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ENVIRONMENTAL MANAGEMENT FRAMEWORK FOR THE UMGUNGUNDLOVU DISTRICT MUNICIPALITY

Volume II: Environmental Sensitivity Zones & Assessment Guideline

JULY 2017

Institute of Natural Resources

FINAL ENVIRONMENTAL MANAGEMENT FRAMEWORK FOR THE UMGUNGUNDLOVU DISTRICT MUNICIPALITY

Volume II: Sensitivity Zones and Assessment Guideline

Prepared For

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EXECUTIVE SUMMARY

INTRODUCTION

The uMgungundlovu District Municipality (uMDM) has set as its long term vision the following: "*The uMDM will evolve into a dynamic metropolitan area, spreading its vibrant economic benefits to its citizens and places and will, through concerted integrated development and service delivery, realise improvement in the overall quality of life" (uMDM, 2016)*[1]

The uMDM has further adopted the seven strategic goals of the Provincial Growth and Development Plan (PGDP) to guide the District's response to key challenges to fulfilling this vision. These include "*Goal 5: Environmental Sustainability*". The vision and goals are further supported by five pillars that include the 3rd Pillar "*Balanced and sustainable development, green economy and a garden-city model that is in harmony with nature*".

The uMDM commissioned the development of a Strategic Environmental Assessment and Management Plan (SEA & SEMP)[2] to serve as a tool for giving effect to these environmental sustainability goals. The SEA & SEMP was completed in 2013. The uMDM together with the KwaZulu-Natal Department of Economic Development and Tourism (EDTEA) identified the need to build on the outcomes of the SEA & SEMP by translating the outcomes into an Environmental Management Framework (EMF).

PURPOSE OF AN EMF

The EMF Regulations of 2010 promulgated under the National Environmental Management Act (Act No 107 of 1998) defines an EMF as "*the study of the biophysical and sociocultural systems of a geographically defined area to reveal where specific land uses may best be practiced and to offer performance standards for maintaining appropriate use of such land".*

PURPOSE OF AN ENVIRONMENTAL MANAGEMENT FRAMEWORK

The EMF regulations, 2010 (Section 2) list the purpose of the regulation as: *Compilation of information and maps specifying the attributes of the environment in a particular geographical area:*

a) For such information to inform environmental management, and

b) For such maps and information to be used as environmental management frameworks in the consideration of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply.

Section 2 (3) further explains that EMFs are aimed at:

a) Promoting sustainability.

b) Securing environmental protection.

c) Promoting cooperative environmental governance.

[1]Integrated Development Plan for uMgungundlovu District Municipality. The Comprehensive 2017/12018 – 2021/22 Five Year IDP – 4th Generation. Accessed on 9 May 2017 from http://www.umdm.gov.za/Official_Site/index.php/idp/draft-comprehensive-idp-2017-2018-to-2021-2022

[2]Umgungundlovu District Municipality. December 2012. Strategic Environmental Assessment Report: for the Umgungundlovu District Municipality Strategic Environmental Assessment and Management Plan. Isikungusethu Environmental Services (Pty) Ltd and Zunckel Ecological and Environmental Services, Pietermaritzburg.

OVERVIEW OF THE EMF

The EMF study is comprised of several volumes and tools that fulfil the requirements of the EMF Regulations, 2010 and the purpose of the EMF. **This document is Volume II** in which environmental sensitivity zones are defined and guidance is provided on how they are considered in decision making within the environmental regulatory processes.

ENVIRONMENTAL SENSITIVITY

Four categories of sensitivity have been defined and mapped for each of the following environmental features identified as important to development decision making in the district.

4 Very high
3 High
2 Moderate
1 Low

- Flood Risk
- Wetlands
- Agricultural Resources
- Water Quality
- Water Production Areas
- Biodiversity
- Infrastructure Availability

The motivation for categorising the sensitivity categories and the methodology applied in mapping them is provided in specialist reports which are included as appendices. The report itself provides guidance as to where in the EIA process the information provided in this and accompanying Volumes is relevant in the EIA process.

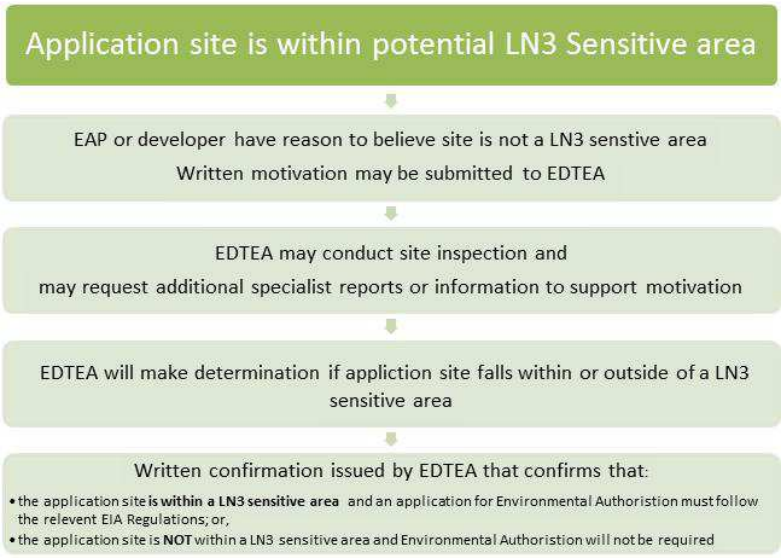
It then provides specific guidance for each environmental component in the form of:

- ***Status quo statement*** – the state of each component, the cause and the implications thereof.
- ***A sustainability objective*** - reflecting the desired future state, against which development planning and decision making should be guided or assessed against.
- ***Specific guidance as to the level of specialist investigation*** - required for each of the four sensitivity categories for each environmental component as well as the relevant method, tools and legislation.

The final focus of the guidance is on EIA: Listing Notice 3 activities triggered by the EMF sensitivity zones as summarized in the table below.

	Listing Notice 3 Activities		
	Map 1	Map 2	n/a
Environmental Constraint Layer	Activities: 1; 2; 3; 5; 8; 9; 11; 12; 13; 16; 20; 21; 24; 25	Activities: 4; 6; 7; 10; 17; 18; 19; 22	Activities: 14; 15; 23
High Biodiversity Area (CBA's and Agro-biodiversity zones)	No	Yes	No
Flood risk / Riparian Area (1:100 year flood risk area)	Yes	Yes	No
Wetland footprint and 32m buffer area	Yes	Yes	No

The aim of the EMF is to limit the number of EIA applications and streamline the process. In recognition of the limitations of certain data sets used to define the location and extent of these sensitive features, a screening process is provided as summarised below. Additional guidance is provided for each step in the screening process.



CONSTRAINT PATTERNS

Analysis of the individual sensitivity layers confirmed the following which are relevant in terms of presenting development constraints.

i. The ***District is endowed with valuable agricultural resources***. As emphasized in the SEA, these resources are not necessarily adequately valued in S.A. and the ongoing transformation of high potential agriculture land to other land-uses represents one the most significant sustainability issues in the Province. Consequently high value agricultural land represents a significant constraint to other land uses which will result in their permanent loss for agricultural production and grazing. These represent a high constraint to any other use with consequent requirements in the EIA process and various agricultural legislation (see Volume II), to confirm the agricultural value of the land in question.

ii. Large areas identified as of '***Very High' sensitivity for agricultural purposes are also deemed to be 'highly' sensitive from a biodiversity***.

iii. The untransformed areas noted in i and ii above are also critical from a water resources delivery point of view. Given that the District incorporates the key economic hubs of the greater Pietermaritzburg-Durban area, and the stressed nature of water resources documented in the status quo and SEA, the transformation of these catchments will place further stress on social well-being and economic productivity in the catchment.

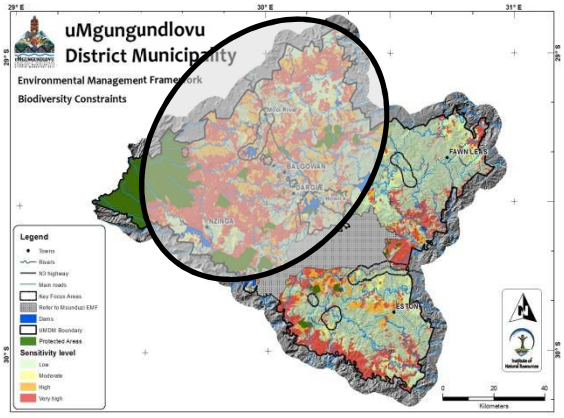
iv. ***There is a clear link between the high urbanised and industrialised sections of the catchment and the water quality sensitivity zones***, which is exacerbated with Pietermaritzburg and its waste water treatment plant being located on major river systems. The agricultural production in the midlands is putting pressure on the quality of water in the major impoundments – namely Spring Grove, Midmar and Albert Falls Dams.

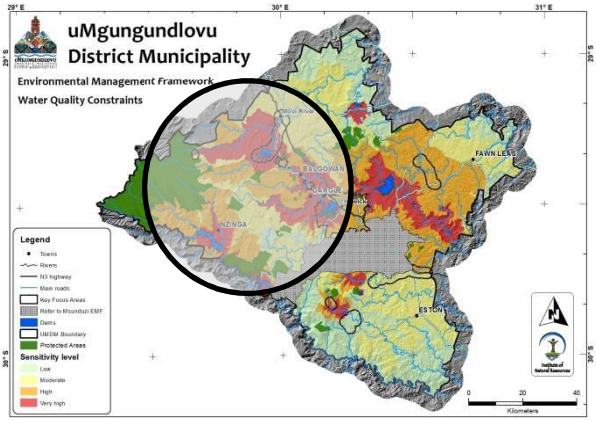
v. The ***high density of wetlands in priority water quality catchments is another key factor to consider given the role that wetlands play*** in ameliorating poor water quality, attenuation floods and regulating streamflow. The ***poor condition of wetlands*** discussed in the SQ and SEA, ***emphasize the need for attention in protecting and reinstating wetland function***.

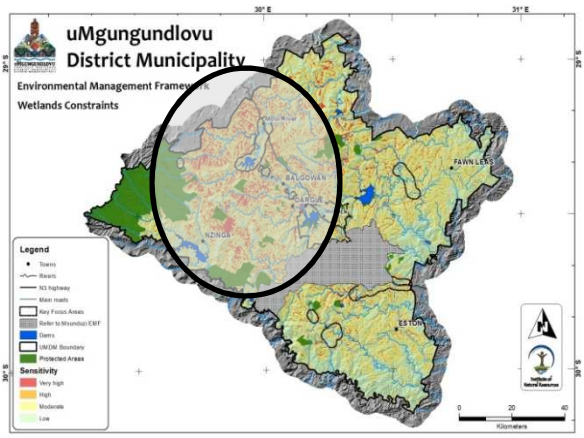
vi. The areas of ***high infrastructure constraint occur in areas key to biodiversity, water production and agricultural*** i.e. areas sensitive to transformation through the development of infrastructure.

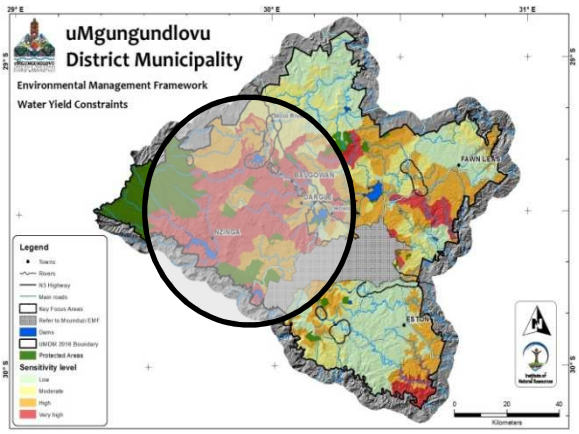
The cumulative value the midlands region of the district for biodiversity, water production, wetlands, water quality and agriculture is emphasized by considering these layers in combination below. This highlights the risk to the people and economy of the District from:

- Transforming the natural systems, notably grassland and wetlands in the region.
- Failing to address water quality through appropriate design and planning requirements related to water quality management.






uMgungundlovu
District Municipality
Environmental Management Framework
Wetlands Constraints
BALGOWAN
CAMPBELL
NZINGA
FAWN LEAS
ESTCOURT
Legend
Towns
Rivers
N3 highway
Main roads
Key Focus Areas
Refer to Mvundlozi EMF
Dams
UMDM Boundary
Protected Areas
Sensitivity
Very high
High
Moderate
Low
0
20
40
Kilometers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Dams
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Sensitivity level
Low
Moderate
High
Very high
0
20
40
Kilometers

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GLOSSARY

AgroBiodiversity Zone: A type of designation for an area in terms of both its agricultural and biodiversity value.

AgroEcological Zones: A land resource mapping unit where climate, landform and soils and/or land cover were sufficiently similar that a specific range of potential and constraints for land use could be estimated.

Agricultural Potential: Any assessment of potential agricultural use that includes arable use (the growing of the widest possible range of annual crops), horticulture (perennial crops in general, and fruit trees in particular), pastoral use (grassland and fodder crops) and silviculture (commercial growing of trees)

Bioresource Unit: Land with soils, vegetation, climate and terrain form which are sufficiently similar to provide for similar recommendations in terms of agricultural land management.

Critical Biodiversity Area: An area required to meet biodiversity targets as identified in a systematic biodiversity plan.

Desired Future State: Is a sustainability objective that sets out a vision, goals, indicators and targets for each key strategic issue.

Ecological Infrastructure: Ecological features that deliver valuable services to people.

Ecological Support Area: An area that is not critical for meeting biodiversity targets but plays an important role in supporting the ecological health of Critical Biodiversity Areas and/or delivering ecosystem services.

Ecosystem Goods And Services: All the benefits for human livelihoods arising from the ecological functions of ecosystems.

Environmental Management Framework: is a legislated tool developed in terms of the National Environmental Management Act, 107 of 1998 (NEMA) which supports sustainable development and provides legal standing to the information and tools generated.

Environmental Management Zone: Areas that have a 'low' agricultural potential that also support important biodiversity patterns and processes.

Key Focus Area: The predefined areas of high development pressure within the uMgungundlovu District Municipality.

Land Use Management Scheme: A tool used by municipalities to guide development according to the vision, strategies and policies of the Integrated Development Plan (IDP) and Spatial Development Framework (SDF).

Protected Areas: all areas as referred under Section 9 of the National Environmental Management: Protected Areas Act (Act 57 of 2003), which are protected by law for the purpose of conserving biodiversity. These include nature reserves and protected environments, with their management assigned to a competent authority of the region.

Service Infrastructure: Is infrastructure that delivers utility services such as electricity, reticulated water, waterborne sewage, waste disposal, and transport infrastructure.

Surface Water Resource: Surface water is water on the surface of the planet such as in a river, lake, wetland, or ocean. It can be contrasted with groundwater and atmospheric water. Sources of water that is potentially useful for human consumption and use

ACRONYMS

ABZ	AgroBiodiversity Zone
AEZ	AgroEcological Zones
ACRU	Agricultural Catchments Research Unit
AFDN	Albert Falls Development Node
AIA	Agricultural Impact Assessment
BA	Basic Assessment
BRU	Bioresource Unit
BSP	Biodiversity Sector Plan
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Central Business District
CE	Critically Endangered species
COGTA	Department of Cooperative Governance and Traditional Affairs
DAQMP	District Air Quality Management Plan
DD	Data Deficient species
DEA	Department of Environmental Affairs
DFS	Desired Future State
DM	District Municipality
DMR	Department of Mineral Resources
DRDLR	Department of Rural Development and Land Reform
DST	Decision Support Tool
DTI	Department of Trade and Industry
DTM	Digital Elevation Model
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Assessments
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIES	Ecological Importance and Ecological Sensitivity
EIMS	Environmental Information Management System
EKZNW	Ezemvelo KZN Wildlife
EMF	Environmental Management Framework
EMP	Environmental Management Programme
EMPr	Environmental Management Plan report
EMZ	Environmental Management Zones
EN –	Endangered species
ESA	Ecological Support Area
ESZ	Environmental Sensitivity Zones
FRIS	Flood Risk Information System
GEV	General Extreme Value
GIS	Geographic Information System
ICMP	Integrated Catchment Management Plans.
IDP	Integrated Development Plan
INR	Institute of Natural Resources
IUCN	International Union for Conservation of Nature
KFA	Key Focus Area
KZN DARD	KwaZulu-Natal Department of Agriculture and Rural Development
KZN SALGA	KwaZulu-Natal Department of Local Government and Traditional Affairs
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

LM	Local Municipality
LUMS	Land Use Management Scheme
MAP	Mean Annual Precipitation
NALR	National Agricultural Land Register
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act
NFA	National Forests Act
NLC	National Land Cover
NSSD	National Strategy for Sustainable Development
NT	Near Threatened species
NWA	National Water Act
PA	Protected Area
PAA	Protected Area Act
PAMP	Protected Area Management Plan
PDALF	Preservation and Development of Agricultural Land Framework
PES	Present Ecological State
PGDP	Provincial Growth and Development Plan
PPP	Public Participation Process
PSC	Project Steering Committee
RQO	Resource Quality Objective
RRAMS	Rural Roads Assets Management System
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SIPs	Strategic Infrastructure Projects
SO	Sustainability Objective
SoER	State of the Environment Report
SUDS	Sustainable Urban Drainage Systems
SWR	Surface Water Resources
TOR	Terms of Reference
UDDT	Urine Diversion Dehydration Toilets
UDPWHS	Ukhlahamba Drakensberg Park World Heritage Site
UMDM	uMgungundlovu District Municipality
UW	Umgeni Water
VIP	Ventilated Improved Pit Toilet
VU	Vulnerable species
WMST	Wetland Management Series Tools
WSA	Water Services Authority
WSDP	Water Services Development Planning
WULA	Water Use Licence Application
WWTW	Wastewater Treatment Work
WWW	Waste Water Works

1. INTRODUCTION

1.1 Background and Motivation for the EMF

The uMgungundlovu District Municipality (uMDM) has set as its long term vision the following: "*The uMDM will evolve into a dynamic metropolitan area, spreading its vibrant economic benefits to its citizens and places and will, through concerted integrated development and service delivery, realise improvement in the overall quality of life" (uMDM, 2016)*[3]

The uMDM has further adopted the seven strategic goals of the Provincial Growth and Development Plan (PGDP) to guide the District's response to key challenges to fulfilling this vision. These include "*Goal 5: Environmental Sustainability*". The vision and goals are further supported by five pillars that include the 3rd Pillar "*Balanced and sustainable development, green economy and a garden-city model that is in harmony with nature*".

The uMDM commissioned the development of a Strategic Environmental Assessment and Management Plan (SEA & SEMP)[4] to serve as a tool for giving effect to these environmental sustainability goals. The SEA & SEMP was completed in 2013. The uMDM together with the KwaZulu-Natal Department of Economic Development and Tourism (EDTEA) identified the need to build on the outcomes of the SEA & SEMP by translating the outcomes into an Environmental Management Framework (EMF). An EMF is a legislated tool developed in terms of the National Environmental Management Act, 107 of 1998 (NEMA) which supports sustainability and provides legal standing to the information and tools generated, something that is not achieved through the SEA & SEMP.

PURPOSE OF AN ENVIRONMENTAL MANAGEMENT FRAMEWORK

The EMF regulations, 2010 (Section 2) list the purpose of the regulation as: *Compilation of information and maps specifying the attributes of the environment in a particular geographical area:*

c) For such information to inform environmental management, and

d) For such maps and information to be used as environmental management frameworks in the consideration of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply.

Section 2 (3) further explains that EMFs are aimed at:

d) Promoting sustainability.

e) Securing environmental protection.

f) Promoting cooperative environmental governance.

The uMDM commissioned the Institute of Natural Resources NPC (INR), to build on the SEA & SEMP in developing the EMF. The focus of this additional work is detailed in the EMF report.

[3]Integrated Development Plan for uMgungundlovu District Municipality. The Comprehensive 2017/12018 – 2021/22 Five Year IDP – 4th Generation. Accessed on 9 May 2017 from http://www.umdm.gov.za/Official_Site/index.php/idp/draft-comprehensive-idp-2017-2018-to-2021-2022

[4]Umgungundlovu District Municipality. December 2012. Strategic Environmental Assessment Report: for the Umgungundlovu District Municipality Strategic Environmental Assessment and Management Plan. Isikungusethu Environmental Services (Pty) Ltd and Zunckel Ecological and Environmental Services, Pietermaritzburg.

