




**GREATER KOKSTAD MUNICIPALITY**

# **Shayamoya Phase 3 Slums Clearance Project**

## **Draft Environmental Impact Assessment Report**

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# GREATER KOKSTAD MUNICIPALITY

## SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

### DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

#### EXECUTIVE SUMMARY

##### INTRODUCTION AND PROJECT DESCRIPTION

SiVEST SA (Pty) Ltd has been appointed by Nanza Consulting on behalf of the Greater Kokstad Municipality to undertake the Environmental Impact Assessment (EIA) for the proposed Shayamoya Phase 3 Slums Clearance Project in Kokstad, in line with the National Environmental Management Act, 1998 (Act 107 of 1998).

The proposed project aims to provide low income housing to assist in the growing demand for formal housing within Kokstad. The development is broken down into six sites, comprising of residential units, planned unit developments (PUD), open space, a religious centre and a clinic. The proposed open space and clinic will be situated on Site 1. The Greater Kokstad Municipality has a community services department that will be responsible for upgrading and maintaining the proposed open space. The religious centre will be situated on Site 5.

A breakdown of the residential units for each site is as follows:

SITE	RESIDENTIAL		PLANNED UNIT DEVELOPMENTS	
	No. of subdivisions	No. of units (single storey)	No. of subdivisions	No. of units (four units per subdivision)
1	96	96	14	56
2	67	67	31	124
3	143	143	56	224
4	55	55	0	0
5	199	199	72	288
6	0	0	42	168
<b>TOTAL</b>	<b>560</b>	<b>560</b>	<b>215</b>	<b>860</b>

The following services are proposed:

##### Roads

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Bulk Access Roads and Bus Routes to the project areas are well served by Murray Road and the road linking Bhongweni and Shayamoya townships and no new bus routes are required. However, internal roads will be required for the project. The following design criteria is proposed for the internal roads:

Main Street Roads:	4.5m wide
Secondary Roads:	3.5m wide
Design Speed:	40 km/hr
Crossfall:	2.5%
Min. K Value:	4
Min V L length:	20 m
Main Road Reserve:	15 m & 12 m
Secondary Road Reserve:	10 m
Cut and fill slopes:	1:1,5
Longitudinal gradient:	Close to natural ground Maximum 10%

### **Stormwater**

The stormwater management strategy will be to manage and collect all surface runoff in a properly designed stormwater system that will discharge into the natural drainage systems on the site. Stormwater from the residential developed areas will be collected in the internal road system and surface channels that will be designed accordingly. The objective of a storm water management plan should be to manage the storm water resources of the collective watersheds to:

- Prevent flood damage
- Preserve the natural and beneficial functions of the natural drainage system
- Preserve and enhance storm water quality

Local on-site detention, grass-lined swales, storm water infiltration systems undulations, landscaping etc. can all be utilized, individually or in combination to attenuate peak flood discharges to the required peak discharge rate and to improve storm water quality. The proposed storm water management strategy will be to manage and collect storm water and surface runoff, from the residential properties before discharging the water in an efficient, safe and environmentally acceptable manner into the onsite natural drainage systems. The following standards are proposed for the installation of the internal stormwater infrastructure for the project:

Flood recurrence interval:	5 years and at critical points 10 years
Pipe Material:	Concrete
Pipe class:	100D in road reserve, 75D others
Pipe diameters:	min. 375mm diam.
Bedding:	Class C
Inlets:	Manhole
Junctions:	Points of deflections on pipelines

### **Water**

The area is served by adequate potable water infrastructure including pipes and storage reservoirs. The District Municipality is aware of the project and will be responsible for the providing the bulk water ties.

The design for the internal water supply criteria will be based on the “Guidelines for Human Settlement Planning and Designs”, as published by the CSIR and will also refer to the local municipality’s guidelines and standards for the design standards for a development of this nature is summarised below.

	PARAMETER	ELEMENT	GUIDELINE
1	Design consumptions	Residential Schools Community Halls/Restaurants Bus Station	600 l/d/unit 20 l/pupil/day 90 l/person/day 15 l/user/day
2	Pressure	Maximum (Static) Minimum : Reticulation Mains : Trunk Mains	9.0 bar 1.0 bar 2.5 bar
3	Flow Velocity	$\varnothing \leq 150\text{mm}$ $\varnothing \geq 200\text{mm}$	1,0m/s - 3.5m/s 1,5m/s - 2,5m/s
4.	Fire Flow	Hydrant Spacing : Residential Hydrant Spacing : Industrial Flow : Residential Flow : Commercial, Industrial	240m max. 180m max. 15 l/s @ 0,7 bar 100 l/s @ 1,5 bar
5	Peak Factor	Design peak	4 to 6.5 x AADD (Table 4.12C)
6	Pipe Location	All areas	1m from boundary in 10m roadreserved 1.5m from boundary in 13m roadreserve 2m from boundary in 16 – 25m road reserves
7	Pipe Materials	75mm diam. and smaller 110mm diam. to 315mm diam.	HDPE type IV class 12

### Sanitation

A water borne sewerage system is proposed with individual connections to each of the sites. The bulk demand for the project is 694.98kl/day for which the municipality will need to provide terminal manholes. The Engineering Services Report details the locality of the terminal manholes that would need to be provided for the project.

Average Dry Weather Flow: 500/erf/day

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Peak Factor (PF) : 2.5  
 Average Dry Weather FLOW: 3.125 l/s  
 Infiltration : 15%  
 Peak Design Flow: ADWF \*2.5 X 15%= 8.90 l/s  
 Ultimate Design Factor: 1.5 = 13.477 l/s  
 Maximum velocity of flow: 2.5 m/sec  
 Fire risk: Low  
 Minimum diameter of pipes: 160 mm  
 Minimum cover over pipes: 900 mm

## APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED IN 2017)

The following activities are applied for:

Listing Notice	Activity	Applicability
GNR 327, April 2017 (Listing Notice 1)	Activity 12  The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more;  where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —  excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;	The layout of the development has been designed to avoid environmentally sensitive features. However, this trigger may be applicable as the proposed infrastructure may be constructed within watercourses or within 32m of watercourses.

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Listing Notice	Activity	Applicability
	(dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
GNR 327, April 2017 (Listing Notice 1)	Activity 19  The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;  but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	The layout of the development has been designed to avoid environmentally sensitive features. However, this trigger may be applicable as the proposed infrastructure may be constructed within watercourses.
GNR 325, April 2017 (Listing Notice 2)	Activity 15  The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This trigger is applicable as the site is 44ha in extent and more than 20ha of indigenous vegetation may need to be cleared.
GNR 324, April 2017 (Listing Notice 3)	Activity 4  The development of a road wider than 4 metres with a reserve less than 13,5 metres.  d. KwaZulu-Natal i. In an estuarine functional zone;	Internal roads will be constructed within the site boundary which falls within 4km of the Mount Currie Nature Reserve.

Listing Notice	Activity	Applicability
	<ul style="list-style-type: none"> <li>ii. Trans-frontier protected areas managed under international conventions;</li> <li>iii. Community Conservation Areas;</li> <li>iv. Biodiversity Stewardship Programme Biodiversity Agreement areas;</li> <li>v. World Heritage Sites;</li> <li>vi. A protected area identified in terms of NEMPAA;</li> <li>vii. Sites or areas identified in terms of an international convention;</li> <li>viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>ix. Core areas in biosphere reserves;</li> <li>x. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</li> <li>xi. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>xii. Outside urban areas: <ul style="list-style-type: none"> <li>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or</li> <li>(bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>xiii. Inside urban areas: <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined; or</li> <li>(cc) Within urban protected areas.</li> </ul> </li> </ul>	
<p>GNR 324, April 2017 (Listing Notice 3)</p>	<p>Activity 12</p> <p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>a. KwaZulu-Natal</p>	<p>A small portion of Site 3 falls within a Critical Biodiversity Area. More than 300 square metres of vegetation will be cleared on this site.</p>



Listing Notice	Activity	Applicability
	<p>i. Trans-frontier protected areas managed under international conventions;</p> <p>ii. Community Conservation Areas;</p> <p>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</p> <p>iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>vi. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p> <p>vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;</p> <p>viii. A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>ix. World Heritage Sites;</p> <p>x. Sites or areas identified in terms of an international convention;</p> <p>xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</p> <p>xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or</p> <p>xiii. In an estuarine functional zone.</p>	
<p>GNR 324, April 2017 (Listing Notice 3)</p>	<p>Activity 14</p> <p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p>	<p>The site falls within 4km of the Mount Currie Nature Reserve.</p> <p>The layout has been designed to avoid all wetlands and watercourses. However, internal services may cross watercourses.</p>

Listing Notice	Activity	Applicability
	<p>where such development occurs—</p> <ul style="list-style-type: none"> <li>(a) within a watercourse;</li> <li>(b) in front of a development setback; or</li> <li>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</li> </ul> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>a. KwaZulu-Natal</p> <ul style="list-style-type: none"> <li>i. In an estuarine functional zone;</li> <li>ii. Community Conservation Areas;</li> <li>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</li> <li>iv. A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>v. World Heritage Sites;</li> <li>vi. Sites or areas identified in terms of an international convention;</li> <li>vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>viii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>ix. Core areas in biosphere reserves;</li> <li>x. Outside urban areas: <ul style="list-style-type: none"> <li>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</li> <li>(bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>xi. Inside urban areas:</li> </ul>	

Listing Notice	Activity	Applicability
	(aa) Areas zoned for use as public open space; (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose; or Areas seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined.	

## DETAILS OF ALTERNATIVES CONSIDERED

No activity alternatives have been identified as the area has been earmarked for housing by the Greater Kokstad Municipality. The IDP of the Greater Kokstad Municipality identifies the Shayamoya area as an area that requires improved economic and social infrastructure, which is in line with the proposed project. The proposed development is also aligned with the Greater Kokstad Municipality SDF.

No location alternatives were considered as the development involves the slums clearance on existing slums within the proposed development area. Whilst the area has existing slums, it is located on either side of Murray Road which is one of the main bus routes of the Kokstad area and is therefore also appropriately situated in terms of public transport.

A preliminary layout was prepared for the project in September 2011, however; this layout did not take into account the sensitive environmental features of the site. Following this, specialists were appointed to undertake their assessments as part of the EIA process and identify all environmentally sensitive areas within the proposed project area. These assessments were distributed to the project team and the layout was revised in order to avoid environmentally sensitive features. No further layout alternatives will be considered as part of the EIA process. Impact assessments have been undertaken on the revised layout.

The “no-go” alternative should in all instances be considered as part of the EIA process. It assumes that the activity does not proceed, implying a continuation of the current status quo. The no-go option is, however, not a feasible option in terms of this development and would go against the constitution of South Africa and infringe upon the basic human rights of access to adequate housing. Residents in this area are living in very poor conditions, some without access to running water and electricity, and simply cannot afford for the interventions proposed as part of this development to not be approved.

Should the project not go ahead, the lack of basic services in the Shayamoya area is likely to remain and people would continue to live without these basic services. Pollution will also likely continue to increase coupled with health issues that arise from living in unsanitary conditions.

## PUBLIC PARTICIPATION PROCESS UNDERTAKEN

The Public Participation Process has been undertaken in line with Chapter 6 of the EIA Regulations 2014 (as amended 2017).

SiVEST will notify I&AP's via email of the availability of the report. Registered stakeholders will be provided with an opportunity to provide comments. The Draft EIA Report will be made available for a 30-day comment period from the 18<sup>th</sup> March 2021 to the 18<sup>th</sup> April 2021. The documents will also be made available on dropbox for review and comment as required. A copy of the EIA report will be left at the Greater Kokstad Municipality and the Bhongweni Library for viewing by the public.

All issues that are raised during the review period for the EIA (this report) will be recorded and addressed by the Environmental Assessment Practitioner (EAP) in a Comments and Responses Report (C&RR) attached to the Final EIA and the Final Report will be amended, as necessary based on issues or concerns raised.

The Final EIA report will be submitted to the ETDEA with all comments received and responses sent during the public comment period.

## IMPACT METHODOLOGY USED

The SiVEST Impact Assessment method, dated 28 July 2017 (attached as **Appendix G**) has been utilised to assess the following potential impacts identified in the assessment phase and presented in the following sections.

The method used in this impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

## IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability
<b>CONSTRUCTION PHASE</b>							
Air/dust pollution	<p>Dust could become a problem during construction, especially on windy days. This is as a result of the developments proximity to residential areas.</p> <p>Air pollution may occur in the vicinity of the site and the immediate surrounds during the construction phase as a result of:</p> <ul style="list-style-type: none"> <li>Exhaust fumes from heavy vehicles and machinery, in particular poorly serviced vehicles</li> <li>Dust from exposed surfaces and soil stockpiles picked up by wind</li> <li>Dust on haulage and access roads emitted into the air by construction vehicles</li> <li>Odours downstream of inappropriate and mismanaged chemical toilets</li> </ul>	<ul style="list-style-type: none"> <li>Vehicles travelling back and forth from the construction site must adhere to speed limits so as to avoid generating excessive dust. A speed limit of 30 km/hour must be adhered to on site on all un-surfaced roads.</li> <li>The dampening down of access surfaces must be practiced especially in dry and windy conditions to prevent excessive dust formation.</li> <li>The Contractor needs to ensure that the fence-line consisting of the wooden poles/supports and shade-cloth structure is maintained in good condition to act as a screen to minimize dust pollution.</li> <li>Vehicles and machinery are to be kept in good working order and should excessive emissions be noted; the Contractor is to have equipment serviced as soon as possible. No fires are to be permitted on site except for the burning of firebreaks.</li> </ul>	Low Negative Impact	Negligible cumulative Impact	Site	Short Term	Probable
Noise pollution	<p>The generation of noise (from earth moving machinery, piling works etc.) during the construction phase may result in the disturbance to the neighbouring residents. Noise generated by delivery vehicles, earth moving machinery, piling works and the workforce have the potential to impact negatively on people living and/or working along the property boundaries and in relatively close proximity to the proposed development. The negative impacts could result in an increase in stress and frustration and associated health implications.</p> <p>Disturbance may also be caused by construction starting too early or finishing too late. However, this impact is likely to be sporadic and relatively short.</p>	<ul style="list-style-type: none"> <li>Blasting, piling or other 'noisy' activities must take place during normal working hours. The adjacent land owners must be notified prior to any planned activities that will be unusually noisy. These activities could include, but are not limited to, blasting and piling.</li> <li>Should complaints regarding noise levels be received, as a result of construction activities on the site, these must be recorded by the ECO.</li> </ul>	Low Negative Impact	Negligible cumulative Impact	Site	Short Term	Possible
Job creation	<p>A small number of jobs (approximately 350 jobs) will be created during the construction phase of the project.</p> <p>For those unemployed in the area, the creation of short-term construction jobs would improve their economic well-being for the period of construction and may lead to further employment opportunities through skills enhancement and experience. Economic well-being is generally regarded as an important contributor of individual quality of life, especially for those unemployed and struggling to make ends meet.</p>	<ul style="list-style-type: none"> <li>No mitigation</li> </ul>	Medium Positive Impact	High Cumulative Impact	High	Short Term	Definite
Wetland - Impacts associated with clearance and edge effects to the wetland habitat	<p>During the construction phase, wetland habitat may be temporarily cleared. Clearing of habitat will mean degradation of the wetland habitat to accommodate the service infrastructure. Clearance will entail removal of indigenous vegetation resulting in loss of wetland habitat. Biota inhabiting the wetland habitat will therefore also be displaced.</p> <p>Disturbance due to edge effects are also likely to take place given the proximity of the existing informal settlements as well as existing roads across the wetlands. Edge effect impacts afford opportunities for alien vegetation to colonise the wetland habitat.</p>	<p><b>Design &amp; routing:</b></p> <ul style="list-style-type: none"> <li>Unavoidable services crossings should be located within already disturbed areas like existing road crossings and located across the narrowest portions of the wetland.</li> <li>The services must be routed so that the wetland is crossed at right angles to the direction of flow.</li> </ul> <p><b>Site setup and construction phase:</b></p> <ul style="list-style-type: none"> <li>Disturbance to the wetland soils along the services crossings should be restricted to an established construction right-of-way (ROW) corridor. 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.</li> <li>The construction ROW should comprise the trench footprint, a narrow one-way running track and soil stockpile zones.</li> </ul>	Low Negative Impact	High cumulative Impact	Site	Permanent	Probable

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts					
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability	
		<ul style="list-style-type: none"> <li>Excavations within the wetland should be undertaken by hand.</li> <li>All wetland areas outside of the demarcated ROW must be considered no-go areas.</li> <li>Ideally, excavations within the onsite wetlands should be undertaken between the months of April and September.</li> </ul> <p><b>Rehabilitation and monitoring:</b></p> <ul style="list-style-type: none"> <li>The disturbed areas within the wetland and/or buffers must be rehabilitated after the water pipes are established. Compacted areas must be ripped and seeded immediately. An indigenous grass seed mix should be used as recommended by a wetland specialist.</li> <li>Adhere to the requirements of the wetland rehabilitation plan if prepared.</li> <li>The environmental control officer must be present during the establishment of the construction ROW, the excavation of the trench and the rehabilitation of the wetland to guide these processes.</li> <li>The disturbed area should be monitored for erosion once a month during the first wet season after construction.</li> <li>The re-instated wetland areas must be monitored post-construction by the municipality to manage and control alien vegetation in the wetland.</li> </ul>						
Impacts to the Geomorphology of the Wetlands	<p>During the construction phase, soil removal, sedimentation and erosion potential impacts can be expected with the preparation of the site and related construction activities. Physical degradation to the wetland habitat is likely to take place by means of clearance, levelling and compaction due to movement of vehicles. With these construction activities, the geomorphology of the wetland is likely to be altered. Ancillary impacts can also be expected in terms of consequent potential erosion and sedimentation impacts. Flattened and exposed soil surfaces and excavation pits / trenches may be vulnerable to increased run-off after rainfall events which can lead to erosion and sedimentation impacts. Where the onset of erosion arises, the structural integrity of the wetlands may be compromised. Moreover, resultant sedimentation can take place where additional sediment loads are washed into the wetland.</p> <p>Further development within the wetland will severely affect the functionality of the system especially with excavation of the wetland soils within the wetlands.</p>	<p><b>Preventing Temporary Increased Run-off, Sedimentation and Erosion Impacting the Wetlands</b></p> <ul style="list-style-type: none"> <li>A construction and operation phase storm water management plan must accompany the pipeline installation. Importantly, the storm water management plan must account for increased run-off and sedimentation. As such, attenuation facilities are to be implemented if and where required.</li> <li>Additionally, appropriate drainage structures at the storm water outlet points are to be implemented with energy dissipating structures as well as sediment trapping devices to prevent sedimentation exiting the site during construction. This can be in the form of silt nets.</li> </ul> <p>See section above for site setup, construction phase, rehabilitation and monitoring mitigation measures.</p>	Low Impact	Negative	High cumulative impact	Site	Permanent	Site
Wetland - Impacts associated with accelerated run-off and associated increased flood peaks to the watercourses.	<p>Currently, the hydrology of the wetland is being affected by the presence and further encroachment of settlements surrounding the wetland in the greater catchment area. The catchment hydrology is affected due to transformation of the catchment area from a natural to an artificial environment, characterised by hardened surfaces (foundations of houses and compacted dirt roads) with little to no vegetation to provide surface roughness in aid of controlling surface run-off. Additionally, the vertical drainage properties are affected by compaction and hardened impermeable surfaces. Sub-surface drainage is therefore also impacted as a result. Increased run-off flood peaks and alteration of the hydrology of the wetland is the current status quo. With further implementation of hardened surfaces for the proposed construction of houses and associated infrastructure (roads and services), a further increase in flood peaks during and following rainfall events are likely whilst surfaces remain</p>	<p><b>Preventing Increased Run-off and associated Erosion Impacting on the Wetland</b></p> <ul style="list-style-type: none"> <li>Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion.</li> <li>The use of silt fencing and potentially sandbags or hessian "sausage" nets along the boundaries of the construction areas can be used to slow run-off entering the wetlands and the associated buffer zones, thereby also decreasing the likelihood of increased flood peaks and consequent potential erosion and sedimentation impacts.</li> <li>An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off and associated erosion.</li> </ul>	Low negative impact		Medium cumulative impact	Site	Long term	Probable

