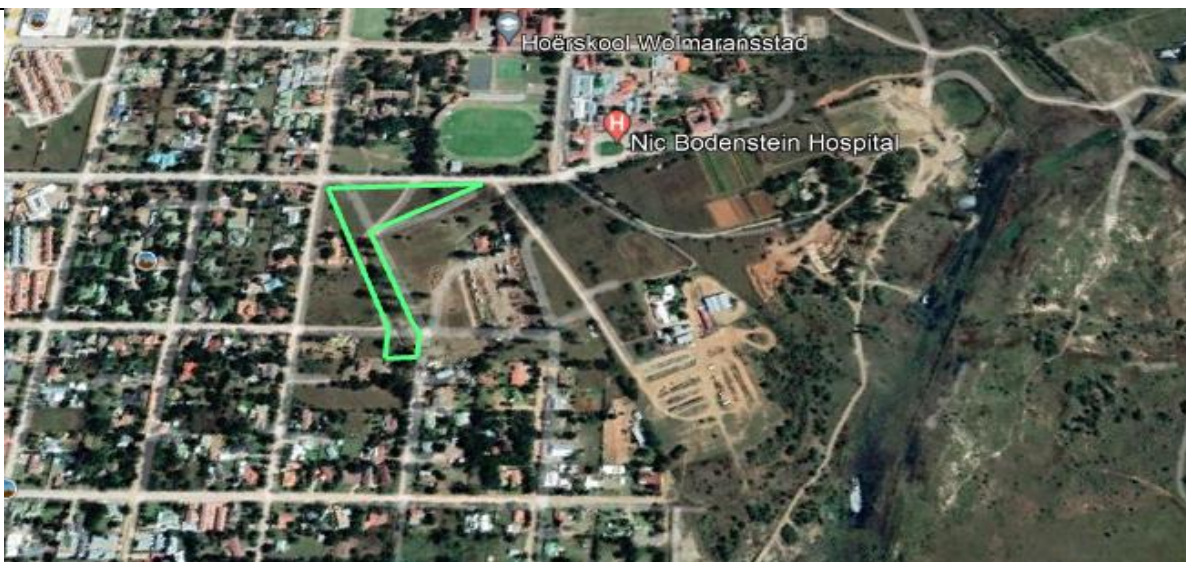




**ENVIRONMENTAL IMPACT ASSESSMENT FOR VEGETATION
CLEARANCE FOR WOLMARANSSTAD EXT 21 HOUSING PROJECT ON
PORTION 2 WOLMARANSSTAD 184HO**

Basic Assessment Report (Final)



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Sept 2023

DRAFT BASIC ASSESSMENT REPORT

EIA FOR HOUSING DEVELOPMENT PORTION OF PORTION 2 WOLMARANSSTAD 1,6HA TOWN AND TOWNLANDS 184HO

Maquassi Hills Local Municipality

Dr Kenneth Kaunda District Municipality

North-West Province

DEDECT REF:

REPORT CONTROL				
Project Title	DEVELOPMENT PORTION OF PORTION 2 WOLMARANSSTAD 1,6HA TOWN AND TOWNLANDS 184HO			
Date	Sept 2023	Report Version	Final BAR for Comments	
Quality Control Aspects	Name	Capacity /Designation		
Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)	
Brenda Makanza	<i>PGC Professional Diploma in Geo-Informatics, UNIGIS, 2016 Environmental Sciences and Health (with Honours), NUST, Zim, 2004</i>	EPASA (2019) 1542	More than 10 years' experience (Please See Attached CV)	
Mr MacCarthy Honu-Siabi	MSSc (Policy & Development Studies) Certs. Environmental Impact Assessments Management & Environmental Management & Envl. Control (Enforcement and Audit)	IAIAsa SAMEA	12 years (in the field of Environmental Impact Assessment) and Environmental management in General	
Sedzani Nemulodi	Bsc Environmental Science		2 Years of work in the Environmental Field and impact assessments	

SECTION G: DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

I, **Brenda Makanza** declare that I –

- (a) act as the independent environmental practitioner in this application;
- (b) do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- (c) do not have and will not have a vested interest in the proposed activity proceeding.
- (d) have no, and will not engage in, conflicting interests in the undertaking of the activity,
- (e) undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;
- (f) will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- (g) will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the Department in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the Department may be attached to the report without further amendment to the report;
- (h) will keep a register of all interested and affected parties that participated in a public participation process;
and
- (i) will provide the Department with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Bizycon PTY LTD

Name of company:

Date

**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2019/1542

Herewith certifies that
Shorai Brenda Makanza
is registered as an
Environmental Assessment Practitioner

***Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as
amended).***

Effective: 01 March 2023

Expires: 29 February 2024

Chairperson

Registrar



Summary of where requirements of Section 22 of the 2014 NEMA EIA Regulations (GN R 983, as amended) are provided in this Basic Assessment Report

Section Requirements	YES/NO	SECTION IN BAR
<p>Objective of the basic assessment process</p> <p>1) The objective of the basic assessment process is to scope the issues in the environment through a consultative process-</p> <p>(a) Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;</p> <p>(b) Identify the alternatives considered, including the activity, location, and technology alternatives;</p> <p>(c) Describe the need and desirability of the proposed alternatives,</p> <p>(d) Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk impact of the proposed activity and technology alternatives on the these aspects to determine-</p> <p style="padding-left: 40px;">(i) The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and</p> <p style="padding-left: 40px;">(ii) The degree to which these impacts-</p> <p style="padding-left: 80px;">(aa) Can be reversed</p> <p style="padding-left: 80px;">(bb) May cause irreplaceable loss of resources;</p> <p>and</p> <p style="padding-left: 80px;">(cc) Can be avoided, managed or mitigated;</p> <p>(e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-</p> <p style="padding-left: 20px;">i. Identify and motivate a preferred site, activity and technology alternatives;</p> <p style="padding-left: 20px;">ii. Identify suitable measures to avoid, manage or mitigate identified impacts; and</p> <p style="padding-left: 20px;">iii. Identify residual risks that need to be managed and monitored.</p>	<p align="center">YES</p>	
<p>Scope of assessment and content of basic assessment reports</p> <p>2) (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include :</p> <p>(a) Details of:</p> <p style="padding-left: 20px;">i. The EAP who prepared the report</p>	<p align="center">YES</p>	

ii. The expertise of the EAP, including a curriculum vitae:		
(b) The location of the activity , including: i. The 21 digit surveyor general code of each cadastral land parcel; ii. Where available, the physical address and farm name; iii. Where the required information items i and ii is not available , the coordinates of the boundary of the property or properties;	YES	
(c) A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure 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 on land where the property has not been defined , the coordinates within which the activity is to be undertaken;	YES	
(d) A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken associated structures and infrastructure;	YES	
(e) A description of the policy and legislative context within which the development is proposed including- I. An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report ; and II. How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	YES	
(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 location;	YES	
(g) A motivation for the preferred site, activity and technology alternative;	YES	
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including: i. Details of all the alternatives considered;	YES	
ii. Details of the public participation process undertaken in terms of regulation 41 of the regulations, including copies of the supporting documents and inputs	YES	
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;	YES	

iv.	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	YES	
v.	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) and (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated	YES	
vi.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration, and probability of potential environmental impacts and risks associated with the alternatives;	YES	
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;	YES	
viii.	The possible mitigation measures that could be applied and level of residual risk	YES	
ix.	The outcomes of the site selection matrix;	YES	
x.	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	YES	
xi.	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	YES	
(i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-</p> <ul style="list-style-type: none"> i. A description of all environmental issues and risks that were identified during the environmental impacts 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; 	YES	

<p>(J) An assessment of each identified potentially significant impact and risk, including-</p> <ul style="list-style-type: none"> (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; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed or mitigated; 	<p>YES</p>	
<p>(k) Where applicable, a summary of the findings and impacts managements measures identified in 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 report;</p>	<p>YES</p>	
<p>(l) An environmental impact statement which contains-</p> <ul style="list-style-type: none"> (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimpose the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; 	<p>YES</p>	
<p>(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;</p>	<p>YES</p>	
<p>(n) 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;</p>	<p>YES</p>	
<p>(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;</p>	<p>YES</p>	

(p) 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;	YES	
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	x	
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties any responses by the EAP to comments or inputs made by interested and affected parties; and	YES	
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	x	
(t) any specific information that may be required by the competent authority; and	x	
(u) any other matters required in terms of section 24(4)(a) and (b) of the act.	x	

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1. BACKGROUND

1.1 INTRODUCTION

Maquassi Hills Local Municipality intends to undertake a housing development on Portion 2 of the Townland Wolmaransstad. This will include the establishment of about 30 medium to high income serviced stands for qualifying beneficiaries. As part of the feasibility assessment and planning of the proposed development, Bizycon Ltd has been engaged through Nata Construction to conduct an environmental assessment for the proposed development.

As per the provisions of the Environmental Impact Assessment (EIA) Regulations, December 2014, as amended, under the National Environmental Management Act- NEMA (Act 107 of 1998) an environmental impact assessment is required for the proposed developments prior to commencing any physical activities that fall within any of the listings within the notices.

Preliminary screening of the site and the information supplied indicates that the site is about 1.6ha and has undeveloped indigenous grassland. This falls within listed activity of removing 1 or more ha of indigenous vegetation. This signifies a need for EIA in terms of Chapter 4 of 2014 EIA Regulation (GNR 982) as amended 2017, Basic Assessment (BA) process is required to be followed towards environmental authorisation for the proposed development. This EIA is to identify the potential impacts of proposed activities on the biophysical and social environment (and *vice versa*) and to facilitate any necessary authorisation for such activity which may be triggered in terms of the regulations.

1.2 PROJECT SITE LOCATION

The site under consideration is currently vacant but surrounded by existing settlement. The Site is situated on the north western corner of Wolmaransstad Town, Enclosed by Bodenstein Street, and Smit Streets. The GPS Coordinates and other geolocation data is presented in table 1. The locality map and Arial locality are presented in Figure 1 and 2.

PROPERTY DESCRIPTION	Portion 2 of Wolmaransstad Town and Townlands 0184HO	
SG 21-DIGIT NO	T0H0000000018400000	
ZONING	Residential	
GPS POINTS		
	27° 11' 31.92"S	25° 58' 53.74"E

Figure 1 Site Locality



Figure 2 Site Location, with evidence of inclusion in the previous township establishment.

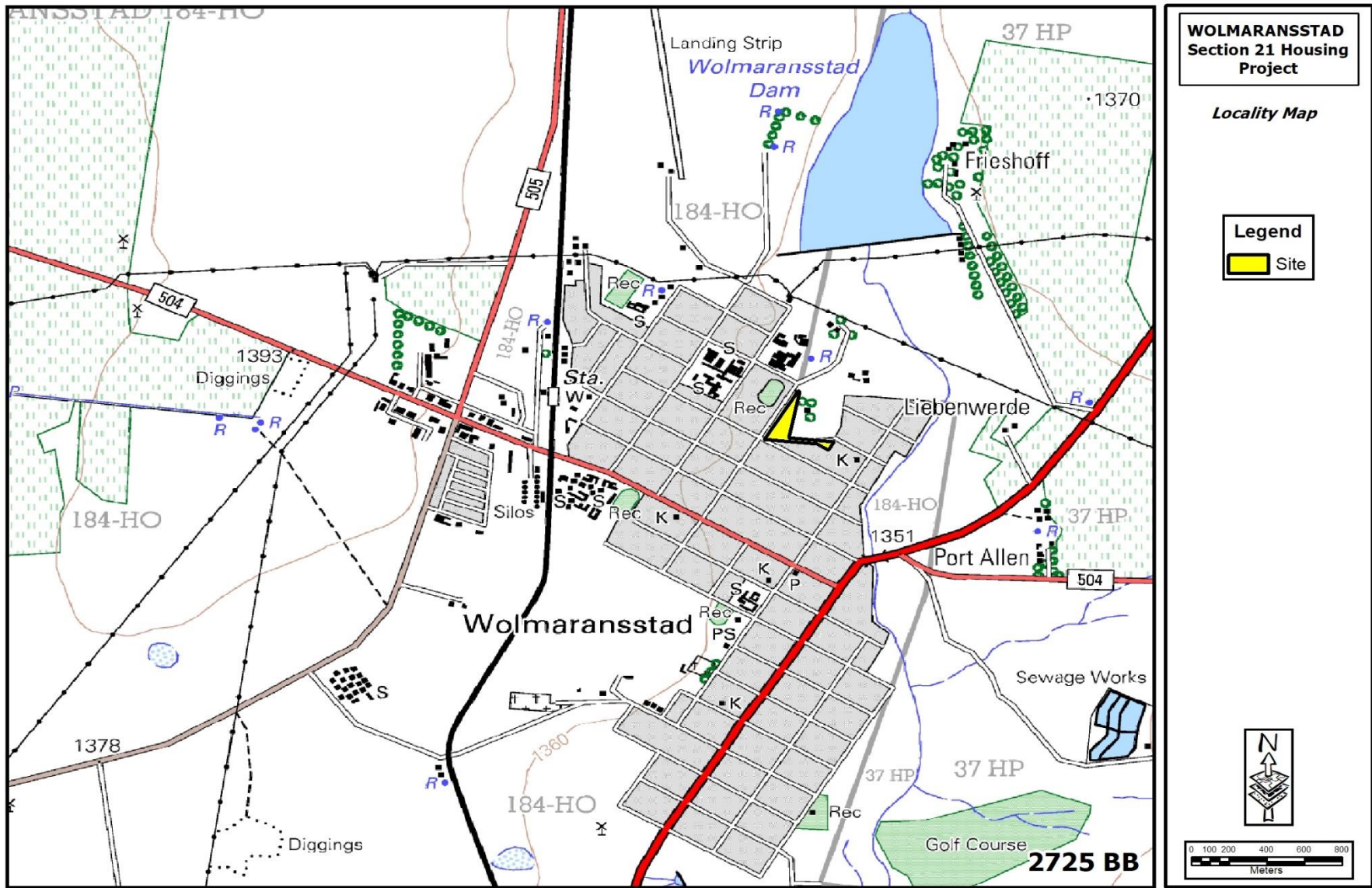


Figure 3 Site locality

2. PROJECT & ACTIVITY DESCRIPTION

A key part of government's theory of change on human settlement programme is to use housing as a vehicle to drive social and integrated settlement developments which allow for the provision of major services and access to urban amenities to communities in which such developments are implemented. This proposed development is to cater for and contribute towards medium to high income housing infrastructure.

Township Establishment of 30 serviced residential stands and associated housing infrastructure on Portion 2 of the Farm Wolmaransstad Town and Townlands. The development is intended for medium to high income residential housing and internal street, as per the layout.

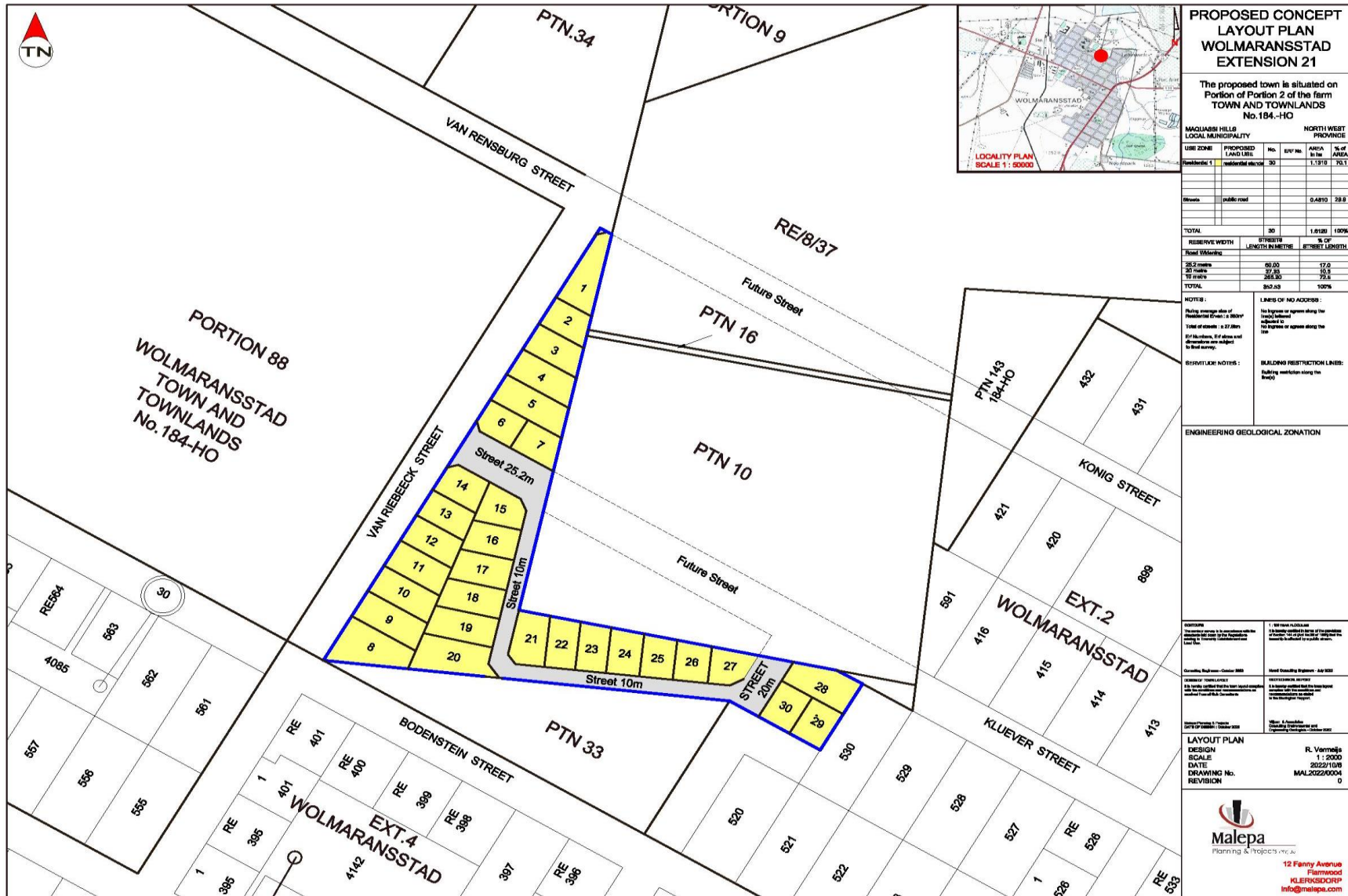
The piece of land is about 1.6ha. Associated housing infrastructure will include an internal road of about 6-10m wide and equipped with stormwater infrastructure, internal water, and sewer reticulation.

A more detailed project description is provided in the table below. The stands will be serviced and then sold to qualifying beneficiaries/buyers. Further description is provided in the table below:

Size of site	<ul style="list-style-type: none"> The total size of the site is approximately .4ha.
Housing /Ervens	<ul style="list-style-type: none"> 30 serviced sites or ervens for medium to high income houses.
Roads and Stormwater Mgt	<ul style="list-style-type: none"> Stormwater infrastructure will be equipped to the internal roads and the exertions road network infrastructure.
Internal Roads network	<ul style="list-style-type: none"> There is an already existing road network in the vicinity of the study area. One more street of about 10m will be constricted of about 0.5km.
Water reticulation	<ul style="list-style-type: none"> There are bulk water pipes available in the vicinity. The approximate diameters of the pipes located \pm 200mm uPVC and supply the areas in Wolmaranstad The pipe diameters of the network in the vicinity range from 75mm to 250mm and this will be applied to the proposed development.
Sewer	<ul style="list-style-type: none"> There are formal bulk sewer services available in the vicinity of the study area.
Electricity	<ul style="list-style-type: none"> There is existing bulk electricity capacity in the area supplied by Eskom. It is expected that the development will be serviced from this connection.

The consolidated layout / Master layout of the site is shown in Figure 3.

PROJECT LAYOUT



2.1 LISTED ACTIVITIES IN TERMS OF NEMA REGULATIONS DEC 2014 AS AMENDED

The National Environmental Management Act 107 of 1998 is the legislative instrument that governs environmental implications in relation to development vis-à-vis sustainability and environmental management. Regulations have been developed to guide the implementation of the National Environmental Management Act, under which, are lists of activities that may require authorization from the relevant Environmental Department prior to implementation.

The implications of various aspects of the proposed development in terms of the regulations are discussed in the ensuing sections of this report. Determination of possible adverse impacts and mitigation would be an advantage to both the receiving environment and the beneficiaries. This report is also prepared in accordance with the environmental assessment requirements for housing projects as prescribed by the Department of Human Settlement.

As per Chapter 3 and 4 of the Environmental impact Assessment Regulations 2014, as promulgated under the National Environmental Management Act (NEMA), Act 107 of 1998, a developer, upon crossing specified thresholds, must conduct environmental impacts assessment processes to obtain authorisation from a competent authority prior to the commencement of such activities. It is the duty of the EAP to determine if proposed activities fall within such schedule. Depending on the magnitude of the proposed activities, a Basic Assessment Process (under regulations 983) or a full scoping and EIA (under regulations 984) may be undertaken in terms of Section 24D .

From the screening of the activities proposed by the developer as detailed in the attached Preliminary Engineering report and layout, and as confirmed by the specialist studies undertaken, the following listed activities are noted, for which a Basic Assessment Process for authorisation is being undertaken. (Table 2).

ACTIVITIES APPLIED FOR

Table 1 Listed Activities)

For an application for authorisation that involves more than one listed or specified activity that, together, make up one development proposal, all the listed activities pertaining to this application must be indicated.

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
e.g. GN.R. 327, 4 December 2017	9	Since the development is new, there are bulk water pipes available in the vicinity. The approximate diameters of the pipes located \pm 200mm uPVC and supply the areas in Wolmaranstad. The pipe diameters of the network in the vicinity range from 75mm to 250mm and this will be applied to the proposed development.
	27	The site is covered by indigenous vegetation classified as Klerksdorp Thornveld (G13), of about 1.6ha that will be cleared for the development of the houses and associated infrastructure.

Please note that any authorization that may result from this application will only cover activities specifically applied for.

3. THE EIA METHODOLOGY: THE BASIC ASSESSMENT PROCESS

The environmental impact assessment process as a whole is intended to provide information on the affected project area, to determine whether there are any fatal flaws that may militate against proposed development, to assess any positive factors that the development may take advantage of, identify alternatives at an early stage, facilitate consultation with all Interested and Affected Parties (I&APs) and key stakeholders, including specialists and to address the concerns of I&APs that may arise regarding the proposed development, thereby ensuring full public participation. This is to ensure a holistic planning approach that promotes full community engagement. A schematic representation of the basic Assessment (EIA) process is depicted in Figure 4.

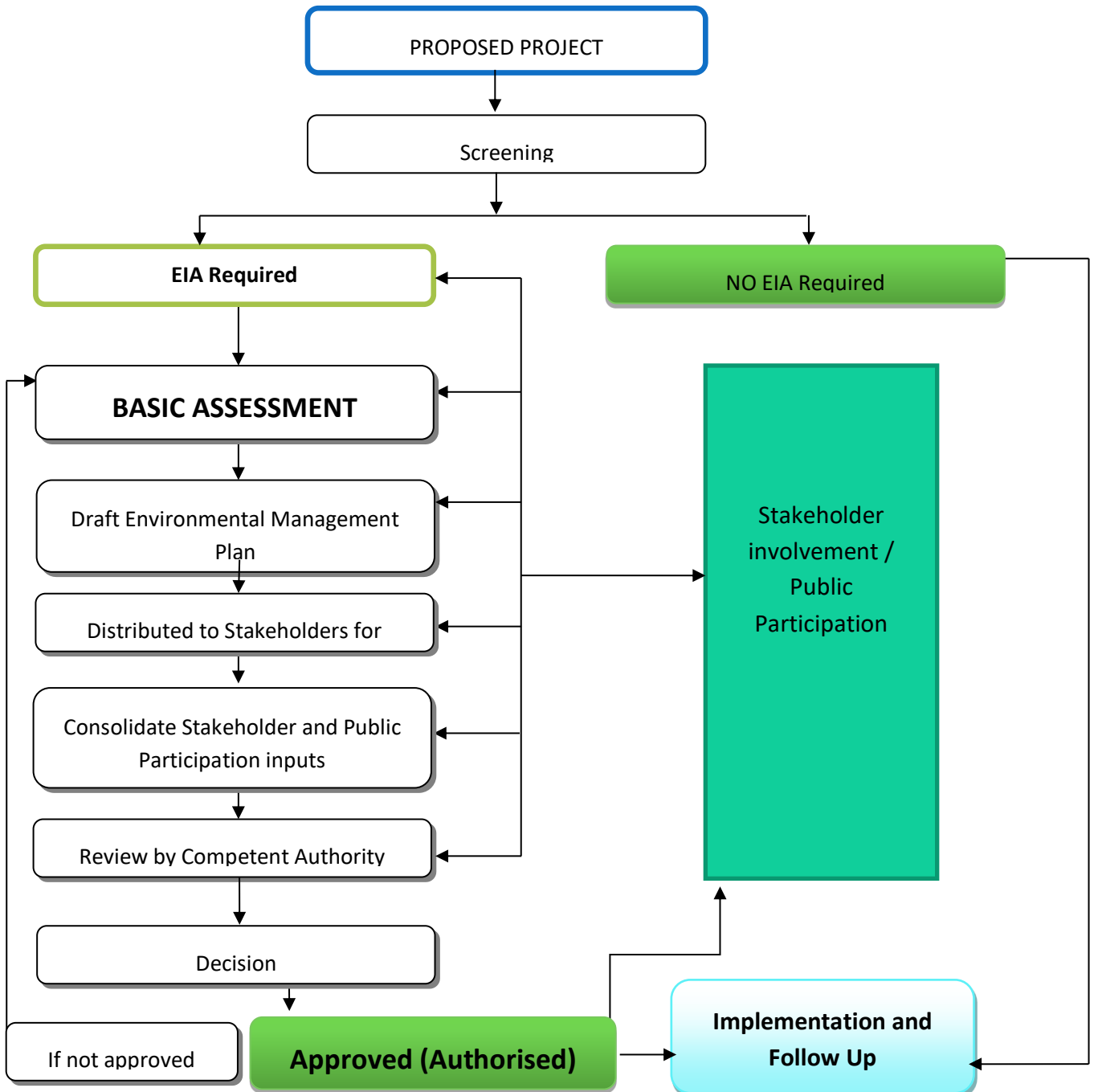


Figure 4 An illustration of the EIA Process flow (Source: Adapted from Aucamp J.P., 2010).

3.1 THE DETAIL SITE ANALYSIS (BASIC ASSESSMENT)

The project is currently at the detail environmental analysis and issue identification and assessment phase of the process. Public participation is fundamental at this stage phase because it assists the Environmental Assessment Practitioner (EAP) to identify, categorize, and recommend issues that are significant and what impacts they may have on the proposed development and Vice-versa in accordance with the guidelines contained in Regulation 327 and 325 of 2017, under the National Environmental Management Act 107 of 1998.

3.2 FIELD VISITS AND DATA COLLECTION

Field visits are conducted for two broad purposes namely collection of data for public participation and also for biophysical environmental assessment. Issues were identified using professional judgment, experience of similar projects, and previous knowledge of the study area, a review of available literature, public consultation, specialist input and consultation with relevant decision-making authorities. Additionally, specialist duties were conducted to identify and confirm the significance of some of the issues identified.

3.3 PUBLIC PARTICIPATION REQUIREMENTS

The public participation process involved consultations with stakeholders, and the public, neighbouring businesses, and stakeholders such as, South African National Biodiversity Institute (SANBI), The South African Heritage Resources Agency (SAHRA), and Department of Water and Sanitation (DWS) and all regional and local stakeholders. This draft report will be circulated for further comments, and these will be attached and integrated when received. Public participation report attached summarises the public participation process undertaken as part of this process.

4. CONSIDERATION OF LEGAL AND REGULATORY REQUIREMENTS

The following are some of the key legislations relevant to this development:

4.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA) ACT 107 OF 1998

The National Environmental Management Act 107 of 1998 has in terms of section 24 and 24D of the Act established regulations regarding the conduct of EIA processes made under section 24 (5) of the Act and published in Government Gazette 38282 of December 2014, as amended. These regulations published lists of activities (982, 983, 984 and 985) that require various levels of applications of EIA process. The section of the regulation that bears relevance to this project is R327, R325 and R324.

Under this regulation an environmental impact assessment, in this case, a basic assessment process is required, the elements of which are stipulated in relevant sections of the National Environmental Management Act 107 of 1998.

4.2 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)

The specific requirements under this Act that are relevant to the proposed project are the regulations on Major Hazardous Installations (MHI) and their potential health and safety impacts. Section 9 of the MHI regulation, which came into force in 1999, requires that where practicable the developer shall prevent the establishment of developments adjacent to sites or areas that the MHI would potentially pose a hazard.

This Act also bears relevance to the National Environmental Management Act, which requires proponents of development to ensure a 'risk averse' approach where there is adequate information that a given development is associated with potential for health and safety risks to beneficiary and neighboring communities. Where a given development affects settlements, the requirement of this Act needs to be carefully and adequately integrated in the planning process.

4.3 DEVELOPMENT FACILITATION ACT (ACT 67 OF 1995)

The Development Facilitation Act was established to facilitate the speedy delivery of services and facilities to previously disadvantaged groups. However, enshrined in this Act is the provision that developers are to ensure that adequate provision is made for the assessment of the potential impacts that the development project is likely to have on the receiving environment, and provision made for the management of these impacts. The EIA process is therefore being undertaken in fulfillment of the requirements of this Act.

4.4 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)

The objective of this Act is to provide for the conservation of natural resources by maintaining the production potential of land, combating, and preventing erosion, preventing the weakening or destruction of water resources, protecting natural vegetation, and preventing and/or combating invader plants and weeds. The planning and implementation processes of the proposed project therefore will take cognizance of relevant provisions of this Act.

4.5 NATIONAL WATER ACT (ACT 36 OF 1998)

Current regulations regarding discharge of surface water requires that surface water is handled with care both in terms of quality and quantity before being discharged into any natural water course, so that the quality and flow rate of natural systems are not significantly disrupted.

The development under investigation is expected to generate large quantities of stormwater, consequently an accelerated run off at the discharge points. This Act requires that stormwater control measures are satisfactorily addressed, and a maintenance programme developed to ensure that stormwater discharge points and downstream impacts are effectively mitigated.

In addition, Section 21 the act National Water Act (Act 36 of 1998) also requires that a water-use license be obtained from the competent authority prior to undertaking certain activities for developments that are within 500m of a watercourse. In this case the project site accommodates a wetland and hence a Water Use License Application may need to be made with the Department of Water and Sanitation.

4.6 NATIONAL FOREST ACT (ACT 84 OF 1998)

The National Forest Act dictates the procedures and processes required for the protection of natural forests and forest trees. The relevance of this Act to the development under investigation is that the impact of the development on trees in the riparian vegetation on the site should be minimized as much as possible. Any removal of indigenous trees has to be authorized by the Department of Forestry.

4.7 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The National Heritage Resources Act (NHRA), Act No. 25 of 1999) defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Reports in fulfilment of Section 38(3) of the NHRA must include the following information:

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

The Heritage Impact Assessment (HIA) is limited to the actions described above, i.e. identification of heritage resources and recommendations for their management, and does not include mitigation costs. The final report will be submitted to the relevant authorities responsible for heritage for assessment and approval.

5. NEED AND DESIRABILITY

The provision of services to local communities is part of the government's initiative to improve service delivery and improve the livelihoods of such communities. This is being done through many means, from improving residential infrastructure, improving of roads infrastructure and extension of other vital services such as water, electricity, sanitation, and accessibility by emergency services.

The Maquassi Hills Local Municipality Integrated Development Plan 2022 and the Maquassi Hills Local Municipality Human Settlement Plan 2021 highlighted that the Municipality had a total housing need that was estimated at 28 456 erven. This includes Wolmaransstad, Leeudoringsstad, Makwassie and Witpoort towns. The town of Wolmaransstad is identified as having a short term, medium to high income housing demand.

