



ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
THE PROPOSED CONSTRUCTION OF THE NEW INKOSI MKHUPHUKELI
SECONDARY SCHOOL WITHIN UTHUKELA DISTRICT MUNICIPALITY

DRAFT BASIC ASSESSMENT REPORT

Public Review

17 August 2020 to 17 September 2020

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PROJECT DETAILS

Reference No.	:	Not assigned as yet
Title	:	Basic Assessment process for the Proposed construction of the new Inkosi Mkhuphukeli Secondary School within Uthukela District Municipality
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Status	:	Draft Basic Assessment Report
Review period	:	The 30-day period for review is from 17 August 2020 to 17 September 2020

EXECUTIVE SUMMARY

INTRODUCTION

Rantech Africa (Pty) Ltd was appointed by the Development Bank of Southern Africa (DBSA) on the behalf of the KwaZulu-Natal Department of Education for the provision of Professional Services for the Detailed Planning and Design; Procurement Assistance and Tender Documentation, Construction Monitoring and Close Out for the Construction of New Inkosi Mkhuphukeli High School (IMHS) National EMIS No. / Ref. uTh17/001, Uthukela Education District: Bid No 116/2018, situated within the Mthembu Tribal Authority. Rantech Africa (Pty) Ltd appointed Envirolution Consulting Pty (Ltd) to obtain authorisation from the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) for the proposed construction of the new Inkosi Mkhuphukeli Secondary School within the jurisdiction of Alfred Duma Local Municipality in Uthukela District Municipality in Kwa-Zulu Natal Province.

Inkosi Mkhuphukeli High School is a new public state-owned secondary school located at the Ravine (Mbango) within Alfred Duma Local Municipality of the Uthukela District in Kwa-Zulu Natal Province, the site for the proposed school development located in a rural area with residential dwellings in close proximity (see Figure 1).

REQUIREMENT FOR A BASIC ASSESSMENT PROCESSENTRDUCTION

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.

An environmental impact assessment is an effective planning and decision-making tool for the applicant as it provides the opportunity for the applicant to be fore-warned of potential environmental issues and assess if potential environmental impacts need to be avoided, minimised or mitigated to acceptable levels. The required Basic Assessment (BA) process which is being conducted in 3 phases namely:

Phase 1: Project inception;

Phase 2: Basic Assessment and Environmental Management Programme; and

Phase 3: Authority review and response.

The report provides a description of the activity, description of property and location and a description of environment, legislation, need and desirability, significant impacts and management as well as mitigation. Comprehensive, independent environmental studies elaborated by specialists are required in accordance with the EIA Regulations to inform the EAP of its comprehensive recommendation and provide the competent authority i.e. KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA). with sufficient information in order to make an informed decision.

PROJECT NEED AND DESIRABILITY

EXECUTIVE SUMMARY

The proposed upgrade will create a safe and healthy learning environment that will not only benefit current and future learners and educators, but the community as a whole, through the uplift of the community in support of positive social change. The proposed upgrade will also remedy the current informal facilities through the upgrade of proper ablution facilities, and improved recreational areas, amongst the proposed development of an administration block consisting of principal offices, HOD offices, general offices, classrooms, multipurpose laboratories, specialist rooms, a media centre, a computer room, a teaching room, a counselling suite, a staff room with kitchen, garden stores, a general storeroom, change rooms, a gate house, toilet facilities, teachers parking bays, a soccer field, parking bays for the soccer field and future multi-sports fields, enhancing the learners schooling experience.

The project area is located in a community where the demand for quality education is likely to be high. The local ward councillor has indicated that the project is long awaited and would be beneficial as local residents want to improve the level of education within their community.

CONCLUSION (IMPACT STATEMENT)

The proposed construction of the school is an essential infrastructure for the community in terms of improved education facilities and indirectly employment opportunities in the local areas in which unemployment rates are high. The environmental attributes of the site are not such that the proposed development would have significant negative impacts. The proposed footprint is on an already transformed site within a high-density peri-urban built-up settlement. No direct impacts on biodiversity resources of significance are expected. No significant impacts to watercourses (and the associated habitats and freshwater biodiversity) are expected to occur. The proposed erven have been allocated for education purposes according to the municipal zoning plans. The proposal would result in optimal utilisation of the site with minimal adverse impacts on the ecological (natural) environment. Impacts on other aspects of the proposed project were also investigated and have been assessed, namely heritage, traffic and soil impacts. The impacts identified have been assessed and err on the conservative side. Refer to impact tables in Section G.

The socio-economic benefits cannot be overlooked. A new and adequate learning facility for young learners will be provided along with the introduction of temporary jobs and skills development for the surrounding communities during construction. The project will provide 175 employment opportunities during the construction phase and a further 100 during the operational phase. General impacts such as noise and dust disturbance will be short term and low in impact. In terms of the long-term cumulative impact of the project, it will have an overall net positive effect due to the provision of better educational facilities which will enhance the education levels of children in the community.

The positive impacts (benefits) of the proposed development outweigh the negative impacts. Any negative impacts can be mitigated as per the proposed measures in this document and the EMP (Appendix F).

There is a social need and desirability for the development. The proposal is in line with social Infrastructure and services development strategies of the Local and District Municipalities and in particular with regards to providing pre-primary educational facilities.

Having assessed the impacts of the construction of the New Inkosi Mkhuphukeli Secondary School as summarised in Table 7.1, no environmental fatal flows and no significant negative impacts have been

identified to be associated with the proposed development. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively **mitigated** to have a **low significance**. The significance levels of the majority of identified negative impacts (as shown in the environmental sensitivity map in **Figure 7.1**) can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr (**Appendix F**) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.. *The Site investigated is considered suitable for the proposed Nkosi Mkhupukeli Secondary School provided that the recommendations made in this report are implemented and/or adhered to.*

I. RECOMMENDATIONS

It is therefore, the EAP opinion that the project should be authorised, the findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.

The following conditions would be required to be included within an authorisation issued for the project:

- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- Formalise the stormwater from the D1275 road north of the site, to prevent erosion on the site. High energy stormwater input into the watercourses should be prevented at all cost.
- **Vegetation:** Plant the layout to retain the two large individuals of *Boscia albitrunca* on the site, the nationally protected tree *Boscia albitrunca* should be conserved in situ if possible, while the provincially protected *Ammocharis coranica* can be relocated to suitable habitat on the school grounds or within gardens. It is also recommended that the large *Aloe* individuals on site be retained or moved to the school grades and rehabilitated areas.
- **Wetlands:** Where watercourse crossings have been shown to be necessary it is important that appropriate mitigation measures (such as avoiding alignments that run parallel to wetlands and the placing pylons within wetland areas as far as possible) are put into place and carefully monitored to ensure minimal impact to regional hydrology
- **Heritage:** Should the informal burial site be retained in its current location; it should be fenced off at least for the duration of construction activities. It is recommended that a buffer zone of 10m is created around the graves by means of a wire fence or, alternatively, with danger tape as a more temporary measure. Should archaeologically sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
- **Paleo:** The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting,

SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.

- **Geotechnical investigation:** It is recommended that the foundation excavations for each structure be inspected by a competent person during construction in order to verify that the materials thus exposed are not at variance with those described in the report and that it meets design criteria. The existing drainage/erosion "gullies" on and in close proximity to the site and/or structures should be rehabilitated prior to construction and storm water run-off should be diverted around the site.
- The developer should **obtain all necessary permits** from relevant authorities prior to the commencement of construction i.e. water use license & plant permits
- Creation of new access roads should be minimised as far as possible.
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended. On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

TABLE OF CONTENTS

PROJECT DETAILS	iii
EXECUTIVE SUMMARY	iv
TABLE OF CONTENTS	vi
LIST OF APPENDICES	viii
ABBREVIATIONS	ix
INVITATION TO COMMENT ON THE DRAFT BA REPORT	x
1 INTRODUCTION	11
1.1 Project Background	11
1.2 Project Team	12
2 PROJECT DESCRIPTION	13
2.1 Location of the activity	13
2.2 Site description	13
2.3 Details of All Components of the Proposed Project	13
2.4 Need and Desirability	17
2.5 Details of Alternatives Considered	20
2.5.1 Site alternatives	20
2.5.2 Activity alternatives	20
2.5.3 Design/ Layout alternatives	20
2.5.4 Technology alternatives	20
2.5.5 Operational Alternative	20
2.5.6 No-go alternative	21
2.6 Bulk Services Requirements	21
3 LEGAL FRAMEWORK FOR EIA	24
3.1 Requirement for a Basic Assessment Process	24
3.2 Listed activities triggered by the proposed development	24
3.3 Legislation and Guidelines that have informed the preparation of this Report	25
3.4 Content of the BAR in term of Appendix 1 of the 2014 EIA Regulations	30
4 PUBLIC PARTICIPATION PROCESS	33
4.1 Purpose of Public Participation	33
4.2 Public Participation Undertaken	33
4.2.1 Placement of Site Notices	34
4.2.1 Written notifications	34
4.2.2 Newspaper advertisement	34
4.2.3 Review of the Draft Basic Assessment Report	34
4.2.4 Summary of Issues Raised by I&AP's	34
4.2.5 Consultation & Public Meeting	35
4.2.6 Comments and Responses Report	35
4.2.7 Identification of I&APs and establishment of a database	35
5 DESCRIPTION OF THE AFFECTED ENVIRONMENT	36
5.1 Biophysical Attributes/Features of the Study Area	36
5.2 Land uses	36
5.3 Vegetation	39
5.4 Wetland	43
5.5 Heritage Aspects of the area	44
5.6 Palaeontology of the area	47
5.7 Social Characteristics of the Study Area and Surrounds	49
5.7.1 Socio-Economic Context	49
5.7.2 Socio-economic value of the activity	51
5.8 Geotechnical and soil condition of the Site	51
6 ASSESSMENT OF POTENTIAL IMPACTS	54

6.1	Impact Evaluation methodology	54
6.2	Alternatives Assessment	56
6.3	Description and assessment of issues and potential impacts	56
6.3.1	Potential Impacts on Vegetation	56
6.3.2	Potential Impacts on Wetlands	63
6.3.3	Potential Impacts on Cultural Heritage & Archaeology	69
6.3.4	Potential Impacts on Palaeontology	73
6.3.5	Other Potential Impacts	75
6.4	No-Go Alternative Assessment	78
6.5	Assumptions and Gaps in Knowledge	78
7	CONCLUSIONS AND RECOMMENDATIONS	79
7.1	Summary of impacts	79
7.2	Conclusion (Impact Statement)	82
7.3	Recommendations	84

LIST OF APPENDICES

Appendix A: Site plan(s)

- Appendix A1: Locality Maps
- Appendix A2: Layout Plan
- Appendix A3: Composite Sensitivity Map

Appendix B: Site Photographs

Appendix C: Facility illustration(s)

Appendix D: Public Participation Process

- Appendix D1: Proof of site notice
- Appendix D2: Written notices issued to I&APs and Stakeholders
- Appendix D3: Newspaper Advertisement
- Appendix D4: Communications to and from I&APs and Stakeholders
- Appendix D5: Minutes of meetings
- Appendix D6: Comments on Draft BAR Report
- Appendix D7: Comment & Response Report
- Appendix D8: I&APs database

Appendix E: Specialist reports

- Appendix E1: Vegetation Assessment
- Appendix E2: Wetland Assessment
- Appendix E3: Heritage Assessment
- Appendix E4: Paleontology Assessment
- Appendix E5: Geotechnical report

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Details of EAP (and expertise) and affirmation

Appendix H: Additional Information

- Appendix H1: Due Diligence Report
- Appendix H2: Screening Report

ABBREVIATIONS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan report
ESA	Ecological Support Area
Ha	Hectares
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
IDP's	Integrated Development Plans
Km	Kilometres
KZN	Kwa-Zulu Natal
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
m	Meters
NEMA	National Environmental Management Act
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NGO's	Non-Governmental Organisations
PPP	Public Participation Process
SDF	Spatial Development Framework
WHO	World Health Organization

INVITATION TO COMMENT ON THE DRAFT BA REPORT

The Draft Basic Assessment Report (BAR) has been prepared by Envirolution Consulting (Pty) Ltd in order to assess the potential environmental impacts associated with the Proposed construction of **the new Inkosi Mkhuphukeli Secondary School** within Uthukela District Municipality in the Kwa-Zulu Natal Province. The report is made available for public review for 30-day review period from **17 August 2020 to 17 September 2020** at

- Abathembu Traditional Council Office in Sahlumbe
- Dropbox link: <https://www.dropbox.com/sh/ow0jbxw5lhrwymr/AADCat4md4uftkQd952VAFNVa?dl=0>

In order to obtain further information or submit written comments please contact:

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The due date for comments on the Draft Basic Assessment Report is **17 September 2020**

1 INTRODUCTION

1.1 Project Background

Rantech Africa (Pty) Ltd was appointed by the Development Bank of Southern Africa (DBSA) on the behalf of the KwaZulu-Natal Department of Education for the provision of Professional Services for the Detailed Planning and Design; Procurement Assistance and Tender Documentation, Construction Monitoring and Close Out for the Construction of New Inkosi Mkhuphukeli High School (IMHS) National EMIS No. / Ref. uTh17/001, Uthukela Education District: Bid No 116/2018, situated within the Mthembu Tribal Authority. Rantech Africa (Pty) Ltd appointed Envirolution Consulting Pty (Ltd) to obtain authorisation from the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) for the proposed construction of the new Inkosi Mkhuphukeli Secondary School within the jurisdiction of Alfred Duma Local Municipality in Uthukela District Municipality in Kwa-Zulu Natal Province.

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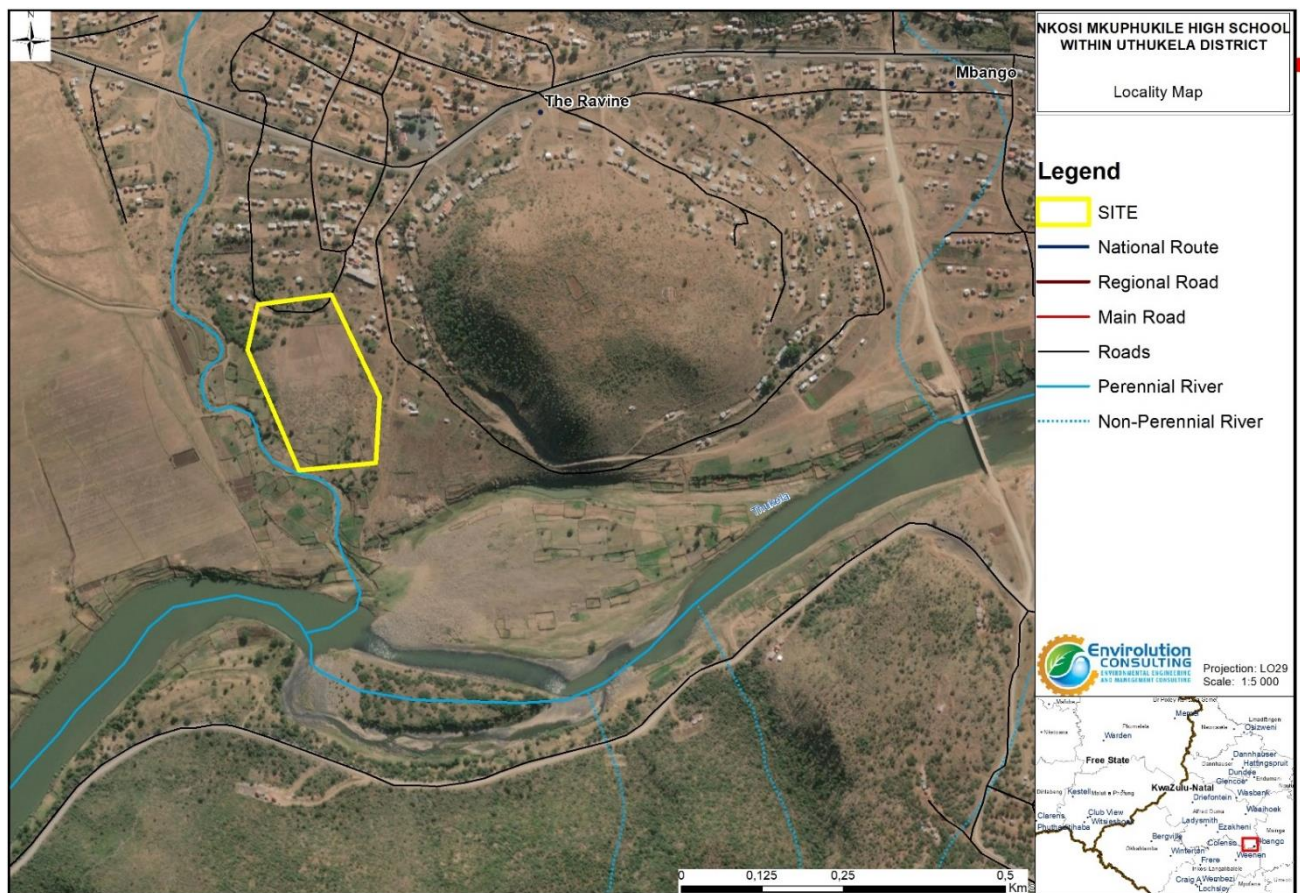


Figure 1.1: Locality map showing the proposed site for the Inkosi Mkhuphukeli Secondary School (refer to Appendix A for A3 maps).

1.2 **Project Team**

Environmental Assessment Practitioner

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Expertise of the EAP to carry out the EIA procedures

- Cheda Sheila Bolingo, the principle author of this Basic Assessment holds an Msc degree in Environmental Management with 9 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- Gesan Govender, the project manager and Environmental Assessment Practitioner (EAP) responsible for this project, is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 15 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Curricula vitae for the project team consultants are included in **Appendix H**.

Specialists: In order to adequately identify and assess potential environmental impacts associated with the proposed project, Envirovolution Consulting has appointed the following specialists to conduct specialist impact assessments:

- Vegetation – Antoinette Eyssel of Dimela EcoConsulting
- Wetland- Antoinette Bootsman of Limosella Consulting
- Heritage - Johan van Schalkwyk of Johan Heritage Consultant
- Palaeontology - Heidi Fourie
- Geotechnical report - M. J. van der Walt of Engineering Geologist CC

2 PROJECT DESCRIPTION

2.1 Location of the activity

Location of all proposed sites:	Inkosi Mkhuphukeli High School is a new public state-owned secondary school located at the Ravine, near Mbango (Ward 30) in the jurisdictional boundary of the Alfred Duma Local Municipality in the Uthukela District, Kwa-Zulu Natal Province.
Farm details	RE of the Farm Ravine 9201
Property size(s) in ha for each proposed site:	378 ha
Development footprint size(s) in ha	The site is approximately 3.8 ha in extent
Co-ordinates:	Lat (S): 28°44'26.99"; Long (E): 30°13'5.14"
Surveyor General (SG) 21-digit code for each proposed site:	NOGT00000000920100000

2.2 Site description

The Site is located approximately 20km north-east of the town of Weenen (Kwanobamba) on the lower slope of a south-facing ridge along the southern border of one of the rural villages in the Mbango area. The site is relatively flat with a gentle slope in a southerly direction towards the Tugela River located approximately 300m south of the site.

The bulk of the site is currently used as a soccer field with scattered trees and scrub bush present within the northern, eastern and western portions. The area south of the school structures, where the sports fields are to be established has a gentle to moderate slope and is covered with lowgrowing bushes and dolerite boulders. A man-made drainage ditch is present within the northern portion of the site whilst natural drainage/erosion "gullies" were observed within the eastern, western and south-eastern portions of the site.

2.3 Details of All Components of the Proposed Project

As per the accommodation schedule issued by the KZN Department of Education the planned enrolment is 800 learners. The school will be made up of the following separate buildings as shown in Table 2.1 and Figure 2.1 respectively.

Table 2.1: Inkosi Mkhuphukeli High School Buildings

BLOCK	FLOOR	AREA(SQM)	FUNCTION	QTY
BLOCK A	GROUND FLOOR	9.53	GUARD HOUSE	1
BLOCK B	GROUND FLOOR	88.16	KITCHEN	1
BLOCK C G	ROUND FLOOR	246.58	CLASSROOMS	5
BLOCK D	GROUND FLOOR	328.39	CLASSROOMS	4
BLOCK E	GROUND FLOOR	246.58	MULTI-PURPOSE CLASS	2
BLOCK F	GROUND FLOOR	328.39	CLASSROOMS	5

BLOCK G	GROUND FLOOR	283.01	ADMINISTRATION BLOCK	1
BLOCK H	GROUND FLOOR	274.12	TEAM & RESOURCE CENTRE	2
BLOCK I	GROUND FLOOR	192.21	COMPUTER ROOM & CLASSROOM	2
BLOCK J	GROUND FLOOR	246.58	MULTI-PURPOSE CLASSROOMS	2
BLOCK K	GROUND FLOOR	328.39	CLASSROOMS	5
BLOCK L	GROUND FLOOR	44.10	GIRLS' ABLUTIONS	1
BLOCK M	GROUND FLOOR	42.15	STAFF ABLUTIONS	1
BLOCK N	GROUND FLOOR	36.88	BOYS' ABLUTIONS	1
BLOCK O	GROUND FLOOR	22.31	SPORTS ABLUTIONS	1
TOTAL Area 2479.64				

Roofs and trusses: ± 12.5° Pitch, Kalahari Red, 0.80mm thick in double-interlocking concealed-fix Klip-Lok or IBR 700 profile roll-formed in continuous lengths on 0x76mm timber purlins at centres to manufacturer's details on isolation to roofing sheets manufacturer's specification on 152x50mm rafters and 152x50mm tie beam as per Engineer specification on 38x114mm timber wall plate. All roofing system specification to manufacturer's recommendation or similar and approved. New truss to be braced to existing wall as per Structural engineer's details. **Insulation-** Install 135 mm Think Pink-Flexible fiberglass blanket insulation (R-value=3.38) or similar and approved in accordance to SANS 204, XA calculation compliance. **Fascia-** New 225x12 mm Medium Density plain un-grooved fascia board by Nutec or similar and approved, installed to strict manufacturer's details. 1 coat Undercoat, 2 coats WHITE weather resistant paint to strict paint manufacturer's application specifications. **Barge-** Marley PVC 200mm x 800mm socket less barge boards. PVC H-profile barge board joiners. Drill for and fix with hot-dipped galvanized screws and washers. 76 x 50mm trimmer batten fixed underside of purlin ends for barge board fixing.