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability
	exposed following clearance and compaction during construction. Increased flood peaks are therefore likely to be higher in intensity.	An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly.					
Wetland - Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery and workers; as well as sedimentation via run-off polluting the wetlands.	During the construction process, potential contamination impacts can be expected as a result of stored oils, fuels, and other hazardous substances or materials being transported via stormwater run-off and / or direct leaks from construction vehicles and machinery. Should this occur, contamination impacts are likely to occur. Water quality impacts can also result from workers using the wetland for various purposes (such as for sanitation). Usage of sanitary substances (for example, soap) in the wetland can alter the chemical balance or water quality thereby causing pollution to the wetland system. Additionally, usage of the wetland for urine and faecal waste is another potential negative water quality impact. Use of water for building purposes can also lead to impaired water quality. Mixing cement and cleaning construction tools in the wetland can furthermore affect the water quality. Impacts to the water quality may affect any organisms or vegetation inhabiting these systems via contamination impacts. Lastly, water quality can be impaired as a result of sedimentation. Additional sediment loads emanating from construction areas that are contained in run-off entering watercourses can be regarded as pollution, and therefore requires mitigation.	<p><b>Storage of Oils, Fuels and Hazardous Substances / Liquids</b></p> <ul style="list-style-type: none"> <li>All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the wetlands and the associated buffer zones.</li> <li>Where these items are stored within the proposed development area, a designated storage area will be required and the storage area must be adequately bunded to contain any spillage from containers.</li> <li>Emergency spill kits must be available to clean up and remove accidental spills.</li> </ul> <p><b>Preventing Soil and Surface Water Contamination</b></p> <ul style="list-style-type: none"> <li>All vehicles and machinery operating on the site are to be checked for oil, fuel or any other fluid leaks before entering the nearby construction area.</li> <li>All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction area.</li> <li>No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the wetlands and the associated buffer zones.</li> <li>The construction site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers.</li> <li>Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110% capacity to prevent oil or fuel contamination of the ground and / or nearby wetlands and the associated buffer zones.</li> <li>No cement mixing is to take place in the wetlands and the associated buffer zones.</li> <li>In general, any cement mixing in the construction area is to take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in by readymix cement vehicles.</li> <li>Importantly, no mixing of cement or concrete is allowed directly within the wetland and associated buffer zone.</li> <li>No "long drop" toilets are allowed on the study site.</li> <li>Suitable temporary chemical sanitation facilities are to be provided.</li> <li>Temporary chemical sanitation facilities must be placed at least 100 meters from the wetlands and the associated buffer zones.</li> <li>Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills.</li> </ul> <p><b>Preventing Sedimentation Impacting on Surface Water Resources</b></p>	Low negative impact	Medium cumulative impact	Site	Long term	Probable

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability
		<ul style="list-style-type: none"> <li>Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation.</li> <li>The use of silt fencing and potentially sandbags or hessian "sausage" nets along the boundaries of the construction area can be used to prevent and / or reduce sediments entering the wetland and the associated buffer zone.</li> <li>An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation.</li> </ul> <p>An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor sedimentation impacts. Where additional mitigation measures are stipulated by the ECO in order to control sedimentation, this is to be undertaken accordingly.</p>					
Vegetation – Loss of habitat for Flora of common and protected or red data species.	The clearing of land reduces available habitat for floral species. This results in a local scale loss in ecosystem functionality and biodiversity and potentially reduces available habitat for red data species. Mitigation measures can reduce inevitable environmental damage to a state where long term losses are negated.	<ul style="list-style-type: none"> <li>Footprint of the activity needs to be strictly adhered to.</li> <li>A site specific Environmental Management Programme needs to be developed for the construction and operation phases.</li> <li>An Environmental Control Officer (ECO) needs to be appointed for the duration of construction.</li> <li>A search and rescue operation needs to be conducted by a suitably qualified ecologist to collect species of special concern.</li> <li>Permits for plants collection/removal need to be obtained prior to search and rescue operations.</li> <li>Strictly no removal of any floral species without valid permits in place.</li> <li>Vegetation clearance in the construction phase is to be removed in a phased approach, as and when it becomes necessary as vegetation harbours fauna.</li> <li>Sensitive areas need to be demarcated clearly before construction commences.</li> </ul>	Low negative impacts	The impact would result in minor cumulative effects.	Site	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).	Impact will certainly occur (greater than a 75% chance of occurrence)
Vegetation - Transformation of habitat for Flora of common and protected or red data species.	Hard transformation will result in a reduction in flora for the area. Additionally, transformation of the habitat may lead to an increased alien and invasive plant establishment and erosion potential through both wind and water erosion. Mitigation measures may decrease the severity of the impact, if the mitigation measures are adhered to.	<ul style="list-style-type: none"> <li>Servitude widths need to be a strictly adhered to.</li> <li>Where possible, indigenous vegetation needs to be retained.</li> <li>Clearance for construction should be done in a phased approach, and rehabilitation should be done as soon as work has ceased along the section of routing.</li> <li>Where possible, construction should occur in the dry season to prevent soil loss through stormwater.</li> <li>Where possible, manual clearance of the vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.</li> <li>The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs.</li> <li>Alien and invasive plants should be hand pulled prior to seeding occurring, and disposed of as per the alien invasive control programme.</li> <li>Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion.</li> <li>Rehabilitation should take place as soon as construction of the section of line is complete.</li> </ul>	Low negative impacts	The impact would result in minor cumulative effects.	Site	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).	Impact will certainly occur (greater than a 75% chance of occurrence).



Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability
		<ul style="list-style-type: none"> <li>Strictly no littering. The contractor should highlight this at daily toolbox talks and site clean-ups should occur on a daily occasion.</li> <li>An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas.</li> <li>A mix of indigenous grass species such as the standard "NPA" mix should be used for rehabilitation.</li> </ul>					
Erosion related impacts for the construction phase	Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil and blocking up drains and eventually clogging roadsides and drainage lines. This removes habitat for fauna occurring in the area. This will effect ecosystem functionality and will have cost implications as the construction site is unlikely to rehabilitate naturally. If the mitigation measures are implemented correctly, erosion related impacts may be largely negated.	<ul style="list-style-type: none"> <li>An approved Stormwater Management Plan should be implemented before construction occurs.</li> <li>Where possible, indigenous vegetation needs to be retained.</li> <li>Vegetation should be cleared only when construction occurs in that section of the development.</li> <li>Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion.</li> <li>Rehabilitation should take place as soon as construction is complete.</li> <li>In areas of higher gradient, access roads should have erosion berms to prevent soil loss.</li> <li>Construction activities should be limited to the winter months to prevent loss of soil to water runoff.</li> <li>Spraying of the soil surface should occur when working in dusty conditions.</li> </ul>	Low negative impact	The impact would result in minor cumulative effects	Site	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	The impact will likely occur (between a 50% to a 75% chance of occurrence)
Heritage	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>OPERATIONAL PHASE</b>							
Provision of Housing	The portion of land under application will provide 1420 units to the Shayamoya area and provide housing for a number of people. Low income, informally settled residents stand to benefit from the proposed housing project. Overall, the beneficiaries will experience a substantial improvement in the quality of their housing, municipal services and social services. This includes access to ownership of private property, electricity, flush toilets, solid waste removal and potable water. As the quality of housing and the access to basic municipal and social services is generally an important contributor to overall quality of life, it is likely that the individual beneficiaries will experience a substantial improvement in their living conditions and quality of life.	n/a	n/a	High cumulative impact	High	Permanent	Definite
Erosion	Erosion potential is increased in areas where vegetation has been removed. Hard transformation may increase water velocity in steeper areas and will result in a loss of topsoil and the erosion of drainage lines. This will aid in alien and invasive plant establishment and vegetation rehabilitation will be compromised as the loss of topsoil will delay rehabilitation efforts.	<ul style="list-style-type: none"> <li>An approved Stormwater Management Plan should be implemented before construction occurs and should be maintained through operation phase.</li> <li>Where possible, indigenous vegetation and rescued plants needs to be returned as soon as construction ceases.</li> <li>Soil stockpiles need to be grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins.</li> <li>Rehabilitation should take place as soon as construction is complete.</li> <li>Operation phase should only begin once the ECO has deemed rehabilitation successful and mitigation measures have been implemented.</li> <li>Six monthly checks of the area should take place for the emergence of erosion gully's, and if gully's emerge, will need to be rehabilitated immediately.</li> </ul>	Low negative impact	The impact would result in minor cumulative effects	The impact will affect the local area or district	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	The impact will likely occur (between a 50% to a 75% chance of occurrence)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts				
	Potential Impacts	Mitigation	Significance after mitigation	Consequence	Extent	Duration	Probability
Biodiversity loss and alien invasive plant establishment due to operation phase	Biodiversity is unlikely to rehabilitate due to loss of habitat. This can be partly mitigated if rehabilitation is successful. Additionally, biodiversity may be further lost due to the establishment of alien and invasive plants.	<ul style="list-style-type: none"> <li>A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced.</li> <li>Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful.</li> <li>Monitoring and control of alien and invasive species as per an alien invasive control programme.</li> </ul>	Low negative impact	The impact would result in minor cumulative effects	The impact will affect the local area or district	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	The impact will likely occur (between a 50% to a 75% chance of occurrence).
<b>NO-GO</b>							
Loss of housing opportunities	If the Shayamoya Phase 3 Slums Clearance Project does not go ahead, the existing informal housing would remain and people would continue to live in poor conditions. There will continue to be a lack of formal housing in the Shayamoya area.	n/a	n/a	High cumulative impact	High	Permanent	Definite

## POSITIVE AND NEGATIVE IMPACTS

Impact	Pre-mitigation	Post-mitigation
<b>Impacts on Biophysical Systems / Components during the construction phase</b>		
Impacts associated with clearance and edge effects to the wetland habitat.	Medium negative impact	Low negative impact
Impacts to the Geomorphology of the Wetlands	High negative impact	Low negative impact
Impacts to the Hydrology of the Wetlands	Medium negative impact	Low negative impact
Impacts to Water Quality	Medium negative impact	Low negative impact
Loss of habitat for flora	Low negative impact	Low negative impact
Transformation of habitat for flora	Low negative impact	Low negative impact
Erosion related impacts for the construction phase	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic Component during the construction phase</b>		
Air / dust pollution	Low negative impact	Low negative impact
Noise	Low negative impact	Low negative impact
Job creation	Medium positive impact	No mitigation required
<b>Impacts to Biophysical Systems/components during the operational phase</b>		
Erosion	Medium negative impact	Low negative impact
Biodiversity loss and alien invasive plant establishment	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic component during the operational phase</b>		
Provision of housing	Very high positive impact	n/a
<b>No-go Alternative</b>		
Loss of housing opportunities	Very high negative impact	n/a

## SPECIALIST STUDIES

The following specialist studies have been undertaken for the project:

- Wetland Assessment (November 2019);
- Vegetation Assessment (November 2019);
- Heritage Assessment (November 2019);
- Geotechnical Investigation (June 2020);
- Bulk and Internal Services Engineering Report (July 2020, revised June 2021).

A summary of the findings of the specialist studies are as follows:

### Wetland Assessment

- An assessment of the Present Ecological State of the wetlands reveals that most HGM units are Largely Modified, while wetland HGM unit 4 is Seriously Modified through changes within the catchment and the removal of wetland soils for brick making.

- An assessment of the current importance of the wetland unit in terms of ecosystem service provision indicates that wetland units provide medium to moderately-high levels of wetland functioning.
- The EIS score indicates that the assessed unit falls into EIS Category C, which corresponds to a Moderate importance and sensitivity.
- All seven wetlands on site have been impacted upon by crop production, livestock grazing, and changes to their hydrology (increased hardened surfaces) and geomorphology (clay removal for brick making) thus leading to an associated infestation by alien vegetation. The current layout takes cognisance of the wetland systems, and thus no housing is proposed within the wetland areas, or the 30m buffer that is recommended here. It must be noted that some informal housing has already been built within the wetland buffer areas, and it is recommended that the municipality try to negotiate for the removal of these houses if possible.

### Vegetation Assessment

- A small portion of site falls within CBA Irreplaceable and according to Mucina and Rutherford 2006 is classified as East Griqualand Grassland (Gs 12) which is a Vulnerable vegetation type.
- Upon undertaking the groundtruthing exercise it was found that the site is heavily transformed from natural and impacted by illegal dumping, human waste, overgrazing and informal housing.
- A total of 23 plant species were recorded during the field survey, of which 3 were alien. Three (3) plant species which are protected by Provincial Legislation were noted within the development site. The plant species that fall under the protection of the KwaZulu-Natal Nature Conservation Management Act are listed below.
  - *Aloe maculata* All.
  - *Hypoxis argentea* Harv. ex Baker var. *argentea*
  - *Ledebouria ovalifolia* (Schrad.) Jessop
- Although the vegetation type is vulnerable, the area is transformed from 'natural' and exhibits a low conservation value.

### Geotechnical Assessment

- The site is underlain by a mantle of transported and residual soils overlying weathered mudstone bedrock and intrusive dolerite which are variably weathered.

### Engineering Services

Subject to the following the project is viable:

- Confirmation from Harry Gwala District Municipality that the bulk water demand can be met and tie in points provided.
- Confirmation from Harry Gwala District Municipality that bulk outfall sewers can be provided at the terminal manholes.

### Heritage Assessment

- The HIA survey noted that much of the area has been disturbed.

**GREATER KOKSTAD MUNICIPALITY**

Prepared by:



**Project No.** 15731  
**Description** Proposed Shayamoya Phase 3 Slums Clearance Project  
**Revision No.** 1.0

**Date:** July 2021

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- No artefacts or features were noted during the survey.
- A PIA desktop study was undertaken. The study noted that the Estcourt Formation (basal unit of the Beaufort Group) is present on this site.
- This lithology is internationally renowned for palaeontological material and it is highly likely that palaeontological material will be found during excavation of this large area.

## **ENVIRONMENTAL IMPACT STATEMENT:**

The Shayamoya Phase 3 Slums Clearance Project has been proposed by the Greater Kokstad municipality in order to assist the growing demand of housing in Kokstad. The proposed project area is situated approximately 2km north east of Kokstad centre and comprises of six (6) sites within the existing township. Approximately 1420 units are proposed which will comprise of residential units, planned unit developments (PUD), open space, a religious centre and a clinic.

The implementation of the housing development will assist in reducing the establishment of informal settlements. The proposed development will also include the construction of water networks, proper sanitation infrastructure, electricity and provision of road infrastructure through the provision of the slums clearance. By providing water and sanitation services to the proposed development, it will indirectly assist in reducing surface water and groundwater pollution. This will be as a result of households using piped water in their daily activities instead of water from the nearby rivers and utilising proper sanitation methods.

According to the Annual Performance Plan (2019/2020) prepared by the Department of Human Settlements, KwaZulu-Natal has the second highest housing backlog in South Africa. People seek improved livelihoods and economic opportunities and as a result, tend to settle in informal settlements around major cities and towns. Based on this, the management of informal settlements in KwaZulu Natal remains a priority.

The Greater Kokstad Municipality Housing Sector Plan (2020-2021) indicates that the municipality faces a low and middle-income housing crisis. The provision of housing for residents is a priority in the municipality however this is met with many constraints. The key issues related to housing include:

- High prices of privately-owned land a lack of land to build houses;
- Private shack settlements as an income-generating activity;
- Urbanisation results in growing number of informal settlements;
- Speculation in up-market housing, especially in areas outside any Strategic development framework: This results in adhoc development and cost inefficiencies;
- The lack of funding and the non-alignment of municipal and government department budgeting processes;
- The lack of bulk services for housing developments

As a result of the constraints stated above, huge housing provision backlogs have been experienced by the municipality. The Shayamoya Phase 3 Slums Clearance Project is an initiative to work towards decreasing that backlog and therefore will result in very high positive social impacts.

The following specialist studies have been undertaken for the project:

- Wetland Assessment (November 2019);
- Vegetation Assessment (November 2019);
- Heritage Assessment (November 2019);
- Geotechnical Investigation (June 2020);
- Bulk and Internal Services Engineering Report (July 2020).

The main findings of the specialist studies are included in **Section 18** above.

The wetland assessment (refer **Appendix F**) revealed that all seven wetlands on site have been impacted upon by crop production, livestock grazing, and changes to their hydrology and geomorphology thus leading to an associated infestation of alien invasive vegetation. The current layout takes cognisance of the wetland systems and the 30m buffer that has been recommended, however some informal housing has already been built within the wetland buffer areas. The specialist recommended that these informal houses be removed from the wetland buffers. Whilst the development may indirectly have negative impacts on the existing wetland systems, these can be mitigated.

A small portion of site falls within CBA Irreplaceable and according to Mucina and Rutherford 2006 is classified as East Griqualand Grassland (Gs 12) which is a Vulnerable vegetation type (refer **Appendix F** for the Vegetation Assessment). However, the specialist confirmed that upon undertaking the groundtruthing exercise, it was found that the site is heavily transformed from natural and impacted by illegal dumping, human waste, overgrazing and informal housing.

In line with the National Heritage Resources Act 1999 (25 of 1999), a heritage survey was undertaken for the project (refer **Appendix F**). No heritage sites were noted during the survey as a result of much of the area being already disturbed. There are therefore no heritage impacts.

No activity or location alternatives were considered as the development involves the slums clearance on existing slums within the proposed development area. No additional activity alternatives have been identified as the area has been earmarked for housing by the Greater Kokstad Municipality. Whilst the area has existing slums, it is located on either side of Murray Road which is one of the main bus routes of the Kokstad area and is therefore also appropriately situated in terms of public transport.

A preliminary layout was prepared for the project in September 2011, however; this layout did not take into account the sensitive environmental features of the site. Following this, specialists were appointed to undertake their assessments as part of the EIA process and identify all environmentally sensitive areas within the proposed project area. These assessments were distributed to the project team and the layout was revised in order to avoid environmentally sensitive features. No further layout alternatives will be considered as part of the EIA process. Impact assessments have been undertaken on the revised layout.

The proposed Shayamoya Phase 3 Slums Clearance Project will have low negative impacts from a biophysical perspective as a result of the already transformed nature of the site and the layout being designed to avoid sensitive features. The negative impacts that are likely to arise from the construction

phase will be of lower significance if the recommended mitigation measures are implemented. The construction phase will also result medium positive impacts from a social perspective.

Should the project not go ahead, the lack of formal housing and basic services in the Shayamoya area is likely to remain and people would continue to informally settle and live without these basic services. Pollution will also likely continue to increase coupled with health issues that arise from living in unsanitary conditions. There is also the potential for the slums to spread into the floodplain and wetland areas. This is both dangerous in terms of flood risks to the community and will also lead to a loss of wetland habitat should the development not be implemented.

## LAYOUT OF THE EIA REPORT

The layout of the EIA Report is detailed in the table below:

Content Requirements	Applicable Section
(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae (CV);	Section 4
(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including- (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 5
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 5.2 Section 6
(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Section 7.1
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Section 7.2 Section 8
(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Section 10
(g) motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Section 11

<b>Content Requirements</b>	<b>Applicable Section</b>
(h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including—	Section 12
(i) details of all the development footprint alternatives considered;	Section 12
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 15
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 13 Section 14
(v) the impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 16
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Appendix G
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 17
(viii) the possible mitigation measures that could be applied and level of residual risk;	
(ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Section 12
(xi) a concluding statement indicating the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Section 12
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 16
(j) an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring;	



<b>Content Requirements</b>	<b>Applicable Section</b>
<ul style="list-style-type: none"> <li>(v) the degree to which the impact and risk can be reversed;</li> <li>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and</li> <li>(vii) the degree to which the impact and risk can be mitigated</li> </ul>	
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Section 18
(l) an environmental impact statement which contains— <ul style="list-style-type: none"> <li>(i) a summary of the key findings of the environmental impact assessment;</li> <li>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</li> <li>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</li> </ul>	Section 19
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Section 20
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Section 21
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 22
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 21
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 22
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post-construction monitoring requirements finalised;	Section 24
(s) an undertaking under oath or affirmation by the EAP in relation to— <ul style="list-style-type: none"> <li>(i) the correctness of the information provided in the report;</li> <li>(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties;</li> <li>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and</li> <li>(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;</li> </ul>	Appendix A

<b>Content Requirements</b>	<b>Applicable Section</b>
(t) where applicable, details of any financial provision for the rehabilitation, closure, and on-going post decommissioning management of negative environmental impacts;	n/a
(u) an indication of any deviation from the approved scoping report, including the plan of study, including— (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Section 25
(v) any specific information that may be required by the competent authority; and	n/a
(a) any other matters required in terms of section 24(4)(a) and (b) of the Act.	n/a
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.	n/a

# GREATER KOKSTAD MUNICIPALITY

## SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

### DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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# GREATER KOKSTAD MUNICIPALITY

## SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

### DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

#### 1. INTRODUCTION

SiVEST SA (Pty) Ltd has been appointed by Nanza Consulting on behalf of the Greater Kokstad Municipality to undertake the Environmental Impact Assessment (EIA) for the proposed Shayamoya Phase 3 Slums Clearance Project in Kokstad, in line with the National Environmental Management Act, 1998 (Act 107 of 1998).