<i>Units</i>		<i>Land Needs</i>
<i>Current Backlog (Formula used = Informal's on stands + Informal's in backyard)</i>	<i>13 830</i>	<i>790</i>
<i>Additional Households (2020-2024) (Formula used = Population Projection difference from 2020-2024)</i>	<i>4 352</i>	<i>249</i>

Waiting list (Income = % of total subsidized category that might qualify)	9 504	543
Informal Settlements Upgrading Programme - ISUP	770	44
TOTAL	28 456	1 626

Source: Maquassi Hills Local Municipality, 2020/2021 Adopted from project Memorandum, Malepa 2022)

The Municipality in response to the above matter instructed Malepa Planning and Projects (PTY) Ltd to conduct a Township Establishment Process. A site was identified, and the said site is located on a portion of Portion 2 of the farm Wolmaransstad Town and Townlands No.184-HO.

6. MOTIVATION FOR THE PROPOSED SITE, ACTIVITY AND TECHNOLOGICAL ALTERNATIVES

The EIA Regulations in the specification of the EIA process requires suitable and feasible alternatives to be provided, if possible, to the proposed activity as part of holistic planning. Chapter 1 of NGR 982 of 2014 defines alternatives to the proposed activity to mean a different means of meeting the general purpose of the requirements of the activity. These include alternatives in terms of:

- a) Property or location at which the proposed development is to occur,
- b) Type of activity to be undertaken.
- c) Design or layout of the activity
- d) Technology to be used in the activity or
- e) Operational aspects of the activity

The alternatives are also to include the option of not carrying out the proposed activity, which is popularly referred to as the “no-go alternative”. The impact assessment then is to include not only the desired alternative but also impacts of the identified alternatives. A summary is then provided of these alternatives to have an idea which will yield the most benefits with less undesirable impacts. It is also acknowledged that in some cases, where not suitable alternatives are feasible, then the proposed activity becomes the only alternative to the no-go alternative.

6.1 SITE ALTERNATIVE

The site proposed for the development is the piece of land adjacent to Van Riebeeck Street. The identified portion of land earmarked for township establishments according to the Municipality can yield 26 pegged erven, and now able to hold about 30 erven. The owner of the land is Maquassi Hills Local Municipality. Due to the land demand backlog in the area, only this site is considered for the proposed development.

A Township Establishment Application in terms of the provision of the Spatial Planning and Land Use Management Act, 2016 (Act 16 of 2013) and other applicable legislation, together with the Maquassi Hills Local Municipality Spatial Planning and Land Use Management By-law.

Malepa Planning and Projects (PTY)Ltd will lodge the application, follow the legal phases of the project and obtain the relevant approvals until registration of a township with the Registrar of Deeds and proclamation of approved township. Other positive spillover developmental effects are expected to occur with the provision of these foundational infrastructures. In this case upgrade of roads infrastructure and provision of better housing infrastructure.

6.2 ACTIVITY ALTERNATIVE

The proposed development entails the establishment of a functional residential community. For the purposes of gap housing for medium to high income houses in the area this is the only alternative housing format considered for this development at this stage.

Also, due to budget and time constraints and the developmental needs of the town, it is indicated that the proposed activity is the most suitable means of improving the community's current outlook. In view of this no other activity alternative is considered as this is already an integrated service delivery project. The site is zoned for housing, and it being used for that. No other activity is earmarked for the site.

6.3 TECHNOLOGICAL ALTERNATIVE

Technological alternatives include the current ways of constructing houses by manually laying of bricks and using human labour in digging trenches laying pipes and covering them up. Roads construction will also be according to the current technological standards as per the transport sector regulations and budget parameters. No special technologies have been considered other than the current accepted technological ways of doing things as per the accepted standards. It is noted however that details of each technology employed will be approved by the project engineer prior to use.

6.4 NO-GO ALTERNATIVE

The no-go alternative to this development implies that the settlement upgrade does not take place. The status quo will simply remain, coupled with current community dissatisfaction with the state of services, leading to potential social unrest and protests. That is the current nature of the no-go alternative. The gap in the housing market is also considered a critical service delivery issue, and therefore though the no-go-alternative may be to not develop, the social and economic benefits for the development may go a long way in adding to the needed service and infrastructure in the community.

7. DESCRIPTION OF THE RECEIVING ENVIRONMENT

7.1 PHYSICAL CHARACTERISTICS

7.1.1 TOPOGRAPHY AND SLOPE AND GEOLOGY AND SOILS

The topographical character of the site consists mainly of a gentle sloping in a north-eastern direction. The site slopes gently and does not consist of any steep slopes of beyond 1:3 within the development footprint. In terms of the implications for the proposed development, it is noted that development cannot be undertaken on slopes greater than 1:3. However, as per general residential development principles, all areas that are not steeper than 1:3 are potentially developable as far as slope is concerned. At this stage slope is not expected to be a hindrance for the proposed development. The geological character is mainly quartz periphery. Soil according to the geotechnical report is Damp dark brown micro shattered silt sand clay and Damp red aerobic clay with loose consistency and Fe + Mn concretions. Further details can be found in the

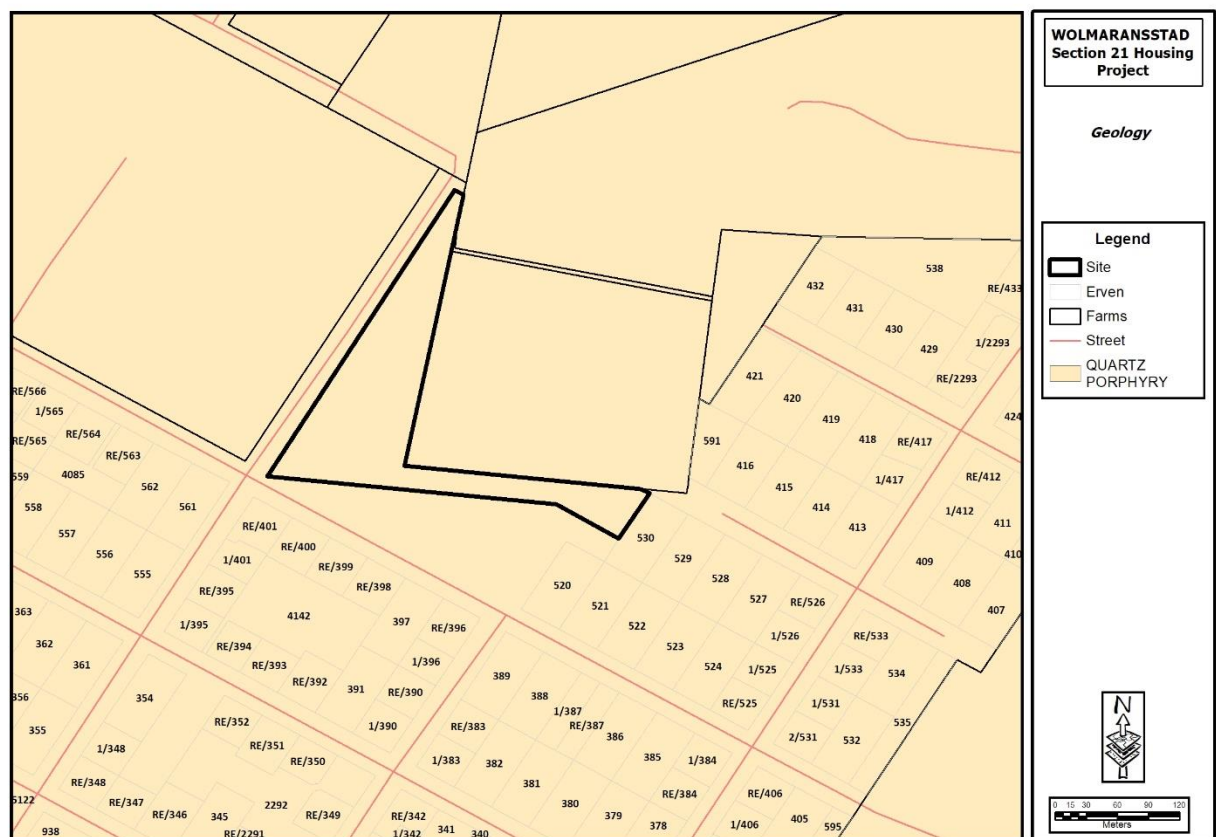


Figure 4 Geology

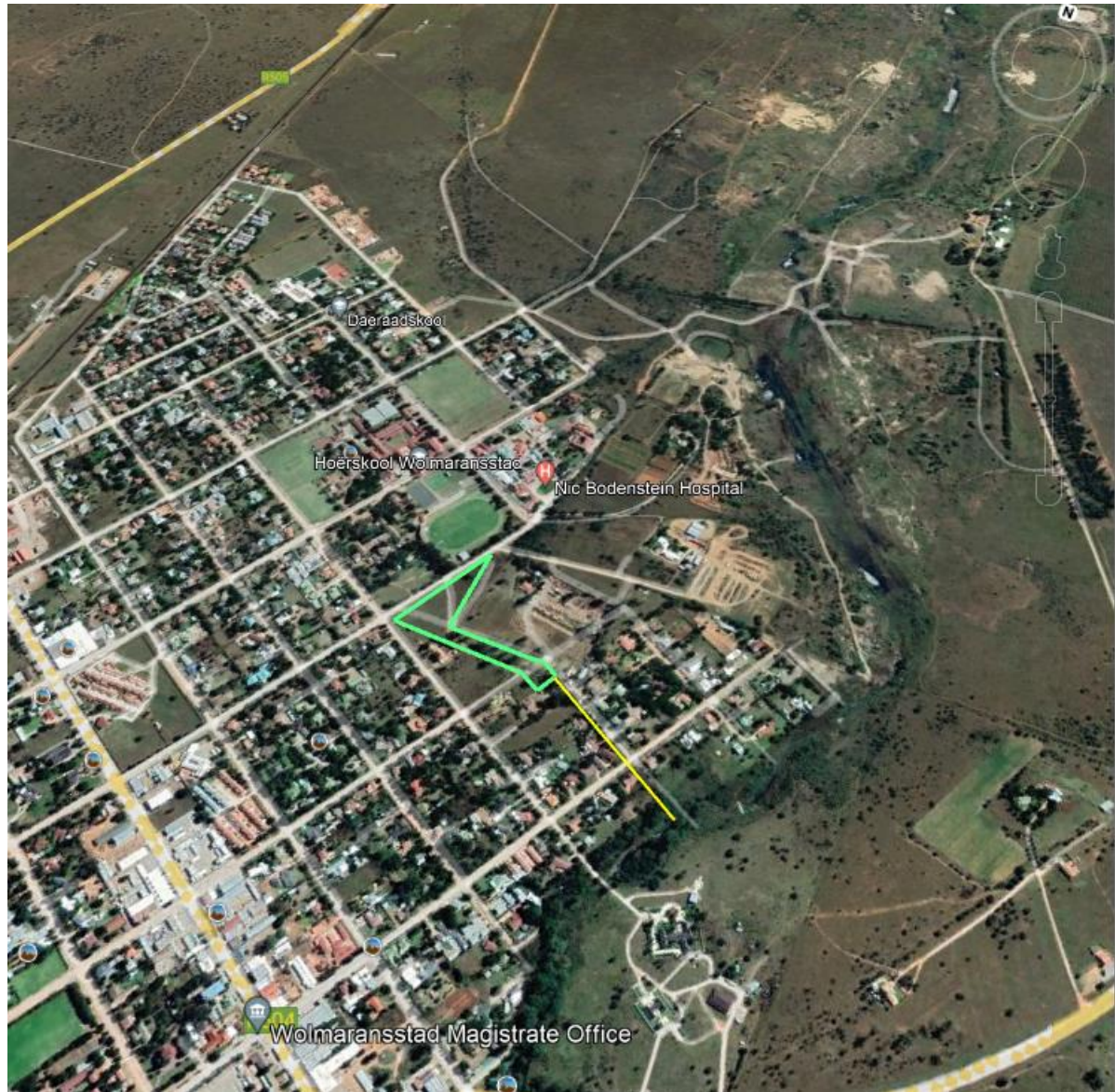
7.1.2 WETLANDS AND RIVERS AND CATCHMENTS.

There are no watercourses within the project boundary or immediate vicinity (at least 100m). The closest watercourse to the site is the stream that flows on the eastern boundary of the town, which is about 300 – 350m

from the site boundary. Given that there are more houses between the project boundary and the stream, stormwater impact from the site to on the stream will mostly be indirect.



Figure 5 Hydrology Map of the site and proximity to hydrological features



Implications for this development

The proposed site is outside wetland areas identified. However, the principles of catchment system management require that all flood lines (1:100 year flood lines) and wetlands within the catchment need to be protected from possible degradation. In view of this, the following principles apply:

- 1:50 years, and 1:100 years flood line of all major rivers within the catchment should be established.
- No development is to occur within the 1:100 years flood line, (bearing in mind the 1:50 year floodline is a component of the 1:100 year floodline)
- No development is to occur within any wetland area or within the recommend buffers.
- In the case of this development, it is observed that the site falls outside these development setback lines, hence it is likely that the site chosen is developable, if necessary, precautions are observed.

Given the proximity of the site to the watercourses (within 500m), there may be the need to apply for a Water use licence (WULA) in terms of Section 21 of the National Water Resources Act (Act 36 of 1998).

7.1.3 VEGETATION

The site is currently vacant piece of land occupied by grassland vegetation type, with few exotic trees. The vegetation is classified as Klerksdorp Thornveld, (G13) Map 3. This vegetation type is currently listed as least threatened in terms of conservation status. The character of this vegetation on the site is mainly grassland with few trees. The grassland is relatively disturbed, due to its proximity to the existing community. It is surrounded by tarred streets and traversed by a few gravel paths.

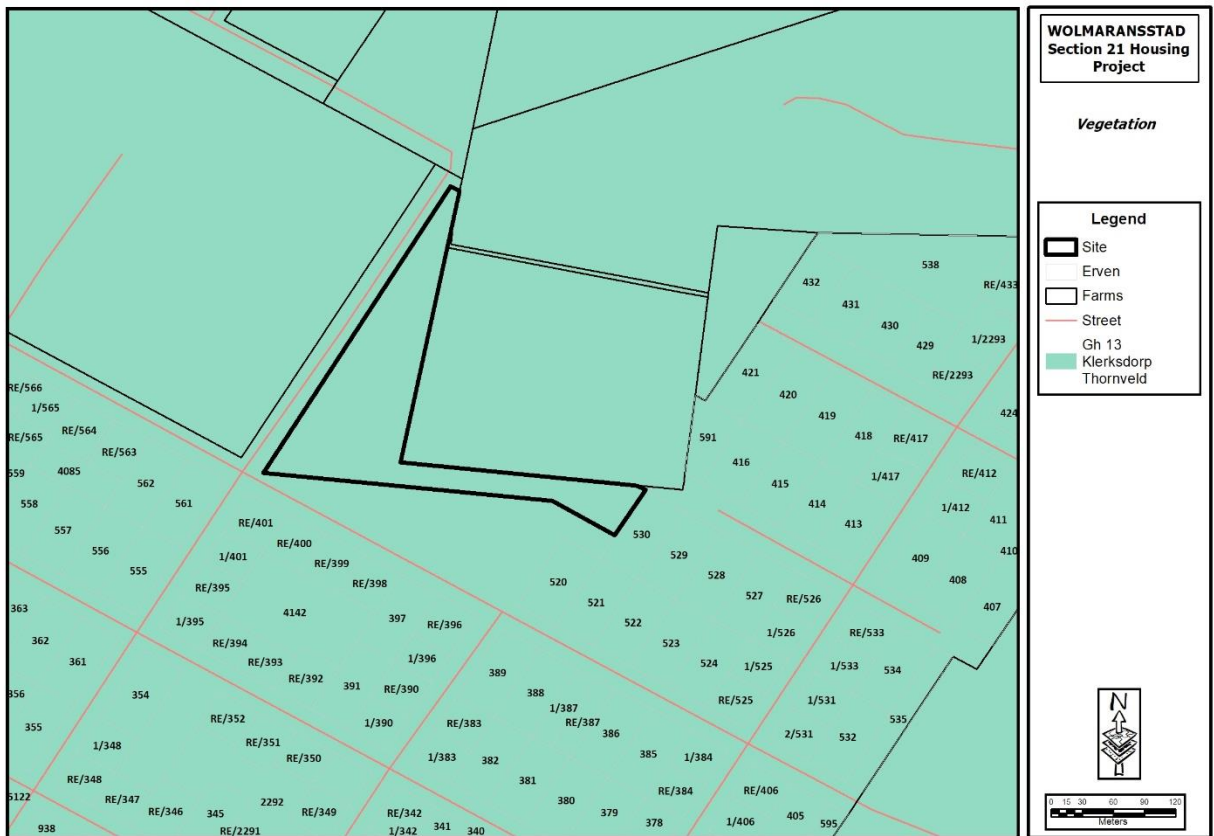


Figure 6 General Vegetation character of the site.

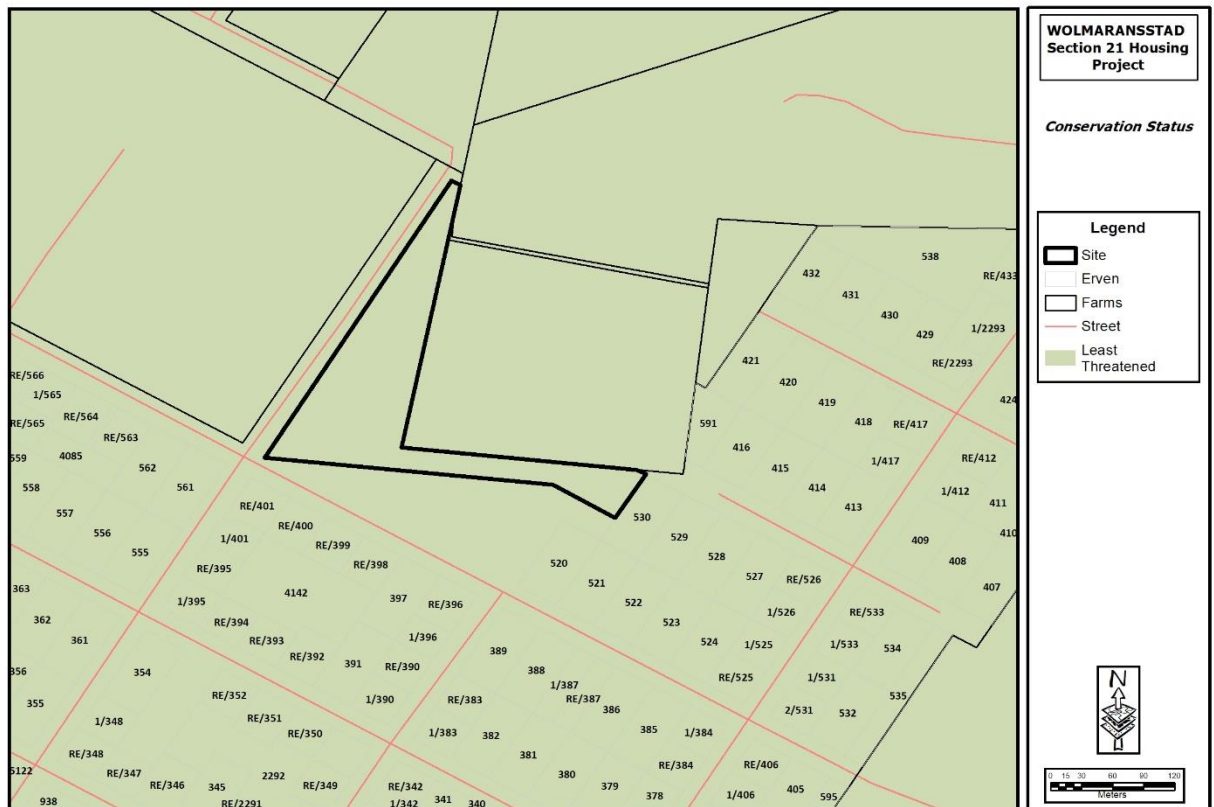
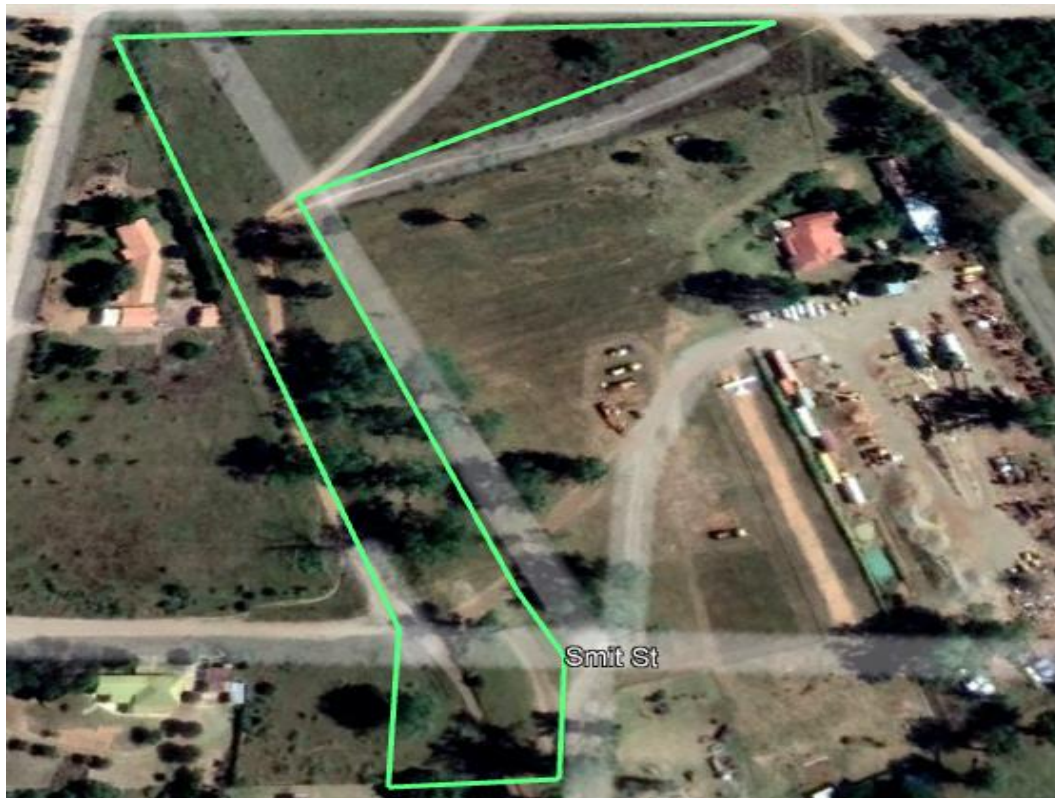


Figure 7 Vegetation conservation status (least threatened)

The general biodiversity information available on the site indicates that the most parts of the site does not fall within biodiversity priority zoning (See Map 4).

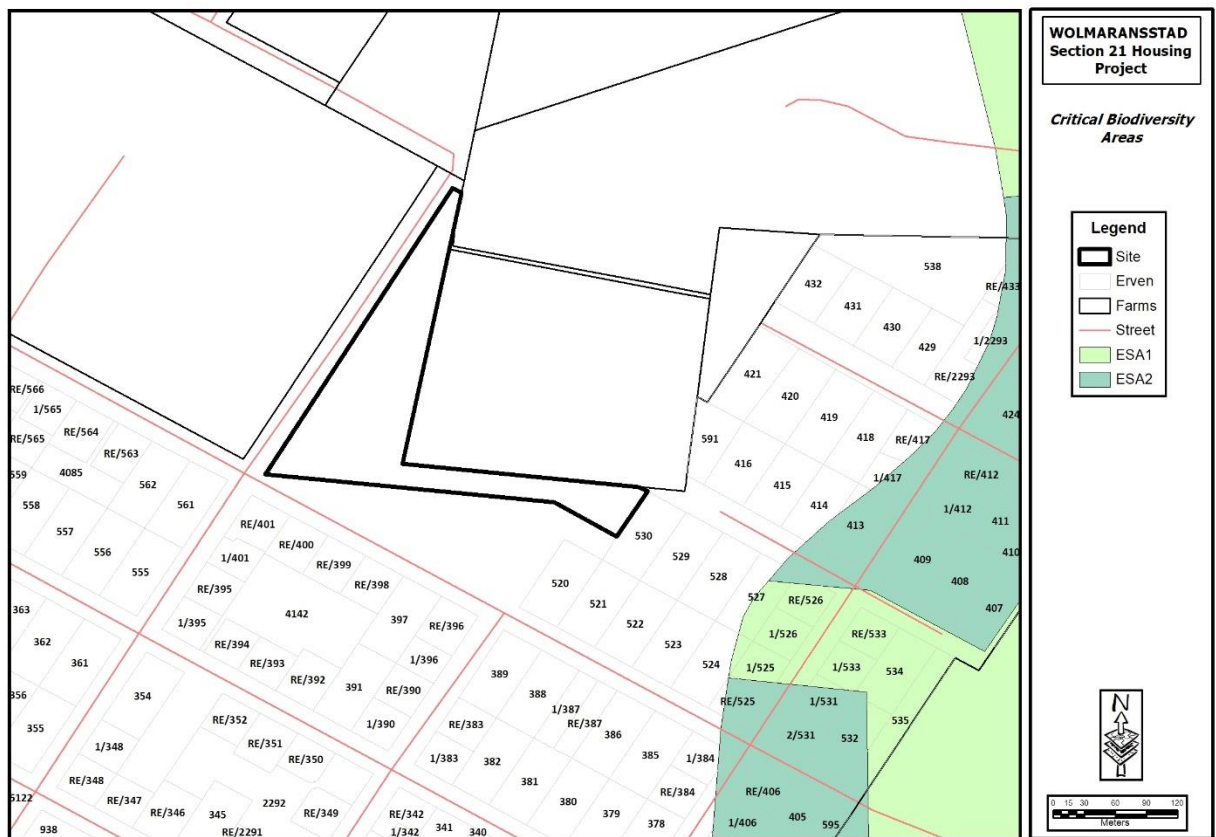


Figure 8 Critical biodiversity Area (CBA) classification of the area.

Implication for the proposed development

The proposed development will entail removal of the vegetation within the development boundary. This implies that an environmental authorisation may be required for the proposed development through an Environmental Impact Assessment process (Basic Assessment Process) in terms of Section 24 of NEMA (Act 107 of 1998), given that the development footprint is more than 1ha.

Also vegetation removal, may lead to increased hardened surfaces, and leading to accelerated stormwater flow/ this may require a proper stormwater management plan to be integrated into the proposed development.

7.1.4 CURRENT AND POTENTIAL LAND USE

The site currently is mostly vacant land. The Environmental management Framework has zoned the area for residential, which resonates with the proposed development in terms of the planning scheme of the municipality.

Implications for the proposed Development

The proposed development appears to be in line with the planning scheme of the Municipality. Given the tendency of informal settlements to spout into vacant lands, the proposed development is perhaps a way of ensuring control and enforcing a barrier with the development boundary, to protect these surrounding sensitive environments.

7.1.5 MAJOR HAZARDOUS INSTALLATIONS (MHI)

This preliminary investigation did not reveal the presence of any MHI within the proposed area or within the immediate surroundings of the site.

Implications for the proposed development

No issues are expected in terms of such installations.

7.1.6 CULTURAL/ HERITAGE ARCHAEOLOGICAL RESOURCES

Site assessment did not readily identify any significant heritage resources in the area. However, the development of a vacant land of more than 500m² may require input from the Southern African Heritage resources Authority (SAHRA). It is also very likely that a Heritage Impact Study may be required, in terms of the National Heritage Resources Act (Act 35 of 1998).

Implications for the proposed development

There are no foreseeable issues relating to local cultural sites. Close collaboration between the development implementation agents and the community should be fostered in order to develop appropriate mitigation acceptable to both parties for local cultural sites.

7.1.7 AVAILABILITY OF SUPPORT INFRASTRUCTURE /BULK SERVICES

The site currently is vacant but is located near within the existing Wolmaransstad community. Electricity and Water infrastructure are located within the community. Services such as water and electricity are available within the vicinity of the site. According to the electrical services report, there exists, 11kv network in Van Riebeeck Street, and 200kV mini substation on the other end of the street.

The Bulk services and engineering report confirmed that, Sedibeng Water supplies water to the community, via the 110mm main water line in Bodenstein Street. The development water requirements of approximately 18kl a day, can be accommodated and will not significantly impact on the existing water infrastructure. The proposed development will also be integrated into the existing sewer reticulation. Access roads with associated stormwater infrastructure also exists within the vicinity of the site. Therefore the proposed development will access the existing infrastructure within the development footprint. Further details can be found in the Bulk services overview report provided by Moedi Consulting Engineers, as attached in the appendixes.

8. IMPACT IDENTIFICATION AND ASSESSMENT

8.1 IMPACT ASSESSMENT AND RATING CRITERIA /FRAMEWORK

The impacts identified have been assessed and rated based on the rating criteria outlined by the Department of Environmental Affairs, as per the guideline documents to the EIA regulations (1998) as amended. This took into consideration the extent, duration, magnitude, and probability of the impact occurring, in arriving at the overall significance of the identified impact. Below is a description of the methodology utilized in ranking the identified impacts.

ASPECT	SCORE/DESCRIPTION	IMPLICATION
(a) Status		Negative impact i.e. at cost to the environment)
		Positive impact i.e. at benefit to the environment
		Neutral effect
(b) Extent	1 Site	Within the boundaries of the site
	2 Local area	Within 10km of the site
	3 Municipal Area	Within the District Municipality and areas less than 100km
	4 Regional	Within the Province
	5 National	South Africa
	6 international	Southern Africa
(c) Duration	1 Immediate temporal /	- < 1 year
	2 Short Term	1 – 5 years
	3 Medium term	6 -15 years
	4 Long term	The impact will cease when the operation stops
	5 Permanent	No mitigation measure will reduce the impact after construction
(d) Magnitude	0 None	Where the aspect will have no impact on the environment
	2 Minor	Where the effects of the environment is in such a way that natural, cultural and social functions or processes are not affected
	4 Low	Where the effects of the environment in such a way that natural, cultural and social functions or processes are slightly affected
	6 Moderate	Where the effects of the environment in such a way that natural, cultural and social functions or processes continue but in a modified way

	8 High	natural, cultural and social functions or processes are altered in such a way that they will temporarily cease or operate in a different way from usual for the duration of the activity
	10 Very high	natural, cultural and social functions or processes will cease or be altered permanently
(e) Possibility of resulting in Irreplaceable loss of resources	0 Very Low	Will not result in any irreversible or irreplaceable loss in resources
	1 Low	Likely to result is preventable and localized loss to resources
	2 Moderate	Most likely to cause loss if the project is implemented but can be moderately mitigated or avoided.
	3 High	Highly likely to cause long term loss as long as the project remains but can be reverted after decommissioning
	4 Very High	Will result in Permanent loss to resources
	6 Extremely High	Southern Africa and beyond (international)
(f) Probability of occurrence	0 None	Impact will not occur
	0.1 Improbable	Possibility of the impact materializing is very low as a result of design, historic experience or by virtue of implementation of adequate mitigation measures.
	0.25 Possible but unlikely	The is moderate chance that the impact will occur
	0.5 Probable	Impact may occur
	0.75 Highly probable	Occurrence is most likely
	1 Definite / unknown	The impact will occur regardless of the implementation of preventive or corrective actions, or where the probability that the impact will occur is unknown due to lack of information

(g) Significance weighting of the impact (S)

From the above descriptions, the potential impacts are assigned a significance weighting (S). This weighting is arrived at by adding the assigned scores of the extent (E), duration (D), possibility to cause Irreplaceable Loss of Resources (I) and magnitude (M) and multiplying the sum by the probability score (P).

Thus: $S = (E+D+M+I) \times P$

The overall significance weightings scores are categorized below:

SCORE	Description	Interpretation	Colour Code
≤ 2	Very Low		
2-5	Low		
5-10	Medium		
11 - ≤16	High		
	Positive		
	Negative		
	Positively High		

8.2 DESCRIPTION OF IMPACTS IDENTIFIED

IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

In terms of the criteria for identifying potential project impacts, it is important to list the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

For this proposed residential development at Wolmaranstad, the anticipated impacts associated with the proposed development have been identified and analysed using the mixed method approach. This includes site visits, consultation or interaction with key stakeholders, consultation of secondary information or literature, and independent assessment by the project environmental personnel and project officials. Direct impacts that may result from the proposed development include impacts on the biophysical environment, from construction activities such as site clearing, digging, building and installations of reticulation infrastructure.

Social impacts include employment and business opportunities that may open to the local and neighbouring communities as well as satisfaction that may be derived from the upgrade in the community's outlook. Other impacts may result from the operational stages of the development. The list below includes the potential identified impacts of the proposed development.

