













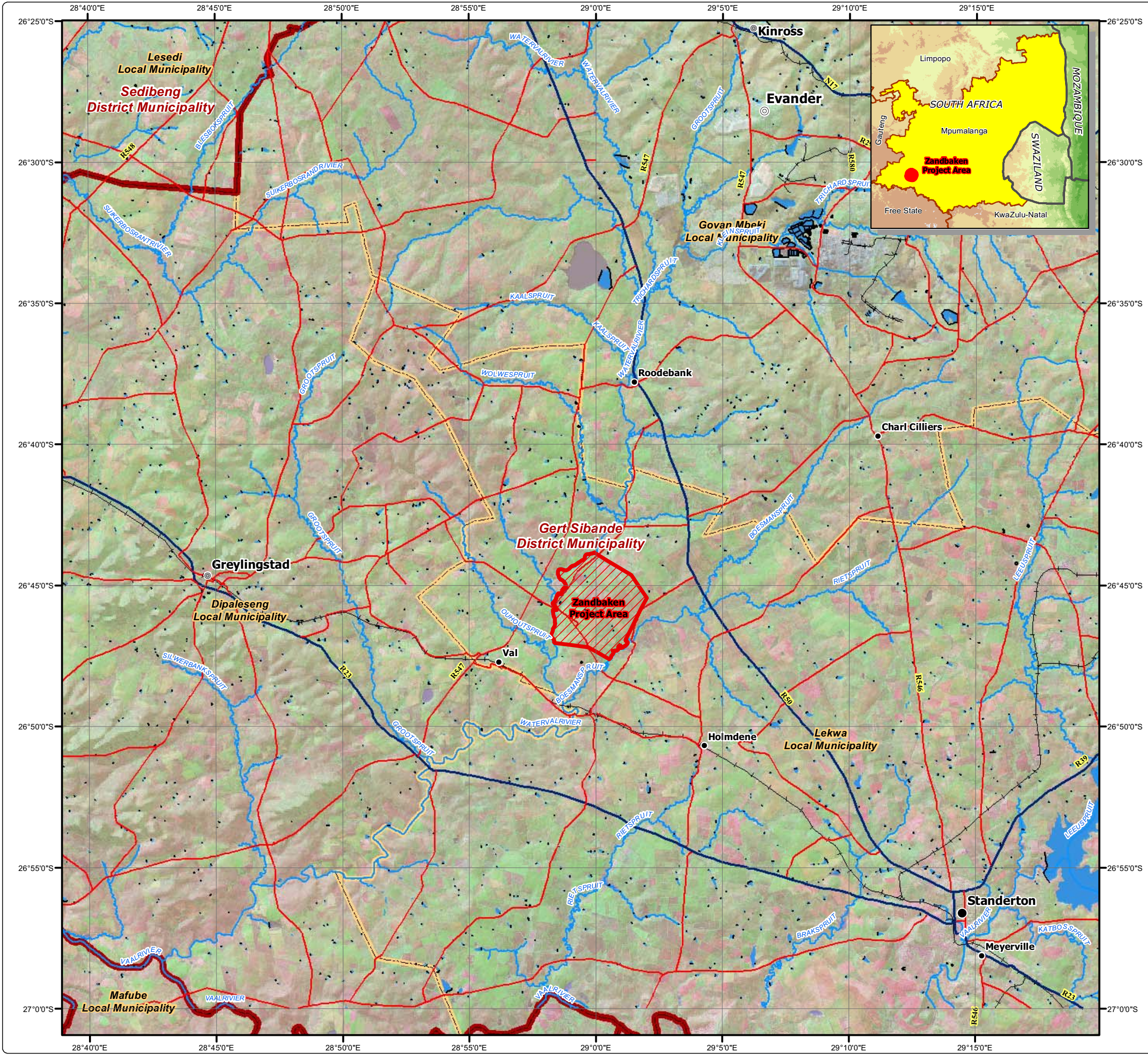


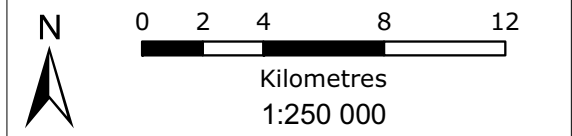
EIA/EMPR for Zandbaken Project Regional Setting

