to construct the housing project on only municipal owned land, Portions 34, 56, 57,58, 59, 60, 61, 62, 63, 72, 73, and 74 of Drie Fonteynen 1127 as per Figure 1 below (outlined in white). Site Alternative 2 is to construct additional housing on a neighbouring portion of land, Portion 1 of Spioen Kop 1125 (shaded in green in Figure 1 below). Portion 1 of Spioen Kop 1125 is privately owned and would need to be expropriated by the Municipality. This will take substantial time to finalise, delaying the development further. The soil on this portion of land has also been identified as having a high agricultural potential¹ and is currently used for growing sugarcane. The agricultural potential of this land would be lost permanently should the establishment of housing take place here. Taking the construction urgency and agricultural potential into consideration, the preferred site alternative (alternative 1) is the more feasible and logical option.

¹ Agricultural Potential Assessment for the Driefontein Housing Project in the KwaDukuza Local Municipality, 2018. The Biodiversity Company.

Figure 1: Site Layout Alternatives 1 (preferred) and 2 (alternative) for the Driefontein Housing Project (source: QGIS)

Layout Alternatives

Minor adjustments have been made to the original proposed location of the sewer reticulation pipeline in order to reduce the number of watercourse crossings required. The number of locations where a pipeline crosses a watercourse has been reduced from seventeen (17) to eleven (11). Examples of the amended pipeline routes has been shown in Figure 2. Since the pipelines are gravity fed, the topography needs to be taken into account when locating the pipelines. Not all watercourse crossings can therefore be avoided. The proposed positioning of the pipeline is also governed by the required tie-ins to the proposed bulk infrastructure (part of the Driefontein Housing Sanitation Project for bulk infrastructure).

The No Go Alternative

Should the Driefontein Housing Project not go ahead, there will be no clearance of indigenous vegetation in the short term, however the Driefontein community will continue expanding informally which will ultimately result in the transformation of the indigenous vegetation in the study area.

The community of Driefontein will continue to live in overcrowded, informal and inadequate housing conditions with no formal sewage systems in place. Sporadic informal housing developments and population within Driefontein has reached a level that is unsustainable. This is resulting in poor living conditions in Driefontein. There is currently no formal sewage system putting the watercourses and wetlands at risk. This has created an unhealthy socio and physical environment for the community of Driefontein.

Figure 2: Red pipeline showing the original layout for the proposed sewer pipeline with the green lines showing the amended pipeline which has been re-located outside of the wetland area in the preferred layout.



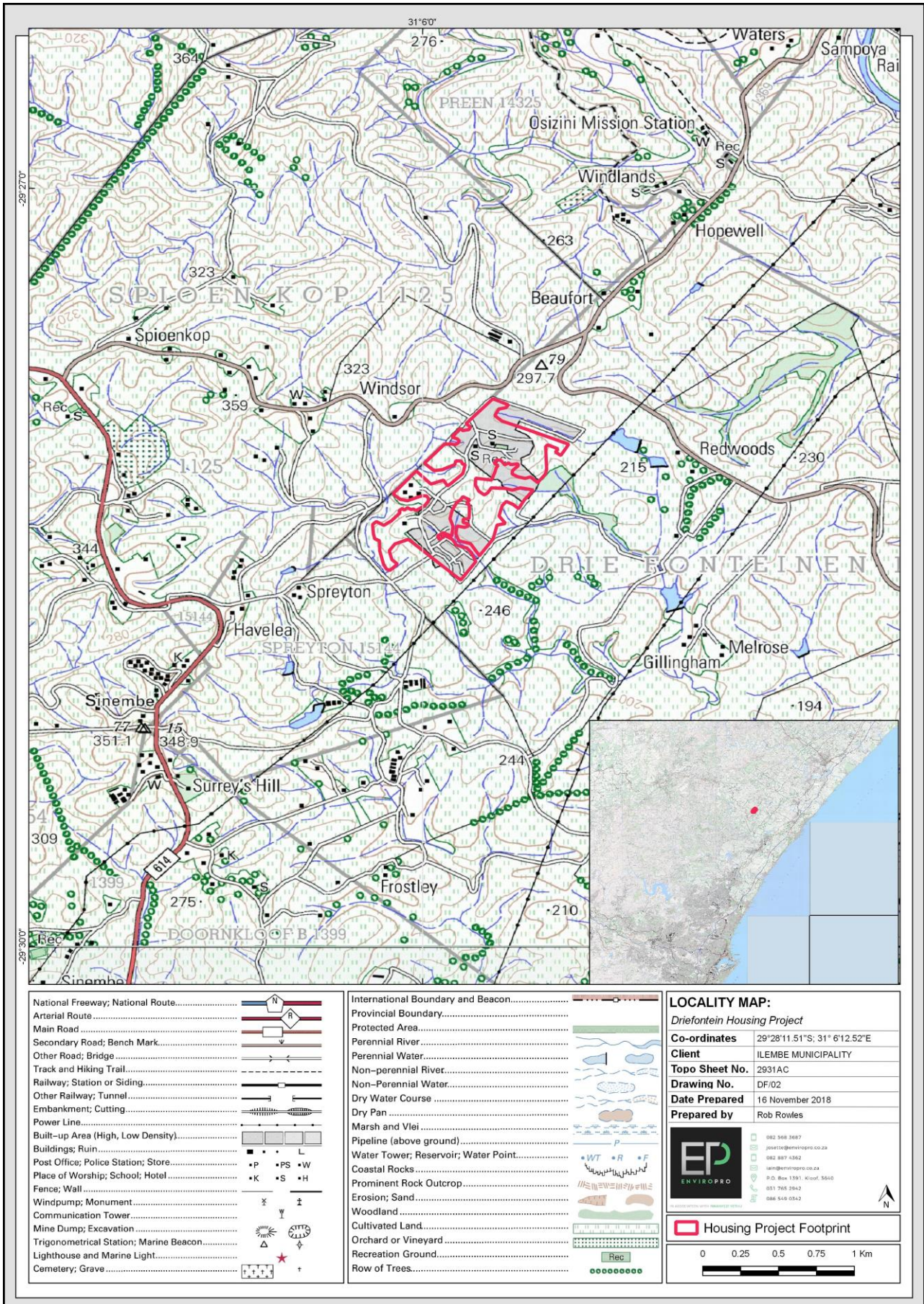
1.4 All Listed and Specific Activities to Be Triggered and Being Applied for As Per Section 3(d) (i)

GNR	Activity Number	Activity as per the legislation	Activity as it applies to the proposal
Listing Notice 1; 04 th Dec 2014 EIA Regs, as amended.	12 (ii)(a) & (c)	<i>The development of- (ii) infrastructure or structures with a physical footprint of 100 m² or more; where such development occurs- (a) within a watercourse; or (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.</i>	Cumulatively, more than 100m ² of the infrastructure (residential units and sewer pipelines) will be constructed within 32m of drainage lines and associated wetlands. An estimated approximately 67 749m ² of infrastructure will be constructed within 32m of a watercourse.
Listing Notice 1; 04 th Dec 2014 EIA Regs, as amended	19	<i>The infilling or depositing of any material of more than 10 m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m³ from a watercourse.</i>	The construction of the pipeline network will result in approximately 132.45m ³ of material being excavated from the watercourses associated within the Driefontein project footprint.
Listing Notice 1; 04 th Dec 2014 EIA Regs, as amended	27	<i>The clearance of an area of 1 hectare or more, but less than 20 hectares 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.</i>	The Driefontein Housing Project will result in the clearance of approximately 18.9ha of previously disturbed, indigenous vegetation.
Listing Notice 1; 04 th Dec 2014 EIA Regs, as amended	28	<i>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</i>	Residential units will be constructed on land, outside of an urban area, which was previously used for sugarcane farming. The total development area of land previously used for farming is approximately 5.4 ha.

1.5 Location of Activity as Per Section 3 (b)(i)-(iii)

District Municipality		iLembe District Municipality	
Local Municipality		KwaDukuza Local Municipality	
Ward		21	
Area / Town / Village		Driefontein	
Co-ordinates:		Latitude	Longitude
	Northern most point of development:	29°27'50.22"S	31° 6'16.50"E
	Southern most point of development:	29°28'33.15"S	31° 6'8.98"E
	Eastern most point of development:	29°28'11.74"S	31° 6'26.23"E
	Western most point of development:	29°28'10.90"S	31° 5'54.60"E
Parent Farm / Township:		Farm Portion / Erf No.:	21 Digit Surveyor General's numbers:
Drie Fonteinen 1127		Portion 34	N0FU00000000112700034
Drie Fonteinen 1127		Portion 56	N0FU00000000112700056
Drie Fonteinen 1127		Portion 57	N0FU00000000112700057
Drie Fonteinen 1127		Portion 58	N0FU00000000112700058
Drie Fonteinen 1127		Portion 59	N0FU00000000112700059
Drie Fonteinen 1127		Portion 60	N0FU00000000112700060
Drie Fonteinen 1127		Portion 61	N0FU00000000112700061
Drie Fonteinen 1127		Portion 62	N0FU00000000112700062
Drie Fonteinen 1127		Portion 63	N0FU00000000112700063
Drie Fonteinen 1127		Portion 72	N0FU00000000112700072
Drie Fonteinen 1127		Portion 73	N0FU00000000112700073
Drie Fonteinen 1127		Portion 74	N0FU00000000112700074

Figure 3: 1:50 000 Map indicating the location of the Driefontein Housing Project, outlined in red.



Section 2: Site Description and Surrounding Land Use as per section 3(h)(iv) and (k)

Information provided in this section has been extracted from the various specialist reports, which are attached under Appendix B of the BAR.