1.2 Project Area

The uMDM is one of 10 District Municipalities in KwaZulu-Natal. It is located in the Midlands on a major transport route or movement corridor (N3) which serves as link between KwaZulu-Natal and Gauteng (Figure 1). It is bordered by the Ethekwini Metropolitan Municipality, Illembe and Ugu Districts to the East, Umzinyathi to the north and Uthukela to the west and Sisonke to the south.

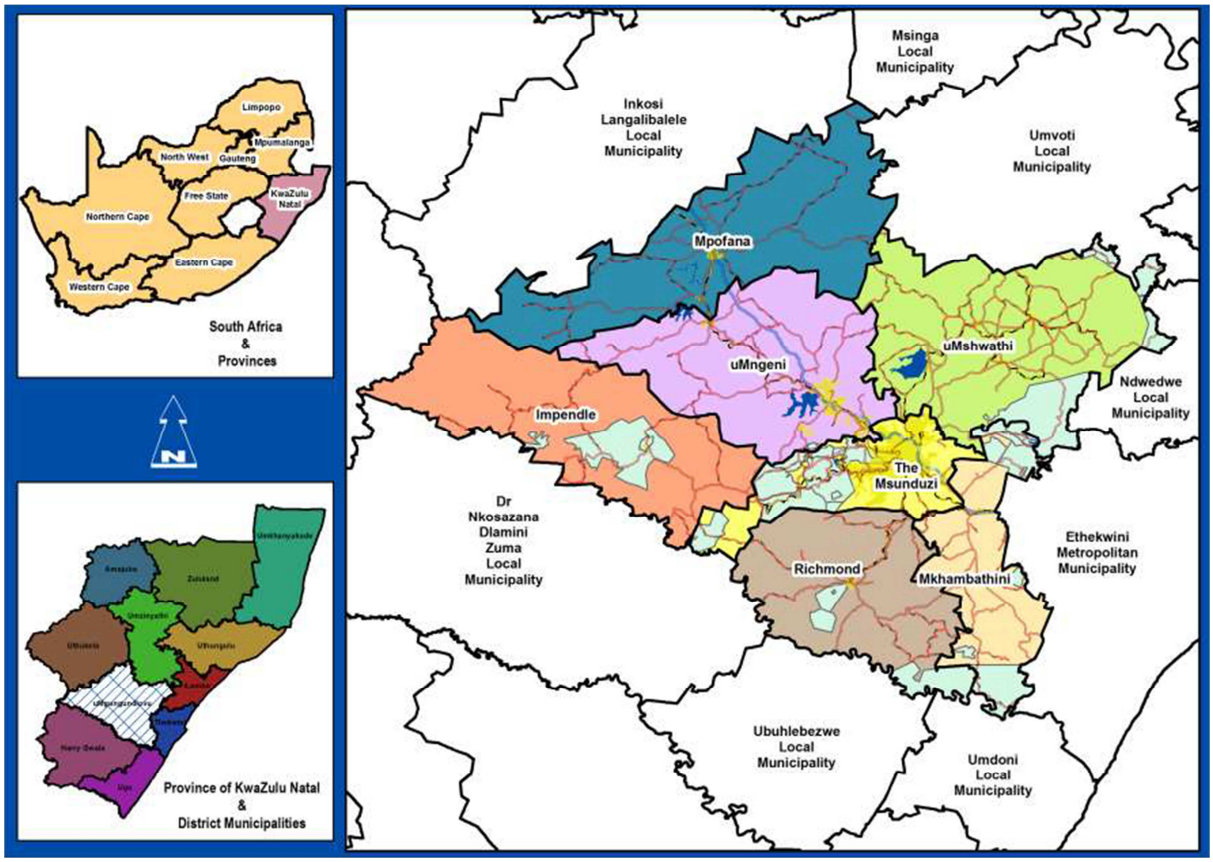

Figure 1 Locality of the uMgungundlovu District wihtin the Province and the Local Municipalities wihtin the District

Several refinements have been made to the focus of the EMF area within the District based on consideration of existing EMFs and development pressure as explained below.

Consideration of Existing EMFs

The District comprises of seven local municipalities (LMs), with a rural-urban mix including uMngeni, uMshwathi, uMzinyathi, Mpofana, Impendle, Richmond and Mkhambathini. Of the LMs, uMsunduzi has a gazetted EMF which is the process of being updated. The decision was taken to defer decision making to the uMsunduzi EMF based on the fact that the:

- Resolution of the information generated at the LM scale is higher than at the District scale,
- The EMF is Gazetted, and
- The EMF includes a specific information management and reporting system.

The implications of this is that for all spatial queries in the District EMF Decision Support System made within uMsunduzi, the response will provide a link to the local EMF, and responsible contacts.

A high resolution EMF has also been developed for the Albert Falls Development Node (AFDN) within uMshwathi Local Municipality (Figure 2). The decision was taken to include this area within the UMDM based on the following points:

- The EMF has not been gazetted.
- The approach to developing the sensitivity assessments and EMF outputs is the same as that for the UMDM EMF, and was developed by the INR.

So in developing the District EMF, the AFDN will be included, integrating the higher resolution information for this EMF in the process.

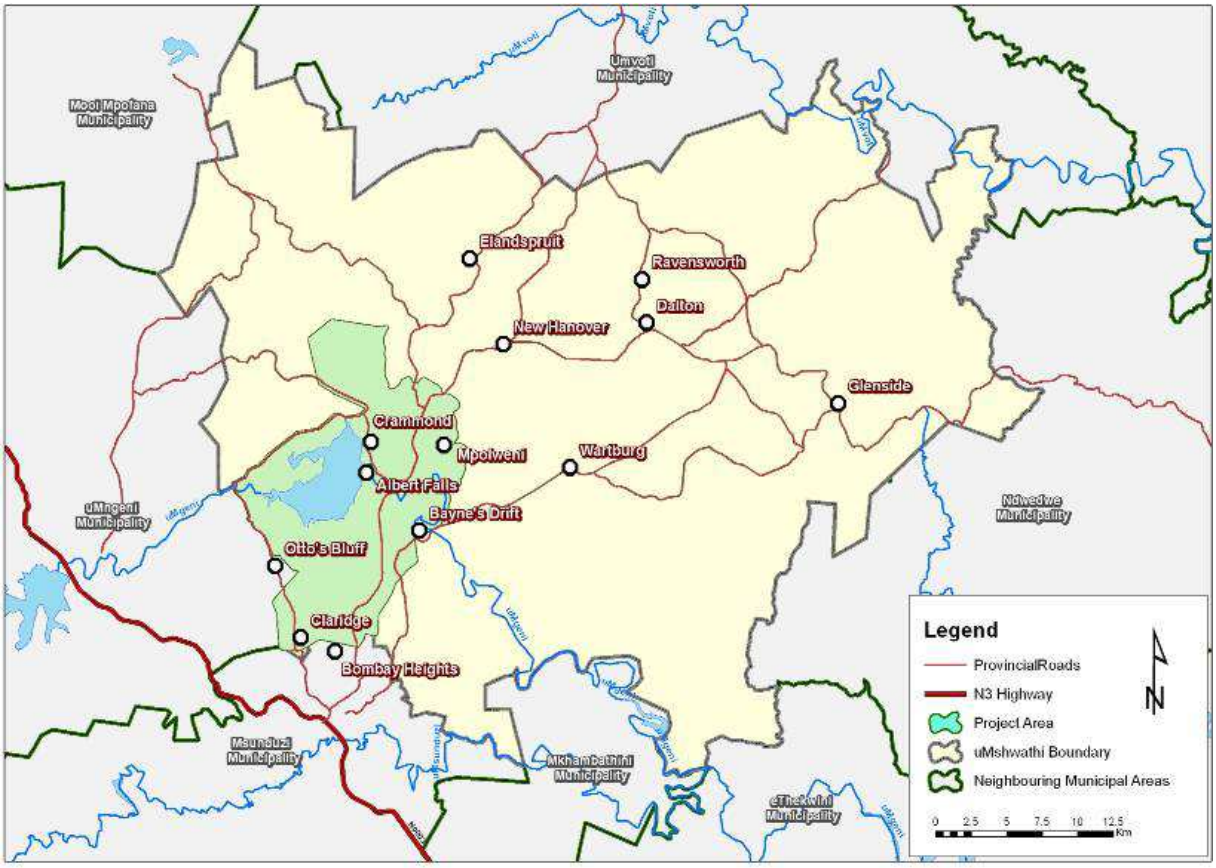

Figure 2 Location of the Albert Falls Development Node wihtin the uMshwathi Local Municipality

Consideration of Development Pressure

The uMDM has identified areas under significant development pressure termed as Key Focus Areas (KFAs). Several of these are located along the N3 corridor and other routes such as the R103 along which the Midlands Meander Tourism Route are clustered. The others KFAs are associated with small outlying towns. These KFAs are indicated with red boundaries and text in Figure 3 and include:

- Midmar;
- Howick and Hilton area;
- The small outlying towns of Mooi River/Nottingham Road; Richmond/Byrne; and, New Hanover/Wartburg,
- A small area in the upper Kamberg Valley titled ‘Cleopatra”.

The terms of reference required that the accuracy of mapping and information generated for these areas was higher than for the remainder of the District in order to improve the confidence in decision making in these areas. The implications of the KFAs in the final EMF products, is that while they received increased attention in developing the EMF, in the form of more detailed mapping and ground-truthing, they will not be highlighted in the final EMF products.

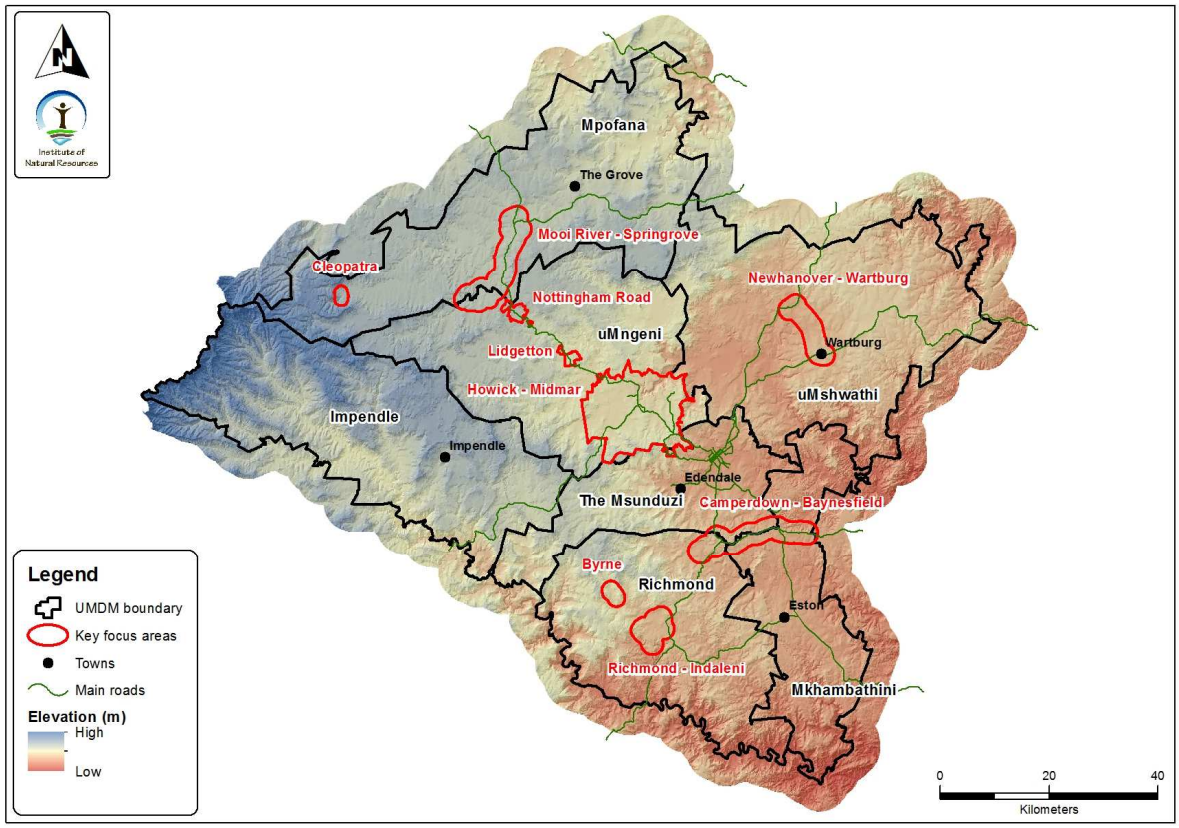

Figure 3 Spatial extent of the Umgungundlovu District and Key Focus Areas identified for specific attention in the EMF

In summary, the Project area is the **entire extent of the uMgungundlovu District** Municipality Boundary, **excluding the uMsunduzi** local Municipality, with **higher confidence** data informing the outputs in the **KFAs**.

2. STRUCTURE OF THE EMF

The aim of the Environmental Management Framework (EMF) is to support the achievement of the Sustainability Vision developed as part of the Sustainability Framework that represents the Desired Future State. This vision is articulated in Figure 4 below along with the various tools developed to support the achievement of the vision. The four outputs summarised in the figure below constitute the Draft EMF Report and all have a role to play in meeting the project aims and the legal requirements. ***This document is Volume II*** of the suite of EMF outputs.

Figure 4 Structure and components of the EMF

3. OVERVIEW OF THE GUIDELINE

3.1 Purpose of the Guideline

The EMF regulations define an EMF as the "***Compilation of information and maps*** specifying the ***attributes of the environment*** in a particular geographical ***area***: and for such maps and information to be used in the ***consideration of applications for environmental authorisations*** in or affecting the geographical areas to which those frameworks apply".

This guideline responds directly to this requirement by providing guidance on the scope and level of environmental assessment considered appropriate for the different levels of sensitivity within the zones identified through the EMF process.

3.2 EIA Regulations and Process

The NEMA EIA regulations[5] define activities for which environmental authorisation is required and the process to be followed in arriving at a decision by the competent authority as to whether the project may proceed or not.

The Regulations[6] include three listing notices which define activities for which environmental authorisation is required and one of two processes that must be followed in support of the application:

- ***Listing Notice 1***: Activities for which the Basic Environmental Assessment (BAR) process must be followed.
- ***Listing Notice 2***: Activities which trigger the need for the Environmental Scoping and Impact Report Process (S&EIR).
- ***Listing Notice 3***: Defines geographical areas within which specific activities trigger the need for environmental assessment according to the BAR process. One of the specific identified geographic areas defined in these regulations are "*sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority*". The uMDM EMF identified three zones as being "sensitive" in relation to specific Listing Notice 3 activities. These are documented in section 11 of the report.

It is possible that a development proposal will trigger activities in one or more of the listing notices. In the event LN 2 activities are triggered, it will be necessary to follow the S&EIR process.

[5] Published in GN R.982 of 4 December 2014, (as amended)

[6] R. 983 do.: Listing notice 1: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282
R. 984 do.: Listing notice 2: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282
R. 985 do.: Listing notice 3: List of activities and competent authorities identified in terms of sections 24 (2) and 24 D 38282

Basic Environmental Assessment Process (BAR)
The BAR process is required for activities defined in Listing Notices I and III. The process is limited to one phase and must be completed within a period of between 197 and 247 days.

Scoping and Environmental Impact Report Process (S&EIR)
The more comprehensive S&EIR process required in terms of Listing Notice II is required where the extent of the impacts are likely to be more significant than activities defined in LN I and III due to the scale of the project and/or the associated outputs, such as levels of pollution. This process therefore comprises two phases. The initial scoping phase is used to identify the full range and nature of impacts, and how they will be investigated and assessed. The Environmental Impact Report phase involves documenting the outcomes of the detailed investigation and conclusions in terms of the project's sustainability. Due to S&EIR process involving two phases, a longer maximum period of 300-350 days from the date of application is provided for completing the process.

Despite the difference in the number of phases and timing, both the BAR and S&EIR processes require certain fundamental steps and outputs. The followings section explains these components and how the guideline can be applied to support the process.

3.2 Applying the EMF Guidance to the Development Planning and EIA Process

The sensitivity zones in this EMF have been defined according to the seven environmental components that formed the specific focus of the ToR and are as follows:

1. Wetlands
2. Water Quality
3. Water Yield
4. Flood Risk
5. Biodiversity
6. Agricultural Resources
7. Infrastructure Services

The following is provided for each environmental feature:

i. A summary of the current status of the environmental system or feature that defines the zone, and its subcomponents.
ii. The key sustainability issues and objective.
iii. A definition and background to the sensitivity levels used [the thresholds that have been used to define the sensitivity levels].
iv. A map showing the spatial extent of the sensitivity levels.
v. Recommendations for undertaking the EIA in these zones in terms of the nature and scope of specialist investigations required, including references to best practice tools and norms and standards.

This guideline is supported by specialist reports included as Appendix 1, that:

- Summarize the data used, process followed and any assumptions and limitations.
- Explain the difference in the approach adopted in the KFAs compared with the remainder of the District, in order to provide appropriate level of confidence and accuracy in the spatial definition of systems within the KFAs.

- List and provide references for the norms and standards to be applied in undertaking specialist studies.
- Document other relevant regulatory processes. The EIA process (as per 2014 regulations) has been designed as the 'one environmental system' which provides for the alignment of process, information requirements and timeframes between the EIA and the following specific Acts to ensure efficiency and co-ordinated decision making: Air Emission License[7], Waste Management License[8], Water-Use License[9] and Mining License[10] . There may be other Acts which impose additional licensing requirements, such as the need for a license in terms of the South African Heritage Resources Act, no 25 of 1999. The EIA process requires that these are also identified and accounted for in aligning processes.

While the two EIA regulated processes (BAR and S&EIR) differ in some ways they both involve the fundamental steps, specific activities and associated requirements summarised in Table 1 below. The table shows how the information provided in this guideline supports the steps and requirements in the EIA process. It should be noted that while the EMF regulations require the EMF to support the EIA process, the earlier that environmental opportunities and constraints are considered in the development planning process the better. The table has therefore been expanded to include the planning or feasibility phases of the project development life cycle.

Table 1 Application of the Environmental Sensitivity guideline in the Development Planning and EIA Process

DEVELOPMENT PLANNING & EIA PROCESS Steps, Activities and Output Requirements	**APPLICATION OF ENVIRONMENTAL SENSITIVITY GUIDELINE INFORMATION**
Project Feasibility and Planning Developers consider a wide range of factors that influence the location, layout and design of the project, the ancillary infrastructure and activities. Developers seldom adequately consider environmental aspects in the planning stages. This may lead to increased time delays and costs when an ill-conceived and planned project is taken into the EIA process.	The consideration of the information in this guideline during feasibility level assessments and planning has the following benefits. • ***Legal & Institutional Framework*** The legal and institutional framework described in the EMF Report is a useful tool for ensuring that all regulatory processes relevant to a particular application are identified early. The developer is then able to build in the associated time and costs requirements of the EIA and any other regulatory processes identified. This is in keeping with the design of the EIA process to facilitate co-ordination across the other primary environmental regulatory processes. • ***Environmental Constraints*** Understanding the location and nature of sensitive systems such as wetlands, or features that impact infrastructure like flood risk areas assists in achieving appropriate developments layouts. • ***Consideration of Alternatives*** It is a legal requirement of the EIA regulations that applicants propose and undertake a comparative assessment of a range of feasible alternatives with the preferred option. These alternatives include alternative site, activities, layout, design and technologies. Consideration of environmental aspects in initial planning demands that these alternatives are investigated. The process and outcomes of considering alternatives can then be documented and fed through into the EIA process to demonstrate compliance with this

[7] National Environmental Management: Air Quality Act, NO 39 of 2004.

[8] National Environmental Management: Waste Act, No 59 of 2008.

[9] National Water Act, No 36 of 1998.

