

DIGBY WELLS
ENVIRONMENTAL



Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project

Heritage Screening Assessment

DEA Reference:

14/12/16/3/3/2/1036 – Normandie-Iphiva 400 kV Powerline

14/12/16/3/3/2/1037 – Iphiva Substation

14/12/16/3/3/2/1038 – Iphiva-Duma 400 kV Powerline

Project Number:

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Prepared for:

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EXECUTIVE SUMMARY

ILISO Consulting (Pty) Ltd, trading as NAKO ILISO, appointed Digby Wells Environmental (hereinafter Digby Wells) in respect of the Eskom Holdings SOC Ltd (hereinafter Eskom) Northern KwaZulu-Natal (KZN) Strengthening Project. The Project will entail four separate applications for Environmental Authorisation (EA) comprising:

- A new Iphiva Substation;
- Establishment of 132 kV Distribution lines;
- The Iphiva – Duma 400 kV Powerline; and
- The Normandie – Iphiva 400 kV Powerline.

The Terms of Reference (ToR) of the specialist heritage study was to complete a Heritage Screening Assessment to comply in part with the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008) (KZNHA) and National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) to predict preliminary heritage impacts and outline activities to be undertaken in the subsequent phases of the Project as a condition of authorisation.

Through the review of available information, Digby Wells demonstrated the greater cultural landscape to contain heritage resources spanning from palaeontological through to contemporary living heritage resources. Further to this, the assessor determined the cultural significance of the defined landscape to be medium based on criteria defined in Section 3 of the NHRA.

Table: Recorded heritage resources in the local study area.

Heritage Resource Type	Number Recorded
Palaeontological	13
Archaeological - MSA	23
Archaeological - LFC	14
Archaeological - Undefined	107
Battlefield	5
Burial Grounds & Graves	100
Monuments & Memorials	2
Historical Built Environment	111
Intangible / Living	6
Place	2
Natural	2
Grand Total	385

Table: Summary of CS of heritage resource types in the local study area

Very High

Palaeontological resources associated with the Karoo Supergroup lithologies
 Burial grounds and graves

High

Archaeological LFC sites with good integrity
 Historic battlefields
 Monuments and memorials
 Natural

Medium High

Archaeological MSA sites with good integrity
 Historical built environment associated with living groups with good integrity
 Intangible / living heritage sites

Medium

Historical built environment not associated with living groups with good integrity

Negligible

Archaeological MSA sites with poor integrity
 Archaeological LFC sites with poor integrity
 Historical built environment associated with living groups with poor integrity
 Historical built environment not associated with living groups with poor integrity

The assessment of potential impacts to heritage resource types, known to occur within the cultural landscape, considered the defined project related activities, specifically project activities during the construction phase that have the greatest likelihood of direct impacts to heritage resources.

Collectively, the activities that may have a direct impact on heritage resources considered in this preliminary assessment include:

- Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures;
- Construction and/or upgrading of access roads; and
- Stringing of conductors.

A summary of the assessment is presented in the following table:


Table: Summary of potential impacts to heritage resource types by project related activities

Impact	Pre-mitigation:						Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Archaeological resources with medium significance	Permanent	Province/Region	Moderately high - negative	Highly detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Archaeological resources with high significance	Permanent	National	Extremely high - negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Battlefields with high significance	Project Life	Limited	High - negative	Moderately detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Burials, monuments and memorials with high significance	Permanent	International	Extremely high - negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Living heritage sites with high significance	Permanent	Province/Region	Extremely high - negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive

The assessment also considered the suitability of the proposed siting and/or routing of infrastructures multi-criteria decision analysis utilising a simple linear additive evaluation model. Defined criteria included:

- Criteria 1: The level of existing anthropogenic disturbance of the various site-specific study areas that will reduce the likelihood of identifying *in situ* heritage resources;
- Criteria 2: Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon;
- Criteria 3: If heritage resources occur within or in proximity to the development footprint and may be impacted upon; and
- Criteria 4: The potential that permitting requirements may be applicable if EA of the development footprint is approved.

The results of the comparison of alternatives demonstrated the following preferred options from a heritage perspective:

1. Iphiva 6 Substation;
2. West routing alternative for the Iphiva-Makhathini / Iphiva-Mbazwane distribution line;
3. All above ground design options for the 132 kV distribution line along the P234 corridor;
4. Iphiva – Duma West 1, West Deviation or East 400 kV alternatives; and
5. Normandie – Iphiva 2 400 kV alternative.

Based on Digby Wells' understanding of the Project and the results of this assessment, the following recommendations were made:

- Exemption from further palaeontological assessment and the inclusion of a Fossil Chance Find Procedure in the EMPr;
- A detailed heritage walk-down and impact assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities to identify any heritage resources that may be impacted upon;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources;
- Recommendations contained within the visual assessment must be considered to reduce the intensity of the powerlines visibility;
- The final heritage impact assessment must be submitted to SAHRA and Amafa for approval prior to construction activities; and
- A project specific Chance Finds Protocol, inclusive of the fossils finds procedure as recommended above, be developed and included in the EMPr as a condition of authorisation.

DECLARATION OF INDEPENDENCE

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I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Eskom SOC Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the Eskom Northern KwaZulu-Natal Strengthening Project, located in KwaZulu-Natal Province.



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Compliance with Appendix 6 of GN 326 of 7 April 2017

Regulatory Requirements	Section of Report
(a) The person who prepared the report; and the expertise of that person to carry out the specialist study or specialised process.	1.6
(b) a declaration that the person is independent	Page vi and Appendix C
(c) an indication of the scope of, and the purpose for which, the report was prepared	1.4 & 1.5
(cA) an indication of the quality and age of base data used for the specialist report	4.4, 4.5 & 11
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	6.2 & 6.3
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	4.4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	4
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	6
(g) an identification of any areas to be avoided, including buffers	6
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	6 and Appendix B
(i) a description of any assumptions made and any uncertainties or gaps in knowledge	3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	5.4 & 6.2
(k) any mitigation measures for inclusion in the EMPr	6 & 9
(l) any conditions for inclusion in the environmental authorisation	9



Regulatory Requirements	Section of Report
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation	9
(n) a reasoned opinion— (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	10
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	8
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto	8
(q) any other information requested by the competent authority	10



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1 Introduction

ILISO Consulting (Pty) Ltd, trading as NAKO ILISO, appointed Digby Wells Environmental (hereinafter Digby Wells) in respect of the Eskom Holdings SOC Ltd (hereinafter Eskom) Northern KwaZulu-Natal (KZN) Strengthening Project.

This report constitutes the specialist Heritage Resources Management (HRM) process in support of the regulatory process to comply with the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008) (KZNHA) and National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

1.1 Project background

Transmission powerlines transport electricity generated at power stations to predetermined locations. Over extended distances, transmission substations are required. At present, the Normandie and Impala Main Transmission Substations, approximately 80 kilometre (km) north-west of Pongola and 180 km south of Makhadini Flats respectively, supply the northern KZN network. With an increase in electricity demand in this region of KZN, voltages are approaching unacceptable low levels. Furthermore, the network is experiencing high voltage drops and thermal loading of the remaining network due to the contingencies on the main 132 kilovolt (kV) supplies.

Eskom recognises these constraints to the current network, and have proposed the implementation of the Northern KZN Strengthening Project (*“the Project”*), as described in Section 1.2 below. For this Project to be realised, Eskom is required to undertake an Environmental Authorisation (EA) process in terms of Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

1.2 Project description

The intent of the Project is to “de-load” the primary sub-transmission network and improve voltage regulation to alleviate existing and future network constraints in northern KZN.

To achieve this strategic objective, Eskom plans to construct the new Iphiva 400/132 kV Substation near the town of Mkuze, which will be integrated into the 400 kV network by two 400 kV lines. These will comprise the following:

- The 120 km Normandie – Iphiva 400 kV Powerline; and
- The 130 km Iphiva - Duma 400 kV Powerline.

To accommodate the towers and overhead lines of the 400 kV Transmission powerlines, a 55 metre (m) servitude (27.5 m on either side of the centre line) is required. The servitude is required to ensure safe construction, maintenance and operation of the line and Eskom will be entitled to unrestricted access. Where 400 kV power lines are constructed in parallel, a minimum separation distance of 55 m between centre points is required.



In addition to the two 400 kV lines, 165 km of 132 kV Distribution power lines will also link into the Iphiva Substation.

The various components of this Project are presented separately below.

1.2.1 Iphiva Substation (Ref. No. 14/12/16/3/3/2/1037)

A substation must be situated within proximity to an existing network, in this instance the existing 132 kV KZN network. It is envisaged that a total footprint of 400 x 400 m (i.e. 16 hectare (ha)) will be required for the development footprint, within a site-specific study area of 1 x 1 km. The 16 ha development footprint area includes provisions for an 80 m high microwave radio communication mast, oil and fuel storage facilities, and an oil bund to contain any accidental transformer oil spills.

The proposed substation will comprise standard electrical equipment, including but not limited to:

- Transformers;
- Reactors;
- Busbars; and
- Isolators.

In respect of this Project, two (2) alternate locations were considered. These comprised Iphiva 3 and 6 respectively. The substation will accommodate three (3) 400 kV and seven (7) 132 kV powerlines entering / leaving the site in various directions¹. Construction of the substation will include:

- Vegetation clearing;
- Surface clearing, levelling and terracing;
- Laying of concrete foundations and other applicable works such as storm water drainage pipes, slabs, bund walls, control room and storage facilities;
- Erection of steelworks;
- Delivery and installations of transformers; and
- Upgrade of access roads, and where applicable, water crossings.

Based on the proposed activities, the Listed Activities as presented in Table 1-1 will be triggered.

¹ The routing of the 400 and 132 kV lines will be determined based on the authorisation of the final siting of the Iphiva Substation at either the proposed Iphiva 3 or Iphiva 6 alternatives.


Table 1-1: Applicable Listed Activities relative to the Iphiva Substation

Listing Notice	Activity	Description	NHRA Trigger
GN R 983 (as amended by GN R 327)	11	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV or (ii) inside urban areas or industrial complexes with a capacity of 275 kV or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is – (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Section 38(1)(c)(i)
	14	Development and related operation facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Section 38(8)
	24	The development of a road (ii) with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres.	Section 38(1)(a)
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 hectare.	Section 38(1)(c)(i)
GN R 984 (as amended by GN R 325)	9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kV or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is – (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Section 38(1)(c)(i)



Listing Notice	Activity	Description	NHRA Trigger
GN R 985 (As amended by GN R 324)	3	<p>The development of masts or towers of any type used for telecommunication broadcasting or radio transmission purposes where the mast or tower- (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 meters in height – but excluding attachments to existing buildings and masts on rooftops. (d) In KwaZulu-Natal (ii) Community Conservation Areas; (iii) Biodiversity Stewardship Programme Biodiversity Agreement areas; (iv) A protected area identified in terms of NEMPAA, excluding conservancies; (vi) Sites or areas identified in terms of an International Convention; (vii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (viii) Core areas in Biosphere Reserves; (ix) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (bb) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>	Section 38(8)
	4	<p>Development of a road wider than 4 m with a reserve less than 13.5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>	Section 38(1)(a)



Listing Notice	Activity	Description	NHRA Trigger
	12	Clearance of an area of 300 m ² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (d) KwaZulu-Natal: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.	Section 38(1)(c)(i)

1.2.2 132 kV Distribution line alternatives

Eskom will at a later stage², submit an application for environmental authorisation for the establishment of 132 kV Distribution powerlines as part of the greater Project. Therefore, these are being considered in this report to provide a holistic assessment of the potential heritage impacts to be considered as a condition of authorisation.

Eskom are considering six (6) 132 kV Distribution powerlines. These will comprise the following routings:

- Iphiva – Pongola (1) 132 kV Powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV Powerline;
- Iphiva / Makhathini 132 kV Powerline double circuit with Iphiva / Mbazwane; and

² A Needs and Desirability (NDA) application will be submitted to Amafa concurrent with the submission of the Environmental Authorisation application to the Department of Environmental Affairs (DEA).



- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line³.

Eskom will apply for the environmental authorisation of 500 m corridors within which the 132 kV Distribution powerlines will occupy a 36 m wide servitude. The associated towers will be placed between roughly 250 – 400 m apart, ranging in heights between 25 – 40 m.

Construction of the 132 kV Distribution powerlines will include:

- Establishment of a contractor site along the route alignments;
- Access road negotiation and construction;
- Survey and pegging of the tower positions;
- Fencing and gate installation;
- Vegetation clearing;
- Foundation excavation and installation;
- Tower assembly and erection;
- Conductor stringing and tensioning; and
- Servitude clean-up and rehabilitation.

Based on the proposed activities, the Listed Activities as presented in Table 1-2 will be triggered.

Table 1-2: Applicable Listed Activities relative to the 132 kV Distribution lines

Listing Notice	Activity	Description	NHRA Trigger
GN R 983 (as amended by GN R 327)	11	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV or (ii) inside urban areas or industrial complexes with a capacity of 275 kV or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is – (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Section 38(1)(c)(i)

³ This line is temporary and will be removed once the Iphiva Substation and new Iphiva / Normandie Line are commissioned.



Listing Notice	Activity	Description	NHRA Trigger
	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from – (i) a watercourse.	Section 38(8)
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 hectare.	Section 38(1)(c)(i)
	56	The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre- (i) where the existing road reserve is 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 meters; excluding where widening or lengthening occur inside and urban area.	Section 38(1)(a)
GN R 985 (As amended by GN R 324)	4	Development of a road wider than 4 m with a reserve less than 13.5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	Section 38(1)(a)

1.2.3 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

The Iphiva – Duma 400 kV Powerline will extend over a 130 km routing in the southern portion of the overall study area. Three technically feasible alternative routing options were considered in this assessment, namely the eastern, west 1 and west 2 corridors. The



overhead powerline will be supported by towers positioned within a 55 m servitude⁴. Possible tower types⁵ that may be considered for this Project include:

- Cross rope;
- Self-supporting; and
- Guyed vee.

Construction of the powerline will include:

- Establishment of a contractor site along the route alignment;
- Access road negotiation and construction;
- Survey and pegging of the tower positions;
- Fencing and gate installation;
- Vegetation clearing;
- Foundation excavation and installation;
- Tower assembly and erection;
- Conductor stringing and tensioning; and
- Servitude clean-up and rehabilitation.

Eskom will require contractors' construction camps along the routing of the powerline during construction activities. The proponent will determine and negotiate the exact position of these with the relevant landowners after issuing of environmental authorisation of the final alignment. As far as possible, contractors will use the existing road network. Where the national regulatory framework requires additional authorisations for the construction of new roads, these will be included within the Environmental Management Programme (EMPr) as a condition of authorisation and obtained during the implementation phase prior to construction of the relevant Project component. Eskom will negotiate the various access points and road alignments the relevant landowners after issuing of environmental authorisation of the final alignment.

The individual towers will be placed on foundations. The type of foundation required however, is dependent on the geo-technical conditions of the final siting and the type of tower used. The foundations may be drilled, mechanically excavated or dug by hand, and filled with concrete. Any incomplete excavations will be protected to prevent injury of both

⁴ The servitude will allow for clearance of 27.5 m on either side of the centre line of the powerline. Where constructed in parallel, a minimum distance of 55 m between the centre points is required. The minimum vertical clearance distance between the ground and powerline conductor is 8.1 m.

⁵ Eskom will determine the tower type after establishing the final routing alignment and associated profiling with the necessary environmental authorisations. Please refer to the Scoping Report and EIA for detailed descriptions of the various tower types.



animals and individuals, but will ultimately be back-filled and stabilised through compaction and capped with concrete.

The contractors will assemble the towers on site and lift it into place using cranes, or where required, helicopters. The conductors are then strung between the towers by lacing cable drums at 5 km intervals and passing the cables via guide wire through the desired position in 2.5 km intervals in each direction.

During operation, Eskom will undertake ongoing monitoring and maintenance in accordance with their "Life Cycle Management Plan for Transmission Overhead Lines" (Ref: TBP41-367).

Based on the proposed activities, the Listed Activities as presented in Table 1-3 will be triggered.

Table 1-3: Applicable Listed Activities relative to the Iphiva – Duma 400 kV

Listing Notice	Activity	Description	NHRA Trigger
GN R 983 (as amended by GN R 327)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from – (i) a watercourse.	Section 38(8)
	24	The development of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road which is identified and included in activity 27 in Listing Notice 2 of 2014; where the entire road falls within an urban area; or which is 1 kilometre or shorter.	Section 38(1)(a)
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 ha.	Section 38(1)(c)(i)
	56	The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre- (i) where the existing road reserve is 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 meters; excluding where widening or lengthening occur inside and urban area.	Section 38(1)(a)
GN R 984 (as amended by GN R 325)	9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kV or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the	Section 38(1)(c)(i)



Listing Notice	Activity	Description	NHRA Trigger
		transmission and distribution of electricity where such bypass infrastructure is – <ul style="list-style-type: none"> (e) temporarily required to allow for maintenance of existing infrastructure; (f) 2 kilometres or shorter in length; (g) within an existing transmission line servitude; and (h) will be removed within 18 months of the commencement of development. 	
GN R 985 (As amended by GN R 324)	4	Development of a road wider than 4 m with a reserve less than 13.5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	Section 38(1)(a)
	12	Clearance of an area of 300 m ² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (d) KwaZulu-Natal: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated	Section 38(1)(c)(i)



Listing Notice	Activity	Description	NHRA Trigger
		for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.	

1.2.4 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

The Normandie – Iphiva 400 kV Powerline will extend over an approximate 150 km routing in the northern portion of the overall study area. Eskom considered the results of the scoping assessment, discarding routing options with significant sensitivities. The remaining N-I 2 and N-I 3 alternative routing options were considered in this assessment. The construction and operational activities, as presented in Section 1.2.3 above, are applicable to this component of the Project. These are not repeated here for the sake of brevity.

Please refer to Table 1-3 for applicable listed activities for the Normandie-Iphiva 400 kV Powerline EA application.

1.3 Project location

The Project is predominantly located in northern KZN, characterised by cultivated areas, plantations, urban and rural settlement, protected areas and open bush.

Table 1-4 presents a summary of the Project location detail.




Table 1-4: Project location summary

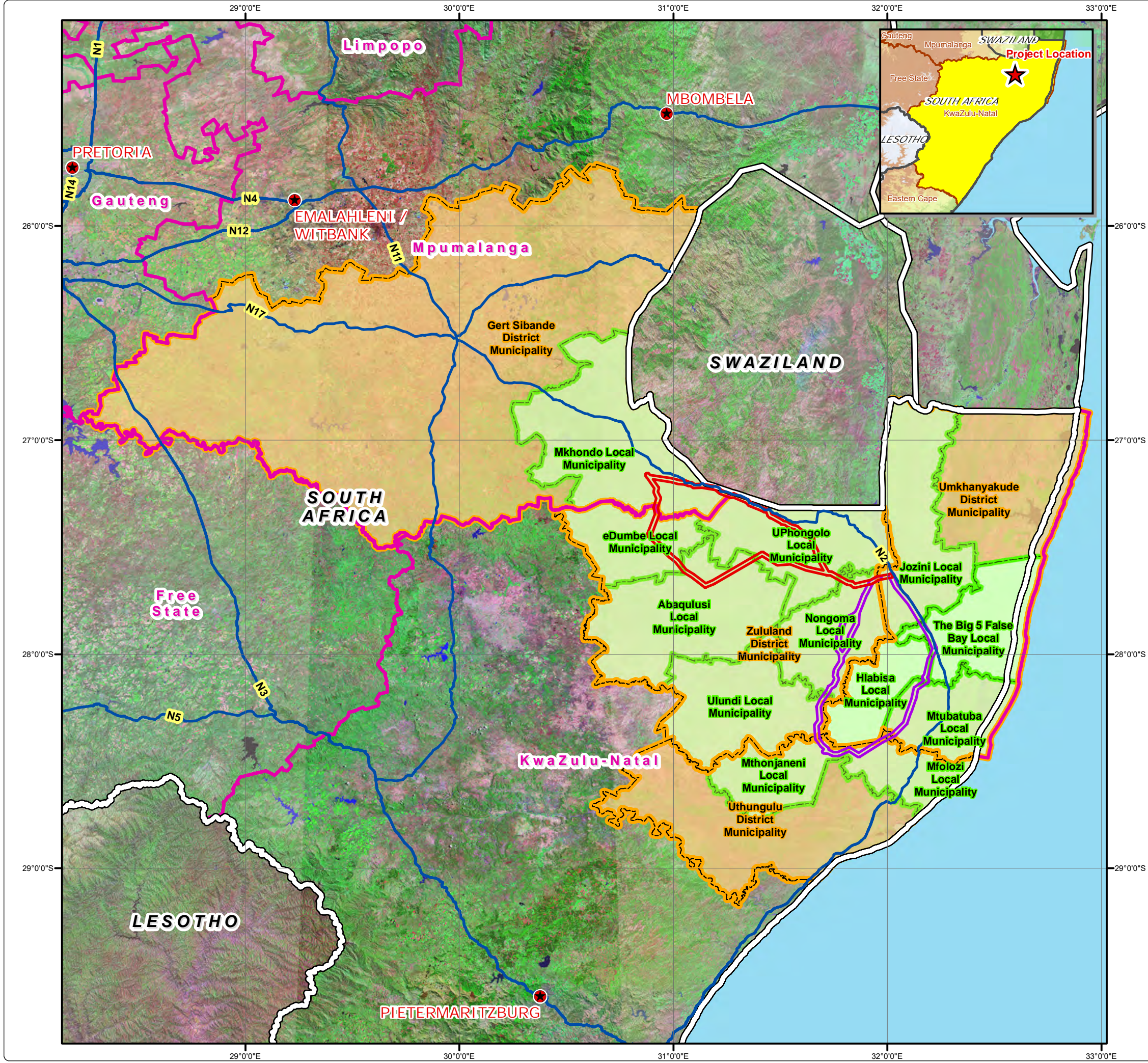
Towns	<u>Iphiva Substation</u> : Mkuze, Mahlangasi; <u>Iphiva-Duma</u> : Mkuze, Nongoma, Hlabisa, Umunywana, Hluhluwe, Bayala; and <u>Normandie-Iphiva</u> : Piet Retief, Paulpietersburg, Pongola, Louwsberg, Magudu, Mahlangasi, Mkuze	
Province	District Municipality	Local Municipality
Mpumalanga	Gert Sibande (GSDM)	Mkhondo (MLM)
KwaZulu-Natal	Zululand (ZDM)	eDumbe (eDLM)
		Uphongolo (UpLM)
		Abaqulusi (ALM)
		Nongoma (NLM)
		Ulundi (UJLM)
	Umkhanyakude (UmDM)	Jozini (JLM)
		Mtubatuba (MtLM)
		Big 5 Hlabisa (B5LM)
	King Cetshwayo (KCDM)	Mfolozi (MfLM)
		Mthonjaneni (MthLM)
Location Coordinates	Northern Extent	
	-27.158278 S	30.873463 E
	Southern Extent	
	-28.478879 S	31.741966 E
	Eastern Extent	
	-27.974434 S	32.236894 E
	Western Extent	
-27.446193 S	30.871083 E	
Predominant Land Uses	Cultivated Areas, Grasslands, Indigenous Forests, Mining Areas, Plantations / Woodlots, Open Bush, Urban Areas, Rural Settlements, and Protected Areas.	