Some of these impacts may occur at the various stages but with different intensities and extent, and significance. These are assessed in relation to the various stages of the development, specifically construction and operational stages. It is noted that no decommissioning is envisaged in the proposed activities of this development. From this context, no decommissioning impacts are identified.

Construction stage Impacts

Direct impacts

- 1) Potential loss of biodiversity during construction stage, due to vegetation removal
- 2) The loss of indigenous vegetation due to the removal of land cover
- 3) Impacts on Hydrological and watercourses
- 4) Noise impacts
- 5) Dust generation and Air pollution
- 6) Possible water pollution / Surface runoff /Stormwater pollution
- 7) Soil disturbance and possible erosion activities
- 8) Heritage/Cultural /historical surface sites
- 9) Visual /aesthetic view disruption
- 10) Hydrocarbon (oil) Spills
- 11) Traffic generation and disruption in normal community life
- 12) Health and Safety issues
- 13) Job Creation

Indirect / cumulative Impacts

- 14) Improvement in the livelihood of local community members
- 15) Potential impacts on local services
- 16) Assistance in the stimulation of local economy
- 17) Potential contamination from improper waste management

Operational Stage Impacts

- 1) Noise
- 2) Water pollution watercourses /
- 3) Soil disturbance and erosion activities
- 4) Dust and air pollution issues
- 5) Stormwater Management
- 6) Job creation
- 7) Visual and aesthetic impacts
- 8) Traffic issues
- 9) Health & Safety Issues
- 10) Impacts on local services
- 11) Benefits to the community

8.3 CONSTRUCTIONAL STAGE

8.3.1 SUMMARY RATING OF POTENTIAL IMPACTS AND THEIR RATINGS ALTERNATIVE A (PREFERRED ALTERNATIVE)

	Impact	Mitigation Required	Nature of Impact	Extent	Duration	Magnitude	Irreplaceable Loss of resources	Probability	Significance Score	
CONSTRUCTION STAGE										
1	Potential Loss of Biodiversity	Yes		1	5	4	4	0,25	3,5	
2	Loss of indigenous vegetation (Flora Impacts)	Yes		1	2	2	2	0,25	2,5	
3	Impact on fauna	Yes		2	5	4	0	0,25	2,75	
4	Impact on Hydrological Resources	Yes		2	4	4	0	0,5	8	
5	Noise Impacts	Yes		2	1	6	0	0,75	6,75	
6	Dust / Air Pollution	Yes		3	2	4	0	0,75	6,75	
7	Water Pollution/Surface runoff/Stormwater pollution	Yes		1	2	8	4	1	15	
8	Soil disturbances and possible degradation	None Required		3	2	6	0	1	11	
9	Cultural or historical surface sites	Yes		1	4	5	0	0,25	2,5	
10	Visual / Aesthetic impact	Yes		1	2	2	2	0,5	3,5	
11	Hydrocarbon Spills	Yes		2	1	8	2	0,5	6,5	
12	Traffic	Yes		2	2	4	0	0,5	4	
13	Health & Safety issues	Yes		2	2	6	0	0,5	5	
14	Job Creation	None required		3	2	6	0	0,75	8,25	

15	Improvement in livelihood of local community	None required		3	2	6	0	0,75	8,25	
16	Impact on Local services	Yes		3	2	4	0	0,5	4,5	
17	Benefits to local economy stimulation	None required		2	2	6	0	0,5	5	
17	Potential contamination from improper waste management	None required		2	2	6	1	0,5	5,5	
									93,5	
Mean Significance Rating									5,84375	0

8.3.2 DETAIL SIGNIFICANCE RATING OF IDENTIFIED IMPACTS

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>Loss of critical biodiversity/habitat</p> <p>The existence of areas of high biodiversity integrity to accommodate critical habitats is very limited. Or non-existing on the site</p> <p>No significant impact is expected on critical biodiversity from this proposed development given the site is relatively transformed, with</p>	3.5 =Low	<p>Though the site has undergone some form of transformation, the grassland on the site still constitutes a good land cover. The removal of these without mitigation may lead to accelerated stormwater.</p> <p>Vegetation removal should only be as much as needed for the development</p>	Low	<p>Unnecessary encroachment on the areas on outskirts, may lead to degradation of the drainage line and disturbance of micro aquatic life within the catchment.</p> <p>These can be avoided by restricting development activity to the development footprint only and</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>only some regrown alien vegetation from previous settlement activities ..</p> <p>the areas where vegetation exist, are not being included in the development hence no impact is expected. However, given the proximity of the shallow drainage to the development, care need to be taken not to disturb the neighbouring vegetation areas.</p>		<p>Appropriate stormwater management strategy needs to be implemented, to reduce stormwater velocity.</p> <p>During construction period, it is important to demarcate these areas off, to reduce any incidents of encroachment.</p> <p>No dumping of materials or turning of vehicles should be allowed.</p> <p>Any activity that will degrade the wetland area should be avoided.</p>		<p>removing only the among of vegetation needed to contain the development, while managing stormwater flow.</p>
<p>Loss of indigenous vegetation</p> <p>Most of the areas of indigenous vegetation in the site has been slightly degraded, however disturbance of these surface cover may pave the ways for alien vegetation encroachment and hardened surfaces as result of loss of landcover. Given the that the development is to occur only within the existing or settled</p>	<p>2,5 Low</p>	<p>All areas that may be left bare during construction should be rehabilitated immediately with suitable vegetation (and approved by ECO and site Engineer) to avoid any alien species encroachment. This must be monitored during construction and post construction.</p>	<p>Low</p>	<p>If all recommendations are adhered to, and monitoring of construction is strictly done, these issues should be avoided, bringing the potential impact to moderate to low.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>areas, no significant impact is expected on the indigenous vegetation. The only possibility of disturbance will be encroaching onto the neighbouring vegetation area due during construction.</p>		<p>During construction period, it is important to demarcate these areas off, to reduce any incidents of encroachment. No dumping of materials or turning of vehicles should be allowed on surrounding vegetation areas.</p>		

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>Impact on fauna The proposed site is next to a settled community and is relatively transformed. There is only grassland on the site. Site visit and walkthrough does not reveal any significant fauna species, other than normal bird species that perch in the areas eating from illegal waste dumping. In view of this, impact on fauna is expected to be very minimal. Limited impacts may occur in the form of noise from machinery, but this is not expected to significantly disturb any fauna in the area.</p>	2.75 = Low	Machinery with low noise levels to be used. Site activities should be conducted during daytime hours to avoid nighttime noise disturbances when people come home and want to rest.	Low	This impact is expected to be limited, given that the community is an existing one, and with the current density, so significant fauna is expected other than occasional birds and domestic animals such as dogs and goats.
<p>Noise Construction stage noise will consist of noise and vibrations by vehicles moving materials and also construction workers. This is likely to cause some irritation to nearby households. This is likely to last during the construction</p>	6,75 = Medium	Machinery must be kept in good working order to reduce noise emission. Noise reduction mechanisms should be equipped if necessary.	Low	Should the mitigation not be implemented, for instance where work is carried out into the night, then the nearby households may get

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>stage and daytime if all activities are restricted to day working hours.</p>		<p>The construction activities should be restricted to normal working hours and during the day, between 8 to 5pm.</p>		<p>irritated. This may be a source of nuisance to the community itself.</p>
<p>Dust / Air pollution</p> <p>Air pollution during the construction stage is likely to stem from dust and perhaps fumes and noise from vehicles.</p> <p>The air pollution will affect the employees and surrounding community. However this can be controlled or mitigated</p>	<p>6.75 = medium</p>	<p>Clearance of the site should be kept to a minimum, and uncovered soil should be kept moist to avoid dust generation.</p> <p>Construction vehicles and machinery utilised on site should be maintained and always be kept in good working order.</p> <p>Protective construction gears should be worn by workers on dusty days, and watering should be applied where necessary keep the ground moist.</p>	<p>Low</p>	<p>Polluted air, from dust and fumes or other sources is likely to be a nuisance to the community members. This may also pose a health risk if not mitigated.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>Possible disturbance to hydrological resources:</p> <p>The site is largely devoid of rivers and major watercourses or drainage lines. These have become the main channels for drainage and aquatic corridor into the river systems outside the site boundary. It is equally important to protect these areas from degradation.</p>	8	<ul style="list-style-type: none"> It is further recommended that in order to augment the catchment efficiency of the area, at detailed planning level, buffers of between 20 m and 15 m be established along all drainage lines, within which no development should occur, to protect important or sensitive natural communities that are specific to certain localities. <p>Storm water attenuation measures should be implemented to ensure no reduction in water quality that ends up in the river on the outskirts of the town.</p>	Low to moderate	Should the recommendations not be adhered to, possibility of polluting surface runoff is likely, leading to poor quality of the river water. Cumulative impacts on these may be localized flooding, as these systems have become good channels for surface water management.
Underground water	15 = High	Equipment or tools with oil or grease is not allowed to be placed on bare ground.	Low	Inappropriate handling of waste and hazardous substance on the site can

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>There is also the possibility of contamination of underground water as a result of soil pollution due to the usage of hazardous substance on the site.</p> <p>Mixing of cement and striped soils may pave the ways for siltation into underground water, especially on rainy days during the construction phase.</p> <p>Surface runoff pollution</p> <p>Impact on surface water may be as a result of uncontrolled waste handling, including stockpiles.</p> <p>Storm water management</p> <p>Given the proposed development regards the removal of land cover in some cases, the potential to create more hardened surfaces is eminent. Storm water acceleration and localised ponding/flooding is likely to occur.</p>		<p>These must always be placed on a lined surface. Cement mixing will take place on a lined surface. No Cement should be mixed on a bare surface.</p>		<p>reduce the quality of underground water</p>
		<p>Stockpiles of rubble and topsoil should not be left piled for more than a reasonable time, as may be stipulated in the EMP, but generally not more than 14 days on site. These should be recycled where possible.</p>	<p>Low</p>	<p>Should there be no mitigation measures, possibility of storm water pollution during constructionism likely to result. This however, is likely to be localized.</p>
		<p>A storm water management system, in terms of the National Building regulations needs to be implemented by the contractor in the building of the structures.</p> <p>Onsite, drainage systems to be provided. In addition, a stormwater management plan be designed and</p>	<p>Very Low</p>	<p>Should no mitigation be implemented, this may constitute poor stormwater management which may result in Issues such as localized ponding, sedimentation, erosion and pollution among other things.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>In addition, spillage and waste could be other sources of pollution of storm water. This may lead to contamination of water bodies and underground water within the catchment system.</p>		<p>approved by the engineer prior to the commencement of construction works on the site.</p>		
<p>Soil disturbance/erosion</p> <p>The proposed activity will result in further surface clearance, soil removal, which decreases soil stability and lead to loss of soil resources by erosion, contamination and</p> <p>Soil degradation will also cause an indirect impact on the loss of micro habitats.</p> <p>Soils that are left bare and rehabilitated may become susceptible to erosion activities. It is noted that some areas within the drainage already shows signs of severe erosion occurring.</p>	<p>11=High</p>	<p>Cleared areas will be mostly occupied by residential units.</p> <p>In the case of areas cleared for pipes and other reticulation work, these need to be vegetated with indigenous vegetation following construction activities, and all excavations will be backfilled with sub soil and topsoil in the reverse order to which the soil profiles were removed.</p> <p>All visible weeds should be removed from topsoil and placement area before replacing topsoil.</p>	<p>medium</p>	<p>Should the mitigation measures not be implemented, and then there is possibility of the impacts discussed occurring. There will also be additional impacts including air pollution by dust as results of diggings and top soil removal, and soil erosion will be high given the fact that soil will be left bare exposed to wind and rain.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
		Contaminated soil by spills should be removed and disposed of as hazardous waste at a licensed hazardous landfill facility.		
<p>Cultural and Historical surface sites</p> <p>From this assessment, no significant heritage resources were identified. The site is currently bare, but with evidence of previous human activities, such farming and related activities.</p>	2=Low	If any cultural or historical features discovered during the construction, the construction must stop immediately, and the remaining must be reported to the heritage authorities in the province. A qualified archaeologists should then be engaged to assess the identified features and make appropriate recommendations.	Very low	This will be observing duty of care, during construction, without which degradation of any materials may occur. For now since nothing is readily identified, chances of any such existence is likely to be low.
<p>Visual / Aesthetic Impacts</p> <p>Visual impacts are likely to emanate from construction activities such as storage of materials, and neglected excavations.</p> <p>Construction of roads may also result in considerable altering of the current looks of the areas along such footprints.</p>	3.5=Medium	<p>Material storage during operations should be done at designated areas, in order not to constitute any aesthetic nuisance.</p> <p>Soil stockpiling and excavations should be worked on and the areas restored</p>	low	Visual Impacts is most likely to occur if mitigations are not considered which will disturb the eyes and mind of the community. This may cause nuisance also to road users etc.

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
		<p>within reasonable time frames, to reduce the length of visual impacts.</p> <p>Roadworks should be undertaken according to construction standards, and no unnecessary blockings and erecting of structures should occur. Where such are necessary, they should be removed as soon as work is complete in that area. Visual friendly materials should be used in all cases.</p>		
<p>Hydrocarbon spill/fuel</p> <p>Oil and fuel leaks and spills from construction vehicles is highly possible during construction phase. This is likely to contaminate storm water and also source possible contamination or pollution of the soil, if not properly managed or prevented.</p>	<p>6.5 medium =</p>	<p>Mitigation measures for this kind of risk includes prevention and management. Ideally, the spillage of such oils and fuels should be prevented at all cost.</p> <p>But where any of such incidents occur, prompt remedial actions should be taken. Examples of which include cutting the site and disposing appropriately, say in a registered landfill.</p>	<p>low</p>	<p>If all the mitigation measures are implemented, the impact should remain low. However should this not be the case the risk of potential contamination is high. This may lead to contamination of underground water, soil pollution and disturbance of the bio-equilibrium among other negative effects</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
		<p>Where necessary all vehicles suspected with leakages should be undersealed with drip pans.</p> <p>Fuels and petroleum product storage should be undertaken and sealed hard surfaces, which are possibly lined, to prevent any dripping into the soil and grass.</p> <p>All foremen of operators of such vehicles should be educated on this, and the vehicles should be well maintained and checked regularly for any such leakages. The health and safety rules as stipulated by the department of health should be well enforced during the construction and operational faces.</p>		
<p>Traffic Traffic during construction stage is likely to stem from the construction vehicles moving materials to and from the site, via the existing</p>	<p>4=Low</p>	<p>Traffic control officers should be appointed to control the flow of traffic</p>	<p>Very low</p>	<p>If the mitigation measures are not implemented, there will be a high</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>road networks and also the blocking of some roads, of lanes for construction work on such roads.</p> <p>This may cause some inconvenience to local residents. However, this is likely to be minimal given that the site can be accessed via different routes.</p>		<p>on the road to avoid such inconvenience.</p> <p>This kind of inconvenience can also be avoided by using alternative routes and proper planning of road diversions is necessary.</p> <p>Road closures and diversions and traffic disruption should be avoided as much as possible, and where such are necessary, should be within minimal durations to allow normal flow of traffic.</p> <p>Proper signage should accompany any planned roadworks, and disruption of traffic</p>		<p>chance of unnecessary traffic disruption.</p>
<p>Health & Safety</p> <p>The movement of machinery, storage of materials, and excavations are possible</p>	<p>5 =Low</p>	<p>The risks of accidents and injury can be minimized by the implementation of safety procedures. Proper health and safety measures should be put in place</p>	<p>Very low</p>	<p>Should these mitigation measures not put in place, these may constitute violation of the health and safety regulations. This may also leave workers exposed to all kinds of risks.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>sources of safety issues during construction stage.</p> <p>Neglect to any health and safety measures may result in injury to both workers and any other persons who may find themselves on this site. This requires a strict enforcement of the national health and safety regulations pertaining to construction sites.</p>		<p>during the implementation of the proposed development.</p> <p>Health and safety plan should be prepared and approved by the engineer prior to construction. The Occupational health and safety procedures as outlined by the department of Health should be put in place prior to the commencement of work. Safety equipment such as fire extinguishers,</p> <p>First Aid boxes, and other safety appliances should be readily available and administered by a trained safety officer.</p> <p>Proper safety measures also need to be implemented with areas of dug trenches barricaded off.</p>		<p>Should any incident occur, this may lead to prolonged waiting for help, which may lead to loss of property for, instance in the case of fire.</p>
<p>Job creation</p>	<p>8.5 =medium</p>	<p>No mitigation is required</p>	<p>High</p>	<p>N/A</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>The construction phase of the proposed development is likely to create temporary additional jobs for the local area. Jobs will be created during construction as labours, masons and other workers may be required.</p> <p>This is likely to impact positively on the local economy as more people getting employment may spiral some level of livelihood improvement</p> <p>Layout 1: All the above employment will be generated. About 35 – 50 labourers may be employed for the duration of the proposed development.</p>				
<p>Improvement in livelihood of local community</p> <p>The temporal income generated may contribute to household life improvement in the short term.</p>	8,5=Medium	None required	Medium	N/A

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>In the long term however, local people will gain skills that will help them on their future and they will stand a better chance of being hired when the development of this kind happens again.</p>				
<p>Impact on Local services</p> <p>Given that the development includes an settlement within an existing community, most of the local services such as water and electricity are already available, and have capacity to aid the development process, according to the specialist studies in terms of bulk services and engineering.</p> <p>Also some services such as road usage and water connections may be disrupted temporarily during construction.</p>	<p>4.5 = Low</p>	<p>Given the proposed technologies that involve mostly manual or human labour and auto-powered machines and construction vehicles, the impact is expected to be low.</p> <p>Any disruption in services should be preceded with ample and adequate notifications of the affected areas.</p> <p>Services should be restored within the shortest possible time.</p>	<p>Low</p>	<p>Disruption in services without adequate notification may be a source of irritation for affected community. However, with proper mitigation measures, these should be mitigated.</p>

POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE)	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>Benefits to local Economy</p> <p>The spill over of the construction stage employment and sourcing of materials from local suppliers will go a long way in providing socio-economic benefit to the community as a whole.</p> <p>More income in the pocket of community members means, more purchasing power, leading to the stirring of economic activity in the local economy.</p> <p>In addition, access and improvement of bus routes will also empower easy movements within the community making people go about their daily business with much ease, thereby improving efficiency of any existing economic activities.</p>	<p>5=Medium</p>	<p>None required</p>	<p>Medium</p>	<p>N/A</p>

8.4 OPERATIONAL STAGE

8.4.1 SUMMARY OF POTENTIAL IMPACTS AND THEIR RATINGS

OPERATIONAL STAGE									
	Impact	Mitigation Required	Nature of Impact	Extent	Duration	Magnitude	Irreplaceable Loss of resources	Probability	Significance Score
1	Noise	Yes		1	1	2	0	0,25	1
2	Water pollution (water courses)	Yes		3	4	4	1	0,25	3
3	Soil disturbance /Erosion	Yes		1	1	4	1	0,5	3,5
4	Air Pollution	Yes		2	3	2	1	0,5	4
5	Stormwater management	Yes		3	2	6	1	0,25	3
6	Job Creation	None Required		3	4	6	0	0,5	6,5
7	Visual / Aesthetic impact	Yes		1	4	0	0	0,5	2,5
8	Traffic	Yes		2	1	4	0	0,5	3,5
9	Safety	Yes		1	2	4	0	0,5	3,5
10	Impact on Local services	Yes		3	4	4	0	0,5	5,5
11	Benefits to local economy	None Required		4	4	8	0	1	7,84
									47
	Mean impact rating								3,3079

8.4.2 DETAILS OF IMPACT ASSESSMENTS AT OPERATIONAL PHASE PROPOSAL (PREFERRED ALTERNATIVE)

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>1. Noise</p> <p>Noise levels are likely to be back to normal during the operational stage.</p> <p>The people who are to benefit from the proposed development are members of the community, hence it is expected that they will live in the same harmony and lifestyle as would now come to exist in the new development. It is therefore not expected that noise levels should increase beyond normal residential levels.</p>	<p>Score 1 = Low</p>	<p>No mitigation required for noise during operational stage as life would have returned to normal as construction machines would have been withdrawn.</p> <p>Simple rules of occupancy should be developed and made available to each person on rental, and should be enforced through various punitive measures if not adhered to, including fines etc. Noise from parties and other gatherings should adhere to normal residential standards according to the rules of the town.</p>	<p>Low</p>	<p>Proper law and order should be kept in the facility and enforced.</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>2. Water pollution (water courses)</p> <ul style="list-style-type: none"> • During operational stage, the handling of waste and other chemicals such as disinfectants could be possible sources of surface water pollutions. • Improper stormwater management may result in contamination of surface water and siltation and subsequent blocking of drains and disturbances of watercourses. 	<p>Score 3 Low</p>	<ul style="list-style-type: none"> • Waste management should be included in the responsibilities of the local authority and carried out regularly to avoid any contamination of the environment. . • Given the improvement in road network, it is expected that waste management services will should not be an issue as it is expected to be integration into the normal municipal waste collection stream. 	<p>Low</p>	<p>Should there be no mitigation measures; possibility of stormwater pollution during the operation is likely to result. This is likely to be localized. Local water systems and drainage systems may be contaminated if not properly managed.</p>
<p>3. Soil disturbance /Erosion</p> <p>At operational stages, potential disturbances to the soil are likely to stem from the areas left bare from</p>	<p>Moderate 3.5</p>	<p>Striped surfaces should be utilized immediately. Stormwater management</p>	<p>Low</p>	<p>Should the mitigation measures not be implemented, and then there is possibility of the impacts discussed occurring. What</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>construction stage, not rehabilitated. These if not properly monitored and attended to may be prone to erosion activities. Soil erosion activities may cause degradation in the land if not checked in time.</p>		<p>mechanisms need to be put in place to reduce or attenuate the possible effects of surface runoff. Land cover within the open spaces and riparian zones should be maintained to serve as a reduction mechanism for surface runoff.</p>		<p>could happen will be ponding and also or stagnation if the bare land is left for a longer time without any mitigation measures. Erosion may also occur as a result of improper discharge of stormwater.</p>
<p>4. Air Pollution</p> <p>Possible pollution sources during the operational phase may stem from waste left uncollected and on any unpaved roads within the area, generating dust.</p>	<p>Low 4</p>	<p>Speed regulating mechanisms should be applied on any unpaved roads, in such a way that reduces any potential dust generation.</p> <p>Waste collection as emphasised in the previous sections, should be regularly carried out by the local authority.</p>	<p>Low 5</p>	<p>The identified impacts may occur, should no long-term mitigation measures not be put in place. People may have unrests and discomfort from such impacts.</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>5. Storm water management</p> <ul style="list-style-type: none"> Given the proposed development regards the removal the land cover, the potential to create more hardened surfaces is eminent. Stormwater acceleration and localised ponding is likely to occur. In addition, spillage and waste could be other sources of pollution of storm water. This may lead to contamination of water surface bodies and underground water. 	<p>Score 3 Medium</p>	<ul style="list-style-type: none"> A stormwater management system, in terms of the National Building regulations needs to be implemented. Onsite, drainage systems will be provided. In addition, a stormwater management plan should be designed and approved by the engineer prior to the commencement of construction works on the site. Proper stormwater discharge points should be identified and implemented as part of the stormwater channelling mechanism. 	<p>Low 6</p>	<ul style="list-style-type: none"> Should no mitigation be implemented, this may constitute poor stormwater management which may result in issues such as localized ponding, sedimentation, erosion and pollution among other things.

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
		<ul style="list-style-type: none"> Onsite water harvesting infrastructure should be installed to the buildings, where possible to reduce the amount of stormwater flow. 		
<p>6. Job Creation</p> <p>Both the construction and operational phases of the proposed development are likely to create additional jobs for the local community. Jobs will be created during construction as labours, masons and other workers may be required.</p> <p>Operational phase of the development may however see fewer jobs. Potential jobs may include maintenance staff and skilled labour work such as engineers overseeing and monitoring operation of services.</p>	<p>6.5 Medium</p>	<p>N/A</p>		<p>Should the development not be implemented, then the iterated or envisaged positive impacts are not likely to occur.</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>Waste collection is also likely to generate some form of job avenues for some local community members.</p> <p>Also if a Security company is appointed, many security personnel may get employment within the management of the CRU.</p>				
<p>7. Visual impact</p> <p>At operational stage, visual impacts are expected to normalise. The new structures should have interested into the new view of the area and become the new reality.</p> <ul style="list-style-type: none"> Aesthetic view or the new view of the community is rather expected to improve, as new residential structures are put in, and roads are well structured and well formalised. The housing typology is improved, to suite blend into the settlement types within the area.. 	<p>2.5 = Low Ext</p>	<p>Any materials left during construction should be cleared, as part of site closure, before contractors leave site.</p> <p>Waste should be organised in such a way to reduce any aesthetic nuisance. Waste storage sites should be properly designated during operation to ensure minimal aesthetic discomfort to community members.</p>	<p>Very low</p>	<p>Aesthetic or visual impacts are expected to normalize drastically during operation if all care is taken during stockpiling of materials and waste.</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<ul style="list-style-type: none"> During construction living of stockpiles for too long may be nuisance to passers-by- people and also to the neighbouring community. 		<ul style="list-style-type: none"> Once construction is complete, it is expected that site clearance should remove all stockpiles. 		
<p>8. Traffic</p> <ul style="list-style-type: none"> Traffic should return to normal and rather improved, with additional and improved road network systems. The traffic is expected to normalise into the community, as there are different alternative routs around the facility. 	<p>3.5 = Moderate</p>	<ul style="list-style-type: none"> Proper signage should be applied, to ensure most efficient traffic situation during operational stage of the development. Traffic calming measures should be implemented on road networks, accompanied by proper signage. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Improper signage and traffic control measures such as speed limits may result in traffic situations, inconvenience and in some cases possible accidents.
<p>9. Safety</p> <p>Safety during operation concerns communal leaving in a complex setting. This may require some level of</p>	<p>3.5 = Low</p>	<p>The municipality non-the-less is the custodian of the facility and should ensure that there is optimum security in the place,</p>	<p>4 Very Low</p>	

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
security and law enforcement to maintain law and order within the facility.		and the facility should be properly managed, and well-kept to make life better for occupants.		
<p>10. Impact on Local services</p> <p>Local services should improve significantly during operational stages. Residential unites would've been provided water and sanitation services from existing sources. Road networks would have improved also. As per the specialists' studies, it is envisaged that the existing facilities and infrastructure should be able to accommodate the proposed development.</p> <p>Waste collection should be managed by the municipality.</p>	5.5 = Medium	Potential impacts on local services during operation are expected to be rather positive, if services such as waste and stormwater management are handled efficiently.		
<p>11. Improvement in livelihood of local Economy</p> <ul style="list-style-type: none"> At operational stage, the improvement in the local economy would stem from the improvement in services to the community. for instance, water 	8 = High	None required	NA	NA

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>connection will be readily available for domestic and commercial activities.</p> <ul style="list-style-type: none"> • The population that may not be able to afford rent, will gain accommodation through these subsidised rental programmes. • Also, the municipality will also gain income from the rentals which may improve the municipalities financial stand, and also the local economy if used to improve further service delivery. • Improvement in road networks, mean people can go about their daily duties with much easy. Cumulative effect of all these improvements is expected to stimulate the local economy, though indirectly. 				

8.5 NO GO ALTERNATIVE

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
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Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
<p>The impacts of no go alternative are most likely to be felt from a socio economic development perspective.</p> <p>No go alternative, may imply that the community remain with the current issues of poor services, and backlog demand for medium to high income houses.</p> <p>The envisaged job creations and economic stimulation may also not occur.</p>	<p>Moderately High</p>	<p>Mitigation for this impact, is to find ways of implementing this development as planned, in an environmentally friendly and responsible manner, adhering to all legislations and guidelines as well as recommendations of this assessment.</p>	<p>Low</p>	<p>Should the mitigation not be implemented, then the issues described in the impacts section will continue as they currently are. More service delivery protests may rather occur. Also there may be dissatisfaction and conflict within the community as some residential unit hopefuls would have been denied houses, leading to social conflicts.</p>

POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS (POSITIVE OR NEGATIVE):	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION:	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
<p>All possible employment opportunities that are likely to arise from the proposed development construction and operational stages will be lost, or at least stunted.</p> <p>Socio economic benefits of the proposed development to the community are also likely to be lost.</p> <p>A no go alternative; however, will keep the environment the way it currently is. Possible construction stage impacts as well may be avoided. Production levels will remain same or increase gradually. Possibilities of informal occupancy of the site may also rise. The proposed development, if properly managed after establishment should lead to proper and formal settlement, where people can build a livelihood.</p>				

9. CONCLUSIONS AND ENVIRONMENTAL IMPACT STATEMENT

The purpose of this is to detail the assessment undertaken, taking the assessment of potential impacts into account, to give an environmental impact statement that summarises the impact that the proposed activities and alternatives may have on the environment prior to and after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

The impact assessment and significance rating show that the construction stage impacts and operational stage impacts are largely of medium significance, given the fact that the site is largely an already settled community. Construction stage impacts at an overall mean of 5,84375, which is Medium, while operational stage impacts have a mean of 3,039, out of 10, which are considered low. If all the proposed mitigations are implemented, these impacts should be reduced further. This is also attributed to the fact that other than the heritage sensitive areas identified, most of the hydrological and terrestrial impacts are located outside the development footprint.

Alternative A (preferred alternative), The Proposal

Biophysical environment

The site slopes gently, and a slope steepness of about 1:12 gradient. The site mostly It is noted that the development is mainly an in-situ upgrade within the existing community. Most of the vegetation on the site is already largely transformed and therefore the removal may not have significant, impact as if the vegetation were still pristine and of critical biodiversity. No red-data species were identified, and the vegetation is only noted to be largely least threatened and not endangered.

The vegetation as land cover however, act as flood attenuation mechanisms and protection against erosion. The proposed development will result in minimal clearing of vegetation on the proposed sites for the construction of houses and service infrastructure such as roads and stormwater infrastructure. The clearing of the site is likely to result in further exposing the land and possible surface runoff pollution. This can be mitigated by implementing appropriate stormwater management strategies, including proper channelling of the stormwater during construction and operational phases.

- **Riparian habitat impact**

No direct development is envisaged on the hydrological areas, as they are more than 300m from the development footprint. Improper stormwater management may lead to pollution of surface runoff. These can be impacted on encroached on during construction if care is not taken. Therefore, the duty of care and adherence to the recommendations in this report are crucial.

- **Other Construction Stage impacts** that were identified, for the construction phase are noted to be mitigatable. Noise and dust, and oil spillage can be mitigated by avoiding and

managing the occurrences. Impacts during the construction stage may be short term and may end when construction is completed.

- **Operational stage impacts** on the natural environment can also be mitigated if proper strategies are put in place. The possibility of mitigating these impacts reduces their significant levels considerably, to low significance once the proper infrastructure is put in place especially in terms of roads and stormwater systems. The neglect of mitigation measures, such as waste management could result in severe health hazards. This therefore infers the need to take the recommendations made herein and in all applicable regulations and guidelines seriously.
- Another most significant impact that needs to be taken care of during operation is the management and maintenance of the facility. These facilities if not properly managed have the tendency of degenerating into deplorable states over time. Normal law enforcement and maintenance should be undertaken by the municipality. Buyers of the stands, are expected to be medium to high income earners, therefore may pose no issues in blending in with the community.

Socio economic impacts during the construction stage will include employment opportunities, for both skilled and unskilled labour and suppliers of construction materials. The spiral effect of these will contribute to the improvement of economic activities during this period.

- During operational stage, few people are likely to be employed on permanent basis, like in waste collection and maintenance services of the municipality. This may reduce the unemployment in the area further and bring improvement in livelihoods of the local community. Above all, it is the **level of social satisfaction** from better service delivery may also be a tangible social and economic impact from the proposed development.

From this assessment, it is observed that most of the negative impacts can be readily mitigated. Also, the positive socio-economic impacts from the proposed development outweigh the identified negatives (if properly mitigated). A no-go alternative may therefore be unwarranted, given the absence of fatal flaws with the proposed servicing of stand, it is our opinion that the proposed development will contribute to much needed residential infrastructure in the town of Wolmaransstad, which may serve those workers who migrate to the area and local residents who are looking for upgraded or high quality residential facilities.