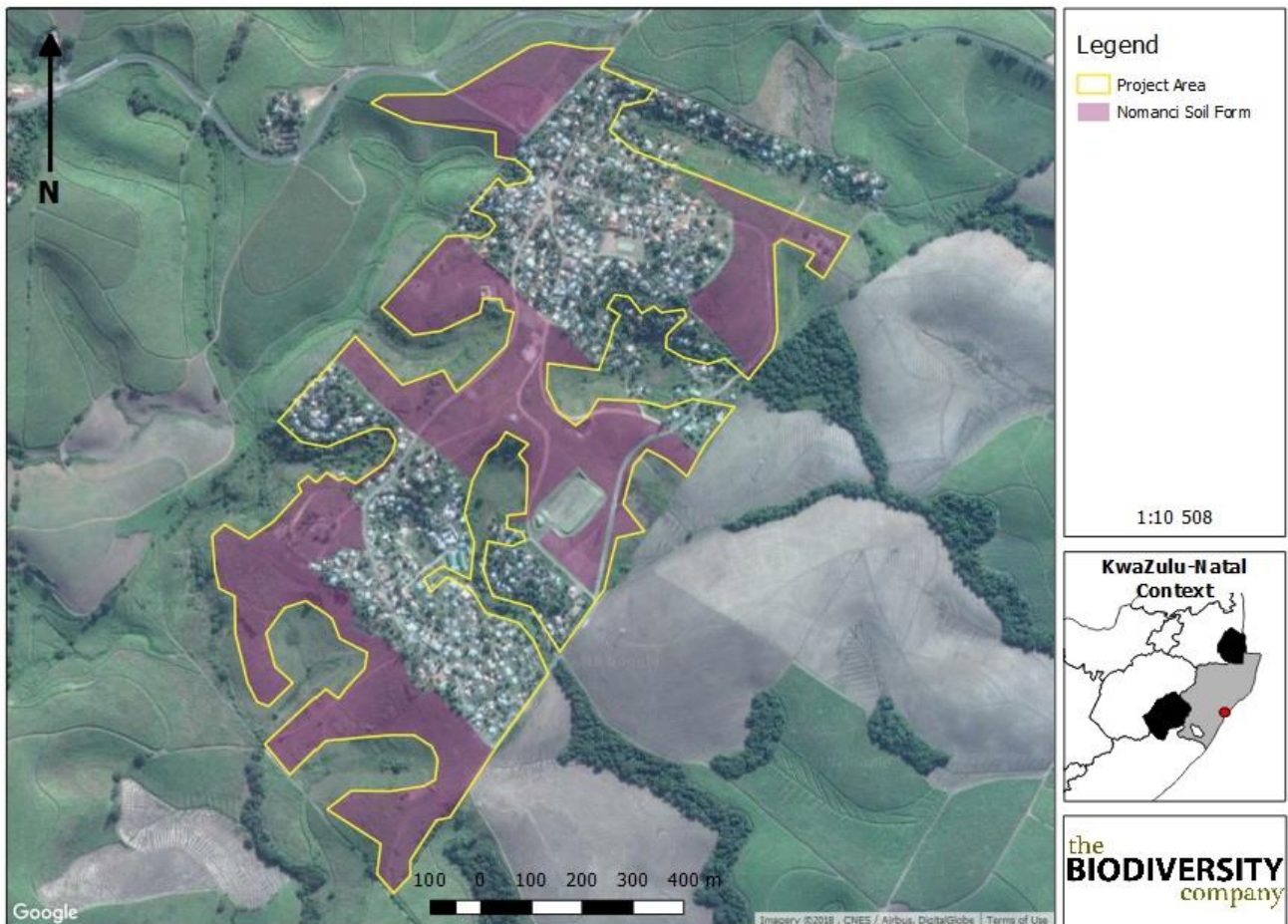
2.1 Topography and Physical Characteristics of Site

The proposed Driefontein Housing Development is located in the Isinembe area, approximately 13km west of Salt Rock in the KwaZulu-Natal province, South Africa. The project area is surrounded predominantly by sugar cane fields. The project area is characterised by a non-uniform relief with an elevation range from approximately 200 meters above sea level (masl) to 300 masl. The lower lying regions are characterised by various signs of wetness including hydrophytes, wetland soils, historic signs of wetness and current signs of wetness. The project area is flat with slopes between 0% and 25% with major height changes within the project boundaries².

2.1.1 Soils and Geology

An Agricultural Impact Assessment was carried out for this project to determine the impact that further housing development would have on the agriculture sector in this area. The project falls within the Fa455 and Fa456 land type. Glenrosa and/or Mispah soil forms are common in this area. Lime is rare or absent throughout the entire landscape³. The project area is characterised by non-uniform topography with an abundance of hillslopes. Approximately half of the soil in the project footprint is already disturbed by housing development. The Nomanci soil form was the only soil type identified on site. This soil form consists of a Humic A-horizon on top of a Litocutanic B-horizon. The Humic A-horizon has a depth of 900 mm which is on top of a Litocutanic B-horizon with an unknown depth. This layer is characterised by sandstone of which more than 70% is weathered³. Figure 4 below shows the soil map identified on site.

Figure 4: Soil map for the project area (Source: Agricultural Potential Assessment, The Biodiversity Company 2018).



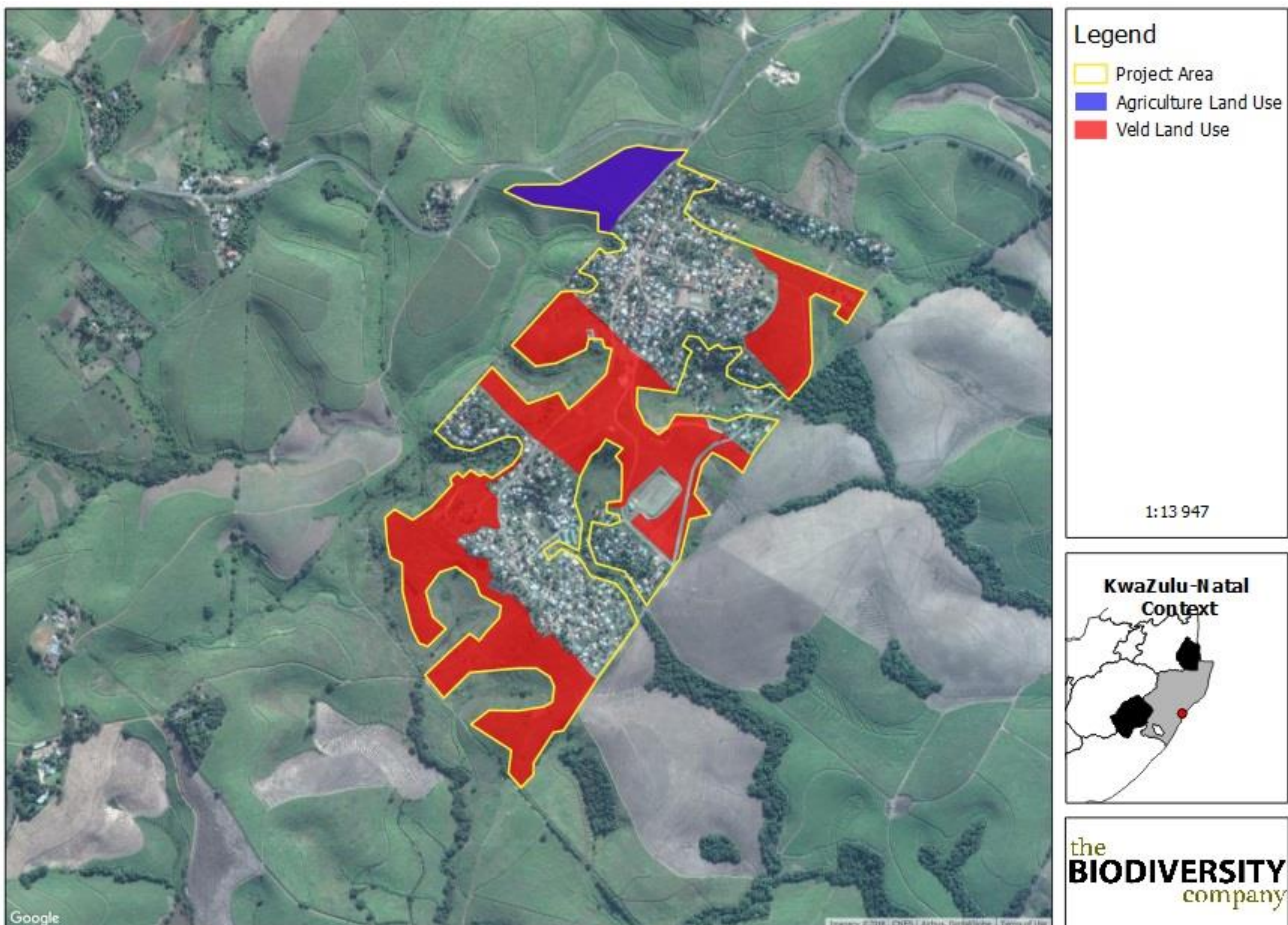
² Agricultural Potential Assessment, The Biodiversity Company 2018.

Semi-formal development has occurred in the northern and southern sector of the project area on gently to moderately southerly sloping landform. Localized platforms have been created to accommodate the structures in areas underlain by sandstone bedrock and residual moderately clayey sandy soils respectively³.

2.1.2 Land Use

The project area is approximately 75ha in size with agriculture taking up approximately 5% of the area. Developed/disturbed areas consist of 50% of the project area and approximately 45% of the land consists of veld land use⁴. Figure 5 below illustrates the high agricultural potential areas in the site footprint (site alternative). Within the study area formal masonry housing and semi-formal structures have been established. Although the condition of the houses appears to be generally satisfactory, problems of groundwater ponding upslope of the houses was noted particularly in cases where the land has been terraced to form a cut to fill platform or inadequately drained⁵. On-site sanitation disposal is comprised of rudimentary pit toilets.

Figure 5: Land uses present within the project area (Source: Agricultural Potential Assessment, The Biodiversity Company 2018).



2.2 Surface Water and Groundwater

The study area site is located within the Wewe River catchment, which is located within the larger Tongati River catchment (Quaternary Catchment U30D). The drainage in the project area is controlled by the sloping landforms either side of the central hilltop. Drainage is directed towards the east beneath 70% of the site with concave valley slopes and overland flow routes defined along four zones in this area. Within the southwestern sector of the site two southerly / southwesterly aligned drainage valleys are prominent. Whilst the main portion of the site is well elevated groundwater seepage should be expected along the lower concave slopes of the valley lines on a seasonal / intermittent basis following rainfall events⁴.

³ Geotechnical Investigation of the Driefontein Rural Housing Site, Davies Lynn & Partners (PTY) LTD.

⁴ Agricultural Potential Assessment, The Biodiversity Company 2018.

⁵ Geotechnical Investigation of the Driefontein Rural Housing Site, Davies Lynn & Partners (PTY) LTD.

2.2.1 Watercourses

The site is located on a watershed with a number of drainage lines originating in the study area (blue in Figure 6). All development will take place outside of all watercourses apart from where the pipelines need to cross the watercourses.

2.2.2 Wetlands⁶

Two wetland assessments have been conducted for this site; SIVEST conducted a wetland assessment in 2012 and the Biodiversity Company conducted an updated wetland assessment in 2018 based on changes to the project description. A total of twelve (12) distinct hydro-geomorphic wetland units and two (2) non-wetland valley bottom seepage/drainage paths were identified for the original study in 2012. Nine (9) of these wetland units have been considered for the updated 2018 assessment (see Figure 6). The wetland units associated with the project area have all been significantly modified and transformed by informal dwellings, informal subsistence farming and formal sugarcane cultivation. The only intact patches of wetland identified onsite were located in Wetland Units A, C1a, C1b and C2 (shown in Figure 6).

The majority of the wetland units were assessed as being of *intermediate* importance from an ecosystem services provision perspective, particularly the surface water management and water quality enhancing services. The proposed site development plan has largely adhered to the recommended 30m buffer zones apart from an area in the southern portion of the development, where there are existing residential units. Some informal units have been constructed within / within close proximity to delineated wetlands. No new houses will be constructed in these sensitive areas.

The project, specifically the construction of crossings (pipelines and bridges) does pose a risk to the identified wetlands, with the level of risk determined to vary from low to moderate. The low risk ratings may largely be attributed to the current state of the local wetland systems.

The moderate risks determined for the study occur in both phases of the project, which are largely associated with direct risks to the wetland areas, and also the longevity of the project. The moderate risks associated with the operational phase of the project is largely due to the lifespan of these risks, being for the life of the project. The project does have the potential to address existing aspects that are impacting on the wetland systems. The moderate risk ratings were all re-allocated a low status due to implementation of additional mitigation methodologies.

The SiVEST (2012) report and the updated wetland study have concluded that, if the mitigation measures recommended are strictly adhered to, the impacts on the integrity of the wetland units and the associated downstream watercourses will be reduced and minimised to acceptable levels.

⁶ Wetland Assessment (update) for the Driefontein Housing Project. The Biodiversity Company, 2018 and Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

Figure 6: Watercourses affected by the Driefontein Housing Project.

2.2.3 Groundwater

Shallow groundwater seepage activity and concentrations of surface runoff occur along the major valley lines across the site. Perennial springs occur with the valley along the northern boundary as well as the drainage line beneath the southwestern sector⁷.