Rain water goods: 150x125 mm seamless Chromadek Kalahari Red gutters or similar and approved with 105x75mm down pipes complete with all joints, brackets and accessories in accordance to manufacturer's specifications.

Eaves: New 15 mm moisture resistant gypsum board or similar and approved on 38x38mm timber branderings (recommended suspension system, jointing and spacing to strict manufacturer's specifications) on timber rafters and Fischer mounted to wall. 1 coat Undercoat, 2 coats WHITE weather resistant paint to strict paint manufacturer's application specifications.

Ceilings and cornices

9mm Gypsum Board or similar and approved on 38x38mm timber branderings (recommended suspension system, jointing and spacing to strict manufacturer's details) on timber trusses with ceiling trap doors per block. 60x60 mm Coved Polystyrene glue on cornice by The Moulding Shop or similar and approved installed with paintable sealing glue to strict manufacturer's details. Paint ceiling and cornice 1 coat undercoat 2 coats ceiling WHITE matt finish to manufacturer's application specifications. Install 600x600mm ceiling trap door per room. All classrooms and admin to have expanded metal security mesh mounted to the u/s of timber trusses. Expanded mesh spec. V.EM 318F or similar and approved for security. 6mm thick light weight semi-hydrate skim plaster or similar and approved, on slab soffit with 60x60 mm Coved Polystyrene glue on cornice by The Moulding Shop or similar and approved installed with paintable sealing glue to strict manufacturer's details. Paint ceiling and cornice 1 coat Undercoat, 2 coats WHITE weather resistant paint to strict paint manufacturer's application specifications.

Walkway posts/ columns: New 100x100x5mm C Channel steel posts to support roof on 200x 200x5 mm base plate to S.E. installation details. 1 coat grey oxide, 1 coat primer, 2 coats medium gloss enamel paint to match roof or similar and approved.

Walls: 230 mm brickwall, plastered above 1.5m AFFL and painted internally, facebrick finish below 1.5m internally and facebrick finish externally and brickforce every 4th course. Foundation to Structural Engineer's details. Apply Anti Termite Solution in foundation trenches. Provide D.P.C and DPM as per sections. Standard air bricks to be fitted into walls at specified height and intervals.

Windows: Galvanized steel window frame. 4mm clear glass puttied in with steel window putty. BOE Facebrick window cills with DPC to u/s Reinforced BOE Facebrick lintel

Doors: Solid meranti framed and ledged door Galvanized steel door frame Reinforced BOE Facebrick lintel

Pinboards: New 3.0x1.2m felt pinboard (FE1230) by Best Board or similar and approved.

Green boards: Install vitreous enamel steel wall mounted school chalk board 4.8x1.14mm.

Shelving: 16mm Plum Tree double faced melamine board for carcass and shelves to comply with SABS 540 or similar approved. 75 mm Standard Brushed Natural Aluminium Skirting to be GLUED to kick board area. Bottom of skirting strip to be silicone sealed.

Floors and skirting: Vinyl floor tiles for classrooms and epoxy floor finish for ablutions. Passages to have power floated concrete finish. 70 mm x 18 mm meranti skirting Profile D (Code CD) by Innovation Mouldings or similar and approved. Wall/Floor to skirting joints to be sealed with marine clear silicone sealant.

Aprons: Concrete aprons laid to fall of 1:200 & in panels with control joints at every 3m centres on fill compacted to MOD AASHTO 95%. Control joints sealed with 10mm Polysulphide sealant with backing strip & softboard.

Ablutions: VIP toilets will be installed in accordance with the Accommodation Schedule.

Water Supply: Install an elevated tank with a minimum 5000L to M.E.

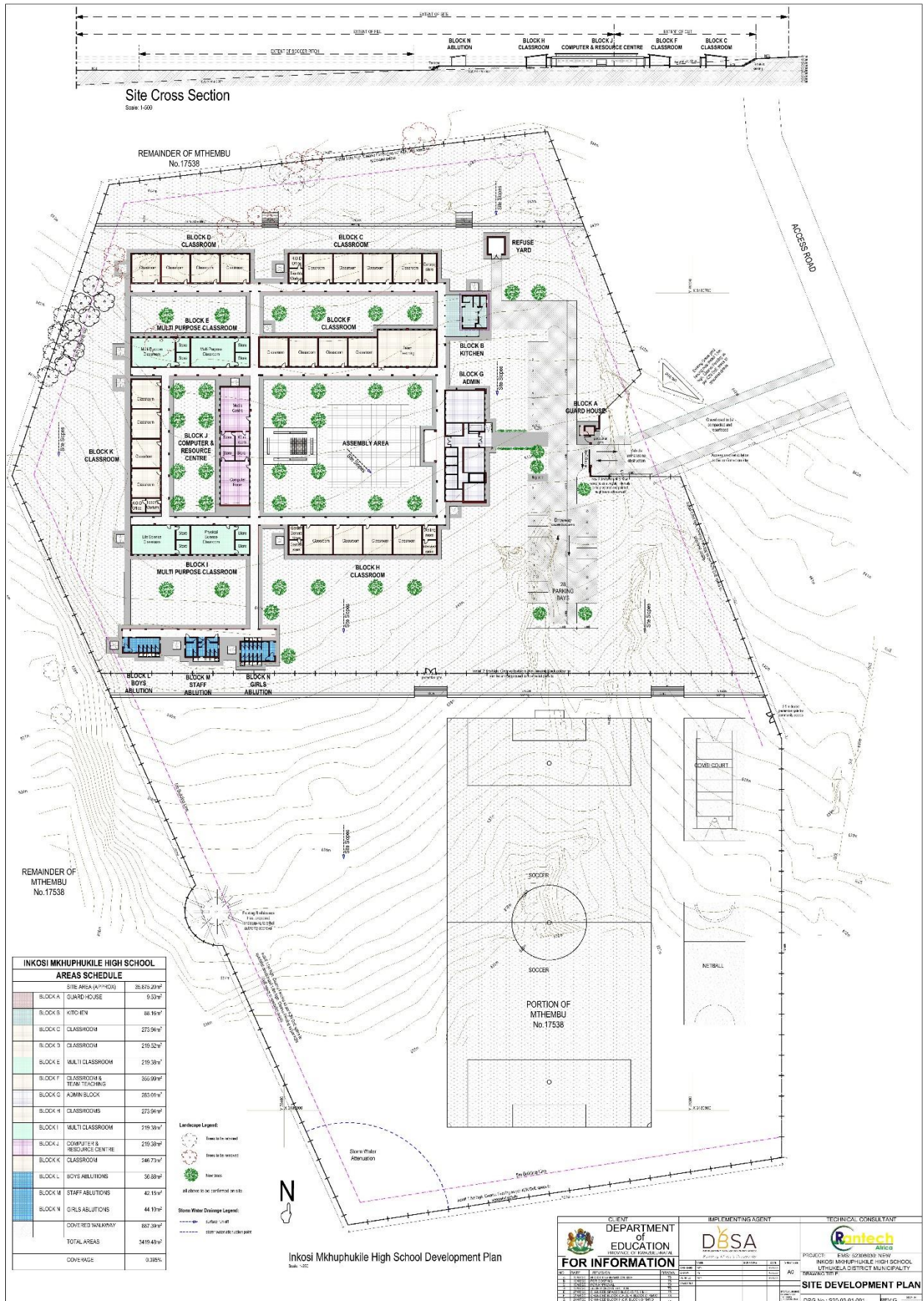


Figure 2.1: The proposed Layout designs (refer to Appendix A for A3 maps).

2.4 Need and Desirability

The following section motivates and explains the needs and desirability of the project (including demand for the activity) by highlighting the needs and desirability of the project in the context of various integrated and spatial plans, frameworks and other pertinent information, either Provincial or Municipal.

The development in terms of the property's existing land use rights.	
The area is currently zoned as restricted development under the Alfred Zuma NLM spatial maps (http://www.alfredduma.gov.za/wp-content/uploads/2019/08/IDP-DRAFT-2019-2020.pdf) however the site is currently being utilised for the community soccer field which will be reintegrated into the proposed school.	
Location factors which favour the current land use (associated with the development proposal and associated listed activity (ies) applied for)	
<p>The proposed upgrade will create a safe and healthy learning environment that will not only benefit current and future learners and educators, but the community as a whole, through the uplift of the community in support of positive social change. The proposed upgrade will also remedy the current informal facilities through the upgrade of proper ablution facilities, and improved recreational areas, amongst the proposed development of an administration block consisting of principal offices, HOD offices, general offices, classrooms, multipurpose laboratories, specialist rooms, a media centre, a computer room, a teaching room, a counselling suite, a staff room with kitchen, garden stores, a general storeroom, change rooms, a gate house, toilet facilities, teachers parking bays, a soccer field, parking bays for the soccer field and future multi-sports fields, enhancing the learners schooling experience.</p> <p>The project area is located in a community where the demand for quality education is likely to be high. The local ward councillor has indicated that the project is long awaited and would be beneficial as local residents want to improve the level of education within their community.</p>	
The Development in terms of the following:	
(a) Provincial Spatial Development Framework (PSDF)	Please explain
<p>The implementation of the Provincial Growth and Development Plan is to assist the Province in realising its vision. A number of goals are identified however in the context of this project, the PDP makes reference to education goals as:</p> <p>Improve and Expand Education and Training</p> <ul style="list-style-type: none"> ○ Early Childhood Development to be transferred from Social Development to Basic Education; ○ 18% of the age group 3-4 have access to ECD in contrary to the 2020 target of 35%; ○ 74% of Grade 1 learners have attended Grade R; ○ 6.5% improvement in Matriculant results since 2014 with a pass percentage of 76.2% in 2018; ○ 43 new schools have been constructed since 2014; ○ 604 Learner Support Agents have been employed to curb the rate of drop-outs with special focus towards the girl-child; ○ Over the past 5 years 47 000 school children have benefited from the learner transport in 320 schools across the province; ○ Bursaries to the tune of R1.8 billion has been awarded to more than 16 000 students between 2014-2018; ○ The province cannot participate in the Fourth Industrial Revolution and its opportunities and all skills development due to the slow pace in rolling out broadband connectivity. <p>*The above represents factors relevant to the project and do not highlight all goals identified.</p>	

(b) Integrated Development Plan and Spatial Development Framework of the Local Municipality
<p>According to the Alfred Duma Local Municipality IDP 2019/2020, “the areas of greatest needs with regards to primary and secondary education include the area of St Chads, Peacetoen and Roosboom. This can be attributed to the high growth rates experienced by the areas. In the rural areas educational facilities are available but, in most cases, constrained as they service a number of children and because of the scattered nature of rural settlements children walk long distances to schools. The Department of Education has worked tremendously in ensuring that children get access to education by providing a number of schools that are serviced and conducive for learning”</p> <p>In Alfred Duma Local Municipality there are 79 primary schools, 11 combined schools and 33 high schools. Some primary schools have Early Childhood Development centres within them especially those that are located in town and the townships. In promoting Early Childhood Development, the municipality assist by donating municipal land to NGO’s registered with the Department of Social Development for construction of such centres. In addition to that the Infrastructure and Services department also constructs such centres informed by the need’s analysis done in IDP community meetings “Alfred Duma Local Municipality IDP 2019/2020”. From the above it can be seen that the proposed development will not compromise the IDP objectives but would rather assist the Local Municipality in achieving the performance areas as identified by the Local Municipality.</p>
(c) An Environmental Management Framework (“EMF”) adopted by the Provincial Department.
Not applicable, no EMF currently exists for the Province or District.
Community need for the Project and the associated land use
<p>It has been indicated in the IDP that there are 79 primary schools, 11 combined schools and 33 high schools in the municipality. Some primary schools have Early Childhood Development centres within them especially those that are located in town and the townships. In promoting Early Childhood Development, the municipality assist by donating municipal land to NGO’s registered with the Department of Social Development for construction of such centres. In addition to that the Infrastructure and Services department also constructs such centres informed by the need’s analysis done in IDP community meetings “Alfred Duma Local Municipality IDP 2019/2020”</p>
The impact on sensitive natural and cultural areas by the Project or the land use associated with the development proposal
It has been identified through Biodiversity and Heritage Impact Assessments that the proposed Project will have little to no impact on any sensitive natural and cultural areas. See Appendix E.
The development impact on people’s health and well-being (e.g. Noise, odours, etc.)
<p>The development may have limited negative impact during the construction phase in terms of typical construction related activities. Visual and sense of place impacts are relative and will be temporary during the construction phase, and will be confirmed through consultation from interested and affected parties through the public participation process. Provided that the conditions and other precautionary and mitigation measures stipulated in both this BAR and the EMPr are complied with, it is not anticipated that the proposed activity will impact negatively on people’s safety, health or wellbeing, but rather have a positive impact on the well-being of the local community once the upgraded school is functionally operational.</p>
Cumulative impacts (positive and negative) of the proposed land use associated with the development proposal and associated listed activity (ies) applied for.

<p>In the context of this proposed land use, at the time of the assessment, much of the northern section of the site comprised a compacted soccer field. Small-scale farming took place around the western and southern boundary. Houses flank the site to the north and east. Given the nature, scale and type of development proposal, it is anticipated that no new significantly negative land-use impacts (cumulative or otherwise) will result. This is coupled with the site footprint being located within a densely populated human settlement which lends further support as to the need for a formal school to benefit the local community.</p>
<p>The site footprint does not possess high biodiversity areas or aspects of significant importance with the exception of a few scattered plant of conservation concern, which can be protected in situ. The same applies from a heritage/cultural perspective. From a socio-economic point of view, the Project will deliver on the need for good educational facilities and assist in increasing the number of youth gaining improved access to primary education. Enhanced primary education aligns directly with Goal 4 of the 2030 Sustainable Development Goals (SDGs) which is to achieve universal quality education; and indirectly with many of the other SDGs relating to reducing poverty, hunger and inequality and creating conditions for decent work opportunities and economic growth. The cumulative effect of improved education enhances competitiveness and increases the quality of life. Improved human health & well-being are examples of indices which are used to assess changes in the quality of life.</p>
<p>The development in terms of best practicable environmental option for the site</p>
<p>The proposed development would take place on land where already operating using informal infrastructure for the community ie soccer fields. The currently Project on the property is the best option as the site footprint has already been altered by existing activities and is ideally located in terms of scholar access for the local community. The current location would ensure that no virgin land is required to be disturbed / degraded / transformed.</p>
<p>The benefits to society in general and the local communities</p>
<p>New and improved facilities will allow the community to benefit through access to a significantly improved education platform. It is anticipated that the construction of the new will assist in increasing the number of pupils gaining access to school and enhancing their educational careers and reduce the current over flow in the nearby Sahlumbe High School which is currently filled beyond its carrying capacity.</p>
<p>Description of how the general objectives of Integrated Environmental Management as set out in Section 23 of the NEMA have been taken into account:</p>
<p>The principles of environmental management as set out in section 2 of NEMA were taken into account and integrated during the EIA process. The actual and potential impact that the proposed development might have on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts and maximising benefits, were identified and evaluated during the EIA process. The nature of the application results in minimal negative impacts. The effects that the proposed activity will have on the environment will receive adequate consideration before actions are taken in connection with them. Mitigation measures have been proposed in this regard and described in both this report and the attached Environmental Management Programme which will ensure that the activities proposed will be conducted in a controlled manner therefore assisting in reducing the chances of significant adverse environmental impacts. A Public Participation Process (PPP) is being followed to ensure an adequate opportunity for all affected parties to comment. All environmental attributes in management and decision-making were considered that may have a significant effect on the environment. Modes of environmental management, best suited to ensuring the best activity is pursued, were identified and employed, including the Environmental Management Programme and mitigation measures as identified in this Report.</p>
<p>Description of how the principles of environmental management as set out in Section 2 of the NEMA have been taken into account</p>

The main and applicable principles of environmental management as set out in Section 2 of NEMA emphasises the following in Section 2(2): *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. Sustainable development requires the consideration of all relevant factors, including but not limited to being socially, environmentally and economically sustainable.*

During the BA process, various options were considered in terms of the proposed development being environmentally sustainable. Alternatives were investigated to ensure that disturbance of ecosystems and loss of biological diversity is avoided through implementation of appropriate mitigation measures. The proposed activity will not impact negatively on the nation's cultural heritage nor exploit non-renewable natural resources. A risk-averse and cautious approach was followed taking into account the limits of current scientific knowledge regarding the consequences of decisions and actions. The proposed project will not impact negatively on people's environmental rights. The participation of all interested and affected parties in environmental governance will be promoted and their comments will be respected and considered.

2.5 Details of Alternatives Considered

The extent of the study area and the selection of the alternative alignment positions gave consideration to aspects such as ecological impacts, social impacts, visual impacts, technical feasibility and cost.

2.5.1 Site alternatives

There is not enough secondary school nearby, the area only has one secondary school i.e. Sahlumbe High School, this school is unable to accommodate all learners within the area. The Tribal Authority have therefore donated the land to the Dept of education to construct the new school. The area chosen for the development of the school was determined to be the most feasible in terms of accessibility and have the lowest impact with regards to vegetative clearing and any disturbance on watercourses. Therefore, the proposed site was deemed suitable for the proposed school and no location alternatives were therefore investigated

2.5.2 Activity alternatives

The project entails the construction of a secondary school, the site is to provide a service to the rural residents in this area whom do not have enough school facilities: No reasonable or feasible alternatives in terms of the type of activity to be undertaken were therefore be investigated.

2.5.3 Design/ Layout alternatives

As there have been no identified highly environmental sensitivities on the property, no design alternatives have been considered. The proposed design maximises the school layout in terms of the site footprint.

2.5.4 Technology alternatives

Consideration of such alternatives is to include the option of achieving the same goal by using a different method or process (e.g. to reduce resource demand and increase resource use efficiency.) In a building type development, technology could be applied to enhance energy efficiency, water saving, waste management etc, depending on the nature and scale of the development.

Within this context, traditional energy options (i.e. electricity) and technology options (i.e. building materials) have been considered and included in the proposed design. Rainwater harvesting from roofs (for small-scale storage and irrigation requirements at the school) will be incorporated as an additional technology incorporated into the technology design. No further technology alternatives were considered.

2.5.5 Operational Alternative

Not applicable to this type of development.

2.5.6 No-go alternative

The No-go option implies that the Project does not proceed, and will thus comprise of the KZN Dept of Education not going ahead with the construction of the new Inkosi Mkhuphukeli High School. Ideally this would be the preferred alternative as the status quo of the environment remains unchanged, however due to the growing demand for education facilities in the area, this alternative is not feasible. Although the no-go alternative has been considered, it is not a practical project alternative in terms of providing stable service delivery supply in the area as it implies a continuation of the current situation or the status quo; therefore, it doesn't render any positive outcomes.

2.6 Bulk Services Requirements

Potable Water: According to the visual assessments conducted, there is no bulk potable water supply source within the allocated site and even nearby village. Due to the unavailability of bulk and potable water, there is an opportunity to explore the possibility of boreholes and wells etc. Including an elevated tank for storage purposes. (**Important note:** *If water abstraction from a borehole becomes an intended need, the Project applicant/developer will need to officially enquire and clarify with the relevant authority (DWS) relating to any potential authorisation and registration processes and requirements for any use of borehole water (i.e. groundwater).*). An alternative will also be rainwater harvesting from roofs for small-scale storage and irrigation requirements at the school will be implemented using pipes connected to roof gutters directed to temporary storage tanks. Further assessments and studies will provide more details on the status of bulk water supply, as alluded to above.

Sewage: There is no sewer system within the community. Schools nearby use pit latrines for sanitation purposes. It would seem that VIP toilets will be recommended during the Preliminary design stages. The accommodation schedule issued by the DBSA will be used in this regard.

Electricity: This section covers the findings of onsite assessment. It was found that there is no existing electrical installation on the allocated site. Electrical Bulk supply will have to be established in order to make provision for the new facility.

Site Access: There are no formalize road networks. The allocated site is approximately 290 meters away from the D1275, which is the main gravel road passing through the Mbango area. A formal access to the school is proposed to join up with the D1275 as indicated in Figure 2.2. There is only one informal access from the D1275 road.



Figure 2.2: New proposed Site Access

Parking: (a) Off-Street Parking Off street parking to the proposed development will be included to accommodate buses since it was indicated that most of the learners are bussed from neighbouring communities to the nearby school named Sahlumbe. (b) Stop-and-Drop Facility: The proposal is to construct a facility that accommodates buses as they are the primary mode of transporting learners.

Storm water Management As per visual assessment, there is an earth drain on the northern site of the soccer pitch which daylight towards the Tugela River, the drain is situated on the toe of the allocated site. All the stormwater generated from the rain is flowing downstream towards the Tugela River. The stormwater management plan will be part of the new design. One of the options is to harvest the storm water generated from the buildings' roofs to be collected by means of gutters and downpipes into strategically positioned storage tanks for use as potable water. Stormwater generated from paved areas will be collected into catch-pits, and then linked to the main collectors, while stormwater on open grassed areas percolates into the ground or flow as sheet flow until coming into contact with catch-pits which then links to the main collectors.