Northern KZN Strengthening Project

Study Areas

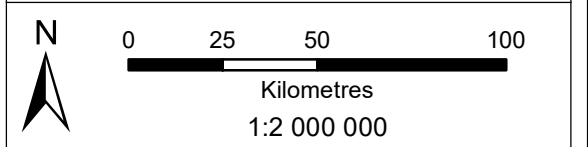
Legend

-  Normandie Iphiva Corridor
-  Duma Iphiva Corridor
-  City
-  National Road
-  Regional Study Area
-  Local Study Area
-  Provincial Boundary
-  International Boundary



• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Geographic Datum: WGS 1984 Ref #: kam.II13864.201712.039 Revision Number: 1 Date: 11/12/2017





1.4 Terms of reference

The Terms of Reference (ToR) of the specialist heritage study was to complete a Heritage Screening Assessment to comply in part with the KZNHA and Section 38(3) of the NHRA to predict preliminary heritage impacts and outline activities to be undertaken in the subsequent phases of the Project as a condition of authorisation.

1.5 Scope of work

The Scope of Work (SoW) for the specialist HRM process included the compilation of a heritage screening and comparative assessment commensurate to the nature of the Project that complies in part with the KZNHA and Section 38(3) of the NHRA. The following activities were completed as part of this SoW:

- Completing a literature review to assist in defining the predominant cultural landscape;
- Identification and mapping (*as far as feasible*) of heritage resources in the proposed site-specific study area;
- Assessment of Cultural Significance (CS) of defined cultural landscape;
- Identification of potential impacts to heritage resources based on Project activities;
- An evaluation of the impact of the operation on heritage resources relative to the sustainable socio-economic benefits that may be derived from the Project;
- Present the results of consultation with Interested and Affected Parties (I&APs) and/or stakeholders;
- Recommend feasible management or mitigation measures to avoid and/or reduce negative impacts and enhance positive ones; and
- Submission of the report to Amafa and SAHRA for Statutory Comment as required under Section 38(8) of the NHRA.

1.6 Expertise of the specialist

The expertise of the HRM specialist is presented in Table 1-5:

Table 1-5: Expertise of the specialist

Team Member	Bio Sketch
Justin du Piesanie ASAPA Member 270 AMAFA Registered ICOMOS Member	Justin is the HRM Manager at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made manager in the Social and Heritage Services Department. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional



Team Member	Bio Sketch
14274 IAIAsa Member Years' Experience: 11	<p>Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 11 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and Conservation Management Plans (CMPs). Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Mali and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. Justin's current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.</p>
Johan Nel The Heritage Foundation ASAPA Member 095 ICOMOS Member 13839 SAMA Member IAIAsa Member Years' Experience: 17	<p>Johan is the Manager of Conservation Services at the Heritage Foundation. Johan has experience in the HRM field spanning the last 17 years, covering various aspects including research projects, archaeological and heritage assessments, social consultation and various mitigation projects. His experience has allowed him to integrate cultural HRM with Environmental Management processed to promote a holistic approach to understanding the value of heritage resources, the various aspects that influence value, and how to best manage the preservation or conservation of these. In his capacity of Manager of Conservation Services at the Heritage Foundation, he is currently focussed on reviewing, drafting and implementing Integrated Management Plans (IMPs) and CMPs for various heritage sites in South Africa. Commensurate to his position, he is also responsible for heritage focussed research and liaison with various government and NGO bodies.</p>

1.7 Structure of the report

The remainder of the report, with references to the relevant information required in terms of Section 38(3) of the NHRA, is structured as per the below table.


Table 1-6: Structure of the report

Chapter	Description	NHRA information requirements	Appendix 6 of GN R 326 of 7 April 2017
2	Outlines the legislative framework relevant to the specialist heritage study.	-	-
3	Identifies the specific constraints and limitations of the assessment.	-	(i)
4	Describes the methodology employed in the compilation of this report.	-	(cA), (d) & (e)
5	Provides the baseline cultural landscape.	38(3)(a)	(cA)
6	Motivates for the defined CS of the identified heritage resources and landscape.	38(3)(b)	-
	Considers the potential impacts to heritage resources by project related activities.	38(3)(c)	(cB), (f) & (h)
	Outlines possible risks to heritage resources and heritage related risks to the project.		-
7	Provides a Multi-Criteria Decision Analysis and motivation for the preferred options associated with the Project	-	-
8	Presented the results of consultation.	38(3)(e)	(o) & (p)
9	Details the specific recommendations based on the contents of the assessment.	38(3)(g)	(g), (j), (k), (l) & (m)
10	Collates the most salient points of the assessment and concludes with the specific outcomes and recommendations of the study.	38(3)(f)	(g), (j), (k), (l), (m), (n), (q)
		38(3)(g)	
11	Lists the source material used in the development of the report.	-	(cA)

2 Legislative and policy framework

The HRM process is governed by the national legislative framework. This section provides a brief summary of the relevant legislation pertaining to the conservation and responsible management of heritage resources.


Table 2-1: Applicable legislative context for the HRM process

Applicable legislation and guidelines used to compile the report	Reference where applied
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></p> <p>Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ol style="list-style-type: none"> i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	<p>The EIA process and associated HRM process is being undertaken to identify heritage resources and determine heritage impacts associated with the Project.</p> <p>As part of the HRM process, mitigation measures and monitoring plans will be recommended to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.</p>
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</u></p> <p>The NEMA, as amended was set in place in accordance with Section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published</p>	<p>The EIA process is being undertaken in accordance with the principles of Section 2 of NEMA as well as with the EIA 2014 Regulations, promulgated in terms of NEMA.</p> <p>These Listed Notices have been reviewed against the project activities to determine the likely triggers. The listed activities which are potentially triggered under the Listing Notices are provided in Section 1.2 above.</p> <p>Based on the activities listed, it has been identified that an EIA process is required for the Project.</p>



Applicable legislation and guidelines used to compile the report	Reference where applied
GN R.983 (Listing Notice No. 1) and GN R.984 (Listing Notice No. 2) in terms of Sections 24(2) and 24D of the NEMA, as amended.	
<p><u>GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017)</u></p> <p>Listing Notices relevant to this Project set out a list of identified activities which may not commence without an Environmental Authorisation from the relevant Competent Authority through one of the following processes:</p> <ul style="list-style-type: none"> ■ Regulation GN R. 983 - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and which must follow a BA process. ■ Regulation GN R. 984 – Listing Notice 2: This listing notice provides a list of various activities which require EA and which must follow an EIA process. 	<p>Refer to Section 1.2 above for the listed activities triggered by the Project.</p>
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p> <p>The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections:</p> <ul style="list-style-type: none"> ■ 5. General principles for HRM ■ 6. Principles for management of heritage resources ■ 7. Heritage assessment criteria and grading ■ 38. Heritage resources management <p>The Act requires that Heritage Resources Authorities (HRAs), in this case the South African Heritage Resources Agency (SAHRA), Kwazulu-Natal Provincial Heritage Resources Authority, <i>Amafa aKwaZulu Natali</i> (Amafa), and</p>	<p>A Needs and Desirability Application (NDA) and Notification of Intent to Develop (NID) were submitted, as part of this HRM process, to Amafa and SAHRA and MPRHA respectively. This report constitutes a Heritage Impact Assessment (HIA) compiled to comply with Sections 5, 38(3), (4) and (8) of the NHRA.</p>



Applicable legislation and guidelines used to compile the report	Reference where applied
<p>Mpumalanga Provincial Heritage Resources Authority (MPRHA) be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.</p>	
<p><u>KwaZulu-Natal Heritage Act, 2008 (Act no. 4 of 2008) (KZNHA)</u></p> <p>The KZNHA provides for the protection and management of heritage resources within KZN. These heritage resources take account of those under general protection and special protection, including:</p> <ul style="list-style-type: none"> ■ General protection: <ul style="list-style-type: none"> ▪ Structures under Section 33; ▪ Graves of victims of conflict under Section 34; ▪ Traditional burial places under Section 35; and ▪ Battlefields, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites under Section 36. ■ Special Protection: <ul style="list-style-type: none"> ▪ Heritage Landmark under Section 38; ▪ Provincial Landmark under Section 39; ▪ Graves of members of the Royal Family under Section 40; ▪ Battlefield sites, public monuments and memorials under Section 41; and ▪ Heritage Objects under Section 43. <p>In terms of the KZNHA, a permit is required to carry out certain listed activities. To accomplish</p>	<p>A NDA was submitted, as part of the HRM process, to Amafa and SAHRA. This report constitutes an HIA compiled to comply with subsection 3(3)(a) and (b), 38(3), (4) and (8) of the NHRA.</p> <p>The NDA was compiled to comply with the KZNHA and subsection 38(1) of the NHRA.</p>



Applicable legislation and guidelines used to compile the report	Reference where applied
<p>this, a NDA form must be completed for any proposed development. This form is submitted to Amafa for processing after which Amafa will issue comments for further heritage studies, if necessary.</p>	

Table 2-2: Applicable policies considered in the HRM process

Applicable policies used to compile the report	Reference where applied
<p><u>South African Heritage Resources Agency (SAHRA) Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007)</u></p> <p>The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA Report.</p> <p>Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows:</p> <ul style="list-style-type: none"> ■ Background information on the Project; ■ Background information on the cultural baseline; ■ Description of the properties or affected environs; ■ Description of identified sites or resources; ■ Recommended field rating of the identified sites to comply with Section 38 of the NHRA; ■ A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and ■ Recommendations for mitigation or management of identified heritage resources. 	<p>The HRM process was completed to adhere to the minimum standards as defined by Chapter II of the SAHRA APM Guidelines (2007)</p>



3 Constraints and limitations

The following constraints and limitations were experienced during the compilation of this assessment:

- The assessment constitutes a high-level screening to identify the potential impacts to heritage resources that may occur within the approved corridors and development footprints. Therefore, this report does not present an exhaustive list of tangible heritage resources that may be impacted upon;
- The development footprint of the various infrastructures will be finalised upon selection and authorisation of the preferred options. To this effect, a detailed impact assessment could not be completed in this report, and will be required as a condition of authorisation;
- Considering the nature of the Project, the extent of the routing options, and scope of work, the field survey was predominantly undertaken as a vehicular survey;
- While every effort was made to cover the extent of the various routing options, access to portions of various routing options was restricted by topography and/or landowners;
- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas;
- Results from the previously completed heritage studies were not subject to an assessment of CS or verified during the field survey; and
- Palaeontological and archaeological resources commonly occur at subsurface levels. These types of resources may not be adequately recorded or documented by assessors without intrusive and destructive methodologies. Therefore, the reviewed literature and previously completed assessments are in themselves limited to surface observations.

4 Methodology

4.1 Defining the study area

Heritage resources do not exist in isolation to the greater natural and social (including socio-cultural, -economic and -political) environment. In addition, the NHRA requires the grading of heritage resources in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study (Refer to Plan 1). The three defined study areas include the following:



- The *site-specific* study area – the extent of the proposed corridors and substations including a 500 m buffer area. The site-specific study area may extend linearly. In such instances, the defined site-specific study area includes the linear development, e.g. a road, and a 200 m buffer either side of the development footprint;
- The *local* study area – the area most likely to be influenced by any changes to heritage resources in the project area, or where project development could cause heritage impacts. Defined as the area bounded by the local municipalities with particular reference to the immediate surrounding properties / farms. The local study area was specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts; and
- The *regional* study area – defined as the area bounded by the district municipality demarcation. Where necessary, the regional study area was extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts.

4.2 Developing cultural significance and field ratings

Digby Wells designed the significance rating process to provide a numerical rating of the CS⁶ of identified heritage resources. This process considered heritage resources assessment criteria set out in subsection 3(3) of the NHRA, which determined the intrinsic, comparative and contextual significance of identified heritage resources. A resource's importance rating was based on information obtained through review of available credible sources and representativity or uniqueness (i.e. known examples of similar resources to exist).

The rationale behind the heritage value matrix takes into account that a heritage resource's value is a direct indication of its sensitivity to change (i.e. impacts). Value, therefore, was determined prior to completing any assessment of impacts.

The matrix rated the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social. Resource significance was directly related to the impact on it that could result from project-related activities, as it provided minimum accepted levels of change to the resource.

⁶ Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.



4.3 Defining heritage impacts

Potential impacts to heritage resources may manifest differently across geographical areas or diverse communities when one considers the simultaneous affect to the tangible resource and social repercussions associated with the intangible aspects. Furthermore, potential impacts may concurrently influence the CS of heritage resources. This assessment therefore considers three broad categories adapted from Winter & Bauman 2005: 36 and summarized in Table 4-1.

Table 4-1: Impact definition

Category	Description
Direct Impact	Affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.
Indirect Impact	Occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its CS that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any direct impact, its significance is affected to the extent that it can ultimately result in the loss of the resource itself.
Cumulative Impact	Result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be: <ul style="list-style-type: none"> ▪ Additive: the simple sum of all the effects, e.g. the reclamation of a historical TSF will minimise the sense of the historic mining landscape. ▪ Synergistic: effects interact to produce a total effect greater than the sum of the individual effects, e.g. the removal of all historical TSFs will sterilise the historic mining landscape. ▪ Time crowding: frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building high. ▪ Neutralizing: where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes from a historic to modern mining landscape could reduce the overall impact on the sense-of-place of the study area. ▪ Space crowding: high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.



4.4 Primary data collection

Primary data was collected by Justin du Piesanie and Johan Nel through a screening pre-disturbance survey of the various infrastructures as described in Section 1.2 above. The field survey was undertaken from 8 – 14 May 2017. The survey was non-intrusive (i.e. no sampling was undertaken) with the objectives to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible tangible heritage resources that may be present within the site-specific study areas.

Considering the scope and nature of the Project, the survey was primarily vehicular based to cover the greatest areal extent of the site-specific study area. The development footprints of the Iphiva Substation options, as well as noted points of interest, were subject to pedestrian survey.

Identified heritage resources were recorded as waypoint using handheld GPS and documented through photographic records. The survey was recorded as track logs.

4.5 Secondary data collection

Data collection assists in the development of a cultural heritage baseline profile of the study area under consideration. Qualitative data was collected to inform this HIA and primarily obtained through secondary information sources, i.e. desktop literature review.

A survey of diverse information repositories was made to identify appropriate relevant information sources. These sources were analysed for credibility and relevance. Credible, relevant sources were then critically reviewed. The objectives of the literature review were to:

- Gain an understanding of the cultural landscape within which the proposed Project is located; and
- Identify any potential fatal flaws, sensitive areas, current social complexities / issues and known or possible tangible heritage.

Repositories that were surveyed included the South African Heritage Resources Information System (SAHRIS), the KZN Specially Protected Heritage Resources Schedule, the University of the Witwatersrand (WITS) Archaeological Site Database, books, online / electronic journals and platforms, and certain internet sources. This HIA only includes a summary and discussion of the most relevant findings. Relevant sources were cited and included in the literature review's reference list.

4.6 Site naming convention

Heritage resources identified by Digby Wells during the pre-disturbance survey were prefixed by the Digby Wells Project Code generated for this Project and site number followed



(e.g. ILI3864/001). This number may be shortened on plans or figures to the period / feature code and site number (e.g. 001).

Heritage resources identified through the secondary data collection were prefixed by the relevant SAHRIS case or map identification (*where applicable*), and the original site name used by the author (e.g. 7808/MKU06).

4.7 Consideration of alternatives

The use of multi-criteria decision analysis (MCDA) has proven to be a quantifiable and defensible method when assessing the suitability of various alternative decision options, i.e. siting of infrastructures. The matrix used in this instance adopts a specific variant of MCDA, the Simple Linear Additive Evaluation Model (SLAEM). This model yields a single, overall value for each decision option that reflects the rating on each of the decision criteria under consideration. The SLAEM has a well-established record of providing robust and effective support to decision makers when considering the suitability of various decision options.

Digby Wells developed specific evaluation criteria that assess decision options suitability from the perspective of specialist disciplines. These criteria denote characteristics that would influence the selection through the severity of identified potential impacts relevant to the specialist disciplines or project-related risks. A clear understanding of the baseline conditions, therefore, is critical to identifying criteria that are relevant to the evaluation.

Digby Wells assessed the various alternative options in terms of the defined evaluation criteria to assign a rating. Rating options range from 5 (most suitable) to 1 (unsuitable). This method employed a "rounded average" of the criteria value to allow for comparison between various specialist disciplines regardless of the number of criteria used. In this way, an overall ranking of between 1 and 5 can be obtained.

5 Cultural heritage baseline description

5.1 Geological context and palaeontology

The proposed transmission line routing options are underlain by several different geological stratigraphic units. This section considers only the lithostratigraphic units that are known to have high palaeontological sensitivities described in the Palaeontological-Sensitivity Map (PSM) available on the South African Heritage Resources Information System (SAHRIS).

The site specific study area is underlain by lithologies associated with the Karoo and Pongola Supergroups. The Pongola Supergroup dates to the Mesoarchaeon Eon (~3000 million years ago (Ma)) and developed in two separate basins. The main Pongola Basin extends from Amsterdam in the north through the Hartland area south of Swaziland as far as the White Mfolozi Inlier in the south. The second basin, known as the Nkandla Basin, only preserved rocks of the Nsuzze Group (Gold, 2006). Lithostratigraphic units associated with the Pongola Supergroup identified in the transmission line routing options have negligible to



low palaeontological sensitivity (SAHRA, 2016) and are not considered further in this assessment.

This region of KZN is underlain by lithostratigraphic units associated with the Karoo Supergroup (Main Karoo Basin), ranging in age from Late Carboniferous to Middle Jurassic. The bulk of the Karoo strata occur in the main basin, covering an area of approximately 700 000 km², which was much more extensive during the Permian Period. The Karoo Supergroup is famously known for its terrestrial vertebrate fossils, distinctive plant assemblages, thick glacial deposits and extensive dolerite dykes and sills. Identified lithostratigraphy underlying the proposed transmission line routing options include units of the Dwyka, Ecca and Beaufort Groups, as well as the Durban-Lebombo Belt (Johanson, et al., 2006).

Based on the review of the PSM, this section considers the lithostratigraphies of the Karoo Supergroup with a high to very-high palaeontological sensitivity. These include the *Emakwezini*, *Ntabene* and *Nyoka Formations* of the Beaufort Group, and the *Volksrust* and *Vryheid Formations* of the Ecca Group.

The *Emakwezini Formation* comprises alternating blue-grey, grey-green and black mudrocks and subordinate fine to coarse grained feldspathic sandstones. This formation is associated with 11 low-grade coal seams, and plant fossils, primarily *Glossopteris*, are thought to be fairly common (Johanson, et al., 2006; SAHRA, 2016).

The *Ntabene Formation* comprises medium- to coarse-grained, cross bedded sandstones and subordinate grey to green shales deposited by braided rivers (Johanson, et al., 2006). This formation is commonly associated with *Dicroidium* ferns and most diverse plant and insect assemblages in the Gondwana Geological Terrain (SAHRA, 2016).