2.3 Fauna and Flora

The study area is comprised of areas which have been disturbed by the expanding Driefontein community. The entire southern portion of the study area was previously under sugarcane, which has been left fallow, given the expanding Driefontein community and purchase of the properties by KwaDukuza Local Municipality for the rural housing project. Given the current level of disturbance, no fauna is therefore anticipated to be impacted by the project.

The flora found within the project area is summarised as follows:

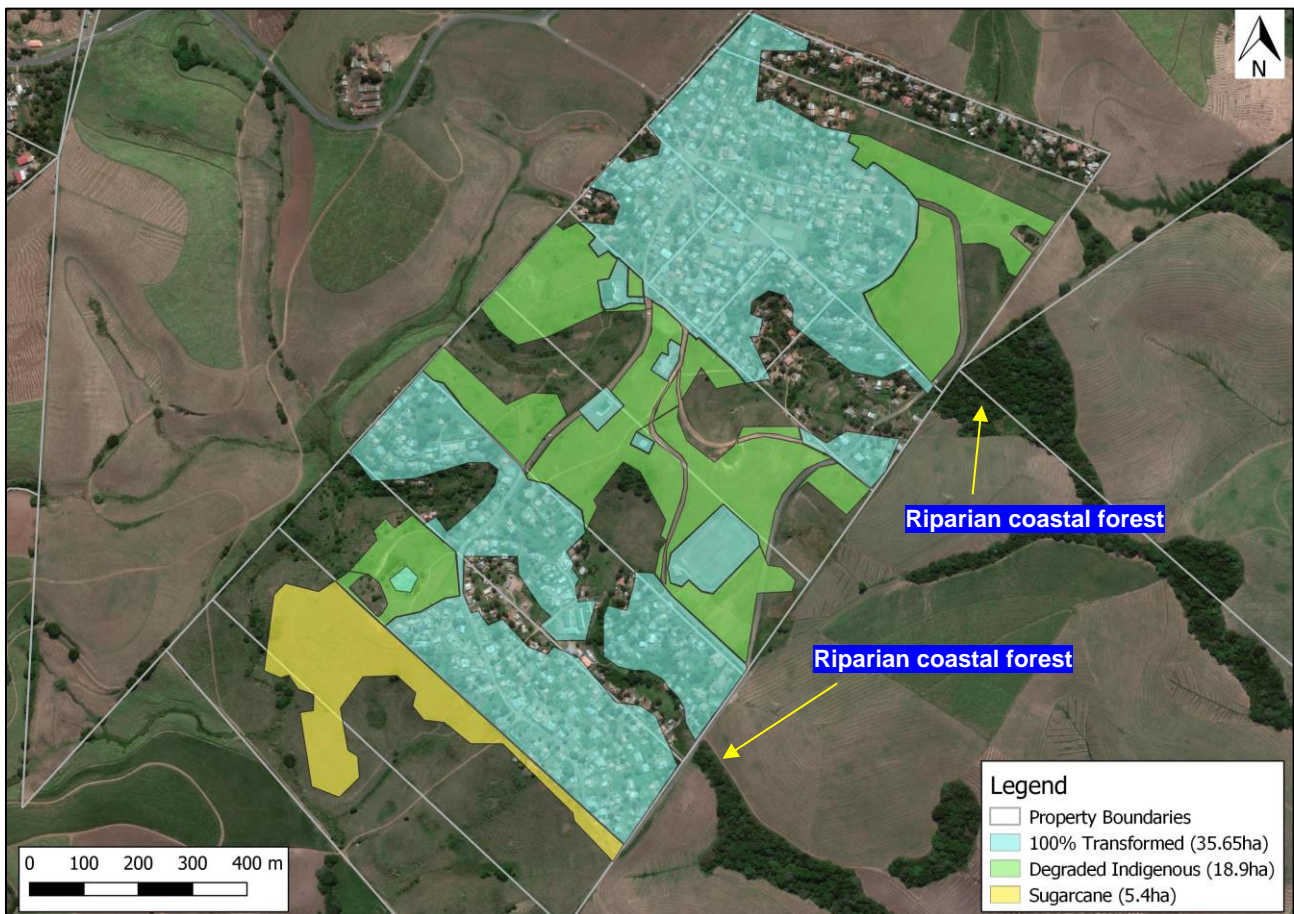
- Ecosystem Type: KwaZulu- Natal Coastal Belt (CB3).
 - This ecosystem type is 'vulnerable'.
- Vegetation Type: KwaZulu- Natal Coastal Belt (CB3)⁸:
 - Endangered vegetation type found only in the KwaZulu-Natal Province.
 - This veld type occurs in highly dissected undulating coastal plains previously covered by subtropical coastal forest. Some primary grassland dominated by *Themeda triandra* still occurs in hilly, high rainfall areas where pressure from natural fire and grazing regimes prevail. Currently, the vegetation type is affected by extensive sugarcane fields, timber plantations and holiday resorts.
 - Found at altitudes of 20-450m;
- Vegetation noted on site:

⁷ Geotechnical Investigation of the Driefontein Rural Housing Site, Davies Lynn & Partners (PTY) LTD.

⁸ Mucina, L. and Rutherford, M. C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

- The vegetation associated with the Driefontein Housing Project has been significantly transformed by historical sugarcane farming and the expanding Driefontein rural community (subsistence farming, grazing, clearance etc. Figure 7).
- According to SiVest, analysis of aerial photography indicates that the vegetation communities onsite have been highly transformed by sugarcane cultivation, subsistence farming and urban/peri-urban residential development. The fragments of grassland, thicket and wetland vegetation that remain are generally secondary in nature and highly degraded⁹.
- The only areas where indigenous vegetation occurs is the riparian vegetation associated with the delineated wetlands. The riparian vegetation is highly invaded by alien and weed species. Alien vegetation identified by the specialist during the study include *Melia azedarach*, *Solanum mauritianum*, *Pennisetum clandestinum* and *Arundo donax*. Agricultural plants identified within wetland areas includes *Cucurbita moschata* (Butternut) and *Zea mays* (Mielies).
- Patches of riparian coastal forest were located along the eastern boundary of the site (indicated in Figure 7). These are to be avoided during construction.

Figure 7: Map showing the areas of indigenous vegetation, agricultural land and areas which are 100% transformed by the existing Driefontein Community (source: QGIS).



2.4 Heritage and Cultural Aspects

A heritage survey of the proposed Driefontein Housing Project, ILembe District Municipality, near Stanger identified three heritage sites on the proposed footprint. These include two rural cemeteries and two Shembe Sites of Worship (Figure 8). Shembe Site 2 and both graveyards have been incorporated into the preferred layout. Shembe Site 1, indicated in Figure 8 has not been taken into account with residential ervens being proposed in this area (see preferred layout in Appendix A). It is understood from discussions with the project manager that this will be discussed with the relevant community members during construction. It was recommended by the heritage specialist that the developers erect a fence with an entrance gate around the cemeteries prior to any development. The area is not part of any known cultural landscape¹⁰.

⁹ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

¹⁰ Heritage Impact Assessment of the proposed Driefontein Housing Project, ILembe District Municipality, Active Heritage 2018.

According to the SAHRA, the Driefontein Housing Project falls within an area of *low* palaeontological (fossil) sensitivity. No palaeontological studies are therefore required however a protocol for finds is required (included under section 3.3 of the attached EMPr).

Figure 8: The sensitive heritage sites identified by the specialist in the project footprint area.



2.5 Socio Economic Environment¹¹

The Driefontein settlement had approximately 575 households with a population of approximately 4,600 residents in 2009. The population growth estimate for Driefontein was expected/ projected to have some 12,000 by 2020. KwaDukuza Local Municipality having seen the demand for additional housing has proposed to build additional housing to cater for the current population growth in this area.

The Driefontein community relies on water from a single borehole which pumps water to a single 250 kl reservoir. The water is gravity fed to a few standpipes for portable water use. Residents have to walk long distances to draw water from the stand pipes to access water. The Driefontein community are estimated at requiring a 1800m³/day and a summer peak demand of 28liters per second/ 2,376m³/day. It was very unlikely that borehole use would be able to sustain this water demand. Households with corrugated iron or tile sheeting roofs utilise rain water harvesting as the public standpipes are few and far between.

2.6 Surrounding Environment

The Driefontein community is located just east of the R614, outside of Isinembe town. The study area is surrounded by agricultural land, which is mainly used for sugarcane farming and more recently, macadamia nut farms (Figure 9). Photographs of the site are provided in Figure 10.

¹¹ Internal Civil Engineering Services Technical Report/Preliminary Design, November 2009.

Figure 9: Aerial image showing the location of the study area and surrounding land uses (source: Google Earth Pro, 2019).



Figure 10: Photographs of the site taken in July 2017 and June 2018. Black lines indicated proposed pipeline crossings.

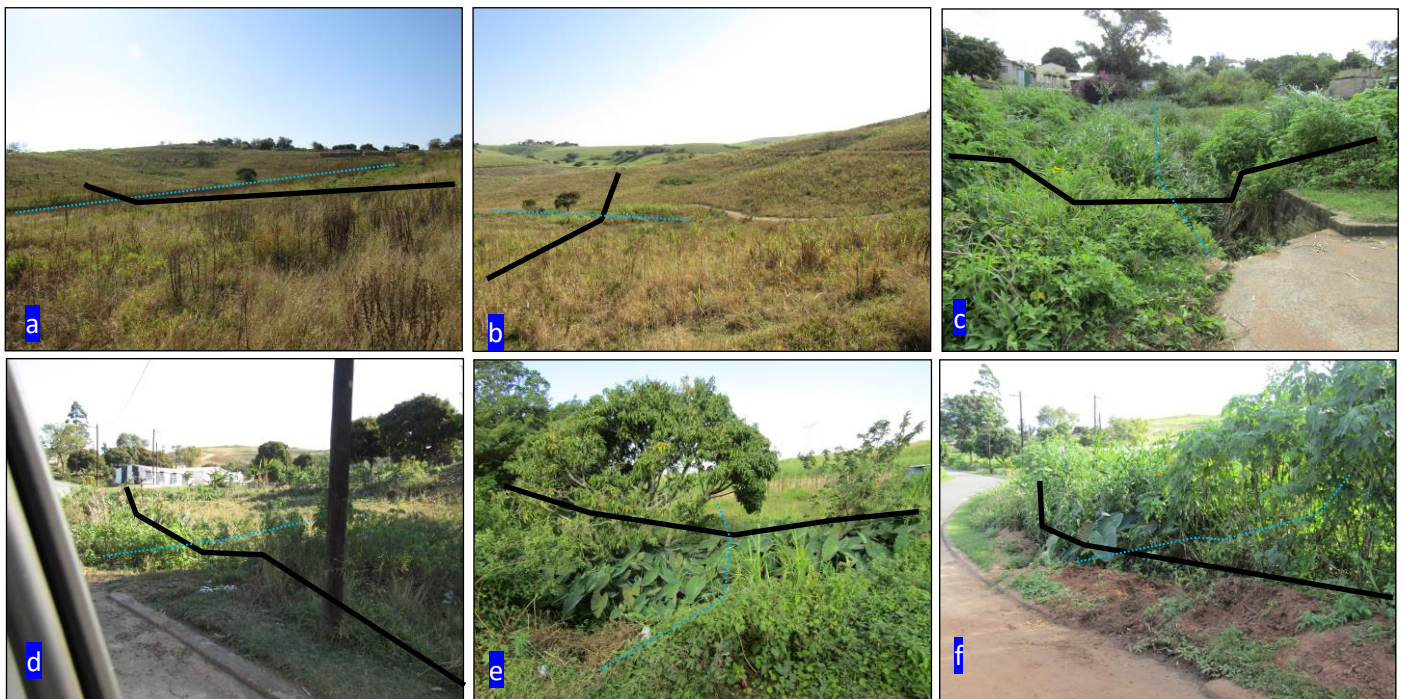


Figure 10: (a): Image showing watercourse crossing 1; (b): Watercourse crossing 2; (c): Watercourse crossing 3 and 4 higher up on the same wetland system; (d): Watercourse crossing 5; (e): Watercourse crossing 6; (f): Watercourse crossings 7, 8 & 9 further upstream of the same wetland system.