No-go alternative (compulsory)

The No-development option will mean that the anticipated effects of impacts of the development will not occur. All the envisaged construction stage impacts, such as dust, noise and so forth will not occur because of the proposed development.

In addition, even though much removal of land cover may not occur as a result of development, a no-go alternation in this case, may still pave the way for some form of degradation as the community expands informally in an uncontrolled manner, without proper infrastructure to manage potential impacts.

- Road networks may still be an issue and some parts of the community may not have proper access. Emergency services may not have access to vital areas of the community.
- From a socio-economic perspective, the no-development option may rather hinder the potential biophysical and socio-economic benefits that were envisaged. From this perspective, it can be asserted that the potential positive impacts outweigh the envisaged negative impacts; hence a no-go alternative may not be necessary.

10. RECOMMENDATIONS

From this assessment of the biophysical and socio-economic environment, given that there are no fatal flaws that will hinder the proposed development it is concluded that the proposed development is feasible. The proposed development is thus possible provided all impacts are duly mitigated as proposed.

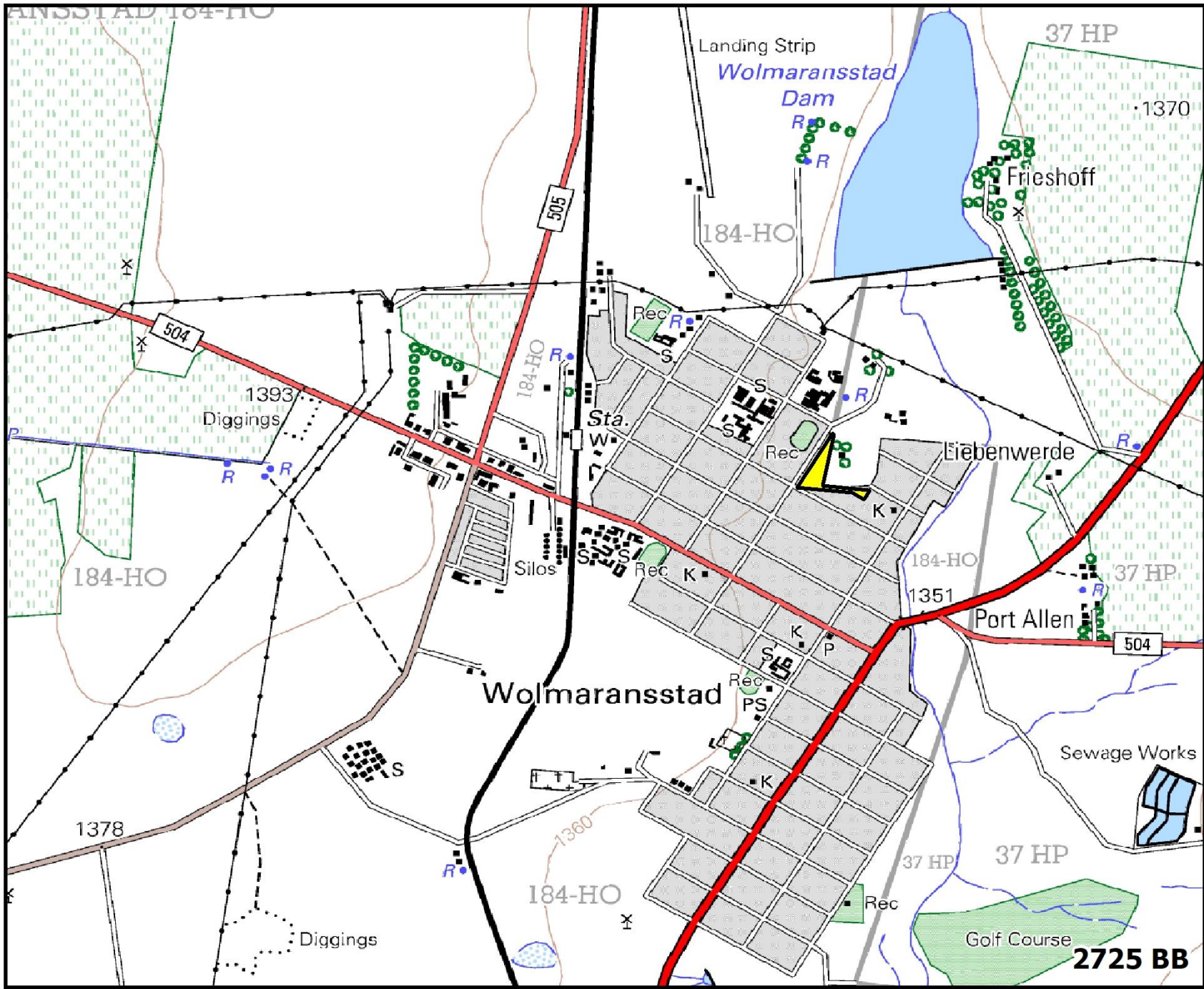
In addition, the following recommendations are provided:

- It is recommended that the mitigation measures suggested in this report herein be taken seriously and considered during the implementation of the proposed development to minimize any unwarranted effects of the identified impacts, such as stormwater management.
- The development must be restricted to the current development footprint as per the layout included in this assessment.
- It is important that an independent environmental control officer be appointed to monitor the construction activities, in terms of the EIA regulations requirements, and to ensure that the EMP is fully implemented.
- Project implementation monitoring and audit report must be regularly submitted to the competent authority to ensure all conditions and mitigation measures and proper due diligence is being applied.
- During implementation, the municipality must ensure provision of management, security, and maintenance of services to the development.
- From the information gathered and based on this Basic Assessment Process, given that no fatal flaws were identified, and given the development is likely to rather improve the settlement, it is our opinion and recommendation that the development may be allowed to proceed given the socio-economic benefits it may yield to the community and the environment. This may also add to the service delivery progress of the Local Municipality.

11. REFERENCES

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Appendix 1 Project location

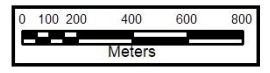


WOLMARANSSTAD
Section 21 Housing
Project

Locality Map

Legend

 Site



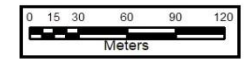


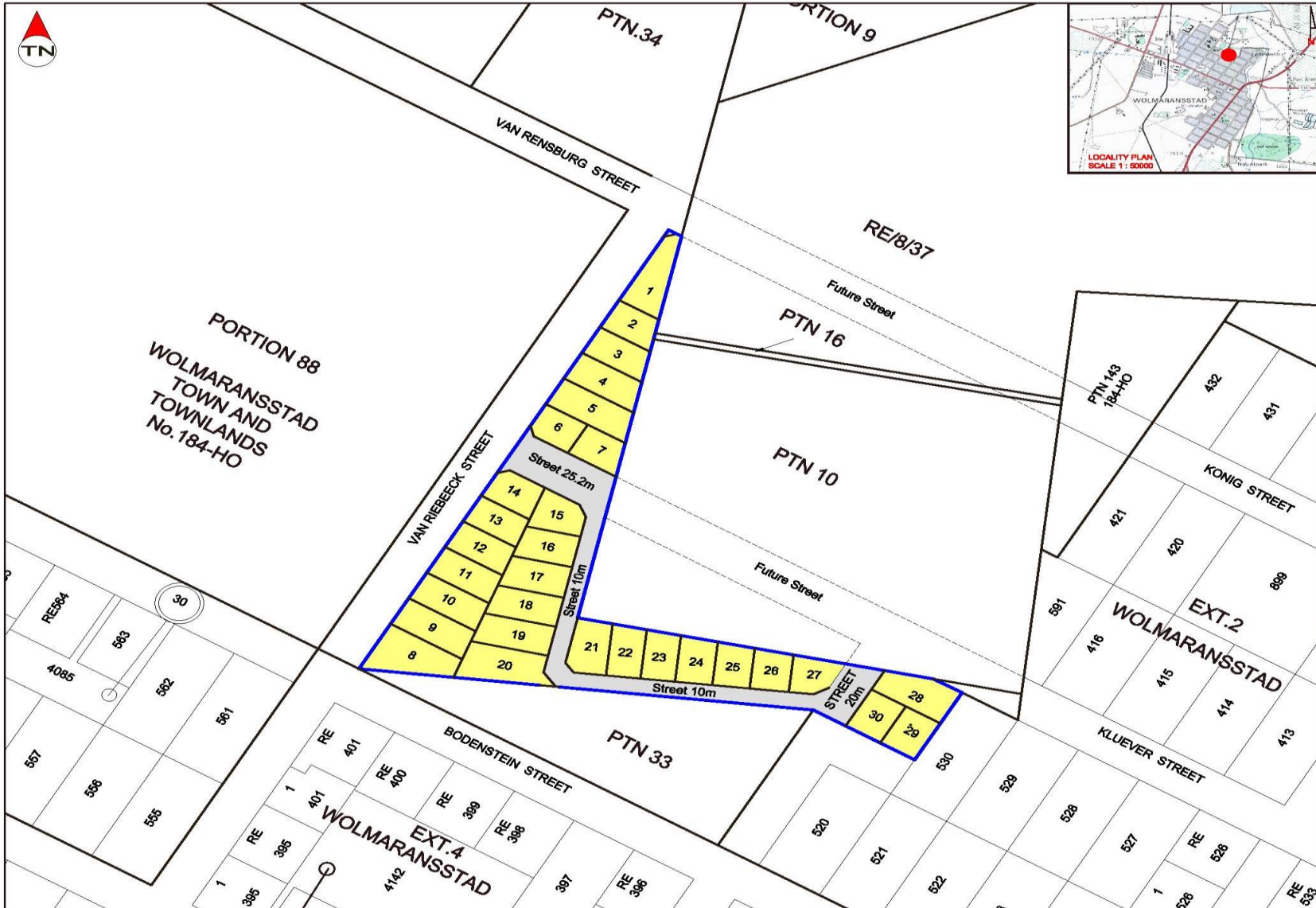
**WOLMARANSSTAD
Section 21 Housing
Project**

Aerial Map

Legend

- Site (Yellow outline)
- Erven (Black outline)
- Farms (Black outline)
- National Road (Blue line)
- Main Road (Red line)
- Street (Black line)





PROPOSED CONCEPT LAYOUT PLAN WOLMARANSSTAD EXTENSION 21

The proposed town is situated on Portion 2 of the farm TOWN AND TOWNLANDS No. 184-HO

USE ZONE	PROPOSED LAND USE	No.	REP No.	AREA In ha	% of AREA
Residential 1	medium density residential	30		1.1318	70.1
Street	public road			0.8810	28.8
TOTAL		30		1.0128	100%

RESERVATION WIDTH	STREET LENGTH IN METRES	% OF TOTAL LENGTH
25.2 metres	69.00	17.0
10 metres	37.95	10.5
10 metres	266.50	72.5
TOTAL	373.45	100%

NOTES:
 1. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 2. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 3. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 4. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 5. All buildings shall be constructed in accordance with the Building Regulations of 2019.

RESERVATION NOTES:
 1. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 2. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 3. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 4. All buildings shall be constructed in accordance with the Building Regulations of 2019.
 5. All buildings shall be constructed in accordance with the Building Regulations of 2019.

ENGINEERING GEOLOGICAL ZONATION

ENGINEERING GEOLOGICAL ZONATION

DATE: 2022/10/08
REVISION: 0

LAYOUT PLAN DESIGN SCALE: 1:2000
DATE: 2022/10/08
DRAWING No.: MAL/2022/0004
REVISION: 0

Malepa
 Planning & Projects (Pty) Ltd
 12 Fanny Avenue
 Fairwood
 KLERKSDORP
 info@malepa.com

PUBLIC PARTICIPATION REPORT

Wolmaransstad Ext 21 Housing development

BIZYCON PTY LTD

KZN: 15 Eugene Marais Road, Napierville, Pietermaritzburg 3200P O Box 1978 Pietermaritzburg 3200

GAUTENG: Unit 77, Block 4, Riversands Business Hub, Ext4 Fourways, Midrand

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Email maccarthy@developmentimpact.co.za www.developmentimpact.co.za

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1. INTRODUCTION

This report is a summary of the public participation process and activities being or that have been undertaken so far for the assessment process carried out for the Wolmaransstad Ext 21 Housing project. Public participation is done with the assistance of the Ward Councillors and also Ward Committee Members within the community to ensure the community is provided sufficient opportunity to participate. This report details the activities carried out and outcomes to date. Generally, the community is happy and anxiously waiting for the project to be executed and completed., as was indicated from interactions with them.

2. PUBLIC ADVERTISEMENT

2.1 Site notices

Site notices were laced within the community in places that are mostly assessable by the community members, under the guidance of the Development Committee members. Photographs of some of the Site Notices are attached in Appendix 2(i).

2.2 Newspaper advertisement

A newspaper advertisement has been placed in a local newspaper. This is to further give notice to the public and invite comments on the Basic assessment report. Copy of the advert is included in this public participation report Appendix 2(ii).

3. BACKGROUND INFORMATION DOCUMENT (BID)

Background Information was prepared and distributed within the community surrounding the development footprint. This was done with the assistance of the local councillor/ ward committee members. All those who received such information were encouraged to register as interested and affected parties if they so wish. A copy of the BID and list of people to whom it was distributed are attached in Appendix 2.

4. PUBLIC MEETINGS

A public engagement was initially planned to be the distribution of BIDs to neighbouring residents. The possibility of public meeting is not ruled out. Once the community is mobilised, then the development will be again presented. Should there be any comments that warrant this, it will be held, and those issues addressed. As for now, no significant issues have been received from the community, other than their support for the proposed development as expressed by some residents during interaction during site visit.

5. COMMENTS FROM STAKEHOLDERS

The draft basic assessment report (BAR) is being distributed to key stakeholders as part of the 30-day comment window, this is being distributed to relevant government departments and municipalities) for comments. These include comments received will be inculcated into this final report to be competent authority.

SITE NOTICE



PUBLIC NOTICE

MAQUASSI HILLS LOCAL MUNICIPALITY

WOLMARANSSTAD EXT 21 TOWNSHIP ESTABLISHMENT ON PORTION 2 OF WOLMARANSSTAD TOWNSAND TOWNLANDS, HOUSING PROJECT ON PORTION 2 WOLMARANSSTAD 184HO
ENVIRONMENTAL SCOPING AND IMPACT ASSESSMENT PROCESS (EIA)

INTRODUCTION

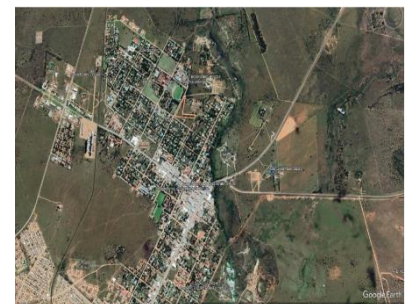
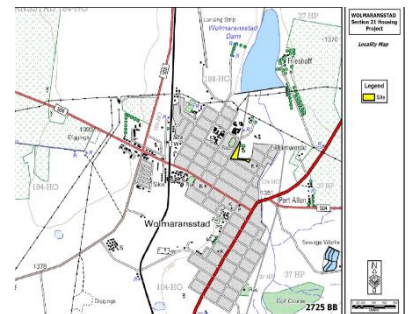
Notice is hereby given in terms of the regulations published in Government Notice No GNR 38282 of December 2014 under the National Environmental Management Act (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 as amended: of the intent to carry out the following activity:

Maquassi Hills Local Municipality intends to undertake a housing development on Portion 2 of the Townsland Wolmaransstad. This will include the establishment of about 30 medium to high income serviced stands for qualifying beneficiaries. As part of the feasibility assessment and planning of the proposed development, Bizycon Ltd has been engaged through Nata Construction to conduct an environmental assessment for the proposed development.

Preliminary screening of the site and the information supplied indicates that the site is about 1.6ha and has undeveloped indigenous grassland. This falls within listed activity of removing 1 or more ha of indigenous vegetation. This signifies a need for EIA in terms of Chapter 4 of 2014 EIA Regulation (GNR 982) as amended 2017, Basic Assessment (BA) process is required to be followed towards environmental authorisation for the proposed development. This EIA is to identify the potential impacts of proposed activities on the biophysical and social environment (and vice versa) and to facilitate any necessary authorisation for such activity which may be triggered in terms of the regulations. All Interested and Affected Parties (I&APs) may submit their names, contact details and written interest or comments relating to the above development to the contact persons given below within 30 days.

Openbare kennisgewing Die Basiese Assesseringsproses (OIE) word deur Bizycon (Edms) BPK uitgevoer en die aansoek om goedkeuring vir die projek sal aan die Departement van Ekonomiese Ontwikkeling, Toerisme en Omgewing by KZN (EDTEA) gestuur word. Alle relevante en relevante entiteite (I &aPs) kan binne 30 dae hul name, kontakbesonderhede en skriftelike belangstelling of kommentaar rakende bogenoemde ontwikkelings aan die onderstaande kontakte stuur.

Tsebiso ya Setjhaba ya Tshebetso ya Tekolo ya Motheo (EIA) e etswa ke Bizycon (PTY) LTD mme kopo ya tumello bakeng sa porojeke e tla romelwa Lefapheng la Ntshetsopele ya Moruo, Bojanala le Tikoloho kZN (EDTEA). Ditheo tsotlhe tse di maleba le tse di maleba (I&aPs) di ka romela maina a tsona, dintlha tsa kgokagano le dikgatlhego tse di kwadilweng kgotsa ditshwaelo tebang le ditlhabololo tse di fa godimo mo dikopanyi tse di tlhalositsweng fa tlase mo sebakeng sa malatsi a le 30.



BIZYCON PTY LTD
 Email: bizycon@live.co.za

Mr MacCarthy Honu-Siabi: Tel: 0724641197 Fax 086 7763325

NEWSPAPER ADVERTISEMENT

**PUBLIC NOTICE****MAQUASSI HILLS LOCAL MUNICIPALITY**

TOWNSHIP ESTABLISHMENT FOR EXT 21 HOUSING PROJECT ON PORTION 2 OF WOLMARANSSTAD TOWNLAND TOWNLANDS, 184HD AND EIA FOR ESTABLISHMENT OF NEW CEMETERY IN KGAKALA EXT 2 SETTLEMENT IN LEEUDORINGSTAD.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA)- BASIC ASSESSMENT PROCESS

Notice is hereby given in terms of the regulations published in Government Notice No GNR 38282 of June 2017 as amended, under the National Environmental Management Act (Act No. 107 of 1998) of the intent to carry out the following activities:

1. Maquassi Hills Local Municipality intends to undertake a housing development on Portion 2 of the Townland Wolmaransstad. This will include the establishment of about 30 medium to high income serviced stands for qualifying beneficiaries. The site is about 1.6ha in extent, is occupied undeveloped but degraded indigenous grassland. This falls within listed activity of removing 1 or more ha of indigenous vegetation, for which Basic Assessment EIA process is required, according to Activity 27 of GNR 327 of 2017. Potential impacts include removal of vegetation and loss of land cover, dust and noise during construction, all of which can be fully mitigated. Positive impacts include availability of additional housing infrastructure to citizens, and a stop to using the site for illegal dumping of waste, robbery and petty crimes, committed on the site because it is vacant and bushy. The development will also generate temporal employment for locals during construction.
2. The Municipality also intend to undertake establishment of a new cemetery and associated infrastructure, including internal roads, ablution facilities in Kgakala Ext 2 in Leeudoringstad, to augment the currently full existing cemeteries in the area. This also triggers Activity 23, the development of Cemetery of 2500m² or more, and 27, the clearance of indigenous vegetation of more than 1ha but less than 20ha. The site is about 6.5ha. Positive benefits will include availability of cemetery to the community as part of critical infrastructure and service delivery. Local suppliers will also gain some business during the establishment. Potential negative impacts include loss of grassland and aesthetic view obstruction which can be mitigated by fencing and planning of trees around the cemetery.

All Interested and Affected Parties (I&APs) may submit their names, contact details and written interest or comments relating to any of the above developments to the contact persons given below within 30 days of the date of this advertisement.

BIZYCON PTY LTD Mr MacCarthy Honu-Siabi: Tel: 0724641197 Fax 086 7763325 Email: maccarthy@developmentimpact.co.za

BACKGROUND INFORMATION DOCUMENT (BID) AND DISTRIBUTION LIST

WOLMARANSSTAD EXT 21 HOUSING PROJECT ON PORTION 2 WOLMARANSSTAD 184HO

MAQUASSI HILLS LOCAL MUNICIPALITY

BASIC ASSESSMENT PROCESS

BACKGROUND INFORMATION DOCUMENT (BID)

BACKGROUND

Maquassi Hills Local Municipality intends to undertake a housing development on Portion 2 of the Town land Wolmaransstad. This will include the establishment of about 30 medium to high income serviced stands for qualifying beneficiaries. As part of the feasibility assessment and planning of the proposed development, Bizycon Ltd has been engaged through Nata Construction to conduct an environmental assessment for the proposed development.

As per the provisions of the Environmental Impact Assessment (EIA) Regulations, December 2014, as amended, under the National Environmental Management Act- NEMA (Act 107 of 1998) an environmental impact assessment is required for the proposed developments prior to commencing any physical activities that fall within any of the listings within the notices.

Preliminary screening of the site and the information supplied indicates that the site is about 1.6ha and has undeveloped indigenous grassland. This falls within listed activity of removing 1 or more ha of indigenous vegetation. This signifies a need for EIA in terms of Chapter 4 of 2014 EIA Regulation (GNR 982) as amended 2017; Basic Assessment (BA) process is required to be followed towards environmental authorisation for the proposed development. This EIA is to identify the potential impacts of proposed activities on the biophysical and social environment (and vice versa) and to facilitate any necessary authorisation for such activity which may be triggered in terms of the regulations

DESCRIPTION OF THE PROPOSED PROJECT SITE

A key part of government's theory of change on human settlement programme is to use housing as a vehicle to drive social and integrated settlement developments which allow for the provision of major services and access to urban amenities to communities in which such developments are implemented. This proposed development is to cater for and contribute towards medium to high income housing infrastructure.

Township Establishment of 30 serviced residential stands and associated housing infrastructure on Portion 2 of the Farm Wolmaransstad Town and Townlands. The development is intended for Medium to high income residential housing and internal street, as per the layout. The size of the site is approximately 4ha. The piece of land is about 1.6ha. Associated housing infrastructure will include an internal road of about 6-10m. There is already existing road network in the vicinity of the study area. There is one more street of about 10m that will be constricted of about 0,5km.

Stormwater infrastructure will be equipped to the internal roads and the exertions road network infrastructure.

There are bulk water pipes available in the vicinity. The approximate diameter of pipes located is about 200mm, uPVC and supply the areas of Wolmaransstad. The pipe diameters of the network in the vicinity range from 75mm to 250mm and this will be applied to the proposed development.

There are formal bulk sewer services available in the vicinity of the study area. There is existing bulk electricity capacity in the area supplied by Eskom. It is expected that the development will be serviced from this connection.

Figure 1 of site locality

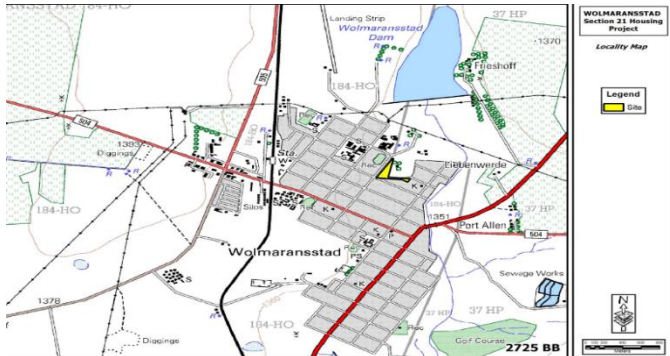
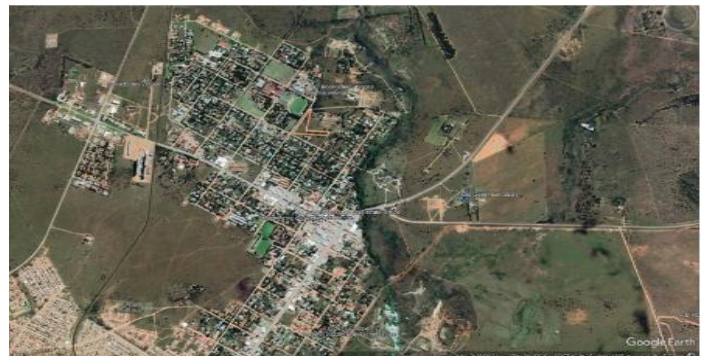


figure 2 of site locality



Environmental Process & Considerations

This triggers activities within Listing Notice 1 of GNR 983, of the National Environmental Management Act (Act 107 of 1998) for which environmental authorisation is required. A full Environmental Impact Assessment (EIA) process is being undertaken by Bizycon (PTY) LTD and an application for authorisation for this project will be submitted to the NW Department of Economic Development, Environment, Conservation and Tourism.

All Interested and Affected Parties (I&APs) may submit their names, contact details and written interests or comments relating to the above development to the contact persons given below within 30 days of the date of publication of this advertisement.

Your involvement

Environmental Assessment plays a vital role to ensure that it provides the necessary and adequate information on which to base the decision of whether to grant environmental authorisation on the anticipated project. This environmental approval will also give information on whether and if yes under which conditions the authorisation will be granted. There are numerous stakeholders that are involved from entirely different sectors, and each contributes towards a desirable conclusion. Your remarks, if any, will enhance all appropriate concerns or appraisals that are assessed in the EIA. You are therefore encouraged to fill in the enclosed registration/comment form or write a letter, call, and email or send a fax to the EAP on the following contacts **in case you want to comment** on the proposed development. If you have no comments, then you do not need to do anything. After 30 days, if no comments are received, we shall take it you do not have any.

REGISTRATION AND COMMENT FORM

Accompanying Background Information Document

Should you have any comments regarding the proposed project, please complete and send the attached comments sheet to either of the following contact person:

Mr Maccarthy Honu-Siabi

Tel: Cell: 0724641197, Fax: 086 776 33 25

Email: bizycon@live.co.za maccarthy@developmentimpact.co.za

TITLE		FIRST NAME	
INITIALS		SURNAME	
ORGANISATION/TOWN		E MAIL	
POSTAL ADDRESS			
TEL NO.		POSTAL CODE	
CELL		FAX NO.	

REGISTRATION AS AN INTERESTED OR AFFECTED PARTY (I&AP) (Please circle applicable box)

Please formally register me as an interested and affected party so that I may receive further information and notifications during the EIA process	YES	NO
I would like my notification by	Letter (mail)	
	E Mail	
	Fax	
	Telephone	
In terms of the GNR 327 (EIA process regulations) I disclose below any direct business, financial, personal or other interest that I may have in the approval or refusal of the application.		

COMMENTS (you may use a separate sheet if you so wish)

I have no objections to the proposed development. My reasons are

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I support the proposed development. My reasons are:

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I object to the proposed development. My reasons are:

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.....
Other I&APs to be contacted are:

.....
.....
.....

SITE NOTICE PHOTOGRAPHS



SITE PHOTOGRAPHS





STAKEHOLDER COMMENTS AND REPOSSES

To be added when received

APPENDIX4 SPECIALISTS STUDIES

Appendix 4 Specialists Studies (Added as attachments)

4.1 Geotech report

4.2 Bulk Services Report Rev 4

4.3 Socio Economic Assessment Report

BULK SERVICES ENGINEERING REPORT

14 November 2022

OUR REF: 4062

MALEPA PLANNING & PROJECTS
12 FANNY AVENUE
KLERKSDORP
2571

ATTENTION: MS. MPHOSIDI

Madam,

TOWNSHIP ESTABLISHMENT: WOLMARANSSTAD EXT. 21 (A PORTION OF PORTION 2 ON THE FARM WOLMARANSSTAD TOWN AND TOWNLANDS NO 184-HO) – CIVIL ENGINEERING SERVICES INVESTIGATION AND REPORT

With reference to the Site Inspection conducted with Maquassi Hills Local Municipality officials on 19 October as well as subsequent further investigations we hereby provide you with the Civil Engineering inputs and Report for the establishment of the above mentioned Township herein after referred to as the Proposed Development.

The Proposed Development is located in the existing residential area of Wolmaransstad bordered by Van Riebeeck Street on the north-western boundary and Bodenstein Street to the south. The proposed layout of the Development will be such that Kleuver Street can be linked to Van Riebeeck Street in future. The Proposed Development consist of 30 No. Medium- to High Income residential stands. Availability and capacity of Civil Engineering Services is presented in the sections below:

1. Water

Sedibeng Water fulfils the function of Bulk Water Service Provider. Sedibeng operates from Balkfontein at the Vaal River near the town of Bothaville where water is extracted, purified and distributed. The Sedibeng rising main runs from Balkfontein to Leeudoringstad and Buisfontein. From Buisfontein, water flows under gravity conditions to Wolmaransstad and related storage reservoirs. An additional bulk pipeline was installed approximately 10 years ago to supplement supply to Wolmaransstad. The Proposed Development will have an insignificant impact on the availability of bulk water with an estimated daily consumption of approximately 18 kl.

Water to the Proposed Development will be supplied from the existing 110mm main water line located in Bodenstein Street. Considering the location of the Proposed Development in relation to the town reservoir, the expected static water pressure is approximately 3.5 bar which is sufficient for fire-fighting purposes. A complete water network with metered yard connections will be provided to each stand in the Proposed Development. The network will consist of uPVC pipes of varying diameter and will also include isolating valves at strategic positions and fire hydrants according to regulations.

Arnold Motors, 1st Floor, 41 Siddle Street | PO Box 1852, KLERKSDORP, 2570 | Tel: +27 18 462 9603 | Fax: +27 18 462 1919 | consult@moedi.co.za
376 Main Road | Postnet Suite 152, Private Bag X3088, PAARL 7620 | Tel: +27 21 872 4288 | Fax: +27 63 249 8608 | paarl@moedi.co.za
The Villages Office Park, 1st Floor, Block D, Off Glenwood Road and Oberon Avenue, Fairlie Glen, PRETORIA, 0081 | Tel: +27 67 697 5076 | itana@moedi.co.za
Cachet Park, Steve Biko Avenue | PO Box 19923, Noordbrug, POTCHEFSTROOM, 2522 | Tel: +27 71 659 8954 | consult@moedi.co.za

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LW Meyer – B.Eng (Civil) | L van Rocyen – B.Sc. Eng (Civil)

ASSOCIATE

AP du Preez – B.Eng (Hons) Water
B.Eng (Hons) Management of Technology



2. Sewer

Wolmaransstad town is serviced by a fully waterborne sewer network that flows under gravity conditions in an eastern direction towards the Makwassiespruit. Bulk gravity outfall sewer mains convey sewage in a southern direction towards the Waste Water Treatment Works (WWTW) located between Wolmaransstad and Makwassie. The WWTW was recently upgraded and the additional volume of sewage to be generated by the Proposed Development will have an insignificant impact on the availability of treatment capacity at the works.

An existing sewer manhole is located on the eastern border of the Proposed Development. Considering the depth of this manhole (3.2m deep), Stands 1 to 7 can be connected to the 150mm main sewer line with relative ease. A new bulk sewer main will be designed to follow the natural topography of the Proposed Development to flow in an eastern direction towards Kleuver Street to service the remainder of the Development (Stands 8 to 30).

A complete water-borne sewer network will be installed with a combination of mid-block and street-front yard connections and manholes to convey sewage to the existing internal sewer network.

3. Access, Roads & Storm Water

Access to the Proposed Development will be provided from the west via a new connection to Van Riebeeck Street. This connection will have a servitude width of 25.2m to enable future connection to Kleuver Street to the east. Internal roads linking to the remainder of the stands in the Proposed Development will have servitude widths varying between 10m and 20m.

It is proposed that all new roads be surfaced by means of concrete block paving as a minimum standard. Considering the natural topography of the Proposed Development, internal roads will be designed to act as storm water carriers on the road prism to convey storm water from the respective stands in an eastern direction towards existing storm water infrastructure.

The Proposed Development is situated in the existing town of Wolmaransstad and is therefore not affected by the 1-in-100 year flood line of the Makwassiespruit.

We trust that you will find the above to be in order and avail ourselves to be of any further assistance.