The *Nyoka Formation* comprises primarily red or purple mudstone with calcareous concretions. Grey, blue-grey or greenish shale and siltstone, as well as thin beds of fine- to coarse grained sandstone are also present, though to have been deposited on the floodplains of slow-flowing meandering rivers under arid conditions (Johanson, et al., 2006). The fossil heritage includes reptilian, mainly dinosaur of lower *Euskelosaurus* range zone⁷ and upper *Massospondylus* range zone, consisting of *Ornithishia* and *Saurischia*, *Thecodontia* and *Crocodylia* (SAHRA, 2016).

The *Volksrust Formation* is a predominantly argillaceous unit that interfingers with the overlying Beaufort Group. The formation consists of grey to black silty shale with thin, usually bioturbated siltstone and sandstone lenses and beds. The substantial thickness, fine grained lithology and great lateral extent suggest it represents a transgressive, open "shelf" sequence (Johanson, et al., 2006). Palaeontologically, the *Volksrust Formation* is associated with a low diversity of marine and non-marine trace fossil assemblages including rare *Temnospondyl* amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, and organic microfossils (SAHRA, 2016).

⁷ The range zone is defined by the geological range (total time of existence) of a particular fossil group or species



The *Vryheid Formation* rests directly on pre-Karoo rocks or the Dwyka Group based on regional expressions, its lithofacies mainly arranged in upward-coarsening cycle essentially deltaic in origin (Johanson, et al., 2006). This formation consists of sandstone, shale, mudstone and coal (Wilson & Anhaeusser, 1998). The *Vryheid Formation* has a high potential to contain fossil heritage inclusive of Permian *Glossopteris* flora, diverse palynomorphs, rare insects and fossil woods, and non-marine bivalves (SAHRA, 2016).

5.2 Archaeological context

5.2.1 Stone Age

The Stone Age is broadly defined as lithic technological developments through time produced by hominids primarily of the genus *Homo*. In southern Africa, these developments are divided into three chronological periods, the Early Stone Age (\pm 2 million years ago (mya) – 250 000 thousand years ago (kya)) (ESA), the Middle Stone Age (300 kya – 20 kya) (MSA) and the Later Stone Age (40 kya – historical period) (LSA). The principal characteristics of these are briefly presented here.

Large hand axes and cleavers produced from coarse-grained material dominate ESA assemblages (Esterhuysen & Smith, 2007). The ESA is generally associated with the first *Homo* species (e.g. *H. habilis*), and possibly with some *Australopithecus* species. Within the area under consideration, no sites associated with the ESA have been identified in the available literature. This period is not considered further.

Early MSA industries are characterised by high proportions of minimally modified blades, represented by the Levallois technique (Clark, 1982). The MSA is generally associated with archaic *H. sapiens* (e.g. *H. rhodesiensis*) through to early anatomically modern *H. sapiens sapiens*. In general the MSA can be broadly defined by the occurrence of blades and points produced from good quality raw material. (Deacon & Deacon, 1999). Noteworthy sites associated with MSA deposits in KZN include Border Cave, Sibudu Cave, iNkolimhashi Shelter and the Umhlatuzana Shelter (Badenhorst, 2003; Lombard, Wadley, Jacobs, Mohapi, & Roberts, 2010; Valladas, et al., 2005; Wadley & Jacobs, 2006; Villa, et al., 2012).

The LSA dates from approximately 40 kya to the historical period and is wholly associated with anatomically modern *H. sapiens sapiens*. Lithics associated with the LSA are specialised: specific tools being created for specific purposes, and the inclusion of bone tools into the assemblages (Mitchell, The Archaeology of Southern Africa, 2002). LSA sites commonly contain diagnostic artefacts, such as microlithic scrapers and segments. In a southern African context, the LSA is closely associated with hunter-gatherer groups, (i.e. the San). Due to the nomadic nature of LSA people, open sites are difficult to identify and usually poorly preserved. In addition to the production of LSA lithics, this period is characterised by evidence of ritual practises and complex societies, as well as rock art (Deacon & Deacon, 1999)

Several MSA sites have been recorded within the area under consideration, however, only one (5332/PC001) is situated within the proposed Normandie – Iphiva corridor option



(Fourie, 2012; van Schalkwyk, 2013). The aforementioned Border Cave is situated in the Lebombo Mountains of KZN, approximately 45 km north of the proposed Normandie – Iphiva corridor. This site is well-known for its MSA sequence, associated hominids and the earliest demonstratable LSA strata in southern Africa (Butzer, Beaumont, & Vogel, 1978). The material remains associated with this site have played a crucial role in understanding the emergence of modern cultural behaviour (Mitchell, 2012).

Analysis of the artefacts collected from demonstrate a regional expression of the transition from MSA technologies sometime after 56 kya in favour of a simplified LSA microlithic technology (~44 kya – 42 kya). Evidence of organic adhesive on the microlithic tools furthermore indicate that these tools were hafted (Villa, et al., 2012). When compared to historically known hunter-gatherer societies, the transition to LSA microliths, organic finds and associated material indicators arguably represent the oldest regional instance of modern culture (Mitchell, 2012).

5.2.2 Rock art

Within southern Africa, three predominant rock art painting traditions are represented (The African Rock Art Digital Archive, 2016). Each of these is associated with particular groups. These comprise the following:

- Fine line paintings associated with autochthonous LSA San hunter-gatherer groups;
- Finger paintings associated with the later arrival of pastoralists and herders such as the Khoi; and
- Finger paintings associated with much later and possibly historic Bantu-speaking farming communities.

The region within which the proposed Project is situated is primarily associated with the art of San hunter-gatherers. The techniques used to produce this form of rock art broadly includes the use fine brushes, quills or sticks to create images in red, white and black, and more rarely bichrome and polychrome (Smith & Zubieta, 2007). San rock art is understood and explained in terms of hunter-gatherer indigenous knowledge systems. San hunter-gatherers thought of their world as bi-axial comprising a tiered shamanistic cosmology and complex social relations (Lewis-Williams, 1998; Lewis-Williams & Pearce, *San Spirituality: Roots, expression and social consequences*, 2004). The images comprise realistic and proportionally correct animals, such as various antelope species, human figures and more symbolic beings associated with a range of shamanistic beliefs, rituals and experiences. Depictions are identified as isolated images on rock surfaces or compositions made by one or more painters that include complex groupings and superimpositions that show the interdigitating of the spirit realm with the material world (Lewis-Williams, 1998; Eastwood, van Schalkwyk, & Smith, 2002).

In contrast to the San hunter-gatherer tradition, art created by Khoi pastoralists and Bantu-speaking farming communities is not as prolific in the region. Broadly, the Khoi pastoralist tradition is typified by finger-painted geometric images, composed entirely of circles, finger



lines, finger dots, and handprints that are red and white in colour (Eastwood, van Schalkwyk, & Smith, 2002; Smith & Zubieta, 2007). Bantu-speaking farming community art was created by the ancestors of the Nguni in this region, and formed part of their expressive culture. Research suggests that Nguni art is almost exclusively engravings (Smith & Zubieta, 2007).

From the available quantitative data collected, four rock art panels have been identified in the area under consideration. These sites occur over 50 km away from the proposed Normandie – Iphiva corridor, and have generally been described as poorly preserved and comprising red pigment including human figures in seated positions and dancing postures (Anderson & Anderson, Heritage Survey of the proposed Waaihoek Wind Energy Facility, Utrecht, KwaZulu-Natal, 2014).

5.2.3 Farming community period

In southern African context the Stone Age is followed by the farming community period, associated with the southwards immigrations into the landscape by Bantu-speaking groups, and their later migrations throughout the landscape. Southern African farming community archaeology is subdivided into two periods to distinguish between widespread events:

- Early Farming Communities (EFC), also referred to as the Early Iron Age (200 AD – 1000 AD); and
- Late Farming Communities (LFC), also referred to as the Late Iron Age (1000 AD – 1840 AD).

In general terms, farming communities in KZN are associated with early Nguni-speaking groups, based on linguistic, anthropological and archaeological evidence. For the purposes of this baseline, the focus is on the archaeological context of early Nguni-speakers through to the present Zulu-speakers: for a detailed discussion on the linguistic and anthropological evidence see Huffman, 2004.

The primary visible indicators of farming community sites in the area under consideration are low fired ceramic ware⁸ (clay pottery). Based on the nature of Nguni material culture, however, the associated archaeology is difficult to study as related ceramics are seldom decorated. These limitations notwithstanding, an abbreviated account of the relevant ceramic sequence is presented here.

The early Nguni ceramic sequence contains four phases: *Blackburn* (AD 1050-1500), *Moor Park* (AD 1350-1700), *Nqabeni* (AD 1700-1850) (Huffman, 2004; 2007) and *Ntsuanatsatsi* (AD 1450-1650) (Huffman, 2007). Considering the accepted distribution of these facies, *Blackburn* and *Nqabeni* occur within the regional study area.

⁸ The works of Huffman (1980; 2007) are used as the primary text to identify ceramics that in turn provide relative temporal markers for occupation in the region. Although ceramics are used as broad cultural and/or linguistic markers as well, it is acknowledged that ceramics do not necessarily equate to narrowly defined ethnic groups.



Blackburn ceramics have been recorded along the north and south coasts of KZN. These ceramics are sparsely decorated, and include rim-notching, appliqué bumps, incised parallel lines and oblique panels of punctates and stamping (Huffman, 2004; 2007). The precise ceramic origin of this facies is unknown, but it is proposed that similarities with the Kalambo Branch of the Urewe Tradition suggest a likely source (Huffman, 2004).

Nqabeni ceramics emphasise a high burnish with black or red colouring, appliqué decoration and panels of fingernail impressions (Huffman, 2004; 2007). This ceramic style centres on northern KZN, and is described as being indirectly derived from *Blackburn* (Huffman, 2007). This ceramic facies, unlike *Blackburn*, is associated with stonewalled settlements that emphasise a centre / side access that align kraal entrances facing uphill. It has been noted that regional variances in the stonewalled patterns exist, but these primarily attest to the small scale of Nguni group identities (Huffman, 2004; 2007).

A second visible indicator for farming community sites are remnants of settlements. The Nguni, like pastoralists in East Africa, build beehive houses and commonly settled on slopes above the valleys and fertile agricultural soil. Tangible remains of these settlements, specifically beehive huts, do not preserve well and are difficult to identify (Huffman, The archaeology of the Nguni past, 2004).

A total of 28 heritage resources associated with the LFC have been identified within 50 km of the proposed routing options. These include artefact scatters, deposits, shelters and archaeological sites of varying complexity (Anderson & Anderson, Heritage Survey of the proposed Waihoek Wind Energy Facility, Utrecht, KwaZulu-Natal, 2014; Anderson, Proposed Agricultural Development by Zamokuhle Trust near Mkuze, northern KwaZulu-Natal, 2015; WITS, 2010; van der Walt, 2014).

5.3 Historical context⁹

5.3.1 Pre-colonial context

The pre-colonial historical context of northern KZN is intrinsically associated with the movement, control and assimilation of various Nguni-speaking clans¹⁰ through time. This, in part, has been demonstrated through the archaeological record introduced in Section 5.2.3 above, and expanded upon here based on historical oral and written records.

Within northern KZN, the territories initially comprised a number of relatively small chiefdoms. These forms of socio-political structures changed during the eighteenth century when political consolidation processes were well underway, resulting in the emergence of a

⁹ The historical period is commonly regarded as successive to the LFC, dated from approximately the mid-19th century with the permanent settlement of Europeans within the interior and contact with the indigenous peoples. This distinction however, is now largely considered artificial in many ways, and the current definition of the historical period includes the past 500 years (Swanepoel, et al., 2008).

¹⁰ Clan refers to a social unit made up of men and women who believe they have descended from a common ancestor through the male line. This differs from a chiefdom which consists of a number of clans, one being politically dominant (Ngubane, 2005)



number of power blocks (Ngubane, 2005). The political consolidation can be understood in terms of an African Frontier Model where mechanisms within social systems trigger repeated fission, migration and fusion of polities leading to the formation of new polities on the margins of, or in the spaces between more established societies (Kopytoff, 1987). The balance between political and economic power shifts between chiefdoms produced a myriad of frontier like interactions. Relevant polities within the regional context include the Mthethwa Paramountcy (c. 1780 – 1817), Ndwandwe Chiefdom (c. 1780 – 1817) and the Zulu Kingdom (c. 1818 – 1897).

The Mthethwa originally settled in the Lebombo Mountains, just north of the proposed Normandie – Iphiva corridor before migrating to the Mfolozi area under the reign of Khayi (*then of the Nyambose clan*). This area was occupied by the Mbokazi, the dominant chiefdom in the area at the time. To secure access to the land, Mthethwa allegiance with the Mbokazi was secured through the marriage of Khayi's heir, Jobe, to an Mbokazi princess. Through time, increased ivory trade resulted in the Mthethwa shifting from beneficiary of trade to patron. This shift is evidenced through *khonza*¹¹ by several chiefdoms, including the Dletsheni, Mkhwanazi, Cambini and Gegeni, towards the Mthethwa, (Hamilton, 1985).

Khayi was succeeded by Jobe, whose reign was characterised by greater participation in the Delagoa Bay trade, greater degree of militarisation and more active expansion. Jobe furthermore assimilated other clans through the *amaButho*¹² system, as opposed to his father's approach to assimilation via kin-relations. The establishment of an *amaButho* system at this time provided an institutional framework necessary for the co-ordination of the activities of large numbers of men. It could be used to expand the territorial area and, under the chief's authority, to extend the control over natural resources and labour.

In the early 19th century, Jobe attempted to kill two of his sons who were born from his Mbokazi wife, in an effort to assert his independence from the Mbokazi. The aim was to kill Tana and Dingiswayo, and proclaim their half-brother Mawewe as heir to the Mthethwa. Tana was assassinated, but Dingiswayo escaped. The latter returned to the Mthethwa after Jobe's death in 1807, and ascended to the chieftaincy (Hamilton, 1985; Ngubane, 2005).

Dingiswayo embarked on a course of consolidation and expansion to stabilise the northern, coastal and inland reaches of the Mthethwa polity. This was facilitated by a policy where recalcitrant chiefs were removed and replaced by petty chiefs or known loyalists. The Mthethwa Chiefdom also relocated from the Mfolozi confluence into the coastal lowlands during this time. This consolidation, expansion and relocation process was largely in response to a climatic crisis to secure superior grazing and maintain the monopoly in trade, now based on cattle rather than ivory.

Although securing grazing in the east and south was the main focus, expansion into the interior was also in response to the threat of the Buthelezi. This group defeated the Zulu

¹¹ To give allegiance to, or to subject oneself to a king or chief, to pay formal respects to.

¹² Age-group or other similar unit, so-called "regiment"



under Senzangakhona. Dingiswayo ultimately integrated the Buthelezi and Zulu through a sort of coalition (Hamilton, 1985). Similar processes as those discussed in terms of the Mthethwa Chiefdom above, apply to the Ndwandwe in the north. This group also aimed to control, first, trade networks and, second, natural resources. These attempts at control caused the Ndwandwe to become centralised and militarised overtime (Wright, 1994; Anonymous, 1750-1820: Ndwandwe Kingdom, 2016; Ngubane, 2005). The history and origins of the Ndwandwe, however, have largely been overshadowed by the rise of the Zulu Kingdom under Shaka (Anonymous, 1750-1820: Ndwandwe Kingdom, 2016), and was under researched.

Shaka was the son of the Zulu chief Senzangakhona (i.e. uShaka kaSenzangakhona). Driven into exile with his mother in approximately 1794, they took refuge with the Langeni. By the early 19th century, Shaka placed himself under the protection of the Mthethwa, around the time that Jobe made attempts on the lives of Tana and Dingiswayo.

During Dingiswayo's campaign for regional dominance, Shaka fought under the Mthethwa in several battles, including against the Ndwandwe. Shaka displayed extraordinary military skills that made him a favourite with Dingiswayo. The latter placed considerable trust in Shaka, who became a prominent figure (Ngubane, 2005). After the death of Senzangakhona, Dingiswayo backed Shaka's claim for the Zulu chieftainship and aided in the assassination of the designated heir, Sigujana. Dingiswayo's strategy was to create a subsidiary satellite chiefdom in the west, under Shaka. This would achieve unification of its neighbours and incorporation of those clans into the Mthethwa through *amaButho*, essential subcontracting them in into military service (Hamilton, 1985; Ngubane, 2005).

Tensions between the Mthethwa and Ndwandwe for regional control culminated between 1817 and 1818. The Ndwandwe, under Chief Zwide kaLanga moved against the Dingiswayo's Mthethwa in an effort to expand their borders. In response, Dingiswayo, called on Shaka to provide his Zulu military support in 1818. However, Shaka did not give his support. It is believed that this was a deliberate move to assert the Zulu Chiefdom's independence from Mthethwa hegemony. The lack of Zulu support led to Dingiswayo's capture and execution, and the ultimate collapse of the Mthethwa Chiefdom (Hamilton, 1985).

Shaka assumed the leadership of the various tributary chiefdoms under the Mthethwa alliance, in response to the vacuum created by its collapse (Bishop). Notably, Shaka integrated clans on the basis of equality, promoting individuals within the army and civil service on merit and not due to circumstances of birth (Hamilton, 1985; Ngubane, 2005). This approach facilitated indebted relations and dependence on Shaka. He also developed great military strategy that ensured many victories (Golan, 1990).

The Ndwandwe under Chief Zwide launched an attack on the Zulu at Gqokli Hill in 1818, in an attempt to thwart their impending threat. Zwide's army was in excess of 12 000 warriors. Shaka, therefore, strategically placed his 5 000 strong force in positions on the summit and around the base of the hill, and deployed 500 warriors as a decoy to draw the Ndwandwe away and deplete their ranks. The Zulu lost approximately 2 000 men as opposed to the



Ndwandwe's 7 500. This victory set the stage for Shaka to conquer and absorb surrounding chiefdoms, consolidating his power in the area north of the Tugela (Von der Hyde, 2013). The Ndwandwe Chiefdom, however, did not collapse until the death of Zwide after the two day running Battle of Mhlatuze River in 1819, which saw most of the Ndwandwe abandon their lands and migrate northwards.

The political changes discussed in this section were instrumental in creating what is known as the *Mfecane* (Garstang, Coleman, & Therrell, 2014).

5.3.2 Colonial context

The colonial context refers to initial contact between European settlers and the local indigenous inhabitants of the region. The proposed Normandie – Iphiva and Iphiva – Duma corridors are, however, situated north of contact areas where several historic events occurred. This section, therefore, provides an abbreviated history of the colonial context.

In response to several grievances with the British in the Cape, the *Voortrekkers* (i.e. Boers) took a collective decision to move into the interior of the country to form an independent state (The Voortrekkers, 2014). The *Voortrekkers* had been populating the interior since approximately 1815 in scattered farms. From approximately 1824, British colonists arrived in significant numbers with considerable interest to contact Zulu Kingdom (Bishop). Shaka, himself, is believed to have heard of the “white tribe” and was interested in as much information about them as possible. To this affect, Shaka granted permission to Europeans to enter and operate within the Zulu territory on rare occasions. This is most notably recorded in his interactions with Henry Francis Fynn.

Shaka's reign was short. After conquering the majority of the chiefdoms, and his mother Nandi's death in 1827, he turned his aggression inward on his Kingdom, inflicting atrocities on his own people (Bancroft, 1988). In September 1828, in retaliation and a succession, Shaka's younger brothers, Dingane and Mhlangana, assassinated him at his Duduzu kraal (Hamilton, 1985). Dingane ultimately succeeded Shaka as Zulu King, embarking on an extensive campaign to purge pro-Shaka elements and chieftains.

During his reign Dingane fought many battles against his brother Mpande, resisted Boer expansion into the interior and the establishment of the Boer Republics on the peripheries of the Zulu Kingdom. At this time, the established trade network and market was economically attractive to the Boers and other exiles from the Cape. The prospect of establishing profitable trade relations with the Portuguese held for the Boers the promise of wealth and independence from British rule (Esterhuysen A. B., 2007).

Piet Retief, one of the principal *Voortrekker* leaders, led his group across the Drakensberg Mountains in the hope of settling in the fertile lands of the Zulu Kingdom and exploiting the established trade network. While efforts were made by Retief to settle in the region with the approval of Dingane through the signing of a treaty, Retief and his party were slaughtered by Dingane's men on 6 February 1838 near uMgungundlovu (Anonymous, Piet Retief, 2016). After the slaying, Dingane ordered his warriors to penetrate south of the Tugela River and



drive out the remainder of the *Voortrekkers* (Von der Hyde, 2013). These actions ultimately saw the *Voortrekkers*, under the command of Andries Pretorius, retaliate in the Battle of Blood River marking the end of the Dingane's power and the brief dominance of the Boers in Natal.

Mpande forged an alliance with the European expansionists, and succeeded to the throne in 1840. Mpande was considered a "peace-loving" ruler who enjoyed relations with the Boers, and later the British after they annexed Natal in 1843 (Von der Hyde, 2013). Mpande died in 1872 and was succeeded by his son, Cetshwayo. Cetshwayo patterned his mode of rule on that of Shaka, strengthening his army to retain the independence of Zululand. This threat created unease amongst the British, ultimately seen as an obstacle to the confederation that resulted in several battles. The most notable in the regional study area under consideration being the Battle of Hlobane on 8 March 1879 and Battle of Ulundi on 4 July 1879.