Waste Management: The construction phase will result in the generation of some excess spoil material and building and demolition waste. This is however expected to be of relatively minimal quantities. Construction sites will be contained and all related waste generated during the construction phase will be removed to the Ladysmith Disposal Site. Construction rubble (excess cement/concrete) will also be removed to a registered landfill site. All waste material categorised as recyclable may be donated to the local SMME's within the area. Hazardous Waste

will be little to no hazardous wastes are predicted. Waste on site will be managed in such a way as to conform to the National Environmental Management Waste Act (Act 59 of 2008). The following waste streams will provisionally be reduced, reused or recycled if there is local capacity in terms of service provision to do so:

- 1) Building rubble to be used as fill material where possible
- 2) Glass and office waste paper/cardboard should be recycled
- 3) Scrap metal and used steel should be taken off site for recycling
- 4) Old/used oil should be sold if possible to hydrocarbon recycling service providers (e.g. OILKOL, Rose Foundation). If not, it must be disposed of at a licensed/certified hazardous waste management facility with proof of safe disposal submitted
- 5) Wood/timber should be distributed for re-use if opportunities exist to do so

3 LEGAL FRAMEWORK FOR EIA

The EIA process, applicable to this application, is determined by the Amendments to the Environmental Impact Assessment Regulations, 2014, published in Government Notice R326 in Government Gazette No 40772 of 7 April 2017 promulgated under Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The EIA regulations inter alia describe the procedure for EIA and provides a description of activities that would require authorisation through either 1) a Basic Assessment (in terms of Government Notices R327 and R324 of 2017) or 2) Scoping and Environmental Impact Assessment (in terms of Government Notice R325 of 2017).

3.1 Requirement for a Basic Assessment Process

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.

An environmental impact assessment is an effective planning and decision-making tool for the applicant as it provides the opportunity for the applicant to be fore-warned of potential environmental issues and assess if potential environmental impacts need to be avoided, minimised or mitigated to acceptable levels. The required Basic Assessment (BA) process which is being conducted in 3 phases namely:

Phase 1: Project inception;

Phase 2: Basic Assessment and Environmental Management Programme; and

Phase 3: Authority review and response.

The report provides a description of the activity, description of property and location and a description of environment, legislation, need and desirability, significant impacts and management as well as mitigation. Comprehensive, independent environmental studies elaborated by specialists are required in accordance with the EIA Regulations to inform the EAP of its comprehensive recommendation and provide the competent authority i.e. KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA). with sufficient information in order to make an informed decision.

3.2 Listed activities triggered by the proposed development

The proposed development triggers activities that require a Basic Assessment; an application is submitted in terms of Chapter 4 of the EIA Regulations to the KZN EDTEA. **Table 3.1** contains the listed activities in terms of the EIA Regulations (as amended) and includes a description of those project activities which relate to the applicable listed activities.

Table 3.1 Listed activities triggered by the proposed development

Listed activities	Description of project activity that triggers listed activity
<p>Activity 12 of GNR 327 (Listing Notice 1): Development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs</p> <p>c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse</p>	The proposed school will be situated within 28 meters from the edge of a watercourse
<p>Activity 27 of GNR 327 (Listing Notice 1): The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation excluding where such clearance is required for-</p> <p>(i) The undertaking of a linear activity; or</p> <p>(ii) Maintenance purposes undertaken in accordance with a maintenance management</p>	The proposed school will require clearance of indigenous vegetation over an area of 1 hectare and more. The footprint of the proposed new school building infrastructure and sport fields would replace the current indigenous vegetation footprint.

3.3 Legislation and Guidelines that have informed the preparation of this Report

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in **Table 3.2**, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 3.2: Relevant legislative and permitting requirements applicable to the proposed project

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
The Constitution of South Africa	The development has to comply with environmental right in the Bill of Rights in the Constitution of the Republic of South Africa (Act 108 of 1996), which reads as follows (Chapter 2, section 24): "Everyone has the right a) to an environment that is not harmful to their health or well-being; and b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i) prevent pollution and ecological degradation; ii) promote conservation; and iii) secure sustainable development and use of natural resources while promoting justifiable economic and social development."	
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>The NEMA EIA Regulations in Government Notice R326 in Government Gazette No. 40772 came into effect on 7 April 2017. These Regulations regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.</p>	KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
	<p>Environmental Impact Assessment process being complied with according to the Section 24 of NEMA (Act 107 of 1998) and NEMA EIA Regulations GNR 982 (Government Gazette 38282, 14 December 2014), Regulation 19 under the National Environmental Management Act (NEMA) Act 107 of 1998:</p> <p>(a). Basic Assessment Report (BAR) – (b). Environmental Management Programme (EMPr)</p>	
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p> <p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the BA phase and will continue to apply throughout the life cycle of the project.</p>	KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA).
National Water Act (Act No 36 of 1998)	<p>The development also triggers activities that require a Water Use License (WUL) because it crosses several water courses. Therefore, before construction activities may take place, the activity will require a Water Use License as per requirement in the National Water Act (Act No.36 of 1998) (NWA) under Section 21 Water Uses. In terms of the NWA, this development requires a Water Use License for the following water uses:</p> <ul style="list-style-type: none"> • Section 21(c) impeding or diverting the flow of water in a watercourse and; • Section 21 (i) altering the bed, banks, course or characteristics of a watercourse. <p>A water use license (WUL) is required in terms of Section 21(c) and 21 (i) of the National Water Act for the project.</p>	Department of Water and Sanitation (DWS)
National Environmental Management: Air Quality Act (Act No 39 of 2004)	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as “priority areas.”</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p> <p>GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas</p>	KZN EDTEA & Local Municipality
National Heritage Resources Act (Act No 25 of 1999)	<ul style="list-style-type: none"> » S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including <ul style="list-style-type: none"> » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a site exceeding 5 000 m² in extent » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component. 	<p>Amafa aKwaZulu-Natali Heritage Council</p> <p>South African Heritage Resources Agency (SAHRA)</p>

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	<p><i>A Heritage Impact Assessment (HIA) was compiled to identify, assess and, if necessary, mitigate against areas of heritage significance.</i></p> <p>In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p> <p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011). GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.</p> <p><i>An ecological study has been undertaken as part of the BA process, as such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered within this report.</i></p>	KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA).
National Forests Act (Act No. 84 of 1998)	<p>In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated” GN 908 provides a list of protected tree species.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
National Environmental Management:	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p>	KZN Department of Economic Development,

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
Waste Act, 2008 (Act No. 59 of 2008)	<ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. <p><i>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMP. The volumes of waste to be generated and stored on the site during construction and operation of the facility will not require a waste license.</i></p>	Tourism and Environmental Affairs (EDTEA).
National Road Traffic Act (Act No 93 of 1996)	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. <p><i>An abnormal load/vehicle permit may be required to transport the various components to site for construction.</i></p>	South African National Roads Agency Limited (SANRAL) (national roads) Provincial Department of Transport
Conservation of Agricultural Resources Act (Act No 43 of 1983)	<p>The Regulations provides a number of prohibitions of noise nuisance conditions one which states: "No person shall – erect a building or structure on residential premises or allow it to be erected there if this may cause a noise or nuisance".</p> <p><i>While no permitting or licensing requirements arise from this legislation, this Act will find application during the BA process and will continue to apply throughout the life cycle of the project.</i></p>	DAFF
Development Facilitation Act (Act No 67 of 1995)	<p>The Development Facilitation Act contains development facilitation regulations under the Regulations under Development facilitation Act 3. The Act is directed at provincial and local spheres of government; and serves to re-address the</p>	KZN Department of Economic

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
	<p>imbalances of the past and to ensure that there is equity in the application of spatial development planning and land use management systems.</p> <p>Provides for the overall framework and administrative structures for planning throughout the Republic.</p> <p>S (2-4) provide general principles for land development and conflict resolution.</p> <p>The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the DFA.</p>	<p>Development, Tourism and Environmental Affairs (EDTEA).</p>
Occupational Health and Safety Act (Act No. 85 of 1993)	<p>The Occupational Health and Safety Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.</p> <p><i>The proposed development site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA] and the National Building Regulations.</i></p>	
National Building Regulations and Building Standards Act, 1997 (Act No. 103 of 1997)	<p>Section 7 of the National Building Standards and Building Regulations Act states that "council must be satisfied that buildings or structures are not dangerous to life or property".</p> <p><i>The proposed development is in line with the Act as the structure is not deemed dangerous to life or property.</i></p>	
National Development Plan 2030	<p>The National Development Plan (NDP) offers a long-term perspective. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal.</p> <p>As a long-term strategic plan, it serves four broad objectives:</p> <ul style="list-style-type: none"> • Providing overarching goals for what the nation want to achieve by 2030. • Building consensus on the key obstacles to us achieving these goals and what needs to be done • to overcome those obstacles. • Providing a shared long-term strategic framework within which more detailed planning can take • place in order to advance the long-term goals set out in the NDP. • • Creating a basis for making choices about how best to use limited resources. <p>The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. The core elements of a decent standard of living identified in the Plan are:</p> <ul style="list-style-type: none"> • Housing, water, electricity and sanitation • Safe and reliable public transport • Quality education and skills development • Safety and security • Quality health care • Social protection • Employment • Recreation and leisure • Clean environment • Adequate nutrition <p><i>The proposed development does not take place in contrast with the objectives of the NDP, in fact the proposed development supports the objectives of the NDP.</i></p>	

LEGISLATION	APPLICABLE REQUIREMENTS <i>description of how the proposed development complies with and responds to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.</i>	RELEVANT AUTHORITY
Public Participation Guideline in terms of National Environmental Management Act, 1998 - (Department of Environmental Affairs 2017)	Guideline document in conducting the Public Participation Process for Basic Assessments. This document was used to guide the public participation process for the proposed development, including Chapter 6 of GN.R 982.	Department of Environmental Affairs

3.4 Content of the BAR in term of Appendix 1 of the 2014 EIA Regulations

Table 3.3 below details of the content of basic assessment report and how the legal requirements of APPENDIX 1 of the 2014 EIA Regulations have been addressed within this report.

Table 3.3: Legal requirements in terms of the 2014 EIA regulations

Appendix 1: CONTENT OF BASIC ASSESSMENT REPORTS	Cross-reference in this BAR report
(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— (a) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1.2 & Appendix G
(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 in items (i) and (ii) is not available, coordinates of the boundary of the property or properties;	Section 2.1
(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 proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 2.1
(d) a description of the scope of the proposed activity, including— i. all listed and specified activities triggered and being applied for; and ii. a description of the activities to be undertaken including associated structures and infrastructure;	Section 3.2
(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;	Section 3.3
(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;	Section 2.4
(g) a motivation for the preferred site, activity and technology alternative;	Section 2.5

<p>(h) a full description of the process followed to reach the proposed preferred alternative within the site, including—</p> <ol style="list-style-type: none"> i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 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— <ol style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; 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; 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; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. a concluding statement indicating the preferred alternatives, including preferred location of the activity; 	<p>Section 2.5</p>
<p>(i) 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> <ol style="list-style-type: none"> i. a description of all environmental issues and risks that were identified during the environmental impact assessment process; and ii. an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by adoption of mitigation measures; 	<p>Section 6.1</p>
<p>(j) an assessment of each identified potentially significant impact and risk, including—</p> <ol 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 the 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>Section 6.2</p>
<p>(k) where applicable, a summary of the findings and impact management 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>Section 7.1</p>
<p>(l) an environmental impact statement which contains—</p> <ol 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 superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivity of the preferred site indicating any areas that should be avoided, including buffers; and 	<p>Section 7.2</p>

iii.	a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Section 6.2, 6.3 & Appendix F
(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;	Section 7.3
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 6.5
(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;	Section 7.2 & 7.3
(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;	N/A
(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 which are relevant; and iv. any information provided by the EAP to interested and affected parties and a summary of responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix H
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	any specific information that may be required by the competent authority; and	N/A
(u)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(2)	Where a government notice <i>gazetted</i> by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply	N/A

4 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) was conducted in accordance with **Chapter 6 of the Environmental Impact Assessment Regulations, Published in Government Notice R326 in Government Gazette No. 40772 on 7 April 2017**. In addition, the PPP was guided by the Integrated Environment Management Guidelines Series 7, Public Participation in the EIA process, published in Government Gazette no. 33308, 18 June 2010.

4.1 Purpose of Public Participation

The engagement of Interested and Affected Parties (I&AP's) and the Stakeholder Engagement Process is an important part of any environmental Impact assessment. The main objectives of the Stakeholder Engagement / Public Participation Process include amongst others:

- Informing the adjacent landowners, tenants, residents' associations, ward councillors, the local municipality and other organs of state of the proposed project;
- Establishing lines of communication between the stakeholders, I&AP's and the project team;
- Providing all parties with an opportunity to exchange information and to express their views and concerns regarding the proposed project;
- Obtaining comments/input from stakeholders and I&AP's, and ensuring that all views, issues, concerns and queries raised are fully documented; and
- Identifying all the significant issues associated with the proposed project

4.2 Public Participation Undertaken

In terms of the requirement of Chapter 6 of the EIA Regulations, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- Giving written notice to:
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority.
- Placing an advertisement in:
 - (i) one local newspaper; and
 - (ii) in at least one provincial newspaper.

- Open and maintain a register/ database of interested and affected parties and organs of state.
- Release of a Draft EIA Report for Public Review
- Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6, the following summarises the key public participation activities conducted to date.

4.2.1 Placement of Site Notices

Site notices were displayed in different points within the study area. This is included in **Appendix D1**.

4.2.1 Written notifications

Access to all information that could influence interested and affected parties has been initiated by the project announcement, which included the placement of site notices and distribution of Background Information Documents (BID's) in the areas. A Background Information Document was produced and distributed during the initial PPP phase on 28 February 2020 in the form of a i) email distribution to registered I&APs ii) a "knock and drop" exercise during visits to surrounding areas iii) registered mail posted to I&APs with no email contacts and lastly iv) a notification to of the project progress. These are all included in **Appendix D2**.

4.2.2 Newspaper advertisement

Newspaper advertisements was placed in *Ilanga News* requesting Interested and Affected Parties (I&APs) to register, and submit their comments. This is included in **Appendix D3**.

4.2.3 Review of the Draft Basic Assessment Report

- i. Stakeholder: The draft BA Report was publically made available to all registered I&AP's from **17 August 2020 to 17 September 2020** at the following locations:
 - Abathembu Traditional Council Office in Sahlumbe
 - Dropbox link sent to registered I&APs via email
 - Email copy of the BAR document (without appendices) sent to registered I&APs via email
- ii. Authority: The Draft BA Report was sent to (amongst others):
 - KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA)
 - KZN Department of Agriculture and Rural development;
 - Department of Water and Sanitation
 - Alfred Duma Local Municipality
 - Uthukela District Municipality

4.2.4 Summary of Issues Raised by I&AP's

Issues and concerns raised by I&AP's will be integrated into the Issues and Responses Report. The issues and concerns were raised by means of:

- issues raised during open day meeting and focus group meetings;
- written submissions in response to advertisements

- telephonic communications with I&AP's;
- issues raised through written correspondence received from I&AP's (fax, email and mail).

Some of the issues raised are as follows:

- How far is the school from the river?
- Is there an access road to and from the school?
- Which areas will the school be serving and what is the population of these areas?
- How is the school contributing to the socio-economic livelihood of the people in close proximity to the school?

All comments received from IAPs are included in Appendix D4 of this report.

4.2.5 Consultation & Public Meeting

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities will be provided in order for I&APs to have their issues noted. I&APs will be consulted through the following means:

- Telephonic consultation sessions
- Written, faxed or e-mail correspondence
- Virtual meetings

4.2.6 Comments and Responses Report

At the end of the announcement phase, all comments/input from stakeholders and I&AP's, will be captured in the Issues and Response Report (IRR) which formed part of the Final BA Report. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent.

This is included in **Appendix D6**.

4.2.7 Identification of I&APs and establishment of a database

Identification of I&APs was undertaken by Envirolution Consulting through existing contacts and databases, recording responses to site notices and the newspaper advertisement, as well as through the process of networking. The key stakeholder groups identified include authorities, local and district municipalities, public stakeholders, Parastatals and Non-Governmental Organisations. All relevant stakeholder and I&AP information has been recorded within a database of affected parties. While I&APs were encouraged to register their interest in the project from the onset of the process undertaken by Envirolution Consulting, the identification and registration of I&APs has been on-going for the duration of the EIA phase of the process.

This is included in **Appendix D7**.

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section provides a description of the environment that may be affected by the proposed project, as stipulated in the EIA Regulations (Appendix 3 Section (h) iv). The requirement is that the description of the footprint should focus on the Geographical, physical, biological, social, economic, heritage and cultural aspects. The environmental specialist studies that were undertaken to inform this section of the BA Report and have focussed on significant environmental issues of the project.

5.1 Biophysical Attributes/Features of the Study Area

According to the available geological map sheet 2830 Dundee at a scale of 1:250,000 **The Site** is underlain by shale and siltstone of the Volksrust Formation belonging to the Karoo Supergroup and/or by intrusive dolerite of Jurassic Geological Age. The dolerite has intruded into the sedimentary rocks along planes of weakness and occurs as both dykes and sills. The bedrock on site is sequentially overlain by residual and transported soils. The transported soil classed as a Recent Deposit consists of fine-grained dark grey brown potentially expansive “**turf**”. Only residual dolerite was encountered in the test pits during the investigation that contains some hard rock core stones and/or boulders. Hard rock dolerite boulders were observed on surface within the western and southern portions of the site during the investigation.

5.2 Land uses

At the time of the assessment, much of the northern section of the site comprised a compacted soccer field. Small-scale farming took place around the western and southern boundary (**Photograph 1**). Houses flank the site to the north and east. Historical Google Earth aerial imagery show that about 1.7ha of the site was cultivated in the last 10 years (**Figure 5.1 & 5.2**). However, at the time of the assessment, it was found that the remaining vegetation on the site was also historically disturbed. An image dated the year 1940 was sourced and showed that most of the site was cultivated at that time (**Figure 5.3**). The southern section seemingly remained natural in the 1940's but has since been cultivated.

The land west of the site was also historically cultivated however, according to the Alfred Zuma Local Municipality SDF plans (**Figure 5.4**), the site agricultural potential is very restricted. Water draining from the D1275 road north of the site, caused erosion of the highly dispersive soils along the eastern boundary of the site (**Figure 5.2**). The erosion was worsened by soil disturbances and overgrazing in the area.



Photograph 1: a) The northern section of the site comprised a soccer field and b) cultivation on the western boundary of the site

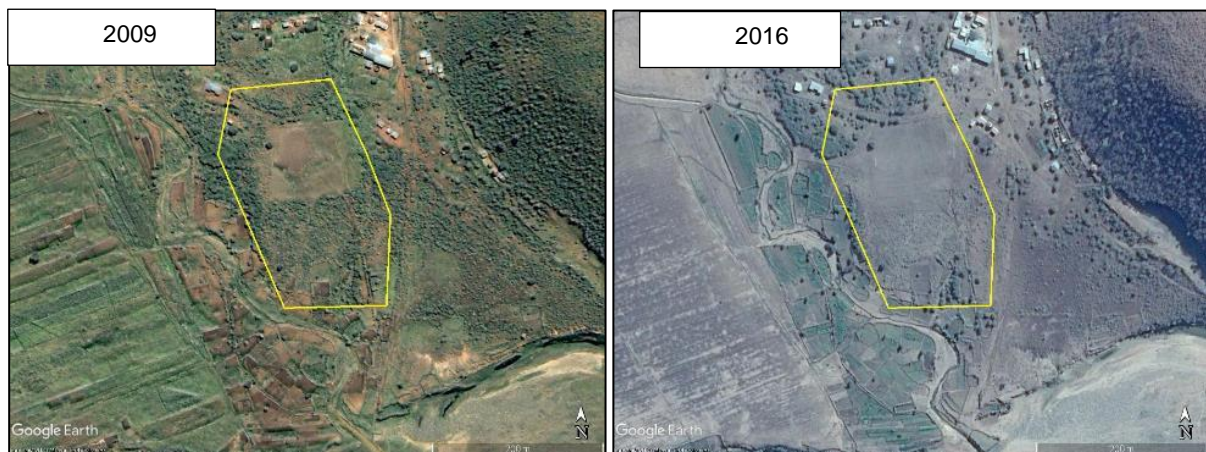


Figure 5.1: Cultivation on and around the site as seen on Google Earth imagery dated 2009 and 2016

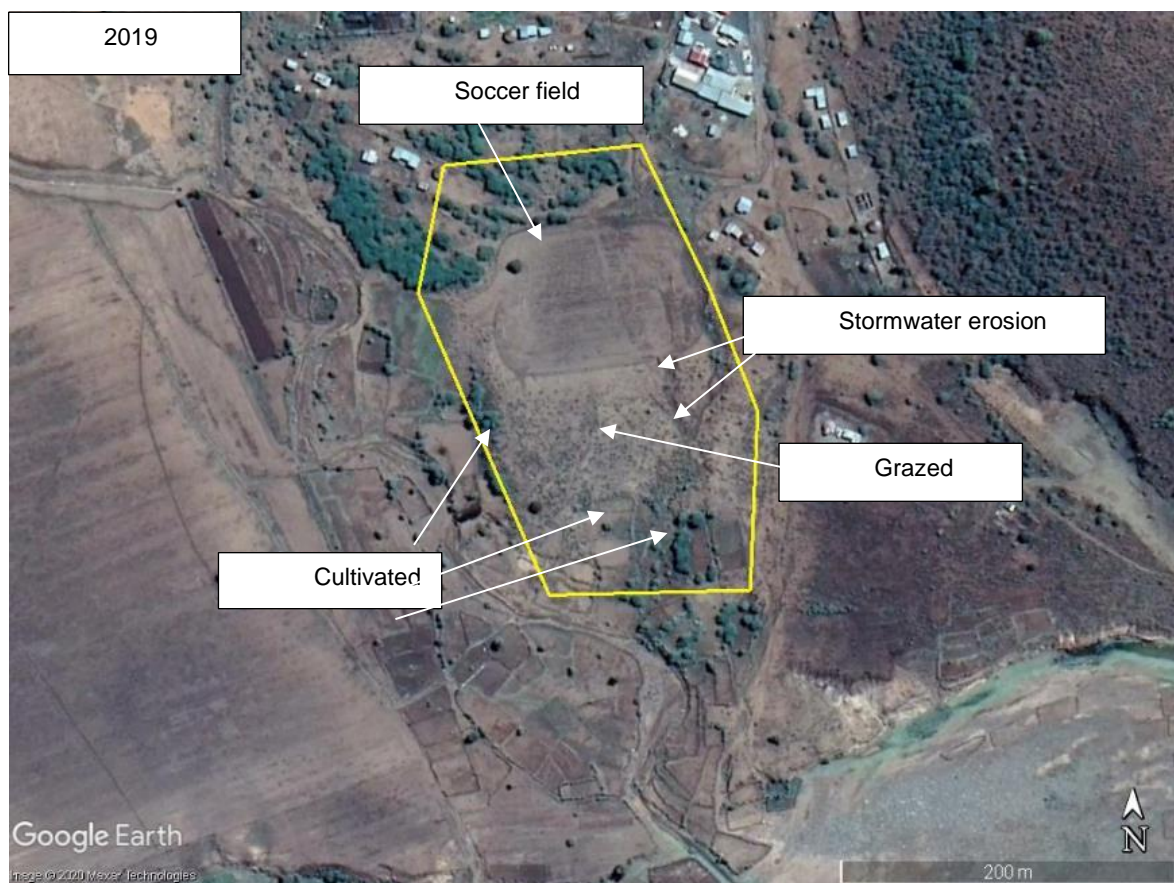


Figure 1.2: Current Google Earth imagery of the site (January 2019)