The Shayamoya Phase 3 Slums Clearance Project has been proposed by the Greater Kokstad municipality in order to assist the growing demand of housing in Kokstad. The proposed project area is situated approximately 2km north east of Kokstad centre and comprises of six (6) sites within the existing township. Approximately 1420 units are proposed which will comprise of residential units, planned unit developments (PUD), open space, a religious centre and a clinic.

The project falls under the definition of an activity which must follow an Environmental Impact Assessment Process as described in Part 3 of Chapter 4 of the Environmental Impact Assessment Regulations, 2014 (as amended on 7th April 2017).

#### 2. PROJECT TITLE

Shayamoya Phase 3 Slums Clearance Project.

#### 3. DETAILS OF APPLICANT

##### 3.1 Name and contact details of the Applicant

Name and contact details of Applicant:

**Table 1: Name and contact details of the applicant**

<b>Business Name of Applicant</b>	Greater Kokstad Municipality
<b>Physical Address</b>	75 Hope Street, Kokstad
<b>Postal Address</b>	PO Box 8, Kokstad
<b>Postal Code</b>	4700



Telephone	039 797 6600
Fax	039 727 3676
Email	<a href="mailto:Samora.Madikizela@kokstad.gov.za">Samora.Madikizela@kokstad.gov.za</a>

#### 4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

##### 4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultants who prepared this report:

**Table 2: Name and contact details of the Environmental Consultant who prepared the report**

Business Name of EAP	SIVEST SA (PTY) Ltd
Physical Address	4 Pencarrow Crescent, La Lucia Ridge Office Estate
Postal Address	PO Box 1899, Umhlanga Rocks
Postal Code	4320
Telephone	031 581 1500
Fax	031 566 2371
Email	<a href="mailto:luvanyan@sivest.co.za">luvanyan@sivest.co.za</a>

##### 4.2 Names and expertise of the Environmental Assessment Practitioner (EAP)

The table below provides the names of the EAP's who prepared this report:

**Table 3: Names and details of the expertise of the EAP's involved in the preparation of this report**

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette ( <i>Cert.Sci.Nat.</i> )	MEnvMgt. (Environmental Management)	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIA	19
Luvanya Naidoo ( <i>Pr.Sci.Nat.</i> )	BSc (Geography)	SACNASP Registration No. 126107 EAPASA Registration No. 2019/1404 IAIA	11

CV's of SIVEST personnel is attached in **Appendix A**. The EAP declaration is attached in **Appendix A**.

##### 4.3 Names and expertise of the specialists

The table below provides the names of the specialists involved in the project:

**Table 4: Names of specialists involved in the project**

<b>Company</b>	<b>Name of representative of the specialist</b>	<b>Specialist</b>	<b>Educational Qualifications</b>	<b>Experience (years)</b>
SIVEST SA (Pty) Ltd	Stephen Burton	Wetland Assessment	MSc Zoological Science Pr.Sci.Nat	13
SIVEST SA (Pty) Ltd	Mark Summers	Vegetation Assessment	MSC Ecological Science Pr.Sci.Nat	4
SIVEST SA (Pty) Ltd	Kavi Soni	Town Planning and SPLUMA Application	Master of Town and Regional Planning PrPIn	23
SIVEST SA (Pty) Ltd	Malusi Khumalo	Town Planning and SPLUMA Application	BTech Town and Regional Planning PrPlan	6
Umlando Consulting	Gavin Anderson	Heritage Assessment	Masters of Philosophy in Archaeological/Social Psychology: 1996, UCT	24
Gondwana Geo Solutions	Mark Richter	Geotechnical Impact Assessment	BSC Hons (Eng Geology)	39
Kantey & Templar	Andrew Mckay	Engineering Services Report	BSc Civil Engineering	30

## 5. LOCATION OF THE ACTIVITY

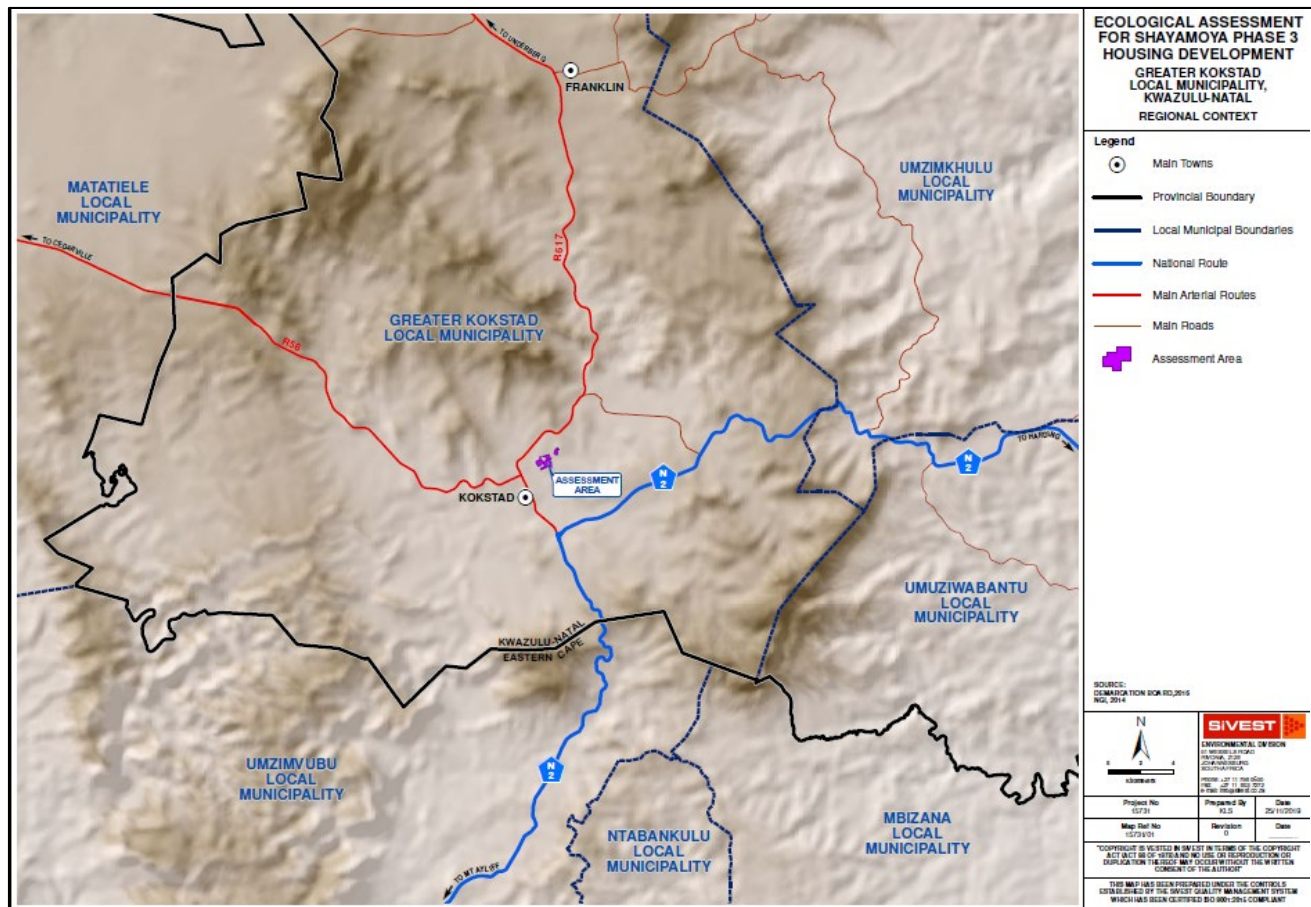
### 5.1 21 Digit Surveyor General Code of the site

- Erf 6319 Kokstad-ES (i.e. Site 1 in terms of the proposed layout) under **SG No. 844/2000**
- Remainder of Erf 1 Kokstad-ES (i.e. which consists of Sites 2, 3, 4, 5 and 6 in terms of the proposed layout) under **SG No. 3268/1932**.

### 5.2 Coordinates of the site

The coordinates for the sites are as follows:

- Latitude: 30°32'9.7" S,
- Longitude: 29°26'13.56" E



**Figure 1: Site locality**

## **6. SITE DEVELOPMENT PLAN**

The Site Development Plan is attached in **Appendix C**.

Photographs of the site are included in **Appendix D**.

## **7. ACTIVITY INFORMATION**

### **7.1 Project Description**

#### **7.1.1 Land Uses**

The proposed project aims to provide low income housing to assist in the growing demand for formal housing within Kokstad. The development is broken down into six sites, comprising of residential units, planned unit developments (PUD), open space, a religious centre and a clinic. The proposed open space

GREATER KOKSTAD MUNICIPALITY

Project No. 15731  
Description Shayamoya Phase 3 Slums Clearance Project  
Revision No. 1.0

Date: July 2021

Prepared by:



and clinic will be situated on Site 1. The Greater Kokstad Municipality has a community services department that will be responsible for upgrading and maintaining the proposed open space. The religious centre will be situated on Site 5.

A breakdown of the residential units for each site is as follows:

**Table 5: Breakdown of proposed residential units for each site and number of units**

SITE	RESIDENTIAL		PLANNED UNIT DEVELOPMENTS	
	No. of subdivisions	No. of units (single storey)	No. of subdivisions	No. of units (four units per subdivision)
1	96	96	14	56
2	67	67	31	124
3	143	143	56	224
4	55	55	0	0
5	199	199	72	288
6	0	0	42	168
<b>TOTAL</b>	<b>560</b>	<b>560</b>	<b>215</b>	<b>860</b>

Each residential site will consist of a single storey unit. Each PUD site will consist of four units (two double story).

### 7.1.2 Internal Services

The following services are proposed:

#### Roads

Bulk Access Roads and Bus Routes to the project areas are well served by Murray Road and the road linking Bhongweni and Shayamoya townships and no new bus routes are required. However, internal roads will be required for the project. The following design criteria is proposed for the internal roads:

Main Street Roads:	4.5m wide
Secondary Roads:	3.5m wide
Design Speed:	40 km/hr
Crossfall:	2.5%
Min. K Value:	4
Min V L length:	20 m
Main Road Reserve:	15 m & 12 m
Secondary Road Reserve:	10 m
Cut and fill slopes:	1:1,5
Longitudinal gradient:	Close to natural ground Maximum 10%

#### Stormwater

The stormwater management strategy will be to manage and collect all surface runoff in a properly designed stormwater system that will discharge into the natural drainage systems on the site. Stormwater from the residential developed areas will be collected in the internal road system and surface channels that will be designed accordingly. The objective of a storm water management plan should be to manage the storm water resources of the collective watersheds to:

- Prevent flood damage
- Preserve the natural and beneficial functions of the natural drainage system
- Preserve and enhance storm water quality

Local on-site detention, grass-lined swales, storm water infiltration systems undulations, landscaping etc. can all be utilized, individually or in combination to attenuate peak flood discharges to the required peak discharge rate and to improve storm water quality. The proposed storm water management strategy will be to manage and collect storm water and surface runoff, from the residential properties before discharging the water in an efficient, safe and environmentally acceptable manner into the onsite natural drainage systems. The following standards are proposed for the installation of the internal stormwater infrastructure for the project:

Flood recurrence interval:	5 years and at critical points 10 years
Pipe Material:	Concrete
Pipe class:	100D in road reserve, 75D others
Pipe diameters:	min. 375mm diam.
Bedding:	Class C
Inlets:	Manhole
Junctions:	Points of deflections on pipelines

## **Water**

The area is served by adequate potable water infrastructure including pipes and storage reservoirs. The District Municipality is aware of the project and will be responsible for providing the bulk water ties.

The design for the internal water supply criteria will be based on the “Guidelines for Human Settlement Planning and Designs”, as published by the CSIR and will also refer to the local municipality’s guidelines and standards for the design standards for a development of this nature; This is summarised below.

**Table 6: Design standards for water supply**

NO	PARAMETER	ELEMENT	GUIDELINE
1	Design consumptions	Residential Schools Community Halls/Restaurants Bus Station	600 l/d/unit 20 l/pupil/day 90 l/person/day 15 l/user/day
2	Pressure	Maximum (Static) Minimum : Reticulation Mains : Trunk Mains	9.0 bar 1.0 bar 2.5 bar

3	Flow Velocity	$\varnothing \leq 150\text{mm}$ $\varnothing \geq 200\text{mm}$	1,0m/s - 3,5m/s 1,5m/s - 2,5m/s
4.	Fire Flow	Hydrant Spacing : Residential Hydrant Spacing : Industrial Flow : Residential Flow : Commercial, Industrial	240m max. 180m max. 15 l/s @ 0,7 bar 100 l/s @ 1,5 bar
5	Peak Factor	Design peak	4 to 6.5 x AADD (Table 4.12C)
6	Pipe Location	All areas	1m from boundary in 10m roadreserved 1.5m from boundary in 13m roadreserve 2m from boundary in 16 – 25m road reserves
7	Pipe Materials	75mm diam. and smaller 110mm diam. to 315mm diam.	HDPE type IV class 12

### **Sanitation**

A water borne sewerage system is proposed with individual connections to each of the sites. The bulk demand for the project is 694.98kl/day for which the municipality will need to provide terminal manholes. The Engineering Services Report details the locality of the terminal manholes that would need to be provided for the project.

Average Dry Weather Flow:	500/erf/day
Peak Factor (PF) :	2.5
Average Dry Weather FLOW:	3.125 l/s
Infiltration:	15%
Peak Design Flow:	ADWF *2.5 X 15%= 8.90 l/s
Ultimate Design Factor:	1.5 = 13.477 l/s
Maximum velocity of flow:	2.5 m/sec
Fire risk:	Low
Minimum diameter of pipes:	160 mm
Minimum cover over pipes:	900 mm

### **7.2 NEMA Listed Activities**

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is

identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process. The project will trigger the following listed activities:

**Table 7: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project**

Listing Notice	Activity	Applicability
GNR 327, April 2017 (Listing Notice 1)	<p>Activity 12</p> <p>The development of—</p> <p>(iii) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</p> <p>(iv) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs—</p> <p>(d) within a watercourse;</p> <p>(e) in front of a development setback; or</p> <p>(f) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development</p>	<p>The layout of the development has been designed to avoid environmentally sensitive features. However, this trigger may be applicable as the proposed infrastructure may be constructed within watercourses or within 32m of watercourses.</p>

Listing Notice	Activity	Applicability
	and where indigenous vegetation will not be cleared.	
GNR 327, April 2017 (Listing Notice 1)	<p>Activity 19</p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	The layout of the development has been designed to avoid environmentally sensitive features. However, this trigger may be applicable as the proposed infrastructure may be constructed within watercourses.
GNR 325, April 2017 (Listing Notice 2)	<p>Activity 15</p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	This trigger is applicable as the site is 44ha in extent and more than 20ha of indigenous vegetation may need to be cleared.
GNR 324, April 2017 (Listing Notice 3)	<p>Activity 4</p> <p>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>d. KwaZulu-Natal</p> <p>i. In an estuarine functional zone;</p> <p>ii. Trans-frontier protected areas managed under international conventions;</p> <p>iii. Community Conservation Areas;</p> <p>iv. Biodiversity Stewardship Programme Biodiversity Agreement areas;</p> <p>v. World Heritage Sites;</p> <p>vi. A protected area identified in terms of NEMPAA;</p>	Internal roads will be constructed within the site boundary which falls within 4km of the Mount Currie Nature Reserve.



Listing Notice	Activity	Applicability
	<ul style="list-style-type: none"> <li>vii. Sites or areas identified in terms of an international convention;</li> <li>viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>ix. Core areas in biosphere reserves;</li> <li>x. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</li> <li>xi. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>xii. Outside urban areas: <ul style="list-style-type: none"> <li>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or</li> <li>(bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>xiii. Inside urban areas: <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined; or</li> <li>(cc) Within urban protected areas.</li> </ul> </li> </ul>	
<p>GNR 324, April 2017 (Listing Notice 3)</p>	<p>Activity 12</p> <p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <ul style="list-style-type: none"> <li>a. KwaZulu-Natal <ul style="list-style-type: none"> <li>i. Trans-frontier protected areas managed under international conventions;</li> <li>ii. Community Conservation Areas;</li> <li>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</li> <li>iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified</li> </ul> </li> </ul>	<p>A small portion of Site 3 falls within a Critical Biodiversity Area. More than 300 square metres of vegetation will be cleared on this site.</p>

Listing Notice	Activity	Applicability
	<p>as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>vi. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p> <p>vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;</p> <p>viii. A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>ix. World Heritage Sites;</p> <p>x. Sites or areas identified in terms of an international convention;</p> <p>xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</p> <p>xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or</p> <p>xiii. In an estuarine functional zone.</p>	
<p>GNR 324, April 2017 (Listing Notice 3)</p>	<p>Activity 14</p> <p>The development of—</p> <p>(iii) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(iv) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that</p>	<p>The site falls within 4km of the Mount Currie Nature Reserve.</p> <p>The layout has been designed to avoid all wetlands and watercourses. However, internal services may cross watercourses.</p>

Listing Notice	Activity	Applicability
	<p>will not increase the development footprint of the port or harbour.</p> <p>b. KwaZulu-Natal</p> <ul style="list-style-type: none"> <li>xii. In an estuarine functional zone;</li> <li>xiii. Community Conservation Areas;</li> <li>xiv. Biodiversity Stewardship Programme Biodiversity Agreement areas;</li> <li>xv. A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>xvi. World Heritage Sites;</li> <li>xvii. Sites or areas identified in terms of an international convention;</li> <li>xviii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>xix. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>xx. Core areas in biosphere reserves;</li> <li>xxi. Outside urban areas: <ul style="list-style-type: none"> <li>(cc) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</li> <li>(dd) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>xxii. Inside urban areas: <ul style="list-style-type: none"> <li>(cc) Areas zoned for use as public open space;</li> <li>(dd) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent</li> </ul> </li> </ul>	

Listing Notice	Activity	Applicability
	<p style="text-align: center;">authority, zoned for a conservation purpose; or</p> <p>Areas seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined.</p>	

## 8. POLICY AND LEGISLATIVE CONTEXT

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

### 8.1 The Constitution

The Constitution of the Republic of South Africa, Act 108 of 1996 sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the Constitution, National Environmental Management Act 107 of 1998 and the Environment Conservation Act 73 of 1989.

The Constitution has enhanced the status of the environment by virtue of the fact that an environmental right has been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) (e) to (g)).

Section 24 of the Constitution states that:

“Everyone has the right –

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
  - Prevent pollution and ecological degradation;
  - Promote conservation and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

## 8.2 National Environmental Management Act (107 of 1998)

The National Environmental Management Act (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date. This Act replaces parts of the Environment Conservation Act (Act No 73 of 1989) with exception of certain parts pertaining to Integrated Environmental Management.

The act intends to provide for:

- a) co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- b) institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- c) to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- d) to provide for matters connected therewith.

NEMA is the overarching legislation which governs the EIA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an environmental authorisation. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), “development must be socially, environmentally and economically sustainable”, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The proposed construction of the Shayamoya Phase 3 Slums Clearance Project requires environmental authorisation in terms of NEMA and the Environmental Impact Assessment (EIA) Process is being undertaken in accordance the EIA Regulations 2014 (as amended in 2017) that consist of the following:

- Listing Notice 1 - GN No. 327 (7 April 2017);
- Listing Notice 2 – GN No. 325 (7 April 2017);
- Listing Notice 3 – GN No. 324 (7 April 2017);
- EIA procedure - GN No. 326 (7 April 2017).

The project triggers activities under Listing Notice 1, 2 and 3 and thus needs to be subjected to an Environmental Impact Assessment Process. The listed activities are explained in Section 7 above.

## 8.3 National Water Act (Act 36 of 1998)

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20th of August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

It is important to note that water resources are protected under the Act. Under the act, water resources as defined include a watercourse, surface water, estuary or aquifer. A watercourse is defined as a river or spring, a natural channel in which water flows regularly or intermittently, or a wetland, lake or dam into which, or from which water flows.

One (1) of the main aims of the Act is the protection of water resources. 'Protection' in relation to a water resource entails:

- Maintenance of the quality of the water resource to the extent that the water use may be used in a sustainable way;
- Prevention of degradation of the water resource; and
- The rehabilitation of the water resource.

In the context of the proposed development and any potential impact on water resources, the definition of pollution and pollution prevention contained within the Act is relevant. 'Pollution', as described by the Act is the direct or indirect alteration of the physical, chemical or biological properties of a water resource, so as to make it (inter alia):

- less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- harmful or potentially harmful to the welfare or human beings, to any aquatic or non-aquatic organisms, or to the resource quality.