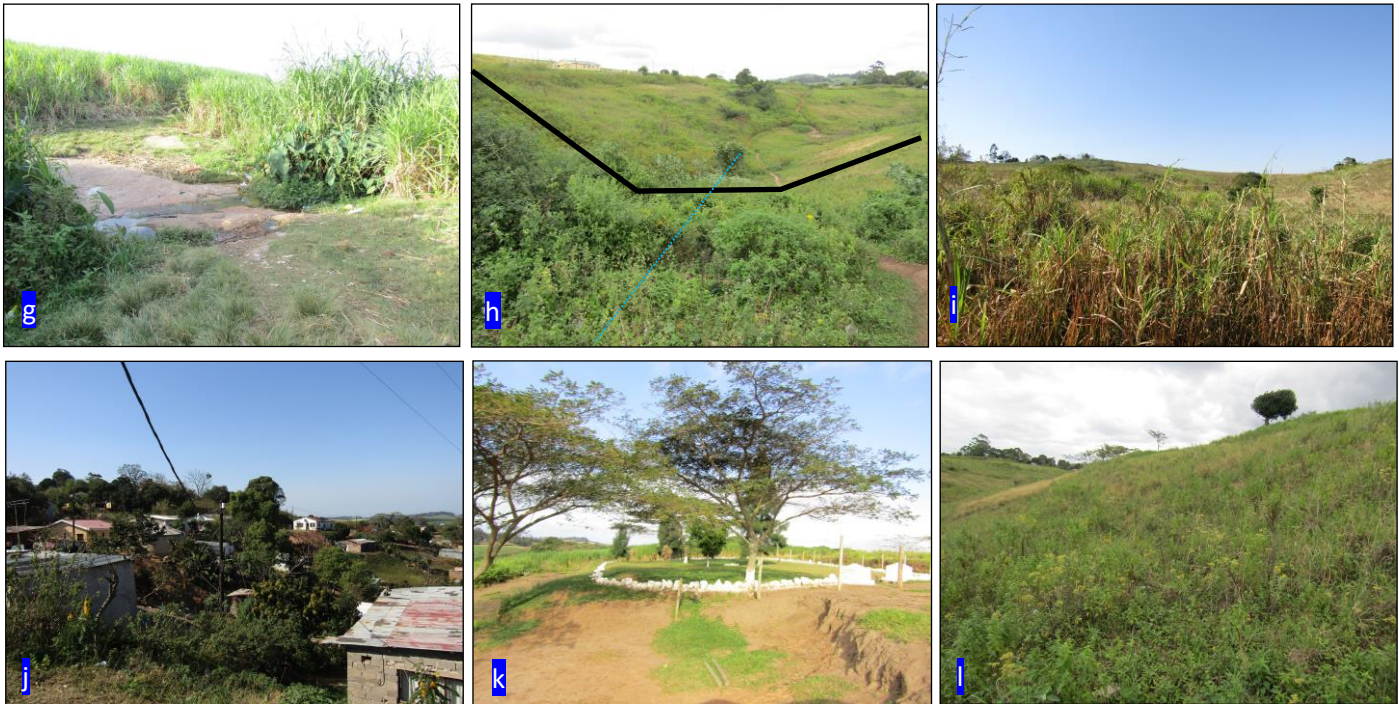


Figure 10 cont.: (g) Watercourse crossing 10; (h) Watercourse crossing 11; (i) Overview of the southern portion of the site which is fallow sugarcane fields; (j): Existing Driefontein Community; (k) Shembe Site 2; and (l) Degraded indigenous vegetation associated with the study area.

Section 3: Policy and Legislative Context

3.1 Identification of All Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks and Instruments as Per Section 3(e)(i) and Compliance of Proposed Activity with Legislation and Policy 3(e)(ii)

Legislation	Compliance of Activity
National Environmental Management Act 1998	The National Environmental Management Act (Act 107 of 1998) (NEMA) is South Africa's overarching environmental legislation. It includes a set of principles that govern environmental management and against which all Environmental Management Programmes (EMPs) and actions are measured. These principles include and relate to sustainable development, protection of the natural environment, waste minimisation, public consultation, the right to an environment that is not harmful to one's health or wellbeing, and a general duty of care. The Environmental Impact Assessment (EIA) Regulations 2014, as amended: GN R.327, R.325, and R.324 under Section 24 of the NEMA define the activities that require Environmental Authorisation and the processes to be followed to assess environmental impacts and obtain Environmental Authorisation. Environmental authorisation is required for the construction of the new sewer reticulation network and Driefontein Housing project. Therefore, this application is in line with the requirements of NEMA.
National Water Act 1998	The project will result in the following water uses being triggered: s21(c) & (i) for alterations to the bed and banks of a watercourse and the site is located within 500m of wetlands. A pre-application was held with DWS on the 17 th October 2017 and a Water Use Authorisation application will be required in terms of the National Water Act.
National Waste Management Act 2008	Reforms the law regulating waste management to prevent pollution and ecological degradation. Section 19 allows the Minister to publish a list of activities which require a Waste Management License. The most recent list is published in

	Government Gazette 37083 Notice No. 921 dated 29 November 2013. It is unlikely that any activities carried out by the development will trigger a Waste Management Activity.
Environmental Conservation Act 1996	Makes provisions for the application of general environmental principles for the protection of ecological processes, promotion of sustainable development and the protection of the environment. This Act has mostly been repealed by NEMA.
National Environmental Management Biodiversity Act 2004	To provide the framework, norms, and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources. Section 52 allows for the publication of a list of threatened ecosystems in need of protection. The list was published in Government Gazette No. 34809 Notice No. 1002 dated 9 December 2011. This site falls within the KwaZulu-Natal Coastal Belt ecosystem type (CB3). This ecosystem type is considered 'vulnerable' and therefore does not trigger environmental authorisation for the clearance of more than 300m ² .
National Heritage Resources Act 25 of 1999	For the protection of South African Heritage to nurture and conserve communities legacy. No archaeological significant artefacts will be disturbed during this project therefore no permits will be required from the provincial heritage authority, AMAFA.
Mineral & Petroleum Resources Development 28 of 2002	To provide for the sustainable development of the nation's mineral and petroleum resources which includes activities carried out for the winning of any mineral on, in or under the earth (i.e. the use of borrow pits). The project does not require any permits or authorizations under the Mineral and Petroleum Resources Development Act.
Municipal Planning Framework	
KwaDukuza Municipality Integrated Development Plan (IDP) 2012-2017	The sanitation of the KwaDukuza Municipality is addressed under section 9.6 of the IDP. As per section 9.6 "there is a lack of maintenance of existing infrastructure. Infrastructure is often poorly sited and has the potential to impact on the environment when it is not operating properly". This is the current situation at the Driefontein community where there is no existing infrastructure. The project fulfills a National Key Performance Indicator of increasing the percentage of households with access to a basic level of sanitation.

Section 4: Motivation, Need and Desirability

4.1 Need and Desirability as Per Section 3(F)

The proposed Driefontein Housing project falls in line with the one of KwaDukuza IDPs four core mission statements, '*to deliver a high standard of essential services*'. Furthermore, KwaDukuza Municipality's IDP states that along with the municipalities high rise in population increase, the municipality is developing several new housing, healthcare and commercial complexes in 2019-2020 which will be provoke employment growth. The Driefontein Housing Development is one of these such influential and essential developments.

The KwaDukuza Municipality has identified the Driefontein settlement as an area that currently has a shortage of low-income housing. With a population of 4272 people, and only 534 houses this community is in need of formal state instituted infrastructure¹².

The community of Driefontein is an informal settlement that has over time been established in a haphazard fashion with rudimentary settlement infrastructure. Dwellings have been constructed with mud and roofed predominantly with corrugated iron sheets with some formal masonry housing. A survey of the community indicated that majority of households are unemployed and are unable to afford alternative accommodation. There are currently no formal sewage or stormwater systems in Driefontein. Further, the informal community poses severe health and safety risks since emergency services are unlikely to reach most of the areas in the event of an emergency due to the state of the un maintained informal gravel road infrastructure.

¹² Preliminary Bulk Services Investigation for Proposed New Driefonein Township Development, KZN BD942/Rev00. Bazi Engineers, 2019.

The formalization of the existing houses and further development of new housing will distribute the density of the population, improve the dignity of households, improve access, social, health, electrical, water services and environmental health in this area.

4.2 Motivation for Preferred Site, Activity and Technology Alternative

The project is for the upgrading of the Driefontein community and therefore there is no alternative site location. A neighbouring portion of privately-owned land was originally considered to form part of the study area however, given the substantial time delay to expropriate the land and the high agriculture potential of the site, this portion of land was excluded from the preferred site location. Preferred Alternative 1 is all owned by the municipality and has been released from the Department of Agriculture, Environmental Affairs & Rural Development in 2012 in terms of Act 70/70 (attached under Appendix B).

The design engineers have worked closely with the Environmental Assessment Practitioner (EAP) to make minor adjustments to the original pipeline layout to avoid unnecessary construction within the wetlands. The location of the pipeline is largely dictated by the topography of the study area with the majority of the pipeline being gravity fed (i.e. needs to be located at a low gradient). The pipeline also needs to be strategically located close to the tie-in points with the proposed bulk infrastructure.

It is the opinion of the EAP that the Alternative 1, the preferred site layout and the proposed sewerage reticulation network, attached under Appendix A, be authorised.

Section 5: Public Participation

5.1 Notification of Interested and Affected Parties

- 1) *fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of-*
 - i. *the site where the activity to which the application or proposed application relates is or is to be undertaken; and*
 - ii. *any alternative site;*

Noticeboards (in isiZulu and English) were placed within the Driefontein Community on the 02nd November 2018. The noticeboard detailed KwaDukuza Municipality's proposal to formalize the Driefontein Housing Community and associated sewer reticulation network, subject to a basic assessment. See Appendix C – Proof of Placement of Notice Board.

- 2) *giving written notice, in any of the manners provided for in section 47D of the Act, to-*
 - i. *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*
 - ii. *the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;*
 - iii. *the municipality which has jurisdiction in the area;*
 - iv. *any organ of state having jurisdiction in respect of any aspect of the activity, and;*
 - v. *any other party as required by the competent authority;*

The following steps were followed during the public participation process.

- A meeting was held with Ward Councilor du Toit on the 02nd November 2018.
- The ward councilor indicated a willingness to engage with the community and distribute the pamphlets given to him at the meeting. It was agreed that this was the best procedure for notification of the community.
- The pamphlets provided details about the proposed project including contact details for EnviroPro.
- Signboards detailing the proposed infrastructure was erected on poles throughout the community and next to a frequently used pedestrian paths / roads on the 2nd November 2018.
- The Ward Councilor will be given opportunity to review complete copies of the Basic Assessment report and relay information back to the community.
- With regards to authority communications, all relevant authorities have been notified of the application on the 27 February 2019 and have been provided with copies of this BAR for comment (see I & AP register attached under Appendix F).
- An advert was placed in the Ilanga News Paper on the 3 March 2019.