Following the defeat of the British column at Isandlwana and the besiegement of the column in Eshowe, Colonel Evelyn Wood's infantry undertook an expedition of cattle-rustling from their stronghold near Vryheid to the Hlobane Mountains. During the attempt to herd cattle from the summit, an approaching Zulu army was spotted, and an order to retire was given in the hopes of a safe escape. This, however, was not the case, and resulted in the defeat of the British, who suffered a loss of approximately 130 soldiers at the hands of the Zulu army (Von der Hyde, 2013).

The defeats suffered by the British at the hands of the Zulu army prompted the redirection of the war effort, resulting in a number of victories culminating in the Siege of Ulundi and the subsequent defeat of the Zulu Kingdom. This was considered the final battle of the Anglo-Zulu War, with a reinforced British army dealing a final blow to the Zulu Kingdom by attacking the Zulu warriors on the open plains close to King Cetshwayo's dwelling at Ondini. All the Zulu camps were torched by the British during the battle, King Cetshwayo was eventually captured and the Kingdom was divided into thirteen chiefdoms. This marked the end of an independent Zululand (Von der Hyde, 2013). This battlefield is located within 50 km of the proposed routing options (*Site KZNListed/19*).

Following the collapse of the Zulu Kingdom, the most notable historical events within KZN are associated with the South African War of 1899 – 1902 (i.e. Second Anglo-Boer War). The Second Anglo Boer War officially started on 9 October 1899 as a result of tensions and conflicting political agendas between the Boers and the British. Events associated with this time period occur on the peripheries of the areas under consideration. The only heritage site associated with this period within 50 km of the proposed routing options is the battlefield associated with the Battle of Blood River Poort (Anderson & Anderson, Heritage Survey of the proposed Waaihoek Wind Energy Facility, Utrecht, KwaZulu-Natal, 2014).

5.4 Field survey results

This section provides details to the tangible heritage resources recorded during the pre-disturbance screening survey (Refer to Plan 2).


Table 5-1: Identified heritage resources from the field survey

Site Name	Latitude	Longitude	Heritage Resource Type	Infrastructures
ILI3864/001	-27.634005	32.016514	Archaeological - Kraal	Normandie Iphiva Corridor, Iphiva Duma Corridor, 57m from Iphiva / Pongola and Iphiva / Hluhluwe Double Circuit Line
ILI3864/002	-27.649434	31.93692	Burial Grounds & Graves	Normandie Iphiva Corridor, Iphiva Duma Corridor, Iphiva 6 Substation, 37m from Iphiva / Pongola 132 kV
ILI3864/003	-27.64916	31.93713	Historical Built Environment	Normandie Iphiva Corridor, Iphiva Duma Corridor, Iphiva 6 Substation, 13m from Iphiva / Pongola 132 kV
ILI3864/004	-27.648168	31.787028	Burial Grounds & Graves	Normandie Iphiva Corridor, 400m from Iphiva / Pongola 132 kV Distribution Line
ILI3864/005	-27.650433	31.791483	Burial Grounds & Graves	Normandie Iphiva Corridor, 405m from Iphiva / Pongola 132 kV Distribution Line
ILI3864/006	-27.660778	31.954344	Burial Grounds & Graves	Outside site-specific study areas
ILI3864/007	-27.661919	31.956111	Burial Grounds & Graves	Outside site-specific study areas



Site Name	Latitude	Longitude	Heritage Resource Type	Infrastructures
ILI3864/008	-28.078669	32.188811	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/009	-28.079967	32.18825	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/010	-28.084761	32.187993	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/011	-28.102409	32.174613	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/012	-28.133907	32.175484	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/013	-28.279645	32.098946	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/014	-28.408295	31.984455	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/015	-28.448771	31.845385	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/016	-28.368476	31.652524	Burial Grounds & Graves	Outside site-specific study area



Site Name	Latitude	Longitude	Heritage Resource Type	Infrastructures
ILI3864/017	-28.330525	31.669361	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/018	-28.257368	31.684032	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/019	-28.225245	31.685149	Archaeological - MSA	Iphiva Duma Corridor
ILI3864/020	-28.116771	31.762306	Burial Grounds & Graves	Iphiva Duma Corridor
ILI3864/021	-27.81512	31.841906	Battlefield	Iphiva Duma Corridor
ILI3864/022	-27.868666	31.83715	Burial Grounds & Graves	Outside site-specific study area

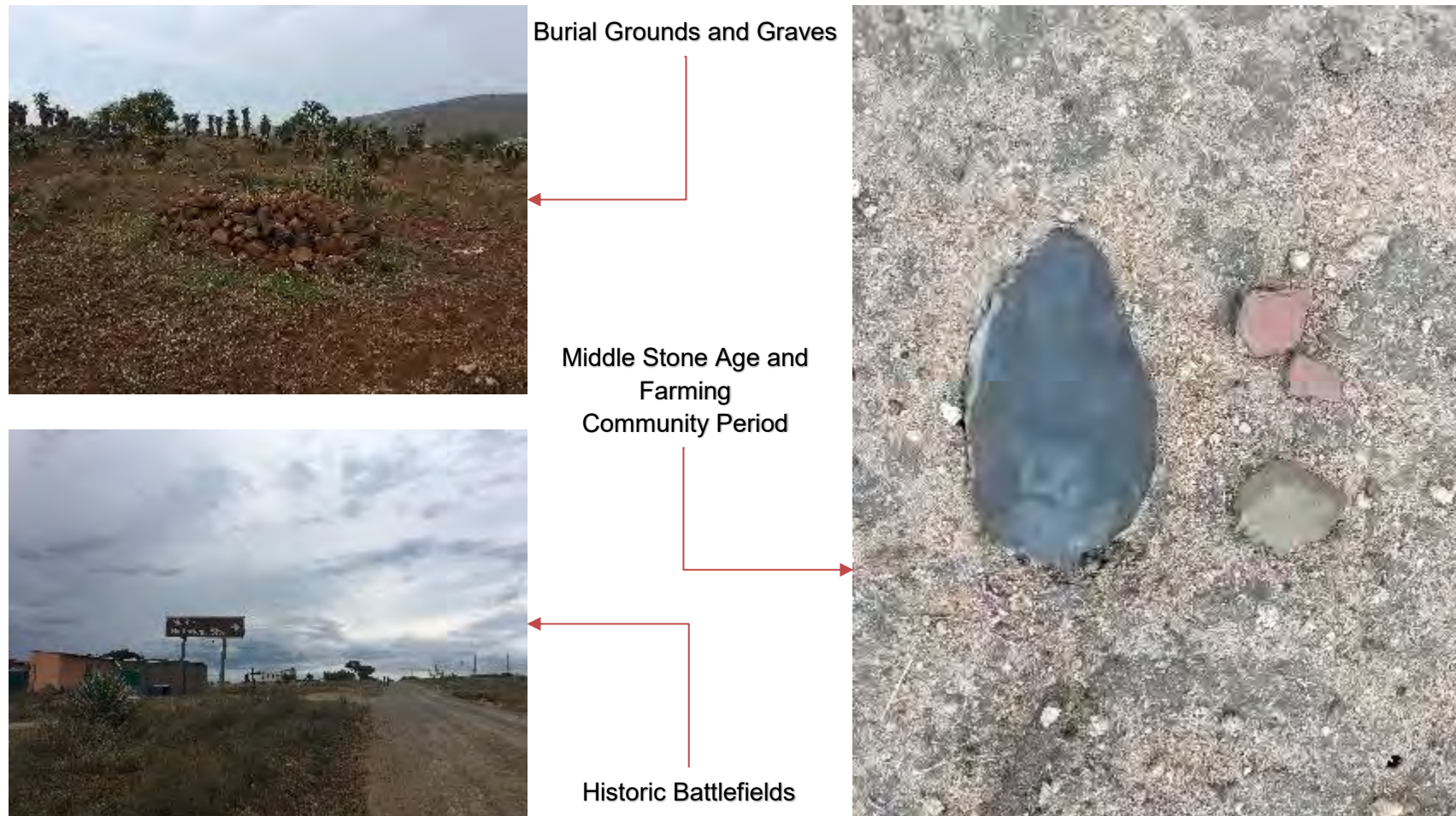




















Figure 5-1: Examples of identified heritage resources

Northern KZN Strengthening Project Identified Heritage Resources


Legend

-  Normandie Iphiva Corridor
 -  Duma Iphiva Corridor
 -  Identified Heritage Resources
 -  Major Town
 -  Secondary Town
 -  Other Town
 -  Main Road
 -  Arterial/National Route
 -  Perennial Stream
 -  Dam / Lake
 -  International Boundary
- Infrastructure**
-  Substations
- Distribution Lines**
-  132 kV Loop-In Line to Candover S/S from existing Iphiva to Pongola Line
 -  Alternative Route for Iphiva / Mbazwana and Iphiva / Makhithini Double Circuit Line
 -  Iphiva / Mbazwana and Iphiva / Makhithini Double Circuit Line
 -  Iphiva / Pongola 132 kV
 -  Iphiva / Pongola and Iphiva / Hluhluwe Double Circuit Line


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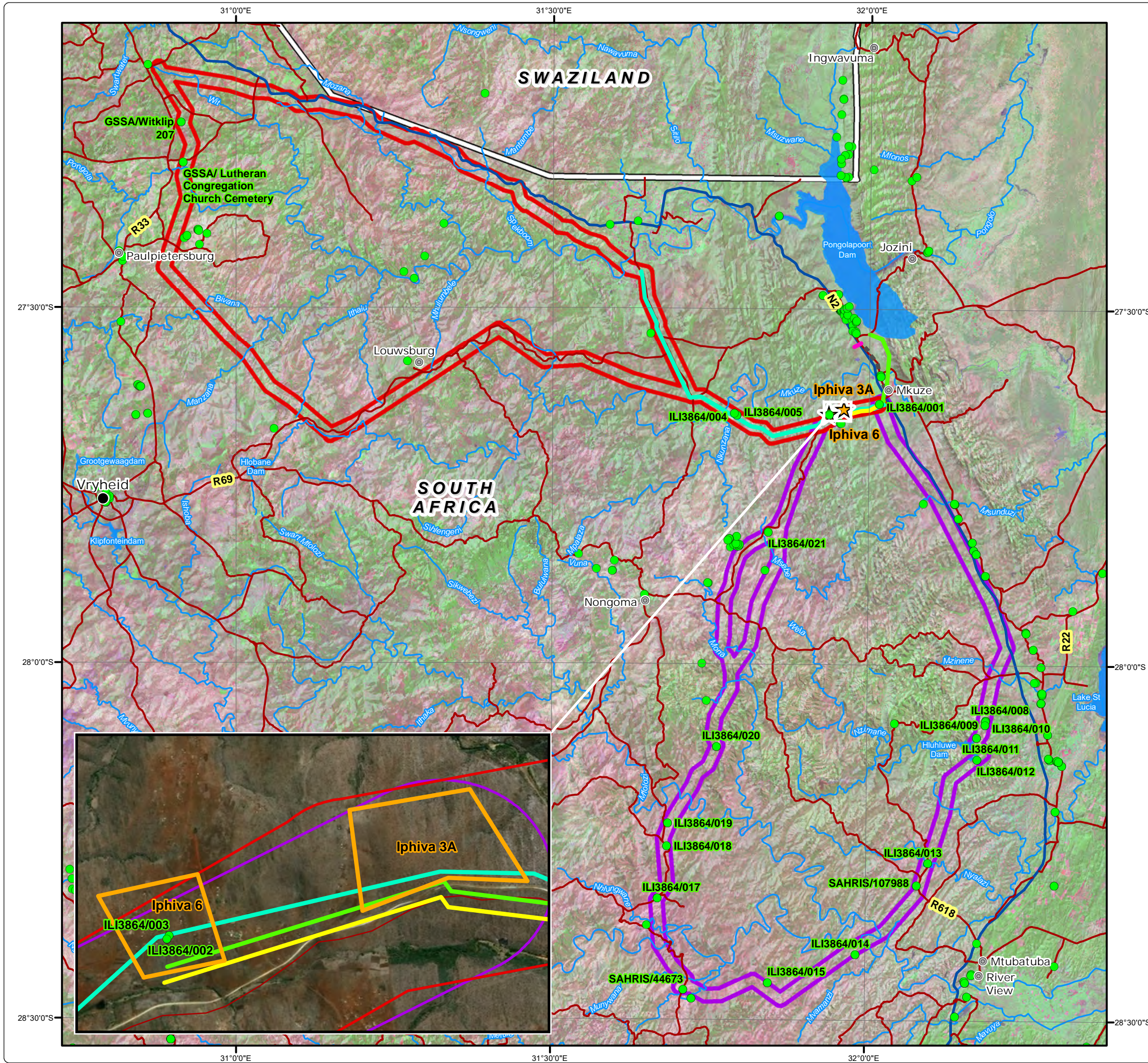
• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator	Ref #: kam.ILI3864.201712.044
Datum: WGS 1984	Revision Number: 1
Central Meridian: 31°E	Date: 11/12/2017



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Kilometres
1:600 000

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6 Preliminary heritage assessment

6.1 Cultural significance of the landscape

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, HRM acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, it is incumbent of the assessor to determine resources significance to allow implementation of appropriate management. This is achieved through assessing heritage resources value relative to certain prescribed criteria encapsulated in policies and legal frameworks.

This section presents a statement of CS as relevant to the greater cultural landscape of the site-specific study area as described in Section 5 above. In brief, the review of available information and primary data collection demonstrated that the greater cultural landscape comprises heritage resources as per Table 6-1.

Table 6-1: Recorded heritage resources in the local study area

Heritage Resource Type	Number Recorded
Palaeontological	13
Archaeological - MSA	23
Archaeological - LFC	14
Archaeological - Undefined	107
Battlefield	5
Burial Grounds & Graves	100
Monuments & Memorials	2
Historical Built Environment	111
Intangible / Living	6
Place	2
Natural	2
Grand Total	385

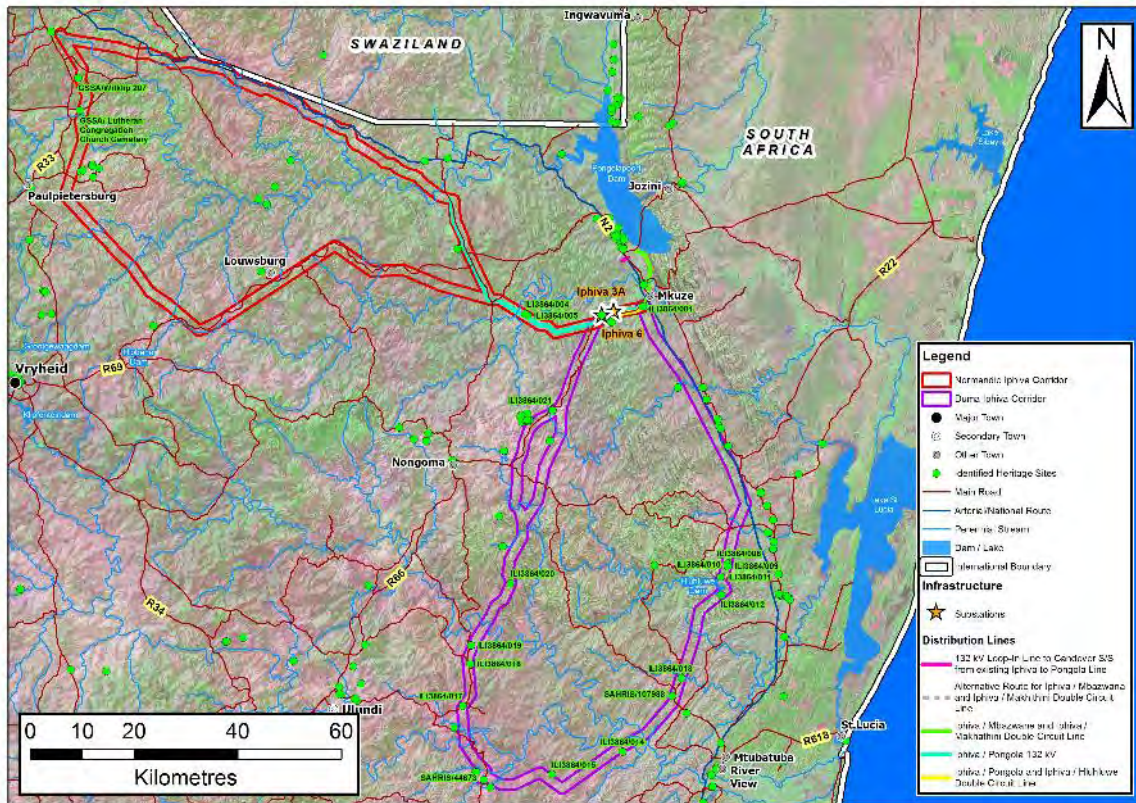


Figure 6-1: Identified heritage resources within the area under consideration in this assessment

The statement of significance considers the identified heritage resources and landscape importance or contribution to four broad value categories: aesthetic, historical, scientific and social values, to summarise the CS and other values described in Section 3(3) of the NHRA. Taking these criteria into consideration, the assessment of CS of the greater cultural landscapes as represented by the recorded heritage resource types demonstrates a CS ranging from negligible to very-high. A summary of the statement of significance is presented in Table 6-2.

Table 6-2: Statement of significance for the greater cultural landscape

Description	Integrity	Designation
Palaeontological resources associated with the Karoo Supergroup lithologies	4	Very High
Archaeological MSA sites with good integrity	4	Medium High



Description	Integrity	Designation
Archaeological MSA sites with poor integrity	1	Negligible
Archaeological LFC sites with good integrity	4	High
Archaeological LFC sites with poor integrity	1	Negligible
Historic battlefields	4	High
Burial grounds and graves	4	Very High
Monuments and memorials	4	High
Historical built environment associated with living groups with good integrity	4	Medium High
Historical built environment associated with living groups with poor integrity	1	Negligible
Historical built environment not associated with living groups with good integrity	4	Medium
Historical built environment not associated with living groups with poor integrity	1	Negligible
Intangible / living heritage sites	4	Medium High
Natural	4	High

6.2 Preliminary heritage assessment

The assessment of potential impacts to heritage resource types, known to occur within the cultural landscape, considered the aforementioned activities for the various applications as detailed in Section 1.2 above.

Project activities during the construction phase have the greatest likelihood of direct impacts to heritage resources. Activities associated with pre-construction, operation and decommissioning of the various infrastructures, however, are not envisaged to have a direct impact on heritage resources. These phases are not considered further in this assessment.



Collectively, the activities that may have a direct impact on heritage resources considered in this preliminary assessment include:

- Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures;
- Construction and/or upgrading of access roads; and
- Stringing of conductors.

The remainder of this section considers the heritage assessment for the individual applications as relevant to archaeological resources, historic battlefields, burials, monuments and memorials, natural¹³ and living heritage sites^{14,15}.

6.2.1 Iphiva Substation (Ref. No. 14/12/16/3/3/2/1037)

The preliminary assessment considers construction activities associated with the two (2) proposed alternate locations, specifically Iphiva 3 and 6 respectively. Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods; and
- Burial grounds and graves.

¹³ Natural heritage resources are not considered in this report as known instances occur at a distance greater than 10 km from any of the site-specific study areas. For a detailed description of the biophysical aspects of the natural heritage resources, please refer to the Fauna and Flora study and/or Visual study for this Project.

¹⁴ The assessor acknowledges that portions of the site-specific study area are underlain by lithostratigraphic units with high palaeontological sensitivity. This notwithstanding without a detailed or finalised infrastructure design, on-site verification of palaeontological resources was restricted. Further to this, the nature of the Project, it is a low risk any fossiliferous material will be disturbed. This report therefore does not consider palaeontological resources in the preliminary heritage assessment, but does include recommendations for a fossil finds procedure as a condition of authorisation.

¹⁵ Considering the nature of the Project and distribution of recorded heritage resources, no impacts to the historic built environment as defined by Sections 33 and 34 of the KZNHA and NHRA respectively are envisaged. This report therefore does not consider the historic built environment in the preliminary heritage assessment.