This definition of pollution is quite wide ranging, and it applies to all types of water resource. Activities which cause alteration of the biological properties of a watercourse (i.e. the fauna and flora contained within that watercourse are also considered pollution).

In terms of section 19 of the Act owners / managers / people occupying land on which any activity or process undertaken which causes, or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. These measures may include (inter alia):

- measures to cease, modify, or control any act or process causing the pollution;
- comply with any prescribed waste standard or management practice;
- contain or prevent the movement of pollutants;
- remedy the effects of the pollution; and
- remedy the effects of any disturbance to the bed and banks of a watercourse.

In terms of the Shayamoya Phase 3 Slums Clearance Project, the Department of Water and Sanitation will be consulted with to discuss the project as a whole and the requirements going forward. A Wetland Delineation, Functional Assessment and Risk Assessment was undertaken to identify the impacts of the project on the water resources within the project area. Seven (7) HGM units were identified within the project boundary. These were grouped into the following:

- Channelled Valley Bottom (HGM Unit 1 and 2)
- Unchannelled Valley Bottom (HGM Unit 2, 3, 4, 5 and 7);

The specialist has assessed the impacts associated with the proposed development and provided recommendations for mitigation. Due to the development falling within a 500m radius of watercourses, the Department of Water and Sanitation will be consulted with regarding the water use licence requirements for the project. The report is attached in **Appendix F**.

#### **8.4 The National Heritage Resources Act 1999 (25 of 1999)**

The National Heritage Resources Act promotes good management of the heritage resources of South Africa which are deemed to have cultural significance and to enable and encourage communities to ensure that these resources are maintained for future generations.

The aim of the Act is to introduce an integrated, three-tier system for the identification, assessment and management of national heritage resources (operating at a national, provincial and local level). This legislation makes provision for a grading system for the evaluation of heritage resources on three levels which broadly coincide with their national, provincial and local significance.

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

- (a) \_ the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) \_ the construction of a bridge or similar structure exceeding 50 m in length;
- (c) \_ any development or other activity which will change the character of a site—
  - (i) \_ exceeding 5 000 m<sup>2</sup> in extent; or
  - (ii) \_ involving three or more existing erven or subdivisions thereof; or
  - (iii) \_ involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - (iv) \_ the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) \_ the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- (e) \_ any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

Under the legislation the South African Heritage Resources Agency (SAHRA), was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, established in each province, will protect Grade II heritage resources which are significance within the context of a province or region. Buildings and sites of local interest (Grade III sites) is the responsibility of local authorities as part of their planning functions.

There is extensive national legislation covering heritage and archaeological sites. Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that, as described above, an assessment of potential

heritage resources in the development area needs to be done. A Heritage Impact Assessment has therefore been commissioned to explore how the proposed development may impact on heritage resources as protected by the Act.

## **8.5 National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended)**

The overarching aim of the National Environmental Management: Protected Areas Act (NEMPAA) No. 57 of 2003, within the framework of NEMA, is to provide for:

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The site falls within 4km of the Mount Currie Nature Reserve.

## **8.6 National Development Plan 2030**

The National Development Plan aims to eliminate poverty and reduce inequality by 2030. Included as one of the direct and immediate measures to combat poverty is the promotion of mixed housing strategies and more compact urban development to help people access public spaces and facilities, state agencies and work and business opportunities. Chapter 8 of the National Development Plan outlines the strategy for transforming human settlements. The housing issue is complex with tension between the need to address housing backlogs quickly and affordably, and the need to provide housing to create well-functioning, high quality human settlements that will offer greater opportunities for income generation and human development.

An approach to human settlement has been envisioned, in which the state properly fulfils its obligation to providing high-quality public infrastructure and environments, while also supporting and facilitating low-income households in acquiring shelter. Part of the challenge of providing housing is closely related to the need to provide access to basic services, and this therefore goes hand in hand with addressing the housing backlog.

The Shayamoya Phase 3 Slums Clearance Project proposes to address some of these issues with the provision of housing and services to these houses.



## 9. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

### 9.1 Human Settlements Annual Performance Plan 2019/2020

South Africa has experienced rapid urbanization and by 2030 it is estimated that 70% of the population will be urbanized with an estimated 7.8 million people living in cities. The country's urbanization is characterized by an "urbanization of poverty" which has resulted in the following:

- Fragmented urban forms with unequal access to job opportunities, amenities and public services,
- Mushrooming of informal settlements and their locations in precarious conditions,
- Illegal occupation of land/properties both private and government owned,
- Illegal occupations of run down or abandoned buildings,
- Construction of illegal buildings;
- Increase in housing backlog.

According to the Annual Performance Plan (2019/2020) prepared by the Department of Human Settlements, KwaZulu-Natal has the second highest housing backlog in South Africa. People seek improved livelihoods and economic opportunities and as a result, tend to settle in informal settlements around major cities and towns. Based on this, the management of informal settlements in KwaZulu Natal remains a priority.

### 9.2 Greater Kokstad Municipality Integrated Development Plan, 2017/2018

Reference is made to the Greater Kokstad Municipality Integrated Development Plan (IDP) 2017/2018 – 2021/2022.

The IDP serves as a tool for transforming local governments towards facilitation and management of development. One of the goals listed in the IDP is to promote access to equitable, appropriate and sustainable level of household infrastructure and community services and facilitate access to housing. Also on the agenda is the reduction in the backlog of housing provision within the municipality.

The IDP has noted that the Shayamoya Township is characterised by monotony, and lacks legibility, partly through the layout design that is predicated on engineering efficiency and lowest cost. Most sites have pedestrian access, or in some instances roads that have only been half surfaced, no storm water control system in place and the current sewer system is old and under huge pressure as over spills are day to day experiences. The character of Shayamoya is largely determined by a mass housing approach to delivery, also evidenced by the mono-functional land use. The Shayamoya Phase 3 Slums Clearance project is likely to address some of these issues with the provision of housing and basic services.

The Greater Kokstad Municipality Housing Sector Plan (2020-2021) indicates that the municipality faces a low and middle-income housing crisis. It broadly describes the housing demand as follows:

- Need for low-income (fully subsidized) houses at 1000.
- Informal settlements need to be relocated or upgraded.

- Highly constrained, demand-driven private housing market with inflated house prices, in all market segments.
- Demand for housing is across the board, ranging from single-person rented accommodation, through basic fully-subsidized housing units, to middle and upper-income bonded accommodation.

The provision of housing for residents is a priority in the municipality however this is met with many constraints. The key issues related to housing include:

- High prices of privately-owned land a lack of land to build houses;
- Private shack settlements as an income-generating activity;
- Urbanisation results in growing number of informal settlements;
- Speculation in up-market housing, especially in areas outside any Strategic development framework: This results in adhoc development and cost inefficiencies;
- The lack of funding and the non-alignment of municipal and government department budgeting processes;
- The lack of bulk services for housing developments

As a result of the constraints stated above, huge housing provision backlogs have been experienced by the municipality. The Shayamoya Phase 3 Slums Clearance Project is an initiative to work towards decreasing that backlog.

### 9.3 Greater Kokstad Municipality Spatial Development Framework (2021-2022)

Reference is made to the Greater Kokstad Municipality's Spatial Development Framework (SDF) 2021 - 2022 (Final report June 2020). The SDF is an integral component of the Integrated Development Plan (IDP) and a key spatial transformation tool which guides how the implementation of the IDP should occur spatially. The SDF is also aligned with provincial and municipal sector plans and strategies as a way of ensuring that the desired spatial form and outcomes of the Municipality are achieved.

The agenda of the SDF is built around a series of Sustainable Development Goals (SDGs) which aims to "make cities and human settlements inclusive, safe, resilient and sustainable". Included in the SDGs are the following:

- No poverty;
- No hunger;
- Good health;
- Clean water and sanitation;
- Good jobs and economic growth;
- Innovation and infrastructure.

The provision of housing within the context of the Greater Kokstad Municipality is an important issue and has been addressed in development guiding documents such as the SDF.

The SDF strives to respond to all the goals and targets within its mandate but of particular importance, amongst others, is to ensure access for all to adequate, safe and affordable housing and basic services and upgrade of slums by 2030.

As per the SDF, urgent attention must be given to addressing the housing backlog and a key spatial challenge is to identify residential opportunities on land that is well located, serviced and with good access to public transport as well as social and economic opportunities. The National Development Plan requires that all municipalities in South Africa prioritise development in rural areas. The provision of housing and basic services is a critical element in the national developmental agenda. Housing, water, electricity, sanitation and social amenities are key and critical services which have been identified by communities that are required to meet their basic needs. Limited funding and exponential growth in the municipality has increased the levels of backlogs.

People living in informal settlements are the most vulnerable communities in the city and climate change is expected to impact these communities the most, especially with regards to increased flood risk. This requires that urgent attention be given to addressing the housing backlog and a key spatial challenge is to identify residential opportunities on land that is well located, serviced and with good access to public transport as well as social and economic opportunities.

The Shayamoya area has been identified in the SDF as one of the areas that require attention in terms of housing backlogs. The Shayamoya Phase 3 Slums Clearance Project has been identified in the SDF as one of the housing initiatives and aims to relieve some of the housing backlog.

## 10. NEED AND DESIRABILITY

The need and desirability for the proposed Shayamoya Phase 3 Slums Clearance Project is evident in the IDP and SDF of the Greater Kokstad Municipality, as it has identified the project area as an area in need of housing developments. The implementation of the housing development will assist in reducing the establishment of informal settlements. The proposed development will also include the construction of water networks, proper sanitation infrastructure, electricity and provision of road infrastructure through the provision of the slums clearance. By providing water and sanitation services to the proposed development, it will indirectly assist in reducing surface water and groundwater pollution. This will be as a result of households using piped water in their daily activities instead of water from the nearby rivers and utilising proper sanitation methods.

According to the Annual Performance Plan (2019/2020) prepared by the Department of Human Settlements, KwaZulu-Natal has the second highest housing backlog in South Africa. People seek improved livelihoods and economic opportunities and as a result, tend to settle in informal settlements around major cities and towns. Based on this, the management of informal settlements in KwaZulu Natal remains a priority.

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- Informal settlements need to be relocated or upgraded.
- Highly constrained, demand-driven private housing market with inflated house prices, in all market segments.
- Demand for housing is across the board, ranging from single-person rented accommodation, through basic fully-subsidized housing units, to middle and upper-income bonded accommodation.

The provision of housing for residents is a priority in the municipality however this is met with many constraints. The key issues related to housing include:

- High prices of privately-owned land a lack of land to build houses;
- Private shack settlements as an income-generating activity;
- Urbanisation results in growing number of informal settlements;
- Speculation in up-market housing, especially in areas outside any Strategic development framework: This results in adhoc development and cost inefficiencies;
- The lack of funding and the non-alignment of municipal and government department budgeting processes;
- The lack of bulk services for housing developments

As a result of the constraints stated above, huge housing provision backlogs have been experienced by the municipality. The Shayamoya Phase 3 Slums Clearance Project is an initiative to work towards decreasing that backlog.

In addition to the above, a clinic, a religious centre and open space is also proposed. According to the SDF, the Kokstad area has a severe backlog of clinics and therefore there is a need for the construction of well-equipped clinics in the area. There are currently only three clinics in the area, however according to the CSIR guideline requirements, fifteen facilities are required. The construction of the clinic as part of the Shayamoya Phase 3 Slums Clearance project will assist in reducing the number of clinics required.

## 11. MOTIVATION FOR THE PROPOSED SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

The Shayamoya area currently consists of a few vacant land parcels which have been earmarked by the Greater Kokstad Municipality for the provision of housing. These land parcels however have a growing number of slums and informal settlements. Should no development take place on the site in question, it is likely that, over time, the vacant sites will be taken over by informal housing in line with the current trends experienced in the area. The increase in slums and informal settlements can be seen in the historical google earth imagery below from April 2017 to 2021:



**Figure 2: Aerial Image April 2017 (Source: Google Earth)**



**Figure 3: Aerial Image June 2019 (Source: Google Earth)**



**Figure 4: Aerial Image 2021 (Source: Google Earth)**

A study undertaken by Govender et al. (2011) entitled “The Impact of Densification by Means of Informal Shacks in the Backyards of Low-Cost Houses on the Environment and Service Delivery in Cape Town, South Africa” investigated the strain imposed on municipal services by informal densification of unofficial backyard shacks. A consequence of the housing backlog in South Africa is that many people live in informal dwellings. The study conducted by Govender *et al.* (2011) in which 1080 people were surveyed in 4 subsidized low cost housing communities in Cape Town explored the reality that informal dwellings were eventually constructed next to more formal but low-cost dwellings and then exploited by the residents living in the units. Illegal electrical connections were established which posed increased fire risks. A high proportion of the main home owners did not pay for water but sold water to the backyard dwellers. It was also identified that municipal water and sewerage systems and solid waste disposal cannot cope with the increased population density and poor sanitation behaviour of the inhabitants of the informal settlements. There is the potential for the same scenario for the Shayamoya area. The Greater Kokstad Municipality has recognized the need for formal housing in this area, and have planned for it accordingly which can be seen in their SDF (2021-2022) and IDP (2017-2018).

Based on the specialist studies undertaken, most of the areas on which the development is proposed, has either already been disturbed due to the increase in slums or isn't environmentally sensitive. The layout has also been designed so that there are no fatal flaws from an environmental perspective and that environmental sensitivities are avoided. In addition, the clearance of the slums and provision of housing will have high socio-economic value and will improve the quality of life that is currently led by the community residing in the slums. The community will also have access to basic services.

It is for the reasons above that formal housing is required in the Kokstad area, and that the site proposed is considered suitable. As such, the Shayamoya Phase 3 Slums Clearance project should proceed.

## **12. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION**

### **12.1 Details of alternatives**

#### **12.1.1 Introduction**

The EIA Regulations, 2010 guideline document stipulates that the environmental investigation needs to consider feasible alternatives for the proposed development. The developer should be encouraged to consider alternatives that would meet the objective of the original proposal and which could have an acceptable impact on the environment. The role of alternatives in the EIA process is therefore to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and/or through reducing or avoiding potentially significant negative impacts.

#### **12.1.2 Activity alternatives**

Activity alternatives refer to the consideration of alternatives requiring a change in the nature of the proposed activity to be undertaken. No additional activity alternatives have been identified as the area has been earmarked for housing by the Greater Kokstad Municipality.

The IDP of the Greater Kokstad Municipality identifies the Shayamoya area as an area that requires improved economic and social infrastructure, which is in line with the proposed project. The proposed development is also aligned with the Greater Kokstad Municipality SDF.

#### **12.1.3 Location/Site alternatives**

No location alternatives were considered as the development involves the slums clearance on existing slums within the proposed development area. Whilst the area has existing slums, it is located on either side of Murray Road which is one of the main bus routes of the Kokstad area and is therefore also appropriately situated in terms of public transport.

#### **12.1.4 Layout alternatives**

A preliminary layout was prepared for the project in September 2011, however; this layout did not take into account the sensitive environmental features of the site. Following this, specialists were appointed to undertake their assessments as part of the EIA process and identify all environmentally sensitive areas within the proposed project area. These assessments were distributed to the project team and the layout was revised in order to avoid environmentally sensitive features. No further layout alternatives will be considered as part of the EIA process. Impact assessments will be undertaken on the revised layout.

#### **12.1.5 No – go option**

The “no-go” alternative should in all instances be considered as part of the EIA process. It assumes that the activity does not proceed, implying a continuation of the current status quo. The no-go option is, however, not a feasible option in terms of this development and would go against the constitution of South Africa and infringe upon the basic human rights of access to adequate housing. Residents in this area are

living in very poor conditions, some without access to running water and electricity, and simply cannot afford for the interventions proposed as part of this development to not be approved.

Should the project not go ahead, the lack of basic services in the Shayamoya area is likely to remain and people would continue to live without these basic services. Pollution will also likely continue to increase coupled with health issues that arise from living in unsanitary conditions.

There is also the potential for the slums to spread into the floodplain and wetland areas. This is both dangerous in terms of flood risks to the community and will also lead to a loss of wetland habitat should the development not be implemented.

## 12.2 Details of Public Participation Process undertaken

The Public Participation Process is being undertaken in line with Chapter 6 of the EIA Regulations 2014 (as amended 2017).

### 12.2.1 Notification of Interested and Affected Parties (I&AP's)

The following process has been followed during the scoping phase to notify potential I&APs of the proposed development:

- Fixing a notice board/placement of site notices at intervals around the site (18<sup>th</sup> March 2021).
- Giving written notice as follows:
  - Distribution of Background information documents to the surrounding community by hand delivery (with an opportunity to provide comment should they wish to do so) (18<sup>th</sup> March 2021).
  - Distribution of Background information documents to Identified stakeholders by Email (17<sup>th</sup> March 2021).
- Placement of adverts in local and national newspapers (The Mercury – 18<sup>th</sup> March 2021, The Kokstad Advertiser – 18<sup>th</sup> March 2021);
- No public meetings were undertaken due to CoVID-19 Regulations.

Copies of the report were delivered to key stakeholders on the 17th March 2021. Copies were left at the Bhongweni Library and the Greater Kokstad Municipality for I&AP's to review.

The following process will be followed to notify potential I&APs of the availability of the draft EIA report for comment:

- Key stakeholders will be notified via email and will be sent a copy of the report (hard/soft copy).
- Any additional I&APs that register will be notified of the availability of the report for comment and sent a copy if requested.
- A copy of the report will be left at the Greater Kokstad Municipality and the Bhongweni Library.
- No public meetings are proposed due to CoVID-19 Regulations. Virtual meetings if required will be conducted using an appropriate platform agreeable to all parties (such as Zoom, Skype or Microsoft Teams).



## 12.2.2 Summary of Issues raised during the public participation process

The following issues were raised during the scoping phase:

Organization	Contact Person	Contact details	Issue raised	Response
Department: Environment, Forestry and Fisheries	Karen Govender	<a href="mailto:karenm@daff.gov.za">karenm@daff.gov.za</a>	The Department of Environment, Forestry and Fisheries appreciates the opportunity given to register as an interested and affected party for the Draft Basic Assessment Report for the abovementioned project. DEFF through the sub-directorate Forestry Regulations and Support is the authority mandated to implement the National Forests Act No. 84 of 1998 by regulating the use of natural forests and protected trees species in terms of the said Act.	Noted
			With reference to the abovementioned document, DEFF (KwaZulu-Natal Forestry Management) concerns pertain to the indigenous vegetation on site i.e. if there are any natural forests or protected trees that occur within the proposed project footprint and will be affected by any of the project phases (i.e. construction, operational and decommissioning etc.) in terms of sections 7 and/or 15 of the National Forests Act No. 84 of 1998 as amended.	Noted
			After review of the report, it has been noted that the natural vegetation within all six sites have transformed due to anthropogenic activities such as farming, housing and cultivation activities. Alien invasive trees species such as <i>Eucalyptus saligna</i> , grass species and succulent shrubs have been the dominant vegetation types that have been identified within these sites. In addition, no natural forests or protected tree will have been identified within the development footprint. Therefore, the Department's (KZN Forestry Management: Forestry Regulations and Support) mandate has not been affected by the activity.	Noted
			Should any further information be required, please do not hesitate to contact this office.	Noted
			This letter does not exempt you from considering other legislations.	Noted

Ezemvelo KZN Wildlife have confirmed in a letter dated 20 April 2021 that they will not be providing comment on this application.

The above table will be updated once the comments have been received on the Draft EIA Report.

## **13. DESCRIPTION OF THE PHYSICAL ENVIRONMENT**

### **13.1 Geographical**

The Shayamoya Phase 3 Slums Clearance project is located in the Shayamoya area in the Greater Kokstad Municipality. The main access is from Murray Road which dissects the site.

### **13.2 Topography**

The general topography of the site varies from east to west. Elevated ground is encountered to the south and southwest and associated with generally shallow bedrock and outcropping dolerite and mudstone ridges and ledges. High ground is also encountered to the extreme northeast. In general, however, the ground slopes towards the Mzintlava River which flows along the southern (Site 1) and eastern boundary (Sites 2, 3 & 4) of the general Shayamoya Township area. Several subordinate drainage lines flow from the west and northwest to join with the main river.

### **13.3 Climate**

The Kokstad area normally receives about 747mm of rain per year, with most rainfall occurring mainly during summer. The area receives the lowest rainfall (12mm) in June and the highest (122mm) in January. The average midday temperatures for the area range from 9.3°C in June to 19.4°C in January.