See Appendix D – Proof of Notification.

- i. *owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*

A map showing the properties affected by the proposed project, has been attached under Appendix D. Email notifications to all I & APs were sent out on the 27th February 2019. See Appendix D – Proof of Notification.

- 3) *placing an advertisement in-*
 - i. *one local newspaper; or*
 - ii. *any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;*
- 4) *placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and*

An advert was placed in the Ilanga Newspaper on the 3 March 2019. Adverts will be placed in the North Coast Courier newspaper. The adverts provided details of the proposed project, Basic Assessment process and providing contact details of EnviroPro should anyone wish to register as an I&AP. See Appendix E – Proof of Advert Placement.

5.2 Registered Interested and Affected Parties

42. *A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of-*
 - (a) *all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;*
 - (b) *all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and*
 - (c) *all organs of state which have jurisdiction in respect of the activity to which the application relates.*

The contact details of all I & APs that have registered have been provided in the Registered I & AP list in Appendix F.

5.3 Comments

Comments of interested and affected parties to be recorded in reports and plans 44.

- 1) *The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.*
- 2) *Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to-*
 - i. *a lack of skills to read or write;*
 - ii. *disability; or*
 - iii. *any other disadvantage;*
 - iv. *reasonable alternative methods of recording comments must be provided for.*

All comments received from I & APs have been recorded in the comments and response table (C & R table). The original comments provided have been provided together with the C & R table. This report has been provided to the KwaDukuza Local Municipality and iLembe District Municipality for comment. See Appendix G for the C & R table and comments received to date.

Section 6: Impact Assessment

6.1 Methodology To Determine And Rank Significance And Consequences Of Impacts Associated With All Alternative As Per Section 3(h)(vi)

Impacts are assessed qualitatively and quantitatively, looking at the duration / frequency of the activity and likely impacts associated with that activity during both construction and operation. If the activity happens frequently, the risk of the associated impact occurring is much higher than if the activity happens less frequently. The geographical extent of the impact is assessed i.e. will the impact be restricted to the point of occurrence or will have it have a local or regional effect. Impacts are also reviewed looking at severity levels and consequences should the impact occur i.e. will the severity be low, medium or high and then probability of the impact occurring is taken into account.

Whether or not the impact can be mitigated and the extent to which it can be avoided, managed, mitigated or reversed is assessed i.e. the probability of occurrence after mitigation has been applied. This also takes into account likelihood of human error based on construction and operational auditing experience i.e. even though spills can be completely mitigated against and prevented, there is always a small chance that spills will still occur (residual risk). Based on all of these factors, the impact is then rated to determine its significance. For example, an impact can have a regional affect with severe environmental implications, however the probability of it occurring is very low and the implementation of the proposed mitigation measures means that the ultimate rating is medium or low.

Please see below a description of the scoring. The full impact scoring tables detailing how the significance rating was calculated can be found in Appendix H.

Scoring of Impacts	
Duration / Frequency of activity likely to cause impact	0 = No impact 1 = short term / once off 2 = medium term / during operation 3 = long term / permanent
Geographical Extent	0 = No impact 1 = point of impact / restricted to site 2 = local / surrounding area 3 = regional
Severity (level of damage caused) if impact were to occur	0 = No impact 1 = minor 3 = medium 5 = major
Probability of impact without mitigation	1 - 5 = low. 6 -10 = medium. 11 -14 = high.
Significance before application of Mitigation Measures	A score of between 1and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.
Will activity cause irreplaceable loss of resources?	10 = Yes 0 = No
Mitigation measures	0 = No impact - 5 = can be fully mitigated - 3 = can be partially mitigated -1 = unable to be mitigated
Probability of impact after mitigation	0 = No impact 1 = Low 2 = Medium 3 = High
Significance after application of Mitigation Measures	A score of between 1and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.

6.2 Standard Construction Impacts

See Appendix H for the full impacts scoring matrix, which assesses the impacts on the above system. The below impacts relate to both the preferred and alternative layouts. These impacts are associated with the construction of the Driefontein Housing project including the internal sewer and water reticulation.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
Direct Impacts				
No generic direct impacts				
Indirect Impacts				
1.	On site erosion due to improper management of stormwater by the contractor during construction (exposed platforms and excavation of pipeline trenches in close proximity to watercourses).	5 (Low)	<p>Areas exposed to erosion (i.e. along the excavated trench line and platform) must be protected. The following applies to erosion control on site:</p> <ul style="list-style-type: none"> • Sand bags or berms must be used to prevent erosion during construction. • No fill material or bedding material may be stored within the watercourses or within the 30m wetland buffer recommended by the wetland specialist. • Temporary stormwater measures should be implemented to ensure that material does not wash off the surface into any watercourse during construction. <p>The following stormwater management measures have been recommended by the wetland specialist¹⁴:</p> <ul style="list-style-type: none"> • The full development footprint must not be stripped of vegetation prior to commencing with other activities. • The contractor must submit a clearing and earthworks plan to the ECO for approval prior to construction commencing. This plan must indicate how clearing and earthworks are going to progress through the site in a phased manner. • Once shaped, all exposed/bare surfaces and fill embankments must be vegetated immediately. Embankments steeper than 1:3 must be vegetated using strip sods established at regular intervals (50-100 cm) down the bank and hydro-seeding in between. Embankments with a slope less than 1:3 must be hydroseeded and the temporary erosion control measures removed only once re-colonisation is successful. In the winter months, the newly grassed areas must be watered daily until re-colonisation is successful. During the wet months, the grassed surfaces must be monitored for erosion until re-colonisation is successful. • If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, rows of straw, hay or cut 	1 (Low)

¹³ See Appendix H for more details.

¹⁴ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>bundles of vegetation should be dug into the soil in contours and/or sand bags or silt fences must be established along the contours at regular intervals to slow runoff and capture eroded soil.</p> <ul style="list-style-type: none"> • All platforms above buffer zones must have a slight back-fall to divert runoff away from the fill embankments. Platform runoff must be diverted away from the platforms via some sort of diversion structure, preferably an open drain. This runoff must be diverted into the formal storm water network where possible. However, sediment must be removed from the runoff before being discharged into the formal system. This can be achieved by using temporary sediment capture ponds. If no formal storm water system is possible, the diverted runoff must be diverted to a temporary detention pond or temporary outlets armoured against erosion with energy dissipation measures. • Small temporary berms should be established on the lip/edge of these platforms during the construction phase to intercept runoff and divert it away from the fill embankments. • Effort must be made to ensure that the storm water system including pipes, drains, headwalls and Reno-mattresses are not silted up during the construction phase. Siltation will be minimised by ensuring that the roads and paths remain clear of sediment. • Sediment on the roads from erosion or construction traffic must be cleared at the end of every day between September and March and at the end of every week between April and August. The need to clear will be minimal if the bare slopes (sediment sources) are re-vegetated as soon as possible and adequate erosion protection and silt control applied where grassing is not feasible. • Where earthen berms within the buffers are unavoidable, all areas outside of the berms footprint must be considered no-go areas during the construction phase and the storm water generated during the construction phase must be strictly controlled with sandbags and silt fences. • After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gully's must be filled-in with appropriate material and silt fences or fascine work must be established along the gully for additional protection until grass 	

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>has re-colonised the rehabilitated area.</p> <ul style="list-style-type: none"> • Proof of financial provision of these mitigation measures must be submitted to the ECO prior to construction commencing. 	
2.	<p>Pipeline trenches remaining open for long periods of time, causing them to collapse, creating an erosion and safety hazard.</p>	5 (medium)	<p>The following applies to the excavated pipeline trenches:</p> <ul style="list-style-type: none"> • Trenches must not remain open indefinitely. Trench work must be completed in sections and then closed once the pipe has been laid in that section. Small inspection holes may be left open along the route but the rest of the trench must be closed. • Cleared areas may not be left exposed for long periods of time and must be re-vegetated as each stage of pipework is completed. • Trenches must not remain open during building shut down periods i.e. over Christmas and Easter. Trench work must be planned so that trenches are closed before these shut down periods as there is a risk that the trenches will either collapse or fill with water if left unattended and this can create a hazard for children and animals. • Sections of trench near homes and pedestrian walking areas must be clearly demarcated. 	1 (low)
3.	<p>Incorrect filling of trenches on completion creating points of erosion, especially on slopes and near the wetlands.</p>	7 (medium)	<p>The following applies when backfilling of the pipeline trenches takes place:</p> <ul style="list-style-type: none"> • Care must be taken to ensure that when closing trenches, soil is compacted sufficiently and left so that the level of the trench is slightly higher than the surrounding land, to allow settling. Should soil settle below the level of the surrounding land, it will leave a depression along which water will travel and this could create a focal point for erosion. • Rehabilitation through replanting of indigenous grass species must take place soon after closure. This will aid in stabilising soil and preventing erosion in the long-term. 	3 (low)
4.	<p>Dusty conditions generated during construction and by construction vehicles travelling over exposed soil.</p>	4 (Low)	<p>Since some of the roads to the site are dirt roads, there will be dust generated during the construction phase; however this will be for temporary i.e. the site will be worked continuously for a few months until construction is completed. Further to this:</p> <ul style="list-style-type: none"> • Vehicle speed limits must be reduced to 40km/hr to reduce the amount of dust raised along gravel roads to and from the pipeline route. • The material being transported to the site in the back of the trucks must be covered. • Water carts must be used on site should dust levels elevate to a nuisance level. 	0