[10] Minerals and Petroleum Resources Development Act, No 28 of 2002.

	requirement. In summary, this guideline provides information that enables developers to effectively integrate environmental constraints into planning from the outset so that the project eventually applied for is environmental appropriate, and has far greater likelihood of being authorised.
Pre- Application Consultation This is an optional step which involves the Environmental Assessment Practitioner meeting with the competent authority to define the listed activities, the likely specialist investigations required and the focus of these investigations.	The environmental sensitivity information generated through the DST report can serve as a screening report to inform the pre application consultation process. This assist in defining which EIA process (BAR or S&EIR) that should be followed.
Application A mandatory requirement involving the completion of a form and supporting information including maps.	The information provided, including maps can be used to populate and support the formal application.
Specialist Investigations Based on the screening process (in the case of the BAR process), and the scoping process (in the case of the S&EIR process) the EAP is required to define the number and scope of specialist investigations. In the case of the S&EIR process a terms of reference must be developed and include in the Environmental Scoping Report for sign off by the Competent Authority.	The guidelines inform the range of specialist investigations required and the focus of these. Narrowing the focus of the specialist investigations alleviates the commissioning of a wide range of unnecessary studies that have time and cost implications for the applicant and detract from analysis of the key issues.
Public Participation Public participation is a legal requirement of the regulations, and the process must comply with a range of specific steps and activities in order to meet the legal requirement.	***Stakeholder Database*** The stakeholder lists generated in the EMF process, provides a starting point for developing an I&AP database for specific projects to take place within the development node. The public participation report is appended to EMF Report.
Reporting The EIA regulations (Appendices) stipulate various information requirements and components a Basic Assessment and Environmental Impact Report which include amongst others: • The environmental attributes associated with the development footprint i.e. the nature and sensitivity of environmental features. • The relevant legal and policy framework. • Alternatives considered. • Impacts assessed, including cumulative impacts. • Assessment framework – the EIA must provide a method for assessing the impact.	The information provided in this guideline assist in meeting various aspects required in EIA reporting as follows: • The specialist information can be used to illustrate the location and extent of sensitive features in relation to the development footprint. • The relevant legal and policy framework is provided in the EMF report and in the specialist reports appended to this guideline. • As described above, consideration of the sensitive environmental features defined in the development planning process will require the consideration of alternatives. Documenting these will assist in meeting this EIA reporting requirement. • Thresholds of concern and standards are built into the sensitivity categories allocated to the environmental features defined. This accounts at a level for the cumulative impact of a project. • The sustainability objective provides a very good measure against which to assess the impact of the project. This is because it has been informed by an assessment of cumulative impact within the SEA undertaken for the EMF. The assessment accounts for the relationship between natural, economic and social systems. This framework therefore holds much greater value than developing a project specific assessment framework i.e. the impact assessment should be made against the sustainability objectives.

To optimize the benefit of the guideline, it must be applied in conjunction with the following resources and outputs developed during the EMF process:

- Status quo specialist reports.
- Specialist reports (appended).
- Legal and policy framework provided in the EMF report, and the reference to regulatory processes specific to certain systems noted in the appended specialist reports.

4. SENSITIVITY ZONES

As context for the detailed sensitivity mapping and analysis, it is important to understand the nature of the various sensitivity layers in relation to development, and the range in confidence of the information presented.

Nature of Sensitivity

In considering the sensitivity zones it is important understand the two variations in the 'sensitivity' relationship between environmental features and development activities described in the guideline.

i. Impact of the Development on the Sensitive Environment

The first is where the development activity impacts the environmental feature or system. For example, urban development on grassland will permanently transform the system resulting in a reduction of habitat and services provided by that system. In this case, the level of constraint imposed on development increases with the level of environmental sensitivity of the system.

ii. Impact of the Environment on Development

The second scenario is where the environmental feature may impact development activities. The prime example is the impact of flooding. There is a risk to building or growing anything in the flood zone. The higher the frequency of the flood occurrence, the higher the risk of impact to development and therefore the associated level of constraint.

iii. The case of Infrastructure

Infrastructure as a development constraint is different from examples i and ii. In the first instance, it is not an environmental feature or phenomenon like flooding. The lack of infrastructure has the following implications:

- The lack of basic infrastructure imposes a constraint on development in that a developer may have to the provision of that service (road, power, water, sanitation) themselves, and/or wait some period for the relevant service provider to install it.
- Where there are inadequate basic services, there are negative consequences for natural systems. For example, lack of waste collection services results in increased pollution, and lack of power and housing may result in the unsustainable harvesting of wood for fuel and construction from natural systems.

The focus in this EMF is o the constraint imposed on developers in terms of costs and delays for providing key infrastructure.

Confidence in Sensitivity Layers

It should be noted that the accuracy of the information, notably the spatial definition of location and extent provided for the various systems (such as wetlands) and environmental aspects (water production) varies considerably. This is due to differences in the resolution or scale at which the mapping has been undertaken and the process (modelling versus direct mapping of systems). While

the assumptions and limitations are detailed in the attached specialist reports, the 'confidence' in the spatial outputs that define the boundaries of the various sensitivity zones is summarized below in table for each feature. The difference between mapping and confidence within and outside the KFAs is also documented, although the KFAs were not always relevant, for example in the case of water production and quality. The confidence rating is a general indication that considers the information presented for each sensitivity layer in relation to the others. As a guiding context, the scale at which mapping should be undertaken relates to the scale of decision making. In the case of the EMF there are various relevant scales:

- *District Scale* – for informing broad development planning such as the spatial development Framework (SDF).
- *Local and site scale* – for informing localised planning at the scale of a LUMS or local area plan.
- *Site/property scale* – at which a developer makes application for a specific development activity.

The scale at which the majority of the features are mapped is consistent with requirements for the District Scale and certain aspects also for the Local Scale. The focus of this guideline is however the EIA process which takes place at the site/property scale. The assessment of confidence is therefore made with this in mind.

CONFIDENCE RATING	DESCRIPTION
VERY HIGH	The feature definitely occurs at this location and the position of the feature boundary is considered accurate. An infield assessment may be required to confirm that an EIA is required if the feature represents the trigger.
HIGH	The feature very likely occurs at this location and the position of the feature boundary is considered relatively accurate but requires in field investigation to confirm the extent and nature of further investigations.
MODERATE	The feature likely occurs at this location but the accuracy of the boundary or level of associated constraint is low. Requires in field review and specialist assessment.
LOW	The feature may occur at the location, and the definition of boundary and nature of the system is poor. In field assessment and specialist investigations definitely required.

Table 2 Sumary of confidence in spatial definition for environmental features and components

ENVIRONMENTAL FEATURE	SOURCE/NATURE OF MAPPING	LIMITATIONS & IMPLICATIONS	CONFIDENCE RATING
Agricultural Resources	*Outside KFAs* – Refined version of the provincial agricultural land potential categories, but excluding transformed land from the land cover and considering existing agricultural land.	The layer is modelled and developed at a provincial scale. Furthermore, a key input in assessing land capability is soils, for which detailed understanding can only be achieved through detailed investigations. As a consequence the Agricultural sensitivity are a high level indicator – except where it has been identified as existing agricultural land.	LOW
	Within KFAs – The extent of the KFAs and limited resources meant that there was not significant field verification – it was mainly desktop analysis	The limitations documented for areas outside the KFAs are slightly alleviated due to a broad level of groundtruthing undertaken.	LOW - MODERATE

Terrestrial Biodiversity	*Outside KFAs* – Provincial scale mapping of the CBAs supplemented by more detailed analysis and mapping for the Agri-Ecological zones which was informed by digitizing off images and consultation	The confidence is higher for the Agro-biodiversity zones (high) and lower for CBAs – hence the differing levels of confidence	MODERATE - HIGH
	Within KFAs – there was a level of groundtruthing undertaken in the KFAs	The level of groundtruthing was inadequate to bump the confidence levels up across the entire area. The confidence levels remain the same	MODERATE - HIGH
Wetlands	*Within KFAs* – A combination of modelled data, the existing provincial layer (which varies in accuracy depending on the source data) and on screen digitizing combined with high level groundtruthing was undertaken.	The robust approach translates into a high level of confidence in the wetland layer within KFAs. This layer exhibits the highest level of confidence at this scale across all the sensitivity layers.	VERY HIGH
	Outside KFAs – The modelled data was combined with the existing provincial layer.	The uncertainties of the location of wetlands in highly disturbed areas, notably sugar cane lands and lack of digitising reduces the confidence. Infield verification is required. The model also predicts the location of certain wetland types better than others.	MODERATE - HIGH
Water Production	*District* - the KFAs are not relevant in this instance as a catchment based model was applied.	Given that this is a modelled output undertaken at a fairly coarse catchment scale, there is a moderate level of confidence relative to the EIA scale.	MODERATE
Water Quality	A modelled assessment of water quality risk was supplemented by analysis of know water quality monitoring data.	In catchments where monitoring data is available, confidence regarding water quality is high (though these issues may not necessarily be present at the site where a development is planned). In catchments where only modelled data is available, confidence is moderate and an assessment should be undertaken to confirm the modelled hypothesis. Given that water quality is a cumulative issue, the scale issue is less of a concern and confidence in the need to apply guidance is higher.	MODERATE - HIGH
Flood Risk	The layer is derived from a provincial scale model that utilised a range of Digital Elevation Model data.	The discrepancies in the modelling show that in flatter areas the output is far more accurate than in steeper areas where the flood risk area is not aligned with the river. In areas where engineering has modified the course of a river and altered the topography, the channel is often poorly represented. Detailed screening and assessments are required.	LOW - MODERATE
Infrastructure	The same approach was applied across the entire District. The approach integrates information regarding the location of the infrastructure but also the condition, and across five different types.	The confidence varies considerably because the layer integrates such a variety of infrastructure types and combines location and condition/capacity. It is worth consulting the individual layers presented in the specialist report.	LOW TO MODERATE

With this contextual understand the following sections present the detail information and guidance for each environmental feature and component.

4.1 Agricultural Systems

4.1.1 Status Quo

Summary Statement: *The District consists largely of high agricultural production potential areas that support a well-developed, diverse and highly integrated agricultural sector which is important for the regional economy. These arable and production areas represent a significant natural asset at a regional and provincial scale.*

The status quo is summarised as follows:

i. **Optimization of high and moderate potential agricultural lands for primary production:** The majority of the productive areas are intensively utilised for primary production of key enterprises (agronomic crops, vegetables, pastures, dairy, beef and timber). Where high potential agricultural land is not currently used for primary production, this land must be set aside for future agricultural production to ensure national food security.
ii. **Well-developed secondary sector activities:** Outputs from the primary production sector support a range of secondary activities in the form of sugar cane mills, saw mills, timber processing, dairy processing and abattoirs that provide important 'Value addition' within the sector.
iii. **Integrated Sector:** In addition to directly related primary and secondary activities, there are several other well developed agricultural enterprises in the area (e.g. input suppliers, support services, markets) that enjoy a symbiotic relationship with the primary activities.
iv. **Threat from Competing Land-use:** The increased urban related development in the area poses a risk to primary production, and thereby the dependent secondary activities such as agro processing. This risk comes in the form of numerous residential and tourism related development. A further threat is the restriction placed on the expansion of agricultural processing activities by developing socially sensitive land-use in close proximity to these existing facilities, which impinges on the right to farm.

4.1.2 Sustainability Objective

Maintain and where possible enhance the value of the Agricultural Sector to the regional economy, national and household food security by securing productive land for agricultural use and protecting secondary agricultural activities from competing land-uses.

4.1.3 Sensitivity Zones

The thresholds defining the sensitivity zones for agricultural systems are defined in table below. As depicted in Figure 4 the majority of the area is classified as being of either high or moderate sensitivity, based on the fact that a large proportion has high potential, is highly developed and utilised. Areas nearby water are included because irrigation increases the potential of land. Areas of high agricultural potential include existing facilities for secondary or intensive production, such as

poultry farms and feedlots as these are important components of the agricultural system and economy.

SENSITIVITY LEVEL	THRESHOLD Agricultural Potential/Value
Very High Sensitivity (Cultivated land)	Land which is currently cultivated should be retained exclusively for this purpose.
High Sensitivity (Uncultivated land in categories A & B)	Regarded as very high potential agricultural land that should be retained exclusively for agricultural use
Medium Sensitivity (Uncultivated land in category C)	Regarded as land with moderate agricultural potential. Arable areas may be restricted and scattered through the landscape – may be more suited to fodder crops and extensive grazing in support of livestock production. Category C areas may also be retained as a buffer to protect Category A & B areas.
Low Sensitivity (Uncultivated land in category D & E)	Regarded as land with restricted to low agricultural potential. Change of land use may be supported as long as it does not conflict with the surrounding agricultural activity. Change should also not interfere with existing agricultural activities.
Very Low Sensitivity	Not applicable (transformed land, protected areas)

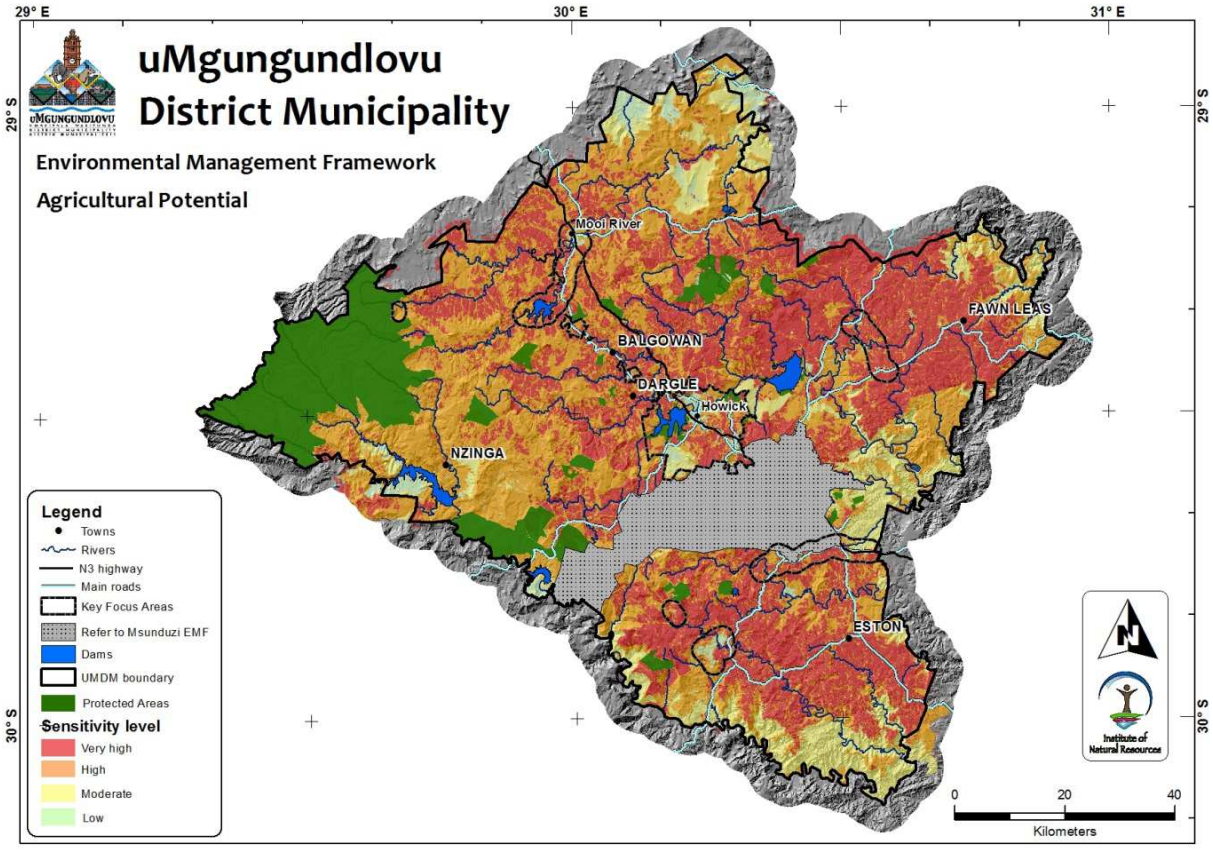

Figure 4: Agricultural Sensitivity in the UMDM

4.1.4 Guidelines

SENSITIVITY LEVEL	DEVELOPMENT OBJECTIVES	EIA GUIDELINES Specialist Investigations
Very High Sensitivity (Cultivated land)	***Cultivated land that should be retained exclusively for agricultural purposes***. These areas represent high capital investment in agriculture with supporting infrastructure such as irrigation and are linked into supporting secondary activities such as mills. Examples include land under sugarcane, cultivated pastures and timber as well as agronomic crop production.	The conversion of cultivated land to other land uses will only be considered under certain exceptional circumstances. In areas outside of town planning schemes, an Agricultural Screening Assessment (as described in **Error! Reference source not found.** below) should be undertaken by a SACNASP registered scientist in the relevant field of expertise If the Agricultural Screening Assessment recommends it, or if requested by the Competent Authority or the Provincial or National Department responsible for Agriculture, a Detailed Agricultural Assessment (as described in **Error! Reference source not found.** below) must be undertaken by SACNASP registered scientist in the relevant field of expertise
High Sensitivity (Uncultivated land in categories A & B)	These areas offer unique opportunities for cultivation and food security. ***These areas are considered non-renewable natural resources which should be reserved for agricultural production and food security***. Areas of high agricultural potential are identified as areas with inherent potential for cultivation based on the inherent soil properties and climate of the area. It is recommended that areas deemed to have high agricultural potential, do not lose viability for sustainable agricultural production on site. Ultimately these sites should not be developed for purposes other than agriculture, and should retain the opportunity for future agricultural production. Activities that will result in the loss of agricultural potential such as the subdivision of land into nonviable portions or extensive non-agricultural development should not be undertaken in this zone. Within this zone it is also important that the viability of a land parcel for agricultural production be considered together with its agricultural potential. Areas that are too small or lack the appropriate resources to become viable agricultural areas could be considered for alternative land use, as long as they do not impinge on the right to farm, nor should they negatively impact adjacent agricultural enterprises.	In areas outside of town planning schemes, an Agricultural Screening Assessment (as described in **Error! Reference source not found.** below) should be undertaken by SACNASP registered scientist in the relevant field of expertise If the Agricultural Screening Assessment recommends it, or if requested by the Competent Authority or the Provincial or National Department responsible for Agriculture, a Detailed Agricultural Assessment (as described in **Error! Reference source not found.** below) must be undertaken by SACNASP registered scientist in the relevant field of expertise
Medium Sensitivity (Uncultivated land in category C)	While these ***areas may have agricultural value*** this can only be determined through more detailed site specific slope, vegetation and soil analysis; consideration of the viability of land parcel size; and, availability	In areas outside of town planning schemes, an Agricultural Screening Assessment (as described in **Error! Reference source not found.** below) should be undertaken by SACNASP registered scientist in the relevant field of expertise

	of appropriate infrastructure. Agricultural potential of these areas is moderate yet provides opportunity for production, or the land could be providing extensive grazing or serving as buffer areas to high potential agricultural land, further investigation of these sites is recommended. ***If any site is deemed to have high agricultural potential then the management priorities and land use guidelines for the high agricultural potential constraint should be applied.***	If the Agricultural Screening Assessment recommends it, or if requested by the Competent Authority or the Provincial Department responsible for Agriculture, a Detailed Agricultural Assessment (as described in **Error! Reference source not found.** below) must be undertaken by SACNASP registered scientist in the relevant field of expertise
Low Sensitivity (Uncultivated land in category D & E)	***Areas within this zone have been identified as having limited value for agricultural production***. This may be as a result of unsuitable soils, terrain or climatic conditions. ***Extensive agriculture*** such as grazing or subsistence farming ***may however be undertaken*** in this zone. It is critical however that stocking rates be carefully considered to ensure that land degradation does not occur. In some areas, this category of land may be the only land available for production and thus the impact of its lost on agriculture in the area should be carefully considered before rezoning.	Agricultural Screening Assessment (as described in **Error! Reference source not found.** below) undertaken by SACNASP registered scientist in the relevant field of expertise if requested by the Competent Authority or the Provincial Department responsible for Agriculture
Very Low Sensitivity	In some areas, this category of land may be the only land available for production and thus the impact of its lost on agriculture in the area should be carefully considered before rezoning	▪ No Assessment Required

Table 1: Agricultural Screening Assessment

As a minimum the Initial Agricultural Assessment must include the following information and must be undertaken by a SACNASP registered agricultural scientist:

1. DESCRIPTION OF ACTIVITY:
   a. Describe the nature of the proposal including a site plan and the location of the proposal in the context of the surrounding area; and,
   b. describe any activities or processes associated with the proposal that may cause adverse impacts on agriculture

2. PHYSICAL RESOURCE:
   a. Provide a general description of the agricultural resources capability of the property and the surrounding area for agriculture, including a description of soils and climate, with special consideration of the contribution of the surrounding area to the regional agricultural sector;
   b. A general description of slope and topographic features including contour mapping of the site and surrounding area; and,

c. Analysis of property size and availability of water for irrigation.

3. SURROUNDING LAND USE:
   a. Zonation of property and surrounding properties in terms of the Municipal Land Use Scheme; and
   b. Include a description of the type and intensity of surrounding agricultural and non-agricultural land uses and proposed land use changes up to a distance of 1 km from the property boundary of the site.