Yours faithfully,


NARDUS HATTINGH (Pr Eng)
PROFESSIONAL ENGINEER/ PROJECT MANAGER
MOEDI CONSULTING ENGINEERS
018 462 9603
072 129 8346
nardus@moedi.co.za

ELECTRICAL SERVICES ENGINEERING REPORT

IQ
solutions



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TOWNSHIP ESTABLISHMENT WOLMARANSTAD EXTENSION 21 FOR MAQUASSI HILLS LOCAL MUNICIPALITY ELECTRICAL SERVICES REPORT

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1. INTRODUCTION

1.1 Project brief

The project brief as understood by IQ Solutions is summarized as follows:

a) The main objective of this report is the bulk services investigation for the proposed sub-division of Wolmaranstad Extension 21.

b) Proposals in this report is based on preliminary designs only.

1.2 Aim of this report

The aim of this report is to provide the necessary information and technical details for providing electrical services for the proposed development. This information is intended to be used by all parties involved to review and approve the technical, operational and financial considerations.

1.3 Appointment

IO Solutions has been appointed by Malepa Planning and Projects (Pty) Ltd for the Electrical Services investigation of the proposed development.

1.4 IQ Solutions

IQ Solutions is Electrical Engineers specializing in designing of electrical installations and reticulation. A full scope of professional services is rendered to our clients. All the phases in the project life cycle are included in our services

Our services also include Project Management.

1.5 Structure of this report

The report summarizes information on the proposed development, Supply Authority, demand, bulk service, required standards & specifications, proposed services and proposed way forward.

2. DEVELOPMENT INFORMATION

2.1 Geographical position

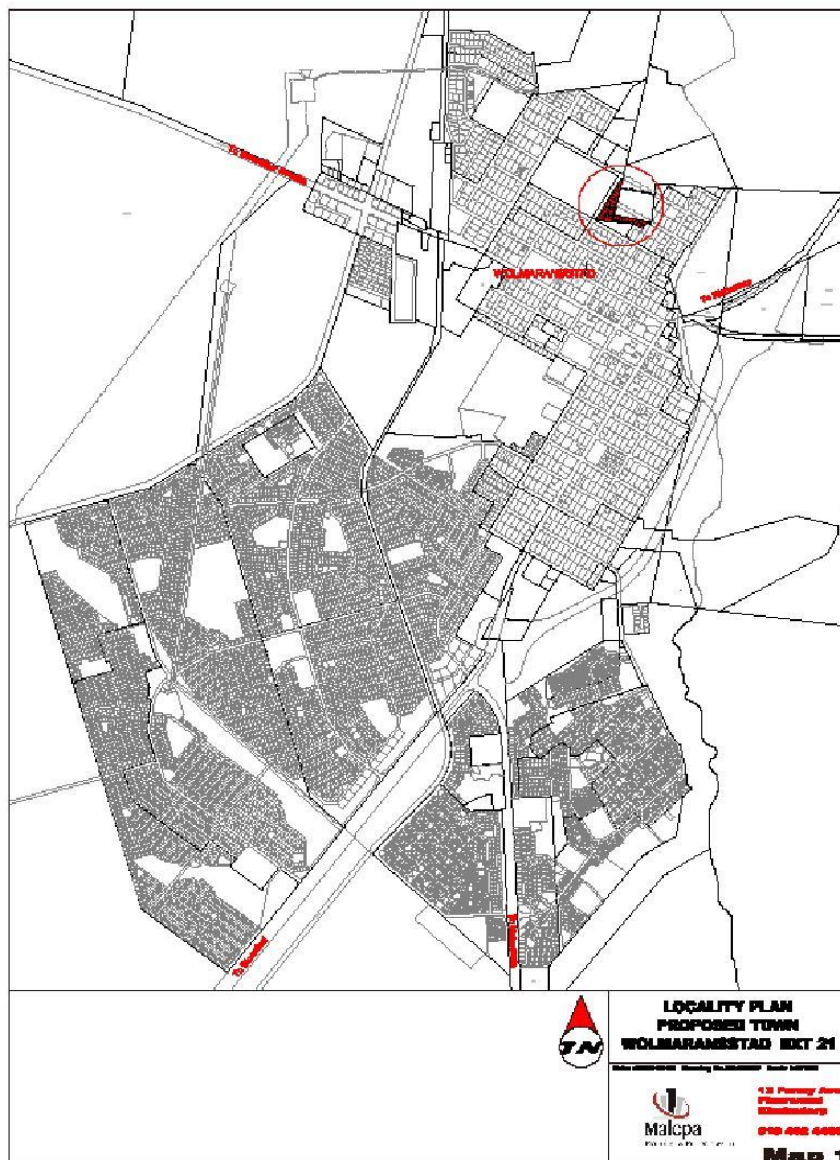
The proposed sub-division is on Extension 21 located in Wolmaranstad Maquassi Hills Local Municipality North West Province as can be seen in Figure 1.

2.2 **GPS Coordinates**

S 27.1969270°

E 25.90020°

Figure 1- Geographical position



2.3 **Layout and Land use information**

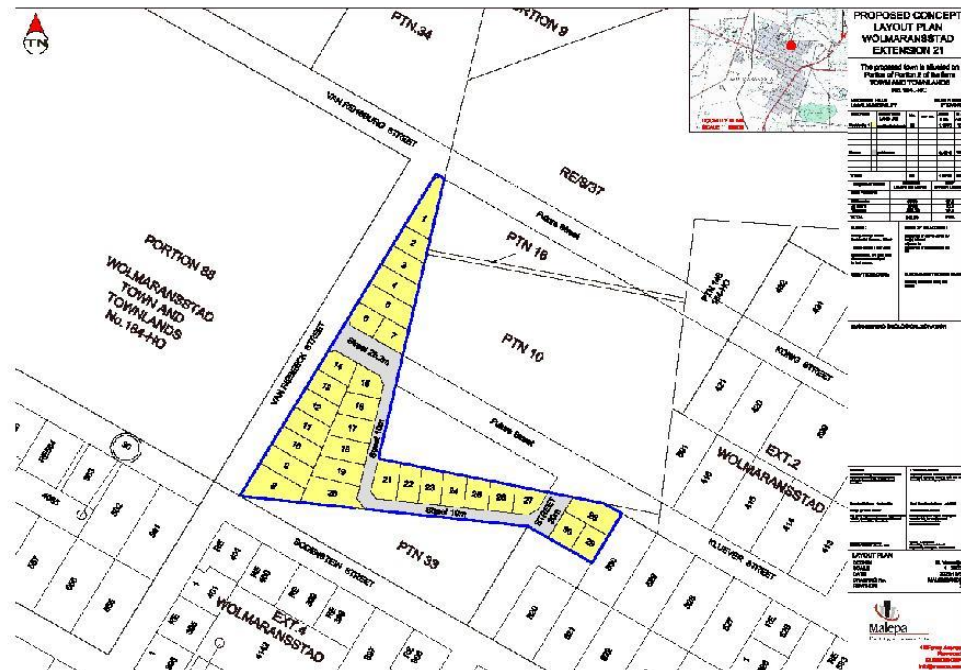
Land use information is summarized in the following table.

Table 1

LAND USE INFORMATION					
Item	Zoning	Land Use	Number of Stands	Units	Area
1	Residential	Residential	30	30	600 sq m ave per unit
11	Public Streets		1		
12	Public Open Spaces		0		
Total			31		2.228 Ha

Land use information can be seen in figure 2

Figure 2



2.4 **Socio-economic information**

This Development is intended primarily for Township Establishment of 30 Residential units and one Public street

2.5 **Licensed supply area**

The Development is situated within the licensed supply area of Maquassi Hills Local Municipality North West Province and the jurisdiction of Dr Kenneth Kaunda District. The electricity supply to extension 21 is from the Maquassi Hills Local Municipality Substation located behind the Nic Bodenstein Hospital. The capacity on this 11kV Feeder is limited to 220 Amps or 4.19MVA.

At present the demand of the supplied area is less than the available 4.19MVA. Maquassi Hills Local Municipality is also responsible for the operation and maintenance of the electrical network within Wolmaranstad.

2.6 **Existing Services**

There are an existing electrical MV under ground cable (70mm PILC) on the west side of Van Riebeeck Street passing the proposed development.

2.7 **Houses**

At present only open spaces do exist in the area

3. **DESIGN PARAMETERS**

3.1 **General**

Electrical services will be designed towards an economic trade-off between financial constraints and optimum technology by taking the following into consideration:

- a) Statutory voltage limits;
- b) Acceptable supply availability and reliability;
- c) Financing constraints and affordability;
- d) Acceptable aesthetics and safety

3.2 **Design Requirements**

All the relevant standards and equipment types have been verified with the Supply Authority.

The following guidelines will be taken into consideration:

- a) All electrical services shall be designed in terms of the standards, specifications and equipment types and ranges of the Supply Authority by a Professional Electrical Consulting Engineer.

b) The electrical infrastructure will be designed to comply with the standards and requirements of the Supply Authority, where appropriate, in accordance with (but not limited to) NRS 034-1:1999 Electricity Distribution – Guidelines for the provision of electrical distribution networks in residential areas, SANS 10142-1 The Wiring of Premises – Low Voltage Installations & SANS 10142-2 The Wiring of Premises – Medium Voltage Installation above 1kV not exceeding 22kV. The electricity distribution system will be designed for the anticipated maximum load to avoid the need for future upgrading of the electricity distribution system.

c) The maximum demand will be calculated in accordance with (but not limited to) SANS 204 Energy Efficiency in Building, SANS 10142-1 The Wiring of Premises – Low Voltage Installations & SANS 10400 Part X & XA Application of the National Building Act – Energy usage.

3.3 Design Parameters

Design parameters to be use are as follows:

Table 2: Design Parameters

Item	Description	Unit	Parameters
1.	System		
	Source		MV network in Van Riebeeck Street
	Nominal system voltage	kV	11
	Frequency	Hz	50
	Phase rotation		RYB
	Nominal Voltage at source	%	0.98
	3 Phase Fault Level at source	kA	20
2	Design Limits		
	Voltage drop	%	10%
	MV and LV cable thermal loading	%	80%
	TRF Thermal loading	%	80%
3	ADMD		
	Method		Empirical
	Diversity		AMEU
	Unbalance		AMEU
	ADMD Stand Residential	KVA	5 x 30 = 150
	ADMD Street Lights	KVA	18 x 0.1 = 1.8

The total maximum demand determined for this development is 151.8kVA or 219.11A, 3-phase.

3.4 Supply Authorities requirements and approval procedures

The requirements and approval procedure of the Supply Authority which is Maquassi Hills Local Municipality for Wolmaranstad Ext 21, are summarized as follows:

3.4.1 Approval

- a).Detail designs shall be submitted for review and approval by the Supply Authority before construction can commence.
- b) The developer shall submit a "formal application" for each MV/LV electrical connection to the Supply Authority.
- c) The developer accepts the conditions as set out in the "formal application" and that all connection costs and any other costs with regards to special arrangements are paid in full.
- d) The Supply Authority reserves the right to only confirm the availability of bulk supply capacity at final application thereof.
- e) Services agreement is drafted, reviewed and signed between the Developer & Supply Authority.

3.4.2 Handing over

- a).The electrical infrastructure must be tested and approved on the conditions laid down by the Supply Authority.
- b) The Supply Authority will authorize the energizing of the electrical network once the final tests have been successfully passed.
- c) A provisional asset register will be submitted to the Supply Authority once the design documentation has been approved. This asset register will be updated once the services have been installed and the network accepted by the Supply Authority.
- d) Ownership of electrical services, will be transferred from the developer to the Supply Authority upon the successful testing and commissioning of the services. The Supply Authority will therefore be responsible for the maintenance of the electrical services.

4. BULK SUPPLY

4.1 General

There are currently no capacity constraints on the existing network. A detail Service Agreement with all relevant information for the proposed township establishment need to be compiled and submitted to Maquassi Hills Local Municipality for approval.

4.2 Existing network analysis

An existing 11kV network feeding from Nic Bodenstein Hospital Substation (Van Wyk Street) currently supplies electricity to the north west surrounding areas of Wolmaranstad.

A Mini substation shall be installed in Van Riebeeck Street on the west side opposite proposed erf number 6 on an existing 11kV cable (70mmPILC). The Mini Substation shall feed six free standing Low Voltage pillar boxes via an under ground LV network using SWA PVC SWA Low voltage cables.

From the pillar boxes LV cables shall feed the houses,

Pre-paid meters shall be installed in the LV kiosks feeding the consumers.

Wireless communication to pre-paid meters shall be used by the consumers

PCMA Pre-paid meters are on the vending system of the Municipality

5. PROPOSED ELECTRICAL SERVICES

5.1 Reticulation

The following electrical reticulation is proposed as indicated in figure 3

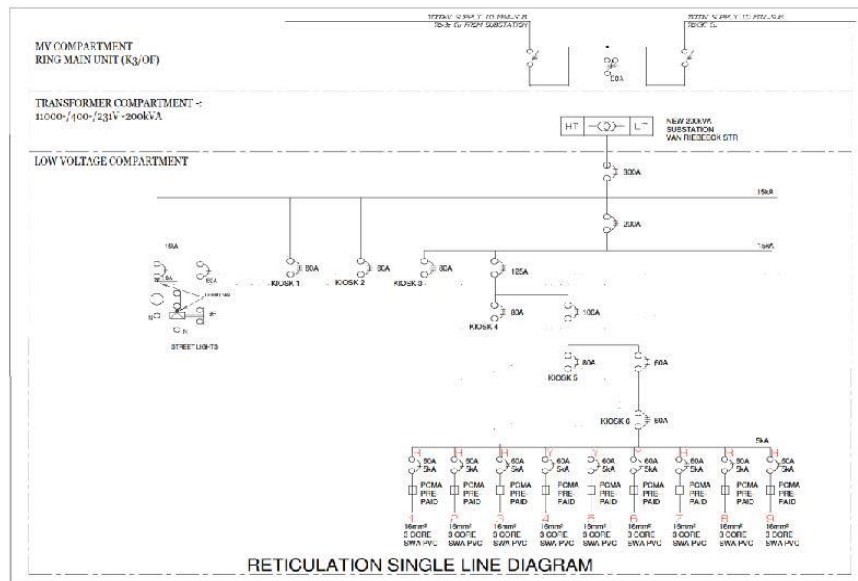


Figure 3

5.2 Bulk Supply

Existing 11kV network in Van Riebeeck Street.

5.3 Medium Voltage reticulation

New 200kVA Mini Substation in Van Riebeeck Street on the west side of the street opposite proposed erf number 6.

5.4 Low Voltage reticulation

Low voltage cable (SWA PVC SWA) from Minisub to 6 x LV pillar boxes.

The under ground reticulation will supply free standing pillar boxes feeding houses via 60Amp circuit breakers

5.5 **Low Voltage connections**

Electricity from kiosks to houses will be distributed by Low Voltage cables (SWA PVC SWA 16mm² x 3 core).

5.6 **Metering**

Pre-paid meters will be used

60A single phase split pre-paid meter to Residential units installed in kiosks.

Supply will be limited to 60Amp single phase per house.

5.7 **Street and Area lighting**

Street lighting shall be included in designs.

Spacing between street lights to be 30 meter or less.

18 x LED type luminaires shall be used.

5.8 **Servitudes**

None identified at time of report.

6. **COSTS**

6.1 **Cost Estimation**

A Cost estimate for the Proposed Township Development can only be made after compiling and submitting a Service Agreement and Preliminary Design to the Local Supply Authority for review and recommendation.

7. **SUMMARY**

7.1 **Summary**

There is a definite need for Township Development in the proposed Wolmaranstad area.

This Township Development is therefore recommended for implementation.

END OF REPORT

GEOTECHNICAL ENGINEERING REPORT

Attached Separately

MALEPA PLANNING & PROJECTS (PTY) LTD



REPORT ON:

**PORTION OF PORTION 2 WOLMARANSSTAD 1,6HA TOWN AND
TOWNLANDS 184HO GEOTECHNICAL ASSESSMENT**

REPORT: P416

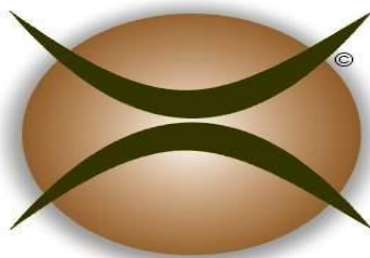
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1 Copy Viljoen Associates

November 2022

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Appendix B General Overview

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EXECUTIVE SUMMARY

The Spatial Planning and Land Use Management Act 16 of 2013, Development Facilitation Act 67 of 1996, Home Builders Protection Measures Act 95 of 1998 (NHBRC act) and the National Department of Housing Norms & Standards all embody and recognise the need for a thorough pre-township establishment geotechnical

investigation carried out by geotechnical investigators registered with either or both of SAIEEG (*South African Institute for Environmental & Engineering Geologists*) or SACNASP (*South African Council for Natural Scientific Professions*).

In terms of Regulations 4(6) the regulations published in Government Notice No. R. 1183 under Section 26 of the Environmental Conservation Act (Act. No. 73 of 1989) of the intent to carry out the establishment of a development on Portion of Portion 2 Wolmaransstad 1,6ha Town and Townlands 184HO *Malepa Planning & Projects (Pty) Ltd* requested a geotechnical assessment.

During October 2022 a geotechnical assessment was conducted at the proposed development Portion of Portion 2 Wolmaransstad 1,6ha Town and Townlands 184HO to identify geotechnical issues relating to construction. Standard methods and techniques were followed to assess the geotechnical viability for building construction as described in the method of investigation (p2).

Development zonation for urban development according to the NHBRC was conducted, indicating the geotechnical conditions on site. The investigation area underlain by andesite was classified as a S zone representing slightly compressible soils (estimated total soil movement <10mm). A competent TLB may be required during placement of services.

No ground water was observed during the assessment, however the presence of ferricrete in the soil profiles indicates perennial water fluctuations. The area of investigation was characterised by a relative smooth gradient with slopes less than 12 degrees and accessibility was not restricted by topography. No potential for slope instability features, *i.e.* land slides, mud flows, *etc.* was identified. Development should be planned to take place above the 1:100 year flood line. There is no erosion potential in the NHBRC zone and no potential for subsidence due to the presence of dolomite, *i.e.* sinkholes, undermining or backfilled soils were observed.

DECLARATION OF INDEPENDENCE

Chris J Viljoen, CEO Viljoen Associates, hereby declare:

- Viljoen Associates act as independent specialist in this investigation.
- The assessment is conducted in a scientific manner and findings will not be manipulated for a favourable outcome.
- Viljoen Associates have no financial, personal or any other interest in this application managed by Malepa Planning & Projects (Pty) Ltd.
- All particulars furnished in this declaration are true and correct.



M.Sc., Pr. Sci. Nat.

DISCLAIMER

The opinions expressed in this Report have been based on the information supplied to Viljoen Associates (Pty) Ltd by Malepa Planning & Projects (Pty) Ltd. Viljoen Associates has exercised all due care in reviewing the supplied information. Whilst Viljoen Associates has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Viljoen Associates does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of the investigation, and those reasonably foreseeable.



PORTION OF PORTION 2 WOLMARANSSTAD 1,6HA TOWN AND TOWNLANDS 184HO GEOTECHNICAL ASSESSMENT

1 TERMS OF REFERENCE

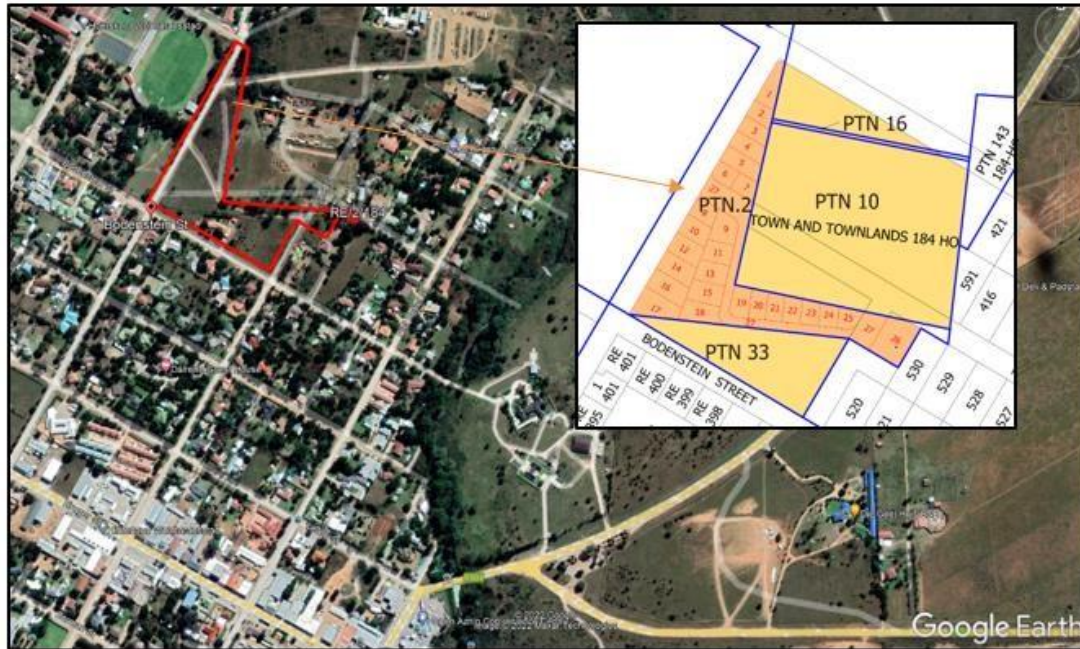


Figure 1. Portion of Portion 2 Wolmaransstad 1,6ha Town and Townlands 184HO.

During September 2022 **Malepa Planning & Projects (Pty) Ltd** requested a proposal for a geotechnical assessment on Portion of Portion 2 Wolmaransstad 1,6ha Town and Townlands 184HO (**Figure 1**).

The report begins by describing the method through which information was obtained for the investigation. The information was analysed and discussed under problem analyses. Conclusions are drawn from the problem analyses and recommendations are made.

2 INTRODUCTION

Soil can be defined as:

“the unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for growth of plants, or, the unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including precipitation and temperature effects), macro- and micro-organisms and topography all acting over the period of time and producing a product – soil – that differs from the material, which is



derived in many physical, chemical, biological and morphological properties and characteristics”.

3 LEGISLATION

The following Acts focus on human rights, protection of the environment, accountability and financial provision, and should be considered (where applicable) with construction and development projects in South Africa.:

- *Section 12 of the Minerals Act 50 of 1991*
- *Sections 41, 42 and 43 of the Mineral & Petroleum Resources Development Act 28 of 2002, the M&PRD Regulations R527.*
- *Constitution of South Africa Act 108 of 1996.*
- *National Environmental Management Act 107 of 1998, and Amendments.*
- *National Water Act 36 of 1998 (Section 36), and Amendments, with specific reference to the NWA Regulations GN704 of 1999 and use of Water for Mining and Related Activities aimed at the Protection of Water Resources.*
- *The Water Services Act 108 of 1997.*
- *The Conservation of Agricultural Resources Act No. 43 of 1983 & Amendments (Govt. Gazette Vol. 429 No. 22166 of March 2001).*
- *National Forest Act 84 of 1998.*
- *Physical Planning Act of 1991.*
- *National Environmental Management Biodiversity Act of 2003.*
- *National Environmental Management Protected Areas Act of 2003.*
- *National Veld and Forest Fire Act 101 of 1998.*
- *Environment Conservation Act 73 of 1089.*
- *Environment Conservation Amendment Act 50 of 2003.*
- *Air Quality Act 39 of 2004.*



- *Atmospheric Pollution Prevention Act 45 of 1965.*
- *National Heritage Resources Act 25 of 1999.*
- *National Development Facilitation Act 67 of 1999.*
- *National Development Facilitation Act 67 of 1995.*
- *Promotion of Access to Information Act 2 of 2000.*
- *National Monuments Act 28 of 1969.*
- *Nuclear Energy Act 46 of 1999.*
- *National Nuclear Regulator Act 47 of 1999.*
- *Health Act 63 of 1997.*
- *Plant Improvement Act 53 of 1976.*
- *Occupational Health and Safety Act 85 of 1993.*
- *Agricultural Pests Act 36 of 1983.*
- *Fertilisers, Farm Feeds, Agricultural remedies and Stock Remedies Act 36 of 1947.*
- *Mine Health and Safety Act 29 of 1996.*
- *Hazardous Substances Act 15 of 1973.*
- *Land Survey Act 8 of 1997.*
- *SABS 0286: 1998 Code of Practice for Mine Residue.*
- *SABS: Water Quality.*
- *Chamber of Mines of SA Guidelines for Environmental Protection: Engineering Design, Operation & Closure of Metalliferous, Diamond & Coal residue deposits.*
- *Department of Mining & Energy Aide Memoir Guideline for the Preparation of EMPR'S.*



- *Department of Mining & Energy Mineral Policy in terms of Section 12 of the Minerals Act 1995.*
- *Department of Mining & Energy Policy on Financial Provision 1994.*
- *Guideline on the Compilation of a Mandatory Code of Practice on Mine Residue Deposits.*
- *Department of Water Affairs & Forestry Guideline on water & salt balances for TSF's.*
- *Chamber of Mines Guidelines for Vegetation of Mine Residue Deposits.*
- *Department of Water Affairs Policy and Guidelines for dealing with pollution from TFS's, and the containment and rehabilitation of abandoned TFS's, and prosecutions.*
- *Convention of Wetlands of International Importance especially as Waterfowl Habitat RAMSAR (in force in SA from 12 Dec 1975).*
- *International Cyanide Code.*

4 INVESTIGATION OBJECTIVES

The main objectives of the investigation were seen to be:

1. Geotechnical assessment of the proposed area of development.
2. Formulate recommendations with regards to geotechnical issues relating to the construction of buildings.

5 METHOD OF INVESTIGATION

During October 2022 the following scope of work was conducted in order to meet the objectives of the investigation:

- General reconnaissance of Portion of Portion 2 Wolmaransstad 1,6ha Town and Townlands 184HO.
- Profile pits was made on the area of investigation.
- Augering of 75mm diameter 1,800mm deep holes (auger refusal) and characterisation of the soil horizons according to the latest version of the South African Taxonomical Soil Classification System. The soil profile was further



described according to the methods described by Jennings *et. al.* (1973). This method describes each horizon in terms of moisture content, colour, consistency, structure, type of soil and origin of the soil.

- Representative sampling of the profile pit for laboratory analyses according to standard methods and techniques (**Table 1**):

TABLE 1: STANDARD METHODS AND TECHNIQUES

ELEMENT	METHOD
Sample Preparation	Standard
pH (H ₂ O)	Standard
EC	Saturated distilled water extract
Particle size distribution (3 fractionssand+silt+clay)	Hydrometer
Flow Index, Plasticity Index, % Linear Shrinkage, KDV	TRH 14 of 1987

- Disturbed samples were taken for laboratory analyses. The grading of the soils was determined by sieve and hydrometer analyses. Undisturbed samples were obtained for consolidation and collapse potential determinations. The mechanical properties of the soil material are described in terms of liquid limit and plasticity index (determined by means of Atterberg Limits tests) and the linear shrinkage. These values can be used to calculate the potential expansiveness of the soils, and to assess the suitability of the material for use as construction material. The consistency of a soil is described by means of its Atterberg limits, where the effect of a change in the moisture content on the consistency of a cohesive soil is measured. According to Cernica (1992) these tests are useful for soil identification, classification and determination of the mechanical properties of cohesive soil material. The linear shrinkage test was conducted to determine the percentage swelling that can be expected and was performed by wetting the soil to approximately its liquid limit and drying the resultant paste in a linear shrinkage mould. The potential expansiveness of a soil depends on its clay content, the type of clay mineral, its chemical composition and mechanical character. Material is potentially expansive if it exhibits the following properties:

- Clay content greater than 12%.
- Plasticity index of more than 12%.
- Liquid limit of more than 30%.
- A linear shrinkage of more than 8%.



The potential expansiveness (low, medium, high, very high) is calculated by means of Van Der Merwe (1964), where the equivalent plasticity index versus the clay content of the material is plotted on a graph divided into heave categories. If any sample in the study area classifies as potentially expansive the amount of mobilisation on the surface will be calculated.


- Compilation and submission of report.

6 PROBLEM ANALYSES

6.1 Soils

The dominant soil types according to the South African Taxonomical Soil Classification System are summarised in **Table 2**:

TABLE 2 SOIL PROFILE

SOIL	DIAGNOSTIC HORIZONS	DESCRIPTION
	<i>Orthic A-Horizon</i>	Damp dark brown micro shattered silt sand clay.
	<i>Yellow Apedalic B-Horizon</i>	Yellow brown, silty clay.
	<i>Soft Plinthic B-Horizon</i>	Damp red aerobic clay with loose consistency and Fe + Mn concretions.

The ***Orthic A-Horizon***, ***Yellow Apedalic B-Horizon*** and ***Soft Plinthic B-Horizon*** of the soil contain predominantly 1:1 clay minerals, *i.e.* kaolinite (**Figure 2**) and oxides and hydroxides of iron and manganese, which swell and shrink under fluctuating soil moisture regimes.

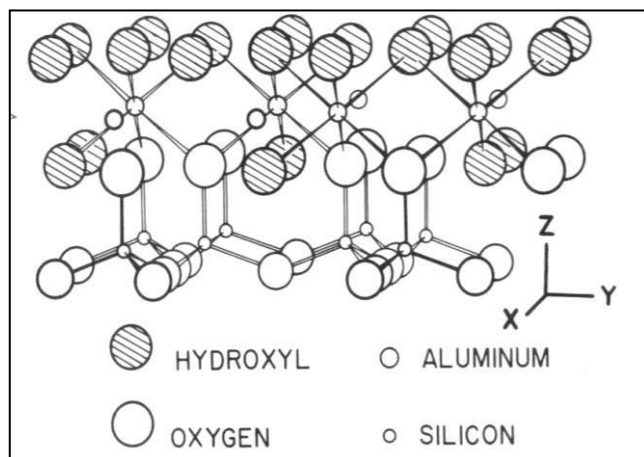


Figure 2. Structure of 1:1 clay mineral.

6.2 Land Use

The land use of the study area at the time of the assessment during October 2022 was natural veld.

6.3 Slope

The natural slope of the area was measured between 1-2% in a north eastern direction.

6.4 Drainage

Plate flow is the dominant drainage pattern, with no drainage channels intersecting the site with drainage occurring in a north eastern direction.

6.5 Climate

The area is located within the summer rainfall area. The average annual rainfall is estimated at 625mm. Weinert's N-value is calculated at 5 indicating chemical decomposition is the predominant form of the weathering process (Weinert, 1980).

6.6 Vegetation

The surrounding area is characterised by veld types of the *Cymbopogon-Themeda* grassveld type (Acocks, 1988).



6.7 Geology



Figure 3. Example of andesite

The investigation area Portion of Portion 2 Wolmaransstad is underlain by andesite (**Figure 3**).

Andesite is an extrusive igneous volcanic rock of intermediate composition, with aphanitic to porphyritic texture. In a general sense, it is the intermediate type between basalt and rhyolite, and ranges from 57 to 63% silicon dioxide (SiO_2).

The mineral assemblage is typically dominated by plagioclase plus pyroxene or hornblende. Magnetite, zircon, apatite, ilmenite, biotite, and garnet are common accessory minerals. Alkali feldspar may be present in minor amounts.

6.8 Engineering Properties and Geotechnical Considerations

6.8.1 Site Evaluation

Following is a summary of ideal conditions for urban development:

- A smooth surface gradient with slopes less than 12 degrees. Accessibility should not be restricted by topography.
- No potential for slope instability features – landslides, mud flows.
- Easy excavation for foundations and installations of services (normal depth of 1,5m required).
- Foundations above ground level or perched water table, with not too low permeability.
- Development above the 1:100 year flood line.



- Adequate surface and subsurface drainage conditions, with minimal erosion potential.
- No presence of problematic soils, for example heaving clays, compressible clays, sand with some collapsible potential, or dispersive soils, that will require expensive remedial measures.
- No potential for surface subsidence due to the presence of dolomite, *i.e.* sinkholes or undermining, or the presence of borrow pits or backfilled soil.
- No damaging differential subsidence or movement (less than 5mm total movement at the surface allowed).

It is the objective during the assessment to determine and quantify the extent of potential problems associated with the area under investigation.