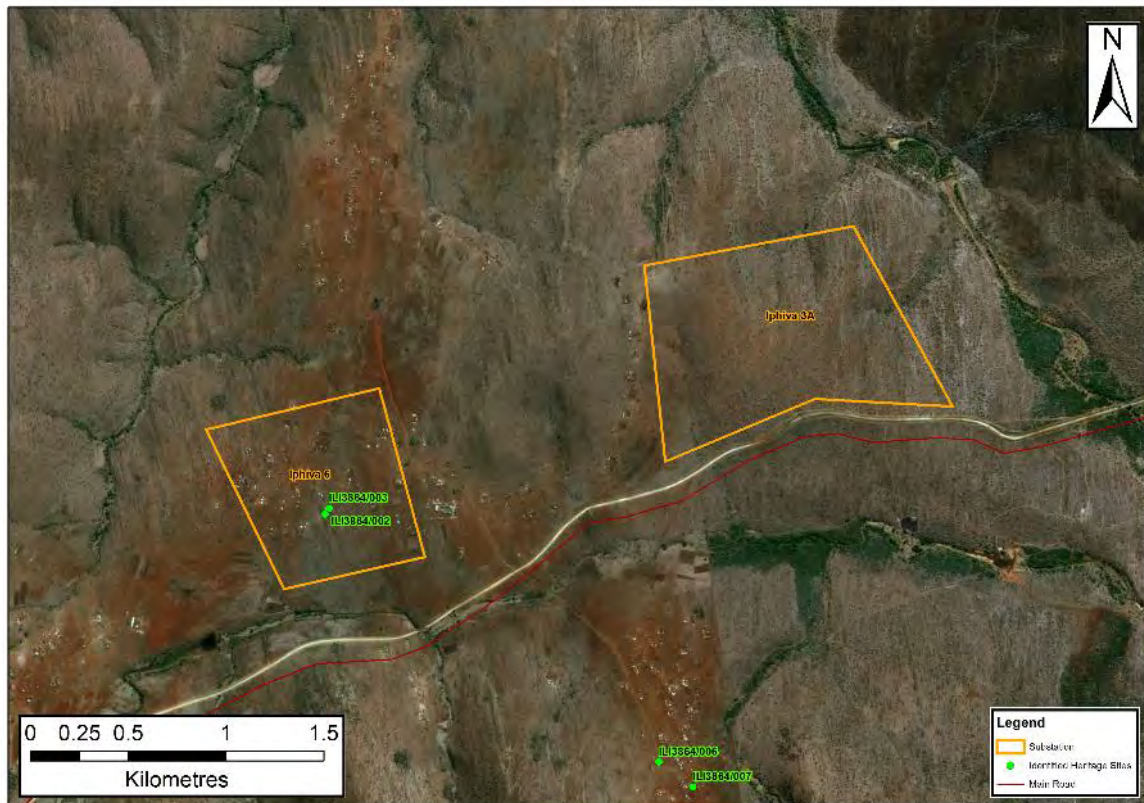


Figure 6-2: Iphiva Substations site-specific study areas with identified heritage resources

A summary of the assessments are presented in Table 6-3 through Table 6-5 respectively.

Table 6-3: Assessment summary for archaeological resources with a medium CS

IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Highly detrimental (-16)	Significance: Minor - negative (-48)
Extent	Province/ Region (5)	The manifested impacts will results in changes to the archaeological record of the region which is		



IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	Rating	Motivation		
		presently, relatively unknown or under researched		
Intensity x type of impact	Moderately high - negative (-4)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a medium CS classified as a moderately high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation. 				
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		



IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	Rating	Motivation		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 6-4: Assessment summary for archaeological resources with a high CS

IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites		
Extent	National (6)	The manifested impacts will result in changes to the archaeological record which is presently, relatively unknown or under researched. These sites may contribute to the understanding of the national pre-history.	Consequence: Extremely detrimental (-20)	Significance: Minor - negative (-60)



IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	Rating	Motivation		
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation. 				
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate		
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very		



IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	Rating	Motivation		
		low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 6-5: Assessment summary for burials, monuments and memorials with a high CS

IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites		
Extent	International (7)	The manifested impacts may result in changes to the heritage resources that may: - Be associated with Next-of-Kin across international borders; and - Have international reputational risks and repercussions.	Consequence: Extremely detrimental (-21)	Significance: Minor - negative (-63)
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high		


IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS

Dimension	Rating	Motivation
		CS classified as an extremely high impact
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.

MITIGATION:

It is recommended:

- A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and
- A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation.

POST-MITIGATION

Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		


IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS

Dimension	Rating	Motivation
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.

6.2.2 132 kV Distribution line alternatives

The preliminary assessment considers construction activities associated with the proposed distribution line routings, specifically:

- Iphiva – Pongola (1) 132 kV Powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV Powerline;
- Iphiva / Makhathini 132 kV Powerline double circuit with Iphiva / Mbazwane; and
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line.

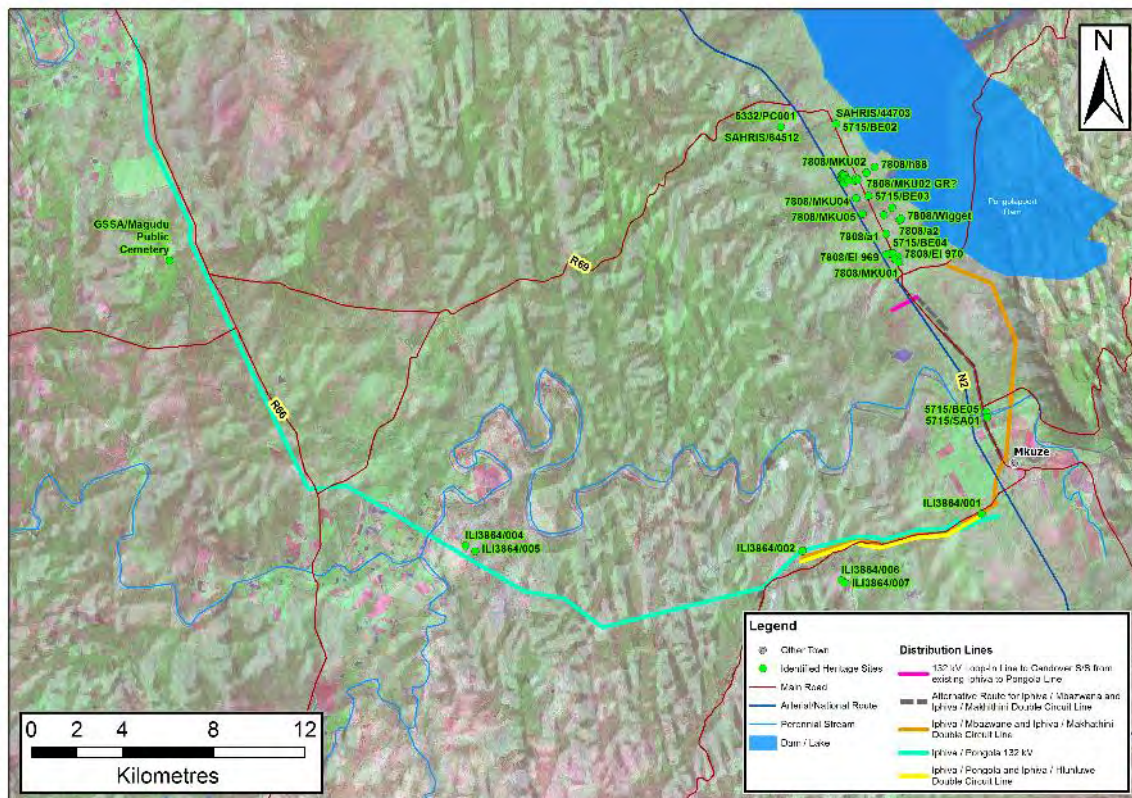


Figure 6-3: Distribution line site-specific study areas with identified heritage resources

Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods; and
- Burial grounds and graves.

A summary of the assessments are presented in Table 6-3 through Table 6-5 respectively and not repeated here for the sake of brevity.

6.2.3 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

The preliminary assessment considers construction activities associated with the proposed powerline corridors, specifically:

- Iphiva – Duma East;
- Iphiva – Duma West 1; and
- Iphiva – Duma West 2.

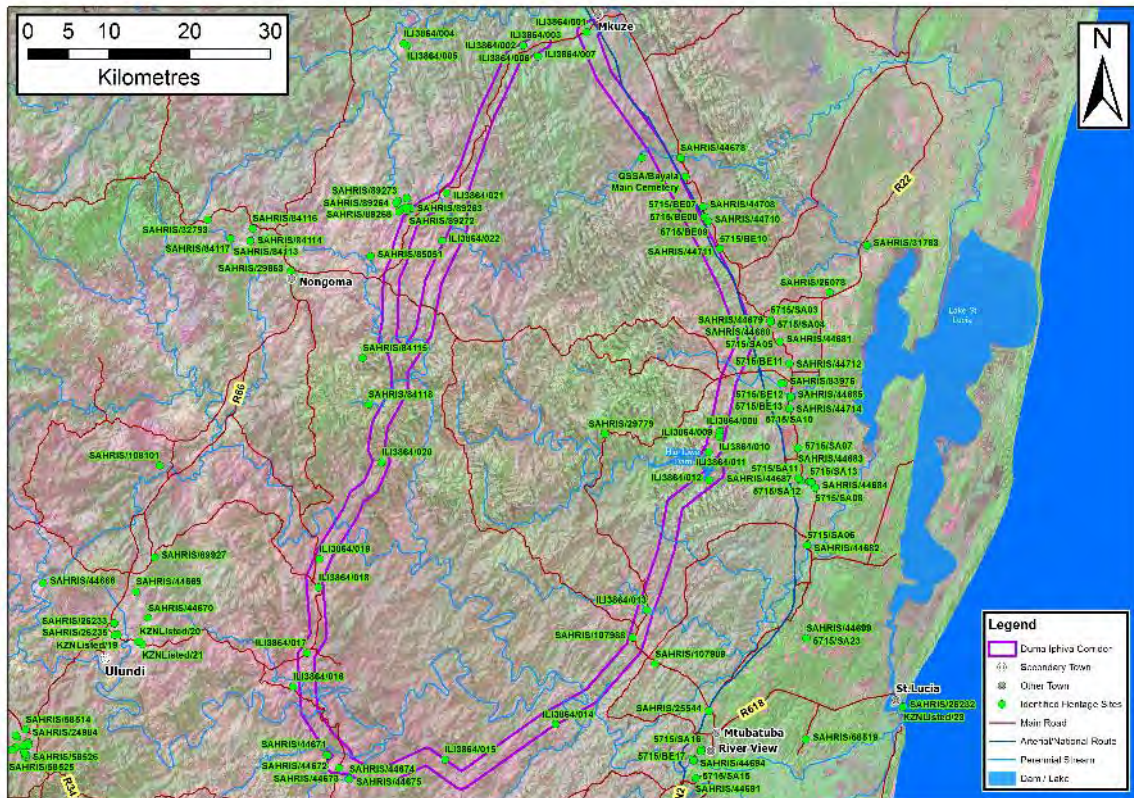


Figure 6-4: Iphiva-Duma 400 kV site-specific study areas with identified heritage resources

Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods;
- Historic battlefield(s);
- Burial grounds and graves; and
- Heritage places and/or living heritage sites.

A summary of the assessments are presented in Table 6-3 through Table 6-5 above and not repeated here for the sake of brevity. A summary of the assessment for historic battlefield and heritage places is presented in the subsequent tables.


Table 6-6: Assessment summary for battlefields with a high CS

IMPACT DESCRIPTION: Direct impact to battlefields with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Project Life (5)	The detraction from the sense-of-place will be removed after decommissioning	Consequence: Moderately detrimental (-12)	Significance: Minor - negative (-36)
Extent	Limited (2)	The extent of the impact will be limited based on the visibility of the powerline		
Intensity x type of impact	High - negative (-5)	Given the CS of the heritage resource type, this is considered a minor change to heritage resources with a high CS classified as a high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Recommendations contained within the visual assessment must be considered to reduce the intensity of the powerlines visibility; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMPr as a condition of authorisation. 				



IMPACT DESCRIPTION: Direct impact to battlefields with high CS				
Dimension	Rating	Motivation		
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 6-7: Assessment summary for living heritage with a high CS

IMPACT DESCRIPTION: Direct impacts to living heritage sites with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to living heritage sites will result in either loss of use, thereby degradation of the CS, and eventual	Consequence: Extremely detrimental (-19)	Significance: Minor - negative (-57)



IMPACT DESCRIPTION: Direct impacts to living heritage sites with high CS				
Dimension	Rating	Motivation		
		permanent abandonment and use of the site		
Extent	Province/ Region (5)	The manifested impact may influence the heritage site users from the greater region.		
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation. 				
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the		



IMPACT DESCRIPTION: Direct impacts to living heritage sites with high CS			
Dimension	Rating	Motivation	
		heritage resources.	
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.	
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.	

6.2.4 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

The preliminary assessment considers construction activities associated with the proposed powerline corridors, specifically:

- Normandie - Iphiva 2 (N-I 2); and
- Normandie - Iphiva 3 (N-I 3).

Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods; and
- Burial grounds and graves.



- Change to the sense-of-place from an archaeological / historic landscape to an modernised landscape;
- Establishment of a stable electricity supply may serve as a driver of development and increase settlement / urban sprawl that may pose risk or manifest in damage to *in situ* heritage resources;
- Sterilisation of the land where tangible heritage such as archaeological sites are destroyed and consequently the integrity of intangible heritage is degraded.

Synergistic cumulative impacts were also identified. These impacts are categorised as the interaction of individual effects to produce a total effect greater than the sum of the individual effect. In this instance, the damage or destruction of heritage resources within the landscape will increase the CS of those resources that remain undisturbed and *in situ* regardless of integrity.

Table 6-8: Summary of potential cumulative impacts

Type	Cumulative Impact	Direction of Change	Extent of Impact
Additive	Contribution to the change of the sense-of-place of the cultural landscape.	Negative	Local
Additive	Increased urban sprawl may pose risks or damage to <i>in situ</i> heritage resources.	Negative	Local
Additive Synergistic	Sterilisation of tangible heritage resources and consequently the possible effect on the integrity of the local intangible heritage, i.e. early history of the Zulu Kingdom.	Negative	Local
Additive Synergistic	Increased significance of remaining <i>in situ</i> archaeological sites and accumulations regardless of integrity.	Negative	Site specific and local

7 Consideration of alternatives

The suitability of the proposed siting and/or routing of infrastructures was subjected to a multi-criteria decision analysis utilising a simple linear additive evaluation model. In this instance, the suitability was considered against the following criteria:

- Criteria 1: The level of existing anthropogenic disturbance of the various site-specific study areas that will reduce the likelihood of identifying *in situ* heritage resources;
- Criteria 2: Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon;



- Criteria 3: If heritage resources occur within or in proximity to the development footprint and may be impacted upon; and
- Criteria 4: The potential that permitting requirements may be applicable if EA of the development footprint is approved.

These criteria were rated on a scale from 1 (unsuitable) to 5 (most suitable) to quantifiably compare the suitability of the various infrastructure sitings and/or routing options. Once the ratings were determined against the criteria above, these were calculated to determine the overall suitability ranking of the proposed infrastructures. The results of this assessment are presented and described in the narrative below per application as described in Section 1.2 above.

7.1 Iphiva Substation (Ref. No. 14/12/16/3/3/2/1037)

The consideration of alternatives assessed the two Iphiva Substation site-specific study areas against the aforementioned criteria. The following table presents the designated ratings and consequent results:

Table 7-1: Consideration of Iphiva Substation alternatives

Alternative	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rating
Iphiva 6	5	5	2	4	80%	4 Suitable
Iphiva 3	2	2	4	2	60%	3 Negligible / insignificant

The site-specific study areas of the proposed alternatives have varying levels of anthropogenic disturbance. Iphiva 6 is presently the location of a rural settlement where anthropogenic disturbance through establishing of structures and agricultural fields may have disturbed or removed previous *in situ* subsurface heritage resources. Iphiva 3 in contrast remains largely free from anthropogenic disturbance, reducing the suitability of the site against criteria 1 and 2.

Conversely, based on criteria 3, Iphiva 3 is more suitable as no heritage resources have been recorded within the site-specific study area. This does not however, preclude the potential permitting requirements in the event of accidental exposure of *in situ* subsurface heritage resources. Iphiva 6 is known to contain burial grounds and graves. While these will have permitting requirements in the event that they are to be impacted upon, because they are known the potential impacts can be easily avoided therefore making it more suitable in respect of criteria 4.

This assessment therefore demonstrated that Iphiva 6 is the more suitable alternative from a heritage perspective based on the available information.



7.2 132 kV Distribution line alternatives

Eskom are considering four (4) 132 kV Distribution powerlines. These will comprise the following routings:

- Iphiva – Pongola (1) 132 kV Powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV Powerline;
- Iphiva / Makhathini 132 kV Powerline double circuit with Iphiva / Mbazwane;
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line.

Of the 132 kV distribution lines considered in this assessment, only the Iphiva-Makhathini / Iphiva-Mbazwane distribution line has a routing alternative as per Figure 7-1.

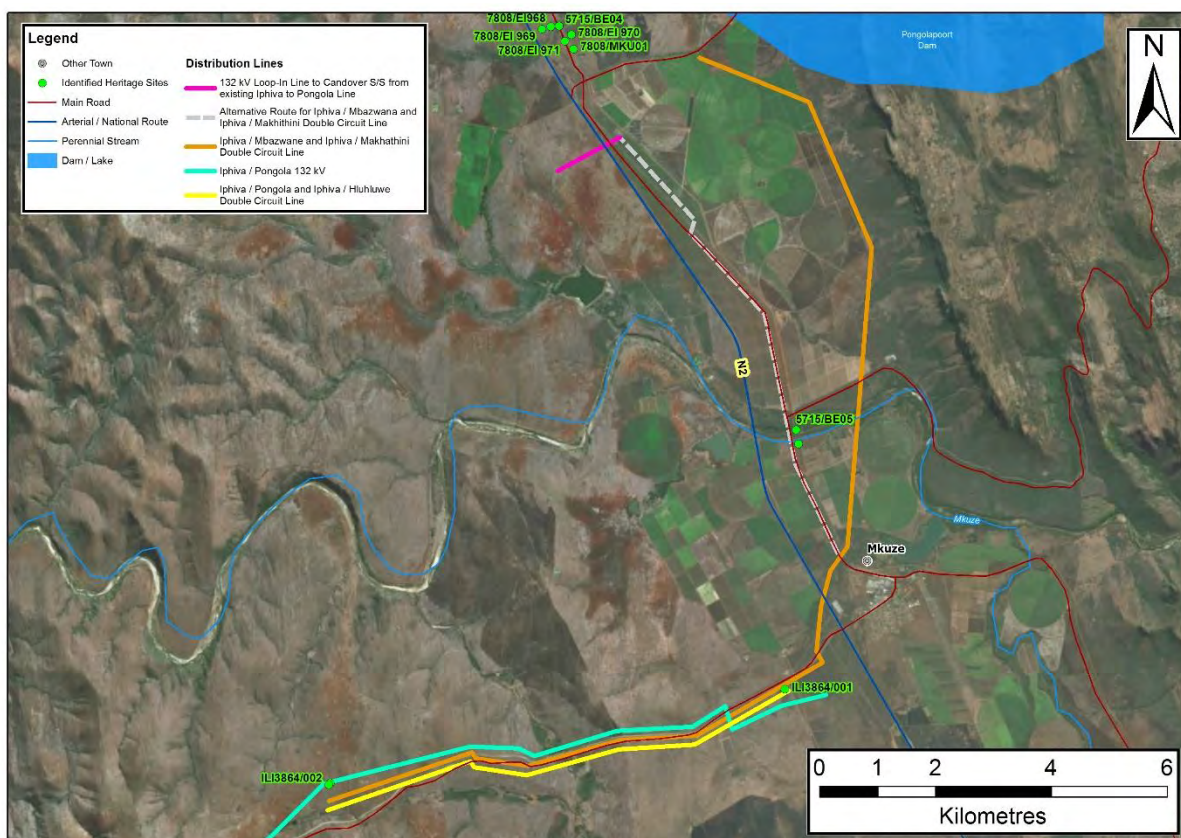


Figure 7-1: Iphiva-Makhathini / Iphiva-Mbazwane routing alternatives.

The following table presents the designated ratings and consequent results:


Table 7-2: Consideration of Iphiva-Makhathini / Iphiva-Mbazwane routing alternatives

Alternative	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rating
West Routing	5	4	4	4	80%	4 Suitable
East Routing	4	2	2	2	60%	3 Negligible / insignificant

The routing alternatives have been disturbed through anthropogenic activities, specifically the establishment of the N2 road (west) and agricultural fields (east). The level of disturbance for the west routing, when compared to the east, suggests that the likelihood of identifying *in situ* heritage resources is reduced making it more suitable against criteria 1 – 3. The west routing is in proximity to known heritage resources. While these will have permitting requirements in the event that they are to be impacted upon, because they are known the potential impacts can be easily avoided therefore making it more suitable in respect of criteria 4. Based on this assessment, the west routing is the preferred option from a heritage perspective.

Further to the recognised routing alternative of the Iphiva-Makhathini / Iphiva-Mbazwane distribution line, Eskom are proposing alternatives in respect of design for a portion of the proposed routing along the P234 road. These will comprise varying combinations of above and below ground options as presented in Table 7-3.

Table 7-3: Design alternative for the 132 kV distribution lines and 400 kV powerline along the P234 road

Design Alternatives	Options	
	Iphiva-Duma West	Iphiva-Duma East
All above ground	1	2
4 x 132 kV powerline below ground 1 x 400 kV powerline above ground	3	4
All below ground	No 400 kV line occurs within P234 corridor in this configuration. Therefore, all 132 kV distribution lines will be below ground	5
4 x 132 kV powerline above ground on double circuit	No 400 kV line occurs within P234 corridor in this configuration. Therefore, all	6



Design Alternatives	Options	
	Iphiva-Duma West	Iphiva-Duma East
1 x 400 kV powerline below ground	132 kV distribution lines will be above ground	
1 x 400 kV and 2 x 132kV powerlines above ground on multi-circuit 1 x 132kV powerline below	N/A	7

From a heritage perspective, the design alternative configurations as presented in Table 7-3 are irrelevant. What must be considered however, is the potential level of disturbance resulting from the establishment of pylons to support above ground configurations, against burying of the powerlines as proposed. The remainder of this section therefore considers the proposed distribution line routings in respect of above and below ground options against the following criteria:

- Criteria 1: The level of disturbance will increase the likelihood of identifying *in situ* heritage resources; and
- Criteria 2: Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon.