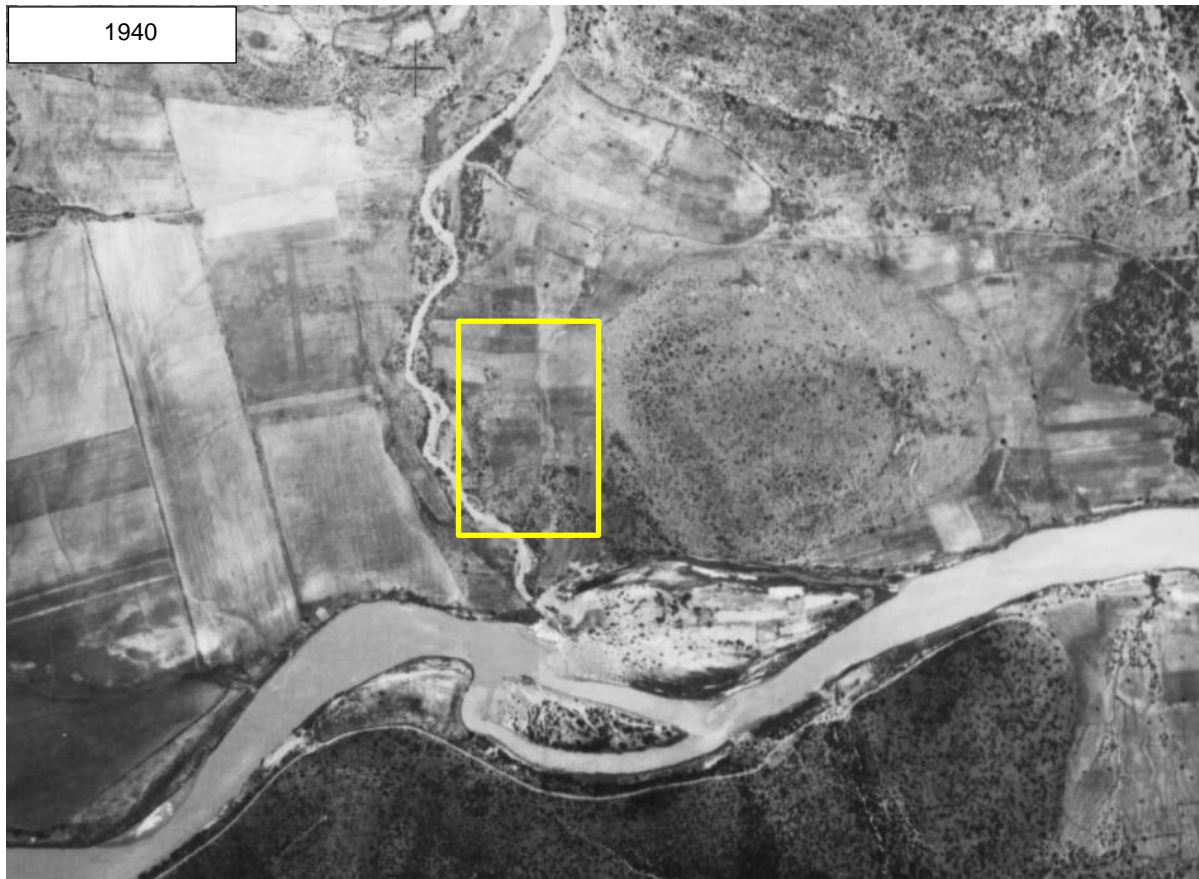


Figure 5.3: An excerpt of a 1940 aerial image showing the extent of historical cultivation on the site

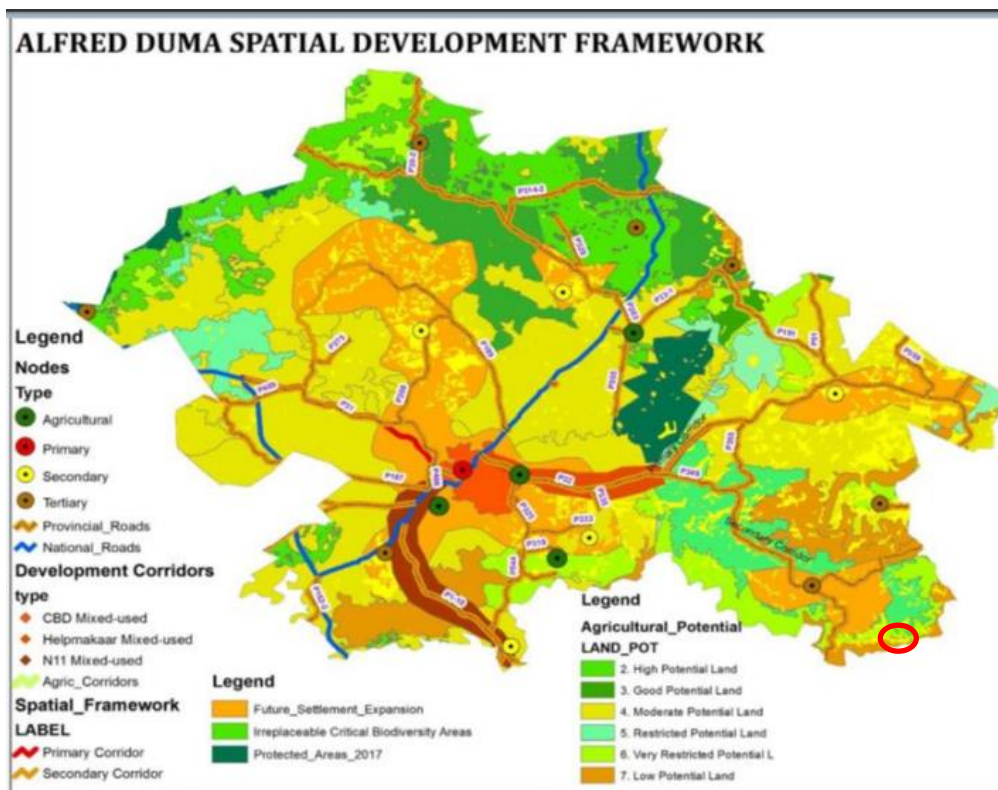


Figure 5.4: Site agricultural potential as per the Municipality SDF.

5.3 Vegetation

Vegetation Overview: The proposed site falls within the Savanna Biome, which is the largest biome in southern Africa. The vegetation is characterised by an herbaceous layer that is dominated by grasses and an upper layer of woody plants consisting of shrubs and trees (Mucina & Rutherford, 2006). The woody layer varies from open to closed, while canopy height may also vary. Summer rainfall coupled with winter fire and regular grazing ensures that the grass layer remains dominant. In addition, the lack of high rainfall prevents the upper layer (trees) from dominating. However, where grazing intensity is high, and fire frequencies low, the tree layer could become increasingly dominant.

The Savanna biome comprise different vegetation types of which the Thukela Valley Bushveld is present within the study area. This vegetation occurs on slopes and terraces mainly with deciduous trees of short to medium height (and many large shrubs) including *Vachellia tortilis*, *V. nilotica* and *V. natalitia*. Prominent evergreen species such as *Olea europaea* subsp. *africana*, *Boscia albitrunca* and *Euclea crispa* are present in places. Succulent plants, mainly species of *Euphorbia* and *Aloe* occur on shallow and eroded soils.

This vegetation is currently classified as Least Threatened (Mucina and Rutherford, 2006). Almost 200ha of Thukela Valley Bushveld is conserved in the Weenen Game Reserve. However, the remaining vegetation outside of protected areas has undergone considerable degradation over almost its entire area.

Listed Ecosystems: The South African Biodiversity Act (Act 10 of 2004) provides for the listing of threatened or protected ecosystems. These ecosystems are grouped into Critically Endangered-, Endangered-, Vulnerable- and Protected Ecosystems (Section 52(1) (a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, 9 December 2011)).

The proposed site does not fall in a listed ecosystem.

KwaZulu-Natal (KZN) Biodiversity Sector Plan: The KZN Biodiversity Sector Plan (BSP) identifies and maps critical biodiversity assets in KwaZulu-Natal District Municipalities and provide associated management guidelines which aim to maintain the integrity of these biodiversity features. The plan depicts Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) of which a CBA: Optimal area is situated south of the site, across the Tugela River (**Figure 5.5**). A CBA is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems. The proposed site is not classified as a conservation concern within this document.

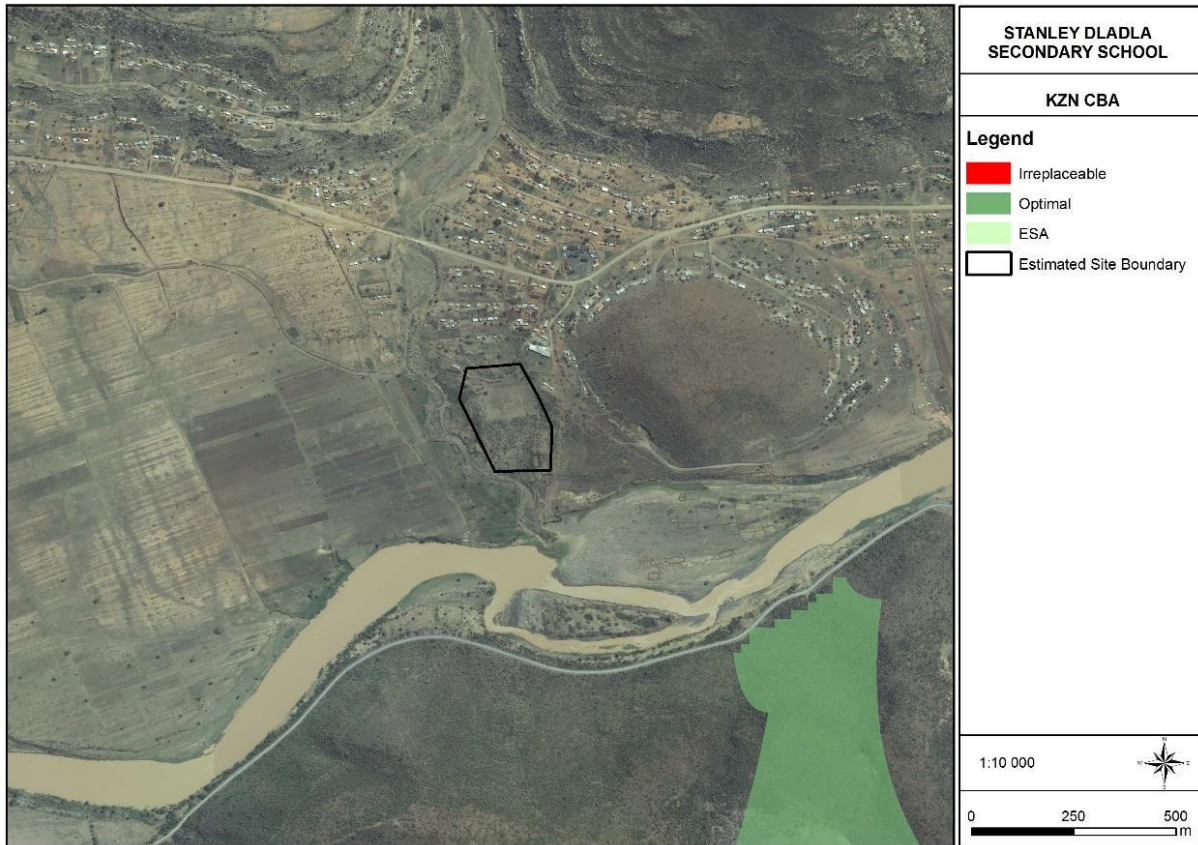


Figure 5.5: A CBA: optimal site is situated about 700m south of the proposed site

Vegetation Communities within the study area: Vegetation associations identified during this study are based on the overall similarity in vegetation structure, species composition, and abiotic features such as moistness and rocky areas. Each broad vegetation grouping is discussed below and geographically represented in **Figure 5.5**, mapped to 50m around the site. Plant species that were recorded at sample points at the time of the site visit are listed in Appendix E1.

The following broad vegetation groups are discussed

1. Modified vegetation;
 - 1.1 Modified and built-up
 - 1.2 Modified and cultivated
2. *Vachellia tortilis* secondary woodland; and
3. *V. tortilis-Commicarpus pentandrus* vegetation

Each broad vegetation grouping is discussed below; plant species that were recorded within each vegetation group at the time of the site visits are shown in **Figure 5.6** and discussed in the section that follows.

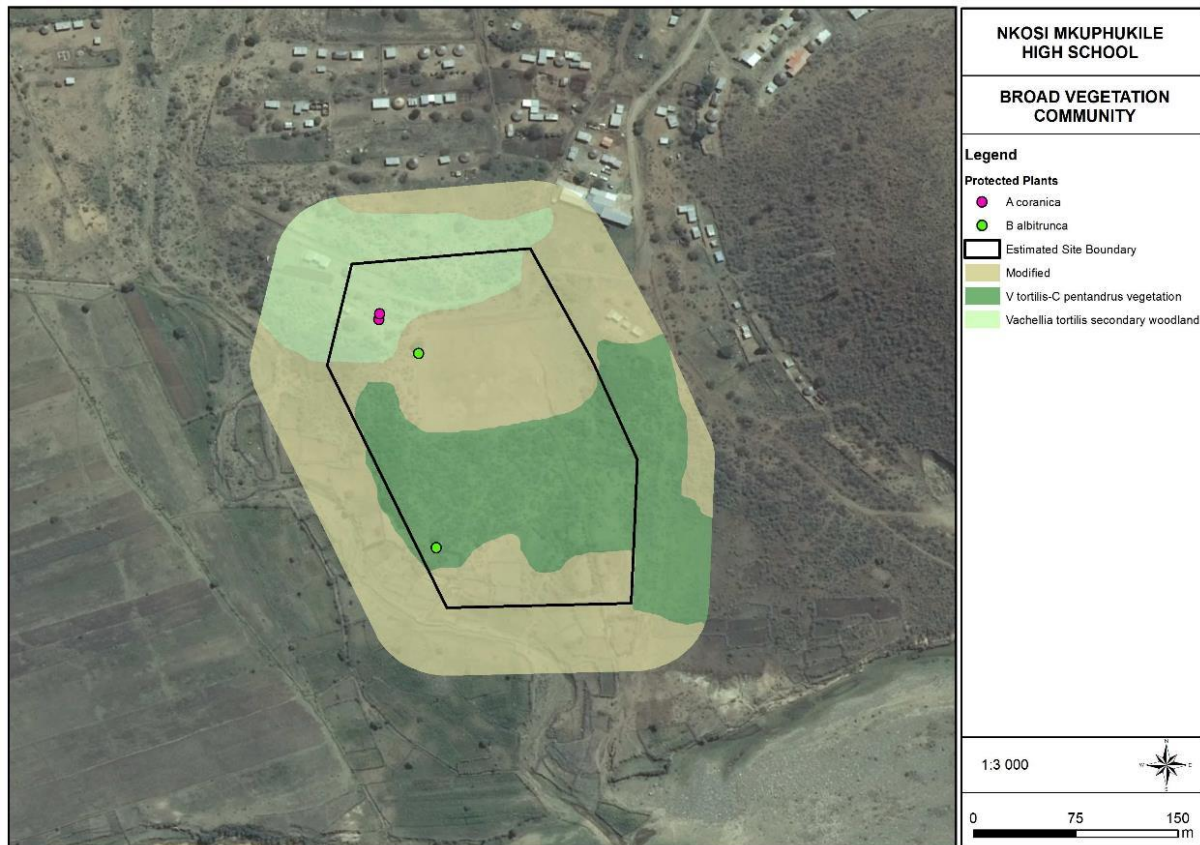


Figure 5.6: Broad vegetation categories.

Modified and built-up: Fallow lands in the northern portion of the site was cleared and compacted for the soccer field. The grass layer was poor with limited species such as *Cynodon dactylon* (couch grass) and *Urochloa mosambicensis* (bushveld signal grass) present. Within the mapped 50m buffer, land was built-up and open spaces in between comprised weedy, annual species and pioneer grasses. The soccer field included only one tree, a large specimen of the national protected *Boscia albitrunca* (Shepard's tree) (Figure 5.6). The tree *Vachellia tortilis* (umbrella-thorn) grew in between the built-up areas

Modified and cultivated: Along the western and southern boundary of the site, the moist drainage line has been cultivated. The land was divided in smaller parcels, fenced in with wire or invasive thorny species such as *Agave sisalana* (sisal) and *Cereus hildmannianus* (queen of the night) The grass layer was trampled and grazed, comprising the same species as the modified and built-up areas. The weedy forb layer in fallow areas included invasive species such as *Parthenium hysterophorus* (parthenium), *Physalis viscosa* (sticky gooseberry) and *Solanum sisymbriifolium* (wild tomato). The indigenous *Dicliptera cernua* (false buckweed) grew in the shade of trees such as *Vachellia tortilis* and the invasive *Melia azedarach* (seringa).

No plant species of conservation concern were recorded here, and none are expected to occur. A large individual of the national protected tree, *Boscia albitrunca*, occurs on the north-western corner of the soccer field.

***Vachellia tortilis* secondary woodland:** The most northerly section of the site was historically cultivated. Once cultivation ceased, pioneer grass and tree species colonised the fallow lands. This portion of the site was colonised by the hardy pioneer *Vachellia tortilis* that naturally occurs within the Thukela Valley Bushveld. Eroded and degraded areas in this vegetation unit can readily become dominated or encroached by this tree species (Hoffman

& O'Connor, 1999), particularly in conjunction with overgrazing. Often the only ground cover is found under *Acacia tortilis* trees where their root systems retain soil (Camp 1999 in Hoffman & O'Connor, 1999). The forb *Dicliptera cernua* (false buck weed) grew dense in the shade of this tree, along with grasses such as *Panicum maximum*. The provincially protected geophyte *Ammocharis coranica* (ground lily) were recorded in the north-western corner of this vegetation group.

***Vachellia tortilis* – *Commicarpus pentandrus* vegetation:** South of the soccer field, the land slopes southwards towards the Tugela River. Parts of this vegetation group was not cultivated; however, the area was heavily grazed, and the grass layer limited. The vegetation comprised stunted trees and shrubs, mainly *Vachellia tortilis*, *Gymnosporia buxifolia* (common spike thorn) and *Grewia occidentalis* (cross berry). The succulent *Aloe marlothii* grew on the higher lying portion of this vegetation. The area was searched for other succulents such as *Orbea* and *Duvalia*, however, none were recorded in walked transects.

Plant Species of Conservation Concern: A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009) and Raimondo *et al*, (2009). A list of five (5) plants of conservation concern is given in Appendix E1. Of these, only *Orbea woodii* has a likelihood of occurring in natural vegetation around the site. This species was not recorded on the site.

Protected plants:

- **NEMBA Threatened or Protected Plant Species (TOPS):** At the time of this assessment, no TOPS listed species were recorded within the proposed development footprint.
- **Provincially Protected Plants:** Several provincially protected plants are listed in KwaZulu-Natal Nature Conservation Management Amendment Act (No. 5 of 1999). These plants are not to be removed, damaged, or destroyed without permit authorisation from Ezemvelo KZN Wildlife. One geophyte species, *Ammocharis coranica* (groundlily) was recorded in the western section of the *Vachellia tortilis* woodland (Figure 5.6).

National Protected Trees: Two large individuals of the protected *Boscia albitrunca* were recorded along the western boundary of the site. it is recommended that the layout plan be amended to conserve these trees *in situ* (Figure 5.6 and Figure 6.1).

Alien Invasive Plant Species: The alien plant species identified on the study site are listed in Appendix B. Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- notify the competent authority in writing
- take steps to manage the listed invasive species in compliance with
 - section 75 of the Act;
 - the relevant invasive species management programme developed in terms of regulation 4; and
 - any directive issued in terms of section 73(3) of the Act.

The following category 1b plants in **Table 5.1** below were observed within the study area:

Table 5.1: Category 1b alien invasive species recorded on the site

Species	Common name	Area of infestation
<i>Caesalpinia decapbelata</i>	Mauritius thorn	Southern boundary of site, modified and cultivated

Species	Common name	Area of infestation
<i>Cereus hildmannianus / jamacaru</i>	Queen of the night	West of site in cultivated areas
<i>Ipomoea carnea</i> subsp. <i>fistulosa</i>	Morning glory bush	South-eastern corner of site and in drainage lines
<i>Melia azedarach</i>	Syringa	Cultivated areas west of site
<i>Cylindropuntia imbricata</i> (was <i>Opuntia imbricata</i>)	mbricate prickly pear / kabeltruksvy	Cultivated areas west of site
<i>Opuntia ficus-indica</i>	Sweet Prickly Pear	Cultivated areas west of site
<i>Parthenium hysterophorus</i>	Parthenium, demonia weed	Cultivated areas west of site
<i>Solanum sisymbriifolium</i>	Wild Tomato	Cultivated areas west of site

5.4 Wetland

Quaternary Catchments: Quaternary Catchment V60G is located in the fourth Water Management Area (WMA), the Pongola -Mtamvuna WMA (Government Gazette, 16 September 2016). In this WMA the major rivers include Pongola-, Mhlatuze-, Mfolozi-, Mkuze-, Thukela-, Mvoti-, Umgeni-, Umkomazi-, Umzimkulu and Mtamvuna Rivers. The watercourse associated with the study site drains directly into the Tugela River, which is located directly south of the study site.