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<ul style="list-style-type: none"> • Shade cloth is must be utilised for stockpiled materials, where required. • The applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site. 	
5.	Increase in heavy truck traffic as construction vehicles travel to the site for construction activities as well as to transport material to where it is required, impacting existing traffic conditions and pedestrian safety.	5 (Medium)	<p>This impact cannot be totally avoided as traffic will increase during the construction phase temporarily (for a few months) until construction is completed. There is currently a low level of traffic in this rural area and therefore the volume of traffic is unlikely to negatively impact the community.</p> <ul style="list-style-type: none"> • All drivers must operate within the speed limits and due caution must be exercised especially when pedestrians are on the road. • All drivers must be appropriately licenced and trained. 	3 (Low)
6.	Impact on any unidentified existing services on site.	7 (Medium)	<p>Since there are no municipal services currently in the area, it is unlikely that there will be any disruption to the community in this form, however the following applies:</p> <ul style="list-style-type: none"> • As standard construction practice the engineer and contractor will identify all existing services that may be affected in the study area prior to construction. • Any infrastructure that is removed must be replaced and any damage caused from construction must be repaired. • This impact can be managed and mitigated. 	3 (Low)
7.	Emissions from construction vehicles.	5 (Medium)	<p>The construction phase of the project will see the increase in vehicles moving through the area which will result in a negligible increase of emissions into the atmosphere.</p> <ul style="list-style-type: none"> • All construction vehicles operating on the site must be fitted with the appropriate silencers and exhausts in order to reduce the emissions and noise into the atmosphere. • Where practical, manual labour is to be used to excavate trenches. 	1 (Low)
8.	Temporary increase in waste and litter due to the construction activities.	7 (Medium)	<p>The construction phase of the project will see an increase in construction staff on site and therefore an increase in waste.</p> <ul style="list-style-type: none"> • Littering will not be permitted on site; • A designated waste storage area must be established at the construction site camp. Appropriate waste receptacles must be set up at intervals along any pipeline routes and emptied into the main waste storage area at the end of each day; • Waste must be removed from site and disposed of at a registered waste disposal site; • Safe disposal slips for the disposal of all waste must be 	3 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			obtained and kept on site as proof of safe disposal.	
9.	Insufficient number of toilet facilities on site.	6 (Medium)	<p>The increase in construction personnel during the construction phase will require an appropriate number of toilet facilities for the site.</p> <ul style="list-style-type: none"> • Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the contractor; • All toilet facilities must be checked on a daily basis; • All toilet facilities must be emptied and cleaned on a weekly basis. 	2 (Low)
10.	Inappropriate disposal of toilet waste resulting in the contamination of the environment.	6 (Medium)	<p>The following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> • All toilet facilities on site utilised by the construction personnel must be checked on a daily basis and emptied on a weekly basis by the contractor. • A registered waste removal contractor must remove sewage waste from site or sewage waste must be disposed of at a permitted Waste Water Treatment Site; • Safe disposal slips for the disposal of effluent waste must be obtained and kept on site as proof of safe disposal. 	2 (Low)
11.	Generation of noise associated with the construction.	7 (Medium)	<p>The construction phase of the project will see the increase in vehicles moving through the area and equipment which will result in the increase of noise.</p> <ul style="list-style-type: none"> • All construction vehicles operating on site must be fitted with standard silencers to reduce the noise levels produced. • A complaints register is to be retained in the environmental file on site and complaints recorded and resolved timeously. 	3 (Low)
12.	Damage to property, fences, or community subsistence farming during construction.	8 (Medium)	<p>Due to the nature of the project, construction activities will take place in close proximity to the surrounding community's homesteads. Construction vehicles movements, storage areas and activities, may damage subsistence farming / fences etc. As part of the contractor's agreement however, the following must be applied to any construction activity resulting in damage to private property or infrastructure:</p> <ul style="list-style-type: none"> • All services must be identified prior to construction through notifying surrounding stakeholders prior to construction commencing; • It is important that contractors are aware of the stakeholders' movements and where possible, disruptive activities should be scheduled outside of peak traffic hours; • Surrounding residents must be notified prior to disruptive activities during construction; • Any infrastructure that gets removed must be replaced and any damage caused from construction must be repaired. 	4 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹³ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<ul style="list-style-type: none"> Construction staff are not to consume any crops, which are grown by the local community. All crop fields are to be avoided by the contractors, unless prior consent is obtained. This impact can be managed and mitigated.	
13.	Unsustainable sourcing of raw materials such as gravel, sand, water etc. which could result in the promotion of illegal mining operations which can cause significant damage to the environment.	8 (Medium)	The construction of the Driefontein Housing project will require raw materials to be sourced and brought to site. <ul style="list-style-type: none"> Contractors must provide proof of sustainable sourcing of materials i.e. permits for quarries and sand winning operations from which stone and sand have been obtained. 	4 (Low)
14.	Positive impact of local employment.	0 (Positive)	This is a positive impact.	0 (Positive)
Operation				
Direct Impacts				
No generic direct impacts				
Indirect Impacts				
No generic direct impacts				
Cumulative				
No generic direct impacts				

6.3 Site Specific Impacts

6.3.1 Preferred Site Location & Pipeline Layout

See Appendix H for the full impacts scoring matrix which assesses the impacts on the above described environment. The below impacts relate to the preferred site location and pipeline layout at the Driefontein Housing Project (in Appendix A).

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
Direct Impacts				
1.	Potential for erosion to take place during earthworks for platforms and the excavation of the pipeline trenches in close proximity to watercourses. Exposed soil may result in sedimentation of the nearby watercourses and associated wetlands.	8 (Medium)	The following measures must be carried out to mitigate against erosion on site. Special precaution to be taken where earthworks / service trenches is excavated within 30m of the watercourses. The following is to be adhered to: <ul style="list-style-type: none"> The areas of wetlands that are not within the direct project footprint must be treated as 'no-go' areas. No site staff are permitted to enter these areas but must remain within the construction footprint. The 30m wetland buffer must be clearly demarcated prior to any earthworks for the platform taking place (i.e. red & white tape, white markers etc). This is to ensure workers are aware of the No Go area. All construction activities occurring within the wetlands must be carried out with extreme care to avoid any 	4 (Low)

¹⁵ See Appendix H for more details.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>unnecessary excavation and erosion taking place in the watercourse or within close proximity to the watercourse.</p> <ul style="list-style-type: none"> • Areas exposed to erosion must be protected through the use of sand bags, berms and efficient construction processes i.e.: limiting the extent (footprint) and duration period that areas are exposed. • The contractor must limit in-stream work at the crossings to minimize streambank and bed disturbance. • Construction to take place during the dry season (i.e. April – Aug). • Where the earthworks take place within 30m of the watercourses, excavated material must be stored on the side of the trench that is furthest from the watercourse. • If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts. 	
2.	Physical damage to the wetlands during the construction of the pipeline reticulation (RC 1 – RC11).	8 (Medium)	<p>Construction of the pipeline will result in the alteration of the banks and bed of the watercourse within the construction footprint. The following has been provided by the wetland specialist¹⁶:</p> <p><i>Approvals:</i></p> <ul style="list-style-type: none"> • A water use license is required to establish wetland sewer or water line crossings as per Section 21 (c) and (i) of the National Water Act. This license is required prior to construction commencing. <p><i>Site setup and construction phase:</i></p> <ul style="list-style-type: none"> • Construction should be undertaken between the months of April and August. • Disturbance to wetland vegetation and soils along the sewer line route should be restricted to an established construction right-of-way (ROW) corridor. The width of the ROW corridor within the wetlands should be as narrow as practically possible and should be demarcated and fenced off during the site setup phase to the satisfaction of the ECO. • Once the ROW is established, all wetland areas outside of the demarcated ROW must be considered no-go areas. • The construction ROW should comprise the following 	4 (Low)

¹⁶ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>o a one-way running track of a maximum width of 3 m; and</p> <p>o pipe bridge pier construction zones (if required).</p> <ul style="list-style-type: none"> • The running track should not be established within the central lowest lying portions of the wetland and/or stream channels and banks where no piers are proposed. In this regard, the running tracks must extend into the wetlands from each valley side to the furthest pier construction site, thus avoiding the crossing of the central wet or channelled areas • The ROW should be established as follows: <ul style="list-style-type: none"> ▪ The indigenous wetland vegetation along the running track and at the pier construction zones must be cut by hand (not stripped). ▪ Thereafter, the ECO must walk the cut ROW to identify any excessively wet areas that may require bog-mats for the running track. ▪ In areas that do not require bog-mats, topsoil along the construction ROW running track and at pier construction zones must be stripped and stored outside of the wetlands in designated stockpiles areas. These turfed topsoil stockpiles must be regularly wetted to ensure that the soils remain moist. Excavated soil must not be stockpiled within the wetlands. The location of topsoil and subsoil stockpile areas must be agreed upon by the ECO prior to the construction of the bridge commencing. ▪ In areas that require bog-mats, the topsoil must not be stripped. The bog-mats must be laid on top of the topsoils and cut vegetation. No excavator must enter a semi-permanent to permanent wetland zone prior to the establishment of bog-mats. • Wherever possible, excavations within the wetlands should be undertaken by hand. If this is unfeasible for sound reasons, a small excavation vehicle (TLB) may be used. • All pipes and equipment must be stored outside of the wetland areas in a stockpile area approved by the ECO. <p><i>Rehabilitation and monitoring:</i></p> <ul style="list-style-type: none"> • Once the pipe bridge is completed, the running track must be rehabilitated by hand 	

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>wherever possible in a systematic and phased manner moving outwards from the wetland areas.</p> <ul style="list-style-type: none"> • Compacted wetland soils along the running track must be ripped to a depth of 30 cm. • Once the compacted soils are ripped, topsoil from that particular area must be reinstated within the wetland areas along the running track by hand to the satisfaction of the ECO. • Once the topsoil has been reinstated, the bare areas must be hydroseeded with an indigenous plant seed mix, the composition of which must be approved by a wetland specialist. • The disturbed area should be monitored for erosion once a month during the first wet season after construction. • Method statements for all activities within the wetlands must be submitted to the ECO for approval prior to construction commencing. 	
3.	Careless operation by the contractor within the wetlands resulting in damage and/or loss to the wetlands within the construction footprint and adjacent areas.	7 (Medium)	<p>The following measures must be carried out to mitigate against potential damage to the wetlands during construction:</p> <ul style="list-style-type: none"> • Areas of the wetlands not within the construction footprint must be demarcated as no-go areas; • The 30m wetland buffer must be clearly demarcated prior to any earthworks for the platform taking place (i.e. red & white tape, white markers etc). This is to ensure workers are aware of the No Go area. • No traffic, vehicles or storage permitted within this 30m buffer zone; • Heavy vehicles must avoid working near / in the wetlands as far as possible; • All work within the watercourses and the associated buffer must be carried out by hand. • Vehicles must use the existing roads to cross the construction footprint; • Non-essential equipment and vehicles are to remain at least 30m from the wetlands at all times. 	3 (Low)
4.	Clearing of vegetation resulting in the loss of vegetation within the KZN Coastal Belt (CB3) vegetation type.	6 (Medium)	Approximately 18.9 ha of degraded indigenous vegetation will be cleared for the Driefontein Housing Project. This indigenous vegetation has been described by the specialist as " <i>secondary in nature and highly degraded</i> " ¹⁷ . The primary impact associated with the clearance is the risk of erosion and sedimentation of	4 (Low)