The following table presents the designated ratings and consequent results:

Table 7-4: Consideration of below and above ground alternatives

Alternatives	Criteria 1	Criteria 2	Total %	Rating
Below ground	1	2	40%	2 Less suitable
Above ground	3	5	80%	4 Suitable

Burying of powerlines in any of the proposed configurations will increase the level of disturbance and consequently the potential to identify, damage or destroy *in situ* heritage resources. Thus the option to establish powerlines below ground is less suitable than the above ground alternative against the defined criteria above. With this reasoning, options 1 and 2 as presented in Table 7-3 are the preferred alternatives from a heritage perspective.

7.3 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

This assessment initially considered three proposed alternatives to the Iphiva-Duma 400 kV (*i.e. West 1, West 2 and East*). Based on the scoping results of the Avifauna Assessment,

and in consultation with Ezemvelo KZN Wildlife, sensitivities associated with Protected Species Habitats necessitated specific mitigation measures. This resulted in the inclusion of an additional Iphiva-Duma 400 kV Deviation as presented in the following figure.

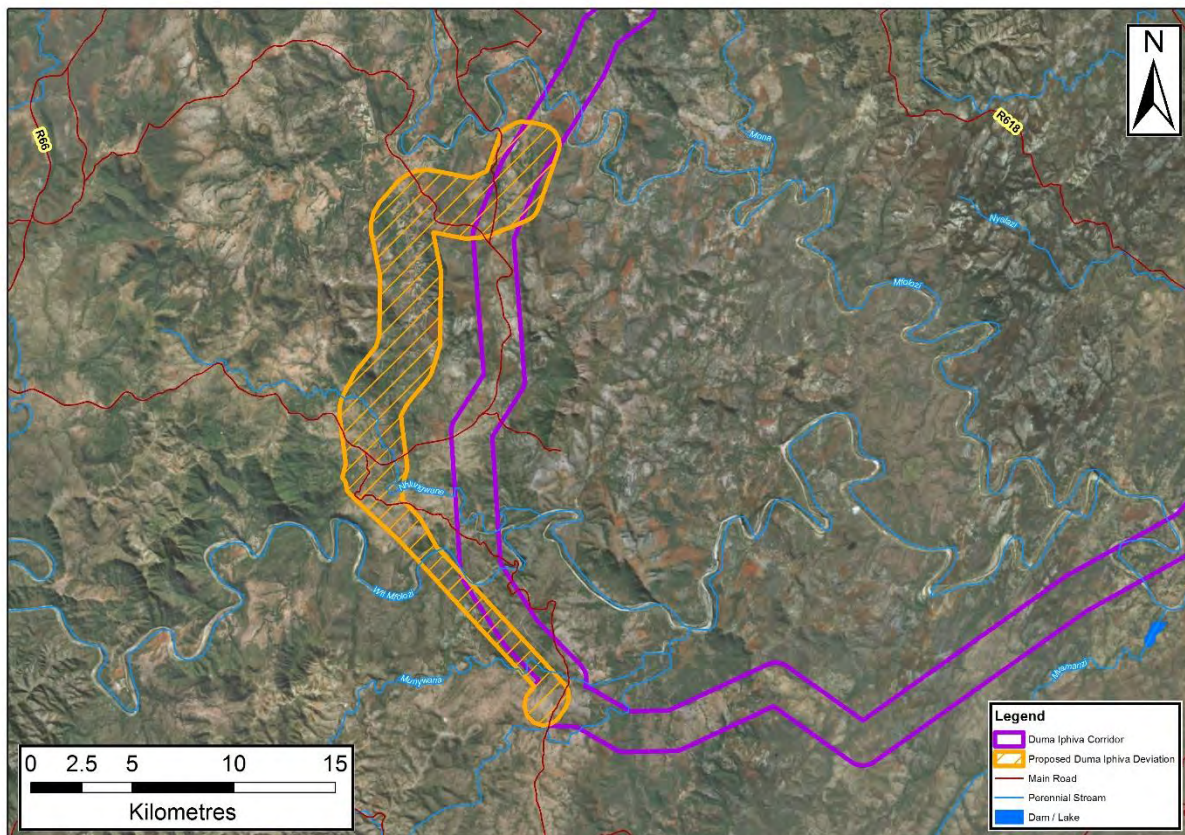


Figure 7-2: Proposed Iphiva-Duma West Deviation

The consideration of alternatives therefore assessed the four Iphiva-Duma 400 kV Powerline site-specific study areas against the aforementioned criteria. The following table presents the designated ratings and consequent results:

Table 7-5: Consideration of Iphiva-Duma 400 kV alternatives

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rating
Duma West 1	4	2	2	2	60%	3 Negligible / insignificant
Duma West 2	2	2	4	1	40%	2 Less suitable
Duma West Deviation	4	2	2	5	60%	3 Negligible / insignificant
Duma East	3	2	2	4	60%	3 Negligible / insignificant



Varying levels of anthropogenic disturbances were noted in the site-specific study areas. These were noted as rural settlements, subsistence and commercial agricultural fields, and municipal infrastructures. Of the options, Duma West 2 was deemed to have less anthropogenic disturbances when compared to the other alternatives. This notwithstanding, there is still the potential to identify *in situ* heritage resources within all four alternatives.

Based on criteria 3, Duma West 2 and the proposed deviation are more suitable as few heritage resources have been recorded within the site-specific study area. This does not however, preclude the potential permitting requirements in the event of accidental exposure of *in situ* subsurface heritage resources as per criteria 4. While permitting requirements may be applicable for Duma West 1 and East in the event that heritage resources are impacted upon, because they are known the potential impacts can be easily avoided through project related mitigation thus making it more suitable in respect of criteria 4.

This assessment therefore demonstrated that Duma West 2 is the least suitable alternative from a heritage perspective based on the available information.

7.4 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

Two alternative routing options for the Normandie-Iphiva 400 kV Powerline were considered in this assessment. Based on the results of the scoping assessment, the width of the proposed Normandie-Iphiva 400 kV Powerline corridors were adjusted in two sections (. The routings however, remain unchanged.

The consideration of alternatives assessed the two Normandie-Iphiva 400 kV Powerline site-specific study areas against the aforementioned criteria. The following table presents the designated ratings and consequent results:

Table 7-6: Consideration of Normandie-Iphiva 400 kV alternatives

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rating
N-I 2	5	4	4	3	80%	4 Suitable
N-I 3	2	3	2	3	60%	3 Negligible / insignificant

Varying levels of anthropogenic disturbances were noted in the site-specific study areas. These were noted as rural settlements, subsistence and commercial agricultural fields, and municipal infrastructures. Of the options, N-I 3 was deemed to have less anthropogenic disturbances when compared to N-I 2. In comparison, this suggests there is a greater potential to identify *in situ* heritage resources within N-I 3.

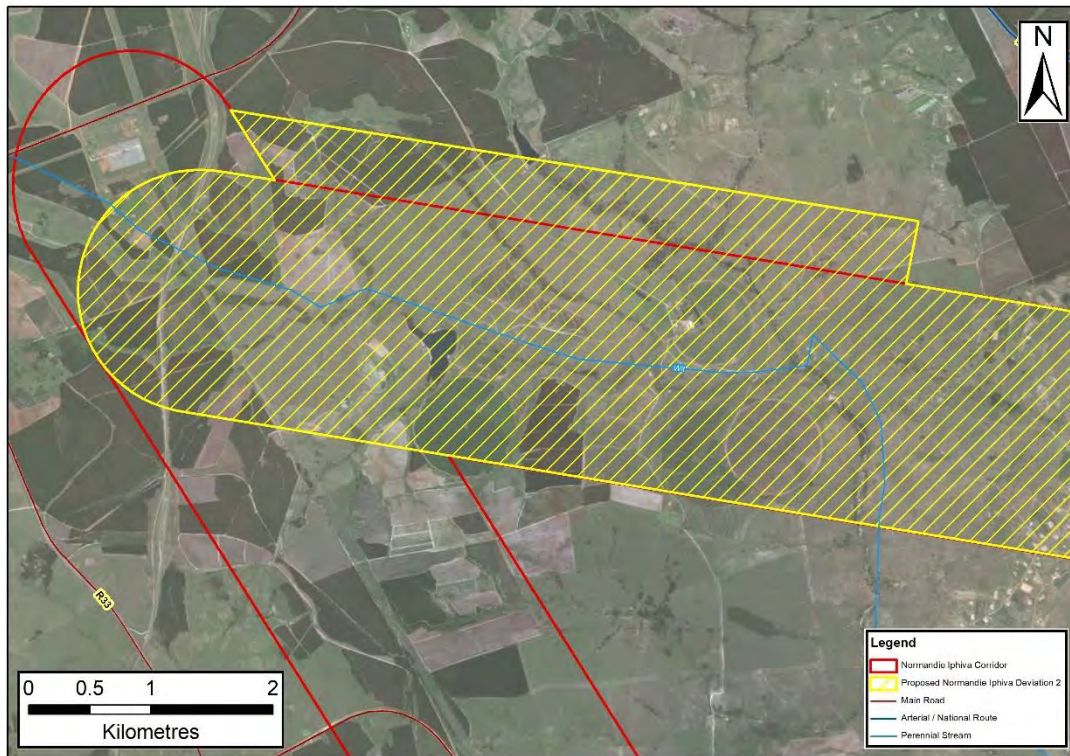


Figure 7-3: Normandie-Iphiva 2 corridor deviation

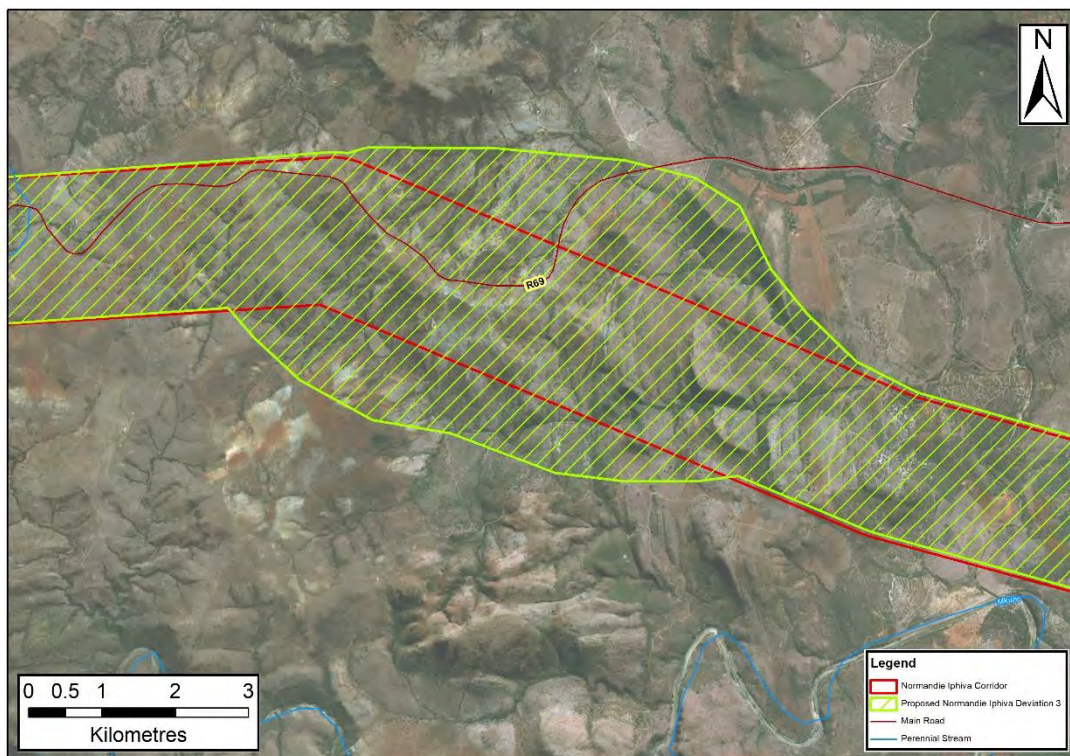


Figure 7-4: Normandie-Iphiva 3 corridor deviation



Based on criteria 3, N-I 2 is more suitable as few heritage resources have been recorded within the site-specific study area. This does not however, preclude the potential permitting requirements in the event of accidental exposure of *in situ* subsurface heritage resources as per criteria 4. While permitting requirements may be applicable for N-I 3 in the event that heritage resources are impacted upon, because they are known the potential impacts can be easily avoided through project related mitigation thus making it more suitable in respect of criteria 4.

This assessment therefore demonstrated that N-I 2 is the more suitable alternative from a heritage perspective based on the available information.

8 Consultation

This section provides as summary of the consultation process as applicable to this assessment. Briefly, no heritage specific consultation was undertaken as part of this assessment. Consultation for the Project adhered to the regulated Stakeholder Engagement Process (SEP). Table 8-1 summarises the select activities completed as part of this process.

Table 8-1: Summary of SEP undertaken during the Scoping Phase

Activity	Details
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.
Distribution of announcement letter and BID	A BID, announcement letter was emailed and posted to stakeholders on 16 August 2016. Furthermore, project information leaflets were distributed to all post-boxes in the site specific study area between July and August 2016.
Placing of newspaper advertisement	An English and Zulu advert was placed on 11 August 2016 in: <ul style="list-style-type: none"> ▪ Excelsior News; ▪ Isolezwe; and ▪ The Mercury.
Key Stakeholder and Authority Meetings	Meetings with key stakeholders and authorities were held as follows: <ul style="list-style-type: none"> ▪ Piet Retief, 5 September 2016; ▪ Pongola, 6 September 2016; ▪ Mkhuze, 7 September 2016; and ▪ Hluhluwe, 8 September 2016.
Focus Group Meeting	Focus Group Meetings were undertaken as follows: <ul style="list-style-type: none"> ▪ Pietermaritzburg, 9 September 2016; ▪ Mkhuze, 25 October 2016; ▪ Mkhuze, 29 March 2017.



Activity	Details
Traditional Council Meetings	Traditional Council Meetings were held from 12 September 2016 through 28 October 2016. Please refer to the Comments and Response Report for details.
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders were captured in the Comments and Responses Report (CRR) dated 30 August 2017.

The following heritage comments were recorded during the scoping phase of the Project:

Table 8-2: Heritage specific comments and responses recorded during the Scoping Phase

Comment	Date	Origin	Response
What procedures will be followed by Eskom should the final corridor pass through a graveyard?	21/09/16	Mr. Petros Mwelase	When selecting the final alignment within the corridor, graves and graveyards are avoided as much as possible. Eskom acknowledges that graveyards have high social importance and are treated with the sensitivity they deserve. Overhead powerlines can cross over graves and graveyards to avoid reburial and potential damage. However, should the proposed project have a direct impact on the graves a reburial process will be facilitated with the assistance of a heritage specialist, Ingonyama Trust, affected family members and the relevant traditional council. Eskom ensures that the reburial process is subjected to the relevant customs and traditions of the affected family. Eskom pays all the costs associated with the reburial as agreed with the affected family.
What measures are followed by Eskom if the recommended corridor has graves?	22/09/16	Mr. M. Ntshangase	
What happens in cases where dwellings needs to be relocated and graves are also in the backyard?	12/10/16	Othaka TC Meeting	
I would like to request that the Dlamini Traditional Council be engaged prior to commencing with construction. There	13/10/16	Mr. Albert Dlamini	The presence of graves within Dlamini Traditional Council was noted and it was confirmed that this information will be forwarded to the Heritage Specialist.



Comment	Date	Origin	Response
are two important graves, i.e. the grave of former iNkosi Magubulunda Dlamini in the Badaza area and the grave of iNkosi Ndida Dlamini in the Engweni area.			
If the family does not wish to leave their graves in the affected site, who will be responsible for the associated reburial costs?	26/10/16	Mr. MS Mahlambi	When selecting the final alignment within the corridor, graves and graveyards are avoided as much as possible. Overhead powerlines can also cross over graves and graveyards to avoid reburial and potential damage. However, should the proposed project have a direct impact on the graves a reburial process will be facilitated with the assistance of a heritage specialist, Ingonyama Trust, affected family members and the relevant traditional council. Eskom ensures that the reburial process is subjected to the relevant customs and traditions of the affected family. Eskom pays all the costs associated with the reburial as agreed with the affected family. In such cases, it would be the preferred option to work around the communal graveyard, hence the leeway provided by the 2 km servitude right, whereas only 55 m is needed.
I am concerned about issues that could arise for families who have graves within their homesteads. I am of the opinion that community members should be using graveyards as it provides for better planning for developments.	26/10/16	Inkosi Zulu	
Is it possible for houses to be relocated and graves to remain undisturbed within the proposed corridors?	27/10/16	Mr. Gumbi	
The exhumation of graves is not in line with our tradition.	27/10/16	Mr. Gumbi	

9 Recommendations

The report considers the greater cultural landscape as defined in Section 5 and 6.1 above respectively to determine the various heritage resource types that occur within the region. A preliminary assessment of the potential impacts to known heritage resource types was completed against the proposed Project and the associated activities (cf. Table 1-1, Table



1-2 & Table 1-3). This section collates the applicable recommendations to manage the potential impacts to known heritage resources types.

Portions of the site-specific study area are underlain lithostratigraphic units with a high palaeontological sensitivity and very high CS. The fossiliferous material commonly occurs at sub-surface levels with limited exposure at surface. Digby Wells acknowledges the significance of the various lithostratigraphic units as described in Section 5.1 above but is of the opinion that a detailed palaeontological assessment at this stage will not add value. Bamford (2016) notes that field assessments prior to subsurface disturbance rarely reveals any additional information.

Digby Wells therefore requests exemption from further palaeontological assessment on the basis of the aforementioned motivation and on condition that a Fossil Chance Find Procedure is included in the final EMP. The recommended procedure developed by Bamford (2016) and adapted in the context of this Project comprises the following:

Table 9-1: Recommended fossil finds procedure

Phase	Procedure
Construction	<p>Surface excavations should be monitored by a geologist in areas defined as having a high palaeontological sensitivity and any fossil material disturbed should be put aside and the palaeontologist called to inspect the material within a reasonable timeframe to minimise delays to the project. The geologist should also review visual references and descriptions of relevant palaeontological material as described in Section 5.1 above.</p> <p>If it is not feasible for the palaeontologist to visit the site timeously then digital photographs of good quality and resolution should be sent to the palaeontologist to assess and make recommendations.</p> <p>From visits or photographs supplied the palaeontologist must make the following recommendations:</p> <ul style="list-style-type: none"> ▪ Material is of no value so development can proceed, or ▪ Fossil material is of some interest where a representative sample should be carefully collected with the necessary permits as regulated by Chapter IV of GN R 548 before the development may proceed. The collected samples must be incorporated into a recognised repository (e.g. Ditsong Museum, Council for Geosciences, Pretoria; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg) to comply with the requirements of the Regulations to the Act; or ▪ Fossils are scientifically important and the palaeontologist must obtain the necessary permits as regulated by Chapter IV of GN R 548 to study the fossiliferous material in situ, where necessary excavate incorporate into a recognised repository. The development may not proceed in the identified area.



The following recommendations are applicable to the other heritage resource types known to occur within proximity to or within the site specific study as per Table 6-1. These include the following:

- A detailed heritage walk-down and impact assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities to identify any heritage resources that may be impacted upon;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources;
- Recommendations contained within the visual assessment must be considered to reduce the intensity of the powerlines visibility;
- The final heritage impact assessment must be submitted to SAHRA and Amafa for approval prior to construction activities; and
- A project specific Chance Finds Protocol, inclusive of the fossils finds procedure as per Table 9-1, be developed and included in the EMP as a condition of authorisation.

10 Conclusion

The aim of the HRM process was to comply with regulatory requirements contained within the KZNHA and Section 38 of the NHRA through the following:

- Defining the cultural landscape within which the Project is situated;
- Identify, as far as is feasible, heritage resources that may be impacted upon by the project as well as define the CS;
- Assess the potential impacts to the known heritage resource types within the local study area;
- Consider the proposed alternatives of the Project; and
- Provide feasible mitigation and management measures to avoid, remove or reduce perceived impacts and risks.

Based on Digby Wells' understanding of the Project (Refer to Section 1.2) while considering the defined cultural landscape and known heritage resource types (Refer to Section 5), the following potential impacts are envisaged by the construction related activities:

- Direct impacts to archaeological resources with medium significance;
- Direct impacts to archaeological resources with high significance;
- Direct impacts to battlefields with high significance;
- Direct impacts to burials, monuments and memorials with high significance; and
- Direct impacts to living heritage sites with high significance.



To manage the identified potential impacts from the preliminary assessment, recommendations as per Section 9 above were made. Where these recommendations are adopted, Digby Wells does not object to the implementation of the proposed Project.