Hydrology: Surface water spatial layers such as the National Freshwater Ecosystems Priority Areas (NFEPA) Wetland Types for South Africa (SANBI, 2010) were consulted for the presence of wetlands and rivers. Several small non-perennial rivers, with many small tributaries are indicated within study site (**Figure 5.7**). The wetland egetation of the area is classified as Lowveld Group 3.

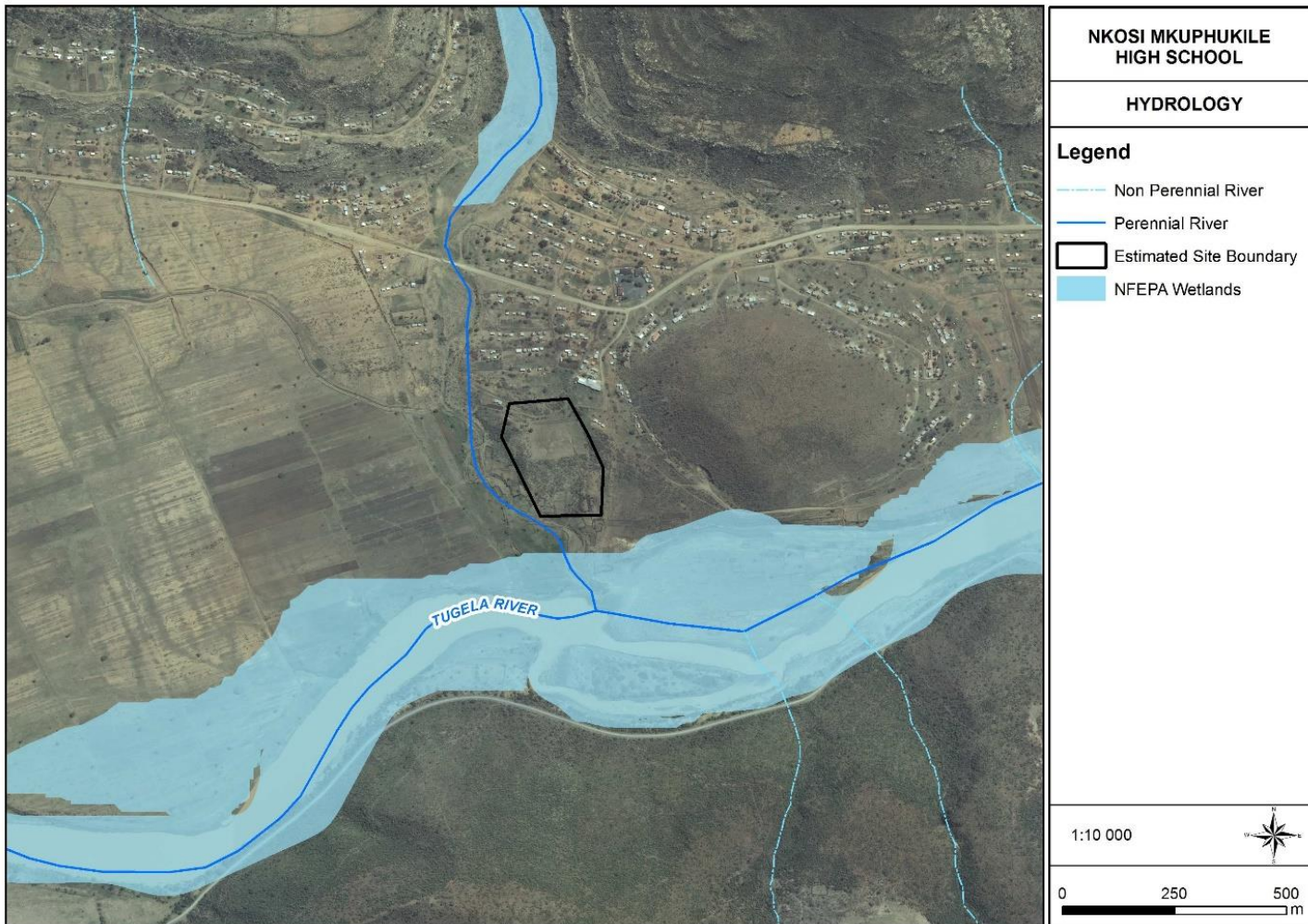


Figure 5.7: Regional hydrology of the study site and surrounding.

5.5 Heritage Aspects of the area

Overview of the region: The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a very limited pre-colonial (Stone Age) occupation. The second and much later component is a colonial (farmer) one, with a very limited urban component consisting of a number of smaller towns, most of which developed during the last 120 years or less.

Identified sites: During the physical survey, the following sites, features and objects of cultural significance were identified in the study area (Figure 5.8).

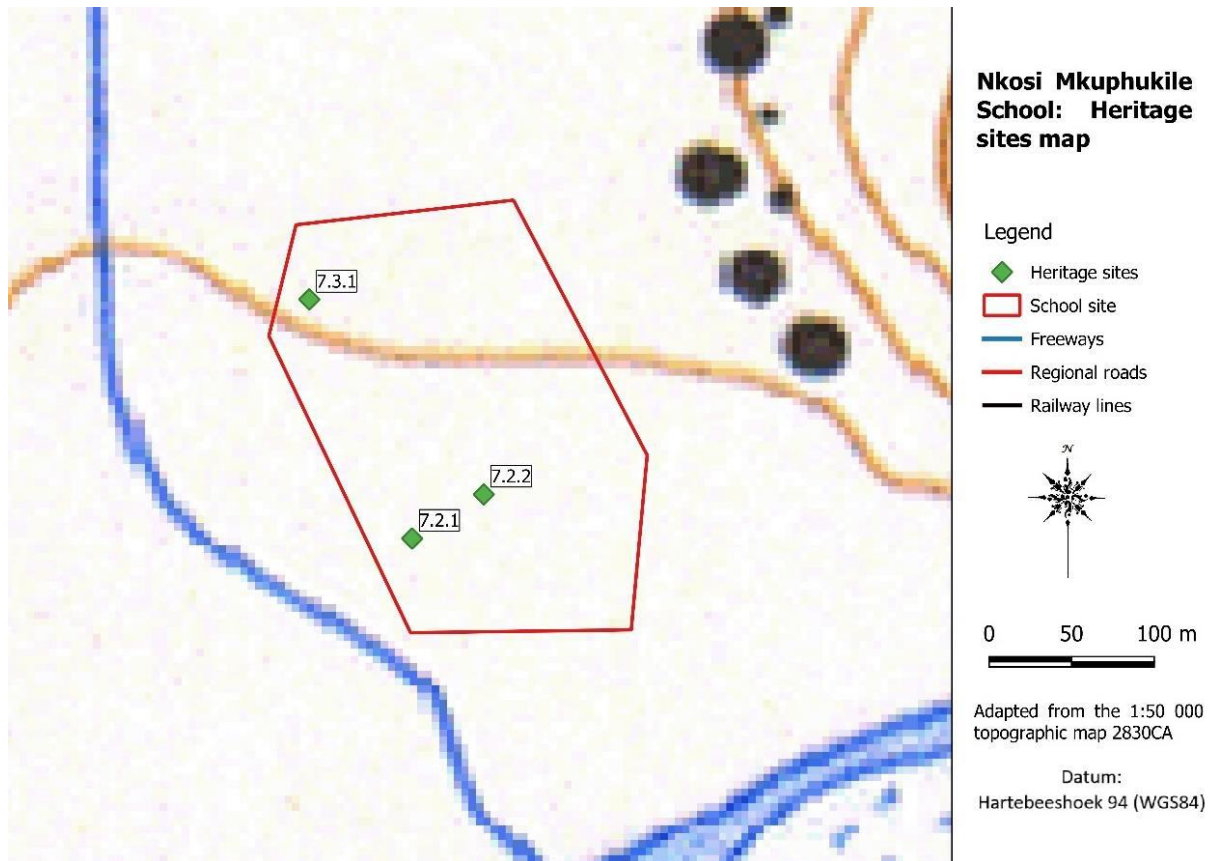


Figure 5.8: Location of heritage sites in the study area

Stone Age (Single MSA point): This lithic was recorded while walking across the proposed development site. The material used is hardened shale. Overall, single chance finds occur very sporadically throughout the area, although it seems as if it is more located in small streambeds where it has been washed down as a result of flash floods. Stone artefacts (tools, cores and flakes) occur in limited numbers in rocky areas close to the Thukela River and its various tributaries.



MSA surface find see (see point 7.2.2.in Figure 5.8)

Iron Age: An area where some undecorated potsherds are eroding out. No other feature, i.e. structure, midden, etc. could be identified in the immediate vicinity. None of the pottery is decorated, apart from one piece that has a polished red sheen to it. This makes the identification and dating of this material difficult. However, it is possible that this site might predate the more recent agricultural activities in the area. It is also possible that it might be linked to the site with vitrified dung, i.e. possible cattle byre, in the record.



Fragments of pottery that was identified (see point 7.2.2 in Figure 5.8)

An area where pieces of vitrified dung is exposed. On Iron Age sites this usually happens when a cattle/goat byre is exposed to intense heat until the dung is liquidized, after which it is cooled down rapidly to a near glass-like substance. No other feature, i.e. structure, midden, etc. could be identified in the vicinity. Also, important to remember, in case in the past people were buried in cattle byres.

It is possible that this site might predate the more recent agricultural activities in the area. It is also possible that it might be linked to the site with pottery, see above.



Fragments of vitrified dung see point 7.2.1.in Figure 5.8

Historic period (Graves, Cemeteries and Burial Grounds - Section 36)

Informal burial site with only two graves, both marked only with stone cairns. These graves probably originated from people that worked/lived here.



Overview of the burial site (see point 7.3.1.in Figure 5.8)

5.6 Palaeontology of the area

Background: When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desk top and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required (SG 2.2 SAHRA AMPHOB, 2012).

The Quaternary Formation may contain fossils. A very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size. Large areas of the coastal plain of Kwazulu-Natal are covered in a blanket of alluvial sand and no significant fossils have been described from these sediments (Groenewald 2012). Large areas of the coastal plain of Kwazulu-Natal is covered in a blanket of alluvial sand and no significant fossils have been described from these sediments (Groenewald 2012).

The Ecca Group may contain fossils of diverse non-marine trace, *Glossopteris* flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans (Johnson 2009). *Glossopteris* trees rapidly colonised the large deltas along the northern margin of the Karoo Sea. Dead vegetation accumulated faster than it could decay, and thick accumulations of peat formed, which were ultimately converted to coal. It is only in the northern part of the Karoo Basin that the glossopterids and cordaitales, ferns, clubmosses and horsetails thrived (McCarthy and Rubidge 2005). The *Glossopteris* flora is thought to have been the major contributor to the coal beds of the Ecca. These are found in Karoo-age rocks across Africa, South America, Antarctica, Australia and India. This was one of the early clues to the theory of a former unified Gondwana landmass (Norman and Whitfield 2006).

The Estcourt Formation contains evidence of an abundance of marine and probably estuarine invertebrates that left trace fossils in the rock record (Groenewald 2012). The Volksrust Formation consists of a monotonous sequence of grey shale and fossils are significant, but very rarely recorded. Fossils include rare temnospondyl amphibian remains, invertebrates, minor coals with plant remains, fish scales, petrified wood, and low-diversity marine to non-marine trace fossil assemblages (Groenewald and Groenewald 2014). The Vryheid Formation (Pv), Ecca Group is rich in plant fossils such as the *Glossopteris* flora (Appendix 1) represented by stumps, leaves, pollen and

fructifications (Appendix 1). Fossils are generally absent from the Pietermaritzburg Formation although trace fossils have been recorded from the upper layers (Groenewald 2012).

Description of significant fossil occurrences: The Quaternary Formation may contain fossils. A very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size. Large areas of the coastal plain of Kwazulu-Natal are covered in a blanket of alluvial sand and no significant fossils have been described from these sediments (Groenewald 2012). Large areas of the coastal plain of Kwazulu-Natal is covered in a blanket of alluvial sand and no significant fossils have been described from these sediments (Groenewald 2012). Fossils occurring in the quaternary can be seen in Appendix 1 of Appendix E4 (Paleontology Assessment).

All Karoo Supergroup geological formations are ranked as **LOW to VERY HIGH**, and here the impact is potentially **VERY HIGH** for the surrounding Ecca Group. Rocks of Permian age in South Africa are particularly rich in fossil plants (Rayner and Coventry 1985). The fossils are present in the grey shale interlayered with the coal seams. The fossils are not very rare and occur also in other parts of the Karoo stratigraphy. The pollen of the Greenside Colliery also on the Vryheid formation was the focus of a Ph.D study. It is often difficult to spot the greyish fossils as they are the same colour as the grey shale in which they are present as these coalified compressions have been weathered to leave surface replicas on the enclosing shale matrix. A locality close to Ermelo, also Vryheid Formation, has yielded *Scutum*, *Glossopteris* leaves, *Neoggerathiopsis* leaves, the lycopod *Cyclodendron leslii*, and various seeds and scale leaves (Prevec 2011).

Fossils likely to be found are mostly plants (Appendix 1) such as '*Glossopteris flora*' of the Ecca Group. The aquatic reptile *Mesosaurus* and fossil fish may also occur with marine invertebrates, arthropods and insects. Trace fossils can also be present. The marine bivalve *Megadesmus* is found in the upper part of the Volksrust Formation near Newcastle (Johnson 2009).

During storms a great variety of leaves, fructifications and twigs accumulated and because they were sandwiched between thin films of mud, they were preserved to bear record of the wealth and the density of the vegetation around the pools. They make it possible to reconstruct the plant life in these areas and wherever they are found, they constitute most valuable palaeobotanical records (Plumstead 1963) and can be used in palaeoenvironmental reconstructions. The Estcourt Formation is singular worldwide in that it yields an excellently preserved, well-studied flora and insect fauna (MacRae 1999).

Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to be determined due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot. The vast coal mining industry (Vryheid Formation) provides palaeontologists with fantastic access to coal-associated plant fossils, while simultaneously resulting in the destruction of important National Palaeontological Heritage.

The threats are: earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in or destruction of fossils by development, vehicle traffic, and human disturbance (See Description of the Geological Setting above).

5.7 Social Characteristics of the Study Area and Surrounds

The purpose of this section is to provide an overview of the current socio-economic situation within the proposed project area. This section will provide a strategic understanding of the socio-economic profile of the study area, in order to develop a better understanding of the socio-economic performance as a background to the development of the project. The data presented in this section has been largely derived from the most recent (2011) Census, as well as the municipalities IDP.

5.7.1 Socio-Economic Context

The Alfred Duma Local Municipality was formed after the redetermination of boundaries in terms of section 21 of the Local Government, the Municipal Demarcation Act 1998 (Act No.27 of 1998) which resulted in municipalities being disestablished and their former areas of jurisdiction merged under new municipalities to be established. The Emnambithi/Ladysmith Municipality and Indaka Local Municipality are part of the municipalities that have merged to form a new municipality known as the Alfred Duma Local Municipality.

This municipality is one of the three municipalities in the Uthukela District. The Municipality is strategically located along the N3 corridor which links Durban and Gauteng as well as the N11 which links it with Mpumalanga and Free State Provinces.

The Alfred Duma Local Municipality is well located in relation to at least two of the major tourism destinations in KwaZuluNatal. In fact, it serves as a base for the exploration of the Battlefields to the north and Ukhahlamba-Drakensburg Park to the south. The latter is a World Heritage Site and a world acclaimed tourist destination.

The municipality is located in the uThukela Water Management Area (WMA) with the Klip River and Sunday's River and their tributaries traversing the municipality. These rivers drain into the Tugela River (also known as uThukela), which is the largest river system in KwaZulu-Natal. The Tugela River forms part of the Tugela River Catchment, which is approximately 30 000 km² in extent. This is one of the important river catchments in South Africa, which drains from the Drakensberg escarpment into the Indian Ocean. There is substantial runoff from the Tugela catchment as a result of high rainfall. This presents the municipality with great opportunity in relation to agriculture.

The municipality takes pride in prioritising the green environment the recently constructed waste recycling plant which will be fully function by end of 2016 which will in turn contribute towards creating jobs in the area especially for people in the rural areas. Another project that the municipality will embark on this financial year is planting of trees in and around the town to address the emission of gas in the atmosphere around the municipality.

Population: Census (2011) indicates that the population for the former Emnamabithi/Ladysmith municipality has risen from a total of 225 459 people in 2001 to 237 437 in (2011) with an average growth of 0.52% which is much less than in 2001 where the growth rate was 4.67% while with former Indaka Municipality Census (2011) decreased from 113,644 people in 2001 to 103,116 people. Thus, indicates a population decline of 10.2% over 10 years. The current population then for Alfred Duma Local Municipality is 340 116 as per statistics obtained through Census 2011 for Indaka and Emanambithi/Ladysmith Municipalities. One of the reasons that has led to decrease in the population is that the youth migrates to other cities like Durban, Pietermaritzburg and Gauteng looking for jobs and tertiary institutions.

Provincial space economy: The Alfred Duma Local Municipality spans over an area of 4 010,13km² of which 90% is rural land with limited basic services and infrastructure. The municipality is laid on the banks of the UThukela River within the region of Northern KwaZulu Natal.

It's bordered by the Greater Drakensberg Mountain to the extreme West. In terms of the socio-economic macro context, the municipality is midway between the National Primary Nodes of Johannesburg and Durban. To the west of the municipality lies the Free State Province and to the north the Mpumalanga province. Bisecting the municipality is the presidential prioritised railway corridor which links the areas of Durban and Johannesburg.

District space economy: The Alfred Duma Local Municipality forms part of the UThukela District Municipality which comprises of other 2 Local Municipalities, namely; Okhahlamba LM and Inkosi Langelibalele Municipality. The municipality currently functions as the main economic hub of the District Municipality with most of the regional offices and industries located in it. In terms of the District Management Area (DMA) of uThukela, the municipality covers approximately 11500km². It is located on the western boundary of KwaZulu Natal.

The Alfred Duma Local Municipality comprises of 36 wards with 22 of those being rural wards and some of them administered by the Traditional Authorities namely Inkosi Khumalo in Driefontein Block and Inkosi Shabalala in Matiwane, Inkosi Sthole, Inkosi Zwane, Inkosi Mthembu and Inkosi Mabaso Mhlumayo area and Inkosi Nxumalo, Inkosi Kunene, Inkosi Mbhense and Inkosi Mchunu in the Limehill area. The 36 wards within the Municipal jurisdiction will be represented by 73 councillors.

Ladysmith is the main/primary urban area/town in the municipality. The Township was proclaimed in June 1850 and officially named Ladysmith later that year. It is accessed via the N11 that connects the town with the N3 and traverse the town while making its way to the north. The R103 from Colenso and Roosboom in the south intersects the N11 in the southeast. Residential suburbs include Egerton, Observation Hill, Reservoir Hill, Hospital Park, Rose Hill, Residential settlements include Steadville and Leonards Ville, with a border of commercial activity on its westernmost edge closest to the river and the CBD.

Industrial areas include the Danskrall Industrial area to the north-east and further southeast is the industrial area of Nambiti. The south-westerly periphery of the CBD over the Klip River is characterised by public open space and recreational areas, including Settlers Park, the Indoor Sports Complex and the Aerodrome. The remaining settlements are rural in nature with the exception of Colenso and Ezakheni, and another minor township such as Steadville and Ekuvukeni.

Locational attributes of Alfred Duma Local Municipality

The Alfred Duma Local Municipality forms part of the UThukela District Municipality, which is one of the ten district municipalities in KwaZulu-Natal. The UThukela District is located along the western boundary of the KwaZulu-Natal Province (KZN), and adjoins the Kingdom of Lesotho and the Free State Province. It also forms the northern segment of UThukela District and is bordered by the Free State province to the west, Dannhauser municipality to the north and Endumeni a municipality to the northeast and east, Umtshezi municipality to the southeast and Okhahlamba municipality to the southwest. It covers an area of approximately 3020km² in extent and has a population of about 340 116 people (2011). Approximately 20% of the municipality is urban whilst 80% is rural, which presents obstacles in terms of service delivery. The Alfred Duma Local Municipality is anchored around the town of Ladysmith which serves as a service centre and administrative centre for the whole of Uthukela District, and a commercial hub for the north-western part of KwaZulu-Natal.

The municipality is strategically located at the intersection of two major national development corridors and trade routes, that is: The N11 which runs in a north south direction linking KwaZulu-Natal with Mpumalanga Province; and the N3 which runs in an east west direction linking Durban and Johannesburg Metropolitan areas.

Railway line linking KwaZulu-Natal and provinces such as Gauteng and Mpumalanga also run through the area creating opportunities for the Alfred Duma Local Municipality to benefit from the recently announced rail infrastructure development programme. To realise this, benefit the municipality has established a medium-term

project called Intermodal Feeder Port with the aim of resuscitating railway lines in Ladysmith and create economic growth as stipulated in the Provincial Growth Development Strategy.

This municipality is highly accessible at both regional and national level. This is recognised in the recently introduced Provincial Growth and Development Strategy for KwaZulu-Natal which classifies Ladysmith as a tertiary node with regional significance. This means that the area is earmarked for the location of infrastructure that serves the whole of Uthukela District and beyond, and connects the region with major urban centres such as Durban and Johannesburg.