### **13.4 Geology and Soils**

A Geotechnical investigation has been undertaken for the Shayamoya Phase 3 Slums Clearance Project area by Gondwana Geo Solutions (June 2020). According to the investigation, the site is underlain by a mantle of transported and residual soils which overlie Adelaide Formation mudstones of the Beaufort Group. These grey, yellow and greenish coloured mudstones are also commonly intruded both locally and regionally by dolerite sills and dykes of Jurassic in age. The mudstones were encountered as outcrops to the east/northeast. Mudstone cobbles and boulders can be seen over a large portion of the site next to the roads which indicate shallow residual mudstone soils as well as potential shallow mudstone rock. Dolerite outcrops and dolerite boulder clusters, are usually indicative of shallow bedrock conditions.

The fieldwork indicated that the site is general slightly to moderately steep in places. No steep or very steep areas were noted within the areas earmarked for development. Furthermore, no largescale ground movements, tension cracks, hummocky ground formations or deformed slopes which may indicate localised slope instability were noted on the walkover assessment. The areas designated for development are thus generally regarded as suitable for township development from a ground stability perspective.

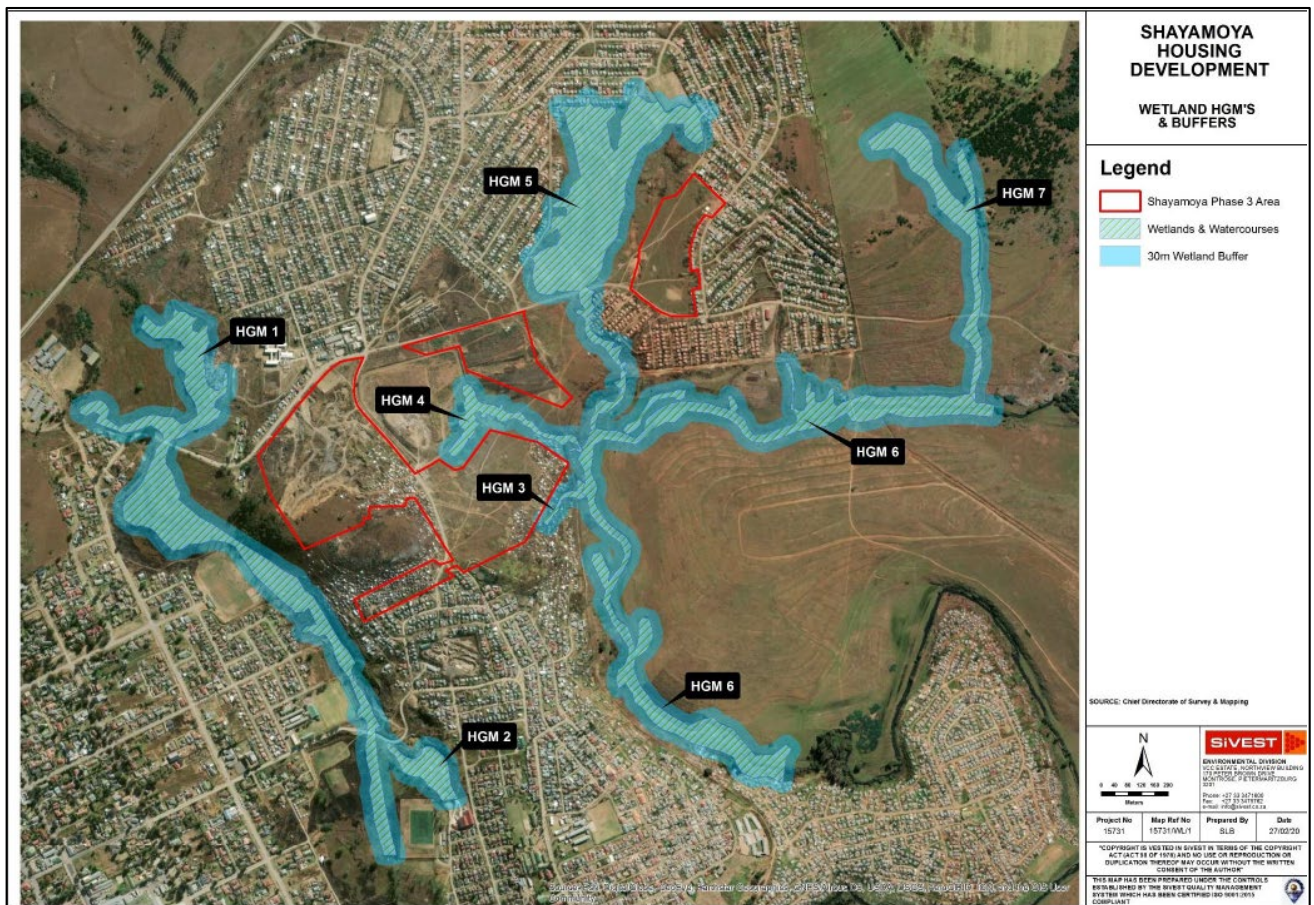
## 13.5 Drainage and Watercourses

### 13.5.1 In-field Investigation

A Wetland Assessment was undertaken by SiVEST SA (Pty) Ltd in February 2020. The report has been included in **Appendix F**. The findings from the assessment are included below.

According to the assessment undertaken by SiVEST, seven (7) HGM units were identified within the project boundary which were grouped into the following:

- Channelled Valley Bottom (HGM Unit 1 and 2)
- Unchannelled Valley Bottom (HGM Unit 2, 3, 4, 5 and 7);



**Figure 5: Wetland units identified in the wetland assessment**

The wetland systems on site are generally extensive, and historically every valley bottom within the hilly study site would have had a wetland system. In some cases, the valley bottoms have been purposefully drained through the creation of drainage ditches. However, the area also has a number of systems (Mzintlava River and tributary, HGM 6 & 1 respectively) that drain relatively large areas that would naturally have developed channels as the volumes are greater. As the area drains towards the lower valley systems

the volume of water that the wetlands can hold is exceeded, and canalised flow develops (rivers and streams). In general, the channelled valley bottom system within the project area have been impacted upon through the hardening of surface within the catchments, and through direct impacts of subsistence and commercial farming practices. Much of the riparian vegetation that would have inhabited the systems has been cleared for timber, or to make way for crop production, and thus the hydrological regime has been altered. Additionally, the planting of crops within the catchment, and the wetland itself, leads to increased erosion and sedimentation, as well as erosion of the channel. The vegetation is infested with alien invasive species, and the surrounding grassland is used for cattle grazing where crops are not produced. Livestock generally leads to increased alien invasive species infestations through the increased manure levels that generally occur where cattle drink and cross the systems.

Unchannelled valley bottom wetlands are by far the most common system within the area, and are extensive in nature. The valley bottoms are generally of a gentle gradient along their length, and thus perfect conditions exist for the creation of valley bottom wetlands. As with the channelled systems discussed above, the unchannelled valley bottom systems have been impacted upon by the clearing of the wetlands and catchments for subsistence, and commercial crop production, and through the creation of drains in order to maximise crop production. In addition, clay harvesting for brick making has had a significant impact on HGM unit 4.

The formal health assessment of the wetland units indicates that most wetland units are **Largely Modified** resulting from past and current land uses and activities. While wetland HGM unit 4 is **Seriously Modified** through changes within the catchment and the destruction of wetland soils for brick making.

**Table 8: PES results for wetlands within the project area**

Unit	MODULE			Combined Impact Score	PES Category
	Hydrology Impact Score and Class	Geomorphology Impact Score and Class	Vegetation Impact Score and Class		
1	4.2 (D)	3.1 (C)	5.8 (D)	4.34	D (Largely Modified)
2	3.8 (C)	4.6 (D)	6.1 (E)	4.69	D (Largely Modified)
3	4.7 (D)	4.4 (D)	5.7 (D)	4.90	D (Largely Modified)
4	4.8 (D)	7.8 (E)	7.1 (E)	6.31	E (Seriously Modified)
5	5.7 (D)	3.2 (C)	4.7 (D)	4.70	D (Largely Modified)
6	5.1 (D)	3.6 (C)	5.1 (D)	4.67	D (Largely Modified)
7	4.1 (D)	3.7 (C)	4.3 (D)	4.04	D (Largely Modified)

During the site visit, minimal faunal activity was noted, and the possibility of wetland faunal and avi-faunal species being present at different times of the day and season is probably limited. The confidence levels for the assessment were generally moderate. The EIS score, based on the **DWAF (1999)** scoring method,

are summarised in **Table 9**, below. The assessed units all fall into an EIS **Category C**, which corresponds to a Moderate importance and sensitivity in terms of the wetland.

**Table 9: EIS Scores**

	HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT	
	1		2		3		4		5		6		7	
	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence
<b>PRIMARY DETERMINANTS</b>														
1. Rare & Endangered Species	0	2	0	2	0	2	0	2	0	2	0	2	0	2
2. Populations of Unique Species	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3. Species/taxon Richness	2	3	2	3	2	3	2	3	2	3	2	3	2	3
4. Diversity of Habitat Types or Features	2	3	2	3	2	3	2	3	2	3	2	3	2	3
5. Migration route/breeding and feeding site for wetland species	1	3	1	3	1	3	1	3	1	3	1	3	1	3
6. Sensitivity to Changes in the Natural Hydrological Regime	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7. Sensitivity to Water Quality Changes	3	3	3	3	3	3	3	3	3	3	3	3	3	3
8. Flood Storage, Energy Dissipation & Particulate/Element Removal	1	3	1	3	1	3	1	3	1	3	1	3	1	3
<b>MODIFYING DETERMINANTS</b>														

	HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT		HGM UNIT	
	1		2		3		4		5		6		7	
	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence	Score	Confidence
PRIMARY DETERMINANTS														
9. Protected Status	0	4	0	4	0	4	0	4	0	4	0	4	0	4
10. Ecological Integrity	1	3	1	3	1	3	1	3	1	3	1	3	1	3
<b>TOTAL</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>	<b>15</b>	<b>29</b>
<b>MEDIAN</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>3</b>
<b>OVERALL ECOLOGICAL SENSITIVITY AND IMPORTANCE</b>	<b>C</b>		<b>C</b>		<b>C</b>		<b>C</b>		<b>C</b>		<b>C</b>		<b>C</b>	

An assessment of the current importance of the wetland unit in terms of ecosystem service provision indicates that wetland units provide medium to moderately-high levels of wetland functioning. The EIS score indicates that the assessed unit falls into EIS Category C, which corresponds to a Moderate importance and sensitivity. All seven wetlands on site have been impacted upon by crop production, livestock grazing, and changes to their hydrology (increased hardened surfaces) and geomorphology (clay removal for brick making) thus leading to an associated infestation by alien vegetation. Any development of this nature within 500m of a wetland requires a water use license from the Department of Water and Sanitation, and it is recommended that a meeting be sought to discuss the project with the Department of Water and Sanitation to determine any license requirements relating to the project.

## 13.6 Fauna and Flora

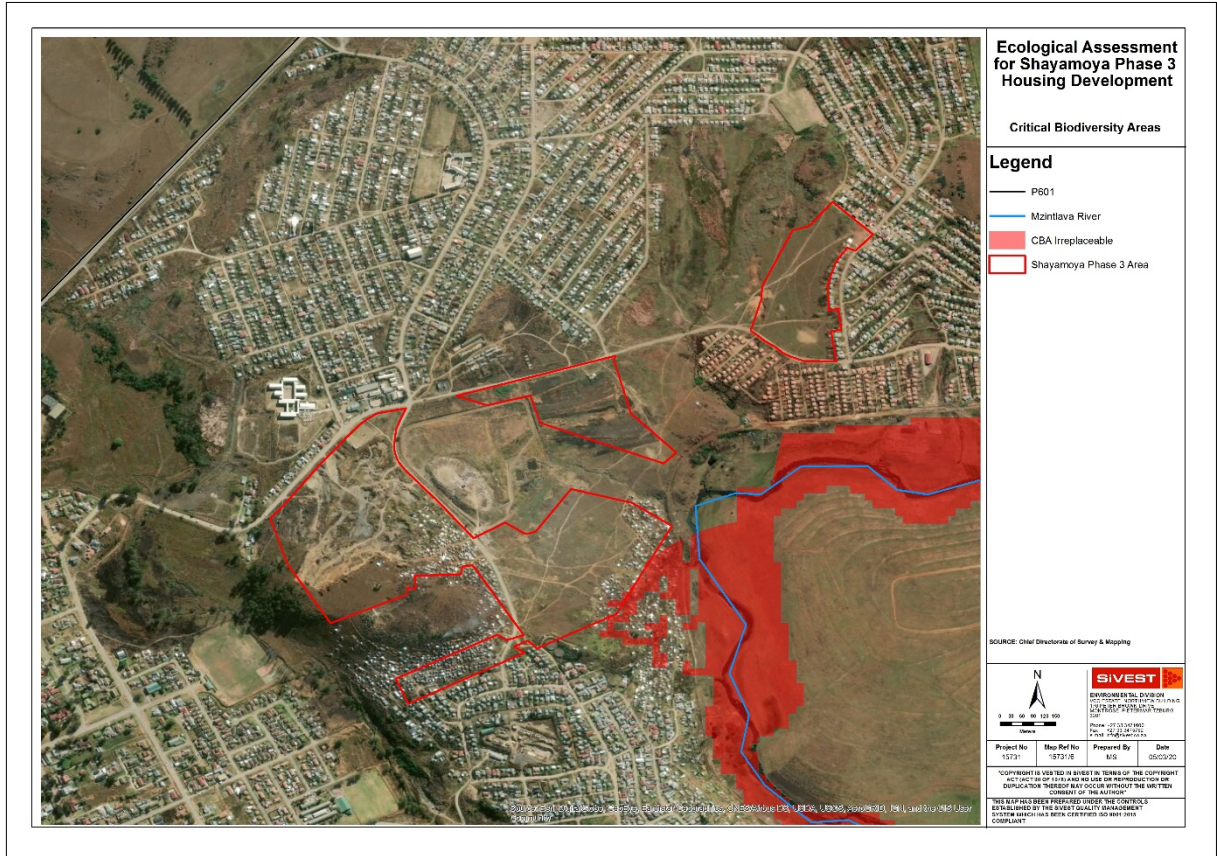
### 13.6.1 Desktop Investigation

#### C-Plan Biodiversity Features / Species within the Project Area

The desktop analysis indicated that the majority of site is classified as 0.05 (i.e. all biodiversity features recorded here are conserved to the target amount, and there is unlikely to be a biodiversity concern with the development of the site) and the Minset analysis mirrors the C-Plan data with the area being deemed as not requiring protection. However, the southern portion of site (site 3) indicates the presence of CBA Irreplaceable, with a Minset score of 1. It must be noted; this area is already transformed into informal housing. The CBA maps indicate that the area is natural and transformed land and not CBA.

In terms of the SEA and C-Plan data generated, through the physical characteristics that are present on site, a number of groups have been identified as potentially present on the site, and these groups are wholly significant in terms of conservation significance or parts thereof. There are no CBA's identified. The

wetlands to the north of the site, and the grassland sections west of the site are CBA irreplaceable. A CBA optimal area occurs on the mountainside to the east of the study area.



**Figure 6: Critical Biodiversity Areas**

Mucina and Rutherford's Vegetation and KZN Vegetation Types

The classification of vegetation on site, is made at a very coarse scale, i.e. low resolution and falls within the East Griqualand Grassland (Gs 12) which is Vulnerable. In this case the KZN Wildlife Vegetation Type is the same.

**Distribution:**

KwaZulu-Natal and Eastern Cape Provinces: Major portion of this unit covers most of the East Griqualand (with Kokstad and Matatiele as centres). Altitude 920 – 1 740m.

**Conservation:**

Vulnerable. Target 23%. Only 0.2% is statutorily conserved in the Malekgonyane (Ongeluksnek) Wildlife Reserve and Mount Currie Nature Reserve. Over one quarter of the area has already been transformed for cultivation (maize), plantations and by urban sprawl. *Acacia dealbata* and *A. mearnsii* are invading these grasslands in some places. Erosion is low (31%), very low (30%) and moderate (30%).

### Indicative Plant Species:

Graminoides: *Alloteropsis semialata* subsp. *eckloniana*, *Aristida congesta*, *A. junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Digitaria tricholaenoides*, *Elionurus muticus*, *Eragrostis chloromelas*, *E. plana*, *E. racemosa*, *Harporchloa flax*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Melinis nerviglumis*, *Microchloa caffra*, *Paspalum dilatatum*, *Sporobolus africanus*, *Themeda triandra*, *Tristachya leucothrix*, *Abildgaardia ovata*, *Andropogon appendiculatus*, *Cynodon incompletes*, *Cyperus obtusiflorus* var. *obtusiflorus*, *Digitaria ternata*, *Eragrostis capensis*, *Eulalia villosa*, *Hemarthria altissima*, *Setaria nigrirostris*, *Trachypogon spicatus*.

Herbs: *Acanthospermum austral*, *Centella asiatica*, *Conyza podocephala*, *Haplocarpha scaposa*, *Helichrysum herbaceum*, *H. nudifolium* var. *pilosellum*, *Hermannia depressa*, *Hibiscus aethiopicus* var. *ovatus*, *Ipomoea crassipes*, *Kohautia amatymbica*, *Lessertia harveyana*, *Pentanisia prunelloides* subsp. *latifolia*, *Rhynchosia effuse*, *Senecio retrorsus*, *Stachys aethiopica*, *Tolpis capensis*, *Vernonia natalensis*.

Herbaceous Climber: *Rhynchosia totta*.

Geophytic Herbs: *Cheilanthes deltoidea*, *C. hirta*, *Haemanthus humilis* subsp. *hirsutus*, *Ledebouria sandersonii*, *Rhodohypoxis baurii* var. *baurii*, *Watsonia pillansii*, *Zantedeschia albomaculata* subsp. *albomaculata*.

Low shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Chaetacanthus setiger*, *Erica caffrorum* var. *caffrorum*, *Felicia filifolia* subsp. *filifolia*, *F. muricata*, *Helichrysum dregeanum*, *Rubus rigidus*.

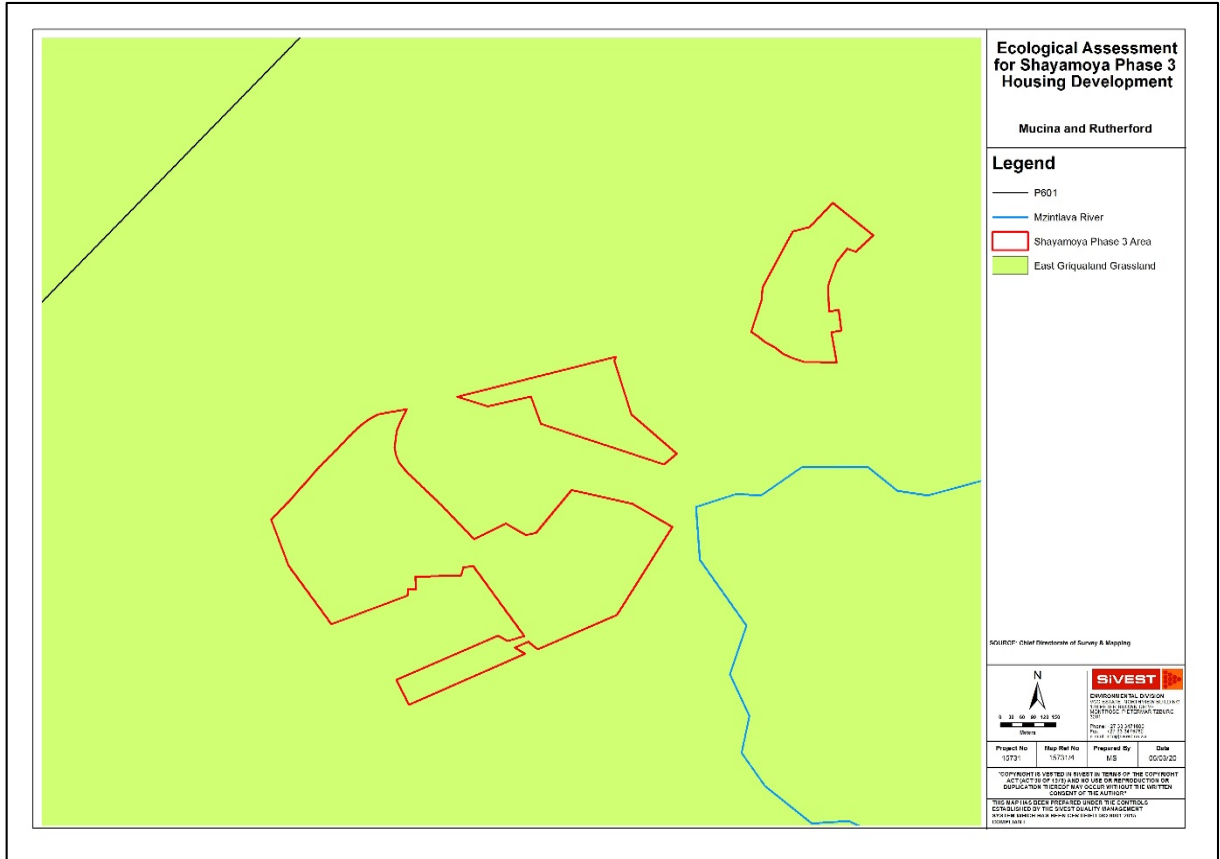
Succulent Shrub: *Euphorbia clavarioides* var. *clavarioides*.