Legend

-  Project Area
-  City
-  Major Town
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Railway Line
-  Perennial Stream
-  Dam Wall
-  Dam /Lake
-  District Municipal Boundary
-  Local Municipal Boundary



Projection: Transverse Mercator Ref #: tdm.XST1716.201209.074
 Datum: Cape Revision Number: 1
 Central Meridian: 29°E Date: 06/09/2012

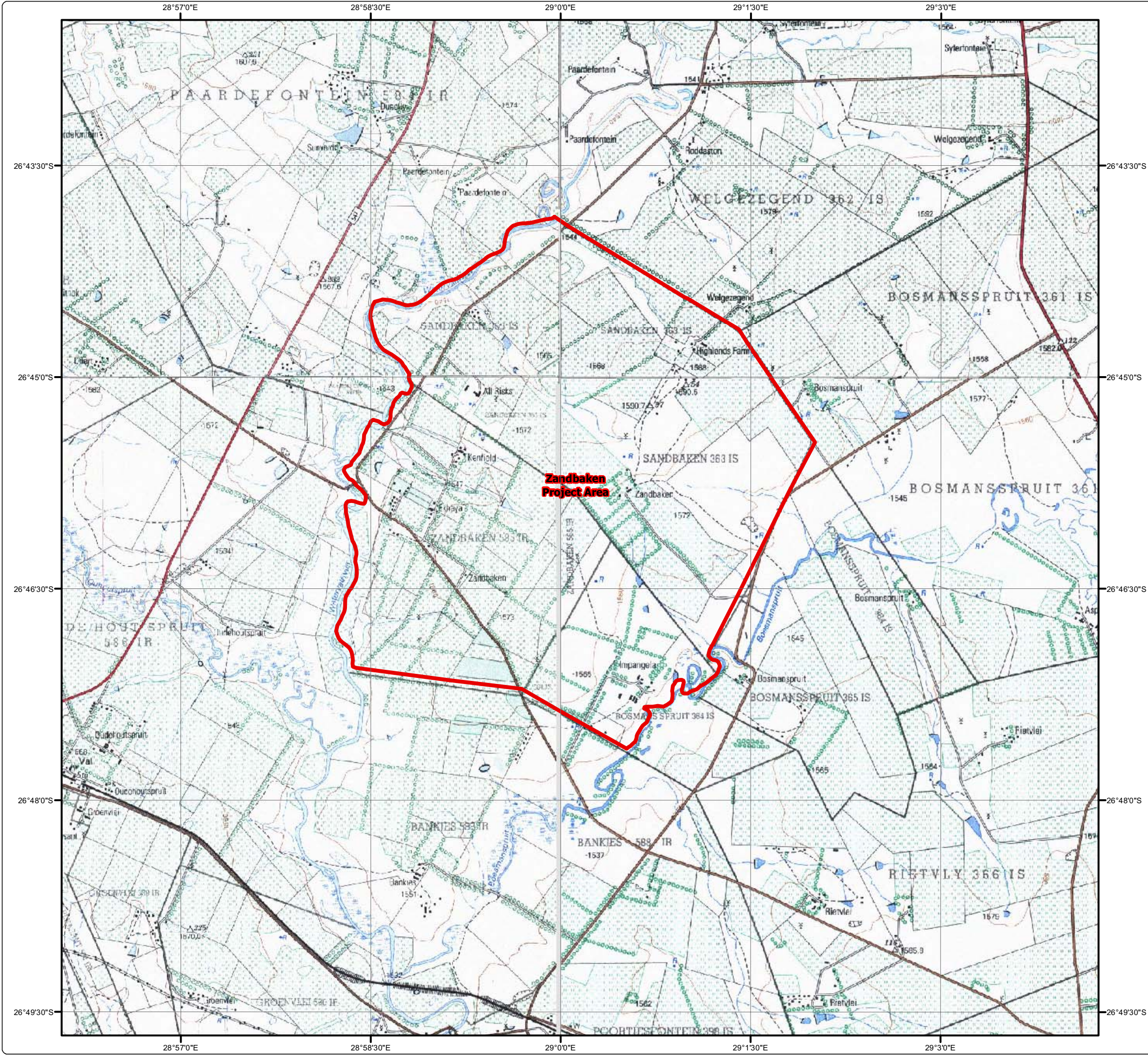


EIA/EMPR for Zandbaken Project

Topographical Map

Legend

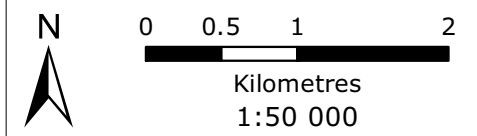
 Project Area



Topo Sheets:
 2628DB
 2628DD
 2629CA
 2628CC















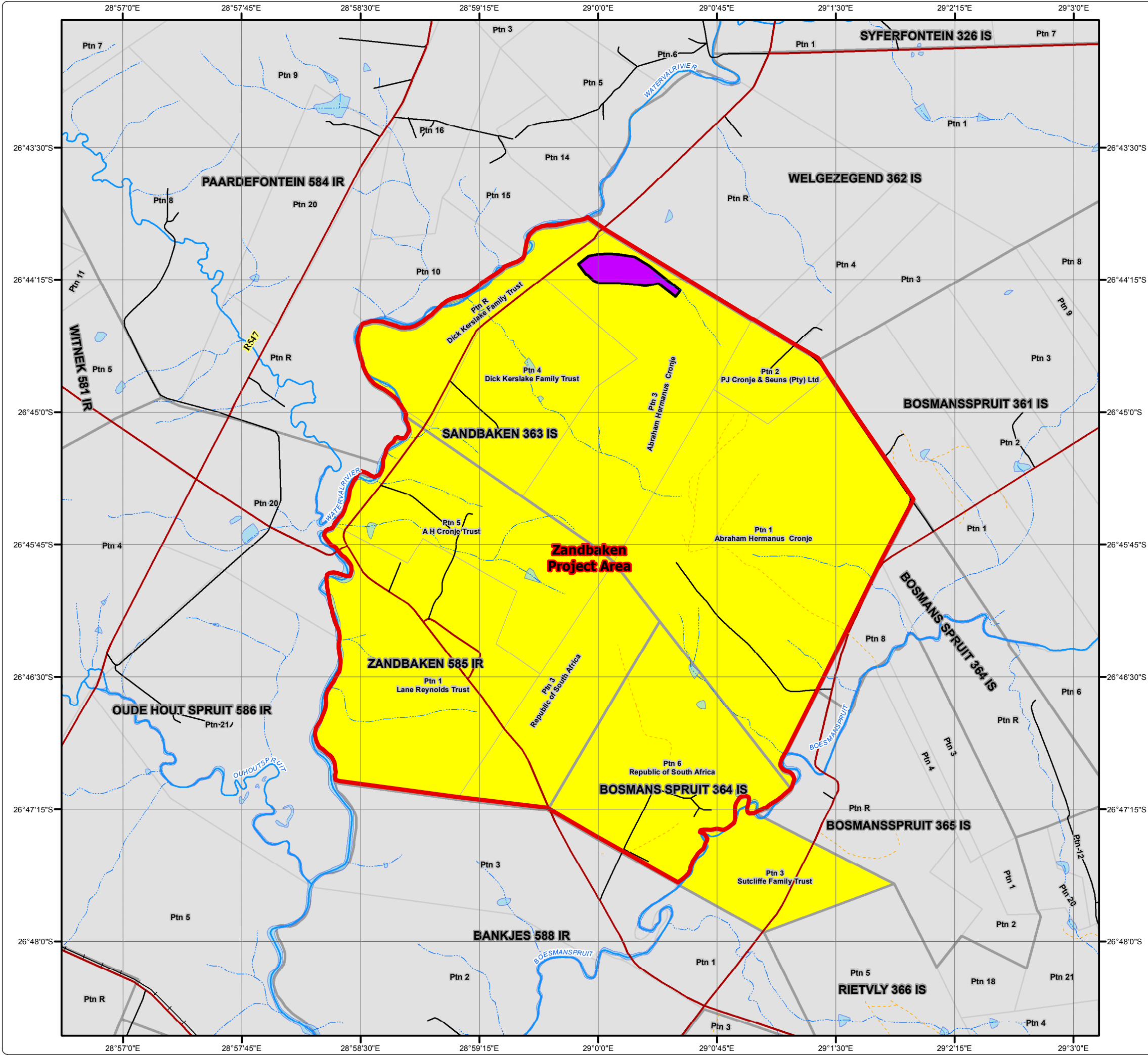
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 Datum: Cape Revision Number: 1
 Central Meridian: 29°E Date: 11/10/2012