The cultural attractions include the certain parts of the Battlefields and Memorial, Museums, Monuments, Rock Art, Crafts, Recreation (Horse Riding) and tourism routes. The municipality is located in a region with a rich heritage and military history ranging from the uMfecane period (early 1800s) to the turn of the century when the Boers tried to stem the tide of British imperialism. It includes Shaka's predatory campaigns, the arrival of the Voortrekkers, the AngloZulu War and the Anglo-Boer Wars. The Battlefields Route provides a structured journey around the sites of various battles, skirmishes and sieges which are situated in a broad belt running through the central core of the region, from Esctourt in the south, through Ladysmith, Dundee and Newcastle, to Charlestown in the north.

This presents the area with a unique 'tourism triangle' character, consisting of three of the five B's branding of provincial tourism – Berg, Bush and Battlefields. In addition to its three main destinations, there is a diversity of related attractions and accommodation facilities. This rich diversity allows tourists to experience a wide range of activities and scenes within a relatively small area, and is used as an important marketing element in the regional tourism industry.

Source: <http://www.alfredduma.gov.za/alfred-duma-local-municipality-profile/>

5.7.2 Socio-economic value of the activity

Anticipated CAPEX value of the project on completion	R 66 000 000,00
What is the expected annual turnover to be generated by or as a result of the project?	R 22 000 000,00
New skilled employment opportunities created in the <u>construction</u> phase of the project	14
New skilled employment opportunities created in the <u>operational</u> phase of the project	2
New un-skilled employment opportunities created in the <u>construction</u> phase of the project	94
New un-skilled employment opportunities created in the <u>operational</u> phase of the project	4
What is the expected value of the employment opportunities during the operational and construction phase?	R7 920 000,00

5.8 Geotechnical and soil condition of the Site

- **Collapsible/Compressible Soil:** The site soils are clayey and no problems with regards to settlement are anticipated.
- **Expansive Soil:** The tests revealed that both the "turf" and residual dolerite are potentially "high" in the degree of expansiveness. According to the van der Merwe (1964) method of analysis total heave of 70mm is estimated

at surface should the site soils change from a state of desiccation to one of saturation. The indicator test results are summarized in Table 1.

- **Foundations:** *The Site* consists of a single geotechnical zone as indicated on the google image named as the *Geotechnical Map (V20/006/2)* in Figure 5.9.

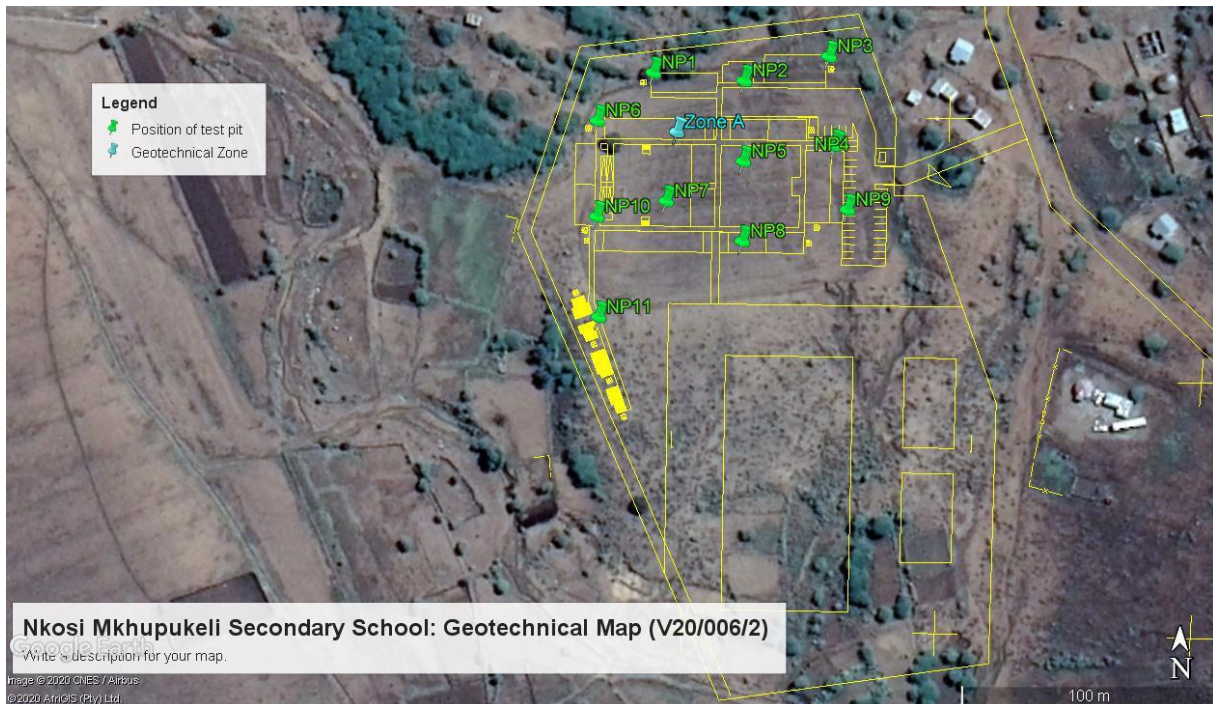


Figure 5.9: Geotechnical Map (V20/006/2).

The entire site consists of this zone where a thick layer of potentially “**highly**” expansive soil (“**turf**” & residual dolerite) was encountered. This zone is classified as **Class H3** according to the National Home Builders Registration Council’s Standards and Guidelines (**NHBRC**) of 1999. This classification indicates that total heave of **more than 30mm** is estimated at surface with differential heave assumed to equal 50% of the estimated total.

Foundation recommendations are provided for the proposed single-storey school complex utilizing the maximum permissible bearing pressure indicated in Appendix E5 Geotechnical report (section 5.3).

The design of foundations (whether soil or concrete) should be done in accordance and under supervision of a civil or structural engineer and the NHBRC recommendations given above should be verified during construction. Strict quality control is necessary during any compaction procedure to ensure that the desired result is achieved and densities/stiffness of all material used as backfill must be controlled with suitable field tests. The design of first floor and upper slabs should take the estimated heave into account.

The existing drainage/erosion “gullies” on and in close proximity to the site and/or structures should be rehabilitated prior to construction and storm water run-off should be diverted around the site.

- **Shallow Seepage:** Although no water seepage associated with the presence of a potential shallow perched water table was encountered during the investigation, the necessary damp proofing precautions should be

taken underneath all structures and provision will have to be made to prevent ingress of water beneath foundations.

- **Material Usage:** Due to the clayey nature of the site soils, no specific tests were conducted to determine the suitability of the soils encountered for use in layer works. The following are derived from the results of the indicator tests. Both the “*turf*” and residual dolerite classify as **A-7** according to the PRA system which indicates that this material should not be used in layer works as it is potentially expansive. It may however be considered for landscaping purposes, but then the erodibility of the soils should be taken into account. Therefore, all material for use in layer works will have to be imported from a commercial source.

The roads and paved areas should be designed according to the anticipated traffic and axle loads bearing the estimated heave of the roadbed into account. Adequate drainage should be provided to ensure that ponding of surface water on and in the vicinity of the roadbed is prevented especially if interlocking paving blocks are used. No trees should be planted close to the road surface or edge of soil rafts/terraces.

- **Stability of Excavations:** Although none of the sides of the test pits collapsed during the investigation it is strongly recommended that all excavations **exceeding 1,5m** should have proper sidewall protection to ensure safety of workers. In general terms it is envisaged that stability to temporary excavation faces could be provided by either lateral support or by battering the excavation back to a suitable (stable) slope angle. Stability of battered slopes and lateral support measures should be designed and constructed by a specialist geotechnical contractor and the contractor should be made responsible for the final selection of slopes and lateral support measures to ensure a safe working environment. Seepage may result in the destabilizing of the soils above the seepage and special precautions may be required.

It is recommended that all constructed embankments **exceeding 1,5m** or as deemed necessary by the design engineers be stabilized/protected by means of retaining walls. Embankments and all terrace faces should be adequately compacted and protected from erosion and potential failure.

- **VIP Ablution System:** The proposal is to install a **VIP Ablution System** at the school. The Department is concerned about the potential impact that this system will of might have on the underground water. From a geotechnical perspective the following should be taken into consideration.
 - If this is a sealed system and if properly maintained then there should be no leakage from the system to contaminate the ground and/or groundwater.
 - During installation it should be borne in mind that the are clayey and potentially expansive. Thus, when the soils wet up, swell pressures could develop on pipes etc. that could potentially cause damage and subsequent leakage to the pipes/system.
 - The system should be well maintained, i.e. not be allowed to overflow and be vandalized.
 - Bear in mind that if the ablution facilities are to be constructed/installed in the area as per the layout provided, some difficulty during installation might be encountered due to the presence of dolerite boulders on surface and within the sub-surface soils as encountered during the geotechnical investigation.

6 ASSESSMENT OF POTENTIAL IMPACTS

6.1 Impact Evaluation methodology

The purpose of impact assessment is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The potential environmental impacts were identified based on the nature of the receiving environment, a review of the proposed activities, and the issues raised in the public participation process.

The potential impacts of the proposed development were identified through a site visit, the Environmental Assessment Practitioners experience and expertise in the field and specialist study reports. In the Basic Assessment Report, the potential impacts are broadly identified and outlined. An assessment of the potential impacts is provided, identifying the impacts that are potentially significant and recommending management and mitigation measures to reduce the impacts. In general, it is recognized that every development has the potential to pose various risks to the environment as well as to the residents or businesses in the surrounding area. Therefore, it is important that these possible risks are taken into account during the pre-construction phase of the development.

In accordance with the requirements from the EIA Regulations 2014 GN 982, Regulation 19 (3) and as set out in Appendix 1, the following impacts of the issues identified through the basic assessment phase were assessed in terms of the following methodology. All impacts are assessed according to the following criteria.

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
 - * The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate with
 - * a score of 1 being site specific,
 - * 2 = local (site + immediate surrounds),
 - * 3 = regional (the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns) ,
 - * 4 = national and
 - * a score of 5 being international (where the impact has international ramifications that extend beyond the boundaries of South Africa).
- The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * Medium-term (5–15 years) – assigned a score of 3;
 - * Long term (> 15 years) - assigned a score of 4; or;
 - * Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease); and
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);

- * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
-
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
 - The **status**, which is described as positive, negative or neutral.
 - The degree to which the impact can be reversed.
 - The degree to which the impact may cause irreplaceable loss of resources.
 - The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M) P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

- **< 30 points: Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30-60 points: Medium** (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **>60 points: High** (i.e. Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.).

6.2 Alternatives Assessment

As there have been no identified highly environmental sensitivities on the property, no design alternatives have been considered. The proposed design maximises the school layout in terms of the site footprint. However technology alternatives have been considered. The consideration of such alternatives is to include the option of achieving the same goal by using a different method or process (e.g. to reduce resource demand and increase resource use efficiency.) In a building type development, technology could be applied to enhance energy efficiency, water saving, waste management etc, depending on the nature and scale of the development.

The development area of the two alternative technology of the same type of vegetation, and do not differ in any significant way as far as the impacts on ecology is concerned. Therefore, there is no significant difference in the potential impacts associated with the alternatives, and the impacts for **the technology alternatives considered are not comparatively assessed** in the assessment tables below.

6.3 Description and assessment of issues and potential impacts

The sections which follow provide a summary of the findings of the assessment of potential impacts associated with the construction and operation of the proposed construction of *the Inkosi Mkhuphukeli High School*. The assessment of potential issues presented in this chapter has involved key input from specialist consultants, the public and the project proponent. Issues were assessed in terms of the criteria detailed in section 6.1. The nature of the potential impact is discussed, and the significance is calculated with and without the implementation of mitigation measures. Recommendations are made regarding mitigation/enhancement and management measures for potentially significant impacts and the possibility of residual and cumulative impacts are noted.

6.3.1 Potential Impacts on Vegetation

Vegetation: The following broad vegetation groups are found within the study area:

- Modified vegetation;
 - Modified and built-up
 - Modified and cultivated
- *Vachellia tortilis* secondary woodland; and
- *V. tortilis-Commicarpus pentandrus* vegetation

Vegetation Sensitivity: Vegetation of conservation importance were classified based on the findings of the study and the criteria as listed in Appendix E1. The sensitivity analysis results were classified as per Table 6.1, geographically represented in **Figure 6.1** and discussed below.

Table 1.1: Scoring of vegetation that occur within the sites

Broad vegetation community	Conservation Status of regional Vegetation*	Predominant state	Protection by legislation/ policies	Plants of conservation concern	Ecological Function	Conservation / Importance / unique habitat	Total Score out of max of 18	Importance and vulnerability
Modified	0	0	3*	1	1	1	6	Low -medium
<i>Vachellia tortilis</i> secondary woodland	0	1	0	1	2	2	6	Low -medium
<i>V tortilis-C pentandrus</i> vegetation	0	1	0	2	2	2	7	Medium

The sensitivity analysis results are discussed below and are geographically represented in **Figure 6.1**.

Medium sensitivity

The *Vachellia tortilis* -*Commicarpus pentandrus* vegetation is in a semi-natural state and supports the most indigenous species on the site. This is also the only habitat in which plant species of conservation concern has a likelihood of occurring. However, the vegetation does not contribute to the conservation of Thukela Bushveld Vegetation and are heavily grazed. It does play a role in conservation of the dispersive soils on the site and as buffer to the Tugela River and associated riparian vegetation. However, these functions can be mitigated, with the most important mitigation to prevent the spread of alien invasive species and to prevent erosion and edge effects into the riparian area.

Low-medium

The remainder of the vegetation on the site is of low-medium sensitivity. The vegetation is degraded and not representative of the Thukela Valley Bushveld. However, the cultivated areas are situated in moist soils along the drainage line which increases its sensitivity to development. Refer to the wetland assessment for the definitive buffer area around the drainage line and Tugela River.

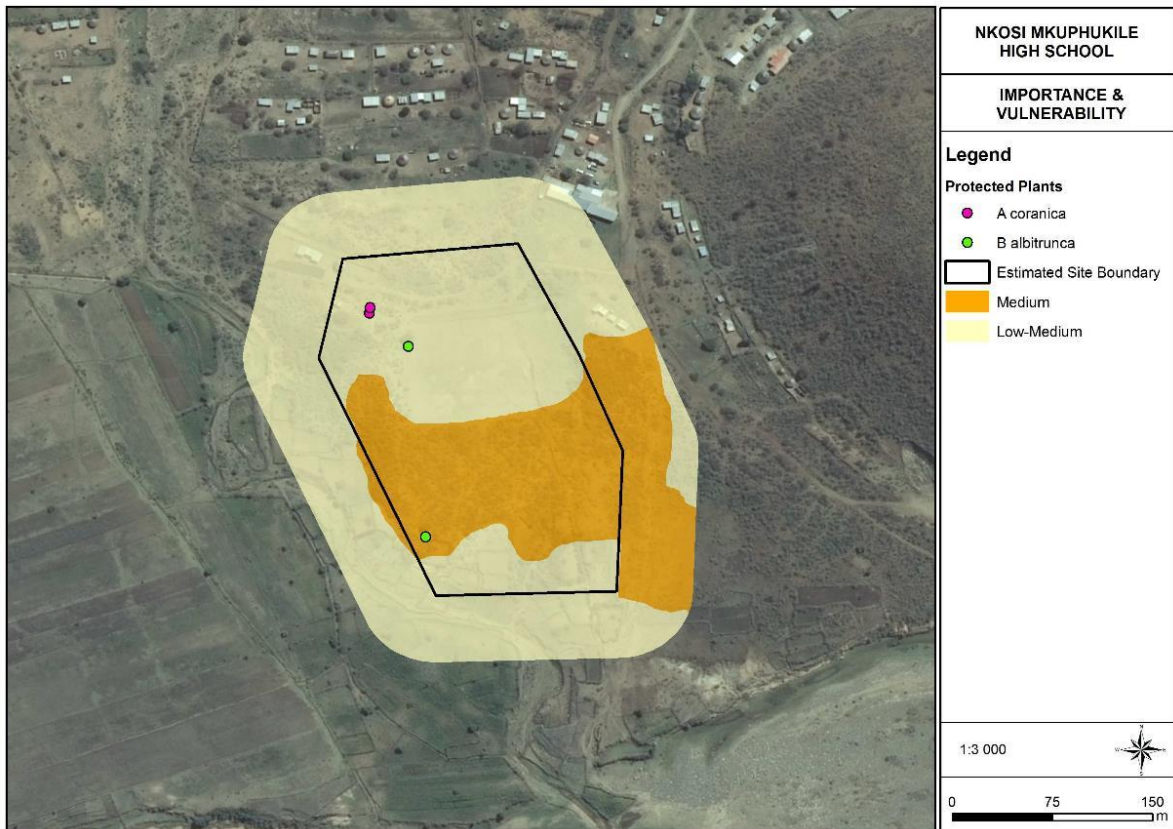


Figure 6.1: Sensitivity Map

Impact table summarising the significance of impacts on vegetation during the construction, operation phases (with and without mitigation)

a) Destruction of vegetation of low-medium and medium sensitivity

Nature: The development will require the removal of the vegetation on much of the site. It is further likely that edge effects from the development could degrade the adjacent vegetation or that construction camps are planned for such areas.

The sources of this impact could include:

- Clearing of and damage to vegetation in construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers;
- Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction.

	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Definite (5)	Definite (5)
Duration	Short term (2)	Short term (2)
Extent	Site and surrounds (2)	Site (1)
Magnitude	Moderate (6)	Low (4)
Significance	52 (medium)	24 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		

Probability	Probable (3)	Improbable (2)
Duration	Short term (2)	Very short (1)
Extent	Local area (2)	Limited to Site (1)
Magnitude	Moderate (6)	Low (4)
Significance	30 (medium)	12 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <p>Planning:</p> <ul style="list-style-type: none"> Plant the layout to retain the two large individuals of <i>Boscia albitrunca</i> on the site. Plan construction in the winter months when the chance for rainfall is low and erosion of the dispersive soils low. Limit the amount of vegetation to be removed and leave as many large, indigenous trees intact as possible. Formalise the stormwater from the D1275 road north of the site, to prevent erosion on the site. <p>Construction:</p> <ul style="list-style-type: none"> An independent Ecological Control Officer (ECO) should be appointed to oversee construction. A temporary fence or demarcation must be erected around the construction area to prevent access to adjacent vegetation. Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area or any natural areas outside of the construction footprint. No open fires are permitted within naturally vegetated areas. No wood or plant species may be collected from the area. Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes which could erode. Only remove vegetation where necessary and retain vegetation in place for as long as possible prior to removal. No activities should take place during rainy events and at least 2 days afterwards. Where topsoil needs to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation and school gardens where applicable. Maintain site demarcations in position until the cessation of construction work. After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. <p>Operational:</p> <ul style="list-style-type: none"> Rehabilitate construction camps and any other vegetation that was impacted on by the construction by using indigenous species naturally occurring in the area. Delay the re-introduction of livestock (where applicable) to all rehabilitation areas until an acceptable level of re-vegetation has been reached. The school should be fenced from the drainage line and the Tugela River to prevent edge effects. Ensure that maintenance work does not take place haphazardly, but according to a fixed plan. Staff, children, workers and community members may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. Address erosion donga crossings, applying soil erosion control and bank stabilisation procedures as specified by the ECO. <p>Cumulative impacts:</p> <ul style="list-style-type: none"> Degradation of surrounding vegetation, erosion and siltation of the Tugela River. <p>Residual Risks:</p> <ul style="list-style-type: none"> Localised alteration of soil surface characteristics and loss of flora. Increase of disturbance footprint in remnant grasslands The colonisation of the disturbance footprint by alien invasive plant species. Loss of plant species of conservation concern. 		

b) Degradation of watercourse vegetation

Nature: The construction will likely require the removal or of vegetation in proximity to the drainage line that flows west of the site. Although the vegetation is disturbed and cultivated, it plays a role in soils stabilisation. Construction could also result in pollution of the watercourse.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Probable (3)	Probable (3)
Duration	Long-term (4)	Short-term (2)
Extent	Limited to site and surrounds (2)	Limited to site (1)
Magnitude	High (8)	Moderate (6)
Significance	42 (medium)	27 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (3)
Duration	Medium term (3)	Short term (2)
Extent	Limited to Local Area (2)	Limited to the Site (1)
Magnitude	Moderate (6)	Moderate (6)
Significance	33 (medium)	24 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	High	Moderate
Can impacts be mitigated?	Yes.	
<p><i>Planning Phase:</i></p> <ul style="list-style-type: none"> No activities may proceed within or in proximity to watercourses without a Water Use License permitting the activity. The layout of the proposed development should avoid the drainage line and buffer as recommended by the wetland specialist (Limosella Consulting,2020). No direct or indirect impacts may take place to the Tugela River and associated vegetation. <p><i>Construction Phase:</i></p> <ul style="list-style-type: none"> The watercourse and associated buffer zones should be fenced during the construction phase to prevent any human activity from encroaching into these areas, other than that which is essential to the construction. Monitoring of the fences is important to ensure no infringement of the fences occurs. Input of sediment during construction activities should be prevented at all cost. Mitigation for this potential impact includes establishment of vegetation as soon as possible after construction. Pollution of the surface and groundwater. Mitigation for this potential impact includes: <ul style="list-style-type: none"> In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately; Store all litter carefully so it cannot be washed or blown into the water course; Construction vehicles are to be maintained in good working order to reduce the probability of leakage of fuels and lubricants; A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas; Storage of potentially hazardous materials should be above any 100-year flood line or the functional wetland boundary (and its associated buffer zone). These materials include fuel, oil, cement, bitumen etc.; Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; Concrete is to be mixed on mixing trays only, not on exposed soil; Concrete and tar shall be mixed only in areas which have been specially demarcated for this purpose; After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved dumpsite; All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring; Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage; Under no circumstances may ablutions occur outside of the provided facilities; and 		

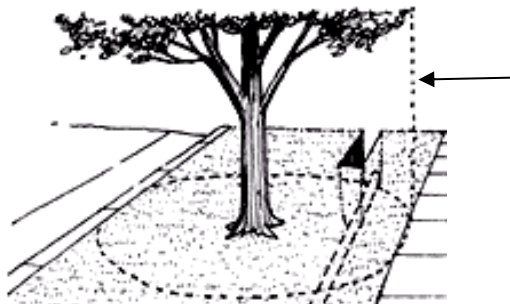
<ul style="list-style-type: none"> ○ No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority. <p><i>Operational:</i></p> <ul style="list-style-type: none"> • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Ensure that the vegetation disturbed during construction is rehabilitated and <u>prevent the colonisation of the disturbed area by invasive alien plant species.</u> • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular and pedestrian access until such time that rehabilitation was successful. <p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Loss of functionality of the vegetation within the drainage line, as well as erosion due to edge effects. <p>Residual Risks:</p> <ul style="list-style-type: none"> • Erosion, pollution of the watercourse and invasion by alien invasive plant species.

c) Destruction of protected plants and trees

Nature: The layout plan could lead to the removal of provincially and nationally protected species.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Probable (3)
Duration	Permanent (5)	Short-term (2)
Extent	Limited to site (1)	Limited to site (1)
Magnitude	Moderate (6)	Low (4)
Significance	48 (medium)	21 (low)
Status (positive or negative)	Negative	Positive only if species are relocated or avoided and protected
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Short term (2)	Very short term (1)
Extent	Limited to Site (1)	Limited to the Site (1)
Magnitude	Moderate (6)	Low (4)
Significance	27 (low)	12(low)
Status (positive or negative)	Negative	Positive
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	low	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<i>Planning:</i>		
<ul style="list-style-type: none"> • Plan the layout to avoid the two large individuals of <i>Boscia albitrunca</i> (coordinates given in Appendix C). If these trees must be removed, it can only be done once a permit from the KZN forestry department has been issued for its removal. • The provincially protected <i>Ammocahris coranica</i> might need to be relocated. Even if the layout is amended to accommodate these species, they may be trampled on during construction or during the operational phase. It is thus recommended to relocate these species to the school gardens or portion of the school grounds, where they can grow in similar conditions as from where they were removed. • Ideally, an on-site ecologist should be present when excavation takes place to ensure that any species not identified during this phase, are protected from destruction. Note that the <i>Ammocahris</i> species could be dormant in winter. Coordinates of the small population on site is given in Appendix C. • Plant to relocate the <i>Aloe marlothii</i>, including its roots, prior to construction and replant in the school gardens. Although not protected, these succulents can easily be replanted and will maintain species diversity on the school grounds. 		