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Appendix A: Plans

Northern KZN Strengthening Project Sensitivity - Iphiva Substations

Legend

-  Substation
-  Main Road

Sensitivity

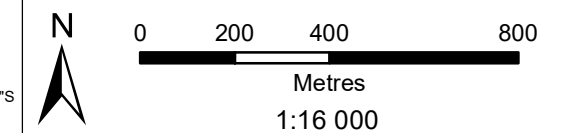
-  High – Open / Undisturbed Area & Palaeontological Sensitivity
-  Medium – Agricultural Fields / Disturbed Areas
-  Low – Settlements



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Projection: Transverse Mercator	Ref #: kam.II3864.201712.040
Datum: WGS 1984	Revision Number: 1
Central Meridian: 31°E	Date: 11/12/2017



Northern KZN Strengthening Project Sensitivity - Distribution Lines

Legend

- ⊙ Other Town
- Main Road
- Arterial/National Route
- Perennial Stream
- Dam / Lake

Distribution Lines

- 132 kV Loop-In Line to Candover S/S from existing Iphiva to Pongola Line
- Alternative Route for Iphiva / Mbazwana and Iphiva / Makhithini Double Circuit Line
- Iphiva / Mbazwane and Iphiva / Makhathini Double Circuit Line
- Iphiva / Pongola 132 kV
- Iphiva / Pongola and Iphiva / Hluhluwe Double Circuit Line

Sensitivity

- High – Open / Undisturbed Area & Palaeontological Sensitivity
- Medium – Agricultural Fields / Disturbed Areas
- Low – Settlements

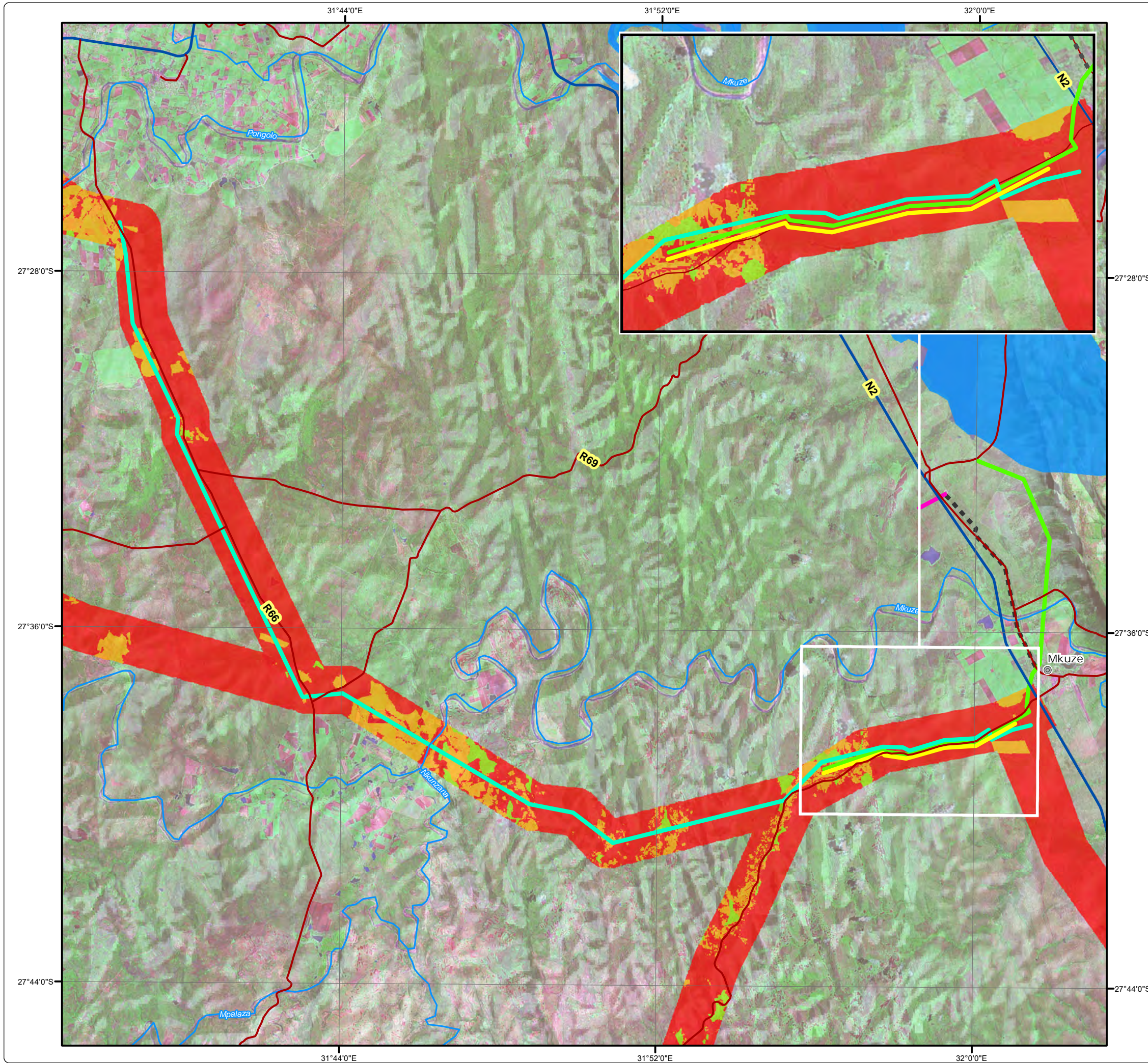


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

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Ref #: kam.II3864.201712.041
Revision Number: 1
Date: 11/12/2017






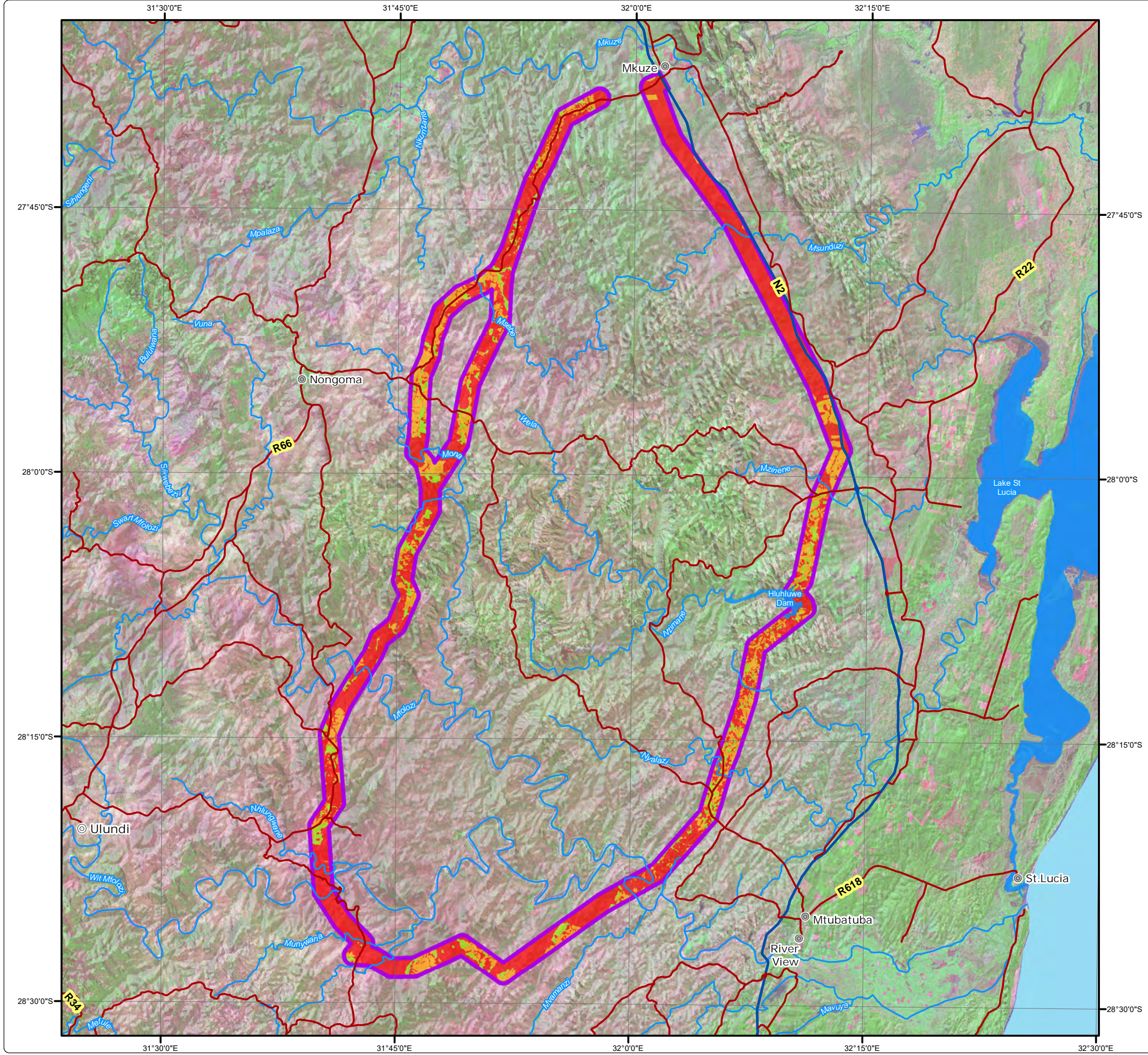
Northern KZN Strengthening Project Sensitivity - Iphiva Duma

Legend

-  Duma Iphiva Corridor
-  Secondary Town
-  Other Town
-  Main Road
-  Arterial/National Route
-  Perennial Stream
-  Dam / Lake

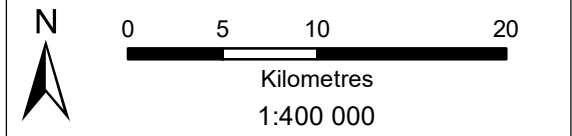
Sensitivity

-  High – Open / Undisturbed Area & Palaeontological Sensitivity
-  Medium – Agricultural Fields / Disturbed Areas
-  Low – Settlements









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Projection: Transverse Mercator Ref #: kam.II3864.201712.042
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 31°E Date: 11/12/2017



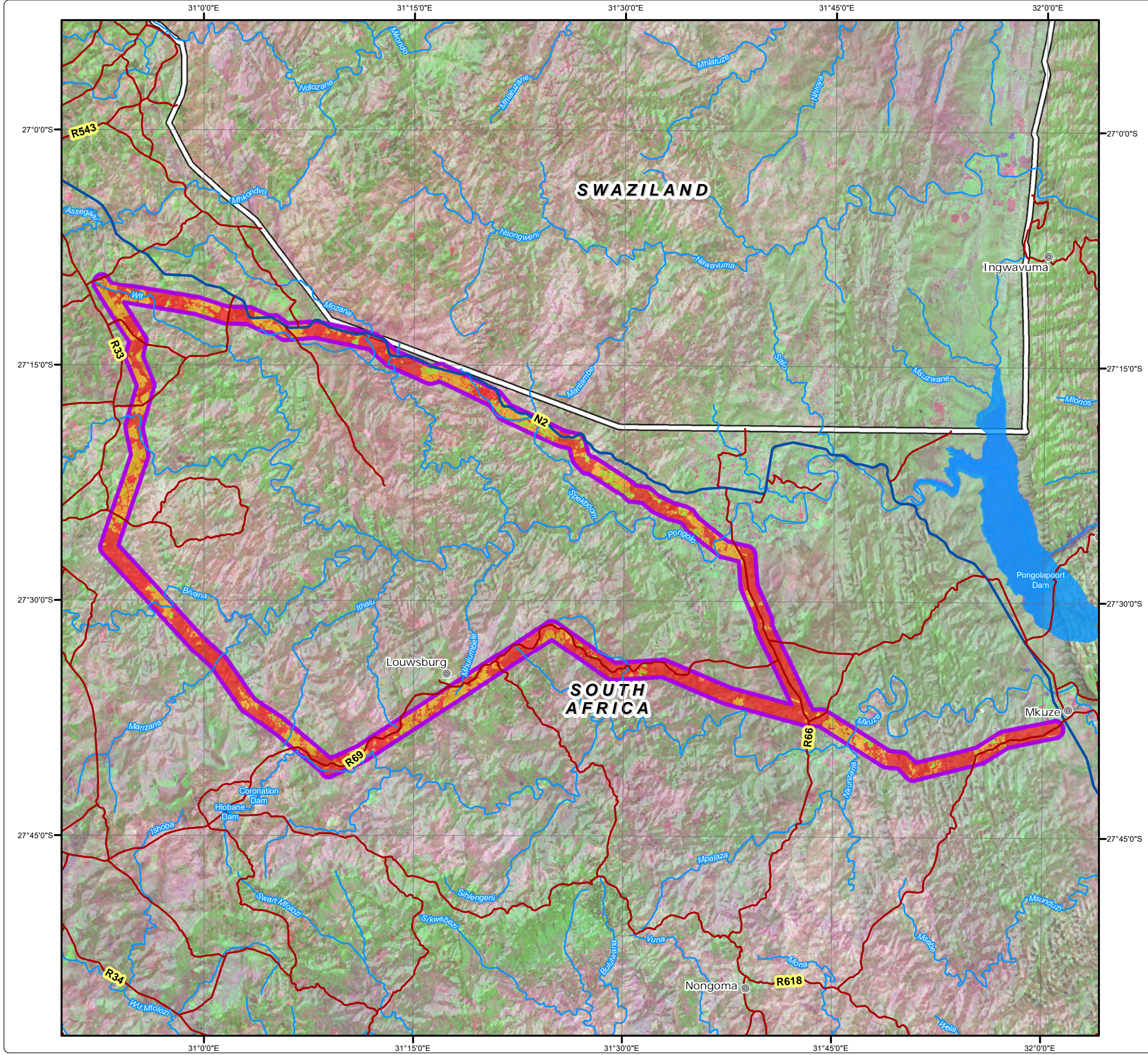
Northern KZN Strengthening Project Sensitivity - Normandie Iphiva

Legend

-  Normandie Iphiva Corridor
-  Other Town
-  Main Road
-  Arterial/National Route
-  Perennial Stream
-  Dam / Lake

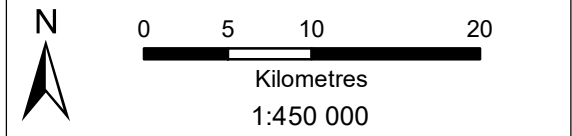
Sensitivity

-  High – Open / Undisturbed Area & Palaeontological Sensitivity
-  Medium – Agricultural Fields / Disturbed Areas
-  Low – Settlements
-  International Boundary



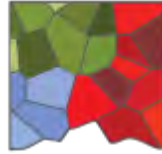
• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator Ref #: kam.II3864.201712.043
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 31°E Date: 11/12/2017





Appendix B: HRM Methodology



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Heritage Cultural Significance, Field Rating and Impact Assessment Methodology

Assessment Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

June 2016

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This document has been prepared by Digby Wells Environmental.

Document:	Assessment Methodology Statement
Description:	Heritage Cultural Significance, Field Rating and Impact Assessment Methodology
Project Code:	ZZZ9999

Revision History

Name	Responsibility	Version	Date
Johan Nel ASAPA Member 095	HRM Unit Manager	Ver 1	May 2014
		Ver 2	October 2014
		Ver 3	May 2015
Justin du Piesanie ASAPA Member 270	HRM Manager	Ver 4	January 2016
		Ver 5	June 2016

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1 Introduction

Assessment of impacts include several steps aimed to evaluate the way in which environmental aspects will / may interact with the cultural landscape (*the environment*) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- Environmental aspects: an element of an organisation’s activities or products or services that can interact with the environment’ (ISO 14001: 2004 - 3.6); and
- Environmental impacts: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or cultural significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 Evaluation of Cultural Significance

The significance rating process is designed to provide a numerical rating of the cultural significance¹ of identified heritage resources. The evaluation was done as objectively as possible through a matrix developed by Digby Wells for this purpose. In addition, the methodology aims to allow ratings to be reproduced independently should it be required, provided that the same information sources are used.

This matrix takes into account heritage resources assessment criteria set out in subsection 3(3) of the NHRA (see Box 1), which determines the intrinsic, comparative and contextual significance of identified heritage resources. A resource’s importance rating is based on information obtained through review

Dimension	Attributes considered	NHRA Ref.
Aesthetic & technical	1 Importance in aesthetic characteristics	S.3(3)(e)
	2 Degree of technical / creative skill at a particular period	S.3(3)(f)
Historical importance & associations	3 Importance to community or pattern in country's history	S.3(3)(a)
	4 Site of significance relating to history of slavery	S.3(3)(i)
	5 Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)
Information potential	6 Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)
	7 Information potential	S.3(3)(c)
	8 Importance in demonstrating principle characteristics	S.3(3)(d)
Social	9 Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)

Box 1: NHRA section 3 criteria

¹ Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.



of available credible sources and representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine significance can be summarised in Box 2.

$$\begin{aligned} \text{Value} &= \text{Importance} \times \text{Integrity} \\ \text{where} \\ \text{Importance} &= \text{average sum} \\ &\text{of} \\ &\text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social} \end{aligned}$$

Box 2: CS formula

The rationale behind the heritage value matrix takes into account the fact that a heritage resource's value is a direct indication of its sensitivity to change (impacts). Value therefore needs to be determined prior to the completion of any assessment of impacts.

This matrix rates the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social.

The significance of a resource is directly related to the impact on it that could result from project-related activities, as it provides minimum accepted levels of change to the resource. SAHRA has published minimum standards that include minimum required mitigation of heritage resources. These minimum requirements are integrated into the matrix to guide both assessments of impacts and recommendations for mitigation and management of resources.

The weight assigned to the various parameters for significance in the formula, significance ratings and recommended mitigation are presented in Table 3-1.

3 Field Rating

Although grading of heritage resources remains the responsibility of heritage resources authorities, SAHRA requires in terms of its Minimum Standards that heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. The NHRA in terms of section 7 provides for a system of grading of heritage resources that form part of the national estate, distinguishing between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation was done as objectively as possible by integrating the field rating into the significance matrix. Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with section 8 of the NHRA. The formula used to determine field ratings is summarised in Box 3. The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are presented in Table 3-1.

$$\begin{aligned} \text{Field Rating} &= \text{average sum} \\ &\text{of} \\ &\text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social} \end{aligned}$$

Box 3: Field rating formula

Table 3-1: Ratings and descriptions used in determining CS and field ratings

Rating	IMPORTANCE <i>A heritage resource's contribution to aesthetic, historic, scientific and social value.</i>	INTEGRITY <i>The undivided or unbroken state, material wholeness, completeness or entirety of a resource or site</i>	FIELD RATING <i>Recommended grading of identified heritage resources in terms of NHRA Section 7</i>
-	Not assessed - dimension and/or attribute not considered in determining value.		Not assessed - dimension and/or attribute not considered in field rating.
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost	
1	Common, well represented throughout diverse cultural landscapes	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance Grade IV C
2	Generally well represented but exhibits superior qualities in comparison to other similar examples	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance Grade IV B
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.	Fabric well preserved, good quality information and meaning evident, limited encroachment	Resources under general protection in terms of NHRA sections 34 to 37 with Medium to Medium-High significance Grade IV A
4	Rare and uncommon, value of national importance	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with High significance Grade III B
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.		Resources under general protection in terms of NHRA sections 34 to 37 with Very High significance Grade III A
6			Heritage resources under formal protection that can be considered to have special qualities which make them significant within the context of a province or a region Grade II
7			Heritage resources under formal protection that can be considered to have special qualities which make them significant within a national and / or international context. Grade I



4 Impact Assessment

The following are terms and definitions applicable to the EIA concept (ISO 14001):

- **Project Activity:** Activities associated with the project that result in an environmental interaction during the different phases (construction, operation and decommissioning), e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;
- **Interaction:** An “environmental interaction” is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change.
- **Environmental Aspect:** The term “environmental aspect” refers to the various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds.
- **Environmental Impact:** An “environmental impact” is a change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.

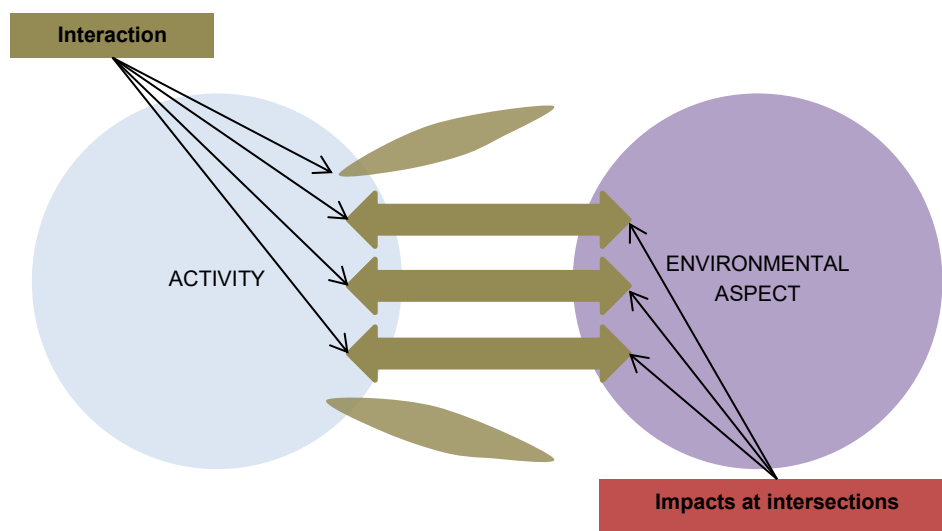


Figure 4-1: Graphical representation of impact assessment concept



The potential impacts were considered through an examination of the project phase and activity, the environmental aspect, the interdependencies between aspects, an assessment and classification of categories, and consideration of the potential impact on heritage resources. An example of this process is presented in Figure 4-2.