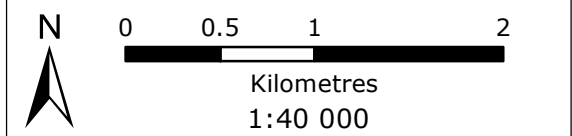
EIA/EMPR for Zandbaken Project Land Tenure & Infrastructure Footprint

Legend

-  Project Area
-  Infrastructure Footprint
-  Arterial / National Route
-  Main Road
-  Minor Road
-  Tracks
-  Railway Line
-  Perennial Stream
-  Non-Perennial Steam
-  Dam / Lake
-  Farm Boundaries
-  Farm Portions
-  Affected Farm Portions



Projection: Transverse Mercator Ref #: tdm.XST1716.201301.034
 Datum: Hartebeesthoek 1994 Revision Number: 1
 Central Meridian: 29°E Date: 14/01/2013



2.3 Relevant Contact Details

2.3.1 Client

The contact details of the client are presented in Table 2-2 below.

Table 2-2: Contact Details of the Client

ITEM	COMPANY CONTACT DETAILS
Company	Xstrata Coal South Africa
Contact person	Kaizer Khunwane
Tel no	013 653 5481
Cell no	073 184 1050
E-mail address	khunwane@xstratacoal.co.za

2.3.2 Consultant

The contact details of the consultant are presented in Table 2-3 below.

Table 2-3: Contact Details of the Consultant

ITEM	COMPANY CONTACT DETAILS
Company	Digby Wells Environmental
Contact person	Stephanie Aken
Tel no	011 789 9495
Fax no	011 789 9498
E-mail address	stephanie.aken@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125, South Africa

2.3.3 Land Owners

The contact details of the land owner are presented in Table 2-4 below.

Table 2-4: Contact Details of Land Owners

SANDBAKEN 363 IS PORTION 3	
Contact person	Abraham Hermanus Cronje
Tel no	017 712 2278
Postal address	PO Box 3669, Standerton, 2430

2.4 Terms of Reference

Xstrata Coal has requested Digby Wells to undertake an EIA in accordance with the MPRDA and NEMA processes. Digby Wells has developed a Heritage Resources Management (HRM) process, aimed at expediting decisions by relevant Heritage Resources Authorities, (HRA) and is firmly founded on the National Heritage Resources Act, 1999 (25 of 1999) (NHRA). This process is a phased approach aimed at integrating HRM with the NEMA and MPRDA process, and is described in more detail in the Methodology section (Section 0) of this report.

2.5 Legislative Requirements

The required actions of a developer or project proponent in terms of heritage resources are defined by the following national legislation and international guidelines on best practice.

South African Legislation

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);

Standards and Regulations

- South African Heritage Resources Agency (SAHRA) Minimum Standards; and
- Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics.

International Best Practise and Guidelines

- International council on Monuments and Sites (ICOMOS) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2010); and
- Applicable guidelines, charters and recommendations.

2.5.1 National Environmental Management Act, 107 of 1998 (NEMA)

HIAs are required in terms of the NEMA and relevant NEMA Regulations.

Principles for environmental management relevant to heritage resources management are highlighted in Section 2 of the NEMA:

- (2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably;
- (3) Development must be socially, environmentally and economically sustainable;
- (4)(a) Sustainable development requires the consideration of all relevant factors including that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied; and
- ((4)(o) The environment is held in public trust for the people the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.