4. STATEMENT ON THE IMPACTS ON AGRICULTURE:
   a. Indicate the potential effects of the proposal on existing and potential agricultural use of the property;
   b. Indicate the potential effects of the proposal on existing and potential agricultural use on surrounding lands;
   c. Identify potential impact on the viability of neighbouring agricultural operations resulting from conflicting uses that may occur as a result of the proposed development;
   d. Consider the proposal's impact on the agricultural character of the general surrounding landscape, including implications on land use, tenure or fragmentation patterns; and,
   e. Consider the potential cumulative impacts of this proposed development in the context of other existing and future non-agricultural developments.

5. CONCLUDING STATEMENT:
   The report must include a professional opinions as to the extent to which the development could impact on or effect agricultural use and provide recommendations as to whether a Detailed Agricultural Assessment is required.

Table 2: Detailed Agricultural Assessment

1. DESCRIPTION OF ACTIVITY:
   a. Describe the nature of the proposal including a site plan and the location of the proposal in the context of the surrounding area; and,
   b. Describe any activities or processes associated with the proposal that may cause adverse impacts on agriculture.

2. PHYSICAL RESOURCE:
   a. Agricultural Capability: Provide a detailed description of the agricultural resources capability of the site and surrounding area for agriculture, including: A detailed description of soils, including mapping and capability ratings based on a site–specific assessment; a description of climate features.
   b. A general description of slope and topographic features including contour mapping of the site and surrounding area;
   c. Analysis of property size and availability of water for irrigation; and,
   d. Consideration of the contribution of the surrounding area to the regional agricultural sector.

3. SURROUNDING LAND USE:
    a. Zonation of property and surrounding properties in terms of the Municipal Land Use Scheme; and
    b. Provide a map and a description of the type and intensity of surrounding agricultural and non-agricultural land uses and proposed land use changes up to a distance of 1 km from the property boundary of the site.

4. ASSESSMENT OF THE IMPACTS ON AGRICULTURE:
    a. Past Agricultural Practices: Outline the history of the type and extent of agricultural operations on the site, including any recent changes;
    b. Describe Existing Agricultural Production: Include current cultivation patterns, livestock operations, and other land use;
    c. Existing Farm Management: Describe land tenure and management ; size of the total operation of which property is part, including the relationship of the site to current operations and the potential to find other similarly capable replacement lands;
    d. Agricultural Viability: Provide an assessment of the viability of the property as an agricultural operation on its own and in consolidation with a larger existing operation; consider the suitability of the site for different types or alternative agricultural uses.
    e. Describe and assess of the degree of investment in land improvements, irrigation systems, facilities, buildings, machinery, etc.;
    f. Local and Regional Context: Describe current land use and the contribution of the property to the local and regional agricultural sector;
    g. Employment: Detail the current employment and job opportunities associated with the property;
    h. Assess the potential effects of the proposal on existing and potential agricultural use of the property including a description of the quantity and quality of land lost from agricultural production, and effects on existing or potential operations on the site;
    i. Assess the potential effects of the proposal on existing and potential agricultural use on surrounding lands including impacts on the viability and sustainability of neighbouring agricultural operations resulting from potential restrictions that may occur as a result of the proposed development;
    j. Assess potential impact on the viability of neighbouring agricultural operations resulting from conflicting uses that may occur as a result of the proposed development;
    k. Assess constraints on agricultural production that may result as a consequence of the proposed development on agricultural uses in the area;
    l. Assess the proposal's impact on the agricultural character of the general surrounding landscape, including implications on land use, tenure or fragmentation patterns; and,
    m. Assess the potential cumulative impacts of this proposed development in the context of other existing and future non-agricultural developments.

CONCLUDING STATEMENT:

The report must include a professional opinions as to the extent to which the development could impact on or effect agricultural use and provide recommendations in this regard.

SUPPORTING INFORMATION

The study should be supported with the following background information:

a) literature cited;

b) all background data sources;

c) a list of people contacted during the study;

d) a description of the methodologies and survey techniques employed in the study, including method of viability impact assessment;

e) source of physical resource inventory data (e.g., soil descriptions, climate and slope measurements); and

f) Resumes of study team members.

4.2 Terrestrial Biodiversity

4.2.1 Status Quo

Summary Statement: *The UMDM supports areas of rich and abundant biodiversity owing to a range of environmental drivers (climate, topography, soils, geology, hydrology, etc.) that give rise to a variety of vegetation types and habitats. These in turn provide a unique template for biota and ecosystems to coexist. Ongoing development and land use activities continue to threaten the biodiversity associated with the remaining, untransformed areas of the UMDM. Formally protected areas provide limited opportunities for conservation of biodiversity to meet conservation targets within the district. The future sustainability and viability of biodiversity is heavily dependent on setting aside other areas that cover the full range of biota and ecosystems.*

The *status quo* is summarised as follows:

i. ***Formally protected areas:*** Approximately 10% of the UMDM is protected in the form of provincial nature reserves, private reserves and stewardship sites. The uKhahlamba Drakensberg Park World Heritage Site makes up the greatest proportion (7%). The latter is further protected by zones and buffers that serve to safe-guard the core wilderness area from aesthetic-related impacts.
ii. ***High levels of transformation, fragmentation and degradation of habitat***: A significant proportion (approximately 45%) of the UMDM is already transformed, largely due to agriculture and forestry covering around 21% and 16% of the UMDM respectively. These and other developments have also caused habitats becoming increasingly fragmented resulting in reduced abilities for biota to move and disperse freely, and to connect with of populations. The remaining untransformed and unprotected area (approximately 45%) is exposed to other pressures through land use management that cause a loss of ecosystem condition and resilience, for example over grazing and poor fire burning practices.
iii. ***Occurrence of Threatened ecosystems:*** Approximately 75% of the UMDM is characterised by ecosystems that are Threatened (i.e. they are Critically Endangered, Endangered or Vulnerable). Of particular importance to the UMDM are KwaZulu-Natal Sandstone Sourveld (Critically Endangered), Midlands Mistbelt Grassland (Endangered), Moist Coast Hinterland Grassland (Endangered) and Mooi River Highland Grassland (Vulnerable). Each of these support important biodiversity that are also at risk from land transformation and land use management. Mooi River Highland Grassland is most common to the UMDM with around 77% of the vegetation occurring within the district, and has relatively low levels of transformation (approximately 37%) with around 9% occurring within protected areas. KwaZulu-Natal Sandstone Sourveld is most at risk, and has experienced the greatest degree of transformation (approximately 82%), with no areas conserved within the protected area network.
iv. ***Species of conservation concern***: The diversity of fauna and flora within the UMDM is high, as are the number of species that are threatened – around 56 plant and 36 animal species are either critically Endangered, Endangered or Vulnerable. The majority of these inhabit habitats associated with grasslands.
v. ***Invasive alien plant infestations***: The number and abundance of invasive alien plants is a key indication of habitat degradation within the UMDM. Large infestations of Wattle trees and

Bramble species occur within grasslands and along riparian areas in particular. Other invasive plants tend to dominate elsewhere in the district, for example Lantana and Triffid Weed in thornveld and valley bushveld areas.

4.2.2 Sustainability Objective

Maintain, enhance, and where possible, protect areas of high biodiversity value through sustainable development planning and land use management practices that promote biodiversity patterns and processes across a more connected and biodiverse landscape.

4.2.3 Sensitivity Zones

The sensitivity zones for terrestrial biodiversity are derived from varying levels of biodiversity importance/sensitivity according to the following levels of hierarchy:

i. **Formally protected areas:** Protected areas include all areas as referred under Section 9 of the National Environmental Management: Protected Areas Act (Act 57 of 2003), which are protected by law for the purpose of managing and conserving biodiversity. These include Nature Reserves and Protected Environments with management assigned to the competent authority of the Province, namely the KwaZulu-Natal Nature Conservation Board, trading under the name of Ezemvelo KZN Wildlife (EKZNW).

ii. **Critical Biodiversity Areas (CBAs) and Agro-Biodiversity Zones:** CBAs include all areas that are critical for meeting biodiversity targets and thresholds in the Province, and which are required to ensure the persistence of viable populations of species, as well as the functionality of ecosystems. CBAs are split into two levels, namely Irreplaceable CBAs and Optimal CBAs. CBAs are derived using provincial–scale conservation planning processes (i.e. the irreplaceable and optimal categories from the 2010 Minset). Other datasets included in the conservation planning process included Critically Endangered and Endangered ecosystems, and critical linkages from the landscape corridor dataset. At a similar level of importance, areas that are important for both sustainable agriculture and biodiversity conservation due to presence of land of moderate to high agricultural potential and high biodiversity value are referred to as Agro-Biodiversity Zones.

iii. **Ecological Support Areas (CBAs) and Environmental Management Zones:** ESAs include areas that support and sustain the ecological functioning of CBAs to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, as well as allowing for the maintenance of Ecological Infrastructure (EI). ESAs include ecological corridors, species-specific areas, and protected area buffers such as the Trail Zone that has been specifically defined for the uKhahlamba Drakensberg Park World Heritage Site. At a similar level of importance to the ESAs, environmental corridors and ecological links that also promote sustainable land management for the ecosystem goods and services that are provided and the biodiversity that is supported are referred to as Environmental Management Zones.

iv. **Other Natural Areas (ONAs):** At the lowest level of importance/sensitivity, areas that have not been identified as a priority for biodiversity conservation based on the

aforementioned categorise. Nevertheless, these areas retain their natural character to perform a range of biodiversity and ecological infrastructural functions. They should be managed in accordance with other components of the UMDM EMF (e.g. water yield and water quality) in terms of maintained and/or enhanced ecological infrastructure.

The table below summarises the categorisation of sensitivity zones covering terrestrial biodiversity that is based on the aforementioned rationale. Figure 5 illustrates the spatial distribution and extent of the terrestrial biodiversity sensitivity zones as they are located within the district.

SENSITIVITY LEVEL	THRESHOLD Terrestrial Biodiversity Potential/Value
Very High Sensitivity	Protected areas,
	Critical Biodiversity Areas (CBAs) and Agro-Biodiversity Zones
High Sensitivity	Ecological Support Areas (ESAs) and Environmental Management Zones.
Medium Sensitivity	Other Natural Areas (ONAs) that are Threatened i.e. Critically Endangered, Endangered, Vulnerable
Low Sensitivity	Other Natural Areas (ONAs) – not threatened.

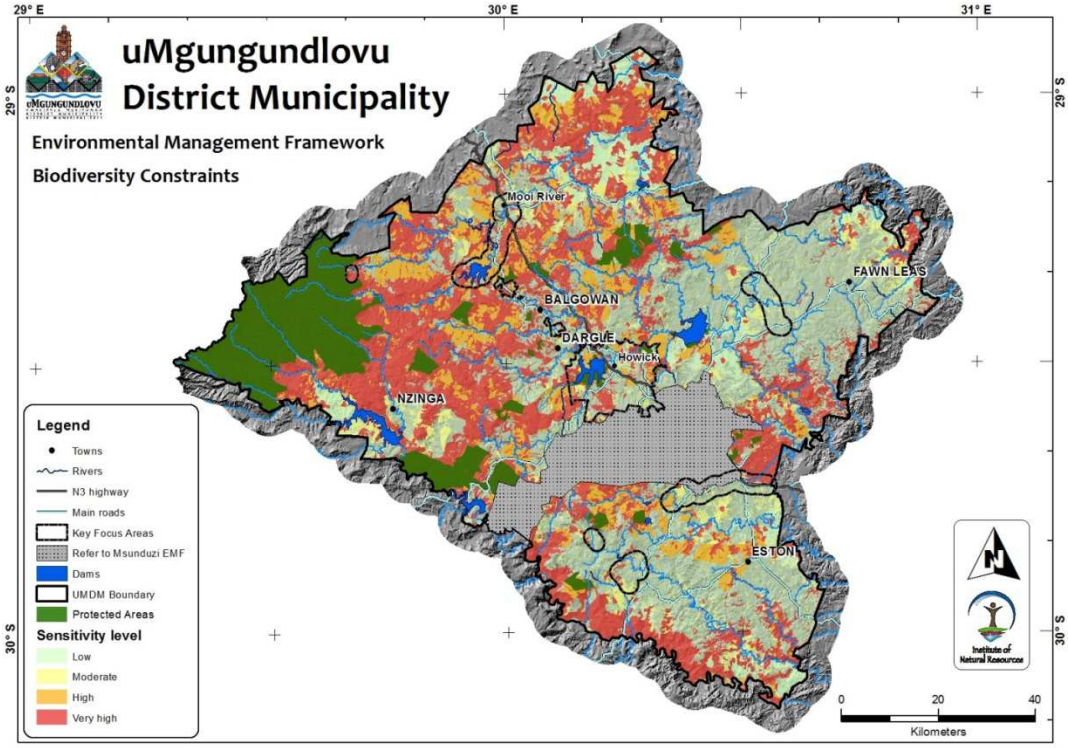

Figure 5: Biodiversity Sensitivity Map

4.2.4 Guidelines

SENSITIVITY LEVEL	DEVELOPMENT OBJECTIVES	EIA GUIDELINES
		Specialist Investigations
Very high Sensitivity	**Protected Areas** Development in accordance with Protected Area Management Plan approved by the KwaZulu-Natal Nature Conservation Board is supported and other relevant Authorities in the case of the UKhahlamba-Drakensberg World Heritage Site. **Critical Biodiversity Areas (CBAs) and Agro-Biodiversity Zones** These areas have very high development constraints and care should be taken to ensure that large scale transformation does not occur and that the ecological functioning of these sites is not lost. Activities that would result in transformation or the nett loss of critical biodiversity elements should not be undertaken in this zone. Activities that are compatible with biodiversity management objectives and that would result in a nett increase in biodiversity should be supported. In cases where biodiversity impacts cannot altogether be avoided or acceptably mitigated on-site, and where there is substantial socio-economic justification to support the development, the establishment of suitable off-site biodiversity offsets that would result in positive impacts for biodiversity in the region must be considered. Development should consider the following principles: ▪ Loss of natural land supporting biodiversity and functioning ecosystems should be avoided. ▪ Development should utilise already transformed and/or heavily degraded land as far as possible. ▪ Development must be planned and designed according to principles of conserving biodiversity by maintaining and/or	Biodiversity/terrestrial ecological assessments should be undertaken, firstly through a desktop screening of biodiversity features associated with the site, followed by adequate field surveys as informed by the desktop screening. The Biodiversity Impact Assessment Guideline developed by EKZNW for KZN should be used to guide all biodiversity-related specialist studies with specific terms of reference defined for botanical, vegetation, fauna, avifaunal, wetland ecological studies, etc. (EKZNW, 2013a). Specialist studies must endeavour to map sensitive areas supporting important vegetation, habitats, and/or species, as well as record and map any Red Listed, protected, rare and endemic species as they occur on-site. ▪ EIA or Basic Assessment to be conducted for listed activities as per Section 24(2) and 24 D of the National Environmental Management Act (Act no. 107 of 1998), with specialist studies informing the environmental authorisation process through the identification and assessment of biodiversity impacts. As a minimum, specialist studies should address specialist reporting requirements set out in the 2014 EIA regulations of NEMA. ▪ Specialist studies must assess the impacts on strategically defined sensitive areas (e.g. protected areas, CBAs, ESAs, threatened ecosystems, etc.) building on ecosystem drivers and responses that influence biodiversity, both on-site and within context of the broader environment. ▪ Outcomes from the specialist studies should advise and inform development planning and decision making in order to avoid biodiversity impacts, with practical measures to enhance biodiversity patterns and processes on-site. Where significant residual impacts remain after exhausting options for avoidance and mitigation, a biodiversity offset process needs to be followed to account for these in order to achieve no-net-loss of biodiversity. The EKZNW Norms and Standards for biodiversity offsets should be used to guide the offsetting process (EKZNW, 2013b).

	enhancing biodiversity features on-site. ▪ Development should ensure a "no nett loss" of biodiversity, with management measures and mechanisms put in place to conserve and/or enhance the biodiversity value of the land. Where these high biodiversity areas correspond with areas of high agricultural values, then areas are to be maintained and managed as agricultural landscapes that encourage biodiversity through linkages and corridors that connect protected areas. The agricultural component should rely on uncultivated land by avoiding ploughing of virgin land.	
High Sensitivity	These areas are critical to the maintenance of biodiversity in the landscape and supporting the areas in category 1 (Very High sensitivity). They should be retained and managed in a natural state. Biodiversity resources on-site should be identified and the impact of the proposed development on these resources must be assessed. Development should only proceed in a manner that would limit potential impacts on important biodiversity elements occurring on the site and the surrounding landscape. Activities that will result in extensive transformation or the nett loss of critical biodiversity elements should not be undertaken in this zone. Activities that will support biodiversity objectives should be encouraged. This would include development that includes components of rehabilitation and conservation as part of the layout and design. Development should consider the following principles: ▪ Development must not impact negatively on the functioning of ecological corridors and natural land that provide an important role of supporting biodiversity at the landscape level.	Biodiversity/terrestrial ecological assessments should be undertaken through a desktop screening of biodiversity features associated with the site, followed by adequate field surveys as informed by the desktop screening. Where the Biodiversity Screening process indicates potentially significant biodiversity impacts, or at the request of the Competent Authority or Ezemvelo KZN Wildlife, undertake a full Biodiversity/Terrestrial Ecological Assessment and associated specialist studies as required in the High Sensitivity zone.

	▪ Habitat fragmentation and edge effects should be limited and developments should be clustered together. ▪ Development should first target existing transformed land, and then heavily degraded land, before considering more natural land. ▪ Corridors comprising natural land should be maintained in a natural/near-natural state.	
Medium Sensitivity	Untransformed land that was not identified as a priority for biodiversity conservation based on the aforementioned categorise are referred to as other natural areas (ONAs). Although they have a lower level of importance/sensitivity, they continue to perform a range of biodiversity processes and ecological functions. They should be managed as far as possible especially when in a natural/near-natural condition.	Biodiversity/terrestrial ecological assessments should be undertaken through a desktop screening of biodiversity features associated with the site, followed by adequate field surveys as informed by the desktop screening. Where the Biodiversity Screening process indicates potentially significant biodiversity impacts, or at the request of the Competent Authority or Ezemvelo KZN Wildlife, undertake a full Biodiversity/Terrestrial Ecological Assessment and associated specialist studies as required in the High Sensitivity zone.
Low Sensitivity	This zone poses little constraint on land use types. Should land use result in transformation of untransformed areas, mitigation measures should be implemented to retain or address any loss of goods and services such as stormwater management and aesthetics. Development should consider the following principles: ▪ Development should aim to avoid impacting natural land, especially when the land is in a natural/near-natural state.	Undertake environmental assessments (EA) in accordance with listed activities under the NEMA, and conduct the necessary specialist studies to assess the impact of the development on biodiversity. If required, an Environmental authorisation must be obtained before commencement of the development.

References:

- Ezemvelo KZN Wildlife. 2013a. Guidelines for Biodiversity Impact Assessments in KwaZulu-Natal, version 2. Report prepared by IEM, Ezemvelo KZN Wildlife. February, 2013. Available from: http://www.kznwildlife.com.
- Ezemvelo KZN Wildlife. 2013b. Biodiversity offsets in KwaZulu-Natal: Concise guideline, version: 4Final. Report prepared by IEM, Ezemvelo KZN Wildlife. February, 2013. Available from: http://www.kznwildlife.com.