**Biogeographically important Taxon** (Sub-Escarpment Grassland endemic) Small Tree: *Encephalartos friderici-guillielmi*.

### Endemic Taxa:

Herbs: *Alepidea duplidens*, *Berkheya griquana*, *Wahlenbergia dentate*, *W. ingrate*





**Figure 7: Mucina and Rutherford Vegetation Types**

**13.6.2 In-field investigation**

The study site is located within the Harry Gwala District Municipality, Greater Kokstad Local Municipality, on the fringe of Kokstad Town. The greater area is surrounded by croplands and livestock farming, while the study site is surrounded by informal and low cost housing on the fringe of Kokstad town. The Mount Currie Nature Reserve occurs within 4km of the study site.

The site is surrounded by formal and informal housing. Livestock from the surrounding communities has led to heavy overgrazing and low biomass with the soil layer exposed during the site assessment. The north eastern area is bisected by a wetland which runs in a southerly direction. Dumping, nappies and human waste litters large portions of site.

According to Mucina and Rutherford 2006, the site is classified as East Griqualand Grassland (Gs 12) which is a vulnerable vegetation type. Upon undertaking the groundtruthing exercise it was found that the site is transformed and overgrazed, with plant diversity being uniform across the entire site.

Site 1

Site 1 is bordered by a wetland in the west and formalised housing in the east. Numerous footpaths and a borrow pit exist in the site camp. No trees were present. The sward height on the vegetation was very low (<20cm), comprising of graminoid species such as Red grass (*Themeda triandra*), Ngongoni grass (*Aristida junciformis*), Giant Spear grass (*Trachypogon spicatus*) and Curly leaf grass (*Eragrostis chloromelas*). Forb species include Everlasting species (*Helichrysum confertifolium* and *Helichrysum pilosellum*), Gifbossie (*Gnidia caffra*) and *Rhynchosia adenodes*.

#### Site 2

Site 2 is bordered by communal farming to the south and a school to the north. The fields appear to have been ploughed in the past, while foundations of farm buildings are still in existence. Communal farming is still being practiced. The area surrounding the communal farming field consists of overgrazed veld, with a low species richness. Species present within site 2 were dominated by graminoids such as Wire grass (*Elionurus muticus*), Red grass, Ngongoni Grass and Nile grass (*Acroceras macrum* – present in the communal fields). Forb species present include Orange poppy (*Papaver aculeatum*), *Helichrysum pilosellum*, Leafy-flowered Ipomoea (*Ipomoea crassipes*) and Gifbossie.

#### Site 3

Site 3 is bordered by informal and formal housing, except for a wetland in the north. The site is traversed by footpaths and roads leading to different parts of the surrounding community. The western portion of the site is bordered by the road leading into Bhongweni and the Shayamoya Dump Site, with a north facing slope with reservoirs to the south of site. The north facing slope is the only place of the entire sample area that has plant species that differ from the remainder of the site. Rocks and stones are present on the north facing slope. It must be noted, this site has a high level of dumping and human waste around the site. Graminoid species such as Red grass, Curly leaf grass (*Eragrostis chloromelas*), Footpath love grass (*Eragrostis pseudosclerantha*), Caterpillar grass (*Harpochoa falx*), and Giant spear grass are present within the north facing slopes. Forb species comprise of *Salvia repens*, Wild Scabiosa (*Scabiosa columbaria*), *Stachys* spp. and *Berkheya* spp. A bulb species, *Ledebouria ovatifolia*, and an Aloe species, Common soap Aloe (*Aloe maculata*) was present within the north facing slope (both species protected under Natal Conservation Ordinance of 1974). Alien invasive stinging nettle (*Urtica dioica*) was also present in low densities around site 3.

#### Site 4

Site 4 was completely transformed into informal housing, very little vegetation other than shrubs within garden patches and forbs were present.

#### Site 5

Site 5 was characterised by a large borrow pit dominating approximately half of the site, with houses present within the borrow pit. The southern half of site 5 was in the process of being pegged out either by potential construction projects or by informal dwellers, however the recent establishment of corrugated iron stands suggests informal housing. Additionally, a Shembe Church was present on the southern boundary. The southern portion of site was predominantly east facing with rocky areas and few trees. It must be noted,

illegal dumping and human waste was present around site. Eucalyptus trees (*Eucalyptus saligna*) were present on the southern site boundary on the southern facing slope. Additional graminoid species occurring at Site 5 consisted of Purple finger grass (*Digitaria tricholaenoides*), Ratstail dropseed (*Sporobolus africanus*) and Broad-leaved Bluestem (*Diheteropogon amplexans*). Forb species included Dolls powderpuff (*Cyanotis speciosa*), *Tephrosia* spp., *Anthericum cooperi*, Small yellow star-flower (*Hypoxis argentea*, protected) and *Senecio polyanthemoides*. Protected *Aloe maculata* and *Ledebouria ovatifolia* were also present around rocks in the southern portion of site 5.

#### Site 6

Site 6 has been heavily disturbed through illegal dumping, borrow pits, human waste and establishment of informal housing, resulting in very little vegetation present. The extremely disturbed nature of site 6 resulted in very few species present. Graminoid species included Curly leaf grass (*E. chloromelas*) and Broad-leaved turpentine grass (*Cymbopogon caesius*), with Khaki bush present (*Tagetes minuta*).

## **14. DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT**

### **14.1 Current Land Use**

The study area is characterized by open spaces and informal settlements, with a network of various tarred and gravel roads providing access to the settlements. A landfill site also exists towards the western periphery of the site.

### **14.2 Socio economic characteristics**

According to the Greater Kokstad Municipality SDF (2020-2021), there are approximately 65 98 people residing in Kokstad. Approximately 71.3% of the population is employed with each household earning R 3 700 per month. The majority (36.4%) of residents in Greater Kokstad have some secondary level of education followed by 28.6% with grade 12 and 14.6% with primary education. Approximately 10.6% have higher level of education and/ or training. The working age population (66.7%) dominates the area followed by youth (30.6%).

### **14.3 Cultural/Historical Environment**

A Heritage Impact Assessment was undertaken by Umlando: Archaeological Surveys and Heritage Management. No heritage sites were noted during the site survey.

A desktop Palaeontological Impact Assessment was undertaken which identified that the Estcourt Formation (basal unit of the Beaufort Group) is present on site. This lithology is internationally renowned for paleontological material and it is likely that palaeontological material will be found during excavation. The sensitive layers will probably occur around 2m below surface. Therefore, any excavations deeper than 2m will require palaeontological inspection. A "Chance Find" Protocol has been incorporated into this report

and must be incorporated into the EMP. It was however noted that the site is likely to be weathered which reduces the chance of valuable paleontological material being found.

## 15. IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

The SiVEST Impact Assessment method, dated 28 July 2017 (**attached as Appendix G**) has been utilised to assess the following potential impacts identified in the assessment phase and is presented in the following sections.

The method used in this impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

The following impacts have been identified:

### 15.1 Impacts to Biophysical Systems / Components during the construction phase

#### 15.1.1 Wetland Impacts

##### ***15.1.1.1 Impacts associated with clearance and edge effects to the wetland habitat.***

During the construction phase, wetland habitat may be temporarily cleared. Clearing of habitat will mean degradation of the wetland habitat to accommodate the service infrastructure. Clearance will entail removal of indigenous vegetation resulting in loss of wetland habitat. Biota inhabiting the wetland habitat will therefore also be displaced.

Disturbance due to edge effects are also likely to take place given the proximity of the existing informal settlements as well as existing roads across the wetlands. Edge effect impacts afford opportunities for alien vegetation to colonise the wetland habitat.

<b>Environmental parameter</b>	<b>Wetland - Impacts associated with clearance and edge effects to the wetland habitat.</b>	
Extent	Site	
Probability	Probable	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Permanent	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	High	
<b>Significance Rating</b>	<b>Pre-mitigation significance rating is medium and negative. With the implementation of mitigation measures, the impact can be minimized to low.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	2	1
Irreplaceable loss	3	1
Duration	4	1
Cumulative effect	3	2
Intensity/magnitude	3	2
<b>Significance rating</b>	<b>- 48 (medium negative)</b>	<b>- 14 (low negative)</b>

Mitigation measures

**Design & routing:**

- Unavoidable services crossings should be located within already disturbed areas like existing road crossings and located across the narrowest portions of the wetland.
- The services must be routed so that the wetland is crossed at right angles to the direction of flow.

**Site setup and construction phase:**

- Disturbance to the wetland soils along the services crossings should be restricted to an established construction right-of-way (ROW) corridor. 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.
- The construction ROW should comprise the trench footprint, a narrow one-way running track and soil stockpile zones.
- Excavations within the wetland should be undertaken by hand.

- All wetland areas outside of the demarcated ROW must be considered no-go areas.
- Ideally, excavations within the onsite wetlands should be undertaken between the months of April and September.

**Rehabilitation and monitoring:**

- The disturbed areas within the wetland and/or buffers must be rehabilitated after the water pipes are established. Compacted areas must be ripped and seeded immediately. An indigenous grass seed mix should be used as recommended by a wetland specialist.
- Adhere to the requirements of the wetland rehabilitation plan if prepared.
- The environmental control officer must be present during the establishment of the construction ROW, the excavation of the trench and the rehabilitation of the wetland to guide these processes.
- The disturbed area should be monitored for erosion once a month during the first wet season after construction.
- The re-instated wetland areas must be monitored post-construction by the municipality to manage and control alien vegetation in the wetland.

**15.1.1.2 Impacts to the Geomorphology of the Wetlands**

During the construction phase, soil removal, sedimentation and erosion potential impacts can be expected with the preparation of the site and related construction activities. Physical degradation to the wetland habitat is likely to take place by means of clearance, levelling and compaction due to movement of vehicles. With these construction activities, the geomorphology of the wetland is likely to be altered. Ancillary impacts can also be expected in terms of consequent potential erosion and sedimentation impacts. Flattened and exposed soil surfaces and excavation pits / trenches may be vulnerable to increased run-off after rainfall events which can lead to erosion and sedimentation impacts. Where the onset of erosion arises, the structural integrity of the wetlands may be compromised. Moreover, resultant sedimentation can take place where additional sediment loads are washed into the wetland.

Further development within the wetland will severely affect the functionality of the system especially with excavation of the wetland soils within the wetlands.

<b>Environmental parameter</b>	<b>Wetland - Impacts associated with levelling, compaction and excavation of wetland soils, and the potential increased run-off, erosion and sedimentation impacts knock-on effects.</b>
Extent	Site
Probability	Probable
Reversibility	Irreversible
Irreplaceable loss of resources	Significant loss of resources
Duration	Permanent
Cumulative effect	High cumulative Impact

<b>Environmental parameter</b>	<b>Wetland - Impacts associated with levelling, compaction and excavation of wetland soils, and the potential increased run-off, erosion and sedimentation impacts knock-on effects.</b>	
Intensity/magnitude	High	
<b>Significance Rating</b>	<b>Pre-mitigation significance rating is high and negative. With the implementation of mitigation measures, the impact can be minimized to low.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	4	1
Irreplaceable loss	3	2
Duration	4	1
Cumulative effect	4	2
Intensity/magnitude	3	1
<b>Significance rating</b>	<b>- 57 (high negative)</b>	<b>- 8 (low negative)</b>

#### Mitigation measures

#### **Preventing Temporary Increased Run-off, Sedimentation and Erosion Impacting the Wetlands**

- A construction and operation phase storm water management plan must accompany the pipeline installation. Importantly, the storm water management plan must account for increased run-off and sedimentation. As such, attenuation facilities are to be implemented if and where required.
- Additionally, appropriate drainage structures at the storm water outlet points are to be implemented with energy dissipating structures as well as sediment trapping devices to prevent sedimentation exiting the site during construction. This can be in the form of silt nets.

**See section 16.1.1.1. for site setup, construction phase, rehabilitation and monitoring mitigation measures.**

#### **15.1.1.3 Impacts to the Hydrology of the Wetlands**

Currently, the hydrology of the wetland is being affected by the presence and further encroachment of settlements surrounding the wetland in the greater catchment area. The catchment hydrology is affected due to transformation of the catchment area from a natural to an artificial environment, characterised by hardened surfaces (foundations of houses and compacted dirt roads) with little to no vegetation to provide surface roughness in aid of controlling surface run-off. Additionally, the vertical drainage properties are affected by compaction and hardened impermeable surfaces. Sub-surface drainage is therefore also impacted as a result. Increased run-off flood peaks and alteration of the hydrology of the wetland is the current status quo. With further implementation of hardened surfaces for the proposed construction of

houses and associated infrastructure (roads and services), a further increase in flood peaks during and following rainfall events are likely whilst surfaces remain exposed following clearance and compaction during construction. Increased flood peaks are therefore likely to be higher in intensity.

<b>Environmental parameter</b>	<b>Wetland - Impacts associated with accelerated run-off and associated increased flood peaks to the watercourses.</b>	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Long term	
Cumulative effect	Medium cumulative Impact	
Intensity/magnitude	Medium	
<b>Significance Rating</b>	<b>Pre-mitigation significance rating is medium and negative. With the implementation of mitigation measures, the impact can be minimised to low.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	4	2
Intensity/magnitude	2	1
<b>Significance rating</b>	<b>- 30 (medium negative)</b>	<b>- 11 (low negative)</b>

#### Mitigation measures

#### **Preventing Increased Run-off and associated Erosion Impacting on the Wetland**

- Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion.
- The use of silt fencing and potentially sandbags or hessian “sausage” nets along the boundaries of the construction areas can be used to slow run-off entering the wetlands and the associated buffer zones, thereby also decreasing the likelihood of increased flood peaks and consequent potential erosion and sedimentation impacts.
- An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off and associated erosion.



An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly.

#### 15.1.1.4 Impacts to Water Quality

During the construction process, potential contamination impacts can be expected as a result of stored oils, fuels, and other hazardous substances or materials being transported via stormwater run-off and / or direct leaks from construction vehicles and machinery. Should this occur, contamination impacts are likely to occur. Water quality impacts can also result from workers using the wetland for various purposes (such as for sanitation). Usage of sanitary substances (for example, soap) in the wetland can alter the chemical balance or water quality thereby causing pollution to the wetland system. Additionally, usage of the wetland for urine and faecal waste is another potential negative water quality impact. Use of water for building purposes can also lead to impaired water quality. Mixing cement and cleaning construction tools in the wetland can furthermore affect the water quality. Impacts to the water quality may affect any organisms or vegetation inhabiting these systems via contamination impacts. Lastly, water quality can be impaired as a result of sedimentation. Additional sediment loads emanating from construction areas that are contained in run-off entering watercourses can be regarded as pollution, and therefore requires mitigation.

Environmental parameter	Wetland - Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery and workers; as well as sedimentation via run-off polluting the wetlands.	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Long term	
Cumulative effect	Medium cumulative Impact	
Intensity/magnitude	Medium	
<b>Significance Rating</b>	<b>Pre-mitigation significance rating is medium and negative. With the implementation of mitigation measures, the impact can be minimised to low.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	1
Reversibility	2	2
Irreplaceable loss	3	2
Duration	3	3

<b>Environmental parameter</b>	<b>Wetland - Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery and workers; as well as sedimentation via run-off polluting the wetlands.</b>	
Cumulative effect	2	2
Intensity/magnitude	3	1
<b>Significance rating</b>	<b>- 45 (medium negative)</b>	<b>- 11 (low negative)</b>

Mitigation measures

**Storage of Oils, Fuels and Hazardous Substances / Liquids**

- All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the wetlands and the associated buffer zones.
- Where these items are stored within the proposed development area, a designated storage area will be required and the storage area must be adequately bunded to contain any spillage from containers.
- Emergency spill kits must be available to clean up and remove accidental spills.

**Preventing Soil and Surface Water Contamination**

- All vehicles and machinery operating on the site are to be checked for oil, fuel or any other fluid leaks before entering the nearby construction area.
- All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction area.
- No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the wetlands and the associated buffer zones.
- The construction site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers.
- Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110% capacity to prevent oil or fuel contamination of the ground and / or nearby wetlands and the associated buffer zones.
- No cement mixing is to take place in the wetlands and the associated buffer zones.
- In general, any cement mixing in the construction area is to take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in by readymix cement vehicles.
- Importantly, no mixing of cement or concrete is allowed directly within the wetland and associated buffer zone.
- No "long drop" toilets are allowed on the study site.
- Suitable temporary chemical sanitation facilities are to be provided.

- Temporary chemical sanitation facilities must be placed at least 100 meters from the wetlands and the associated buffer zones.
- Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills.

**Preventing Sedimentation Impacting on Surface Water Resources**

- Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation.
- The use of silt fencing and potentially sandbags or hessian “sausage” nets along the boundaries of the construction area can be used to prevent and / or reduce sediments entering the wetland and the associated buffer zone.
- An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation.

An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor sedimentation impacts. Where additional mitigation measures are stipulated by the ECO in order to control sedimentation, this is to be undertaken accordingly.

**15.1.2 Vegetation Impacts**

**15.1.2.1 Loss of habitat for flora**

The clearing of land reduces available habitat for floral species. This results in a local scale loss in ecosystem functionality and biodiversity and potentially reduces available habitat for red data species. Mitigation measures can reduce inevitable environmental damage to a state where long term losses are negated.

<b>Environmental parameter</b>	<b>Loss of habitat for Flora of common and protected or red data species.</b>
Extent	The impact will only affect this site
Probability	Impact will certainly occur (greater than a 75% chance of occurrence)
Reversibility	The impact is partly reversible but more intense mitigation measures are required
Irreplaceable loss of resources	The impact will result in marginal loss of resources
Duration	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
Cumulative effect	The impact would result in minor cumulative effects
Intensity/magnitude	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.



<b>Environmental parameter</b>	<b>Loss of habitat for Flora of common and protected or red data species.</b>	
<b>Significance Rating</b>	<b>The anticipated impact will have negligible negative effects and will require little to no mitigation.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	3	2
Intensity/magnitude	1	1
<b>Significance rating</b>	<b>-17 (low negative)</b>	<b>-10 (low negative)</b>

#### Mitigation measures

- Footprint of the activity needs to be strictly adhered to.
- A site specific Environmental Management Programme needs to be developed for the construction and operation phases.
- An Environmental Control Officer (ECO) needs to be appointed for the duration of construction.
- A search and rescue operation needs to be conducted by a suitably qualified ecologist to collect species of special concern.
- Permits for plants collection/removal need to be obtained prior to search and rescue operations.
- Strictly no removal of any floral species without valid permits in place.
- Vegetation clearance in the construction phase is to be removed in a phased approach, as and when it becomes necessary as vegetation harbours fauna.
- Sensitive areas need to be demarcated clearly before construction commences.

#### **15.1.2.2 Transformation of habitat for flora**

Hard transformation will result in a reduction in flora for the area. Additionally, transformation of the habitat may lead to an increased alien and invasive plant establishment and erosion potential through both wind and water erosion. Mitigation measures may decrease the severity of the impact, if the mitigation measures are adhered to.

<b>Environmental parameter</b>	<b>Transformation of habitat for Flora of common and protected or red data species.</b>	
Extent	The impact will only affect this site	
Probability	Impact will certainly occur (greater than a 75% chance of occurrence)	
Reversibility	The impact is partly reversible but more intense mitigation measures are required	
Irreplaceable loss of resources	The impact will result in marginal loss of resources	
Duration	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).	
Cumulative effect	The impact would result in minor cumulative effects	
Intensity/magnitude	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.	
<b>Significance Rating</b>	<b>The anticipated impact will have negligible negative effects and will require little to no mitigation.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	3	2
Intensity/magnitude	1	1
<b>Significance rating</b>	<b>-14 (low negative)</b>	<b>-10 (low negative)</b>

#### Mitigation measures

- Servitude widths need to be a strictly adhered to.
- Where possible, indigenous vegetation needs to be retained.
- Clearance for construction should be done in a phased approach, and rehabilitation should be done as soon as work has ceased along the section of routing.
- Where possible, construction should occur in the dry season to prevent soil loss through stormwater.
- Where possible, manual clearance of the vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.
- The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs.
- Alien and invasive plants should be hand pulled prior to seeding occurring, and disposed of as per the alien invasive control programme.
- Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion.