Construction:

- If the *Boscia albitrunca* remain *in situ*, the trees must be protected from construction activities:
 - Educate all workers on which trees may **not** be removed and mark and fence these trees to prevent removal.
 - Avoid physical damage to the trees (above mentioned fence, implemented about a 2m around the tree should be able to protect the trees).
 - Trees could fall if the structural roots were damaged by digging activities (e.g. foundations) causing damage to property and persons. Prevent digging within the dripline of the trees



Drip line (width of tree canopy on the ground)

- Tree roots damaged by digging trenches must be treated with an appropriate fungicide or sealant, in accordance with manufacturers specifications.
 - No topsoil should be store against tree trunks.
 - Rubble and toxic waste must not be left near trees.
 - Contractors must prevent root zone compaction, mechanical damage to trunks and branches and chemical spillage around the tree roots.
- Remove the *Ammocharis* species prior to clearing of vegetation and on-site activities. Dig out the whole bulb and roots, being careful not to damage the plant. These could be kept in pots or nursery bags and be replanted as part of rehabilitation, or within the school gardens where they will only receive summer rainfall, no irrigation.

Operational:

- Prevent operational activities from damaging the *B albitrunca* trees, as well as relocated species.
- The relocated species could be irrigated once transplanted. However, the plants should not be irrigated once established.

Cumulative impacts:

- If mitigation measures are adequately implemented, no cumulative impacts are expected.

Residual Risks:

- Edge effects from construction and the development.

d) Potential increase in invasive vegetation

Nature: The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site

	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Probable (3)
Duration	Long-term (4)	Short-term (2)
Extent	Local Area (2)	Site bound (1)
Magnitude	High (8)	Low (4)
Significance	56 (medium)	21 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Highly probable (4)	Improbable (2)
Duration	Long term (4)	Short term (2)
Extent	Limited to Local Area (2)	Limited to the Site (1)

Magnitude	High (8)	Low (4)
Significance	56 (medium)	14(low)
Status (positive or negative)	Negative	Positive removal of such species
Reversibility	Moderate	High
Irreplaceable loss of resources?	High	Moderate
Can impacts be mitigated?	Yes	
<p>Mitigation: <i>Construction:</i></p> <ul style="list-style-type: none"> • Alien invasive species, in particular category 1b and category 2 species that were identified on site must be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. • All alien seedlings and saplings must be removed as they become evident for the duration of construction. • All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. • If filling material is to be used, this should be sourced from areas free of invasive species. <p><i>Operational:</i></p> <ul style="list-style-type: none"> • Only use indigenous species for rehabilitation. • Remove alien invasive species from the disturbance footprint as soon as they become apparent. <p>Cumulative impacts: Several invasive species are present within the area that the proposed development is situated in. Therefore, if mitigation measures to limit and prevent the spread of alien species are not implemented, the cumulative impact could lead to remaining natural vegetation transformed by alien plant species.</p> <p>Residual Risks: Re-infestation in areas initially cleared.</p>		

6.3.2 Potential Impacts on Wetlands

Watercourse Delineation: Two watercourse were recorded in close approximate to the study site (**Figure 6.2**). These include the perennial Tugela River and a non-perennial ephemeral stream. None of the watercourses are located on the proposed study site, although the buffer zone of the non-perennial ephemeral stream encroaches onto the study site in the south west corner (Figure 6.2). The school is however expected to have a small footprint and can therefore be expected to have minimal impact on the watercourse. An understanding of the potentially high floodpeaks of both the ephemeral stream and the Tugela River should be taken into account when completing the design of the infrastructure. It is therefore important to determine the 1:100 floodlines prior to construction and to avoid these areas.

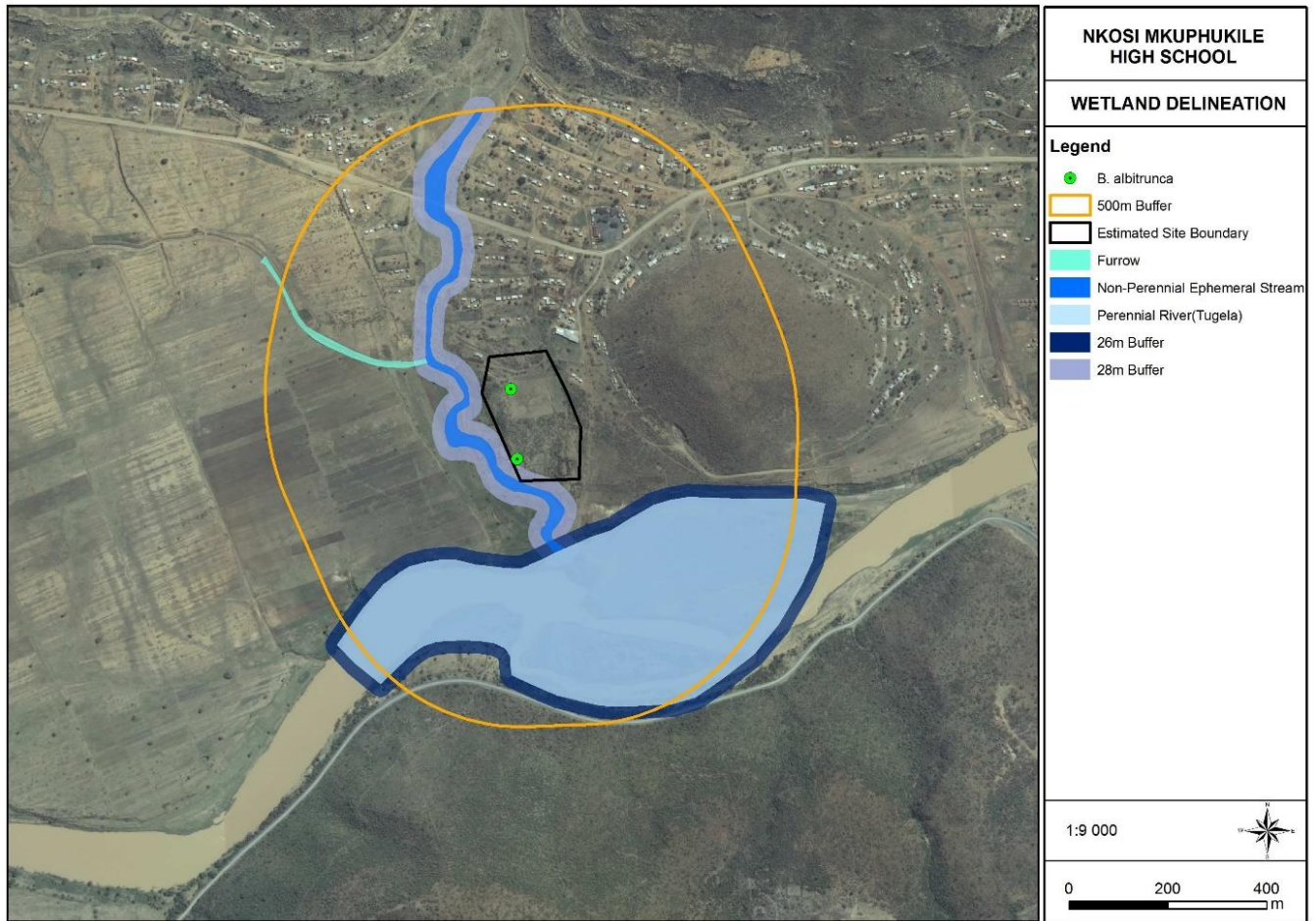


Figure 6.2: The watercourses associated with the study site and surroundings including buffer zones.

Watercourse Functional Assessment

The functional assessment was only done for the ephemeral stream which encroaches in a small section of the study site. The Perennial Tugela River is unlikely to be significantly impacted given that mitigation measures are adhered to.

Impact table summarising the significance of impacts on wetlands during the construction, operation phases (with and without mitigation)

a) Changes in water flow regime impact ratings

Nature: Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows		
ACTIVITY: The sources of this impact include the compaction of soil, the removal of vegetation and surface water redirection during construction activities. Permanent changes to water flows may occur during the operational phase		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Limited to Local Area (2)	Limited to the local area (2)

Magnitude	High (8)	Low (4)
Significance	52 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Highly probable (4)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Limited to Local Area (2)	Limited to the local area (2)
Magnitude	High (8)	Low (4)
Significance	52 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place to prevent access to the adjacent portions of the watercourse. • Effective stormwater management and sediment control should be a priority during both construction and operational phase. This should be monitored as part of the EMP. • Effective culverts should be incorporated into the design of access roads • High energy stormwater input into the watercourses should be prevented at all cost. 		
Cumulative impacts: Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. It is very important that protective measures should be put into place and monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from stormwater or sediment input. Increases in stormwater flows will cause erosion downstream unless mitigated at the design level.		
Residual Risks: Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.		

b) Changes in sediment entering and exiting the system impact ratings

Nature: Changes in sediment entering and exiting the system.		
Activity: Changing the amount of sediment entering water resource and associated change in turbidity in the downstream Tugela River. Construction and operational activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity of the water. Possible sources of the impacts include:		
<ul style="list-style-type: none"> • Earthwork activities during construction • Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils. • Disturbance of soil surface • Disturbance of slopes through creation of roads and tracks adjacent to the watercourse • Erosion (e.g. gully formation, bank collapse) 		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Limited to Local Area (2)	Limited to the local area (2)

Magnitude	High (8)	Low (4)
Significance	52 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (3)	Limited to the local area (2)
Magnitude	Low (4)	Low (4)
Significance	30 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. Runoff from the construction area must be managed to avoid erosion and pollution. Implementation of best management practices Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction. Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. Monitoring should be done to ensure that sediment pollution is timeously dressed 		
Cumulative impacts: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.		
Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.		

c) Introduction and spread of alien vegetation impact ratings.

Nature: Introduction and spread of alien vegetation.		
Activity: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		

Probability	Probable (3)	Probable (3)
Duration	Medium-term (3)	Short duration (2)
Extent	Regional (4)	Local (2)
Magnitude	Low (4)	Low (4)
Significance	33 (moderate)	24 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (4)	Limited to Local Area (2)
Magnitude	Low (4)	Low (4)
Significance	33 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Weed control • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish. • Rehabilitate or revegetate disturbed areas 		
Cumulative impacts: Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.		
Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.		

d) Loss and disturbance of watercourse habitat and fringe vegetation impact ratings.

Nature: Loss and disturbance of watercourse habitat and fringe vegetation.		
Activity: Since the development footprint is removed from the watercourse, this potential impact is not likely to occur. Changes in management, fire regime and habitat fragmentation resulting from the proposed school may change biophysical processes that cause habitat degradation along the ephemeral stream.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Possible (2)	Improbable (1)
Duration	Medium-term (3)	Short term (2)
Extent	Local Area (2)	Local Area (2)
Magnitude	High (8)	Low (4)
Significance	26 (low)	8 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Possible (2)	Improbable (1)
Duration	Medium-term (3)	Short duration (2)

Extent	Local Area (2)	Local Area (2)
Magnitude	High (8)	Low (4)
Significance	26 (low)	8 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas • Operational activities should not impact on rehabilitated or naturally vegetated areas 		
Cumulative impacts: Expected to be moderate. May result in a high degree of irreplaceable loss of resources.		
Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.		

e) Changes in water quality due to pollution impact ratings.

Nature: Changes in water quality due to pollution.		
Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the watercourses and a reduction in watercourse function.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Probable (3)	Possible (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (3)	Local Area (2)
Magnitude	High (8)	Low (4)
Significance	42 (moderate)	18 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Highly probable (4)	Probable (3)
Duration	Medium-term (3)	Short Term (2)
Extent	Local Area (2)	Local Area (2)
Magnitude	High (8)	Low (4)
Significance	52 (moderate)	24 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	

Mitigation:

- Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.
- Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.
- The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.
- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use.
- Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer.
- Control waste discharges and do not allow dirty water from operational activities to enter the watercourse
- Treatment of pollution identified should be prioritized accordingly.

Cumulative impacts: Expected to be moderate. Once in the system it may take many years for some toxins to be eradicated.

Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.

6.3.3 Potential Impacts on Cultural Heritage & Archaeology

Heritage survey: The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a very limited pre-colonial (Stone Age) occupation. The second and much later component is a colonial (farmer) one, with a very limited urban component consisting of a number of smaller towns, most of which developed during the last 120 years or less.

Identified sites

- Single MSA point was recorded while walking across the proposed development site. The material used is hardened shale. Overall, single chance finds occur very sporadically throughout the area, although it seems as if it is more located in small streambeds where it has been washed down as a result of flash floods.
- An area where some undecorated potsherds are eroding out. No other feature, i.e. structure, midden, etc. could be identified in the immediate vicinity. None of the pottery is decorated, apart from one piece that has a polished red sheen to it. This makes the identification and dating of this material difficult. However, it is possible that this site might predate the more recent agricultural activities in the area. It is also possible that it might be linked to the site with vitrified dung, i.e. possible cattle byre, in the record below.
- An area where pieces of vitrified dung is exposed. On Iron Age sites this usually happens when a cattle/goat byre is exposed to intense heat until the dung is liquidized, after which it is cooled down rapidly to a near glass-like substance. No other feature, i.e. structure, midden, etc. could be identified in the vicinity. Also, important to remember, in case in the past people were buried in cattle byres. It is possible that this site might predate the more recent agricultural activities in the area. It is also possible that it might be linked to the site with pottery, see above.
- Informal burial site with only two graves, both marked only with stone cairns. These graves probably originated from people that worked/lived here.

Areas of sensitivity has been determined for the sites without definite boundaries and are presented in **Figure 6.3**

- Pottery occurrence = 340 m²
- Vitrified dung = 400 m²

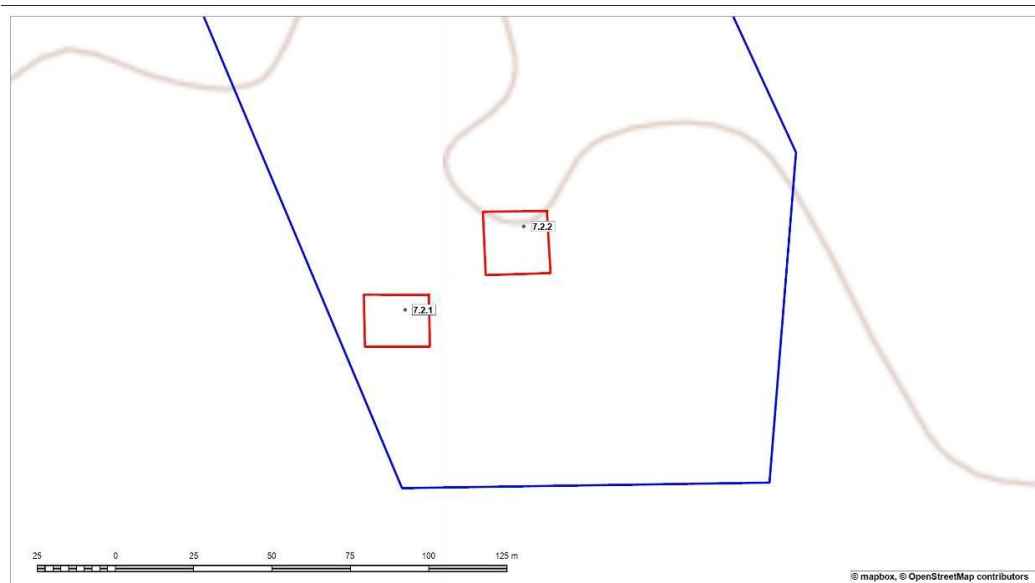


Figure 6.3: Map indicating the areas of sensitivity

Impact table summarising the significance of impacts on Heritage during the construction, operation phases (with and without mitigation).

a) Destruction & damage of Identified Heritage Resource: Stone Ages tools – 7.1.1

Nature: Chance find Stone Age material: These features are rated to have low significance due to their low numbers as well as the fact that the area has already extensively been disturbed by surface interference.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Extent	Minor (2)	Minor (2)
Magnitude	Probable (3)	Improbable (2)
Significance	10 (low)	4 (low)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Possible (2)	
Duration	Short term (2)	
Extent	Local (2)	
Magnitude	Low (4)	
Significance	16 (low)	
Status (positive or negative)	Negative	
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

<p>Mitigation:</p> <ul style="list-style-type: none"> Avoidance of site Chance find stone tools: No further action required, they are seen to be fully recorded after having been included in this report.
<p>Cumulative impacts:</p> <p>Limited loss of similar features in the larger landscape.</p>
<p>Residual Impacts:</p> <p>Depleted archaeological record.</p>

b) The destruction & damage of identified heritage resource: Archaeological site – 7.2.1

<p>Nature: Site with surface scatter of pottery. This site is located inside the study area and therefore there is a high likelihood that it would be impacted on by the proposed development.</p>		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Improbable (2)
Duration	Permanent (5)	Permanent (5)
Extent	Site (1)	Site (1)
Magnitude	Moderate (6)	Minor (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Possible (2)	
Duration	Short term (2)	
Extent	Local (2)	
Magnitude	Low (4)	
Significance	16 (low)	
Status (positive or negative)	Negative	
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> Full documentation Pottery site: Archaeological investigation: <i>Due to the lack of sufficient material visible on the surface of this site, it is advised that an archaeologist should be present if and when excavation activities for the school takes place in this area.</i> 		
<p>Cumulative impacts:</p> <p>Loss of information regarding settlement in the region.</p>		
<p>Residual Impacts:</p> <p>Depleted archaeological record.</p>		

c) The destruction & damage of identified heritage resource: Archaeological site – 7.2.1

<p>Nature: Site with surface scatter of vitrified dung. This site is located inside the study area and therefore there is a high likelihood that it would be impacted on by the proposed development.</p>		
	Without mitigation	With mitigation

CONSTRUCTION PHASE		
Probability	Highly probable (4)	Improbable (2)
Duration	Permanent (5)	Permanent (5)
Extent	Site (1)	Site (1)
Magnitude	Moderate (6)	Minor (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Possible (2)	
Duration	Short term (2)	
Extent	Local (2)	
Magnitude	Low (4)	
Significance	16 (low)	
Status (positive or negative)	Negative	
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Full documentation • Cattle byre: Archaeological investigation: Due to the lack of sufficient material visible on the surface of this site, it is advised that an archaeologist should be present if and when excavation activities for the school takes place in this area. 		
Cumulative impacts:		
Loss of information regarding settlement in the region.		
Residual Impacts:		
Depleted archaeological record.		

d) The destruction & damage of identified heritage resource: Burial site – 7.3.1

Nature: Informal burial site with two graves. This site is located inside the study area and therefore there is a high likelihood that it would be impacted on by the proposed development.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	Highly probable (4)	Improbable (2)
Duration	Permanent (5)	Permanent (5)
Extent	Site (1)	Site (1)
Magnitude	Moderate (6)	Minor (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Possible (2)	
Duration	Short term (2)	
Extent	Local (2)	
Magnitude	Low (4)	
Significance	16 (low)	
Status (positive or negative)	Negative	
Reversibility	No	

Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • <u>Avoidance/Preserve:</u> Because of its location inside the project development area, it would be impacted on. If it can be retained in its current location, it should be fenced off at least for the duration of construction activities. It is recommended that a buffer zone of 10m is created around the graves by means of a wire fence or, alternatively, with danger tape as a more temporary measure. • <u>Relocation of graves:</u> If the former is not possible, the graves should be relocated after proper procedures have been followed. 		
Cumulative impacts:		
Limited loss of similar features in the larger landscape.		
Residual Impacts:		
Depleted archaeological record.		