4.3 Water Yield

4.3.1 Status Quo

Summary Statement: *The uMDM's is centred on nationally and regionally strategic catchments that supply water to the economic hubs of Durban and Pietermaritzburg. Water supply is supported by a series of major impoundments (e.g. Midmar, Albert Falls and, Spring Grove Dams) that are directly and indirectly linked to the uMngeni River. Despite attempts to meets demands for water through the existing of water supply chain, including the recent contributions via Spring Grove and the Mooi-uMngeni River transfer scheme, assurance of water supply is rapidly being lowered within increasing risk of shortfalls. Plans for additional transfers via the Mkomazi River are currently underway. Although, the impoundments are vital for economic development, they come at the cost of the environment, even though the environment forms the basis for the water that is supplied to the impoundments. A more holistic view to water supply is required that allows for a maintained and/or improved supply of water-related ecosystem services, with strong links to ecological infrastructure and which sustains water flows within rivers.*

The *status quo* is summarised as follows:

i. **Water supply and regulation from catchments:** biophysical characteristics of catchments and feedback mechanisms of the hydrological cycle determine the water flow through the landscape. The flow of water eventually enters into the network of rivers that drain through a series of connected catchments. River flow is broadly partitioned into three flow components, i.e. baseflow, quickflow and streamflow – the latter is the combination of baseflow and quickflow thus reflecting the provision of water throughout the year. Baseflow is a useful indicator of maintained water supply, particularly during the dry seasons. The water flow response from catchment areas varies markedly across the UMDM, with certain catchments producing significantly more streamflow and/or dry-season baseflow than others. Headwater catchments of the Mooi, uMngeni and Mkomazi River systems are particularly important in terms of producing high streamflow and dry-season baseflow.
ii. **Alteration of the natural hydrological regime:** Catchment hydrological response is directly linked to land cover and land use. Any change in land cover and land use, as brought on through land transformation, will result in an alteration of the natural flow response. In some cases this may lead to an increase of flow (e.g. greater stormflow response from hardened surface and urbanised areas), while in other cases there will be a reduction of flow (e.g. as can be experienced from plantation forestry and other streamflow reduction activities). Any alteration of natural hydrology directly affects the ability of catchments to supply water both through sustained streamflow and controlled baseflow.
iii. **Operation of water supply dams and impoundments:** The uMDM has a dense network of water supply dams, ranging from small farm dams to large impoundments. The combined effect of these dams affects the natural distribution flow in rivers, in most instances a decrease in flow downstream is experienced, while in certain other situations there can be an increase in flow during the dry season resulting in a reverse hydrograph as typically observed below Albert Falls Dam.

iv. **Present Ecological State, Ecological Importance and Ecological Sensitivity:** The Present Ecological State (PES) of rivers that drain the uMDM vary from systems in a "natural/good" condition to systems that are in a "poor/severely modified" condition. Aquatic biota occurring within the river systems not only provide a useful indication of aquatic ecosystem condition, they also provide a useful measure of system Ecological Importance (EI) and Ecological Sensitivity (ES). Most of the catchments within the uMDM are characterised by high/very high EI and/or ES thus emphasising the importance of maintaining/improving aquatic health in conjunction with water flows that are needed to support the wellbeing of aquatic ecosystems.

4.3.2 Sustainability Objective

Protect, maintain, and as far as possible enhance, ecological infrastructure to improve the delivery of water-related ecosystem services through a natural supply of streamflow and dry-season baseflow to support social and ecological wellbeing.

4.3.3 Sensitivity Zones

The sensitivity zones for water yield are derived mainly from modelled hydrological data taking into consideration downstream social and ecological flow requirements. The Agricultural Catchments Research Unit (*ACRU*) model was used to generate daily flow data for catchments draining the UMDM. Daily flow data was analysed to establish average annual streamflow (i.e. total runoff produced on average annually) as well as dry-season baseflow as an indicator of sustained flows during the low-flow months (August, September, October). Two model configurations were used, namely the uMngeni Catchment model that was configured at a sub-catchment using the 2011 KZN land cover data, and the Quinary Catchment model that was configured specifically for the UMDM using the available input data from the quinary catchment dataset. Water yield categories were therefore derived separately using the output flow data from the two models, and a composite catchment layer generated to accommodate the different catchment scales as well as to ensure a spatially explicit representation of flow data. Annual streamflow and dry-season baseflow values where then categorised using ranked quantile values, ranging from 1 for low water yield to 4 for very high water yield.

Additional information was integrated in order to accommodate the social-ecological importance of water flow within the UMDM. This included the following datasets:

- **Catchments that supply water to major water supply dams:** Major water supply dams, such as Midmar and Springrove Dams, are important in terms of meeting demands for bulk water supplied to urban areas (e.g. Pietermaritzburg and Durban). These catchments are given a value of 1, representing a higher weighting to account for socio-economic importance of water supply.
- **Ecological Importance (EI) and Ecological Sensitivity (ES) of aquatic ecosystems:** Available information of Ecological Importance (EI) and Ecological Sensitivity (ES) obtained from the 2014 DWS PES EI ES assessment of rivers throughout South Africa was used to determine the

importance and/or sensitivity of catchments. Catchments with a very high/high EI and/or ES are prioritised in terms of maintaining river flows to sustain the ecological requirements of the systems. Catchments with a high/very high EI and/or ES are given a value of 1, representing a higher weighting to account for the aquatic ecological importance of water supply.

Four water yield categories were used to represent water yield sensitivity using the summed values of annual stream flow (1 to 4), dry-season baseflow (1 to 4), supply to water supply dams (0 or 1) and aquatic ecosystem EI and ES (0 or 1). The Jenks Natural Breaks categorisation method was used in ArcGIS to assign the summed value water yield value for each catchment to one of the following sensitivity classes as shown in below table. Figure 6 illustrates the spatial distribution and extent of the water yield sensitivity zones as they are located within the district.

SENSITIVITY LEVEL	THRESHOLD Water Yield Potential/Value
Very High Sensitivity	Catchments with a very high water yield value (i.e. combined score greater than and equal to 9)
High Sensitivity	Catchments with a high water yield value (i.e. combined score of 7 and 8)
Moderate Sensitivity	Catchments with a moderate water yield value (i.e. combined score of 5 and 6)
Low Sensitivity	Catchments with a low water yield value (i.e. combined score less than and equal to 4)

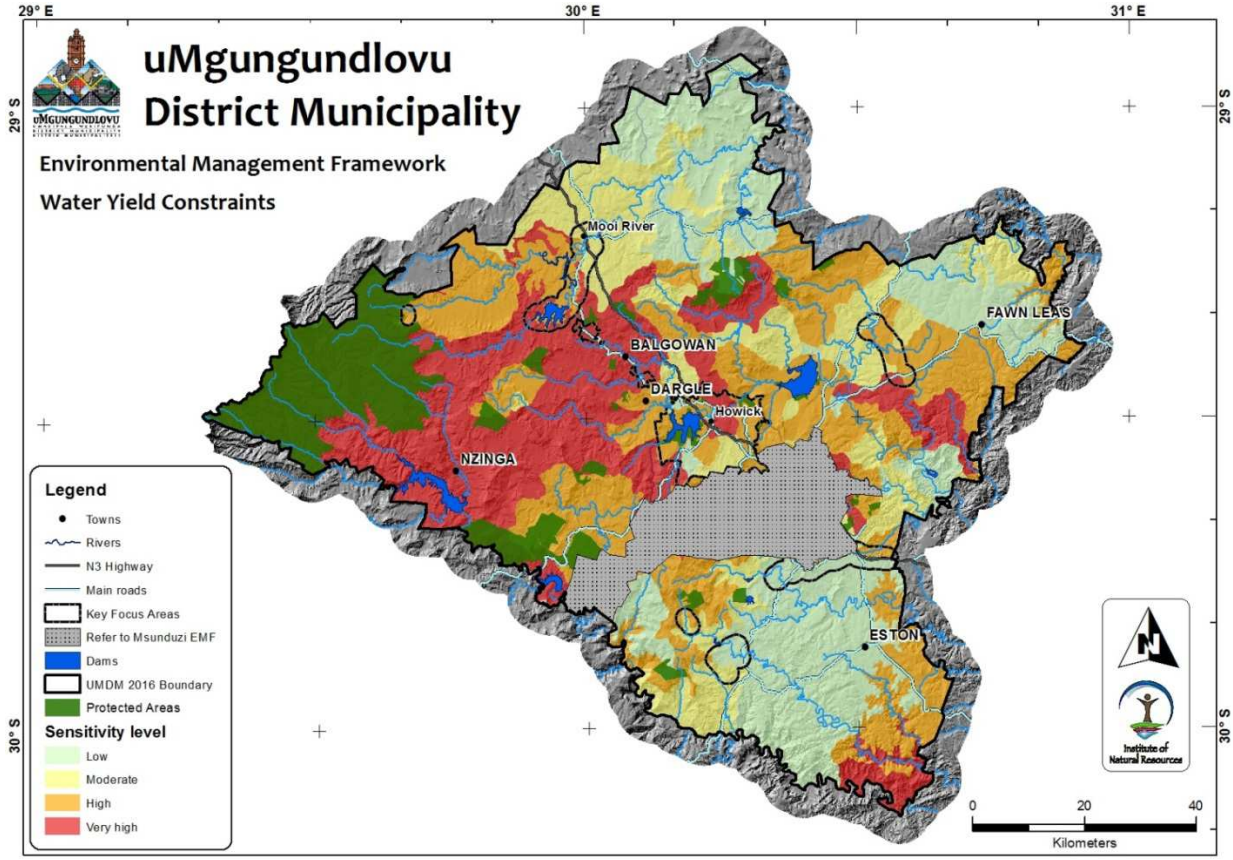

Figure 6: Water Yield Areas in the UMDM

4.3.4 Guidelines

SENSITIVITY LEVEL	DEVELOPMENT OBJECTIVES	EIA GUIDELINES
		Specialist Investigations
Very high Sensitivity	▪ Developments that would result in the large scale transformation of ecological infrastructure should be avoided (particularly grasslands and wetlands). Where impacts on critical ecological infrastructure will result in the loss of ecological infrastructure and these impacts are not avoidable, and, where substantive socio-economic benefit justifies the development, the establishment of suitable off-site offsets for these ecological water yield services in the region must be considered. ▪ Ensure that the ecological Reserve is maintained such that aquatic ecosystems will continue to supply goods and services to society. ▪ Ensure the development is flood neutral and does not result in significant hydrological alteration. ▪ The developments of additional dams and streamflow reduction activities (e.g. plantation forestry) should be avoided ▪ Maintain and/or enhance ecological infrastructure (wetlands, riparian areas, grasslands, etc.) to improve water supply to downstream users and safeguard ecological requirements. ▪ Ensure that adequately-sized buffers for aquatic ecosystems are maintained and/or reinstated, and managed in an optimum, natural/near-natural condition (i.e. good vegetation cover free of alien vegetation).	▪ If required. undertake an environmental impact assessment (EIA) and water use licence application (WULA). These should preferably be undertaken concurrently to improve the overall authorisation/licencing process, as well as to avoid delays in obtaining authorisation from the competent authorities. The process should be initiated with a pre-application meeting with the Department of Water and Sanitation (DWS) to establish the WULA requirements; and, a pre-application process with the Competent Authority in terms of the EA process. ▪ Conduct the necessary specialist studies to assess the impact of the development on the water resource. Specialist studies should include, but not be limited to; wetland delineation and functional and/or a river ecosystem assessments; and, a hydrological impact assessment. ▪ Through existing and/or new studies, establish the flow requirements for the human and ecological Reserve. The ecological Reserve needs to be determined at an appropriate level (i.e. Rapid, Rapid level III, Intermediate or Comprehensive Reserve determination) according to the nature of the proposed development, as well as other relevant factors such as the present ecological status of the water resource. The Department of Water and Sanitations' (DWS) methods for Eco Classification and Eco Status Determination in rivers should guide the Reserve determination process. ▪ If required water use license (i.e. WULA) must be obtained before commencement of the development, in accordance with the various water use types listed under Section 21 of the National Water Act (Act no. 36 of 1998). The WULA process should integrate findings from specialist studies and the ecological Reserve
High Sensitivity		
Moderate Sensitivity	▪ Ensure that the ecological Reserve is maintained such that aquatic ecosystems will continue to supply goods and services to society. ▪ Avoid aquatic ecosystems, and where possible, incorporate appropriate aquatic buffers during the developing planning process. ▪ Maintain, and as far as possible enhance aquatic ecosystems (e.g. wetlands and riparian) and associated buffers. ▪ Ensure that adequately-sized buffers for aquatic ecosystems are maintained and/or reinstated, and managed in an optimum, natural/near-natural condition (i.e. good vegetation cover free of alien vegetation).	

		determination, and should include a risk assessment using the DWS Risk Assessment Matrix. ▪ Appropriate measures need to be established based on the outcomes of the risk assessment, and incorporated into an environmental management plan report (EMPr). The EMPr should also include, but not be limited to, a stormwater management plan; rehabilitation plan covering both terrestrial and aquatic environments; and, procedures for ongoing monitoring and maintenance.
Low Sensitivity	• Ensure that the ecological Reserve is maintained such that aquatic ecosystems will continue to supply goods and services to society. • Avoid aquatic ecosystems, and where possible, incorporate aquatic buffers during the developing planning process. • Maintain, and as far as possible enhance aquatic ecosystems (e.g. wetlands and riparian) and associated buffers.	• If required undertake environmental assessments (EA) and water use licence applications (WULA) in accordance with listed activities under the NEMA and the NWA, and conduct the necessary specialist studies to assess the impact of the development on the water resource. • If required. a water use license (i.e. WULA) must be obtained before commencement of the development, in accordance with the various water use types listed under Section 21 of the National Water Act (Act no. 36 of 1998).

4.4 Water Quality

4.4.1 Status Quo

Summary Statement: *The surface water resources of the uMgungundlovu District Municipality, which include the Mooi, Mngeni and Mkomazi Rivers are critical to the economic and environmental sustainability of the District and of KwaZulu-Natal. Water quality is severely compromised in several critical catchment areas particularly with respect to nutrient loading, bacteria and other pathogens.*

The status quo is summarised as follows:

i. **Key resources are compromised with respect to nutrient loading:** Several of the key water resources are effectively eutrophic and unable to absorb further loading without directly impacting users. Eutrophication encourages the growth of potentially harmful algae and bacteria and increases the cost of treating water to a potable standard.
ii. **Key resources are compromised with respect to bacteria and other pathogens:** Several of the key water resource catchments show high counts of faecal bacteria suggesting sewage and animal waste contamination. This is significant given the very serious health risks posed by the pathogens associated with such contamination.
iii. **Monitoring sites are spatially restricted to water supply:** Monitoring of water quality is very limited outside of the key water supply catchments. This means that it is very difficult to assess the present state of the water quality in these catchments.
iv. **Major threats relate to waste water management:** Poor management of waste water from the concentration of human activities and intensive livestock production poses a significant threat to water resources, particularly through the rapid expansion of residential areas and housing developments. The cumulative impacts of diffuse pollution sources are also important, particularly in an agriculturally dominated landscape.

4.4.2 Sustainability Objective

Ensure the sustainable supply of good quality water to meet the needs of all water users in the District by protecting sensitive catchments by ensuring development is appropriately located and waste is appropriately managed.

4.4.3 Sensitivity Zones

The mechanisms for defining the sensitivity zones for water quality are defined in the table below. As depicted in Figure 7, the highest sensitivity is located around the key water supply features on the Mooi and Mngeni Rivers. Not only are these critically important resources, but they are also stressed from a water quality perspective. All catchments are established to be sensitive from an ecological perspective.

SENSITIVITY	FEATURE
Very High Sensitivity	**WQ Zone 1** Quinnary Catchments containing key water supply features
	WQ Zone 2 Proximal catchments influencing key supply features with **measured** elevated pollutant concentrations
	WQ Zone 3 Proximal catchments influencing key supply features with **high potential** for elevated pollutant concentrations
High Sensitivity	**WQ Zone 4** Proximal catchments influencing key supply features with low pollutant concentrations
	WQ Zone 5 Distal catchments influencing key supply features with **measured** elevated pollutant concentrations
	WQ Zone 6 Distal catchments influencing key supply features with **high potential** for elevated pollutant concentrations
Medium Sensitivity	**WQ Zone 7** Distal catchments influencing key supply features with low pollutant concentrations
	WQ Zone 8 Catchments not influencing key supply features with **measured** elevated pollutant concentrations
	WQ Zone 9 Catchments not influencing key supply features with **high potential** for elevated pollutant concentrations
Low Sensitivity	**WQ Zone 10** Catchments not influencing key supply features with low pollutant concentrations

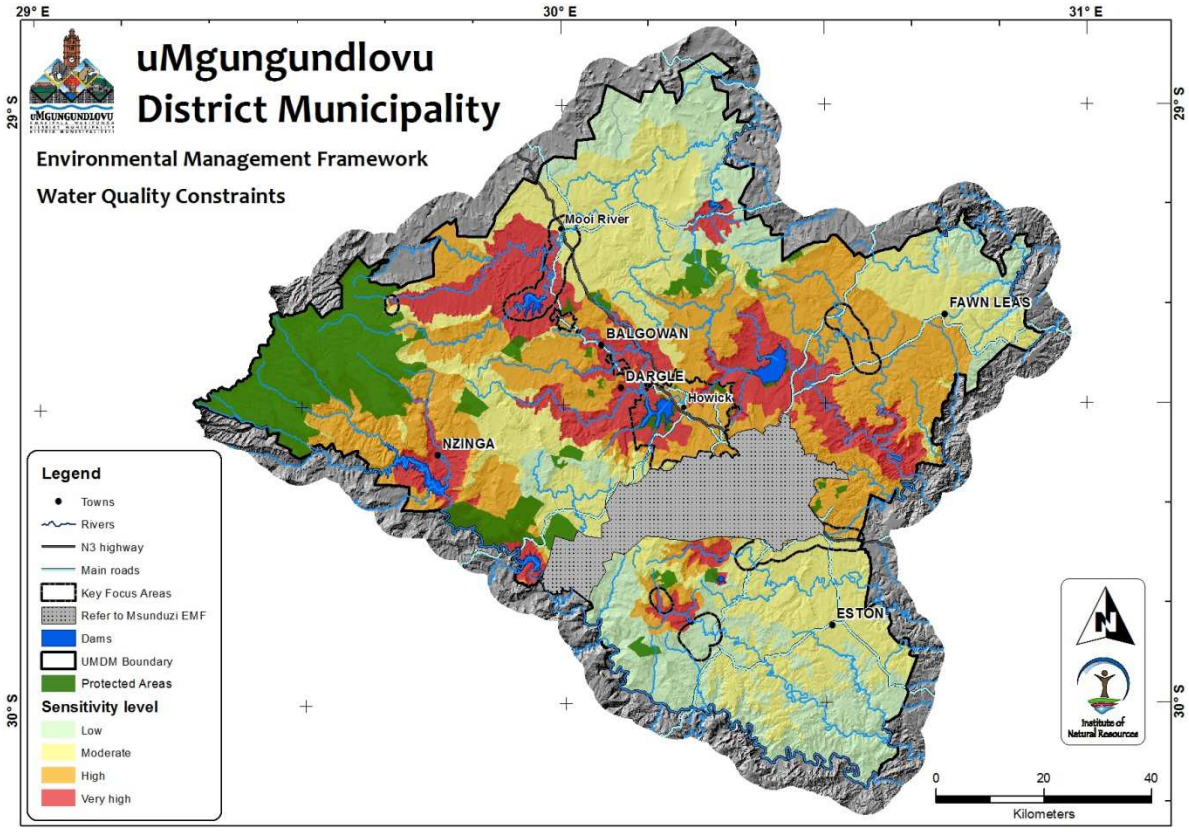

Figure 7 Water Quality Sensitivity

4.4.4 Guidelines

SENSITIVITY	FEATURE	DEVELOPMENT PLANNING OBJECTIVES	EIA GUIDELINES
Very High Sensitivity	**WQ Zone 1** Quinnary Catchments containing key water supply features	There should be no increase in loading of pollutants, particularly nutrients, sediments and microbiological contaminants. These catchments have, or are predicted to have, limited or no capacity to absorb further contamination and are in close proximity to key water storage infrastructure, thereby posing a risk to quality of supply. Activities undertaken here should be limited to those which can prove that they will have a negligible impact on water quality. 1. Where discharge of waste is unavoidable, effluent should be environmentally neutral (nutrient and microbiological concentrations should be the same as or lower than receiving environment concentration to increase dilution). 2. Only activities which will result in no discernible change from present nutrient and microbiological concentrations via diffuse sources should be permissible. 3. Activities must ensure limited soil disturbance (where sediment generation can be meaningfully controlled). Water quality monitoring requirements for authorised activities must include high frequency sampling and analysis of relevant indictors.	A water quality impact study must be undertaken to determine the proposed development's impact on the key water resources in this catchment and, immediately downstream of it. This should assess the impacts broadly, but specifically take into account: 1. The volume of waste generated by the development and its proposed disposal; 2. Cumulative impacts of existing activities located in the critical and proximal catchments particularly with respect to nutrient loading and bacteria contamination; 3. The potential contribution of the development to eutrophication of the water resource; and, 4. The potential sedimentation impacts associated with construction projects. The study must also assess the impact of the proposed activity on the sensitive aquatic ecology of the catchment. Any proposed activity must adhere to the requirements of the Resource Quality Objectives for the catchment and by requirements of any water use licence issued in respect of the activity.
	WQ Zone 2 Proximal catchments influencing key supply features with **measured** elevated pollutant concentrations		
	WQ Zone 3 Proximal catchments influencing key supply features with **high potential** for elevated pollutant concentrations		
High Sensitivity	**WQ Zone 4** Proximal catchments influencing key supply features with low pollutant concentrations	Existing and predicted high pollutant loads indicate that the ability of the natural environment to ameliorate these impacts and assimilate the pollution loads is already heavily utilised. Developments in these areas should exclude activities with the requirement to discharge large quantities of liquid waste to the environment (i.e. point source	A water quality impact study must be undertaken, to determine the proposed development's impact on the sensitive aquatic ecology of the catchment and on the water resources located downstream of this catchment. This should assess the impacts broadly, but specifically take into account: 1. The impact of waste generated in and by the development and its proposed disposal 2. Cumulative impacts of the
	WQ Zone 5 Distal catchments influencing key supply		

	features with **measured** elevated pollutant concentrations **WQ Zone 6** Distal catchments influencing key supply features with **high potential** for elevated pollutant concentrations	discharges) or activities with a high potential for spills and stormwater contamination. Activities undertaken in these areas should be limited to those with a low impact on water quality. All approved activities that could have a negative impact on water quality must include appropriate water quality monitoring.	proposed development together with existing activities located in the downstream catchments particularly with respect to nutrient loading Any proposed activity must abide by the requirements of the Resource Quality Objectives for the catchment and by requirements of any water use licence issued in respect of the activity.
Moderate Sensitivity	**WQ Zone 7** Distal catchments influencing key supply features with low pollutant concentrations **WQ Zone 8** Catchments not influencing key supply features with **measured** elevated pollutant concentrations **WQ Zone 9** Catchments not influencing key supply features with **high potential** for elevated pollutant concentrations	Existing and predicted pollutant loads are considered to be moderate to low. All catchments however are considered important and sensitive from an ecological perspective (see ecological importance and sensitivity map). This means that catchments with lower pollutant loads are still important from a water quality perspective as they provide dilution capacity and support important and sensitive ecosystems. Activities in these catchments should ensure any waste generated is treated to standards reflecting the ecological sensitivity of the receiving environment. All development activities should take the Resource Quality objectives into account and abide by required water quality standards contained therein. All requirements of any water use licence issued must be complied with. Activities that could result in a substantive deterioration of the current water quality standard should not be supported.	The Competent Authority or the Department of Water and Sanitation may request that water quality impact study must be undertaken, to determine the proposed development's impact on the sensitive aquatic ecology of the catchment. This should assess the impacts broadly, but specifically take into account: 1. The impact of waste generated by the development and its proposed disposal 2. Cumulative impacts of the proposed development together with existing activities located in the downstream catchments particularly with respect to nutrient loading Any proposed activity must abide by the requirements of the Resource Quality Objectives for the catchment and by requirements of any water use licence issued in respect of the activity.
Low Sensitivity	**WQ Zone 10** Catchments not influencing key supply features with low pollutant concentrations	Development (present and future) within these catchments must maintain the current state of the catchment. These areas have a greater absorption capacity for pollution loads however all catchments in the study area are considered	Activity related water quality assessments may be requested by the Competent Authority or the Department of Water and Sanitation during environmental assessment and/or water use licence applications.

		important and sensitive from a water quality perspective. Localised areas with high pollutant loads should be treated carefully. Activities in these catchments should ensure waste is treated effectively. All development activities should take the Resource Quality objectives into account and abide by required water quality standards contained therein. All requirements of any water use licence issued must be abided by.	