6.8.2 Collapsible soil

A consolidation test was conducted on the soil material (8,1% collapsible potential). The test was conducted at the material's original moisture content up to loading capacity of 200kPa and thereafter in wet condition up to 400kPa. From these results the collapsible coefficient (SP) can be determined for the soil, which is an indication if problems can be expected under increasing load from construction. There are five SP categories (**Table 3**):

TABLE 3: SP CATEGORIES

SP CATEGORY	DESCRIPTION
<1%	No problems
1-5%	Medium problems
5-10%	Problems
10-20%	Serious problems
>20%	Very serious problems

Foundations should be thoroughly inspected for soft collapsible areas and when identified compacted to a minimum density of 95% of the AASHTO density of the material.



6.8.3 Expandable Soil

A prediction of heave from the plasticity index and percentage clay fraction of materials was carried out and interpretation of the analytical data reveal low potential swelling and shrinking anomalies to occur under fluctuating moisture regimes.

6.8.4 Load bearing capacity of the soil

The estimated bulk density of the soil is estimated at 1,275kg/m³ and estimated to have a load bearing capacity of >100kPa.

6.8.5 Excavation

All excavations for sub-surface services up to 1,300mm would be able to be conducted with conventional earthmoving equipment.

6.8.6 Groundwater



Figure 4. Fe/Mn concretions (ferricrete).

No ground water was observed during the assessment in October 2022. However, presence of oxides and hydroxides of iron and manganese was observed, which is indicative of anaerobic wet soil conditions. ***It is possible that during extreme rainy seasons the water table might be closer to the surface.***

6.8.7 NHBC Zonation

According to NHBC (1995) the area of investigation is zoned as S (**Table 4**):

TABLE 4. NHBC SITE CLASS DESIGNATION

Residential Site Class Designation (SAICE, 1995)

Typical Foundation Material	Character of founding material	Expected range of soil movement (mm)	Site Class
Rock (excluding mud rocks which exhibit swelling to some depth)	Stable	Negligible	R
Fine-grained soils with	Expansive Soils	<7,5	H



moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)		7,5-15 15-30 >30	H1 H2 H3
Silty sands, sands, sandy and gravelly soils	Compressible and potentially collapsible soils	<5,0 5,0-10 >10	C C1 C2
Fine-grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils	Compressible Soil	<10 10 to 20 >20	S S1 S2
Contaminated soils Controlled fill Dolomitic areas Land Fill Marshy areas Mine waste fill Mining subsidence Reclaimed areas Very soft silt/silty clays Uncontrolled fill	Variable	Variable	P

6.8.8 Drainage Requirement

The site is drained by surface sheet flow along natural drainage courses. No ground water was intersected during the investigation, however the presence of ferruginised profiles indicated perennial water fluctuations. It is imperative that any proposed water channels and water features on the proposed area of development be properly sealed to prevent surface and subsurface seepage. Care must be taken to ensure adequate surface drainage to prevent accumulation of water next to structures.

6.8.9 Soil Chemistry

Interpretation of the analytical data reveals no acidification anomalies that would have a corrosion effect on iron subsurface infrastructure, although a neutralising requirement of 1ton/ha/300mm CO₃ is indicated by the analytical data.

The soil is also not prone to erosion as a function of low sodium concentration (*sodium adsorption ratio <15% of the cation exchange capacity (1N NH₄Ac @ pH7)*). Excess sodium concentrations cause dispersion of clay particles, which induces reduction of water permeability, infiltration capacity and ultimately causes erosion.

7 CONCLUSION

- Development zonation for urban development according to the NHBRC was conducted, indicating the geotechnical conditions on site. The investigation



area underlain by andesite was classified as a S zone representing slightly compressible soils (estimated total soil movement <10mm). A competent TLB may be required during placement of services.

- No ground water was observed during the investigation, however the presence of ferricrete in the soil profiles indicates perennial water fluctuations.
- The area of investigation was characterised by a relative smooth gradient with slopes less than 12 degrees and accessibility was not restricted by topography.
- No potential for slope instability features, *i.e.* land slides, mud flows, *etc.* was identified.
- Development should be planned to take place above the 1:100 year flood line.
- There is no erosion potential in the NHBRC zone and no potential for subsidence due to the presence of dolomite, *i.e.* sinkholes, undermining or backfilled soils were observed.



8 BIBLIOGRAPHY

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JENNINGS, J.E., BRINK, A.B.A. & WILLIAMS, A.A.B. Revised guide to soil profiling for civil engineering purposes in South Africa. The civil Engineer in South Africa, Vol. 15, No1, January 1973.

THE NATIONAL HOME BUILDERS REGISTRATION COUNCIL (NHBC), 1995.

Standards and guidelines, first issue, May 1995.

THE SOUTH AFRICAN INSTITUTE OF ENGINEERING GEOLOGISTS (SAIEG),

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VAN DER MERWE, D.H., 1964. The prediction of heave from plasticity index and percentage clay fractions of soils. The civil Engineer in South Africa., June 1964.

WEINERT, H.H., 1980. The natural road construction materials of Southern Africa. Academia, Cape Town.

This investigation was done on trail pit information and subsequent interpolation of data to reveal the geotechnical properties on site with the techniques described. Although every possible factor during the investigation was dealt with, it is possible to encounter variable local conditions. This will require the inspection of foundations by a competent person to verify expected problems.

M.Sc., Pr. Sci. Nat., SACNSP: 400131/96, NHBC: 1179020991,

Professional Indemnity Insurance: CFP Brokers Hollard Insurance: SPL/SLFG/000013915



APPENDIX A



VILJOEN & ASSOCIATES

PO Box 20954, Noordbrug, Potchefstroom, 2522

Tel: (+27)83 271 6304

email: chris@univata.com

CEO: CJ Viljoen *Pr.Sci.Nat., M.Sc*

Soil Profile Nr: 001

Date: October 2022

Job Nr: P416

Client: Malepa Planning & Projects





Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties
0,00	[Pattern]	A	Moist, dark brown, very soft intact, silty clay - organic material.
0,10			
0,20			
0,30	[Pattern]	B	Slightly moist, brown, firm to stiff, intact, micaceous, fine sandy silt, scattered ferricrete nodules.
0,40			
0,50			
0,60			
0,70			
0,80	[Pattern]		Moist, light brown, mottled brown and black, soft intact, silty clay with ferricrete nodules.
0,90			
1,00			
1,10			
1,20	[Pattern]		Andesite.
1,30			



Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBC Zone Classification: S.









		VILJOEN & ASSOCIATES PO Box 20954, Noordbrug, Potchefstroom, 2522 Tel: (+27)83 271 6304 email: chris@univata.com CEO: CJ Viljoen <i>Pr.Sci.Nat., M.Sc</i>		
		Soil Profile Nr: 002 Date: October 2022 Job Nr: P416 Client: Malepa Planning & Projects		
				
Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties	
0,00			Moist, brown, very soft intact, silty clay - organic- material.	
0,10				
0,20				
0,30				
0,40				Moist, brown, firm to stiff, intact, micaceous, fine sandy silt, scattered ferricrete nodules.
0,50				
0,60				
0,70				
0,80				Moist, light brown, mottled brown and black, soft intact, silty clay with ferricrete nodules.
0,90				
1,00				
1,10			Andesite.	

Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBRC Zone Classification: S.





		VILJOEN & ASSOCIATES PO Box 20954, Noordbrug, Potchefstroom, 2522 Tel: (+27)83 271 6304 email: chris@univata.com CEO: CJ Viljoen <i>Pr.Sci.Nat., M.Sc</i>	
		Soil Profile Nr: 003 Date: October 2022 Job Nr: P416 Client: Malepa Planning & Projects 	
Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties
0,00			Moist, brown, very soft intact, silty clay - organic- material.
0,10			
0,20			Moist, brown, firm to stiff, intact, micaceous, fine sandy silt, scattered ferricrete nodules.
0,30			
0,40			
0,50			
0,60			Moist, light brown, mottled brown and black, soft intact, silty clay with ferricrete nodules.
0,70			
0,80			
0,90			Andesite.
1,00			






Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBRC Zone Classification: S.



 **VILJOEN & ASSOCIATES**
 PO Box 20954, Noordbrug, Potchefstroom, 2522
 Tel: (+27)83 271 6304
 email: chris@univata.com
 CEO: CJ Viljoen *Pr.Sci.Nat., M.Sc*

Soil Profile Nr: 004
Date: October 2022
Job Nr: P416
Client: Malepa Planning & Projects





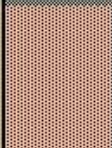


Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties
0,00			Moist, brown, soft intact, silty clay - organic- material.
0,10			
0,20			
0,30			Moist, brown, stiff, intact, micaceous, fine sandy silt, scattered ferricrete nodules.
0,40			
0,50			
0,60			Moist, brown, mottled brown and black, soft intact, silty clay with ferricrete nodules.
0,70			
0,80			
0,90			Andesite.



Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBRC Zone Classification: S.





		VILJOEN & ASSOCIATES PO Box 20954, Noordbrug, Potchefstroom, 2522 Tel: (+27)83 271 6304 email: chris@univata.com CEO: CJ Viljoen <i>Pr.Sci.Nat., M.Sc</i>		
		Soil Profile Nr: 005 Date: October 2022 Job Nr: P416 Client: Malepa Planning & Projects		
				
Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties	
0,00		C	Slightly moist, dark brown, very soft intact, silty clay - organic material.	
0,10			A	Moist, brown, firm to stiff, intact, micaceous, fine sandy silt scattered ferricrete nodules.
0,20				B
0,30				
0,40				
0,50				Moist, light brown, mottled brown and black, soft intact, silty clay with ferricrete nodules.
0,60				
0,70				
0,80				
0,90				
1,00				
1,10				
1,20				
1,30				
1,40			Andesite.	

Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBRC Zone Classification: S.





		VILJOEN & ASSOCIATES PO Box 20954, Noordbrug, Potchefstroom, 2522 Tel: (+27)83 271 6304 email: chris@univata.com CEO: CJ Viljoen <i>Pr.Sci.Nat., M.Sc</i>		
		Soil Profile Nr: 005 Date: October 2022 Job Nr: P416 Client: Malepa Planning & Projects		
				
Depth (m)	Soil Profile	Sample Nr. Symbols	Description of Soil and Properties	
0,00		C	Slightly moist, dark brown, very soft intact, silty clay - organic material.	
0,10			A	Moist, brown, firm to stiff, intact, micaceous, fine sandy silt scattered ferricrete nodules.
0,20				B
0,30				
0,40				
0,50				
0,60				
0,70				
0,80				
0,90				
1,00				
1,10				
1,20				
1,30				
1,40			Andesite.	

Notes: Refusal on andesite.
 No groundwater intersected - moist conditions.
 NHBRC Zone Classification: S.







2:



SITE CLASS S
 This zone represents slightly compressible soils (expected of total soil movement) <10mm and underlain by andesite and classified as S in terms of NHBRC (1995) or SAICE (1995) code of practice. A competent TLB may be required during placement of services. Foundations will require normal foundation techniques with standard compaction and drainage precautions.

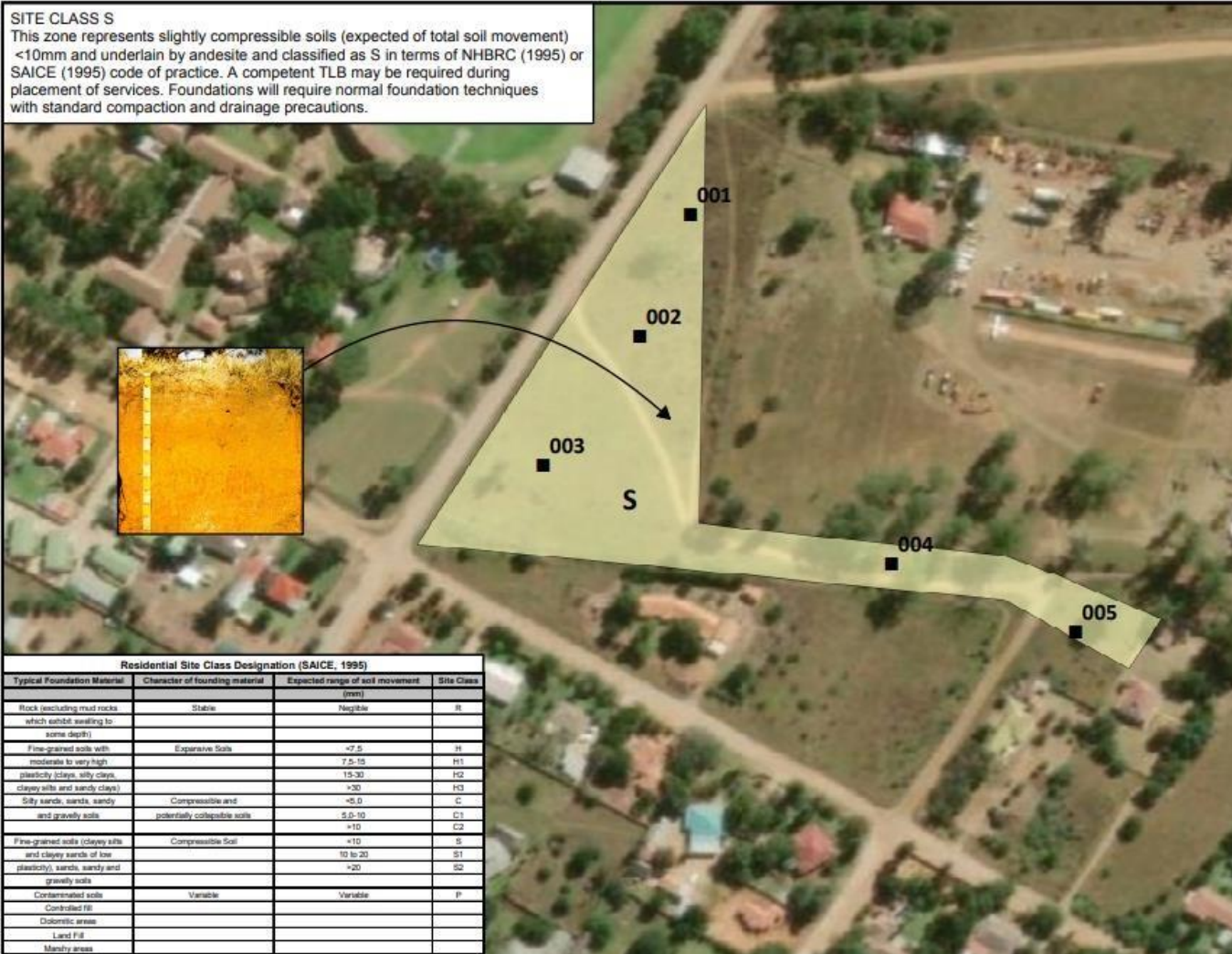
**P416
 Geotechnical
 Assessment**

Legend

■ Profile Pits

Soil Legend

■ Avalon Soil (Ha : 1.800)
 (Orthic A / Yellow
 Brown Apedallic B /
 Soft Plintic B Horizon)



Residential Site Class Designation (SAICE, 1995)			
Typical Foundation Material	Character of founding material	Expected range of soil movement (mm)	Site Class
Rock (excluding mud rocks which exhibit swelling to some depth)	Stable	Negligible	R
Fine-grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)	Expansive Soils	<7.5 7.5-15 15-30	H1 H2 H3
Silty sands, sands, sandy and gravelly soils	Compressible and potentially collapsible soils	<5.0 5.0-10 >10	C C1 C2
Fine-grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils	Compressible Soil	<10 10 to 20 >20	S S1 S2
Contaminated soils Controlled fill Domestic areas Land fill Masonry areas Mine waste fill Mining subsidence Reclaimed areas Very soft silty clays Uncontrolled fill	Variable	Variable	F

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEC, Getmapping, Aerogrid, IGN, Community

NOTE : Boundaries interpolated between test pit and soil auger holes.



Viljoen & Associates





APPENDIX B



APPENDIX C

STRATALAB
MATERIALS LABORATORY

Page 1

IVOR STREET 4, WILKOPPIES, KLERKSDORP, 2571
P O BOX 2334, KLERKSDORP, 2570
TEL: 018 462 2089
Email address: stratalab@yahoo.com
VAT No: 4620161093

Test Report: Cover Page

Job no: 202210053	Date Report Generated: 07-11-2022
Client: Viljoen & Associates P O Box 20954 Northbridge South Africa 2522	Date Sample Received: 19-10-2022 Date Tested: 19-10-2022 Report Rev. Number:

Attention: Chris Viljoen

Project: P416

Herewith the laboratory test results for the above mentioned project, as requested by client.

Please see attached results.

Page 1	Cover sheet
Page 2	Summary of test results
Page 3 - 10	* Laboratory Test Results - * MOD / * CBR / * Foundation Indicators
Page 11	* Consolidation Test BS 1377 : Part 5 : 1990
Page 12	* Compactibility Factor SABS 0120

Report end

Notes, additions, deviations or exclusions:

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- This report relates only to the sample(s) tested and in no way guarantees the performance of a similar product that has not been tested.
- Tests marked with an asterisk (*) in this report does not form part of the schedule of accreditation of Stratalab
- Stratalab is a SANAS Accredited Testing Laboratory, No. T0942



Technical Signatory: D van Vreden

STRATALAB

MATERIALS LABORATORY

IVOR STR 4, KLERKSDORP, 2570
 P O BOX 2334, KLERKSDORP, 2570
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 EMAIL: stratalab@yahoo.com
 VAT No: 4620161093

MOD A.A.S.H.T.O./Std PROCTOR/MOISTURE DENSITY/C.B.R. or U.C.S. DATA, SIEVE ANALYSIS & ATTERBERG LIMITS

TMH1: A1; A2; A3; A5; A7; A8; A9; A14; A16T

CLIENT: **Viljoen & Associates**
 PROJECT: **P416**

DATE TESTED: **19-10-2022**
 DATE REPORT GENERATED: **07-11-2022**
 JOB NUMBER: **202210053**
 SAMPLE DESCRIPTION: **001A**
 Light Brown
 Clayey Gravel

ORDER NUMBER:

MOISTURE DENSITY RELATIONSHIP (MOD)

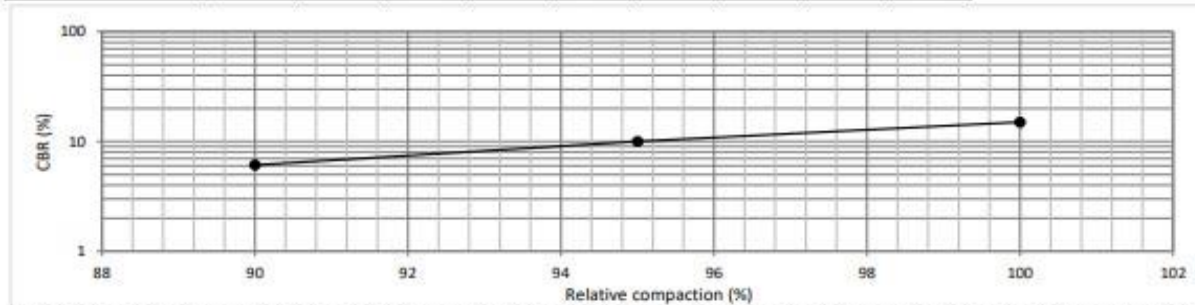
COMPACTIVE EFFORT: **Mod.AASHTO: TMH1 A7**
 PREPERATION: **Crushing**

MOULD NUMBER: **H2**
 MOULD VOLUME: **2283**
 MOULD MASS (g): **4478**

MAX. DRY DENSITY (kg/m ³):	2020
OMC (%):	9.1

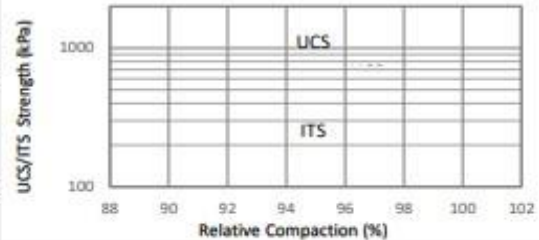
CORRECTED C.B.R at 2.54mm/13.344 Kn

CBR @ % COMPACTION	100%#	15.0	95%#	10.0	93%#	8.2	90%#	6.1
PERCENTAGE SWELL (%)	Mod#	0.3	NRB#	0.4			Proc.#	0.5



UNCONFINED COMPRESSIVE STRENGTH (UCS) / INDIRECT TENSILE STRENGTH (ITS)

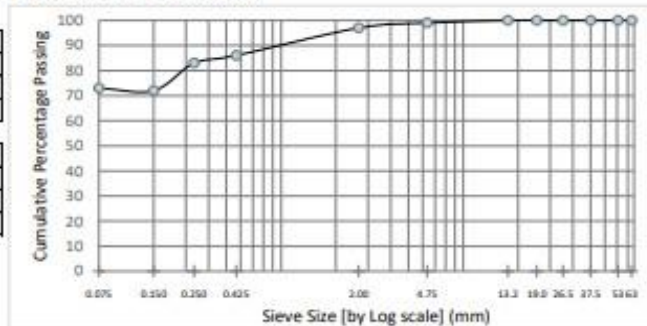
UCS	
% STABILISING AGENT & TYPE	n/a
UCS (kPa) @ % COMPACTION	100%# n/a 90%# n/a



ITS	
ITS (kPa) @ % COMPACTION	100%# n/a 90%# n/a

SIEVE ANALYSIS & ATTERBERG CONSTANTS

PERCENTAGE PASSING SIEVES (BY MASS) (%)	(mm)	%	SOIL MORTAR ANALYSIS	
			TEST	RESULT
	63	100	C.S <2.0>0.425	11
	53	100	F.S <0.425>0.075	44
	37.5	100	S&C <0.075	44
	26.5	100	G.M.	0.74
	19.0	100	ATTERBERG LIMITS	
	13.2	100	LIQUID LIMIT (%)	30
	4.75	99	PLASTIC LIMIT (%)	21
	2.00	97	PLASTICITY INDEX	9
	0.425	86	LINEAR SHRINK.(%)	4.5
	0.250	83		
	0.150	72		
	0.075	73		



REMARKS:

RF3
 REV1
 Eff. Date: 17-07-2019

Technical Signatory: *D. v Vreden*

STRATALAB
MATERIALS LABORATORY
 IVOR STR 4, KLERKSDORP, 2570
 P O BOX 2334, KLERKSDORP, 2570
 TEL: 018 462 2089 / FAX: 018 462 6655
 EMAIL: stratalab@yahoo.com
 VAT No: 4620161093

Sieve Analysis, Hydrometer, Atterberg Limits, pH and Conductivity
TMH1 A1(a), A2, A3, A20, A21T; SANS 3001-GR3

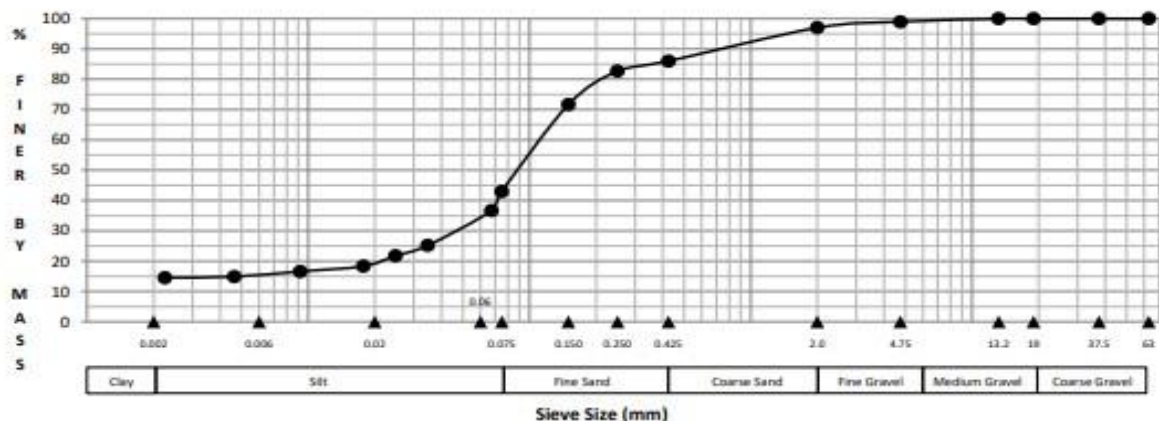
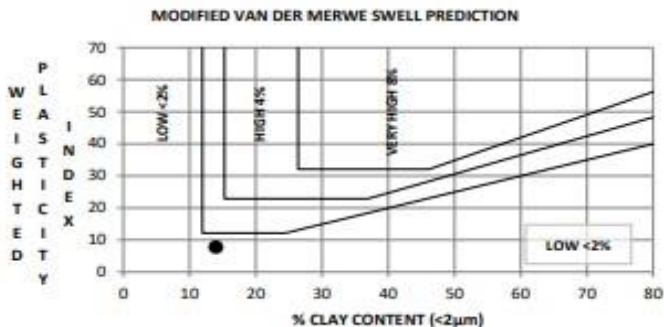
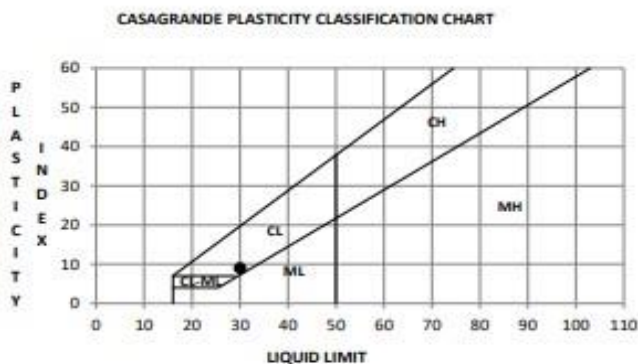
CLIENT: Viljoen & Associates
PROJECT: P416

DATE TESTED: 19-10-2022
DATE REPORT GENERATED: 07-11-2022
JOB NUMBER: 202210053
SAMPLE DESCRIPTION: SC - Light Brown Clayey Sand

ORDER NUMBER: -
TRIAL PIT: 001A

DEPTH (mm) 0

SAMPLE	(mm)	●
SIEVE ANALYSIS (modified TMH1 A1(a))	63.0	100
	37.5	100
	19.0	100
	13.2	100
	4.75	99
	2.00	97
	0.425	86
	0.250	83
	0.150	72
	0.075	43
HYDROMETER (SANS 3001-GR3)	DATE TESTED	19-10-2022
	(µm) 60	34
	(µm) 20	19
	(µm) 6	15
	(µm) 2	14
ATTERBERG LIMITS (TMH1 A2,A3)	GRADING MODULUS	0.74
	LIQUID LIMIT (%)	30
	PLASTICITY INDEX	9
	LINEAR SHRINKAGE (%)	4.5
	WEIGHTED PI	8
SOIL MORTAR ANALYSIS	SG	2.650
	Coarse Sand(<2.0>0.425)	11
	Fine Sand(<0.425>0.075)	44
	Silt(<0.075>0.002)	30
ELECTRO-CHEMICAL (TMH1 A20; A21T)	Clay (<0.002)	14
	pH	
	Conductivity(S/m)	



STRATALAB

MATERIALS LABORATORY

IVOR STR 4, KLERKSDORP, 2570
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 VAT No: 4620161093

MOD A.A.S.H.T.O./Std PROCTOR/MOISTURE DENSITY/C.B.R. or U.C.S. DATA, SIEVE ANALYSIS & ATTERBERG LIMITS
TMH1: A1; A2; A3; A5; A7; A8; A9; A14; A16T

CLIENT: **Viljoen & Associates**
 PROJECT: **P416**
 ORDER NUMBER.:

DATE TESTED: **19-10-2022**
 DATE REPORT GENERATED: **07-11-2022**
 JOB NUMBER: **202210053**
 SAMPLE DESCRIPTION: **004 A
 Light Brown
 Silty Sand**

MOISTURE DENSITY RELATIONSHIP (MOD)

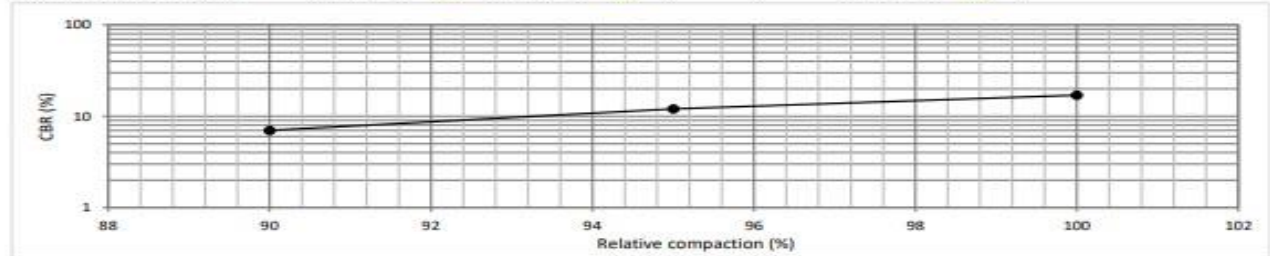
COMPACTIVE EFFORT: **Mod.AASHTO: TMH1 A7**
 PREPERATION: **Crushing**

MOULD NUMBER: **H2**
 MOULD VOLUME: **2283**
 MOULD MASS (g): **4478**

MAX. DRY DENSITY (kg/m ³):	2040
OMC (%):	8.1

CORRECTED C.B.R at 2.54mm/13.344 Kn

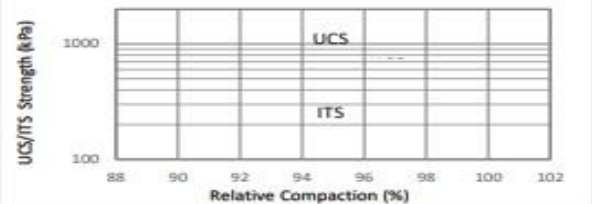
CBR @ % COMPACTION	100%= 17.0	95%= 12.0	93%= 9.1	90%= 7.0
PERCENTAGE SWELL (%)	Mod= 0.2	NRB= 0.3	Proc.= 0.4	



UNCONFINED COMPRESSIVE STRENGTH (UCS) / INDIRECT TENSILE STRENGTH (ITS)

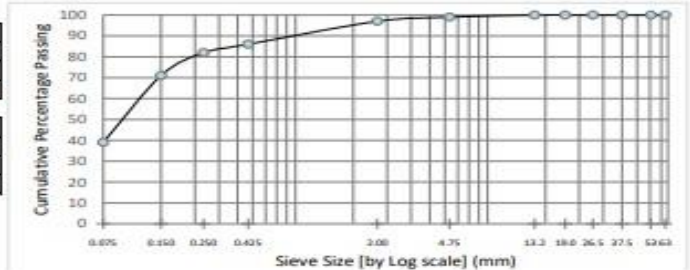
UCS			
% STABILISING AGENT & TYPE	100%= n/a	90%= n/a	
UCS (kPa) @ % COMPACTION			

ITS			
ITS (kPa) @ % COMPACTION	100%= n/a	90%= n/a	



SIEVE ANALYSIS & ATTERBERG CONSTANTS

PERCENTAGE PASSING SIEVES (BY MASS) (%)	(mm)	(%)	SOIL MORTAR ANALYSIS	
	63	100	C.S <2.0>0.425	11
53	100	F.S <0.425>0.075	48	
37.5	100	S&C <0.075	40	
26.5	100	G.M.	0.78	
19.0	100	ATTERBERG LIMITS		
13.2	100	LIQUID LIMIT (%)	28	
4.75	99	PLASTIC LIMIT (%)	19	
2.00	97	PLASTICITY INDEX	9	
0.425	86	LINEAR SHRINK.(%)	4.5	
0.250	82			
0.150	71			
0.075	39			



REMARKS:

RF3
 REV1
 Eff. Date: 17-07-2019

Technical Signatory: **D. v Vreden**

STRATALAB

MATERIALS LABORATORY
 IVOR STR 4, KLERKSDORP, 2570
 P O BOX 2334, KLERKSDORP, 2570
 TEL: 018 462 2089 / FAX: 018 462 6655
 EMAIL: stratalab@yahoo.com
 VAT No: 4620161093

Sieve Analysis, Hydrometer, Atterberg Limits, pH and Conductivity TMH1 A1(a), A2, A3, A20, A21T; SANS 3001-GR3