In addition to the above principles, the general objective of the environmental management relative to heritage resources management is illustrated in Section 23 of the NEMA:

- (2)(a) promote the integration of the principles of environmental management set out in [the Principles] into the making of all decisions which may have a significant effect on the environment; and
- (2)(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits, and promoting compliance with the principles of environmental management set out in section 2.

HIAs are implemented in terms of the NEMA Section 24 in order to give effect to the general objectives. Procedures in terms of the NEMA Section 24(7) considering heritage resources management are provided and must include:

- a. Investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto;
- b. Investigation of the potential impact. including cumulative effects, of the activity and its alternatives on the environment, socio-economic conditions and cultural heritage, and assessment of the significance of that potential impact;
- c. Investigation of mitigation measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity;
- d. Public information and participation, independent review and conflict resolution in all phases of the investigation and assessment of impacts;
- e. Reporting on gaps in knowledge. the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;

- f. Investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation;
- g. Co-ordination and co-operation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;
- h. That the findings and recommendations flowing from such investigation, and the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to the proposed policy, programme, plan or project; and
- i. That environmental attributes identified in the compilation of information and maps as contemplated in subsection (2)(e) are considered.

2.5.2 Mineral and Petroleum Development Act, 28 of 2002 (MPRDA)

The NEMA Principles outlined apply to all prospecting and mining operations in terms of the MPRDA Section 37.

HIAs are required in terms of integrated environmental management required in terms of Section 39 of the MPRDA, and that must reflect the general objective of the NEMA described above. In relation to heritage resources management, a specific MPRDA requirement in terms of Section 39 is to:

- (3)(b)(iii) investigate, assess and evaluate the impact of ... prospecting or mining operations on any national estate referred to in section 3(2) of the NHRA with the exception of the national estate as contemplated in section 3(2)(i)(vi) and (vii) [objects of scientific or technological interest and books, records, documents, etc.].

2.5.3 National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)

The primary legislation that must be considered with regard to heritage resources is the NHRA. The sections of this act are applicable to the NFS UCG are discussed below.

2.5.3.1 Section 2 – Definition of heritage resources

Section 2 of the NHRA contains definitions of certain terms used in heritage resources management. In terms of this proposal the following definitions must be considered:

- (ii) **archaeological**: any material remains resulting from human activity older than 100 years; any form of rock art older than 100 years and the area within 10 m of the art; and any feature, structure or artefact associated with military history older than 75 years as well the sites on which they are found;
- (v) **cultural significance**: aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance;

- (viii) **development**: any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including construction, alteration, demolition, removal or change of use of a place or a structure at a place; carrying out any works on or over or under a place; subdivision or consolidation of land comprising, a place, including the structures or airspace of a place; constructing or putting up for display signs or hoardings; any change to the natural or existing condition or topography of land; and any removal or destruction of trees, or removal of vegetation or topsoil;
- (xiii) **grave**: a place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place;
- (xvi) **heritage resource**: any place or object of cultural significance;
- (xxi) **living heritage**: intangible aspects of inherited culture, and may include cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships;
- (xxxix) **palaeontological**: any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trances;
- (xxxviii) **public monuments and memorials**: all monuments and memorials erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;
- (xiii) **site**: any area of land, including land covered by water, and including any structures or objects thereon;
- (xiv) **structure**: any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith; and
- (xviii) **victims of conflict**: certain persons who died in any area now included in the Republic as a direct result of any war or conflict as specified in the regulations, but excluding victims of conflict covered by the Commonwealth War Graves Act, 1992 (Act No. 8 of 1992); members of the forces of Great Britain and the former British Empire who died in active service in any area now included in the Republic prior to 4 August 1914; persons who, during the Anglo-Boer War (1899-1902) were removed as prisoners of war from any place now included in the Republic to any place outside South Africa and who died there; and certain categories of persons who died in the

“liberation struggle” as defined in the regulations, and in areas included in the Republic as well as outside the Republic.

2.5.3.2 Section 34 – Structures older than 60 years

Section 34 of the NRHA provides for general protection of structures older than 60 years. Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant Provincial Resources Heritage Authority (PHRA). These permits will not be granted without a HIA being completed.