4.5. Flood Risk Zones

4.5.1 Status Quo

Summary Statement: *Flood zone data provides an indication of areas where developments are at risk from flooding. The frequency of a particular flood level being realised is used to describe the area inundated by such a flood. Climate change is an important consideration in assessing flood areas given that large/violent storms are anticipated to become more frequent. This has implications with respect to the frequency of large flooding events and will result in the expansion of 1:100yr, 1:50yr and 1:20yr events' areas.*

4.5.2 Sustainability Objective

Ensure the safe development of areas adjacent to rivers by locating developments appropriately with respect to their resilience to flood impacts. Ensure the continued provision of flood attenuation services to vulnerable areas downstream through the protection of the riparian/flood zone vegetation

4.5.3 Sensitivity Zones

A flood risk sensitivity zone is defined based on the 1:100 yr. flood risk area. All of these areas are potentially at risk of flooding and thus are classified as highly sensitive due to the flood risk to property and human life and to vulnerable areas downstream. These riparian areas and associated buffers also provide critical ecological infrastructure, providing services in the form of storm water attenuation, sediment trapping, nutrient removal and water purification.

Sensitivity Level	Flood zone
Very High	1:100 yr. flood risk area
Low	Areas outside of the modelled 1:100 year flood risk area

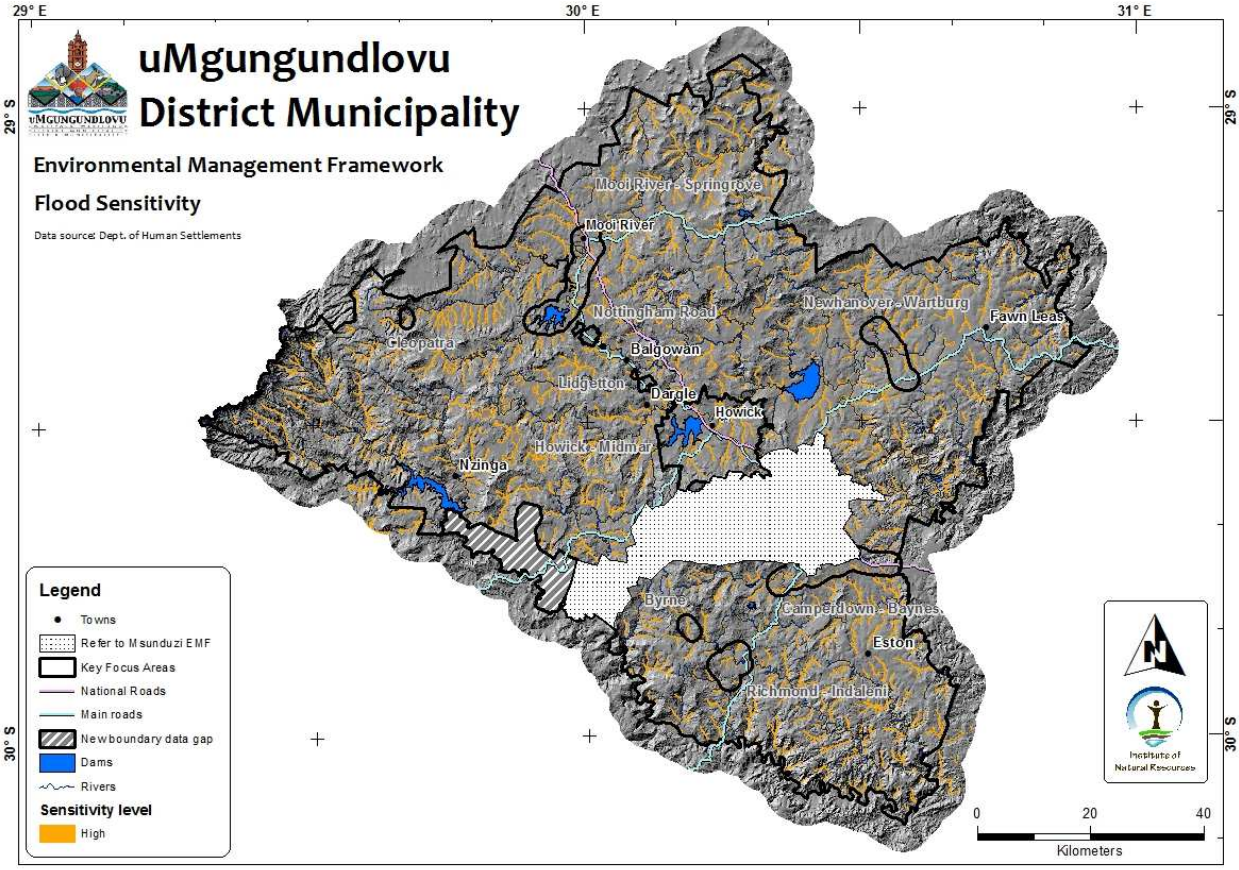

Figure 8: Flood Risk in the UMDM

4.5.5 Guidelines

Sensitivity level	Flood zone	Development objectives	EIA guidelines
Very High	1:100 year flood risk area's risk area	Any development situated within the 1:100 year flood risk zone is in **danger** of being affected by a river or stream in flood and may place people and infrastructure on-site, and upstream or downstream of the site, in danger. Developments within flood risk areas may also negatively impact upon riverine ecology and hydrology. Should development be proposed below the established flood lines (see EIA guidelines), precautions must be taken to ensure the protection of the infrastructure and people associated with that development; and, the protection of infrastructure and people both up and down-stream of the site. Buildings and residential structures should not be permitted below the 1:50 year flood line. Activities that will result in unacceptable flood risk; or, that would negatively impact on the ecological and hydrological functioning of the floodplain are not supported in the flood risk area. Flood zone areas can contain ecological features that help mitigate flooding potential and provide ecosystem services. If development cannot be avoided within a predicted flood risk area, care must be taken to ensure that the functioning of the flood zone area is not compromised. Where residual impacts remain after mitigation, the establishment of suitable off-site offsets for these residual impacts must be considered and implemented.	A flood line assessment should be undertaken for any application for development in these areas to accurately delineate the 1:20, 1:50 and 1:100 year flood lines. A flood risk assessment should be conducted for those proposed developments that may be impacted on by flood events, or may impact or influence flood events. A riparian and aquatic ecology impact assessment should also be undertaken for any development activities proposed to be located within the 1:100 year flood risk area. This assessment should include an assessment of the impact of any development on the riparian area, aquatic ecology of the stream, and flood attenuation service provided to downstream areas by the riparian vegetation that exists within these zones.
Low	Areas outside of the predicted 1:100 year flood risk area	The area is not expected to experience flooding. However development anywhere in the catchment may alter the flow of water into a catchment system. It is therefore important that no development occurs that will significantly affect the flood regime of the catchment. Smaller catchments are more sensitive to flood regime changes. Activities that will result in increased hardened surfaces should be subject to storm water management. Storm water management plans should allow for the management of stormwater entering the natural drainage system, ensuring that there are no cumulative effects on the catchment flow pattern. All developments within this zone should be flood neutral.	Should a drainage line or small stream occur in the vicinity of any proposed development, a flood risk assessment should be undertaken.

4.6 Wetlands

4.6.1 Status Quo

Summary Statement: *High levels of loss and degradation have reduced the capacity of wetlands to provide a range of important ecosystem services. Remaining wetlands form an important part of the vital ecological infrastructure within the UDM, which needs to be conserved and where possible restored.*

The situation summarised above is due to the following factors and drivers:

1. *Reduction in natural flows, primarily through afforestation.*
2. *Increased infestation by alien species due to disturbance associated with land transformation.*
3. *Total conversion of wetland habitat through draining and planting of crops such as sugar cane and timber.*
4. *Increased toxic and nutrient inputs (associated with fertiliser and insecticide application) to adjacent wetlands.*
5. *Increased sediment and nutrient inputs from key agriculture sectors.*
6. *Loss or disturbance to habitat essential for species of conservation concern, either through direct or indirect disturbances.*

4.6.2 Sustainability Objective

Maintain, enhance, protect and manage wetlands in a scientific and ecologically sustainable manner in order to contribute to social and economic needs, both now and in the future.

4.6.3 Sensitivity Zones

SENSITIVITY LEVEL	THRESHOLD - WETLANDS
Very High Sensitivity	**Within a wetland (footprint)** Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or land that is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typical of life in saturated soil (National Water Act (NWA), Act No 36 of 1998).
High Sensitivity	**Within 32m from a wetland (32m 'Buffer')** Land adjacent to a wetland, up to and including 32m from the edge of the wetland. The 32m mark is a 'Trigger' for listed activities according to the National Environmental Management Act (NEMA) (Act No 107 of 1998). Certain activities within 32m of a watercourse, which includes a wetland resource, will require either a Basic Assessment (BA) or Environmental

	Impact Assessment (EIA). **This development constraint is used as a surrogate for sensitivity.*
Moderate Sensitivity	**Within 500m from a wetland (500m' Buffer')** Land adjacent to a wetland, up to and including 500m from the edge of the wetland. The regulated area according to the NWA is 500m from the edge of a wetland resource. All developments within this regulated area are required to undertake a wetland assessment and a risk assessment to determine the potential impacts on the characteristics of the wetland or the quality and/or flow of water through the wetland resource, to determine whether a Water Use Licence or a General Authorisation is required according to Section 21 (c) and (i) of the NWA. **This development constraint is used as a surrogate for sensitivity.*
No / Low Sensitivity	**> 500m from a wetland** Land that falls outside of the regulated area adjacent to a wetland resource (i.e. >500m from the edge of a wetland).

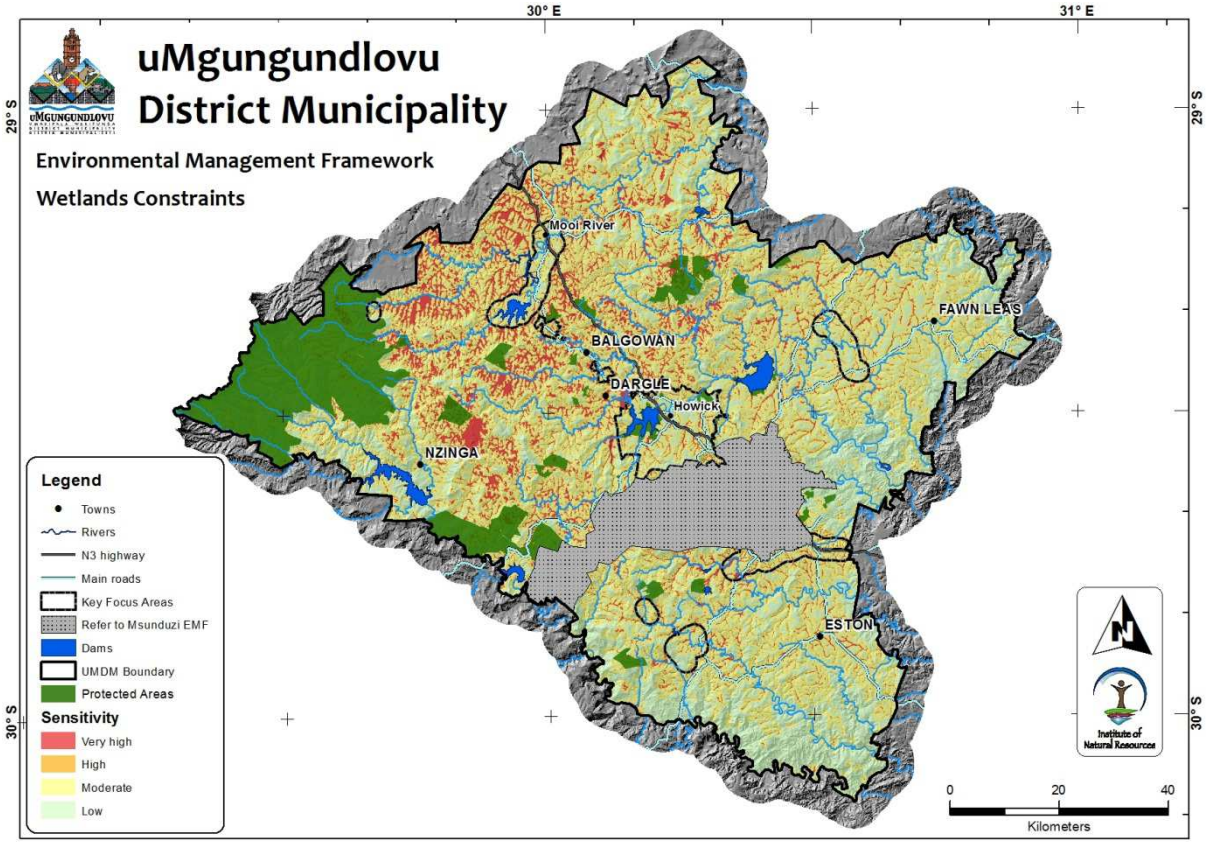

Figure 9: Wetland Sensitivity in the UMDM

4.6.4 Guidelines

Sensitivity Level	Development Objectives	Key legislation / guidelines
Very High	The overarching objective from a wetland conservation and maintenance of ecosystem service perspective is to achieve a 'No Net Loss' of the functions and values of a wetland. No activity that will result in the transformation of wetlands is recommended. Wetlands should be retained for the ecosystem goods and services they supply. In cases where wetland impacts cannot altogether be avoided or acceptably mitigated on-site, consideration must be given to establishing off-site wetland offsets that would result in positive impacts for wetland management in the region.	A specialist wetland assessment must be undertaken. Key legislation to be taken into consideration includes the NEMA and the NWA. The NWA requires that a risk assessment be undertaken according to the Section 21(c) and (i) water use Risk Assessment Protocol (DWS, 2014). Approval for development within a 'wetland footprint' would require extensive investigations, including but not limited to: • *A Wetland Delineation Assessment* The mapping undertaken for the EMF was at a broad level. Where it is suspected that a wetland occurs on site a wetland specialist will be required to confirm this. If wetlands occur on the site then the wetlands need to be delineated according to DWA delineation guidelines (A practical field procedure for identification and delineation of wetland riparian areas (DWAF, 2005)). • *A Wetland Condition and Functional Assessment* A wetland condition and functional assessment is required. Tools available include WET-Health (Macfarlane *et al*, 2008) and WET-EcoServices (Kotze *et al*., 2007). • *A Wetland Buffer Zone Assessment* A wetland buffer zone assessment is typically required. The guideline for the determination of buffer zones for wetlands, rivers and estuaries (Macfarlane and Bredin, 2016) should be applied. The buffer assessment procedure provides a standard approach for determining appropriate buffer zones which are informed by the sensitivities of the water resource as well as the condition of the buffer zone. • *Wetland Rehabilitation and Management* The EMP should include a wetland management component that details how existing systems in good condition will be protected and managed, and how degraded systems will be restored and managed to achieve the sustainability objective. Guidelines for rehabilitation and management are provided as part of the Wetland Management Series tools (Dada et al, 2007). • *A Wetland Offset Assessment* Offsets must be undertaken in accordance with any National Policy on Offsets and any Provincial Offsets Policy or Guideline adopted by the Competent Authority/s. The South African National Biodiversity Institute (SANBI) and the DWS have developed a wetland offsets guideline describing the best-practice for unavoidable wetland development in South Africa (SANBI and DWA, 2014). This guideline is a tool aimed at ensuring the consistent application of wetland offsets in South Africa. Wetland offsets are aimed at ensuring compensation for significant residual impacts arising from development after appropriate avoidance; minimisation and rehabilitation measures have been taken. Wetland offsets must be secured from future development through relevant and appropriate legal measures.

Sensitivity Level	Development Objectives	Key legislation / guidelines
High	This is regarded as a 'wetland buffer area' and identifies areas where the on-site delineation of wetlands may not have been undertaken and, it identifies areas that may be close to, and have a direct impact on, wetland areas. If development is proposed in this area, studies must be undertaken to delineate any wetlands and to assess the functionality of any wetland areas on the development site or in close proximity to the development site. In addition, site specific development buffers should be determined within which development should not be allowed to encroach. Activities that would result in negative impacts on wetlands should not be undertaken in this zone. These land uses include any uses that would result in the transformation of natural surfaces to hardened surfaces; the contamination of run-off or storm water; and, any land uses that would result in a negative impact on the hydrology of the wetland area through an increase, decrease or change in storm water run-off or flow.	A wetland specialist assessment is required. Approval for development within a 'wetland buffer area' would require extensive investigations, including but not limited to: • *A Wetland Delineation Assessment* The mapping undertaken for the EMF was at a broad level. Where it is suspected that a wetland occurs on site a wetland specialist should be required to confirm this. If a wetland occurs on the site then they need to be delineated according to DWA delineation guidelines (A practical field procedure for identification and delineation of wetland riparian areas (DWAF, 2005)). • *A Wetland Condition and Functional Assessment* A wetland condition and functional assessment is required. Tools available include WET-Health (Macfarlane *et al*, 2008) and WET-EcoServices (Kotze *et al*., 2007). • *A Wetland Buffer Zone Assessment* A wetland buffer zone assessment is typically required. The guideline for the determination of buffer zones for wetlands, rivers and estuaries (Macfarlane and Bredin, 2016) should be applied. The buffer assessment procedure provides a standard approach for determining appropriate buffer zones which are informed by the sensitivities of the water resource as well as the condition of the buffer zone Key legislation to be taken into consideration includes the NEMA and the NWA. The NWA requires that a risk assessment be undertaken according to the Section 21(c) and (i) water use Risk Assessment Protocol (DWS, 2014). Approval for development within 32m from the edge of a wetland will require wetland delineation, wetland condition assessment, wetland functional assessment, wetland buffer zone assessment, and in the event of a direct impact to the wetland a wetland rehabilitation and / or offset assessment.
Moderate	This is regarded as a 'wetland influence area' and identifies areas that may have a direct or indirect impact on wetland areas.	Key legislation to be taken into consideration is the NWA. Approval for development within 500m from the edge of a wetland requires a risk assessment (DWS, 2014). Wetland assessments that are likely to be required include: wetland delineation, a wetland condition assessment, wetland functional assessment, wetland buffer zone assessment, and in the event of a direct impact to the wetland a wetland rehabilitation and / or offset assessment.