- Rehabilitation should take place as soon as construction of the section of line is complete.
- Strictly no littering. The contractor should highlight this at daily toolbox talks and site clean-ups should occur on a daily occasion.
- An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas.
- A mix of indigenous grass species such as the standard “NPA” mix should be used for rehabilitation.

### 15.1.2.3 Erosion related impacts for the construction phase

Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil and blocking up drains and eventually clogging roadsides and drainage lines. This removes habitat for fauna occurring in the area. This will effect ecosystem functionality and will have cost implications as the construction site is unlikely to rehabilitate naturally. If the mitigation measures are implemented correctly, erosion related impacts may be largely negated.

Environmental parameter	Erosion	
Extent	The impact will only affect this site	
Probability	The impact will likely occur (between a 50% to a 75% chance of occurrence)	
Reversibility	The impact is partly reversible but more intense mitigation measures are required	
Irreplaceable loss of resources	The impact will result in marginal loss of resources	
Duration	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	
Cumulative effect	The impact would result in minor cumulative effects	
Intensity/magnitude	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity)	
<b>Significance Rating</b>	<b>The anticipated impact will have negligible negative effects and will require little to no mitigation.</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	1
Cumulative effect	3	2
Intensity/magnitude	2	1
<b>Significance rating</b>	<b>- 26 (low negative)</b>	<b>-11 (low negative)</b>

#### Mitigation measures

- An approved Stormwater Management Plan should be implemented before construction occurs.
- Where possible, indigenous vegetation needs to be retained.
- Vegetation should be cleared only when construction occurs in that section of the development.
- Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion.
- Rehabilitation should take place as soon as construction is complete.
- In areas of higher gradient, access roads should have erosion berms to prevent soil loss.
- Construction activities should be limited to the winter months to prevent loss of soil to water runoff.
- Spraying of the soil surface should occur when working in dusty conditions.

### 15.1.3 Heritage Impacts

No heritage sites were noted during the survey. This is a result of much of the area being already disturbed. There are thus no heritage impacts.

## 15.2 Impacts to Socio-Economic Components during Construction Phase

### 15.2.1 Air / Dust pollution

Dust could become a problem during construction, especially on windy days.

Air pollution may occur in the vicinity of the site and the immediate surrounds during the construction phase as a result of:

- Exhaust fumes from heavy vehicles and machinery, in particular poorly serviced vehicles
- Dust from exposed surfaces and soil stockpiles picked up by wind
- Dust on haulage and access roads emitted into the air by construction vehicles
- Odours downstream of inappropriate and mismanaged chemical toilets

Environmental parameter	Dust pollution (for customers and neighboring residents)	
Extent	Site	
Probability	Probable	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short term	
Cumulative effect	Negligible cumulative impact	
Intensity/magnitude	Low	
<b>Significance Rating</b>	<b>Low negative impact</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1

Environmental parameter	Dust pollution (for customers and neighboring residents)	
Probability	3	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	2	2
<b>Significance rating</b>	<b>-16 low negative impact</b>	<b>-14 low negative impact</b>

#### Mitigation measures

- All exposed stockpiles must be covered with hessian sheeting when not in use or dampened by a watercart at regular interval if in use.
- The exposed areas must be dampened at regular intervals and more frequently during windy conditions.
- Dust generating construction activities should be avoided during strong winds.
- Management (including storage, transport, handling and disposal) of hazardous substances that have the potential to become airborne during construction should be carefully managed.
- Soil loads in transit should be kept covered or wetted.
- Servicing of any construction vehicles must occur off site to limit gaseous emissions.
- Chemical toilets should be placed on site and must be maintained on a daily basis.
- Burning of waste is forbidden.
- A dust complaints register must be kept within the site for the entire construction phase.
- These measures are contained within the EMP and must be monitored to ensure compliance.

#### **15.2.2 Noise**

The generation of noise (from earth moving machinery etc.) during the construction phase may result in the disturbance to the workers and residents in the area. Noise generated by delivery vehicles, earth moving machinery and the workforce have the potential to impact negatively on surrounding residents. The negative impacts could result in an increase in stress and frustration and associated health implications. Disturbance may also be caused by construction starting too early or finishing too late. However, these impacts are likely to be sporadic and relatively short.



Environmental parameter	Noise	
Extent	Site	
Probability	Possible	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	No loss of resources	
Duration	Short term	
Cumulative effect	Negligible cumulative impact	
Intensity/magnitude	Low	
<b>Significance Rating</b>	<b>Low negative impact</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	1
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
<b>Significance rating</b>	<b>-8 low negative impact</b>	<b>-7 low negative impact</b>

#### Mitigation measures

- Construction activities should only take place within agreed working hours.
- A complaints register must be kept at all times.
- Construction staff should be provided with training regarding noise prevention and antisocial behaviour/conduct.

#### 15.2.3 Job creation

A number of jobs (approximately 350 jobs based on information received from the Greater Kokstad Municipality) will be created during the construction phase of the project.

For those unemployed in the area, the creation of short-term construction jobs would improve their economic well-being for the period of construction and may lead to further employment opportunities through skills enhancement and experience. Economic well-being is generally regarded as an important contributor of individual quality of life, especially for those unemployed and struggling to make ends meet.

Parameter	Job creation during the construction phase
Extent	High
Probability	Definite

Parameter	Job creation during the construction phase	
Social value	High	
Importance to Quality of Life	High	
Duration	Short term	
Cumulative effect	High cumulative impact	
Intensity/Magnitude	Medium	
<b>Significance Rating</b>	<b>High Positive Impact</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	n/a
Probability	4	n/a
Social value	3	n/a
Importance to Quality of Life	3	n/a
Duration	1	n/a
Cumulative effect	4	n/a
Intensity/Magnitude	2	n/a
Significance rating	<b>36 medium positive impact</b>	n/a

Mitigation measures

n/a

### 15.3 Impacts to Biophysical Systems / Components during the operational phase

#### 15.3.1 Erosion

Erosion potential is increased in areas where vegetation has been removed. Hard transformation may increase water velocity in steeper areas and will result in a loss of topsoil and the erosion of drainage lines. This will aid in alien and invasive plant establishment and vegetation rehabilitation will be compromised as the loss of topsoil will delay rehabilitation efforts.

<b>Environmental parameter</b>	<b>Erosion</b>	
Extent	The impact will affect the local area or district	
Probability	The impact will likely occur (between a 50% to a 75% chance of occurrence)	
Reversibility	The impact is partly reversible but more intense mitigation measures are required	
Irreplaceable loss of resources	The impact will result in significant loss of resources	
Duration	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	
Cumulative effect	The impact would result in minor cumulative effects	
Intensity/magnitude	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).	
<b>Significance Rating</b>	<b>Medium Negative Impact</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	3	2
Duration	2	1
Cumulative effect	3	2
Intensity/magnitude	2	1
<b>Significance rating</b>	<b>-30 (medium negative)</b>	<b>-11 (low negative)</b>

Mitigation measures

- An approved Stormwater Management Plan should be implemented before construction occurs and should be maintained through operation phase.
- Where possible, indigenous vegetation and rescued plants needs to be returned as soon as construction ceases.
- Soil stockpiles need to be grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins.
- Rehabilitation should take place as soon as construction is complete.
- Operation phase should only begin once the ECO has deemed rehabilitation successful and mitigation measures have been implemented.
- Six monthly checks of the area should take place for the emergence of erosion gulley's, and if gulley's emerge, will need to be rehabilitated immediately.

### 15.3.2 Biodiversity loss and alien invasive plant establishment due to operation phase

Biodiversity is unlikely to rehabilitate due to loss of habitat. This can be partly mitigated if rehabilitation is successful. Additionally, biodiversity may be further lost due to the establishment of alien and invasive plants.

Environmental parameter	Loss of biodiversity	
Extent	The impact will affect the local area or district	
Probability	The impact will likely occur (between a 50% to a 75% chance of occurrence)	
Reversibility	The impact is partly reversible but more intense mitigation measures are required	
Irreplaceable loss of resources	The impact will result in significant loss of resources	
Duration	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	
Cumulative effect	The impact would result in minor cumulative effects	
Intensity/magnitude	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).	
<b>Significance Rating</b>	<b>Low negative impact</b>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	3	2
Duration	2	1
Cumulative effect	3	2
Intensity/magnitude	2	1
<b>Significance rating</b>	<b>-28 (Low negative)</b>	<b>-11 (low negative)</b>

#### Mitigation measures

- A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced.
- Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful.
- Monitoring and control of alien and invasive species as per an alien invasive control programme.

## 15.4 Impacts to Socio-Economic Components during Operational Phase

### 15.4.1 Provision of housing

The portion of land under application will provide 1420 units to the Shayamoya area and provide housing for a number of people. Low income, informally settled residents stand to benefit from the proposed housing project. Overall, the beneficiaries will experience a substantial improvement in the quality of their housing, municipal services and social services. This includes access to ownership of private property, electricity, flush toilets, solid waste removal and potable water. As the quality of housing and the access to basic municipal and social services is generally an important contributor to overall quality of life, it is likely that the individual beneficiaries will experience a substantial improvement in their living conditions and quality of life.

Environmental parameter	Provision of housing	
Extent	High	
Probability	Definite	
Reversibility	Very High	
Irreplaceable loss of resources	Very High	
Duration	Permanent	
Cumulative effect	High cumulative impact	
Intensity/magnitude	Very High	
<b>Significance Rating</b>	<b>Very high positive impact</b>	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	3	n/a
Probability	4	n/a
Reversibility	4	n/a
Irreplaceable loss	4	n/a
Duration	4	n/a
Cumulative effect	4	n/a
Intensity/magnitude	4	n/a
<b>Significance rating</b>	<b>92 very high positive impact</b>	<b>n/a</b>

#### Mitigation measures

n/a

## 15.5 No-go alternative

### 15.5.1 Loss of housing opportunities

If the Shayamoya Phase 3 Slums Clearance Project does not go ahead, the existing informal housing would remain and people would continue to live in poor conditions. There will continue to be a lack of formal housing in the Shayamoya area. In addition, there would be further degradation of the wetlands and sensitive areas through improper usage and settlement and lack of basic services.

Environmental parameter	Loss of housing opportunities	
Extent	High	
Probability	Definite	
Reversibility	Very High	
Irreplaceable loss of resources	Very High	
Duration	Permanent	
Cumulative effect	High cumulative impact	
Intensity/magnitude	Very High	
<b>Significance Rating</b>	<b>Very high negative impact</b>	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	3	n/a
Probability	3	n/a
Reversibility	4	n/a
Irreplaceable loss	4	n/a
Duration	4	n/a
Cumulative effect	4	n/a
Intensity/magnitude	4	n/a
<b>Significance rating</b>	<b>88 very high negative impact</b>	<b>n/a</b>

#### Mitigation measures

n/a

## 16. POSITIVE AND NEGATIVE IMPACTS OF THE SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

A summary of the impacts pre-mitigation and post-mitigation are provided below:

**Table 10: Summary of impacts pre-mitigation and post-mitigation**

Impact	Pre-mitigation	Post-mitigation
<b>Impacts on Biophysical Systems / Components during the construction phase</b>		
Impacts associated with clearance and edge effects to the wetland habitat.	Medium negative impact	Low negative impact
Impacts to the Geomorphology of the Wetlands	High negative impact	Low negative impact
Impacts to the Hydrology of the Wetlands	Medium negative impact	Low negative impact
Impacts to Water Quality	Medium negative impact	Low negative impact
Loss of habitat for flora	Low negative impact	Low negative impact
Transformation of habitat for flora	Low negative impact	Low negative impact
Erosion related impacts for the construction phase	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic Component during the construction phase</b>		
Air / dust pollution	Low negative impact	Low negative impact
Noise	Low negative impact	Low negative impact
Job creation	Medium positive impact	No mitigation required
<b>Impacts to Biophysical Systems/components during the operational phase</b>		
Erosion	Medium negative impact	Low negative impact
Biodiversity loss and alien invasive plant establishment	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic component during the operational phase</b>		
Provision of housing	Very high positive impact	n/a
<b>No-go Alternative</b>		
Loss of housing opportunities	Very high negative impact	n/a

### 16.1 Mitigation measures

Refer to section 16 above. The assessment of each issue is included in Section 16 above and mitigation measures are provided for each impact identified.

## 17. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Table 11: Summary of specialist findings and recommendations

Specialist Study	Findings	Recommendations
Wetland Assessment	<ul style="list-style-type: none"> <li>• An assessment of the Present Ecological State of the wetlands reveals that most HGM units are Largely Modified, while wetland HGM unit 4 is Seriously Modified through changes within the catchment and the removal of wetland soils for brick making.</li> <li>• An assessment of the current importance of the wetland unit in terms of ecosystem service provision indicates that wetland units provide medium to moderately-high levels of wetland functioning.</li> <li>• The EIS score indicates that the assessed unit falls into EIS Category C, which corresponds to a Moderate importance and sensitivity.</li> <li>• All seven wetlands on site have been impacted upon by crop production, livestock grazing, and changes to their hydrology (increased hardened surfaces) and geomorphology (clay removal for brick making) thus leading to an associated infestation by alien vegetation. The current layout takes cognisance of the wetland systems, and thus no housing is proposed within the wetland areas, or the 30m buffer that is recommended here. It must be noted that some informal housing has</li> </ul>	<ul style="list-style-type: none"> <li>• The current layout takes cognisance of the wetland systems, and thus no housing is proposed within the wetland areas, or the 30m buffer that is recommended here. It must be noted that some informal housing has already been built within the wetland buffer areas, and it is recommended that the municipality try to negotiate for the removal of these houses if possible.</li> <li>• Any development of this nature within 500m of a wetland requires a water use license from the Department of Water and Sanitation, and it is recommended that a meeting be sought to discuss the project with the Department of Water and Sanitation to determine any license requirements relating to the project.</li> </ul>



Specialist Study	Findings	Recommendations
	<p>already been built within the wetland buffer areas, and it is recommended that the municipality try to negotiate for the removal of these houses if possible.</p>	
Vegetation Assessment	<ul style="list-style-type: none"> <li>• A small portion of site falls within CBA Irreplaceable and according to Mucina and Rutherford 2006 is classified as East Griqualand Grassland (Gs 12) which is a Vulnerable vegetation type.</li> <li>• Upon undertaking the groundtruthing exercise it was found that the site is heavily transformed from natural and impacted by illegal dumping, human waste, overgrazing and informal housing.</li> <li>• A total of 23 plant species were recorded during the field survey, of which 3 were alien. Three (3) plant species which are protected by Provincial Legislation were noted within the development site. The plant species that fall under the protection of the KwaZulu-Natal Nature Conservation Management Act are listed below. <ul style="list-style-type: none"> <li>- <i>Aloe maculata</i> All.</li> <li>- <i>Hypoxis argentea</i> Harv. ex Baker var. <i>argentea</i></li> <li>- <i>Ledebouria ovalifolia</i> (Schrad.) Jessop</li> </ul> </li> <li>• Although the vegetation type is vulnerable, the area is transformed from 'natural' and exhibits a low conservation value.</li> </ul>	<ul style="list-style-type: none"> <li>• Permits for the removal and relocation of plants and animals must be in place before any construction can commence;</li> <li>• Translocation plan should inform the relocation of protected plants;</li> <li>• A search and rescue operation, undertaken by a suitably qualified person, must be undertaken before construction commences;</li> <li>• Should budget be available, the developer should consider planting fruit trees or plants which assist in providing the community with extra food;</li> <li>• An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas.</li> <li>• An Alien Invasive Control Programme must be implemented;</li> <li>• Erosion control measures must be implemented;</li> <li>• Construction must occur in a phased approach;</li> <li>• Rehabilitation must occur once construction is complete in the relevant area.</li> </ul>

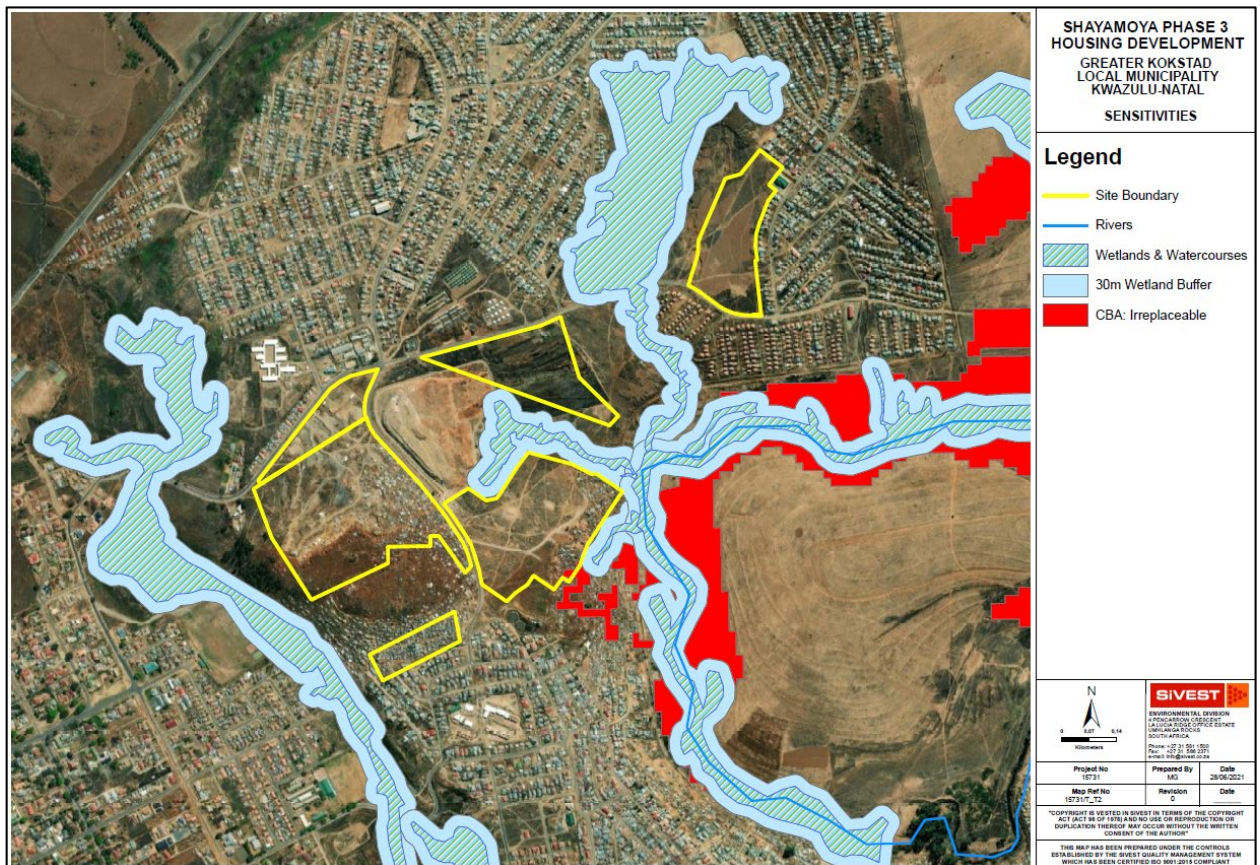
Specialist Study	Findings	Recommendations
Geotechnical Assessment	<ul style="list-style-type: none"> <li>The site is underlain by a mantle of transported and residual soils overlying weathered mudstone bedrock and intrusive dolerite which are variably weathered.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary recommendations for earthworks and drainage to promote stable development are given.</li> <li>The site has been classified into preliminary foundation classes R/H, H/H1 and H1/H2 according to the NHBRC guidelines, with the proposed dwellings and associated structures required to be founded according to the criteria laid down by the NHBRC.</li> <li>It is important to note that the Preliminary Geotechnical assessment is based on walkover mapping and very limited available test pit and laboratory information.</li> <li>It is thus essential that a Phase 1 Geotechnical Investigation as per GFSH-1 guidelines is carried out to verify the materials beneath the entire site, being Sites 1 through 6, and the preliminary NHBRC foundation categories given in this report.</li> <li>Finally, the ground conditions described in this report relates specifically to the positions of the mapped man-made and natural exposures comprising visible rock outcrops, road cuttings, trenches and dongas as well as the Inspection Pit locations.</li> <li>It is therefore quite possible that conditions at variance with those discussed above</li> </ul>

Specialist Study	Findings	Recommendations
		<p>can be encountered elsewhere on the site during construction.</p> <ul style="list-style-type: none"> <li>It is therefore important that GGS carry out periodic inspections of the cut platforms and confirm the founding conditions and bearing pressures for the foundations of the proposed structures.</li> </ul>
Engineering Services	<p>Subject to the following the project is viable:</p> <ul style="list-style-type: none"> <li>Confirmation from Harry Gwala District Municipality that the bulk water demand can be met and tie in points provided.</li> <li>Confirmation from Harry Gwala District Municipality that bulk outfall sewers can be provided at the terminal manholes.</li> </ul>	<ul style="list-style-type: none"> <li>It is essential that appropriate erosion control measures need to be taken into consideration at the various storm water discharge points located throughout the site to limit erosion on the receiving environment e.g. at headwalls and culverts.</li> <li>Steep water courses may require additional protection from erosion through the use of channel lining-controlled drops etc., in order to dissipate flow energy.</li> <li>Road intersections should be designed to prevent localised flooding.</li> <li>The storm water system must be kept separate from the wastewater (sewer) drainage system.</li> </ul>
Heritage Assessment	<ul style="list-style-type: none"> <li>The HIA survey noted that much of the area has been disturbed.</li> <li>No artefacts or features were noted during the survey.</li> <li>A PIA desktop study was undertaken. The study noted that the Estcourt Formation (basal unit of the Beaufort Group) is present on this site.</li> </ul>	<ul style="list-style-type: none"> <li>The palaeontological desktop noted that the area is of very high sensitivity. However, much of the deposits will be weathered and thus contain very little palaeontological remains.</li> <li>If any excavations are deeper than 2m, then a suitably qualified palaeontologist will need to inspect the excavations.</li> </ul>

Specialist Study	Findings	Recommendations
	<ul style="list-style-type: none"> <li>This lithology is internationally renowned for palaeontological material and it is highly likely that palaeontological material will be found during excavation of this large area.</li> </ul>	<ul style="list-style-type: none"> <li>A “Chance Find” Protocol has been incorporated must be incorporated into the EMP. In mitigation this site is likely to be weathered, reducing the chance of valuable palaeontological material being found.</li> </ul>

## 18. ENVIRONMENTAL IMPACT STATEMENT

The Shayamoya Phase 3 Slums Clearance Project has been proposed by the Greater Kokstad municipality in order to assist the growing demand of housing in Kokstad. The proposed project area is situated approximately 2km north east of Kokstad centre and comprises of six (6) sites within the existing township. Approximately 1420 units are proposed which will comprise of residential units, planned unit developments (PUD), open space, a religious centre and a clinic. A layout of the development and the environmental sensitivities is included below:



**Figure 8: Layout and site sensitivities**

The implementation of the housing development will assist in reducing the establishment of informal settlements. The proposed development will also include the construction of water networks, proper sanitation infrastructure, electricity and provision of road infrastructure through the provision of the slums clearance. By providing water and sanitation services to the proposed development, it will indirectly assist in reducing surface water and groundwater pollution. This will be as a result of households using piped water in their daily activities instead of water from the nearby rivers and utilising proper sanitation methods.