A destruction permit will thus be required before any removal and/or demolition may take place, unless exempted by the PHRA according to Section 34(2) of the NHRA.

2.5.3.3 Section 35 – Archaeological and palaeontological resources and meteorites

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. In the event that archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the PHRA, or local authority or museum who must notify the PHRA. Furthermore, no person may without permits issued by SAHRA destroy, excavate, or make any alterations to archaeological or palaeontological resources encapsulated in Section 38(4).

2.5.3.4 Section 36 – Burial grounds and graves

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during the course of development, Section 36(6) stipulates that such activities must immediately cease and the discovery reported to the responsible heritage resources authority and the South African Police Service (SAPS). Furthermore, as specified in Section 38(3) no person may destroy, damage, exhume or alter any burial site without a permit issued by SAHRA.

2.5.3.5 Section 37 – Public monuments and memorials

Section 37 makes provision for the protection of all public monuments and memorials in the same manner as places which are entered in a heritage register referred to in Section 30 of the NHRA.

2.5.3.6 Section 38 - Heritage Resources Management

Section 38(1) and (2) – Heritage Impact Assessments independent of NEMA/MPRDA processes

Section 38(1) stipulates that the relevant heritage authority must be notified of any development at the earliest opportunity possible, via a Notice of Intent to Develop (NID). The heritage authority is required to comment on the NID within 14 days stating whether a HIA is required or not. A Heritage Statement – which is the equivalent of a baseline – should be compiled to inform the NID.

The following activities, as stipulated in Section 38(1) of the NHRA, act as triggers for the undertaking of HIAs:

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) the construction of a bridge or similar structure exceeding 50 m in length;
- (c) any development or other activity which will change the character of a site -
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority,
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Section 38(8) – Heritage impact assessment required by NEMA/MPRDA processes

HIAs are in general required in terms of subsection (8) where development is undertaken in terms of both NEMA and the MPRDA. In the event that a HIA is required in terms of subsection (8), subsection (3) requires the responsible HRA to specify information that must be provided in the HIA report.

The Listed Activities in terms of NEMA for which Environmental Authorisation will be applied for will trigger a HIA as contemplated in Section 38(1) above as follows:

Activity	NHRA Trigger	Description
Basic Assessment		
GNR 544-21	38(1)(a)	Construction of a road longer than 300 m
GNR 544-23 i	38(1)(c)(i)	Transformation of land in excess of 5 ha that will change the character of a site
	38(1)(d)	Rezoning of land in excess of 10 ha
GNR 544-23 ii	38(1)(c)(i)	Transformation of land in excess of 5 ha that will change the character of a site

Activity	NHRA Trigger	Description
Basic Assessment		
	38(1)(c)(ii)	Transformation of land involving three or more existing erven or divisions
	38(1)(d)	Rezoning of land in excess of 10 ha
Scoping and Full EIA		
GNR 545-4 GNR 545-5	38(1)(a)	Construction of a road longer than 300 m
	38(1)(c)(i)	Transformation of land in excess of 5 ha that will change the character of a site
	38(1)(c)(ii)	Transformation of land involving three or more existing erven or divisions
	38(1)(d)	Rezoning of land in excess of 10 ha

3 METHODOLOGY

The Digby Wells HRM process is a phased approach aimed at integrating HRM into the NEMA and/or MPRDA processes, as well as expediting the HIA process required in terms of the NHRA. The process consists of three phases:

- Phase 1: Notification;
- Phase 2: HIA specialist studies; and
- Phase 3: Implementation of applicable heritage mitigation measures.

These phases integrate into the NEMA process as indicated in the following flow diagram. The methodology only addressed the first phase of the HRM process.