Sensitivity Level	Development Objectives	Key legislation / guidelines
No / Low	These include areas where no wetlands or buffer areas have been identified in the wetland specialist study undertaken. Due to the scale of mapping it may still be possible for a wetland to occur within a low constraint zone. Therefore there is still the obligation to assess the site and to determine the potential existence of wetlands prior to development commencing. Should any wetland areas be identified on-site, the constraints identified in the wetland and wetland buffer areas would apply.	Wetland assessments are typically not required. However, in the event of a development that may impact on wetland resources at a landscape or watershed level, then an appropriate wetland assessment will need to be undertaken (i.e. as per the assessments outlined above).

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SANBI and DWA, 2014.*Wetland offsets: a best-practice guideline for South Africa.* South African National Biodiversity Institute and the Department of Water Affairs. Pretoria. 53 pages. Technical editors: Macfarlane, D., Holness, S.D., von Hase, A., Brownlie, S. & Dini, J.

4.7 Infrastructure

4.7.1 Status Quo

Summary Statement: *The high levels of infrastructure service vulnerability have the potential cause significant environmental impacts. The infrastructure assessment of the EMF indicates that waste services, water and sanitation infrastructure are not well developed across the UMDM. This presents constraints to development and has implications for an overstrained natural resource base to assimilate pollution and waste and natural resource needs.*

The situation summarised above is due to the following factors and drivers:

1. *Uneven distribution on infrastructure services across the UMDM remains a constraint to development and a threat to natural resources.*
2. *Existing water, sanitation and waste collection services are under pressure. This presents impacts negatively on the environment increasing pollution and reducing water quality.*
3. *Roads and electricity have a greater coverage across the district and can facilitate development objectives of the district.*
4. *Development of infrastructure should proceed with green innovation and efficiency technologies.*

4.7.2 Sustainability Objective

The sustainable development of infrastructure services that will enhance sustainable socio-economic development and reduce the impact on natural resources and the environment.

4.7.3 Sensitivity Zones

The infrastructure assessment component of the Umgungundlovu Environmental Management Framework (EMF) investigated the extent of available infrastructure services in the Umgungundlovu District Municipality (UMDM). Five infrastructure services were investigated:

- Water Services,
- Sanitation Services
- Road Networks
- Electricity Distribution Networks
- Solid Waste Collection Services

The approach to mapping the infrastructure services included the acquisition of accessible data from municipal and infrastructure service providers and utilities. This was conducted through extensive engagement with various gate keepers of infrastructure data including workshops and meetings.

The data was then assessed in terms of the coverage and condition assessment information obtained. The mapping sources of information included the following:

- Water: Umgeni Water, UMDM Water Services Authority – consultants for the Water Services Development Plan update and UMDM GIS Shared Services

- Roads: Strategic Infrastructure Projects (SIP 2) from Department of Transport sub-consultant and UMDM GIS Shared Services
- Sanitation: UMDM Water Services Authority – consultants for the Water Services Development Plan update and the UMDM GIS Shared Services
- Electricity: Eskom
- Waste Services: UMDM GIS Shared Services, UMDM Waste Services

SENSITIVITY LEVEL	THRESHOLD
Very High	**0-1 Infrastructure Services Present** Infrastructure Service extent assessed include water, sanitation, electricity, roads, water services. If only one of these present it would indicate a very high sensitivity and therefore a very high constraint to development and on the environment by virtue of the impacts caused by lack of services e.g. watercourse pollution
High	**2-3 Infrastructure Services Present** Infrastructure Service extent assessed include water, sanitation, electricity, roads, water services. If only two of these are present it would indicate a high sensitivity and therefore a high constraint to development and on the environment by virtue of the impacts caused by lack of services.
Moderate	**3-4 Infrastructure Services Available** Infrastructure Service extent assessed include water, sanitation, electricity, roads, water services. If only 3 of these are present it would indicate a moderate sensitivity and therefore a moderate constraint to development and on the environment by virtue of the impacts caused by lack of services.
No/Low Constraint	**4-5 Infrastructure Services Present** Infrastructure Service extent assessed include water, sanitation, electricity, roads, water services. 4 of these are present and indicate a low sensitivity and therefore a low constraint to development and on the environment by virtue of the reduced impacts caused by lack of services.
Protected Area	Bulk infrastructure services present to support the sustainable management and utilisation of the Protected Area and established in accordance with the Protected Area Management Plan.

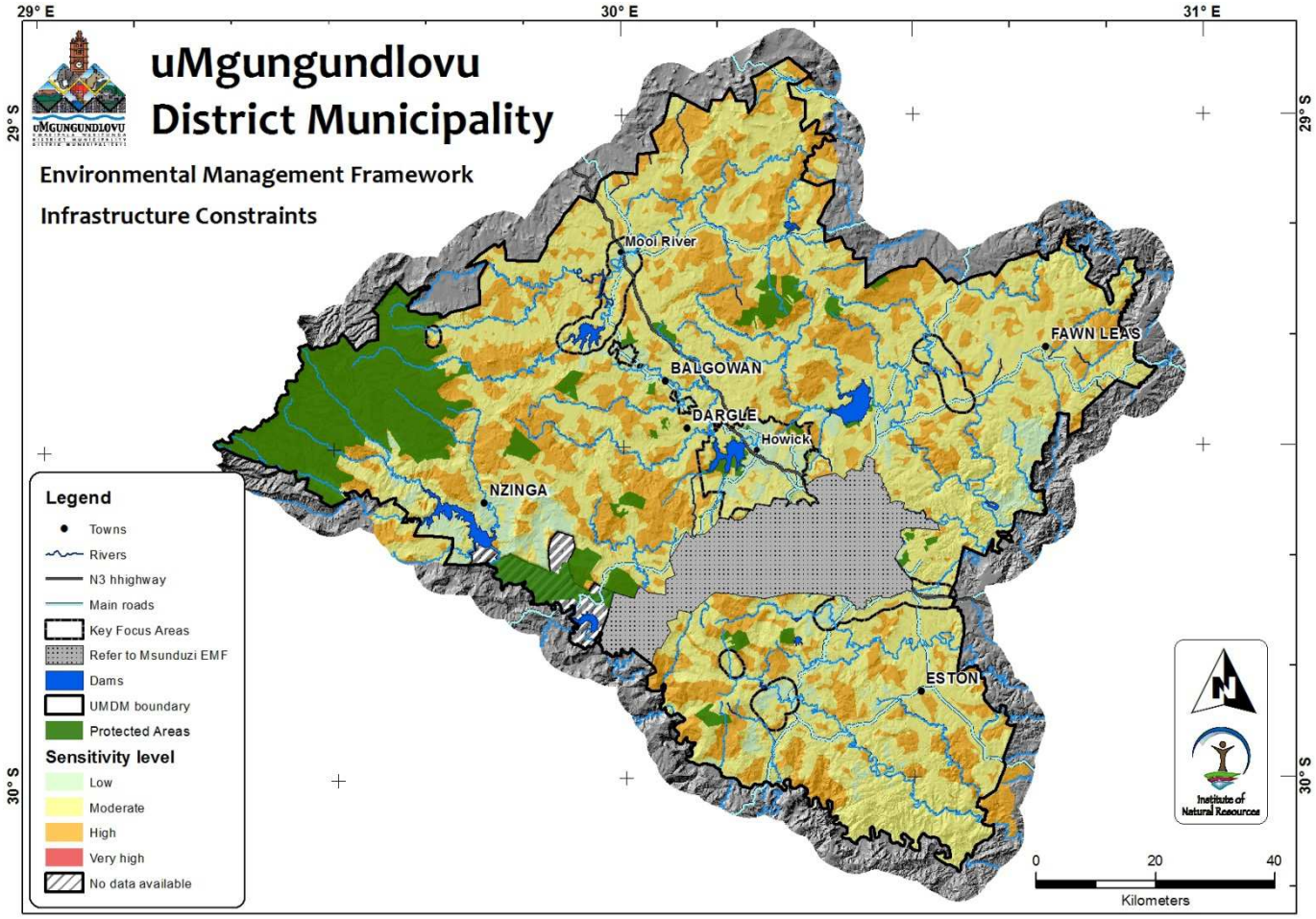


Figure 10 Infrastructure Sensitivity in the UMDM

4.7.4 Guidelines

Sensitivity Level	Development Objectives	Key legislation / guidelines
Very High	This zone has only one or none of the critical bulk services present for the support of developments and requires new services, to provide for current and future developments. New developments must ensure that bulk service requirements are met prior to development commencing. Activities that will result in increased population density should not be supported until it can be demonstrated that sustainable basic services can be provided to the area without negatively impacting on the environment.	All development applications must consider increased costs to allow for infrastructure services development. Developments requiring extensive bulk infrastructure must confirm the planned provision of various services with the municipal and town planning officials. The NEMA Act (1998) and the NEMA EIA Regulations of 2014 have application to development authorisations in Listing 3 sensitive environments as identified in this EMF or other sensitive areas as indicated in the Listing 3 notice. Depending on the impact and nature of the development an EIA or Basic Assessment Process will need to be followed. All infrastructure services in the district will be approved through development planning applications, water use licence and environmental authorisations processes. Streamlining and integration of the applications should be considered in early planning in order to expediently pursue sustainable development in service delivery provision. All applicable environmental authorisations and development applications must be supported by mitigation plans to ensure that energy efficient, green building and water efficiency technologies are implemented. The development application must show that the most appropriate sewage treatment facilities for containment and treatment before release to the natural environment will be established. The level of treatment should exceed generally accepted standards to assist in working towards a state of improved water quality (in terms of nutrients and bacterial quality) in consultation with the DWS. Sustainable urban storm water design (SUDS) principles should be applied to reduce the volumes and intensity of water run-off from the development area. The indicative (not exhaustive) list of applicable guidelines to ensure environmentally sensitive development include the following: ***Waste Services:*** • NEMA: Waste Act (2008): Waste Classification and Management Regulations • National Norms and standards for the assessment of waste for landfill disposal (2008) • National norms and standards for disposal of waste to landfill (2008)
High	This zone has only two of the critical bulk services present in support of developments. New services may be required to meet the needs of certain developments. New developments must ensure that bulk service requirements are met prior to development commencing, This may entail the upgrading of existing services within the area planned for development. Activities that will result in increased population density should not be supported until it can be demonstrated that sustainable basic services can be provided to the area without negatively Impacting on the environment. This should include consideration of the capacity of existing service infrastructure.	

Sensitivity Level	Development Objectives	Key legislation / guidelines
Moderate	This zone has at least 3 of the critical bulk services present to meet the needs of developments, however Upgrading of these services may be required to ensure that capacities are not exceeded. Service Capacity, particularly of existing infrastructure, should be considered prior to the approval of any development that would result in increased population density.	***Linear Developments*** • NEMA EIA Regulations 2014, as amended • Department of Transport, National Transport Master Plan 2050 • National Road Traffic Act, 1996 as amended ***Water*** Umgeni Water infrastructure Master Plan National Water Services Act National Water Act, 1998 ***Municipal Planning*** Umgungundlovu Integrated Development Plan Umgungundlovu Spatial Development Framework Local Municipality Integrated Development Plans Local Municipality Spatial Development Frameworks ***Energy Efficiency*** National Energy Efficiency Strategy of the Republic of South Africa , 2008 .
No / Low	This zone has at least 4 of the critical bulk infrastructure services present for the needs of developments. New developments may however exceed the current capacity of the zone and investigations into the capacity and Possible upgrading of the services within this zone may be needed. Land use is therefore not limited By the existence of basic services but rather by their capacity. Service capacity, particularly of existing infrastructure, should be considered prior to the approval of any development that would result in increased population density	While there is adequate infrastructure services present, the maintenance and upgrading of existing services will require adherence to the guidelines indicated above.
Protected Area	This zone may have critical bulk infrastructure services present to support the sustainable management and utilisation of the Protected Area.	Infrastructure provision should be in accordance with the Protected Area Management Plan approved in terms of the NEM:PAA.

5. LISTING NOTICE III GUIDANCE

5.1 Overview of LN 3 Triggers

In terms of Regulation 5(2) of the Environmental Management Framework Regulations (GN R547 of 18 June 2010) an Adopted Environmental Management Framework must be taken into account in the consideration of applications for environmental authorisation in or affecting the geographical area to which the framework applies.

The Environmental Impact Assessment Regulations Listing Notice 3 of 2014 (GN R985 of 4 December 2014 (as amended)) identifies activities where environmental authorisation is required prior to commencement of that activity within specific identified geographic areas. One of the specific identified geographic areas defined in these regulations are "*sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority*".

The uMgungundlovu Environmental Management Framework identifies the following areas as being regarded as "sensitive" in relation to specific Listing Notice 3 activities, due to their environmental attributes and sensitivities.

Table 3 Listing Notice 3 activities triggered in relevant EMF senstivity zones

	Listing Notice 3 Activities		
	Map 1	Map 2	n/a
Environmental Constraint Layer	Activities: 1; 2; 3; 5; 8; 9; 11; 12; 13; 16; 20; 21; 24; 25	Activities: 4; 6; 7; 10; 17; 18; 19; 22	Activities: 14; 15; 23
High Biodiversity Area (CBA's and Agro-biodiversity zones)	No	Yes	No
Flood risk / Riparian Area (1:100 year flood risk area)	Yes	Yes	No
Wetland footprint and 32m buffer area	Yes	Yes	No

The determination sensitive areas has taken into consideration the existing thresholds and activities included in Listing Notice 1, 2 and 3 and the sensitivities and attributes of the receiving environment and the potential impacts of specific types of activities on these areas.

Table 3 refers to 2 maps that show where a suite of various activities are triggered in different sensitivity zones. These maps are meaning les at the scale they can be shown in this document. They are therefore best accessed through the DST, which allows you to query these maps to confirm whether a development site intersects these constraint maps.

The following figures do provide a view of all three of these sensitivity zones (Figure 11), and 'zoomed in view' of the three sensitivity layers for the same location to provide users with an understanding of what these layers represent at a project area scale (Figures 12 -14).