CLIENT: Viljoen & Associates
PROJECT: P416

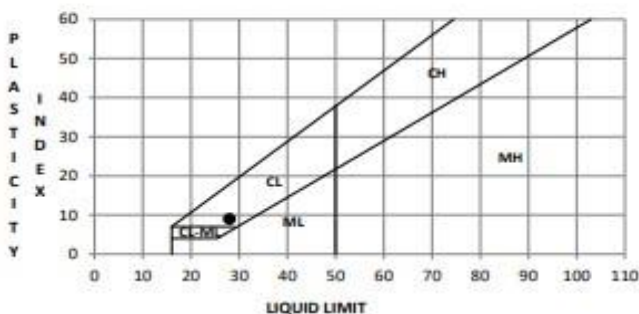
DATE TESTED: 19-10-2022
DATE REPORT GENERATED: 07-11-2022
JOB NUMBER: 202210053
SAMPLE DESCRIPTION: SC - Light Brown Silty Sand

ORDER NUMBER: -
TRIAL PIT: 004A

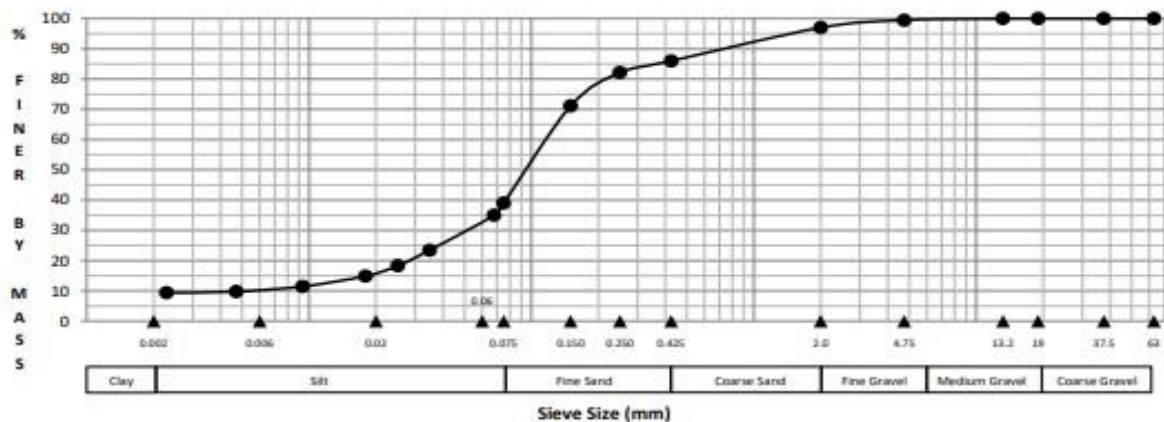
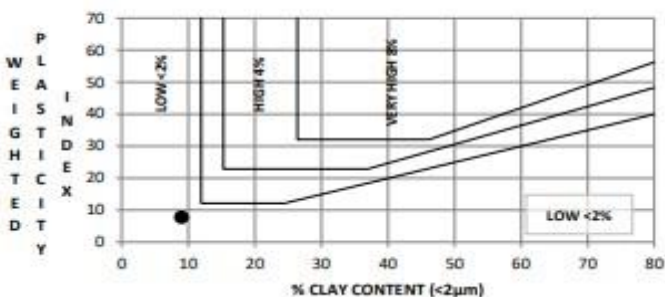
DEPTH (mm) 0

SAMPLE	(mm)	●
SIEVE ANALYSIS (modified TMH1 A1(a))	63.0	100
	37.5	100
	19.0	100
	13.2	100
	4.75	99
	2.00	97
	0.425	86
	0.250	82
HYDROMETER (SANS 3001-GR3)	DATE TESTED	19-10-2022
	(µm) 60	32
	(µm) 20	16
	(µm) 6	10
	(µm) 2	9
	ATTERBERG LIMITS (TMH1 A2,A3)	GRADING MODULUS
LIQUID LIMIT (%)		28
PLASTICITY INDEX		9
LINEAR SHRINKAGE (%)		4.5
WEIGHTED PI		8
SOIL MORTAR ANALYSIS	SG	2.650
	Coarse Sand(<2.0>0.425)	11
	Fine Sand(<0.425>0.075)	48
	Silt(<0.075>0.002)	31
ELECTRO-CHEMICAL (TMH1 A20; A21T)	Clay (<0.002)	9
	pH	
	Conductivity(S/m)	

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION



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MATERIALS LABORATORY

IVOR STR 4, KLERKSDORP, 2570
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MOD A.A.S.H.T.O./Std PROCTOR/MOISTURE DENSITY/C.B.R. or U.C.S. DATA, SIEVE ANALYSIS & ATTERBERG LIMITS

TMH1: A1; A2; A3; A5; A7; A8; A9; A14; A16T

CLIENT: **Viljoen & Associates**
 PROJECT: **P416**

DATE TESTED: **19-10-2022**
 DATE REPORT GENERATED: **07-11-2022**
 JOB NUMBER: **202210053**
 SAMPLE DESCRIPTION: **004B**
Light Brown / Yellowish
Clayey Gravel

ORDER NUMBER:

MOISTURE DENSITY RELATIONSHIP (MOD)

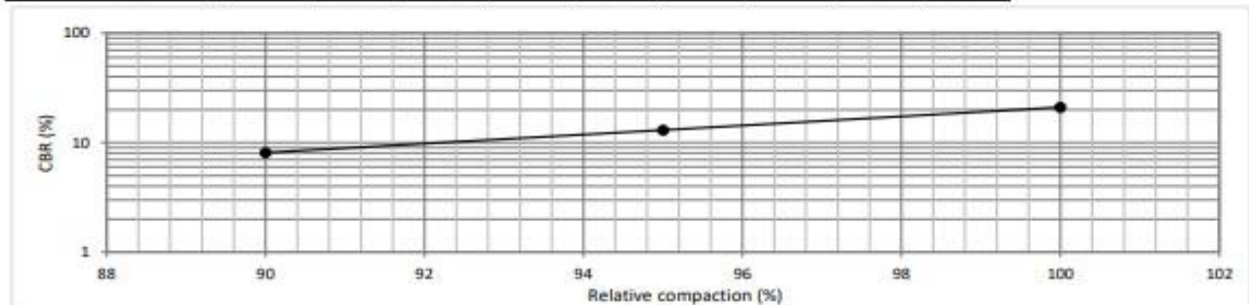
COMPACTIVE EFFORT: **Mod.AASHTO: TMH1 A7**
 PREPARATION: **Crushing**

MOULD NUMBER: **H2**
 MOULD VOLUME: **2283**
 MOULD MASS (g): **4478**

MAX. DRY DENSITY (kg/m ³):	2010
OMC (%):	10.1

CORRECTED C.B.R at 2.54mm/13.344 Kn

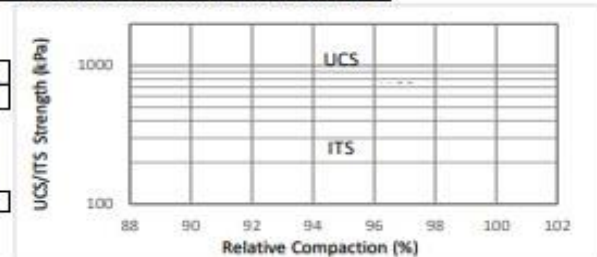
CBR @ % COMPACTION	100%#	21.0	95%#	13.0	93%#	11.0	90%#	8.1
PERCENTAGE SWELL (%)	Mod#	0.3	NRB#	0.4			Proc.#	0.5



UNCONFINED COMPRESSIVE STRENGTH (UCS) / INDIRECT TENSILE STRENGTH (ITS)

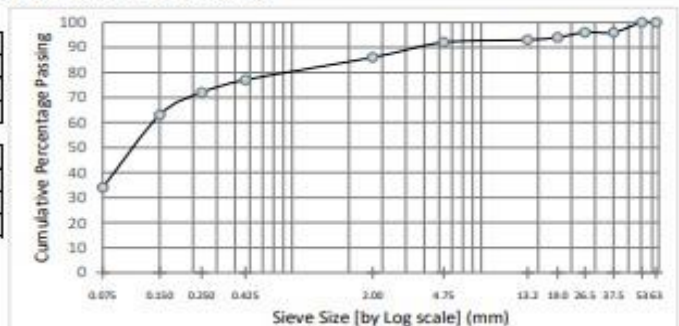
UCS	
% STABILISING AGENT & TYPE	n/a
UCS (kPa) @ % COMPACTION	100%# n/a 90%# n/a

ITS	
ITS (kPa) @ % COMPACTION	100%# n/a 90%# n/a



SIEVE ANALYSIS & ATTERBERG CONSTANTS

PERCENTAGE PASSING SIEVES (BY MASS) (%)	(mm)	(%)	SOIL MORTAR ANALYSIS	
	63	100	C.S <2.0>0.425	10
53	100	F.S <0.425>0.075	50	
37.5	96	S&C <0.075	39	
26.5	96	G.M.	1.03	
19.0	94	ATTERBERG LIMITS		
13.2	93	LIQUID LIMIT (%)	30	
4.75	92	PLASTIC LIMIT (%)	21	
2.00	86	PLASTICITY INDEX	9	
0.425	77	LINEAR SHRINK.(%)	4.5	
0.250	72			
0.150	63			
0.075	34			



REMARKS:

RF3
 REV1
 Eff. Date: 17-07-2019

Technical Signatory: **D. v Vreden**

STRATALAB

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Sieve Analysis, Hydrometer, Atterberg Limits, pH and Conductivity TMH1 A1(a), A2, A3, A20, A21T; SANS 3001-GR3

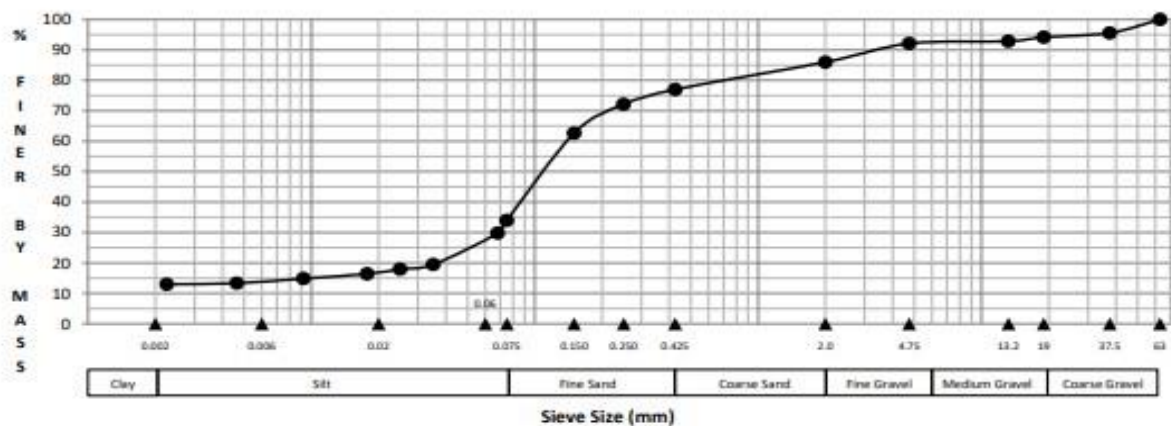
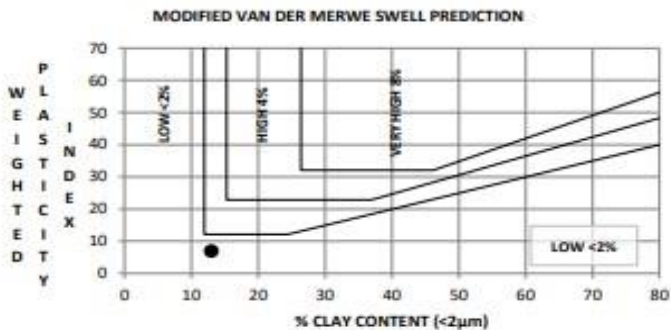
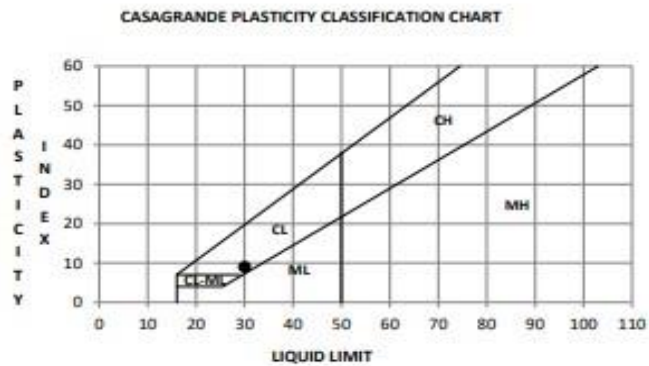
CLIENT: Viljoen & Associates
 PROJECT: P416

DATE TESTED: 19-10-2022
 DATE REPORT GENERATED: 07-11-2022
 JOB NUMBER: 202210053
 SAMPLE DESCRIPTION: SC - Light Brown / Yellowish Clayey Gravel

ORDER NUMBER:
 TRIAL PIT: 004A

DEPTH (mm) 0

SAMPLE	(mm)	●
SIEVE ANALYSIS (modified TMH1 A1(a))	63.0	100
	37.5	96
	19.0	94
	13.2	93
	4.75	92
	2.00	86
	0.425	77
	0.250	72
HYDROMETER (SANS 3001-GR3)	DATE TESTED	19-10-2022
	(µm) 60	27
	(µm) 20	17
	(µm) 6	14
	(µm) 2	13
ATTERBERG LIMITS (TMH1 A2,A3)	GRADING MODULUS	1.03
	LIQUID LIMIT (%)	30
	PLASTICITY INDEX	9
	LINEAR SHRINKAGE (%)	4.5
	WEIGHTED PI	7
SOIL MORTAR ANALYSIS	SG	2.650
	Coarse Sand(<2.0>0.425)	10
	Fine Sand(<0.425>0.075)	50
	Silt(<0.075>0.002)	24
ELECTRO-CHEMICAL (TMH1 A20; A21T)	Clay (<0.002)	15
	pH	
	Conductivity(S/m)	



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VAT No: 4620161093
Consolidation Test
BS 1377 : Part 5 : 1990

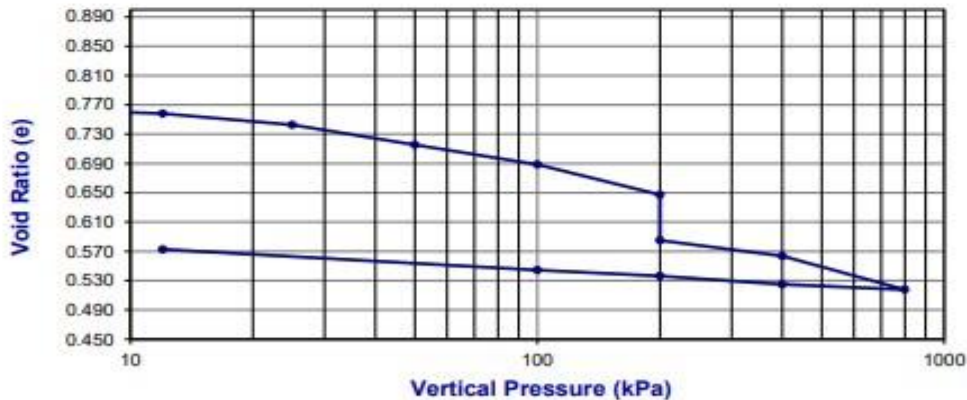
CLIENT: Viljoen & Associates	DATE TESTED: 19-10-2022
PROJECT: P 416	DATE REPORT GENERATED: 03-11-2022
	JOB NUMBER: 202210053
ORDER NUMBER:	SAMPLE DESCRIPTION: Br s/clay
TRIAL PIT: 004 C	DEPTH (mm): -

Machine	22	Mass of Ring + wet sample (start of test)	300.2 g
Ring No	2	Mass of Ring + dry sample	289.1 g
Ring Ht	19.88 mm	Mass of Ring + wet sample (end of test)	317.8 g
Ring Diam.	75.07 mm	Mass of ring	157.4 g
Ring Vol.	87.99 cm ³	Dry Density	1.497 Mg/m ³
M/C at Start	8.4 %	M/C at End of Test	21.8 %
Sat. at Start	29.1 %	Sat. at End	100.6 %
Initial Voids Ratio	0.767	S.G.	2.645
Initial Ht. of Voids	8.63 mm	Ht. Of Solids	11.25 mm

TEST WAS DONE ON A SPECIMEN PREPARED FROM AN UNDISTURBED SAMPLE AND SATURATED @ 200 kPa

Test Parameters

V.Strs (kPa)	1	6	12	25	50	100	200	200	400	800	400	200	100	12
Dial (u)	10000	9970	9903	9732	9424	9119	8657	7957	7716	7198	7278	7407	7498	7817
Strain (%)		0.15	0.49	1.35	2.90	4.43	6.76	10.28	11.49	14.09	13.69	13.04	12.59	10.98
Void Ratio	0.767	0.764	0.758	0.743	0.715	0.688	0.647	0.585	0.564	0.518	0.525	0.536	0.544	0.573
Cc		0.003	0.020	0.048	0.091	0.090	0.136		0.071	0.153	0.024	0.038	0.027	0.031
Mv (1/MPa)		0.302	0.562	0.662	0.620	0.307	0.232		0.061	0.065	0.010	0.032	0.046	0.182
Collapse Potential (%)	8.1													



Percent (%) volume change	Severity of problem*
0 - 1	No Problem
1 - 5	Moderate trouble
5 - 10	Trouble
10 - 20	Severe trouble
> 20	Very severe trouble

*Jennings and Knight (1975)

RF18
 REV1
 10-02-2020

Technical Signatory: D van Vreden

Wolmaransstad Ext 21 Housing Project
Construction & Operational Stage

ENVIRONMENTAL MANAGEMENT PROGRAMME
(EMPr)

PREPARED BY:

BIZYCON PTY LTD

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Midrand 2021

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I. Glossary of Terms and Abbreviations (See Annexure A)

II. Key to Acronyms

- EDTEA Economic Development Tourism and Environmental Affairs
- DME Department of Mineral and Energy
- ECO Environmental Control Officer
- EMPr Environmental Management Programme
- EA Environmental Authorisation
- ARC Agriculture Research Council
- BA Basic Assessment
- BAR Basic Assessment Report
- BID Background Information Document
- DEA Department of Environmental Affairs
- DWS Department of Water & Sanitation
- EIA Environmental Impact Assessment
- EIR Environmental Impact Report
- EAP Environmental Assessment Practitioner
- I&APs Interested and/or Affected Parties
- LRAD Land Reform for Agricultural Development
- NEMA National Environmental Management Act, 1998(Act 107 of 1998)
- NHRA National Heritage Resources Act
- SAHRA South African Heritage Resource Agency
- SANBI South African National Biodiversity Institute

EMP: SECTION 1: INTRODUCTION

1.1. Background

The National Environmental legislation requires that an assessment of potential environmental issues is undertaken as an important component of development projects. The Environmental Impact Assessment process identifies potential impacts that may arise at various stages of the development process and how these impacts can be mitigated. An Environmental Management Plan serves as a guideline.

Bizycon Pty Ltd (PTY) LTD conducted a Basic Assessment environmental investigation regarding the Wolmaransstad Ext 21 settlement establishment. This process identified potential environmental impacts that may arise and made recommendations in the report on how these impacts can be managed, especially during construction stages of the development. It also identified issues that should be considered during the operational phase of the development.

This EMP is a key environmental document, the content of which the line contractor must comply with during the construction process with the assistance of an environmental control officer and the site engineer and all relevant role players. This is to include any post construction rehabilitation work, which may be needed, and which would be carried out by the contractor or specialist subcontractor who he may appoint to do such rehabilitation when needed.

This EMP is also developed in accordance with the requirements of the National Environmental Management Act (NEMA, Act 107 of 1998).

1.2 Aims and objectives of the EMP

1.2.1 Aim

This EMP outlines measures to be implemented in order to minimize the potential environmental impacts associated with construction works along the drainage lines, rivers and associated wetlands. It serves as a guide for the contractor and the construction workforce on their roles and responsibilities concerning environmental management on site, and it provides a framework for environmental monitoring throughout the construction period.

1.2.2 Objectives

The EMP becomes a legally binding document upon granting of an environmental authorisation. The objectives of this EMP include:

- Encourage good management practices through implementation of the proposed development and ensure commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- To point out necessary mitigation measures to be carried out
- Develop waste management practices based on prevention, minimization, recycling, treatment or disposal of wastes;
- Follow all monitoring procedures required to identify impacts on the environment; and;
- Provide guidance to the employees and contractors regarding their environmental and legislative obligations.

SECTION 2: REGULATORY / LEGISLATIVE CONTEXT

The EPMr is prepared taking into cognizance relevant legislative instruments that relate to the proposed development. The onus lies on the applicant to ensure adherence to all necessary regulations. Contractors must be alerted of the existence of the EMPr and its legislative implications and the need to comply and **a copy of the EMPr must always be kept on site.**

DEALING WITH NON-COMPLIANCE WITH THE EMPr (Penalties/ Incentives)

The contractor shall put in place procedures to motivate his staff to comply with the EMPr and to ensure that the work force is sufficiently aware and understand all necessary legal requirements related to the construction process. It is also important for the contractor to ensure that the workforce understands the implications of acts of non-compliance, or deliberate and malicious damage to the environment by any staff member.

2.1 Key Legislation and Regulatory Requirements

The following legislations are instrument for the construction process of the poultry houses. Noncompliance will lead to the penalties as set by the relevant sections of the related legislations:

2.1.1 National Environmental Management Act No. 107 of 1998

The National Environmental Management Act of 1998, Chapter 7 Part 1 Section 28 States that:

- Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, and is responsible for the costs and repair of the environment.

2.1.1.1 Penalties for non-compliance

Chapter 7 of the National Environmental Management Act of 1998 indicates explicitly under subsections 8, 9, and 10 the steps that may be taken to recover environmental protection costs from any manager, agent or employee who omits or goes against this Act.

2.1.2 National Heritage Resources Act No. 25 of 1999

Chapter II Part 1 Section 27 (18) on Protection and Management of Heritage Resources provides guidelines that state that;

- No person will be allowed to destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage sites without a permit issued by the heritage resources authority responsible for the protection of such site.

2.1.2.1 Penalties for noncompliance

Section 51 of National Heritage Resources Act of 1999, set penalties to non-compliance as follows:

- A fine or imprisonment for a period not exceeding five years or to both such fine and imprisonment.
- A fine or imprisonment for a period not exceeding three years or to both such fine and imprisonment.
- A fine or imprisonment for a period not exceeding two years or to both such fine and imprisonment.

2.1.3 Occupational Health and Safety Act No. 85 of 1993

Section 14 (a) of the Occupational Health and Safety Act of 1993 makes the contractor responsible for the health and safety of persons who may be affected by any acts of omissions and the safety of the working environment under his jurisdiction.

2.1.3.1 Penalties for noncompliance

Section 38 (1)(2) (3) and (4) of this Act explicitly explain the offence and penalties to any employer who does or omits an act thereby causing any person to be injured at workplace.

2.1.4 Other necessary legislations but not limited to:

Environmental safety requirements in other legislative instruments such as the National Veld and Forest Fire Act, (No.101 of 1998), National water Act, (No.36of 1998) and Hazardous Substances Act, 1973, the National Air Quality Act, 39 of 2004, need to be taken into consideration and conditions observed during the implementation of his development.

2.2 KEY ROLE PLAYERS AND THEIR RESPONSIBILITIES

The successful implementation if the EMPr hinges heavily on the proper identification, definition, and allocation of roles to responsible persons or role players.

SECTION 3: SENSITIVE AREAS OF THE PROJECT AREA

Although the broad environment within and around the proposed development area is important in general consideration of construction impacts, the contractor shall ensure that his workforce are aware of the key sensitive sites within the project area and that they understand how their activities could impact directly or indirectly on environmental resources of these areas. The following descriptions need to be particularly understood and adhered to in the implementation of this EMP.

3.1 The Development site

The most likely activities that may impact on sensitive areas is the roadworks and construction of houses near to the wetland areas on the boundary of the site as shown in Figure 2 below. These areas require extra care during the construction period. These should be fenced off as no-development zones.



Figure 9 Site layout with sensitive areas that may be impacted .

3.2 Protecting the Integrity of the Ecosystem of the project site

- As part of conserving biological diversity and protecting the integrity of the ecosystem within development areas, sites that are typically rich in species diversity, contain the presence of rare or endangered species, function as a unique or intriguing habitat, or are heritage sites, are often mapped as “sensitive sites”. The sensitivity refers broadly to sites being sensitive to the activities of man, and therefore, qualifying for additional protection over and above that of the surrounding areas.
- In the case of the site for the proposed community upgrade such sensitive areas such as wetlands and associated buffer areas are noted and mapped out. As shown in Figure 7 and work around these areas should be planned to avoid or at least reduce any negative impacts.

3.3 Potential development activities

- Potential development activities that may impact on receiving environment include:
 - a. Clearing of the site unto surrounding areas and into the river systems or working within watercourses, such as road upgrades and pipe laying across rivers,
 - b. Storage of equipment and material unto surrounding areas
 - c. Driving and turning of construction vehicles outside the designated area of construction
 - d. Indiscriminate location of construction camp
 - e. Excavations for foundations for buildings
 - f. Mixing of mortar and concrete
 - g. Structure assembly and erecting
 - h. Transport of materials /supplies
 - i. Waste generation and management

As a general principle to observe in conducting activities:

- In order to make it easier to avoid, minimize or contain, the occurrence of the above impacts, all construction activities should be restricted to within the boundary of the development footprint.
- Though the vegetation on the site is severely transformed, the site is surrounded by river systems and which could be the receiver of any environmental malpractices on the site. Thus the buffer zones between the site development footprint and the river should be strictly maintained as no-development zones as mapped on the layout.

3.4 Ensuring Health and safety

- Although development in whatever form it takes is expected to benefit mankind, it in the process, could also cause disruptions to the established livelihood system and the general day-to-day operations of affected beneficiary communities or as in this case the surrounding houses, road users, and also workers/construction staff.
- The purpose of this EMPr in this regard is to provide guidelines that would ensure that the health and safety needs of residents are taken into consideration during the construction and operation period and that, every necessary and possible step is taken to ensure that the normal social life of the community is not disrupted significantly during the period of construction and operation but rather improved in a positive manner.

SECTION 4: IMPACTS, MITIGATION MEASURES, AND MONITORING

- This section covers the core of the EMPr detailing potential environmental impacts, impacts sources and objectives are described, and environmental management mitigation measures to be implemented during construction are specified. **The contractor shall always adhere to these measures.** A checklist that may be used for internal monitoring of environmental performance is contained in Appendix 1.

The table below details the potential impacts, management objectives and proposed management actions required for mitigation.

Table 2 EMPr Impacts and Management Actions (Template adapted from CSIR, 2016).

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
Site Clearing and Vegetation Removal						
Clearing of the vegetation during site establishment fencing and construction.	To ensure safety of the surrounding environment and the River systems are not disturbed	<ul style="list-style-type: none"> Vegetation removal within the buffer zones should be strictly avoided, as this will serve as storm water control mechanism for the river systems. All areas where vegetation is tripped off, such as camp site etc, should re-vegetation immediately after construction is complete. 	<ul style="list-style-type: none"> Site visit monitoring of construction period and before handover to ensure environment is properly taken care of. 	Visual Observations	Continuous	Constructor, Site Engineer and ECO
Noise Impacts						
Noise is likely to be generated from the use of equipment and from construction workers on site.	Ensure that noise does not become nuisance to surrounding environment and neighbours	<ul style="list-style-type: none"> Construction activities should be limited to daytime hours (i.e. 07:00- 17:00, as defined in South African National Standards (SANS) 10103). The noise generated during construction and operational phases must adhere to the relevant SANS standards. 	Construction times to be monitored and managed (as well as included in the tender contract).	Records of complaints register and visual observations	Continuous	Contractor and ECO /EHS Officer
Traffic Impacts						

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
Traffic, congestion and potential for collisions during the construction phase.	Prevent unnecessary impacts on the surroundings road network by supplying parking for construction vehicles on site. Managing the flow of traffic at critical areas where necessary.	<ul style="list-style-type: none"> Road barricading should be undertaken where required and road safety signs should be adequately installed at strategic points within the construction and operational vehicles site must be adhered to During the construction phase, suitable parking area should be created and designated for construction trucks and vehicles. A construction supervisor should be appointed to coordinate construction traffic during the construction phase (by drawing up a traffic plan prior to construction). 	Monitor, Record and report non-compliance.	Records of complaints register and visual observations	Continuous	Contractor EHS Manager
Safety, Health and Environment						
Potential impact on the safety of construction workers due to construction activities (such as welding cutting, use of hot metals,	Prevention of injuries to and fatalities of construction personnel during the construction phase.	<ul style="list-style-type: none"> Ensure that skilled, licensed and competent Contractors, riggers and crane operators are appointed during the construction phase, along with the use of certified. Equipment and scaffolding. Ensure that roads are not closed during construction, which may restrict access for emergency services. Ensure that construction and operational staff members adhere to 	Monitors activities and record and report non-compliance by undertaking inspections.	Records of complaints register and visual observations	Continuous	Health and Safety Officer /contractor /ECO

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
working at heights, lifting of heavy items etc.).		the relevant health and safety standards of the Occupational Health and Safety Act 181 of 1993				
Pollution caused by spillage or discharge of construction wastewater into the surrounding environment	Prevention unnecessary pollution impacts on the surrounding environment	<ul style="list-style-type: none"> No mixing of cement directly on the ground. All spills to be reported to the ECO. Ensure that adequate containment structures are provided for the storage of construction materials on site. Ensure the adequate removal and disposal of construction waste and material. Oil containers must be stored on lined platform covered by disposable sand. 	Monitor activities and record and report non-compliance by undertaking inspections.	Incident registers	Continuous	Project Developer, ECO and contractor
Heritage Resources (Archaeology and Palaeontology)						
Impact on Archaeology and Palaeontology.	Prevent damage and destruction to fossil, artefacts and material of heritage significance.	<ul style="list-style-type: none"> Carry out general monitoring of excavations for potential fossil heritage, artefacts and material of heritage importance as per the Chance Find Protocol (Refer to Heritage Report in BAR) All work must cease immediately, if any human remains and /or other Archaeology, Paleontology and historical material are uncovered. Such material, if exposed, must be reported 	Monitor excavations and construction activities for archaeological and paleontological material.	Visual observation	Daily during excavation work. As required/ necessary during construction.	Contractor and ECO.

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
		to the nearest museum, archaeologist/ palaeontologist and to AMAFA (or the South African Police Service), so that a systematic and professional investigation can be undertaken. Enough time should be allowed to remove/collect such material before construction recommences.	Contact AMAFA/SAHRA and identified paleontological/ Archaeology if any heritage features are uncovered.			
Groundwater Management						
Contamination of soil and ground water through spillage of concrete and cement	To control concrete and cement batching activities to prevent spillages and contamination of soil, groundwater and the marine environment.	<ul style="list-style-type: none"> Concrete mixing must be carried out on an impermeable surface (such as on boards or plastic sheeting and/or within a banded (lined) area with an impermeable surface). Concrete mixing areas must be fitted with a containment facility for the collection of cement-laden water. This facility must be impervious to prevent soil groundwater contamination. A washout facility must be provided for washing of concrete associated equipment. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site. Sand and aggregates containing cement must be kept damp to prevent the generation of dust. 	Monitor the handling and storage of sand, stone and cement as instructed	Register of incident	Daily	Project Developer, Contractor and EHS Manager.