¹⁷ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>the wetlands (see impact 1 above). The following measures must be carried out to mitigate against excessive clearing:</p> <ul style="list-style-type: none"> • This impact cannot be fully mitigated as it will result in the loss of 18.9ha of indigenous vegetation found within the KZN Coastal Belt (Gs9) vegetation type. • The vegetation that will be cleared must be restricted to the construction footprint. • Contractors must avoid damaging any vegetation that is not within the construction footprint (i.e. open space indicated in green in the layout attached under Appendix A). • The green open space shown in green in the preferred layout must be retained as a No-Go area. • The patches of riparian coastal forest located along the eastern boundary of the study area must be avoided during construction. 	
5.	Removal of alien invasive vegetation found within the construction site.	0 (Positive)	<p>This is a positive impact.</p> <ul style="list-style-type: none"> • The removal of alien species will be ongoing throughout the duration of the construction phase. • An Alien Plant Control Plan has been included in an appendix of the attached EMPr. 	0 (Positive)
6.	Loss of Agricultural Land	9 (Med)	<p>As per the Agriculture Potential Assessment:</p> <ul style="list-style-type: none"> • Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. • The water outflow points should be monitored weekly by the EO for any signs of off-site siltation. • All areas impacted by earth-moving activities should be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. • The areas surrounding watercourse crossings must be regularly checked for signs of erosion. • If erosion is evident, corrective action must be taken. Any exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. • Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances to run into 	7 (Med)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			drainage lines, rivers, wetlands or the dams, to avoid any possible eutrophication impacts.	
7.	Impact on heritage features identified in the Heritage Impact Assessment (HIA).	8 (med)	<p>Both cemeteries identified by the heritage specialist have been retained in the preferred layout. One of the two Shembe worship sites identified in the HIA has been retained in the development layout. As per the recommendations of the heritage specialist:</p> <ul style="list-style-type: none"> • The developers should erect a sturdy fence with an entrance gate around the Cemetery prior to any development. The fence (once erected) should be inspected by a heritage consultant or by Amafa. • The developers should maintain a buffer of at least 30m around the Shembe sites. • It is recommended that both Shembe sites be included in the preferred layout. If this is not possible then the developers must initiate a Phase Two Heritage Assessment with an emphasis on community consultation. The possibility of moving the existing site to a new venue must be investigated as an option. This is to be discussed with the relevant community members during construction. 	6 (med)
Indirect Impacts				
1.	Positive impacts for the community include potential for local employment.	0 (Positive)	<p>This is a positive impact.</p> <ul style="list-style-type: none"> • A Community Liaison Officer must be appointed at the commencement of the project to assist the contractor with employment opportunities and restriction of access during construction etc. 	0 (Positive)
2.	The increased risk to pedestrians and livestock due to construction activities.	6 (Medium)	<p>Due to the rural nature of the project, the construction activity has the potential to pose an increased safety and security risk to pedestrians and livestock.</p> <ul style="list-style-type: none"> • Appropriate construction safety signage must be erected to notify of construction activities and potential hazards on site; • Appropriate barriers must be used to cordon off construction excavations, hazardous areas and areas undergoing construction. • Flagmen must be in attendance to direct traffic where required. <p>This impact can be managed and mitigated.</p>	2 (Low)
3.	Wetlands and buffers in study area to be rehabilitated.	0 (Positive)	<p>As per the recommendation of the wetland specialist, the wetland and buffer areas previously impacted on by informal dwellings should be rehabilitated. Rehabilitation should include:</p> <ul style="list-style-type: none"> • Soil preparation and stabilisation, 	0 (Positive)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<ul style="list-style-type: none"> • Removal of alien invasive plant species; and • Re-vegetation using the hydroseeding method. • The ECO is to provide guidance on the rehabilitation during construction. • The rehabilitated area should be monitored once a month during the first wet season after rehabilitation. 	
Operation				
Direct Impacts				
1.	Sewer pipeline leaking into the watercourses at RC1 – RC11.	8 (Medium)	<p>The design of the pipelines (uPVC, larger pipe diameter to reduce pressure etc.) has reduced the risk of this impact occurring. The pipelines will also be constructed out of uPVC, which is the traditional material used to construct waste water pipelines due to its resistant nature. Other mitigation measures are as follows:</p> <ul style="list-style-type: none"> • Pipelines spanning the watercourses must be solid / sleeved to prevent leakages directly into the system during operation. • The applicant must ensure that the pipeline is monitored and maintained during operation. • Leaks or faults in the pipeline are to be reported to the relevant personnel as soon as detected. It is recommended that a community member be appointed to monitor the sewer pipeline crossing points. • To reduce the risk of surcharging sewer manholes onsite and downstream, a form of gully trap should be installed at or before the connection of the various components of the housing project with the main/street line through the development. This gully trap will block foreign objects from entering the main internal line of the site and isolate blockage problems at the source. 	4 (Low)
2.	Pipelines impeding the flow of water during high rainfall / flooding.	5 (Low)	<p>Since the study area is located at a watershed between two catchments, the watercourses crossed by the pipeline have relatively small catchment areas (i.e. originate on site). Even during a flood event, the volume of water flowing through the watercourses is not anticipated to increase significantly. The design of the pipe crossings must reduce the risk of this impact from occurring:</p> <ul style="list-style-type: none"> • The pipeline must be securely positioned in the trench according to engineering specs to prevent any wash away during high rainfall events (during construction and operation). • The pipeline must be located below ground to avoid debris from collecting around the pipe. 	1 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<ul style="list-style-type: none"> • Pipes to be laid on flexible bedding, unless otherwise specified by the engineer. • Conduct regular inspections and maintenance on the pipeline, when required. It is recommended that a community member be appointed to monitor the sewer pipeline crossing points. 	
3.	Long-term erosion of the housing platforms and pipeline route resulting in material loss into wetlands.	7 (Medium)	<p>Provided that the mitigation measures provided in the table above are adhered to, long-term erosion is unlikely on the site.</p> <ul style="list-style-type: none"> • Exposed platforms areas should be stable (i.e. vegetated / re-enforced); • Pipeline trenches should be suitably backfilled during construction and the formation of any preferential water paths avoided. • Once the pipeline has been installed, the backfill is to be suitably compacted to prevent movement of soils during rains. • Should erosion be noted by the applicant during the routine maintenance inspections, the area is to be rehabilitated and the cause of erosion rectified. 	3 (Low)
Indirect Impacts				
1.	Positive impact for the community includes the provision of housing and a functional municipal sewer reticulation network to the Driefontein community.	0 (Positive)	This is a positive impact in terms of the Driefontein community's sanitation and the associated environmental impact (i.e. pit latrines vs municipal sewer pipeline). The proposed new housing has also adhered to specialist recommendations by constructing outside the 30m wetland buffer zone.	0 (Positive)
2.	An increase in hardened surfaces within the Driefontein Community will increase stormwater runoff and potentially erosion, which may result in sedimentation of the adjacent watercourses.	9 (Medium)	<p>The function of the buffers recommended by the specialist for the wetlands, is to ensure that the wetlands are protected from any indirect impacts such as high stormwater runoff volumes. The buffers should allow sediment, carried in the stormwater, to settle in these open areas prior to the water draining into the wetland itself. Mitigation measures included in the EMP to manage stormwater in the long-term include:</p> <ul style="list-style-type: none"> • The formalization of a Stormwater Management Plan (SWMP), which is to be incorporated into the construction phase. • The SWMP is to adequately dispose of runoff from the new houses without causing soil saturation or erosion. • Overland flow routes are to be provided through the site to cater for major storms thereby minimizing any risk of damage to property infrastructure and other immovable assets. • The stormwater system is to be designed to function adequately with low 	5 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>maintenance in the long term and should cater for silting.</p> <ul style="list-style-type: none"> • The green open space shown in green in the preferred layout must be retained as a No-Go area. <p>The following recommendations were provided by the wetland specialist¹⁸:</p> <ul style="list-style-type: none"> • All stormwater runoff onsite should be directed into open, grass-lined channels/swales and stone-filled infiltration ditches rather than into underground piped systems or concrete V-channels. • Wherever possible, runoff from individual erven should be directed into the buffers and other public open spaces rather than onto roads. At these points erosion control in the form of Reno-mattresses should be installed where necessary. • Rainwater harvesting and storage should take place onsite and all runoff from roofs should be collected in tanks or landscaped features for irrigation and non-potable purposes. • Storm water should be attenuated locally at critical points across the site through the use of underground tanks, detention ponds and swales. Unless unfeasible for substantiated technical reasons, all detention and attenuation structures must be located outside of the wetland units. • Many smaller stormwater outlets should be favoured over a few large outlets. The storm water outlets must be constructed at regular intervals to spread out surface flow and avoid flow concentration. The outlets should be aligned along the contours instead of bisecting them. • Gabion and/or concrete stilling basins should be established at all storm water outlets to not only reduce the energy of flows but also provide some detention. Reno-mattresses should be installed below the outlet stilling basins and must be laid down to reflect the slope of the natural ground surface and designed to cope with the amount of water expected to be discharged onto the Reno-mattress. • Wherever possible, the storm water outlet structures must be located outside of the wetland buffers. Where this is not 	

¹⁸ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁵ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			feasible, outlet structures must be located on the upper edge of all buffers in the vicinity of the buffer boundary. <ul style="list-style-type: none"> • The onsite storm water system will need maintenance (silt and litter clearing) over time to function adequately and such maintenance should be budgeted for by the Municipality. • A waste disposal education programme should be implemented when the owners take occupancy. • All platforms should have a slight back-fall to prevent runoff from cascading down the embankments. • The current extent of erosion within the wetlands must be recorded before construction commences to provide a baseline with which to monitor the erosion impacts associated with the operation of the storm water management system. • The ECO must approve of the storm water system design before the finalization of the design prior to construction commencing. 	
Cumulative				
1.	Maintenance will be required for the sewer pipeline meaning workers may be entering the wetlands.	8 (Medium)	The maintenance of the sewer pipelines must only be conducted when required and for short periods of time to improve the structural quality. Should a section of the pipeline need to be repaired, the following is required: <ul style="list-style-type: none"> • The excavated material must not be stockpiled directly adjacent to or within any of the watercourses for long periods of time (i.e. more than 1 day). • An independent ECO is to be appointed for the duration of the maintenance period in the event that any vegetation clearing is required or excavation in the watercourses. 	4 (Low)
2.	Improved housing conditions for the expanding Driefontein Community	0	This is a positive impact. <ul style="list-style-type: none"> • A set of rules and prohibitions regarding the correct use of the toilets and kitchen sinks must be developed for inclusion into the terms of occupation and education programme. • The beneficiary community must be educated about the importance of the wetlands on site so that they are discouraged from disturbing these areas. 	0

6.3.2 Alternative Site Location & Pipeline Layout

See Appendix H for the full impacts scoring matrix which assesses the impacts on the above described environment. The below impacts relate to the alternate site (i.e. inclusion of Portion 1 of Spioen Kop 1125) and alternative pipeline layout (i.e. seventeen watercourse crossings) at the Driefontein Housing Project (in Appendix A).

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁹ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation :
Construction				
Direct Impacts				
Please note that all impacts listed above for the preferred housing layout alternative are the same for the alternative layout as the same amount of indigenous vegetation will be cleared to accommodate the layout. 4.3ha of high value agricultural land would be cleared for housing in the alternative layout. The alternative pipeline layout crosses watercourses at seventeen locations and not eleven. The significance ratings of some of the impacts is therefore higher. The same mitigation measures are required and therefore, to avoid repetition have not been included in the mitigation's column below.				
1	Potential for erosion to take place during earthworks for platforms and the excavation of the pipeline trenches in close proximity to watercourses. Exposed soil may result in sedimentation of the nearby watercourses and associated wetlands.	9 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	7 (Med)
2	Physical damage to the wetlands during the construction of the pipeline reticulation (RC 1 – RC17).	9 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	7 (Med)
3	Careless operation by the contractor within the wetlands resulting in damage and/or loss to the wetlands within the construction footprint and adjacent areas.	8 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	6 (Med)
4	Clearing of vegetation resulting in the loss of vegetation within the KZN Coastal Belt (CB3) vegetation type.	6 (Medium)	This impact and significance remains the same for both the preferred and alternative layouts.	4 (Low)
5	Removal of alien invasive vegetation found within the construction site.	0 (Positive)	This impact and significance remains the same for both the preferred and alternative layouts.	0 (Positive)
6	Loss of Agricultural Land	11 (High)	With the inclusion of the private property to the north of the study area, there is a more significant loss of agricultural land. The privately-owned portion of land is currently being farmed with the remainder of the study area lying fallow. In the alternative layout, there will be a loss of 4.3ha of active farming land.	8 (Med)
7	Impact on heritage features identified in the Heritage Impact Assessment (HIA).	13 (high)	The alternative layout does not take into consideration the location of all the heritage features identified by the heritage specialist, particularly the Shembe worship sites. The significance of the risk is therefore higher in the alternative layout.	11 (high)
Indirect Impacts				
1	Positive impacts for the community include potential for local employment.	0 (Positive)	This is a positive impact.	0 (Positive)
2	The increased risk to pedestrians and livestock due to construction activities.	6 (Medium)	This impact and significance remains the same for both the preferred and alternative layouts.	2 (Low)