According to the Annual Performance Plan (2019/2020) prepared by the Department of Human Settlements, KwaZulu-Natal has the second highest housing backlog in South Africa. People seek improved livelihoods and economic opportunities and as a result, tend to settle in informal settlements

around major cities and towns. Based on this, the management of informal settlements in KwaZulu Natal remains a priority.

The Greater Kokstad Municipality Housing Sector Plan (2020-2021) indicates that the municipality faces a low and middle-income housing crisis. The provision of housing for residents is a priority in the municipality however this is met with many constraints. The key issues related to housing include:

- High prices of privately-owned land a lack of land to build houses;
- Private shack settlements as an income-generating activity;
- Urbanisation results in growing number of informal settlements;
- Speculation in up-market housing, especially in areas outside any Strategic development framework: This results in adhoc development and cost inefficiencies;
- The lack of funding and the non-alignment of municipal and government department budgeting processes;
- The lack of bulk services for housing developments

As a result of the constraints stated above, huge housing provision backlogs have been experienced by the municipality. The Shayamoya Phase 3 Slums Clearance Project is an initiative to work towards decreasing that backlog and therefore will result in very high positive social impacts.

The following specialist studies have been undertaken for the project:

- Wetland Assessment (November 2019);
- Vegetation Assessment (November 2019);
- Heritage Assessment (November 2019);
- Geotechnical Investigation (June 2020);
- Bulk and Internal Services Engineering Report (July 2020).

The main findings of the specialist studies are included in **Section 18** above.

The wetland assessment (refer **Appendix F**) revealed that all seven wetlands on site have been impacted upon by crop production, livestock grazing, and changes to their hydrology and geomorphology thus leading to an associated infestation of alien invasive vegetation. The current layout takes cognisance of the wetland systems and the 30m buffer that has been recommended, however some informal housing has already been built within the wetland buffer areas. The specialist recommended that these informal houses be removed from the wetland buffers. Although the development may indirectly have negative impacts on the existing wetland systems, these can be mitigated.

The vegetation assessment (refer **Appendix F**) identified a small portion of site falls within CBA Irreplaceable and according to Mucina and Rutherford 2006 is classified as East Griqualand Grassland (Gs 12) which is a Vulnerable vegetation type . However, the specialist confirmed that upon undertaking the groundtruthing exercise, it was found that the site is heavily transformed and impacted by illegal dumping, human waste, overgrazing and informal housing.

In line with the National Heritage Resources Act 1999 (25 of 1999), a heritage survey was undertaken for the project (refer **Appendix F**). No heritage sites were noted during the survey as a result of much of the area being already disturbed. There are therefore no identified heritage impacts. A desktop Palaeontological Impact Assessment was undertaken which identified that the Estcourt Formation (basal unit of the Beaufort Group) is present on site. This lithology is internationally renowned for paleontological material and it is likely that palaeontological material will be found during excavation. The sensitive layers will probably occur around 2m below surface. Therefore, any excavations deeper than 2m will require palaeontological inspection. A “Chance Find” Protocol has been incorporated into this report and must be incorporated into the EMP. It was however noted that the site is likely to be weathered which reduces the chance of valuable paleontological material being found.

No activity or location alternatives were considered as the development involves the slums clearance on existing slums within the proposed development area. No additional activity alternatives have been identified as the area has been earmarked for housing by the Greater Kokstad Municipality. Whilst the area has existing slums, it is located on either side of Murray Road which is one of the main bus routes of the Kokstad area and is therefore also appropriately situated in terms of public transport.

A preliminary layout was prepared for the project in September 2011, however; this layout did not take into account the sensitive environmental features of the site. Following this, specialists were appointed to undertake their assessments as part of the EIA process and identify all environmentally sensitive areas within the proposed project area. These assessments were distributed to the project team and the layout was revised in order to avoid environmentally sensitive features. No further layout alternatives will be considered as part of the EIA process. Impact assessments have been undertaken on the revised layout.

The proposed Shayamoya Phase 3 Slums Clearance Project will have low negative impacts from a biophysical perspective as a result of the already transformed nature of the site and the layout being designed to avoid sensitive features. The negative impacts that are likely to arise from the construction phase will be of lower significance if the recommended mitigation measures are implemented. The proposed project will also result in positive impacts from a social perspective both during construction and operation.

Should the project not go ahead, the lack of formal housing and basic services in the Shayamoya area is likely to remain and people would continue to informally settle and live without these basic services. Pollution will also likely continue to increase coupled with health issues that arise from living in unsanitary conditions. There is also the potential for the slums to spread into the floodplain and wetland areas. This is both dangerous in terms of flood risks to the community and will also lead to a loss of wetland habitat should the development not be implemented.

The following table provides a summary of the positive and negative impacts associated with the proposed project:

**Table 12: Summary of positive and negative impacts**

Impact	Pre-mitigation	Post-mitigation
<b>Impacts on Biophysical Systems / Components during the construction phase</b>		
Impacts associated with clearance and edge effects to the wetland habitat.	Medium negative impact	Low negative impact
Impacts to the Geomorphology of the Wetlands	High negative impact	Low negative impact
Impacts to the Hydrology of the Wetlands	Medium negative impact	Low negative impact
Impacts to Water Quality	Medium negative impact	Low negative impact
Loss of habitat for flora	Low negative impact	Low negative impact
Transformation of habitat for flora	Low negative impact	Low negative impact
Erosion related impacts for the construction phase	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic Component during the construction phase</b>		
Air / dust pollution	Low negative impact	Low negative impact
Noise	Low negative impact	Low negative impact
Job creation	Medium positive impact	No mitigation required
<b>Impacts to Biophysical Systems/components during the operational phase</b>		
Erosion	Medium negative impact	Low negative impact
Biodiversity loss and alien invasive plant establishment	Low negative impact	Low negative impact
<b>Impacts to Socio-Economic component during the operational phase</b>		
Provision of housing	Very high positive impact	n/a
<b>No-go Alternative</b>		
Loss of housing opportunities	Very high negative impact	n/a



## 19. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) AND CONDITIONS TO BE INCLUDED IN ENVIRONMENTAL AUTHORISATION (EA)

A EMPr has been prepared for the proposed Shayamoya Phase 3 Slums Clearance Project (refer **Appendix H**).

Taking into account the potential negative and significant positive impacts that the proposed development could have on the biophysical and social environment, it is the opinion of the EAP that the proposed development should be authorised subject to the following conditions of authorisation:

- All of the mitigation measures identified in this EIA Report must be made conditions of the authorisation.
- It is important that all of the listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance.
- The activity-specific construction EMPr must be adhered to.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

The mitigation measures based on the impacts identified are as follows:

### Air Quality

- Vehicles travelling back and forth from the construction site must adhere to speed limits so as to avoid generating excessive dust. A speed limit of 30 km/hour must be adhered to on site on all un-surfaced roads.
- The dampening down of access surfaces must be practiced especially in dry and windy conditions to prevent excessive dust formation.
- The Contractor needs to ensure that the fence-line consisting of the wooden poles/supports and shade-cloth structure is maintained in good condition to act as a screen to minimize dust pollution.
- Vehicles and machinery are to be kept in good working order and should excessive emissions be noted; the Contractor is to have equipment serviced as soon as possible. No fires are to be permitted on site except for the burning of firebreaks.

### Noise

- Blasting, piling or other 'noisy' activities must take place during normal working hours. The adjacent land owners must be notified prior to any planned activities that will be unusually noisy. These activities could include, but are not limited to, blasting and piling.
- Should complaints regarding noise levels be received, as a result of construction activities on the site, these must be recorded by the ECO.

## Wetland

### **Design & routing:**

- Unavoidable services crossings should be located within already disturbed areas like existing road crossings and located across the narrowest portions of the wetland.
- The services must be routed so that the wetland is crossed at right angles to the direction of flow.

### **Site setup and construction phase:**

- Disturbance to the wetland soils along the services crossings should be restricted to an established construction right-of-way (ROW) corridor. 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.
- The construction ROW should comprise the trench footprint, a narrow one-way running track and soil stockpile zones.
- Excavations within the wetland should be undertaken by hand.
- All wetland areas outside of the demarcated ROW must be considered no-go areas.
- Ideally, excavations within the onsite wetlands should be undertaken between the months of April and September.

### **Preventing Temporary Increased Run-off, Sedimentation and Erosion Impacting the Wetlands**

- A construction and operation phase storm water management plan must accompany the pipeline installation. Importantly, the storm water management plan must account for increased run-off and sedimentation. As such, attenuation facilities are to be implemented if and where required.
- Additionally, appropriate drainage structures at the storm water outlet points are to be implemented with energy dissipating structures as well as sediment trapping devices to prevent sedimentation exiting the site during construction. This can be in the form of silt nets.

### **Preventing Increased Run-off and associated Erosion Impacting on the Wetland**

- Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion.
- The use of silt fencing and potentially sandbags or hessian “sausage” nets along the boundaries of the construction areas can be used to slow run-off entering the wetlands and the associated buffer zones, thereby also decreasing the likelihood of increased flood peaks and consequent potential erosion and sedimentation impacts.
- An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off and associated erosion.

## **Storage of Oils, Fuels and Hazardous Substances / Liquids**

- All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the wetlands and the associated buffer zones.
- Where these items are stored within the proposed development area, a designated storage area will be required and the storage area must be adequately bunded to contain any spillage from containers.
- Emergency spill kits must be available to clean up and remove accidental spills.

## **Preventing Soil and Surface Water Contamination**

- All vehicles and machinery operating on the site are to be checked for oil, fuel or any other fluid leaks before entering the nearby construction area.
- All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction area.
- No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the wetlands and the associated buffer zones.
- The construction site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers.
- Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110% capacity to prevent oil or fuel contamination of the ground and / or nearby wetlands and the associated buffer zones.
- No cement mixing is to take place in the wetlands and the associated buffer zones.
- In general, any cement mixing in the construction area is to take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in by readymix cement vehicles.
- Importantly, no mixing of cement or concrete is allowed directly within the wetland and associated buffer zone.
- No "long drop" toilets are allowed on the study site.
- Suitable temporary chemical sanitation facilities are to be provided.
- Temporary chemical sanitation facilities must be placed at least 100 meters from the wetlands and the associated buffer zones.
- Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills.

## **Preventing Sedimentation Impacting on Surface Water Resources**

- Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation.

- The use of silt fencing and potentially sandbags or hessian “sausage” nets along the boundaries of the construction area can be used to prevent and / or reduce sediments entering the wetland and the associated buffer zone.
- An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation.

#### **Rehabilitation and monitoring:**

- The disturbed areas within the wetland and/or buffers must be rehabilitated after the water pipes are established. Compacted areas must be ripped and seeded immediately. An indigenous grass seed mix should be used as recommended by a wetland specialist.
- Adhere to the requirements of the wetland rehabilitation plan if prepared.
- The environmental control officer must be present during the establishment of the construction ROW, the excavation of the trench and the rehabilitation of the wetland to guide these processes.
- The disturbed area should be monitored for erosion once a month during the first wet season after construction.
- The re-instated wetland areas must be monitored post-construction by the municipality to manage and control alien vegetation in the wetland.

#### Vegetation

- Footprint of the activity needs to be strictly adhered to.
- A search and rescue operation needs to be conducted by a suitably qualified ecologist to collect species of special concern.
- Permits for plants collection/removal need to be obtained prior to search and rescue operations.
- Strictly no removal of any floral species without valid permits in place.
- Vegetation clearance in the construction phase is to be removed in a phased approach, as and when it becomes necessary as vegetation harbours fauna.
- Sensitive areas need to be demarcated clearly before construction commences.
- Servitude widths need to be a strictly adhered to.
- Where possible, indigenous vegetation needs to be retained.
- Clearance for construction should be done in a phased approach, and rehabilitation should be done as soon as work has ceased along the section of routing.
- Where possible, construction should occur in the dry season to prevent soil loss through stormwater.
- Where possible, manual clearance of the vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.
- The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs.
- Alien and invasive plants should be hand pulled prior to seeding occurring, and disposed of as per the alien invasive control programme.

- Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion.
- Rehabilitation should take place as soon as construction of the section of line is complete.
- Strictly no littering. The contractor should highlight this at daily toolbox talks and site clean-ups should occur on a daily occasion.
- An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas.
- A mix of indigenous grass species such as the standard “NPA” mix should be used for rehabilitation.
- An approved Stormwater Management Plan should be implemented before construction occurs.
- In areas of higher gradient, access roads should have erosion berms to prevent soil loss.
- Spraying of the soil surface should occur when working in dusty conditions.

## **20. FINAL PROPOSED ALTERNATIVE WHICH RESPOND TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH THE ASSESSMENT**

The final proposed alternative is the preferred alternative that has been assessed as part of this EIA Report.

## **21. ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION**

### Wetland

- The current layout takes cognisance of the wetland systems, and thus no housing is proposed within the wetland areas, or the 30m buffer that is recommended here. It must be noted that some informal housing has already been built within the wetland buffer areas, and it is recommended that the municipality try to negotiate for the removal of these houses if possible.
- Any development of this nature within 500m of a wetland requires a water use license from the Department of Water and Sanitation, and it is recommended that a meeting be sought to discuss the project with the Department of Water and Sanitation to determine any license requirements relating to the project.

### Vegetation

- Permits for the removal and relocation of plants and animals must be in place before any construction can commence;
- Translocation plan should inform the relocation of protected plants;
- A search and rescue operation, undertaken by a suitably qualified person, must be undertaken before construction commences;

- Should budget be available, the developer should consider planting fruit trees or plants which assist in providing the community with extra food;
- An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas.
- An Alien Invasive Control Programme must be implemented;
- Erosion control measures must be implemented;
- Construction must occur in a phased approach;
- Rehabilitation must occur once construction is complete in the relevant area.

### Geotechnical

- Preliminary recommendations for earthworks and drainage to promote stable development are given.
- The site has been classified into preliminary foundation classes R/H, H/H1 and H1/H2 according to the NHBRC guidelines, with the proposed dwellings and associated structures required to be founded according to the criteria laid down by the NHBRC.
- It is important to note that the Preliminary Geotechnical assessment is based on walkover mapping and very limited available test pit and laboratory information.
- It is thus essential that a Phase 1 Geotechnical Investigation as per GFSH-1 guidelines is carried out to verify the materials beneath the entire site, being Sites 1 through 6, and the preliminary NHBRC foundation categories given in this report.
- Finally, the ground conditions described in this report relates specifically to the positions of the mapped man-made and natural exposures comprising visible rock outcrops, road cuttings, trenches and dongas as well as the Inspection Pit locations.
- It is therefore quite possible that conditions at variance with those discussed above can be encountered elsewhere on the site during construction.
- It is therefore important that GGS carry out periodic inspections of the cut platforms and confirm the founding conditions and bearing pressures for the foundations of the proposed structures.

### Engineering Services

- It is essential that appropriate erosion control measures need to be taken into consideration at the various storm water discharge points located throughout the site to limit erosion on the receiving environment e.g. at headwalls and culverts.
- Steep water courses may require additional protection from erosion through the use of channel lining-controlled drops etc., in order to dissipate flow energy.
- Road intersections should be designed to prevent localised flooding.
- The storm water system must be kept separate from the wastewater (sewer) drainage system.

### Heritage

- The palaeontological desktop noted that the area is of very high sensitivity. However, much of the deposits will be weathered and thus contain very little palaeontological remains.
- If any excavations are deeper than 2m, then a suitably qualified palaeontologist will need to inspect the excavations.

- A “Chance Find” Protocol has been incorporated and must be incorporated into the EMP. In mitigation this site is likely to be weathered, reducing the chance of valuable palaeontological material being found.

## 22. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE

The assessment has been based by SiVEST on information sourced and provided by the Applicant, site visits conducted, specialist findings and the application of the SiVEST assessment criteria. The EAP is of the opinion that the assessment method applied is acceptable. SiVEST assumes that:

- All the information provided by the Applicant is accurate and unbiased.
- The available data, including Topocadastral maps, Orthophotographs, geological maps and Google Earth images, are reasonably accurate.
- It is not always possible to involve all Interested and/or Affected Parties (I&APs) individually, however, every effort has/will be made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.
- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.

## 23. AUTHORISATION OF THE PROPOSED SHAYAMOYA PHASE 3 SLUMS CLEARANCE PROJECT

We request that the Department authorizes the development. The proposed Shayamoya Phase 3 Slums Clearance Project will be constructed within an area earmarked for housing within the Kokstad area. Furthermore, the layout has been designed to avoid sensitive features on site that have been identified through the various specialist studies that have been undertaken. Whilst it is acknowledged that the project will result in negative impacts, these can be mitigated to acceptable levels; furthermore the proposed site areas have been transformed by human activities which in most cases have resulted from the lack of formal housing. In addition, the provision of housing and basic services within the Shayamoya area will result in very high positive impacts from a social perspective.

Conditions to be included in the Environmental Authorisation for the construction phase are listed in **Section 22** above.

The environmental authorization should be valid for a period of 5 years. It is anticipated that the construction period will however commence shortly after authorization.

## 24. EAP DECLARATION

The EAP declarations, CV's and qualifications for the EAP's responsible for the preparation of this report have been attached in **Appendix A**.

## 25. DEVIATIONS FROM THE APPROVED SCOPING REPORT

The deviations from the approved scoping report is as follows:

- The layout included in the scoping has been updated. An error was picked up in the number of units displayed on the legend of the layout however, the site boundary has remained the same. All layouts in the EIA report have been corrected and updated as well. The engineering services report has been updated to reflect the correct number of units.
- The listed activities have been updated. Listed activities with regard to internal services have been included as the details for the services have now been confirmed. An updated application form has been sent to EDTEA and attached in **Appendix I**.





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