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
		<ul style="list-style-type: none"> Any excess sand, stone and cement must be removed from site at the completion of the construction period and disposed at a registered disposal facility. 				
Wastewater Management						
Pollution caused by spillage or discharge of construction wastewater into the surrounding environment.	Reduce construction wastewater discharge into the environment and the resulting impact.	<ul style="list-style-type: none"> Implement proper construction site management actions such as the installation of containment structures, good on-site housekeeping (regular sweeping of roadway and work areas, reporting system and environmental awareness training), and spillage management 	Monitor via site audits and records non-compliance and incidents.	Register incidents Visual observation	of Monthly	EHS Manager
Storm water Management						
Pollution of the surrounding environment because of contamination of storm water. Contamination	Reduce the contamination of storm water.	<ul style="list-style-type: none"> The appointed Contractor should compile a Method Statement for Storm Water Management during the construction phase. Provide secure storage for oil, chemicals and other waste materials to prevent contamination of storm water runoff. 	Compile Method Statement Monitor the banding and containment structures.	Register incidents of	Once off (and thereafter updated as required). Weekly Weekly	Contractor ECO/ EHS Manager Contractor

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
could result from chemicals, oil, fuels, sewage, solid waste, litter etc.		<ul style="list-style-type: none"> Regular inspections of storm water infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds. Erosion prevention structures should be placed to reduce water velocity within the drainage system. Only essential (what cannot be avoided) vegetation should be removed and no disturbance to surrounding vegetation should be permitted. Accumulation of water on the surface must be avoided always. 	Monitors via site audits and record non-compliance and incidents (i.e. by implementing walk through inspections.)	Visual observation		
Waste Management						
Pollution of the surrounding environment because of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater and river contaminations because of incorrect storage, handling and disposal of general and hazardous waste.	<ul style="list-style-type: none"> General waste and hazardous waste should be sorted temporarily on site in suitable (and correctly labelled) waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Should on-site storage of general waste and hazardous waste exceed 100m³ and 80m³ respectively, then the National Norms and Standards for the Storage of Waste (published on 29 	<p>Inspection of the temporary waste storage area.</p> <p>Monitor waste generation and collection throughout the construction phase</p>	<p>Register of incidents</p> <p>Visual observation</p>	Daily	ECO & EHS Manager

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
		<p>November 2013 under Government Notice 926) must be adhered to.</p> <ul style="list-style-type: none"> • Ensure that the construction site is kept cleans always and that construction personnel are made aware of correct waste disposal methods. • No solid waste may be burned or buried on site. 				
Air Quality Management						
Increased dust level and Air Quality Impact: Emissions from construction vehicles and generations of dust because of earthworks, as well as the delivery and mixing of construction material.	Reduce dust emissions during construction activities.	<ul style="list-style-type: none"> • Ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water (obtained from an approved source) to minimise dust generation. • Ensure that construction vehicles travelling on unpaved roads do not exceed a speed limit of 40km/hour. • Limit construction activities to daytime hours. 	Monitor dust suppression mechanisms and record non-compliances.	<p>Register of incidents</p> <p>Visual observation</p>	During complaints/in cidents	EHS Manager, ECO and Contractor
Socio-Economic Impacts Management						

Impact	Management Objectives	Management /Mitigation Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
Employment creation and skills development opportunist during the construction.	Maximise local employment and local business opportunities to promote and improve the local economy.	<ul style="list-style-type: none"> Enhance the use of local labour and local skills as far as reasonably possible. The project will employ approximately 20 people from the area. Where the required skills do not occur locally, and where appropriate and applicable ensure that relevant local individuals are recruited. Ensure that goods and services are sources from the local and regional economy as far as reasonably possible. 	<p>Maximize local employment for unskilled labour and provincial/national skilled labour.</p> <p>Visual observation</p> <p>Procurement source documents</p>	<p>Records of staff members</p> <p>Number of Local people employed.</p>	During the construction phase	Contractor and ECO.

MANAGEMENT PLAN FOR OPERATIONAL PHASE

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
Alien Vegetation Management						
Potential re-establishment of alien plants on site	Ensure the removal of alien invasive vegetation from the proposed projects area and prevent the establishment and spread of alien invasive plants.	<ul style="list-style-type: none"> Ensure that any alien invasive plants that become re-established on site are removed promptly. The removal of these species must have carried out in line with relevant municipal and provincial procedures, guidelines and recommendations. The removed species should be immediately disposed of correctly and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species. 	<p>Monitor the removal of the alien invasive vegetation</p> <p>Visual observation</p>		During the removal process	EHS Manager / Municipal Environmental Officer in Charge
Land rehabilitation	Ensure land (neighbours) impacted during construction phase is	<ul style="list-style-type: none"> Infilling of all excavation work. Remove all rubble from construction site and disposal of it at a registered landfill site. 	Infill of excavation ensuring sub soil is filled first.	Visual observation	When /if complaints are received.	Project Developer

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
	sufficiently rehabilitated.		Removal rubble to a registered			
Safety, Health and Environment						
Soil and Water pollution	Prevent unnecessary pollution impacts on the surrounding environment	<ul style="list-style-type: none"> Storm water should not be allowed to encounter effluent. Monitoring water quality of onsite borehole should be conducted. Ensure that excrement, carcasses, feed and other operational waste and hazardous materials are appropriately and effectively contained and disposed of without detriment to the environment 	<p>Carry out thorough inspection of piping, loading hoses, and banding for leaks, using a checklist.</p> <p>Proof of attendance to training sessions to be kept on file at the terminal.</p>	<p>Incident reports</p> <p>Visual observation</p>	Daily	Project Applicant (municipal Environmental Officers)
Storm water Management						
Increased storm water discharge into the	Reduce the impacts of increased	<ul style="list-style-type: none"> Regular monitoring of stormwater quality and river health 	Implement surface water quality monitoring programme, based on	Incident reports	As agreed during the	Project ECO

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
surrounding environment which may end up in the rivers	storm water discharge to the environment		consultation with the landowner		operational phase.	Project Applicant (Municipal Environmental Officer)
		<ul style="list-style-type: none"> Regular inspections of storm water infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds. Accumulation of water on the surface must be avoided. Waste traps in storm water system should be cleaned at regular intervals. Run off to roads must avoided. 	Undertake regular inspections of the storm water infrastructure (i.e. by implementation walk through inspections).		Weekly	Site Manager and EHS Manager
Socio-Economic Management						
Additional employment opportunities	Maximise local employment and local business opportunities to promote	<ul style="list-style-type: none"> Enhance the use of local labour and local skills as far as reasonably possible. Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individual are trained. 	Maximise local employment for unskilled labour and provincial/national skilled labour		During the operational phase	Project Developer

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
	and improve local economy	<ul style="list-style-type: none"> Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible. 				
Environmental Awareness`						
Increased energy consumption during the operational phase	Reduce energy consumption where possible	<ul style="list-style-type: none"> Encourage the use of energy saving equipment (such low voltage light and low-pressure taps) and promote recycling. Operational personnel must be made aware of energy conservation practices as part of the environmental awareness training programme. 	<p>Monitor energy usage via site investigations.</p> <p>Conduct training for all operational personnel</p>		Monthly	EHS Manager / Municipality
		<ul style="list-style-type: none"> Firefighting equipment must be made available at various appropriate locations 				
Safety, Health and Environment						
Pollution of the surrounding environment as a result of the handling, temporary storage	Prevent unnecessary pollution impacts on the surrounding environment	<ul style="list-style-type: none"> General waste (i.e. building rubble, demolition waste, discarded concrete, bricks, tiles, woods, glass, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) and hazardous waste (i.e. empty 	Monitor activities and record and report non-compliance by undertaking inspections.	<p>Compliance reports</p> <p>Visual observations</p>	Throughout the decommissioning phase	Project applicant, ECO and Contractor

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
and disposal of solid waste		<p>tins, paint and paint cleaning liquids, oils, fuel spillage and chemicals etc.) generated during the decommissioning phase should be stored temporarily on site in suitable (and correctly labelled waste collection bins and skips (or similar).</p> <ul style="list-style-type: none"> Ensure that enough general waste disposal bins are provided for all personnel throughout the site. These bins must be emptied on a regular basis. 				
Spill contingency, Management and Handling of Chemicals/Dangerous Goods						
Potential spillage of effluent to the surrounding environment from chemicals used in latrines.	Reduce the spillage of domestic effluent and the impact thereof on the environment.	<ul style="list-style-type: none"> Ensure that normal sewage management practices are implemented during usage. 	EHS Manager to monitor via site audits and record non-compliance and incidents.	Incident reports Visual observations	Monthly	EHS Manager and Environmentalist
		<ul style="list-style-type: none"> Ensure that the toilet/sanitation facilities are maintained in a clean, orderly a sanitary condition. 	Monitor via site audits and record non-compliance and incidents.	Incident reports Visual observations	Daily	EHS Manager and Contractor

Impact	Management Objectives	Management Actions	Monitoring			
			Indicator	Methodology	Frequency	Responsibility
Waste Management						
Pollution of the surrounding environment because of the handling, temporary storage and disposal of solid waste	Reduce soil and ground water contamination as a result of incorrect storage. Handling and disposal of general and hazardous waste	<ul style="list-style-type: none"> Include regular waste collection from the facility into the municipal waste stream. 	Carry out monitoring throughout the operational phase	Compliance reports Visual observations	Continuously thought-out life of project	Project Developer and EHS Manager
		•	•			

5. EMP CONCLUSIONS AND RECOMMENTATIONS

The significance of most of the issues identified may be effectively reduced after mitigation should this environmental management plan be carefully followed. The proposed development will be undertaken as part of the in-situ upgrade which requires that care be taken to not unnecessarily inconvenience the community during construction. The concluding recommendations are:

- Contractors need to follow the environmental management plan;
- A copy of the EMP should always be placed on site, and the contractor and team should be work shopped on the requirements of the EMP.
- The development needs to benefit the community in a tangible manner, and therefore, attempts need to be made to integrate community needs and aspirations into the implementation processes of the development.
- Where appropriate, the contractor must use local labour as much as possible;
- The contractor needs to show concerns for health in general and the health safety of the employees in particular;
- In terms of the National Environmental Management Act 107 of 1989 everybody is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner;
- Furthermore, in terms of the Nation Environmental Management Act 107 of 1998 the cost of repair for any environmental damage shall be borne by the person responsible for the damage.
- Operational stage recommendations should be also implemented and the onus is on the applicant to ensure adherence to the mitigation measures proposed. Regular maintenance and monitoring is required from the municipality and to ensure smooth operations.
- The competent authority may also pay random visits to the facility to monitor compliance during construction and operation stages.

Annex A: Glossary

- **1.3.1 General**

- The contractor shall actively engage himself and workers (if necessary) on this project to knowing and understanding of relevant terms, descriptions, and abbreviations in this EMP as indicated below:

- ***Contractor (CT)***

- For the purpose of this EMP: “CT” refers to the main contractor(s) appointed for the construction activities of the project or portion of the project. The main contractor(s) are required to adhere to the EMP and are responsible for ensuring that all subcontractors, suppliers and staff appointed by them, also adhere to the EMP.

- ***All Staff***

- This is the entire workforce. Workers employed by the contractor or persons involved with activities related to the project, or persons present or visiting the construction area, including permanent, contract, or casual labour and informal traders.

- ***Environmental Control Officer (ECO)***

- An individual or representative of an organization appointed to act on matters concerning the day-to-day implementation of the EMP, and for liaison with the DAEA&RD, and the public affected by construction.

- ***EDTEA***

- Department of Economic Development, Tourism, and Environmental Affairs – who is the competent authority in the case of this application.

- ***Local Community***

- People residing in the region and near the construction activities, including the owners and/or managers of land affected by construction, small holdings, workers on the land, and the people in nearby towns and villages.

- ***Public***

- Any individual or group of individuals concerned with or affected by the project and its consequences, -including the local community, local, regional, and national authorities, investors, workforce, customers, consumers, environmental interest groups, and the general public.

- ***Relevant Authority***

- This refers to the environmental authority on national, provincial or local level with the responsibility for granting approval to a proposal or allocating resources.

- **1.3.2 About the Construction Activities**

- ***Alternatives***

- A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternative can refer to any of the following but are not limited to hereto: alternative sites for development, alternative site layouts, alternative design, alternative process, and materials.
- **Construction Areas/Site:**
- This is land area on which the project is to be located. It includes the sites of individual stands, construction campsites, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMP (particularly) the specifications for rehabilitation) are relevant for all areas disturbed during construction.
- **Development**
- This is the act of altering or modifying resources in order to obtain potential benefits.
- **Access Roads and Tracks**
- Access Roads and Tracks refers exiting and newly established roads and tracks, and areas cleared or driven over to provide access to/from the construction areas, and for the transportation of the construction workforce, equipment, and materials.
- **1.3.3 About the Environment**
- **Receiving / Affected environment**
- Those parts of the socio-economic and biophysical environment impacted on by the development.
- **Assessment**
- The process of collecting, organizing, analysing, interpreting, and communicating data that is relevant to some decision.
- **Environment**
- The surrounding within which humans exist that are made up of: - the land, water and atmosphere, fauna and flora, including any part, combination or interrelationships among these; and all the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human wellbeing.
- **Environmental Impact**
- This is the degree of change in an environment resulting from effect of an activity whether desirable or undesirable. Impacts may be direct consequences of an organization's activities or may be indirectly caused by them.
- **Environmental Impact Report**
- A report describing the process of examining the environmental effects of a development proposal, the expected impacts, and the proposed mitigation measures.

- **Evaluation**

- The process of weighing information, the act of making value judgments or ascribing values to data in order to reach a decision.

- **Hazards**

- Hazardous substances in this regard are anything that constitutes a source of, or exposure to danger. Some examples of hazardous sources or materials are:
 - Diesel, petroleum, oil, bituminous products;
 - Cement;
 - Solvent based paints;
 - Lubricants;
 - Explosives;
 - Drilling fluids;
 - Pesticides, herbicides.

- **Hydrological Features**

- Hydrological features include, but not limited to:
 - Rivers and Wetlands;
 - Open water;
 - Vegetated drainage channels;
 - Subterranean water;

- **Life Support Systems**

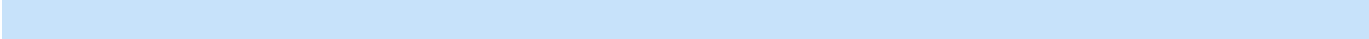
- Life support systems include, but are not limited to:
 - An ecological system in which its outputs are vital for sustaining specialized habitats;
 - An ecological system in which its outputs are vital for sustaining human life (e.g. water purification).

- **Mitigation**

- Measures designed to avoid, reduce or remedy adverse impacts.

- **Monitoring**

- This is the repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period to assess the efficiency of control measures.

- ***Negative Impact***
 - A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, property or by causing nuisance.
 - ***Rehabilitation***
 - Measures implemented to restore a damaged Environment to an acceptable level.
 - ***Significant impact***
 - This is an impact that, by its magnitude, duration or intensity alters an important aspect of the environment.
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Curriculum Vitae

Of

Honu-Siabi MacCarthy

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[/macCarthy@developmentimpact.co.za](mailto:macCarthy@developmentimpact.co.za)

PERSONAL INFORMATION

Surname : Honu-Siabi
 First Names : MacCarthy
 Gender : Male
 Current residence : South Africa (Pietermaritzburg / Johannesburg)

Profile summary:

Having been working in the development sector for a while, I have acquired more than 12 years experience in critically assessing the environmental, economic and social impacts of development interventions, in Africa. I have worked with both the public and private sector on diverse developmental initiatives and mostly work across sectors, and in collaborate with other individuals, teams and institutions in ensuring collective efforts towards sustainable and people-centered development and growth in South Africa and in on the continent of Africa as a whole.

EDUCATION

Name of Institution	Degree/Qualification obtained	Year Obtained
University of the Witwatersrand	PGD in Public and Development Sector Monitoring and Evaluation	2015
University of KwaZulu-Natal -RSA	Master of Social Sciences (MS Sc.) – Policy and Development Studies	2014
North West University - RSA	Environmental Impact Assessment (Cert)	2013
North West University - RSA	Post Decision Environmental Monitoring and Enforcement (Cert)	2013
University of Kwazulu-Natal GSB -RSA	Project Management (Cert)	2012
University of Cape Coast - Ghana	Bachelor of Management Studies – (Honours)	2007
International School Of Aviation - Ghana	Tourism Management (Diploma)	2001

Skills and Competencies

- Good Programme implementation and management skills

- Ability to use MS Projects in scheduling, executing and managing complex projects
- Conversant with all Microsoft Office End User Applications (Word, Excel, PowerPoint, Access, Publisher etc), Corel Draw, SPSS etc
- General Knowledge in computer Hardware and Software.
- Excellent verbal and written communication skills all levels
- Research, workshop, organisation, facilitation and Presentation skills
- Attention to details and strong result oriented thinking and innovation ability
- Ability to work under pressure with less or no supervision
- Design and implementation of monitoring systems
- Data collection (multiple methods/tools), data analysis and reporting skills
- Ability to search, using search protocols, and write up high quality academic/professional output

RESEARCH ACTIVITIES / CONFERENCES /WORKSHOPS

Research

Theses

An Analysis of the Implementation of a Monitoring & Evaluation System at the NGO sector: The Case of the NGO SaveAct, 2013

(Paper on this is being edited for publication)

Market research

Commercialization Goat meat in the KZN Province

Department of Finance & Economic Development (Funder)
2011

Conferences /Presentations

Conference

Presenter: Unpacking diagnostics as a key component in public policy making process: The need for evidence in diagnosing societal problems

5th SAMEA Biennial Conference

Sandton, Johannesburg, RSA

12-16 October 2015

Capacity-Building Workshop

Research synthesis and Systematic Reviews (3IE training)

African Evidence network Colloquium on Research evidence use

University of Johannesburg

November 2014

Workshop and conference

Participant - Workshop on Systematic Reviews and Impact Evaluations

Presenter: *The critical role of monitoring and evaluation systems in impact evaluation: Lessons from a case study*

3IE, Asian Development Bank Conference: Making Impact Evaluations Matter; Better evidence for Effective Policies and Programmes.

Asian Development Bank

Manila, Philippines
1-5 September, 2014

Conference

Presenter- An Analysis of the Implementation of a Monitoring and Evaluation System: The Case of the NGO SaveAct
SAMEA, DPME Conference on: Policy Research: Do findings make a difference
16 to 20 September 2013

Capacity-Building Workshop

Participant-Developing Monitoring and Evaluation Systems
SAMEA and DPME *workshop Series*
25-27 September, 2013, Durban

AWARDS AND RECOGNITIONS

Conference Scholarship

3IE Sponsorship to attend and present poster at workshop and conference dubbed Making Impact Evaluations Matter. Manila, Philippines,
Sept 1-7, 2014

Best Poster Presentation Award

1st Position, Best poster presentation, Making Impact Evaluation Matter Conference, Manila, Philippines, 2014

Emerging Evaluator Award (Scholarship)

South African Monitoring and Evaluation Association (SAMEA) 4th Biennial Conference, Sandton, Johannesburg, Sept 2013

Runner up (2nd Position) – National

Millennium Essay Competition (Organized for all Secondary Schools Nationwide)
Ghana Millennium Commission,
Nov 2000

EMPLOYMENT HISTORY

Employer
Position
Duties
Duration

Bizycon Pty Ltd / Development Impact Group
Snr EAP – EIAs, Research & Evaluations
Managing projects and consulting -
2011 to date

Employer
Position
Duties
Duration

Quest Research Services (QRS)
Snr Consultant – Monitoring and Evaluation
Project consultancy
2016 - 2019

Employer
Position

University of the Witwatersrand
MOOC Community Teaching /Facilitating (short consultancy)

Duties	Assisting with student issues, monitoring and moderating online discussion forums and helping plan and review new modules and online courses.
Duration	September 2016 – November 2016
Employer	Anglophone Centre for learning on Evaluation and Results (CLEAR-AA), Wits School of Governance
Position	Researcher
Duties	Rendering support to Snr M&E technical expert Managing projects and offering support on key projects of CLEAR-AA, assisting institutions develop M&E systems and capacity, Undertaking research, conducting surveys, collecting and analyzing data and report writing, in addition to conducting presentations and meetings, and also organizing workshops and other interactive events.
Duration	November 2015 – April 2016
Employer	Nature & Development Group of Africa
Position	Project Manager (consulting) Project Manager – Environmental Consulting and Research
Duration	2009 – 2012, 2012 to 2015
Name of employer	Nisis Engineering Designs Co. Ltd (Project Management/Civil Engineering/Construction)
Position held	Assist. Manager (Projects and Administration)
Duties	Management of Projects and Procurement (For Construction of Public Water and Sanitation Facilities), Managing personnel and preparing of quarterly reports, General administration
Duration	Feb, 2006—November, 2007.
Name of company	Thembaletu Community Education Centre
Position	Trainer/ Facilitator
Duties	Training participants in Basic Business Skills, Reviewing Training material, preparing and conducting assessments and Evaluation, and reporting at meetings

DEVELOPMENTAL WORK EXPERIENCE /PROJECTS

RECENT MONITORING AND EVALUATION PROJECTS

Jan 2017 –July 2017	Diagnostic Evaluation of the implementation process of Pomfret Relocation and Rehabilitation intervention. –A project to evaluate the implementation process and also diagnose socio economic conditions of Pomfret community for
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	redesigning of new intervention and provide cabinet with sufficient evidence for decision making.
Client	DPME
Project Leader (QRS)	Mr C Dube
My role /Position	Principal Evaluator

Nov 2016	Design and Facilitation of (2 Workshops): Dialogue among Higher Educational Institutions across Sub-Sahara Africa on the Professionalization of Monitoring and Evaluation in Africa, including curriculum structuring and delivery. Held in Nairobi (for Eastern and Southern Africa) and Accra (for Western Africa).
Implementer /Employer	CLEAR AA (Wits School of Governance)
Project Leader (QRS)	Ms H Robertson
My role /Position	Organiser and Co Facilitator

Oct 2015 –April 2016	Strengthening the Monitoring and Evaluation Framework of City Of Johannesburg: Institutional Support from CLEAR AA: Diagnostic assessment of the current monitoring & Evaluation system, programme design, curriculum development and training
Implementer /Employer	CLEAR AA (Wits School of Governance)
Project Leader (QRS)	Ms H Robertson / Dr Laila Smith
My role /Position	Programme Coordinator

Nov 2016	Workshop Design and Facilitation: Monitoring and Measuring the effect of Human Settlement interventions: A re-look at the human settlement mandate and evaluation frameworks of various sectors of government as related to Outcome 8 of the National Development Plan. The workshops sort to find a dialogue on integration and aligning of the evaluations frameworks related to various legislative instruments such as the IUF, SPLUMA, MTSF, and MEIA Etc.
Implementer /Employer	DPME /CLEAR-AA
Project Leader (QRS)	Dr Laila Smith /Ms M Amisi
My role /Position	Programme Design and Co-Facilitation.

2. ENVIRONMENTAL IMPACT ASSESSMENT PROJECTS:

Some Selected Projects worked on in this regard include:

Environmental Impact Assessment (BAR) for Residential development on Erf 1087 Posmasburg, Northern Cape	
Project Implementing Agent	: Thuso Enviro and Developments
Project Leader	: Mr R Themeli
Project Consultant (Environmental)	: MacCarthy Honu-Siabi
Project status	: In progress 2020

Environmental Impact Assessment (BAR) for Residential development on 15 Strathcona Drive, Clansthal, Durban	
Project Implementing Agent	:

Project Leader : Mr H P Rayes
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : In progress 2020

Environmental Impact Assessment (BAR) for Greater Kokstad Cemetery Establishment

Project Implementing Agent : Inzuzo Yesizwe Development Planners
Project Leader : Mr Mxolisi Ndlovu
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed July 2020

Environmental Impact Assessment for Umzimkhulu Housing Project, Umzimkhulu

Project Implementing Agent : Isibuko Development Planners
Project Leader : Ms Sithokoza Cele
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed Aug 2020

Environmental Impact Assessment for Greenco Poultry Farm, Bela Bela, Limpopo

Project Implementing Agent : Development Impact Group (DIG)
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed June 2020

Environmental Analysis for Town Planning Scheme: Nquthu Local Municipality

Project Implementing Agent : NANGA Projects
Project Leader : Mr Suleiman Mwajuzuu
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2019

Environmental Analysis for Town Planning Scheme: Umlalazi Local Municipality

Project Implementing Agent : NANGA Projects
Project Leader : Mr Suleiman Mwajuzuu
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2018

Environmental Analysis for Town Planning Scheme: Emfuleni Local Municipality, Mpumalanga

Project Implementing Agent : Isibuko Development Planners
Project Leader : Mr M Maseko
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : 2018

Project identification and Township Establishments Nkangala District – Strategic Development Framework (SDF)

Project Implementing Agent : Isibuko Development Planners
Project Leader : Mr M Maseko
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : 2016

Middlebuilt Housing Project, Delmas – Environmental Impact Assessment (Scoping)

Project Implementing Agent : Isibuko Development Planners
Project Leader : Mr M Maseko
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : 2016

West Rand Poultry Value Chain – Environmental Impact Assessment

Project Implementing Agent : DRDLR, through Nkwele Agribusiness & Investments
Project Leader : Mr Thati Tladi
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2016

Environmental Impact Assessment Groutville Priority 2 Sanitation Project

Project Implementing Agent : Linda Masinga & Associates, Durban
Project Leader : Patrick Addo
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2015

Environmental Impact Assessment Namani Shopping Mall Ekuvukeni – near Ladysmith

Project Implementing Agent : Isineke Developments
Project Leader : Dr Nelson Mwanyama
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2015

Environmental Impact Assessment (Basic Assessment) Mkhuze Waste Water Treatment Works

Project manager : RCR Collaborative, Durban
Project Leader : Patrick Addo
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2015

Environmental Impact Assessment (Environmental Scoping & EIA) for Redcliff Housing Project

Project manager : RCR Collaborative, Durban
Project Leader : Patrick Addo
Project Consultant (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2012

Environmental Impact Assessment for the Rehabilitation of Storm-Damaged Roads in Hibiscus Coast Municipality

Project manager : Liquid Platinum
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
Project status : Completed 2009

Environmental Impact Assessment for Kenville Housing Project (Durban)

Project manager : Project Preparation Trust of KZN
Project leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation

Project status : Successfully 2009

Environmental Impact Assessment for the Vulamehlo Ward 5 Housing Project

Project manager : TMS Properties
Project leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed 2010

Environmental Scoping for the Emapeleni Housing Project (Emapeleni)

Project manager : eThekweni Municipality
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : In progress

Environmental Scoping for the Kwadinabakubo Housing Project

Project manager : eThekweni Municipality
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Completed 2008

Environmental Scoping for the Cottonlands Housing Project (Cottonlands, Ndwedwe)

Project manager : eThekweni Municipality
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, public participation and report preparation
Project status : In progress

Wetland Assessment for the Copesville Housing Project (Copesville, Pietermaritzburg)

Project manager : Mr. M. Marareni (Umpheme Development Services)
Project leader : Dr. Nelson Mwanyama/Patric Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My Duties : Wetland Delineation and Report preparation
Project status : Successfully completed 2009

Environmental Impact Assessment for the Umlasi AA and Chicago Housing Project (Umlaasi, Durban)

Project manager : Chris Calitz (Terraplan Associates)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed 2009

Environmental Impact Assessment for the Umlasi - Isimbini Housing Project (Umlasi, Durban)

Project manager : Chris Calitz (Terraplan Associates)
Project Leader : Patrick Addo

Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed 2009

Environmental Impact Assessment for the Zanzibari Housing Project (Bluff, Durban)

Project manager : Project Preparation Trust of KZN
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Completed

Environmental Screening/Assessment for the Chartsworth Bulk and Infill Housing Project

Project manager : Nelson Allopi and Associates
Project Leader : Patrick Addo
Project Manager (Environmental) : Dr. Nelson Mwanyama
MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed 2009

Environmental Impact Assessment for the Valley View Special Residential Housing Project (Valley-View Road, Marrianhill)

Project manager : eThekwini Housing
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed 2010

Environmental Impact Assessment for the Rehabilitation and Upgrade of Roads in Inanda Project (Inanda, Durban)

Project manager : Sigh Govender and Associates
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Completed 2010

Environmental Impact Assessment for the Sandton Phase 2 Housing Project (Kwandengezi, Pine Town)

Project manager : Sakum Housing Cc
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for a Helicopter Landing Facility in Darnell

Project manager : Silvermoon Investment 364 Cc
Project Leader : Patrick Addo
Project Manager : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation

Environmental Impact Assessment for the Fredville Phase 2 Housing Project (Fredville, Hamasdale)
Project manager : Chris Calitz (Terraplan Associates)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Bhubhubhu Housing Project (Mfolozi Municipality)
Project manager : Chris Calitz (Terraplan Associates)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Iutval Rural Housing Project (Indaka Local Municipality)
Project manager : Mr. Graham (Siyamthanda Development)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Cato Crest Housing Project
Project manager : Bernd Rothaug (RCR Collaborative)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : In Progress.

Environmental Impact Assessment for the Waterfall Ext. 4 Housing Development
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : In Progress

Other Housing Development Projects

Projects worked on in this regard include:

Environmental Impact Assessment for the Zidweni Rural Housing Project (Zedweni, Ingwe Municipality)
Project manager : Mr. M. Marareni (Umpheme Developments)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Manzamnyama Rural Housing Project (Centocow, Ingwe Municipality)

Project manager : Mr. Ray Doherty
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Qiniselani-Manyuswa Rural Housing Project (Qiniselani near Hillcrest)

Project manager : Chris Calitz (Terraplan Associates)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Vukuzithathe Rural Housing Project (Ezinqoleni)

Project manager : Mr. M. Marareni (Umpheme Developments)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the Zidweni Rural Housing Project (Zidweni, Creighton)

Project manager : Mr. M. Marareni (Umpheme Developments)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the KwaMashabane Rural Housing Project (Mbazwana)

Project manager : Mr. M. Marareni (Umpheme Developments)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Environmental Impact Assessment for the KwaMashabane Rural Housing Project (Mbazwana)

Project manager : Mr. M. Marareni (Umpheme Developments)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Strategic Planning and Environmental Assessment (SEA) Developments

Projects worked on in this regard include:

Strategic Environmental Impact Assessment for the Groutville, Adinville, Melville and Dube Village Township

Regeneration Strategy (Groutville)

Project manager : S'bongiseni Maseko (Isibuko se Africa)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Strategic Environmental Impact Assessment for the Shakaskraal, Woodmead, Shayamoya and Nkobongo Township Regeneration Strategy (Shakaskraal)

Project manager : S'bongiseni Maseko (Isibuko se Africa)
Project leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Strategic Environmental Assessment for preparation of a Strategic Development Framework for Phelandaba Township

Project manager : S'bongiseni Maseko (Isibuko se Africa)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Strategic Environmental Assessment for preparation of a Strategic Development Framework for Ndumo Township

Project manager : S'bongiseni Maseko (Isibuko se Africa)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Strategic Environmental Assessment for the preparation of a Strategic Development Framework for Bhambanana Township (Jozini)

Project manager : S'bongiseni Maseko (Isibuko se Africa)
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Field work, data collection and report preparation
Project status : Successfully completed

Other Work on EIAs and Environmental Management

Rehabilitation of Storm-Damaged Roads in Hibiscus Coast Municipality

Project manager : Liquid Platinum
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
Duties : ECO (Monitoring and preparation of monthly reports)
Project status : Completed

Kwaxolo Low Cost Housing Project, Kwaxolo, Bushy Vales, Marburg
Project manager : Malusi Zwane Dept. Of Human Settlement
Project Leader : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
Duties : Sales Administration
Project status : Completed

Environmental Scoping for Ekwandeni Housing Project
Project manager : eThekwini Housing
Project Leader : Patrick Addo
My duties : Public Participation – Information Distribution
Project status : Completed

Preparation of Business Plan for the Commercialisation of the Goat Industry in Kwazulu-Natal
Prepared for : Department of Economic development
Project manager : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Market research - data collection and analysis report preparation
Project status : Completed

Empangweni Housing Development
Project manager : Patrick Addo
Project Manager (Environmental) : MacCarthy Honu-Siabi
My duties : Beneficiary Data Collection and processing

REFERENCES

1 Name : Dr. Nelson Mwanyama
Position : Director of Projects /CEO
Organisation : Isineke Developments / Bizycon Pty Ltd
Contact Number : nelson@isineke.co.za

2. Name : Mr. P. K. Addo
Position : Managing Director
Organisation : Nature and Development Group of Africa CC
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IAIASa Confirmation of Membership: 2022/2023
MacCarthy Honu-Siabi Membership Number: 6819

19 Oct 2022

TO WHOM IT MAY CONCERN

Mr MacCarthy Honu-Siabi, Bizycon (Pty) Ltd (Development Impact Group) (IAIASa membership Number 6819) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 01 Mar 2021.

Membership has been continuous from 01 Mar 2021 to date.

This membership is valid from 01 Mar 2022 to 28 Feb 2023.

IAIASa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.

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Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Rethabile Mbokodi
President 2021/2022

President: R Mbokodi, Past President: A. Adams, President Elect: M. Sham, Treasurer: S Nkosi, Secretary: M. Sham.
Members: F. Fortune, R. Kruger, R. Mellett, R. Patak. Branch Chairs: N. Arnott, G. Beyers, Z Dlamini, Z. Mkhize, H Moolman.