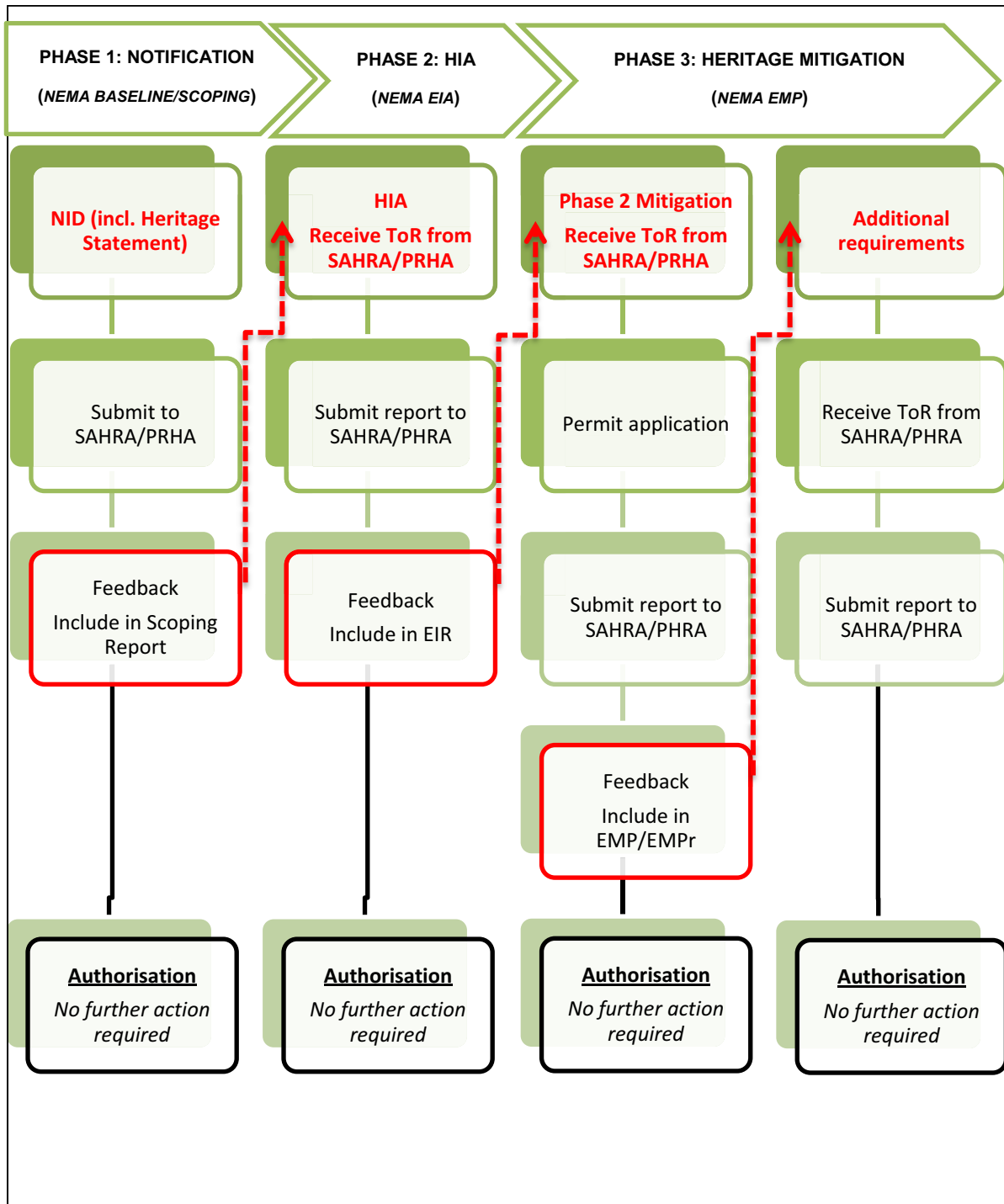


Figure 3-1: Integration of the HRM process into the NEMA and/or MPRDA processes

3.1 Heritage Statement

The current heritage landscape of the Zandbaken Project area was characterised to include existing and potential heritage resources. The following methods were used in compiling the Heritage Statement:

3.1.1 A Literature Review

- A literature review of relevant and available published research such as academic journals and academic books;
- Archival and background research;
- A review of existing heritage impact assessment reports; and
- Review of relevant institutional frameworks such as Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).

3.1.2 Historical Layering

- A desktop-based survey of existing historical to current aerial photography to complement historical research and identify potential heritage resources;
- A desktop-based survey of historical to current topographical maps where relevant to determine the existence of potential heritage resources; and
- A desktop-based survey of historical to current geological maps where relevant to determine the potential existence of palaeontology resources.