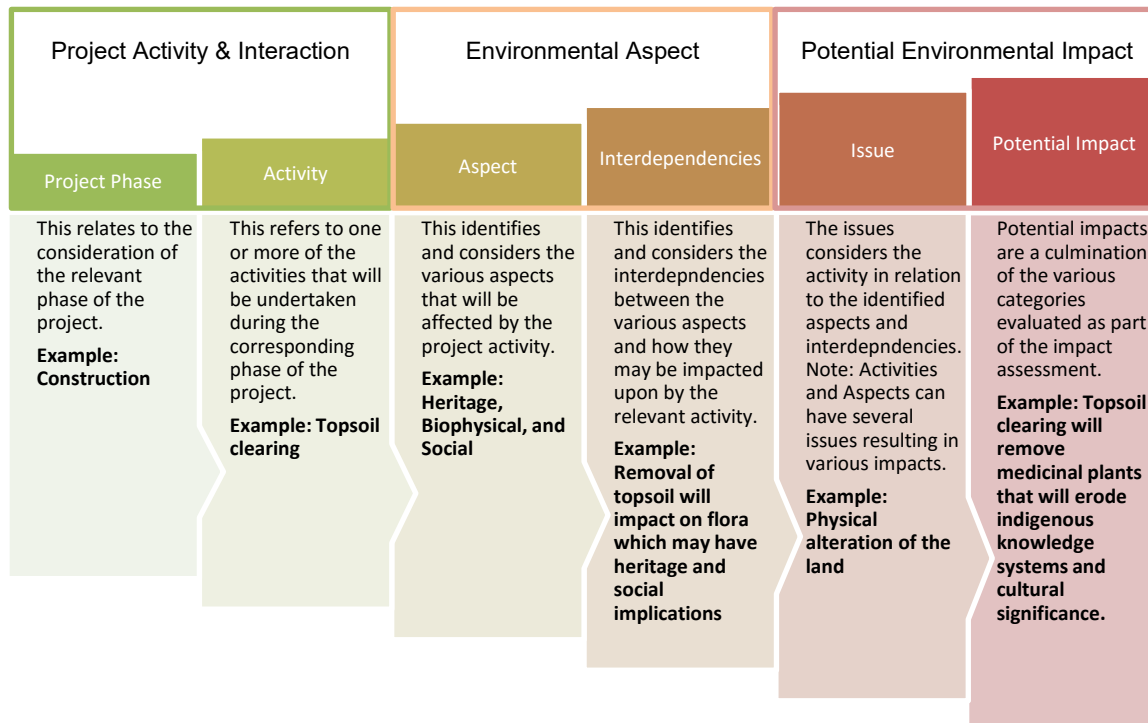


Figure 4-2: Example of how potential impacts were considered.

4.1 Defining Heritage Impacts

Different heritage impacts may manifest in different geographical areas and diverse communities. For instance, heritage impacts can simultaneously affect the physical resource and have social repercussions: this is compounded when the intensity of physical impacts and social repercussions differ significantly. In addition, heritage impacts can influence the cultural significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.



- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.
- **Cumulative heritage impacts** result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
 - **Additive:** the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area.
 - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area.
 - **Time crowding:** frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building high.
 - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area.
 - **Space crowding:** high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The relevance of the above distinction to defining the study areas in the HSR arises from the fact that heritage resources do not exist in isolation to the wider natural, social, cultural and heritage landscape: cultural significance is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study and are discussed in detail in the HSR.

4.2 Impact Assessment

The impact rating process is designed to provide a numerical rating of the identified heritage impacts. The significance rating follows an established impact/risk assessment formula is shown in Box 4.



The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 4-2 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above, and only applied to resources with values above negligible. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required.

Significance = consequence of an event x probability of the event occurring

where:

Consequence = type of impact x (Intensity + Spatial Scale + Duration)

and

Probability = Likelihood of an impact occurring

In the formula for calculating consequence:

Type of impact = +1 (positive) or -1 (negative)

Box 4: Impact assessment formula

This may include alteration, restoration or demolition of structures under a permit issued by the HRAs.

Impacts were rated prior to mitigation and again after consideration of the proposed mitigation measures. Impacts were then categories into one of eight categories listed in Table 4-2. The relationship between the consequence, probability and significance ratings is also graphically depicted in Table 4-2.

Table 4-1: Description of duration, extent, intensity and probability ratings used in impact assessment

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
7	Permanent	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	International	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	Extremely high	Major change to Heritage Resource with High-Very High Value	Certain/Definite	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Beyond Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	National	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	Very high	Moderate change to Heritage Resource with High-Very High Value	High probability	Happens often. It is most likely that the impact will occur.
5	Project Life	The impact will cease after project life.	Region	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	High	Minor change to Heritage Resource with High-Very High Value	Likely	Could easily happen. The impact may occur.
4	Long Term	Impact will remain for >50% - Project Life	Municipal area	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	Moderately high	Major change to Heritage Resource with Medium-Medium High Value	Probable	Could happen. Has occurred here or elsewhere
3	Medium Term	Impact will remain for >10% - 50% of Project Life	Local	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	Moderate	Moderate change to Heritage Resource with Medium - Medium High Value	Unlikely / Low probability	Has not happened yet, but could happen once in a lifetime of the project. There is a possibility that the impact will occur.

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
2	Short Term	Impact will remain for <10% of Project Life	Limited	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.	Low	Minor change to Heritage Resource with Medium - Medium High Value	Rare / Improbable	Conceivable, but only in extreme circumstances. Have not happened during the lifetime of the project, but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	Transient	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.	Very Limited	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	Very low	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	Highly Unlikely /None	Expected never to happen. Impact will not occur.

Table 4-2: Impact significance ratings, categories and relationship between consequence, probability and significance

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the heritage resources.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the heritage resources.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the heritage resources.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the heritage resources.	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the heritage resources and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

Relationship between consequence, probability and significance ratings																																						
Probability	Significance																																					
	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Consequence																																					



5 Mitigation Measures and Recommendations

The desired outcome of an impact assessment is the removal of negative impacts on heritage resources through the implementation of feasible mitigation measures. The mitigation and management measures recommended in this section comply with the General Principles set out under section 5 of the NHRA. The recommendations further considered the cultural significance of heritage resources and were guided by the minimum mitigation contained in the SAHRA Minimum Standards (See Box 5).

Designation	Recommended mitigation
Negligible	Sufficiently recorded, no mitigation required
Low	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Medium High	Project design should aim to reduce or remove changes; Mitigation of resource to include extensive sampling and recording, e.g. test excavation, analyses, etc.
High	Project design must aim to avoid change to resource; Partly conserved, Conservation Management Plan (CMP)
Very High	Project design must change to avoid all change to resource; Conserved in entirety, CMP

Box 5: Recommended minimum level of required mitigation

Recommended mitigation is therefore divided into two categories: *project-related* and *mitigation of heritage resources* defined below.

- Project-related mitigation requires changes or amendments to project design, planning and siting of infrastructure to avoid or reduce physical impacts on heritage resources. Project-related mitigation measures are always the preferred option, especially where heritage resources with higher cultural significance will be impacted on. Project-related mitigation may include:
 - *In situ* preservation (i.e. no-development) of heritage resources for which Conservation Management Plans (CMPs) are required; and
 - Conservation of heritage resources through, for example, incorporating the resources into project design and planning, for which CMPs are also required.
- Mitigation of heritage resources may be necessary where project-related mitigation will not sufficiently reduce or remove impacts, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs. This may require actions such as:
 - Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – “preservation by record”;
 - Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is a regulated permitted activity for which permits need to be issued by



the relevant heritage authorities. Such mitigation may result in a reassessment of the value of a resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled; and

- Where resources have negligible significance the specialist may recommend that no further mitigation is required and the site may be destroyed, for which a destruction permit must be applied for.

Appropriate mitigation measures were identified for each impact, and the procedure discussed above was to assess the possible consequence, probability and significance of each impact post-mitigation.

The post-mitigation rating provided an indication of the significance of residual impacts, while the difference between an impact's pre- and post-mitigation ratings represents the degree to which the recommended mitigation measures are expected to be effective in reducing or ameliorating that impact.

Assessment Methodology Statement

Heritage Cultural Significance, Field Rating and Impact Assessment Methodology

ZZZ9999



DIGBY WELLS
ENVIRONMENTAL

Heritage Screening Assessment

Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project

ILI3864



DIGBY WELLS
ENVIRONMENTAL

Appendix C: Specialist declaration and CV



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

- (1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and
- (2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project.

Specialist:	Digby Wells and Associates (South Africa) (Pty) Ltd		
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Postal code:	2125	Cell:	+27 82 791 5974
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Professional affiliation(s) (if any)	Association of Southern African Professional Archaeologists (ASAPA); <i>Amafa aKwaZulu Natali</i> (Amafa); International Council on Monuments and Sites (ICOMOS); International Association for Impact Assessment South Africa (IAIAsa)		

Project Consultant:	ILISO Nako		
Contact person:	Teresa Calmeyer		
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Postal code:	2191	Cell:	+27 82 455 1157
Telephone:	+27 11 465 2163	Fax:	+27 86 242 3117
E-mail:	terry@mdte.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Justin du Piesanie, declare that --

General declaration:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



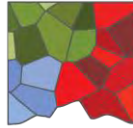
Signature of the specialist:

Digby Wells Environmental

Name of company (if applicable):

17 April 2018

Date:



DIGBY WELLS

ENVIRONMENTAL

Mr. Justin du Piesanie
Manager: Heritage Resources Management
Social and Heritage Services Department
Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2015	Continued Professional Development, Intermediate Project Management Course	PM.Ideas: A division of the Mindset Group
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

Period	Company	Title/position
2016 to present	Digby Wells Environmental	Unit Manager: Heritage Resources Management
2011-2016	Digby Wells Environmental	Heritage Management Consultant: Archaeologist
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

4 Experience

I joined the company in August 2011 as an archaeologist and was subsequently made unit manager in the Social and Heritage Services Department in 2016. I obtained my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. I further attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. I am a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. I am also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. I have over 10 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. I gained further generalist experience since my appointment at Digby Wells in Botswana, Burkina Faso, the Democratic Republic of Congo, Liberia and Mali on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, I have acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. My current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.

5 Project Experience

Please see the following table for relevant project experience:

Project Title	Project Location	Date:	Description of the Project	Name of Client
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005 2006	Archaeological surveys	ARM
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006 2006	Phase 2 Mapping	Sun International
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007 2007	Archaeological survey	ARM
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008 2008	Heritage Basic Assessment	ARM
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008 2008	Heritage Impact Assessment	Rhino Mines
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008 2008	Archaeological surveys	Cronimet
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008 2008	Heritage Statement	Eskom
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009 2009	Phase 2 Excavations	Heritage Contracts Unit
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009 2009	Phase 2 Mapping	University of the Witwatersrand
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010 2010	Heritage survey	Umlando Consultants
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010 2010	Archaeological Impact Assessment	ARM
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 Excavations	Heritage Contracts Unit
De Brochen and Booyensdal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 Mapping	Heritage Contracts Unit
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010 2010	Heritage Statement	Strategic Environmental Focus
Bathhako Mine Expansion	North-West Province, South Africa	2010 2010	Phase 2 Mapping	Heritage Contracts Unit
Kibali Gold Project Grave Relocation Plan	Oriental Province, Democratic Republic of Congo	2011 2013	Grave Relocation	Randgold Resources Limited



Project Title	Project Location	Date:		Description of the Project	Name of Client
Kibali Gold Hydro-Power Project	Orientale Province, Democratic Republic of Congo	2012	2014	Heritage Impact Assessment	Randgold Resources Limited
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2012	Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012	2012	Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012	2012	Burial Grounds and Graves Survey	Platreef Resources
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012	2012	Phase 2 Excavations	Resources Generation
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012	2012	Watching Brief	Bokoni Platinum Mine
SEGA Gold Mining Project	Burkina Faso	2012	2013	Socio Economic and Asset Survey	Cluff Gold PLC
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2015	Heritage Impact Assessment	Aquarius Resources
SEGA Gold Mining Project	Burkina Faso	2013	2013	Technical Reviewer	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013	2013	Heritage Impact Assessment	Msobo
New Liberty Gold Project	Liberia	2013	2014	Grave Relocation	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013	2013	Heritage Scoping	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013	2014	Heritage Impact Assessment	Atkins Limited
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013	2014	Notification of Intent to Develop	ERM Southern Africa
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013	2013	Heritage Impact Assessment	ERM Southern Africa
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	-	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
Nzoro 2 Hydro Power Project	Orientale Province, Democratic Republic of Congo	2014	2014	Social consultation	Randgold Resources Limited
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	Ergo (Pty) Ltd



Project Title	Project Location	Date:		Description of the Project	Name of Client
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014	2014	Heritage Basic Assessment	Ergo (Pty) Ltd
Kibali ESIA Update Project	Oriental Province, Democratic Republic of Congo	2014	2014	Heritage Impact Assessment	Randgold Resources Limited
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014	2014	Gap analysis	Gold One International
Yzermite PIA	Wakkerstroom, Mpumalanga, South Africa	2014	2014	Palaeontological Assessment	EcoPartners
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014	2014	Heritage Basic Assessment	Sasol Mining
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014	2015	Heritage Impact Assessment	Oakleaf Investment Holdings
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	ILISO Consulting
Imvula Project	Kriel, Mpumalanga, South Africa	2014	2015	Heritage Impact Assessment	Ixia Coal
Sibanye WRTRP	Gauteng, South Africa	2014	2016	Heritage Impact Assessment	Sibanye
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014	2015	Heritage Impact Assessment	VM Investment Company
NLGM Constructed Wetlands Project	Liberia	2015	2015	Heritage Impact Assessment	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015	2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015	2015	Heritage Impact Assessment	Jindal
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Permit Application	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Basic Assessment	Rustenburg Platinum Mines Limited



Project Title	Project Location	Date:		Description of the Project	Name of Client
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014	2016	Technical Review	IMIC plc
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Impact Assessment	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Basic Assessment	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment	Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Basic Assessment	Eskom Holdings SOC Limited
Grootegeluk Amendment	Lephalale, Limpopo Province, South Africa	2016	2016	Notification of Intent to Develop	Exxaro
Garsfontein Township Development	Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Leungo Construction Enterprises
Massawa EIA	Senegal	2016	2017	Technical Reviewer Heritage Impact Assessment	Randgold Resources Limited
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations	Royal Haskoning DHV
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Impact Assessment	Sibanye Gold Ltd
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping	Sun International
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Basic Assessment	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Umcebo Mining (Pty) Ltd
Elandsfontein EMP Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Anker Coal
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	-	Heritage Impact Assessment	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	-	Grave Relocation	Exxaro Resources Ltd
Grootegeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief	Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Site Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Basic Assessment	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

Project Title	Project Location	Date:	Description of the Project	Name of Client
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017 2017	Phase 2 Excavations	Lanxess Chrome Mine (Pty) Ltd
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017 2017	Heritage Impact Assessment	Birimian Limited
Zuurfontein Residential Establishment Project	Ekurhuleni, Gauteng, South Africa	2017 2017	Notification of Intent to Develop	Shuma Africa Projects
Kibali Grave Relocation Training and Implementation	Oriental Province, Democratic Republic of Congo	2017 -	Grave Relocation	Randgold Resources Limited
Exxaro Matla HRM	Kriel, Mpumalanga	2017 -	Heritage Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

6 Professional Registrations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A
Member	International Association of Impact Assessors (IAIA) South Africa	5494

7 Publications

Huffman, T.N. & du Piesanie, J.J. 2011. Khami and the Venda in the Mapungubwe Landscape. *Journal of African Archaeology* 9(2): 189-206

du Piesanie, J.J., 2017. Book Review: African Cultural Heritage Conservation and Management. *South African Archaeological Bulletin* 72(205)



CURRICULUM VITA

1 PERSONAL DETAILS

Full names	Johan Nel
Nationality	South African citizen
Date of birth	7 January 1980
South African identity number	80 01 07 50 11 080
Driver's licence type	South Africa code B
Home language	Afrikaans and English
Highest qualification obtained	BA Honours (Archaeology) (UP), 2002
Current employer	The Heritage Foundation
Current position	Manager: Conservation Services
Health	Excellent
Criminal record	None

2 EDUCATION

Date	Degree(s) or Diploma(s) obtained	Institution
2014	Integrated Heritage Resources Management Certificate, NQF Level 6	Rhodes University
2002	BA (Honours) (Archaeology)	University of Pretoria

Besturende Direkteur/Managing Director: Me Cecilia Kruger

Direkteure/Directors

Voorsitter/Chairman: Van Wyk WC Bailey A Botha PR Brink DJ Cruywagen AA Gouws JD Grobler JEH
Landman EF Mostert J Pienaar AJ Pretorius C Spies WD Van der Merwe JH

2001	BA	University of Pretoria
1997	Matric with exemption	Brandweg Hoërskool

3 LANGUAGE

Language	Speaking	Writing	Reading
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

4 EMPLOYMENT

Period	Company	Title/position
11/2016 –	The Heritage Foundation	Manager: Conservation Services
09/2011 to 10/2016	Digby Wells Environmental	Manager: Heritage Resources Management unit
05/2010-2011	Digby Wells Environmental	Archaeologist
10/2005-05/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007		Freelance archaeologist
(2004-2005)	Rock Art Mapping Project	Resident archaeologist
2002-2003	Department of Anatomy, University of Pretoria	Special assistant: Anthropology
2001-2002	Department of Anatomy, University of Pretoria	Technical assistant
1999-2001	National Cultural History Museum & Department of Anthropology and Archaeology, UP	Assistant: Mapungubwe Project,

5 BIOGRAPHY

My involvement in Cultural Heritage Resources Management spans a period of 17 years. This includes *inter alia* research projects, archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have worked in both urban settings and remote rural landscapes throughout South Africa, as well as Botswana, the Democratic Republic of the Congo, Liberia Sierra Leone and Swaziland. In addition, I have also acted as a specialist reviewer of heritage studies undertaken by local specialists in countries such as Cameroon, Malawi, Mali and Tanzania.

Since 2010 I have been fortunate to complement my experience in the heritage arena with Integrated Environmental Management. This exposure has enabled me to investigate and implement the integration of Cultural Heritage Resources Management into Environmental Management processes. Many of the projects have required compliance with International Finance Corporation requirements and other World Bank standards. This knowledge has allowed me to develop and implement a Cultural Heritage Resources Management approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS.

I have been appointed by the Heritage Foundation, a Section 21 not-for-profit company in November 2016 as Manager: Conservation Services. My duties here include among other things review, drafting and implementing Integrated Management Plans and Conservation Management Plans for various heritage sites in South Africa, identifying funding opportunities and drafting funding proposals, heritage focussed research and liaison with various government and NGO bodies. In addition, I still maintain a level of general Heritage Resources Management consulting services through the Heritage Foundation.

I am fluent in English and Afrikaans, with excellent writing and research skills. My fully computer literacy includes proficiency in all Microsoft programmes. I am fortunate to be able to work very well under pressure, especially when projects demand grasping complex, interconnected processes.

6 PROFESSIONAL REGISTRATION

Position	Professional Body	Registration Number
Professional member (Council member) (2013-2015)	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	095
Member	International Council on Monuments and Sites (ICOMOS)	13839

Professional member	International Association of Impact Assessors – South Africa (IAIAsa)	NA
Institutional member	South African Museums Association (SAMA)	NA

7 PUBLICATIONS AND CONFERENCE PAPERS

Author/s & date	Title	Published in/presented at
Nel, J. (2001)	Cycles of Initiation in Traditional South African Cultures.	South African Encyclopaedia (MWEB).
Nel, J. 2001.	Social Consultation: Networking Human Remains and a Social Consultation Case Study	Research poster presentations at the. Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists the National Museum, Cape Town
Nel, J. 2002.	Collections policy for the WG de Haas Anatomy museum and associated Collections.	Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.
Nel, J. 2004.	Research and design of exhibition for Eloff Belting and Equipment CC	Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004
Nel, J. 2004.	Ritual and Symbolism in Archaeology, Does it exist?	Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley
Nel, J & Tiley, S. 2004.	The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa.	Archaeology World Report, (1) United Kingdom p.14-22.
Nel, J. 2007.	The Railway Code: Gautrain, NZASM and Heritage.	Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.

Nel, J. 2009.	Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture.	The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
Nel, J. 2011.	'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: Mapungubwe Remembered.	University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.
Nel, J. 2012	HIAs for EAPs.	. Paper presented at IAIA annual conference: Somerset West.
Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.

8 PROJECT EXPERIENCE

Archaeological and Heritage Impact Assessments	80+
Burial grounds and graves consultation and relocation processes	20
Heritage mitigation projects	10+
Research reports and reviews	10+
Management plans	2

9 REFEREES

A list of referees can be provided on request.