6.3.4 Potential Impacts on Palaeontology

The Ecca Group is rich in plant fossils such as the Glossopteris flora represented by stumps, leaves, pollen and fructifications. Fossils are generally absent from the Pietermaritzburg Formation although trace fossils have been recorded from the upper layers. This property is quite small and it was possible to walk the entire property. The property is surrounded by informal housing and the river to the south. It is a disturbed soccer field with scattered boulders and vegetation surrounding it. No fossils were found. The northern part of the block will be used for the buildings and the southern part for sports (recreation). The Project includes with a **MODERATE** sensitivity:

Impact table summarising the significance of impacts on Palaeontology during the construction, operation phases (with and without mitigation).

a) The destruction, disturbances and damage to sediments

Nature: Possible loss of Quaternary soils (topsoil resources), disturbance of intact sediments during the construction of access roads.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	probable3)	improbable (2)
Duration	Permanent (2)	Permanent (1)
Extent	short duration r (2)	very short duration (1)
Magnitude	high (8)	high (8)
Significance	36 (medium)	20 (low)
Status (positive or negative)	probable3)	improbable (2)
OPERATIONAL PHASE		
Probability	improbable (2)	Possible (2)
Duration	Permanent (1)	Short term (2)
Extent	very short duration (1)	Local (2)
Magnitude	high (8)	Low (4)
Significance	20 (low)	16 (low)

Status (positive or negative)	Negative	
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Mitigation:		
The development footprint is situated on the Masotcheni Formation (Qm) of Quaternary age with a moderate palaeontological sensitivity. The Nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact. The probability of the impact occurring will be local and site specific. The expected duration of the impact is assessed as potentially permanent. Only the site will be affected. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. With Mitigation the impact will be low and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur but are regarded as having a minor possibility. The significance of the impact occurring will be low.		
Cumulative impacts:		
Low. Surrounding areas with a Very High Palaeontological sensitivity, but likelihood of intruding is Low.		
Residual impacts:		
Low. Fossils occur random throughout geological layers. Likelihood of fossils occurring is Low.		

6.3.5 Potential Impacts on soil and groundwater contamination

Impact table summarising the significance of impacts on Groundwater Contamination during the construction, operation phases (with and without mitigation).

a) Potential soil and groundwater contamination

Nature: Potential soil and groundwater contamination		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Probability	probable ³)	improbable (2)
Duration	Permanent (2)	Permanent (1)
Extent	short duration r (2)	very short duration (1)
Magnitude	high (8)	high (8)
Significance	36 (medium)	20 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Not Applicable as the facility is a School, it is predicted that little to no hazardous substances will be located or used on site during operational phase.	
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Reversibility	No	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

The following should be taken into consideration.

- If this is a sealed system and if properly maintained then there should be no leakage from the system to contaminate the ground and/or groundwater.
- During installation it should be borne in mind that the are clayey and potentially expansive. Thus, when the soils wet up, swell pressures could develop on pipes etc. that could potentially cause damage and subsequent leakage to the pipes/system.
- The system should be well maintained, i.e. not be allowed to overflow and be vandalized.
- Bear in mind that if the ablution facilities are to be constructed/installed in the area as per the layout provided, some difficulty during installation might be encountered due to the presence of dolerite boulders on surface and within the sub-surface soils as encountered during the geotechnical investigation.

Cumulative impacts:

none

Residual impacts:

none

6.3.6 Other Potential Impacts

Other potential impacts associated with the project includes the following:

- Visual impacts
- Noise impacts
- Traffic impacts
- Socio-economic impacts

These impacts are summarised in the following section

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
b) VISUAL IMPACTS				
<p>Direct Impacts:</p> <ul style="list-style-type: none"> Pollution may occur due to the littering and illegal dumping on the site and surrounding areas which can affect the visual character of the site. 	Medium	<ul style="list-style-type: none"> Ensure that no litter, refuse, waste, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent or surrounding properties including road verges, roads or public places and open spaces during or after the construction period. All waste/litter/rubbish etc. must be disposed of at an approved dumping site as approved by the Council. Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area; The landscape must be rehabilitated in such a way that it corresponds to the surrounding topography; Manage construction activities in accordance with the accepted/ approved construction EMPr. Screen Construction site from neighbouring area by means of a fence and opaque cover/sheeting Ensure appropriate housekeeping No construction rubble, construction material, refuse, litter or any other material not found naturally in the surroundings should be allowed at any time to be lying around on the construction site 	Low	Medium
<p>Indirect impacts: None</p>				
<p>Cumulative impacts: As more development establish in the area there will be a change in the visual character of the area from agriculture use to mixed land use.</p>				
c) NOISE IMPACTS				
<p>Direct Impacts:</p> <ul style="list-style-type: none"> Increase in noise pollution due to, among others, excavations and site clearing, noise from construction vehicles and construction staff and or drilling activities. Noise pollution caused during construction could potentially be a nuisance to neighbouring residential areas. 	Low	<ul style="list-style-type: none"> Construction activities must be limited to normal working hours and according to municipal bylaws, i.e. working hours must be limited to weekdays only. If construction is required on the weekend; permission from adjacent landowners will be required prior to construction. No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc) must be used as per operating instructions and maintained properly during site operations. Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. Introduce a formal recording system/grievance mechanism to capture public perceptions and complaints with regard to noise impact. 	Low	Medium
<p>Indirect impacts: None</p>				
<p>Cumulative impacts: As more development establish in the area there is a possibility that the ambient noise levels may change from that of agriculture/residential area to mixed use developed area.</p>				

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
d) TRAFFIC IMPACTS				
<p>Direct Impacts:</p> <ul style="list-style-type: none"> ○ Anticipated impact on traffic owing to construction vehicles and heavy vehicles delivering materials to the site. ○ Traffic congestion in and around the area may offend neighbouring property owners during the construction phase. 	Medium	<ul style="list-style-type: none"> ● Construction vehicles are not to be parked on the roads thereby blocking the way to the neighbouring properties. ● Clear signs should be displayed and entrance to the site indicating a construction site and turning construction vehicles. ● Construction vehicles are to avoid main roads during peak traffic hours and mitigation measures outlined in the EMPr are to be implemented. ● Ensure an appropriate access procedure to avoid backlog of traffic at the entry point to the site 	Low	Low
<p>Indirect impacts: None</p>				
<p>Cumulative impacts: Possible traffic congestion or delays if no mitigation measures are implemented</p>				
e) SOCIAL ECONOMIC IMPACTS (positive)				
<p>Direct Impacts</p> <ul style="list-style-type: none"> ● Direct employment opportunities for locals ● Skills development through the facility for those employed on site ● Improved infrastructure in the area ● Better learning facilities for learners 	Low	<p>Enhancement:</p> <ul style="list-style-type: none"> ○ It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labour force. ○ Training and skills development programmes should be provided to all employees. ○ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. 	Medium	None, it is a positive impact
<p>Indirect impacts: Creation of safe and secure school environment for learners in the area</p>				
<p>Cumulative impacts: Possible economic boost</p>				

6.4 No-Go Alternative Assessment

The No-go option implies that the Project does not proceed, and will thus comprise of the KZN Dept of Education not going ahead with the construction of the new Inkosi Mkhuphukeli Secondary School. Ideally this would be the preferred alternative as the status quo of the environment remains unchanged, however due to the growing demand for education facilities in the area, this alternative is not feasible. Although the no-go alternative has been considered, it is not a practical project alternative in terms of providing stable service delivery supply in the area as it implies a continuation of the current situation or the status quo; therefore, it doesn't render any positive outcomes.

6.5 Assumptions and Gaps in Knowledge

- All information provided by Rantech Africa (Pty) Ltd to the EAP was correct and valid at the time it was provided.
- The EAP does not accept any responsibility in the event that additional information comes to light at a later stage of the process.
- All data from unpublished research is valid and accurate.
- The scope of this investigation is limited to assessing the potential environmental impacts associated with the school.

7 CONCLUSIONS AND RECOMMENDATIONS

The previous chapters of this report together with the **specialist studies** contained within **Appendix E** provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the Basic Assessment Report for the proposed project by providing a summary of the conclusions of the assessment of the proposed powerline. In so doing, it draws on the information gathered as part of the BA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project. Potential impacts which could occur as a result of the proposed project are summarised in the sections which follows.

7.1 Summary of impacts

Summarised Findings of the Specialist Studies:

Vegetation: The remainder of the vegetation on the site is of low-medium sensitivity. The vegetation is degraded and not representative of the Thukela Valley Bushveld. However, the cultivated areas are situated in moist soils along the drainage line which increases its sensitivity to development. Refer to the wetland assessment for the definitive buffer area around the drainage line and Tugela River. Due to the largely modified state of the vegetation and the lack of plant species of conservation concern on the site, the proposed development will not impact significantly on threatened or sensitive vegetation and mitigation measures can be implemented to limit edge effects, particularly on the riparian vegetation and Tugela River. In addition, the nationally protected tree *Boscia albitrunca* should be conserved in situ if possible, while the provincially protected *Ammocharis coranica* can be relocated to suitable habitat on the school grounds or within gardens. It is also recommended that the large *Aloe* individuals on site be retained or moved to the school grades and rehabilitated areas.

Wetland: Two watercourses were recorded in close proximity to the study site. These include the perennial Tugela River and a non-perennial ephemeral stream. None of the watercourses are located on the proposed study site, although the buffer zone of the non-perennial ephemeral stream encroaches onto the study site in the south west corner. The school is however expected to have a small footprint and thus can be expected to have minimal impact on the watercourse. Cognisance of the floodpeaks of both the ephemeral stream and the Tugela River should be taken into account when completing the design of the proposed school infrastructure. It is important to determine the 1:100 floodlines prior to construction and avoid these areas.

Heritage: The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a very limited pre-colonial (Stone Age) occupation. The second and much later component is a colonial (farmer) one, with a very limited urban component consisting of a number of smaller towns, most of which developed during the last 120 years or less.

Identified sites

- Single MSA point was recorded while walking across the proposed development site. The material used is hardened shale. Overall, single chance finds occur very sporadically throughout the area, although it seems as if it is more located in small streambeds where it has been washed down as a result of flash floods.
- The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.

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From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures above and the conditions proposed below.

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the study area has a moderate sensitivity of fossil remains to be found and therefore a desktop palaeontological required.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Paleo: a. There is no objection to the development, but it was necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study to determine whether the development will affect fossiliferous outcrops as the palaeontological sensitivity is **Moderate**. A Phase 2 Palaeontological Mitigation is only required if the Phase 1 Palaeontological Assessment identified a fossiliferous formation or surface fossils or if fossils are found during construction. The Protocol for Finds and Management Plan is attached (Appendix E4) for the ECO. b. This project will benefit the environment, economy, and social development of the community. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting SAHRA must be notified. All construction activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures.

Geotech: It is recommended that the foundation excavations for each structure be inspected by a competent person during construction in order to verify that the materials thus exposed are not at variance with those described in the report and that it meets design criteria. The existing drainage/erosion “**gullies**” on and in close proximity to the site and/or structures should be rehabilitated prior to construction and storm water run-off should be diverted around the site. The proposal is to install a VIP Ablution System at the school. The Department is concerned about the potential impact that this system will of might have on the underground water. From a geotechnical perspective the following should be taken into consideration. • If this is a sealed system and if properly maintained then there should be no leakage from the system to contaminate the ground and/or groundwater.

A summary of the impact assessments is presented in **Table 7.1**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (i.e. the weighted score is the average of each of the individual scores). The impact scores are also colour coded according to the following:

< 30	Low significance
30 to 60	Moderate significance
>60	High significance

It must be noted that the impact scores in **Table 7.1** below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development

Table 7.1: Impact Summary table

CONSTRUCTION PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
Destruction of vegetation of low-medium and medium sensitivity	Medium	Low
Degradation of watercourse vegetation	Medium	Low
Destruction of protected plants and trees	Medium	Low
Potential increase in invasive vegetation	Medium	Low
Changes in water flow regime	Medium	Low
Changes in sediment entering and exiting the system	Medium	Low
Introduction and spread of alien vegetation	Medium	Low
Loss and disturbance of watercourse habitat and fringe vegetation	Low	Low
Changes in water quality due to pollution	Medium	Low
Destruction & damage of Identified Heritage Resource (Stone Ages tools)	Low	Low
Destruction & damage of Identified Heritage Resource (Burial site)	Medium	Low
The destruction, disturbances and damage to sediments (paleo)	Medium	Low
Potential soil and groundwater contamination	Medium	Low
Visual Impacts	Medium	Low
Noise Impacts	Low	Low
Traffic Impacts	Medium	Low
Social-Economic: Direct employment and skills development (Positive)	Low	Medium
OPERATIONAL PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
Destruction of vegetation of low-medium and medium sensitivity	Medium	Low
Degradation of watercourse vegetation	Medium	Low
Destruction of protected plants and trees	Low	Low
Potential increase in invasive vegetation	Medium	Low
Changes in water flow regime	Medium	Low
Changes in sediment entering and exiting the system	Medium	Low
Introduction and spread of alien vegetation	Medium	Low
Loss and disturbance of watercourse habitat and fringe vegetation	Low	Low
Changes in water quality due to pollution	Medium	Low
Destruction & damage of Identified Heritage Resource	Low	Low

Apart from the anticipated Construction phase impacts, which would be temporary (short-term duration), other impacts identified (including cumulative impacts) are associated with ecological aspects, waste and potential, but slight, increase in traffic volumes. Where impacts are unavoidable, they have been found to be of moderate to low significance according to the criteria used and furthermore, can be mitigated through appropriate design and effective implementation of the EMP. The only feature of significance would be the possible occurrence of buried heritage artefacts, graves or fossils, however mitigation measures through monitoring and recording have been proposed for any chance finds/discoveries.

Positive socio-economic impacts are associated with job creation which would materialise during the Construction phase, thus reducing the unemployment rate in the area and the creation of increased educational opportunities for learners within Ward 30.

The No-Go Alternative will result in the environment remaining as is with no construction of the School. Should the proposed development not proceed, the local community and its surroundings will not benefit from the positive impacts associated with the development. The No-Go Alternative conflicts with the Local Municipality's Strategic and Integrated Development Plans whereas the Preferred Alternative is aligned with the aforementioned as it proposes to address the needs of the local community by providing them with formal educational facilities.

7.2 Conclusion (Impact Statement)

The proposed construction of the school is an essential infrastructure for the community in terms of improved education facilities and indirectly employment opportunities in the local areas in which unemployment rates are high. The environmental attributes of the site are not such that the proposed development would have significant negative impacts. The proposed footprint is on an already transformed site within a high-density peri-urban built-up settlement. No direct impacts on biodiversity resources of significance are expected. No significant impacts to watercourses (and the associated habitats and freshwater biodiversity) are expected to occur. The proposed erven have been allocated for education purposes according to the municipal zoning plans. The proposal would result in optimal utilisation of the site with minimal adverse impacts on the ecological (natural) environment. Impacts on other aspects of the proposed project were also investigated and have been assessed, namely heritage, traffic and soil impacts. The impacts identified have been assessed and err on the conservative side.

The socio-economic benefits cannot be overlooked. A new and adequate learning facility for young learners will be provided along with the introduction of temporary jobs and skills development for the surrounding communities during construction. The project will provide 175 employment opportunities during the construction phase and a further 100 during the operational phase. General impacts such as noise and dust disturbance will be short term and low in impact. In terms of the long-term cumulative impact of the project, it will have an overall net positive effect due to the provision of better educational facilities which will enhance the education levels of children in the community.

The positive impacts (benefits) of the proposed development outweigh the negative impacts. Any negative impacts can be mitigated as per the proposed measures in this document and the EMPr (**Appendix F**). There is a social need and desirability for the development. The proposal is in line with social Infrastructure and services development strategies of the Local and District Municipalities and in particular with regards to providing pre-primary educational facilities.

Having assessed the impacts of the construction of the New Inkosi Mkhuphukeli Secondary School as summarised in **Table 7.1**, no environmental fatal flows and no significant negative impacts have been identified to be associated with the proposed development. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively **mitigated** to have a **low significance**. The significance levels of the majority of identified negative impacts (as shown in the environmental sensitivity map in **Figure 7.1**) can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr (**Appendix F**) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.. *The Site investigated is considered suitable for the proposed Nkosi Mkhupukeli Secondary School provided that the recommendations made in this report are implemented and/or adhered to.*

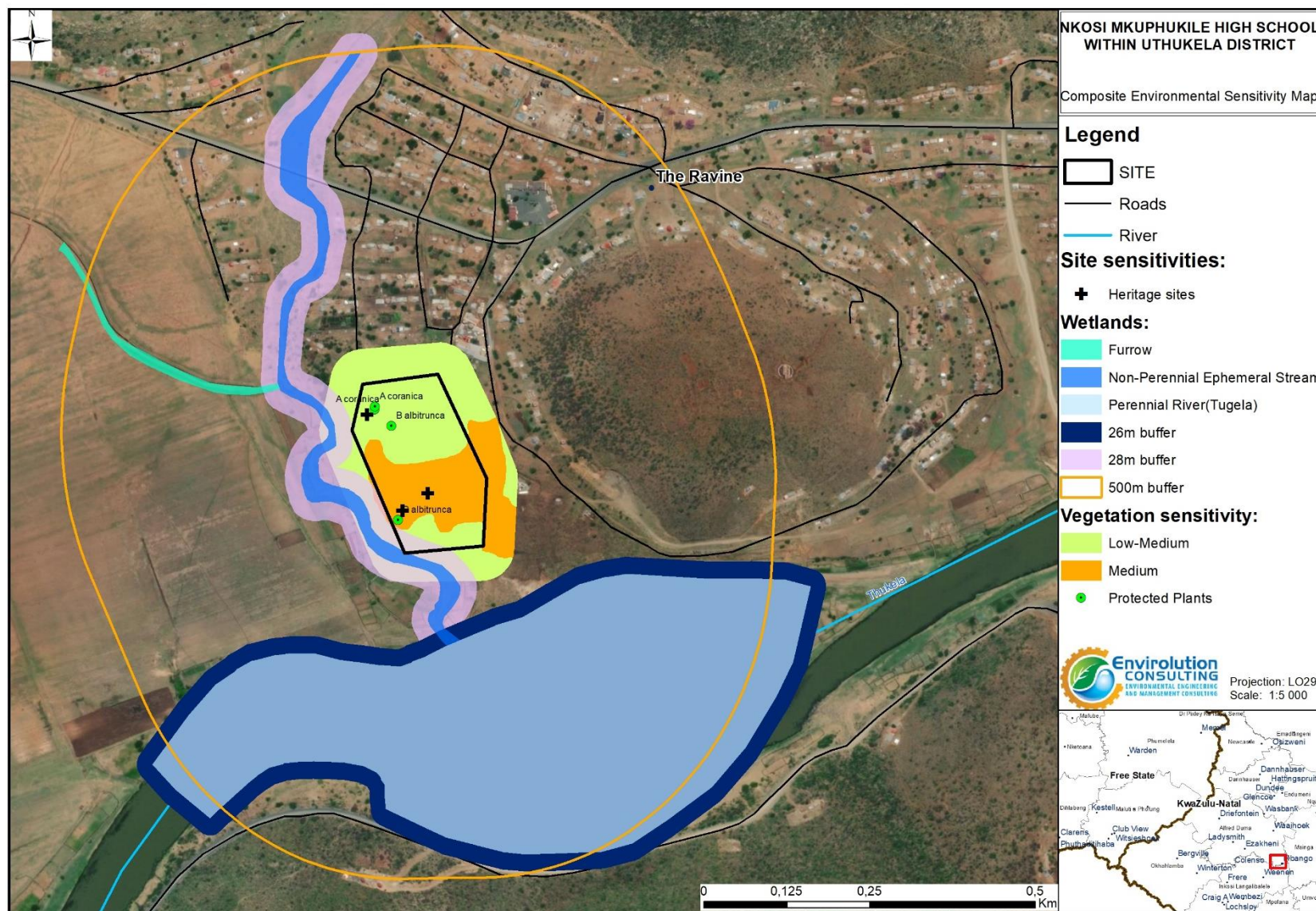


Figure 7.1: Combined environmental sensitivity (refer to Appendix A for A3 maps).

7.3 Recommendations

It is therefore, the EAP opinion that the project should be authorised, the findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.

The following conditions would be required to be included within an authorisation issued for the project:

- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- Formalise the stormwater from the D1275 road north of the site, to prevent erosion on the site. High energy stormwater input into the watercourses should be prevented at all cost.
- **Vegetation:** Plant the layout to retain the two large individuals of *Boscia albitrunca* on the site, the nationally protected tree *Boscia albitrunca* should be conserved in situ if possible, while the provincially protected *Ammocharis coranica* can be relocated to suitable habitat on the school grounds or within gardens. It is also recommended that the large *Aloe* individuals on site be retained or moved to the school grades and rehabilitated areas.
- **Wetlands:** Where watercourse crossings have been shown to be necessary it is important that appropriate mitigation measures (such as avoiding alignments that run parallel to wetlands and the placing pylons within wetland areas as far as possible) are put into place and carefully monitored to ensure minimal impact to regional hydrology
- **Heritage:** Should the informal burial site be retained in its current location; it should be fenced off at least for the duration of construction activities. It is recommended that a buffer zone of 10m is created around the graves by means of a wire fence or, alternatively, with danger tape as a more temporary measure. Should archaeologically sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
- **Paleo:** The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.
- **Geotechnical investigation:** It is recommended that the foundation excavations for each structure be inspected by a competent person during construction in order to verify that the materials thus exposed are not at variance with those described in the report and that it meets design criteria. The existing drainage/erosion "gullies" on and in close proximity to the site and/or structures should be rehabilitated prior to construction and storm water run-off should be diverted around the site.
- The developer should **obtain all necessary permits** from relevant authorities prior to the commencement of construction i.e. water use license & plant permits
- Creation of new access roads should be minimised as far as possible.
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended. On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.

- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
 - Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
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