3.1.3 Site Naming

3.1.3.1 Previously identified sites

Sites may be identified based on previous relevant reports. The site names and/or numbering that were used in the original reports will be used, but suffixed with the relevant SAHRA report number if available, for example a heritage resource identified in Pistorius 2008, described as a farm complex and numbered FC01.1 in that report will be:

- FC01.1/2008-SAHRA-0323

3.1.3.2 Unconfirmed sites identified during desktop study

Potential sites not previously identified, but noted as a result of historical layering, desktop studies or through indicators such as vegetation will be named using the Digby Wells project number and site number prefixed with HS and suffixed with a short description, for example XST1716/HS001-grave.

3.1.4 Identification and Evaluation of Potential Sources of Risk

Identification of possible sources of risk considered proposed project activities and infrastructure designs supplied by Xstrata Coal for the Zandbaken Project, as well as development proposed in the GS-IDP.

Evaluation of potential impacts on heritage resources that may result due to identified sources were based on professional experience, known existence of types or categories of heritage resources in and near the Zandbaken Project area.

4 CHARACTERISATION OF CULTURAL LANDSCAPE

4.1 Literature Review

4.1.1 Geological Context

The geology of the study area is depicted on the 1:100 000 scale geological sheet (Plan 4). The study area is underlain by carbonaceous shales and coal of the Karoo Super Group. The coal deposits are preserved in the Waterberg Basin and it is believed that the Waterberg Coal Field holds more than 40% of South Africa's *in situ* mineable coal reserves (Wilson, 2012).

The Zandbaken Project area is situated near the edge of the Highveld Coal Field which forms part of the Karoo Basin that extensively covers parts of South Africa. The main Karoo Basin, which covers more than 50% of the surface of South Africa, can be subdivided into the Dwyka, Ecca and Beaufort Groups.

The bedrock of the study area is comprised of ancient basement rocks of the Transvaal Super Group. These rocks are very old and date to the Vaalian period. The basement rocks are overlain by the Karoo Super Group.

The Dwyka Formation which dates to the Palaeozoic overlies the Transvaal Super Group rocks and comprises the basement of the Karoo Super Group. The Dwyka Formation consists mostly of tillites that are fairly regularly deposited over the basin.

In comparison to the Dwyka Formation, the Ecca Group (Palaeozoic) consists predominantly of sandstone, siltstone, shale and coal. In the Karoo, these sedimentary rocks are of palaeontological importance as they are rich in fossils.

In the project area, the Dwyka tillites are overlain by the Madzaringwe Formation which correlates to the Vryheid Formation of the Ecca Group. The Vryheid and Madzaringwe Formations contain coal seams as well as various sequences of sandstone, shale and siltstone.

The stratigraphy of the Zandbaken Project area is presented, in order of decreasing age, in Table 4-1 below.

Table 4-1: Stratigraphy of the Zandbaken Project area

Phanerozoic	Palaeozoic	250 million years	<i>Madzaringwe Formation</i>
			<i>Vryheid Formation</i>
			Ecca Formation
			Dwyka Formation
			KAROO SUPERGROUP
Proterozoic	Vaalian	2050 million years	TRANSVAAL SUPERGROUP

4.1.2 Palaeontological Heritage

In this southern region of the Mpumalanga Province, the Karoo rocks are thick and contain large seams of extensive coal fields (De Wit, 2007) and extensive mining has resulted in the destruction of these rocks.

The coal bearing Coal Shales that overlie the basement rocks of the pre-Karoo Super Group have been dated to the Permian (Karoo). The evidence for this came from fossil plants that were found in these strata namely *G. obovata* and *N. hislopi* (Cairncross, 2001).

Furthermore, in the Mpumalanga Province, around Ermelo, there are exposures of Permian rocks of the Vryheid Formation which contains fossil plants of the *Glossopteris* flora but no vertebrates (Bamford, 2011).

Certain geological strata that occur in the study area are known to be fossiliferous in other parts of South Africa. However, due to the lack of published scientific literature, the fossil potential of the geological strata within the project area is expected to be low.