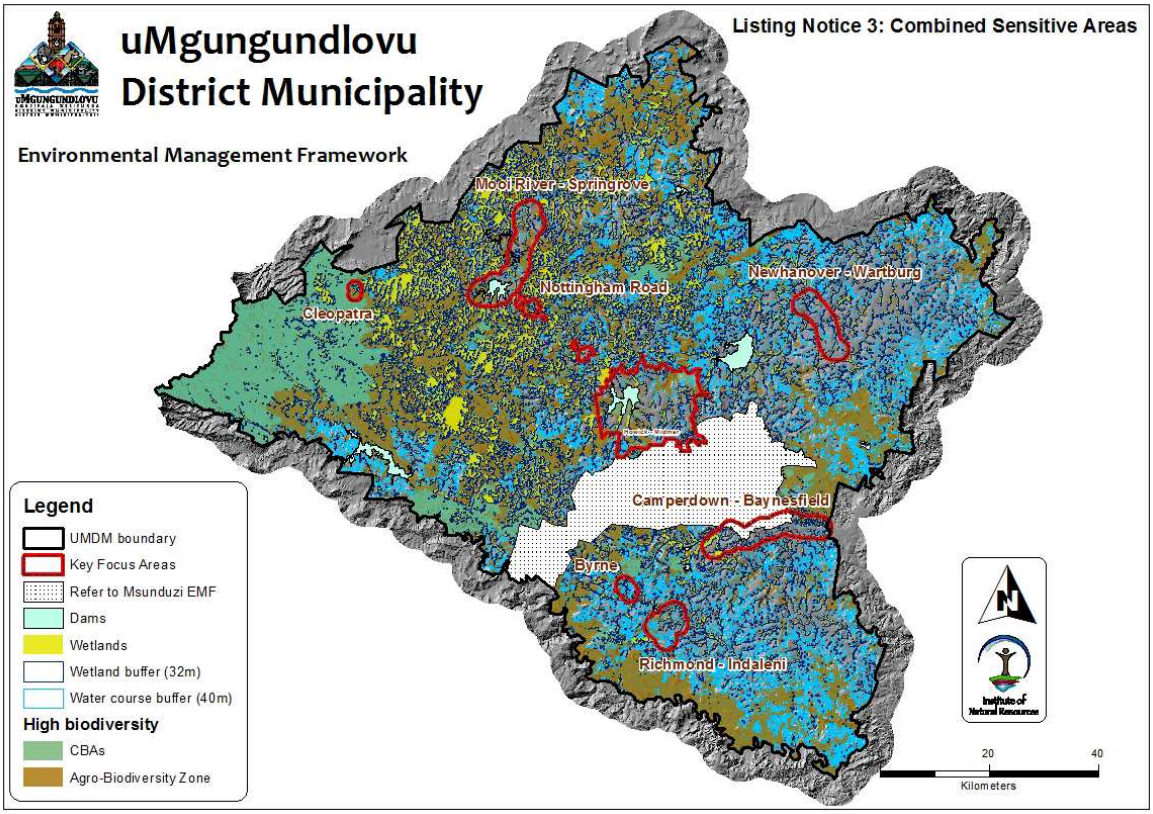


Figure 11 Listing Notice 3 combined senstivity areas map

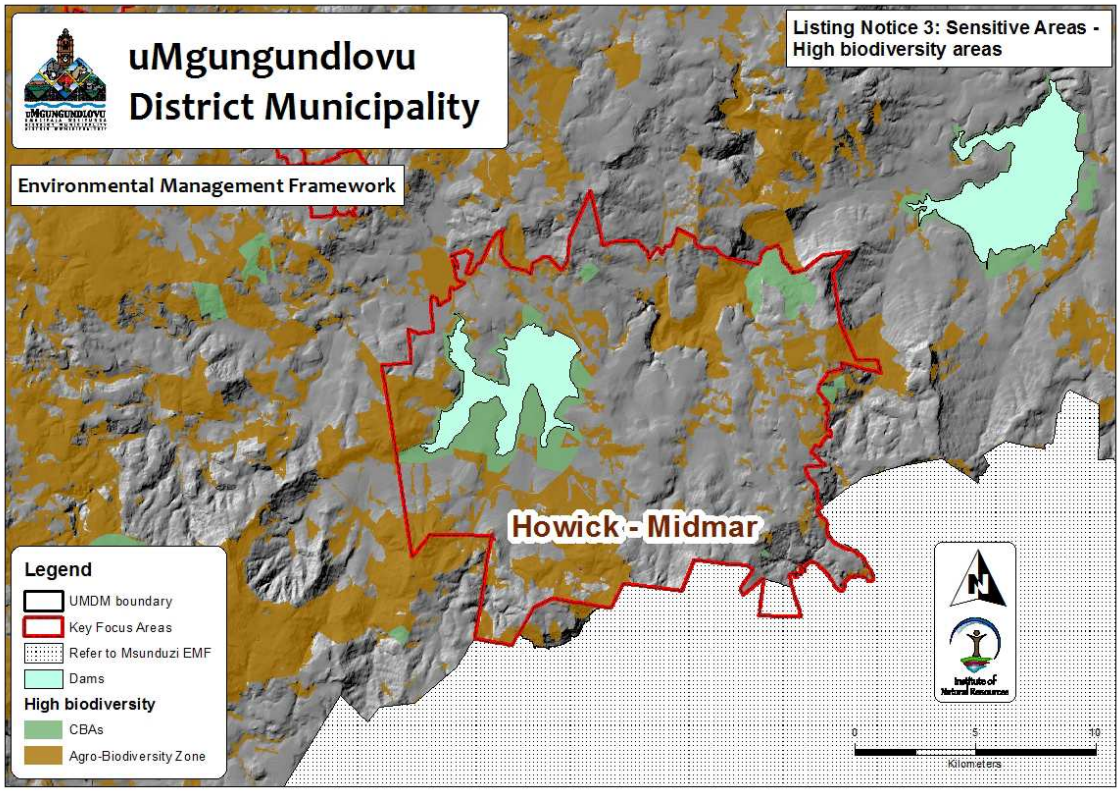


Figure 12 Listing Notice 3 sensitive biodiversity area

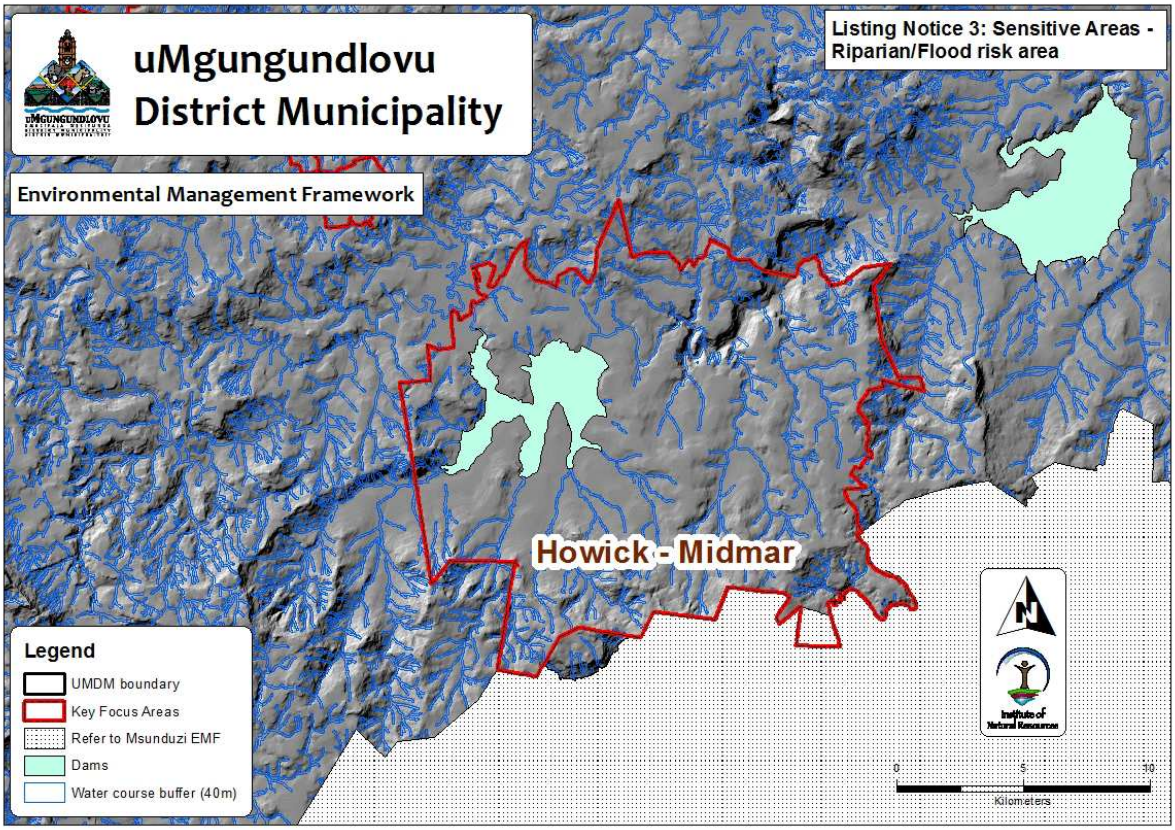


Figure 13 Listing notice 3 senstive riparian/flood risk area

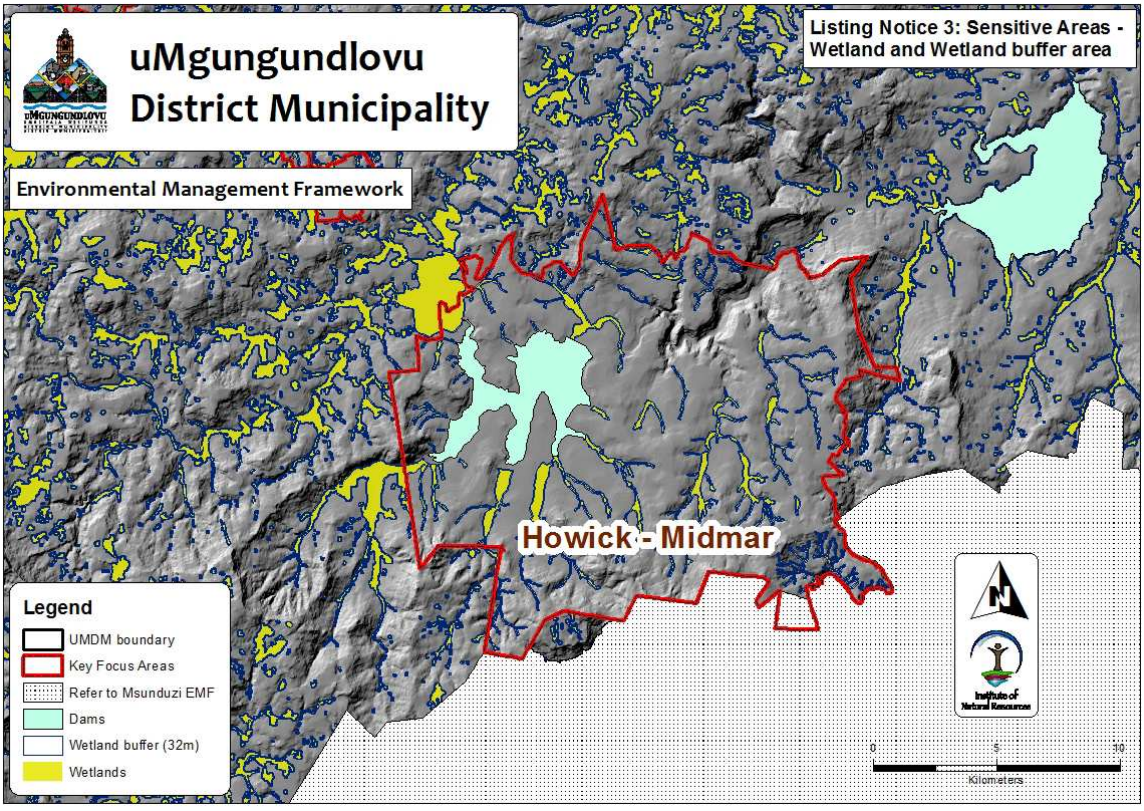
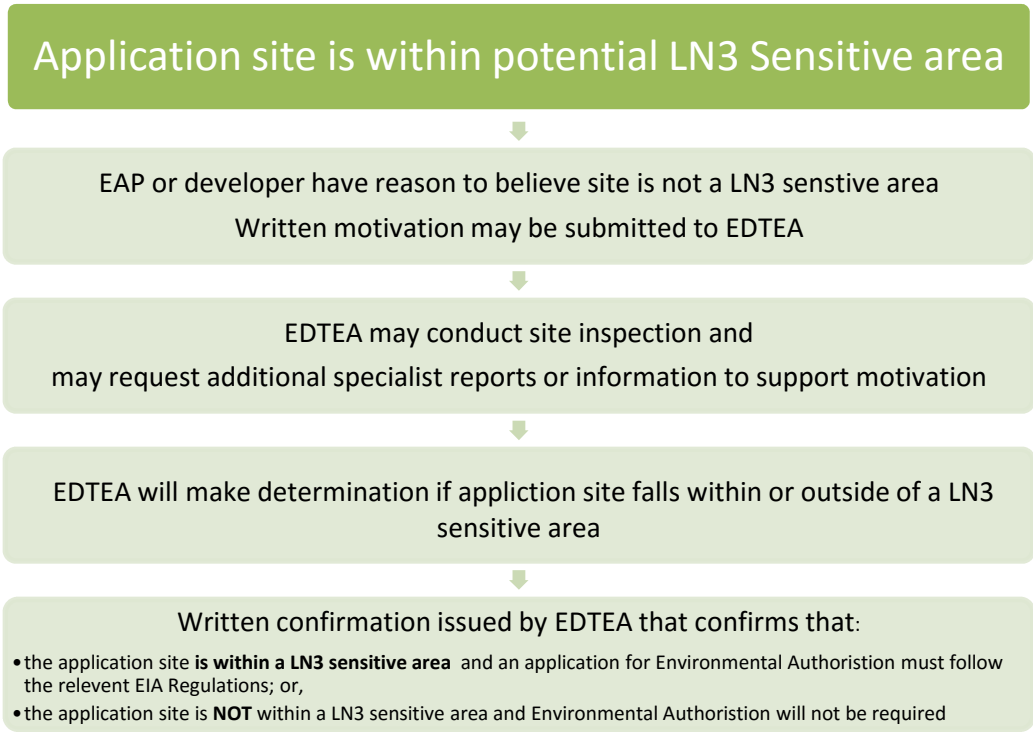


Figure 14 Listing notice 3 senstive wetland and buffer area

5.2 Listing Notice 3 Screening Process

Being mindful of the confidence levels of the spatial data that has been used to determine the defined sensitive areas, an Environmental Screening process has been established in order to assist in confirming the environmental sensitivity of the site prior to requiring an application to obtain Environmental Authorisation.

LISTING NOTICE 3 SENSITIVE AREAS ENVIRONMENTAL SCREENING PROCESS



5.2.1 High Biodiversity Sensitivity Trigger

The Department recognises that the spatial data used in the biodiversity constraint layer may be outdated and has not been comprehensively groundtruthed. Should an activity fall within the identified High biodiversity constraint area and the Environmental Assessment Practitioner or Developer ***feel that they have reasonable motivation*** that the site should not be considered a High biodiversity constraint area, a written request and motivation may be made to the Department to consider the applicability or otherwise of the proposed development site as a sensitive area.

Based on the initial request and motivation the Department may either -

1. Make a determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3;
2. Request that the motivation be supported by a Preliminary Biodiversity Assessment Report produced by a suitably qualified and experienced independent biodiversity specialist; and/or,
3. Request any other relevant information required to make an informed decision.

The Preliminary Biodiversity Assessment Report must be undertaken in accordance with an acceptable scientific methodology and as a minimum must consider:

- The presence of, or potential presence, biodiversity attributes and/or species of conservation significance, including but not limited to threatened and protected species and those species identified in the systematic conservation plan of Ezemvelo KZN Wildlife;
- Any landscape features that may be of conservation significance;
- The condition of the site in terms of current or previous land use;
- The current level of fragmentation of habitat on the development site and in the wider landscape;
- Whether the site forms part of, or can form part of, any ecological corridor; and,
- Any likely significant negative impacts on biodiversity and/or ecosystem services.

Based on the information provided, and any other relevant considerations, the Department will provide a written determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3.

Without written approval from the Department which confirms that the site should not be considered a High biodiversity constraint area, all sites that fall within the defined High biodiversity constraint area must be considered Sensitive, and the relevant activities, as listed in the Environmental Impact Assessment Regulations Listing Notice 3 of 2014, would require environmental authorization to be issued prior to the commencement of that activity.

5.2.2 High Flood Risk and Riparian Sensitivity Trigger

The Department recognises that the spatial data used in the flood risk and riparian constraint layer may not be 100% accurate as it has been based on a lower resolution Digital Elevation model data and has not been comprehensively groundtruthed. Should an activity fall within the identified High flood risk and riparian constraint area and the Environmental Assessment Practitioner or Developer feel that they have reasonable motivation that the site should not be considered a High flood risk and riparian constraint area, a written request and motivation may be made to the Department to consider the applicability or otherwise of the proposed development site as a sensitive area.

Based on the initial request and motivation the Department may either -

1. Make a determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3;
2. Request that the motivation be supported by a Flood risk assessment report and/or a Riparian assessment report produced by a suitably qualified and experienced specialist/s; and/or,
3. Request any other relevant information required to make an informed decision.

The Flood risk assessment Report must be produced by a suitably qualified and experienced independent hydrological specialist and, must be undertaken in accordance with an acceptable scientific methodology and as a minimum must establish:

- Where necessary a Flood line determination to establish the 1:20, 1:50 and 1:100 year floodlines;
- The presence of, or potential presence, high flood risk areas; and,
- Any likely significant negative impacts of the proposed development on flood regimes.

The Riparian assessment report must be produced by a suitably qualified and experienced independent ecological specialist and, must be undertaken in accordance with an acceptable scientific methodology and as a minimum must consider:

- The presence of riparian areas and vegetation ;
- The condition of the riparian areas and vegetation and the current ecosystem goods and services provided by the riparian area; and,
- Any likely significant negative impacts of the proposed development on riparian areas and associated vegetation.

Based on the information provided, and any other relevant considerations, the Department will provide a written determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3.

Without written approval from the Department which confirms that the site should not be considered a High flood risk and riparian constraint area, all sites that fall within the defined High flood risk and riparian constraint area must be considered Sensitive, and the relevant activities, as listed in the Environmental Impact Assessment Regulations Listing Notice 3 of 2014, would require environmental authorisation to be issued prior to the commencement of that activity.

5.2.3 High Wetland Sensitivity Trigger

The Department recognises that the spatial data used in the wetland and wetland buffer constraint layer may not be 100% accurate and has not been comprehensively ground-truthed. Should an activity fall within the identified High wetland constraint area and the Environmental Assessment Practitioner or Developer feel that they have reasonable motivation that the site should not be considered a High wetland constraint area, a written request and motivation may be made to the Department to consider the applicability or otherwise of the proposed development site as a sensitive area.

Based on the initial request and motivation the Department may either -

1. Make a determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3;
2. Request that the motivation be supported by a Wetland delineation Report produced by a suitably qualified and experienced independent wetland specialist; and/or,
3. Request any other relevant information required to make an informed decision.

The Wetland delineation Report must be undertaken in accordance with the guidance and using the tools and methodology described in section 4.6 and as a minimum must consider:

- The presence of wetland soils and habitat on the site;
- The condition of the wetland areas identified; and,
- Any likely significant negative impacts on wetland areas on the site and those wetland areas directly influenced by the site.

Based on the information provided, and any other relevant considerations, the Department will provide a written determination in respect of whether the site is regarded as sensitive in terms of Listing Notice 3.

Without written approval from the Department which confirms that the site should not being considered a High wetland constraint area, all sites that fall within the defined High wetland constraint area must be considered Sensitive, and the relevant activities, as listed in the Environmental Impact Assessment Regulations Listing Notice 3 of 2014, would require environmental authorisation to be issued prior to the commencement of that activity.

6. CUMULATIVE SENSITIVITY PATTERNS

The following points summarize the main findings with regard the individual sensitivity zones from which certain areas are highlighted in terms of their cumulative sensitivity. :

vii. The ***District is endowed with valuable agricultural resources*** as indicated in Figure 5. As emphasized in the SEA, these resources are not necessarily adequately valued given that S.A. and the ongoing transformation to other land-uses represents one the most significant sustainability issues in the Province. This is the basis for productive land forming a key focus of the EMF scope of work. Consequently high value agricultural land represents a significant constraint to other land uses which will result in transformation. These represent a high constraint to any other use with consequent requirements in the EIA process to confirm the agricultural value of the land in question. The low resolution of the agricultural information means that this constraint is wide ranging in terms of the spatial coverage.

viii. Large areas identified as of '***Very High' sensitivity for agricultural purposes are also deemed to be 'highly' sensitive from a biodiversity perspective***. In the case of grazing, the two land-uses support each other in terms of protecting these grasslands. There are however areas where the two land-uses compete i.e. where high potential arable land has not been developed and is important in its natural state for meeting biodiversity targets.

ix. The untransformed areas noted in i and ii above are also critical from a water resources delivery point of view. Given that the District incorporates the key economic hubs of the greater Pietermaritzburg-Durban area, and the stressed nature of water resources documented in the status quo and SEA, the transformation of these catchments will place further stress on social well-being and economic productivity in the catchment.

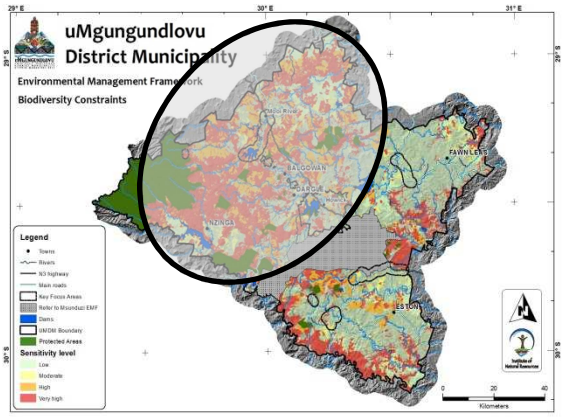
x. ***There is a clear link between the high urbanised and industrialised sections of the catchment and the water quality sensitivity zones***, which is exacerbated with Pietermaritzburg and its waste water treatment plant being located on major river systems. The agricultural production in the midlands is putting pressure on the quality of water in the major impoundments – namely Spring Grove, Midmar and Albert Falls Dams.

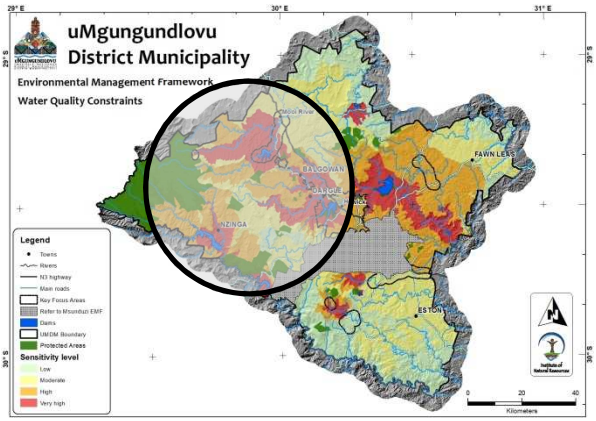
xi. The ***high density of wetlands in these priority wetland and water quality catchments is another key factor to consider given the role that they play*** in ameliorating poor water quality, attenuation floods and regulating streamflow. The ***poor condition of wetlands*** discussed in the SQ and SEA, ***emphasize the need for attention in protecting and reinstating wetland function***.

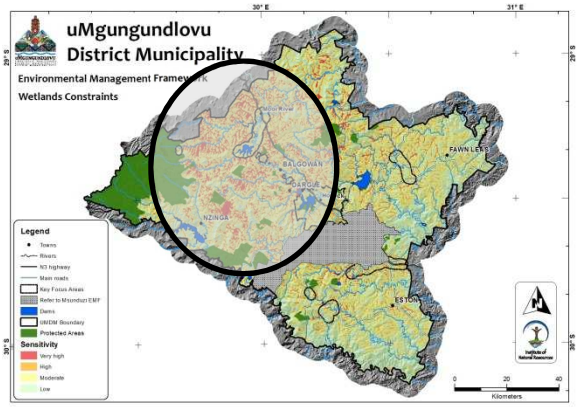
The cumulative value the midlands region of the district for biodiversity, water production, wetlands, water quality and agriculture is emphasized by considering these layers in combination below. There is other areas of the district in which are highly sensitive for each of these features. For example the well-developed sugar-cane growing areas in the Wartburg and Eston/Richmond areas are an important for agriculture. However, the midlands region is highly sensitive to all. This highlights the risk to the people and economy of the District from:

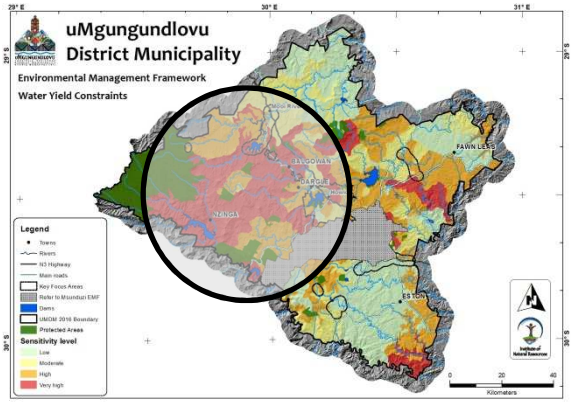
- Transforming the natural systems, notably grassland and wetlands in the region.
- Failing to address water quality issues.
- Failing to protect and utilise the valuable agricultural resources.

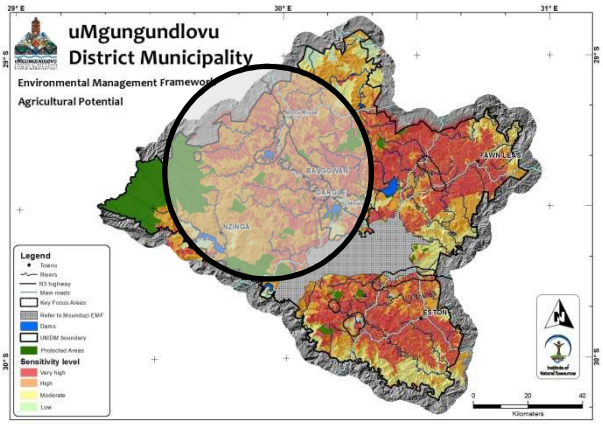
These patters have been translated into development constraints for land-uses in Volume III: Environmental Guidelines for Development Planning.











APPENDIX 1
Specialist Reports