¹⁹ See Appendix H for more details.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁹ :	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Sig. rating of impacts after mitigation :
3	Wetlands and buffers in study area to be rehabilitated	0 (Positive)	This impact and significance remains the same for both the preferred and alternative layouts.	0 (Positive)
Operation				
Direct Impacts				
1	Sewer pipeline leaking into the watercourses at RC1 – RC17.	10 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	6 (Med)
2	Pipelines impeding the flow of water during high rainfall / flooding.	9 (Med)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	5 (Low)
3	Long-term erosion of the housing platforms and pipeline route resulting in material loss into wetlands.	10 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	6 (Med)
Indirect Impacts				
1.	Positive impact for the community includes the provision of housing and a functional municipal sewer reticulation network to the Driefontein community.	0 (Positive)	This is a positive impact in terms of the Driefontein community's sanitation and the associated environmental impact (i.e. pit latrines vs municipal sewer pipeline).	0 (Positive)
2.	An increase in hardened surfaces within the Driefontein Community will increase stormwater runoff and potentially erosion, which may result in sedimentation of the adjacent watercourses.	9 (Medium)	This impact and significance remains the same for both the preferred and alternative layouts.	5 (Low)
Cumulative				
3.	Maintenance will be required for the sewer pipeline meaning workers may be entering the wetlands.	10 (Medium)	The same mitigation measures apply to both the preferred and alternative layout however, since there are seventeen watercourses crossed by the pipeline in the alternative layout, the significance of the impact is higher.	6 (Med)
4.	Improved housing conditions for the expanding Driefontein Community	0	This is a positive impact.	0

6.4 Environmental Impact Statement as per section (I)

The key impacts associated with the Driefontein Housing Project relate to those during the construction period. Issues such as unnecessary clearance of indigenous vegetation, encroachment of construction activities into the watercourses and wetlands as well as the management of erosion need to be addressed. This can be best managed by placing the proposed new houses in already disturbed areas (directly adjacent to existing homesteads) and moving proposed new houses outside the recommended wetland buffer areas. These recommendations have been taken into account for the preferred layout alternative. The wetlands are to be regarded as sensitive “no-go areas” and must be clearly demarcated prior to work commencing in these areas. All vehicles must use the existing roads and operate with care due to the rural setting of the project (pedestrians and school children).

The Wetland Assessments concluded that, provided “*the mitigation measures recommended are strictly adhered to, the impacts on the integrity of the wetland units and the associated downstream watercourses will be reduced and minimised to acceptable levels*”²⁰. Given the “*secondary and highly degraded*” nature of the indigenous vegetation remaining within the study area and taking into consideration the significant positive social impacts associated with the project, the clearance of this vegetation is of low environmental importance.

²⁰ Wetland Assessment (update) for the Driefontein Housing Project. The Biodiversity Company, 2018.

The inclusion of open spaces associated with the wetland buffers in the layout allows for indigenous riparian vegetation to be retained in these areas.

Once construction is complete there should be no significant impacts related to the operation of the project, as shown in the preferred layout attached under Appendix A. The construction of the waterborne sewer system should improve the current sanitation levels in the Driefontein community having a positive impact on the watercourses in this area. As per the wetland specialist report *“the formalisation of the informal development actually provides an opportunity to reduce some of these human disturbances through the retraction (retreat) of development out of the wetland units, better service delivery and education. The current residents will be provided with municipal services which will reduce the need to dispose of solid waste within the wetland areas. In addition, with the implementation of a buffer zone, it is likely that most of the informal structures will be removed from the wetlands and their buffers thus reducing direct disturbance impacts”*²¹.

Taking into consideration the above impacts and mitigation measures, it is the EAP’s opinion that the construction of the Driefontein Housing Project be authorised (Preferred Alternative).

6.5 Impact Management Objectives and Outcomes for The Development for Inclusion in The EMP As Per Section 3(m)

The following objectives and outcomes must be considered for this project:

- Objectives:
 - For there to be no lasting negative impacts on the environment once construction is complete, specifically within the watercourses and associated wetlands.
 - To practice responsible construction, ‘best practice’ with regards to housekeeping on site during construction (outlined within the EMP) and enforce the polluter pays principle. The applicant / contractor must be responsible for their actions on site during construction and the rehabilitation of the site post construction.
- Outcomes:
 - To promote sustainable development. Create infrastructure and an environment that is healthy and sustainable for future generations to come.

6.6 Assumptions, Uncertainties and Gaps in Knowledge Relating to The Assessment and Mitigation Measures Proposed as Per Section 3(o)

The following assumptions, uncertainties and gaps in knowledge are noted:

- Input from the specialist reports attached under Appendix B has been used to provide the description of the environment as well as assisting with the identification of impacts.
- It is assumed that the Final Layout will avoid the sites of cultural importance identified in the Heritage Impact Assessment. It is understood from discussions with the project manager that this will be discussed with the relevant community members during construction.
- It is assumed that the bulk sewer and water reticulation networks will be constructed by the iLembe Municipality prior to this development occurring. This bulk infrastructure is being assessed through a separate environmental authorization process. The development of the Driefontein Housing Project is reliant on the provision of this bulk infrastructure.
- No design drawings have yet been received from the engineer for where the pipelines cross watercourses. The EAP is therefore uncertain as to whether the pipelines will be constructed above or below ground. It is assumed that the pipes will be constructed below ground given the rural nature of the project (i.e. potential of theft). Should the pipes be constructed above ground on piers, there will be less infilling / excavation required and the significance of this impact reduced. The worst-case scenario has therefore been assumed.

6.7 Period for Which Authorization Is Required, Proposed Monitoring and Auditing and Post Construction Requirement’s

Environmental authorisation is required for the construction of the Driefontein Housing Project and associated sewer reticulation network within 2020 or 2021, therefore it is recommended that the authorization be valid for a period of five years, within which time construction would need to commence.

Given the nature of this project, it is recommended that **monthly** ECO audits be carried out for the duration of the construction phase of this project. One post construction audit should be conducted once construction is complete.

²¹ Wetland Assessment Report for the Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KwaZulu-Natal. SiVest, 2012.

The EMPr details the post construction, rehabilitation and closure objectives which will be monitored by the ECO and compliance authorities.

6.8 Financial Provisions as Per Section 3(s)

The contractor is responsible for and must ensure that the site has been rehabilitated in full before leaving the site. No upfront financial provision is required for this project.

6.9 EAP Opinion on Whether or Not to Authorize Activity and Recommendations and Conditions for Authorisation As Per Section 3(n) And (p)

The EAP recommends that the proposed Driefontein Housing Project and associated sewer reticulation network (preferred layout), as shown in Appendix A, be authorised. There are a number of impacts which have been identified and mitigation measures provided in the attached EMPr (Appendix J). Despite the mitigation measures provided, the following are recommended conditions for the Environmental Authorisation:

Stakeholders, Properties & Services

- As standard construction practices the engineer and contractor should identify all existing services that may be affected prior to construction.
- The contractor should liaise with the local Driefontein community, through the designated Community Liaison Officer (CLO) regarding restriction of access during construction.
- The construction of the new houses are not to disturb any of the existing subsistence farms associated with the Driefontein community, unless prior consent has been given.
- It is suggested that any structures that need to be removed, should be replaced and any damage repaired.

Traffic & Construction Vehicles

- The contractor must take into consideration the potential movements of surrounding stakeholders.
- Appropriate signage and barriers must be used to cordon off construction areas.
- All construction vehicles should be fitted with the appropriate silencers and exhausts.
- Speed limits must be obeyed.

Housekeeping, waste management, storage and materials handling

- Littering must not be permitted on site.
- All hazardous materials and substances should be stored within a secured area in the construction camp. The storage area should be a hard surfaced, bunded and covered area.
- Cement mixing must be done on a hard surface that is protected from storm water runoff.
- Contractors should be required to dispose of construction rubble at an appropriate landfill site. Delivery notes and safe disposal certificates to prove appropriate disposal should be available.
- Appropriate and sufficient toilet facilities must be provided by the contractor.
- Toilet facilities must be provided by a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.
- Toilet facilities must not be located within 30m of any watercourses.

Dust and erosion control

- A water cart should be used to dampen dusty surfaces and suppress dust should it become a nuisance.
- Exposed areas should be rehabilitated and re-vegetated as soon as possible during construction.
- Areas exposed to erosion must be protected through the use of sand bags, berms and efficient construction processes i.e.: limiting the extent (footprint) and duration period that areas are exposed. The contractor must ensure that any blockages created during construction are resolved.

Stormwater management

- The engineer/contractor must ensure that only clean stormwater runoff enters the environment. Any contaminated run off must be collected and disposed of.
- All watercourses must be identified and demarcated at the start of construction.
- No excavated material or fill material may be stored within the drainage line or within the 30m wetland buffer.
- Only the area directly in the path of construction may be cleared and excavated. The remainder of the watercourses must be demarcated as a 'no-go' area.
- Heavy vehicles should avoid working near the watercourses as much as possible.

- Stormwater management to be implemented along the length of the trench to prevent preferential water paths from forming exasperating erosion leading to the loss of material which will enter water ways.

Protection of Heritage Resources

- Attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008) which, requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.
- All heritage features identified by the heritage specialists (cemeteries and Shembe sites) must be retained in the development layout. If this is not possible, the relevant community members are to be consulted and a Phase 2 Heritage Impact Assessment commissioned prior to construction in this area.

Specific conditions

- The watercourse crossing points where the pipelines will be constructed must be clearly demarcated and only one point of entry into and out of the watercourses determined prior to construction commencing.
- Ensure that the laying of the pipes does not interrupt flow within the wetlands even during low flow periods.
- Construction of the pipeline in the watercourses is to take place during the dry season (i.e. April – Aug).
- The 30m wetland buffer must be clearly demarcated prior to any earthworks for the platform taking place (i.e. red & white tape, white markers etc). This is to ensure workers are aware of the No Go area.
- No storage of materials or construction equipment may occur within 30m of the watercourses.
- The portions of vegetation that will be cleared is restricted to the proposed new house footprint (i.e. no further clearing must take place to accommodate storage areas / site camps etc.). Green open space to be retained around wetland areas (as per the preferred layout alternative attached under Appendix A).

Appendix A: Drawings & Maps

Appendix B: Specialist Reports

#	Specialist Report	Specialist
1	Proposed Driefontein Housing Project in the KwaDukuza Local Municipality, KZN – Wetland Assessment Report (2012).	SiVest
2	Wetland Assessment (update) for the Driefontein Housing Project in the KwaDukuza Local Municipality (2017).	The Biodiversity Company
3	Agricultural Potential Assessment for the Driefontein Housing Project in the KwaDukuza Local Municipality (2018).	The Biodiversity Company
4	Heritage Impact Assessment of the Proposed Driefontein Housing Project, iLembe District Municipality.	Active Heritage
5	Internal Civil Engineering Services Technical Report / Preliminary Design (2009)	Ubuhle Bempisi Consulting Engineers
6	Preliminary Bulk Services Investigation for Proposed New Driefontein Township Development, KZN (2019)	Bazi Dukhan Consulting Engineers.
7	Geotechnical Investigation	Davies Lynn & Partners
8	Dept. Agriculture, Environmental Affairs & Rural Development's letter releasing the properties from agriculture.	

Appendix C: Noticeboard

Appendix D: Proof of Notification

Appendix E: Adverts

Appendix F: Registered I &Aps

Appendix G: Comments and Response table and Comments Received

Appendix H: Impacts Scoring Matrix

Appendix I: EAP declaration and Curriculum Vitae

Appendix J: Environmental Management Program