



HERITAGE STATEMENT FOR THE REPLACEMENT OF A PIPE BRIDGE IN STOFFEL PARK, MAMELODI EAST

ILISO CONSULTING (PTY) LTD

February 2014

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*Non-Executive


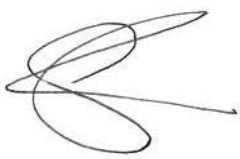



DIGBY WELLS
ENVIRONMENTAL

This document has been prepared by **Digby Wells Environmental**.

Report Title: **Heritage Statement for the replacement of a pipe bridge in Stoffel Park, Mamelodi East**

Project Number: **ILI2395**

Name	Responsibility	Signature	Date
Natasha Higgitt <i>Junior heritage consultant: archaeologist</i> Shahzaadee Karodia <i>Junior heritage consultant: palaeontologist</i>	Specialists and report writers	 	6 February 2014
Johan Nel HRM Unit Manager	1 st Review		6 February 2014

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EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter Digby Wells) has been requested by ILISO Consulting Engineers (hereafter ILISO) to complete a Heritage Statement Report and submit a Notification of Intent to Develop to the responsible authority in order to comply with certain requirements in terms of the National Environmental Management Act, 1998 and the National Heritage Resources Act, 1999 for the replacement of an informal pipe bridge in Stoffel Park, Mamelodi East.

The Heritage Statement report was completed using a text-based research methodology that included a field-based screening survey of the project impact area.

The project is located between an informal settlement and a large shopping centre complex. The area is highly disturbed with large amounts of illegal dumping occurring in the project area. In addition, reviews of existing impact assessment reports indicated that the project area had been surveyed previously, and no significant heritage resources have been identified during these surveys.

The first-hand results of the heritage screening assessment support the findings that no significant heritage resources exist. No further heritage studies or mitigation measures are therefore required.

The conclusion of this Heritage Statement Report is that a Letter of Request for Exemption of further studies be submitted to the South African Heritage Resources Agency and the Provincial Heritage Resources Authority – Gauteng.

GLOSSARY OF ABBREVIATIONS AND TERMS

ASAPA	Association of Southern African Professional Archaeologists
CoT	City of Tshwane
EIA	Environmental Impact Assessment
GN	Government Notice
HIA	Heritage Impact Assessment
HRA	Heritage Resources Authority
HSA	Heritage Screening Assessment
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Management Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
PHRAG	Provincial Heritage Resources Authority Gauteng
SAHRA	South African Heritage Resources Agency

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1 INTRODUCTION

Digby Wells Environmental (hereafter Digby Wells) has been requested by ILISO Consulting Engineers (hereafter ILISO) to complete a Heritage Statement report (HSR) in support of a Notification of Intent to Develop (NID) for the upgrade of the Stoffel Park Bridge (Stoffel Park Project). The HSR and NID is required in order to comply with certain requirements in terms of the National Environmental Management Act, 1998 (NEMA) and the National Heritage Resources Act, 1999 (NHRA).

2 BACKGROUND INFORMATION OF PROJECT

Certain areas within the City of Tshwane (CoT) are prone to flooding during rainfall events due to anthropogenic activities such as the increase in residential development. This may pose a serious risk to human lives and damage to infrastructure. One of the areas that are prone to flooding is the crossing over a spruit in the Stoffel Park area.

2.1 Project Details

In order to determine the level of specialist heritage input required for the HIA, a Heritage Statement was completed in support of a Notification of Intent to Develop (NID). The NID and Heritage Statement are to be submitted to the relevant Heritage Resources Authorities (HRA) such as the Provincial Heritage Resources Authority Gauteng (PHRA-Gauteng) as stipulated in Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). This Heritage Statement will form part of the Draft Basic Assessment Reports in accordance with NEMA.

The project will include the replacement of a dangerous informal bridge over the Edendalespruit at Stoffel Park (Mamelodi East) with a low level bridge structure 18 m long and 4, 5 m wide (4 m road width and 1, 5 m for a pedestrian walkway) and will consist of a battery of 8 no. 2, 1 m wide x 1, 2 m high pre-cast box culvert units.

The proposed improvements and construction activities will inter alia entail the following:

- The temporary closure of the road and the removal of the existing drainage structure;
- The necessary excavations to install the box culvert structure as well as to improve the alignment of the existing water course;
- The construction of the new structure and reinstatement of the road;
- Installation of erosion protection measures upstream of the new structure to stabilise the new watercourse alignment; and
- The clearing of the construction site.

2.2 Description of Property and/or Affected Environment

The project area is located between an informal settlement and a large shopping centre complex. The watercourse has high levels of refuse dumping along the banks and the road crossing the informal bridge is subjected to on-going grading and maintenance.

2.2.1 Location Data

The Stoffel Park project is located between the informal settlement of Stoffel Park and a large shopping centre.

Table 2-1: Location data for the pipe bridge upgrade

Item	Description
Province	Gauteng Province
Magisterial district	Pretoria
Municipality	City of Tshwane Metropolitan Municipality
Town	Pretoria
Map reference	2528CB Silverton
Co-ordinates for the centre of the project	-25.699519/28.424182
Farm/s name/s	Portion 195 of Franspoort 332-JR and Erf 6149 of Mahube Valley X20

2.2.2 Location maps

The regional settings of the Project are depicted in **Error! Reference source not found.**, REF _Ref346718028 \h **Error! Reference source not found.**, and **Error! Reference source not found.** in Appendix B: Location and Site Maps.

2.2.3 Site maps

The historical layering is depicted in **Error! Reference source not found.** and regional eology is depicted in **Error! Reference source not found.** in Appendix B: Location and Site Maps.

2.3 Relevant Contact Details

The contact details of the Client, Consultant and Landowners are provided below.

2.3.1 Client Details

Table 2-2: Contact details of the client

ITEM	COMPANY CONTACT DETAILS
Name of company:	ILISO Consulting (Pty) Ltd
Contact person:	Carol Hooghiemstra

Tel no:	086 124 5476
Fax no:	012 665 1886
E-mail address:	carol@iliso.com

2.3.2 Consultant

Table 2-3: Contact details of the consultant

ITEM	CONSULTANT CONTACT DETAILS (If applicable)
Name of company:	Digby Wells Environmental
Contact person:	Johan Nel
Tel no:	(011) 789 9495
Fax no:	(011) 789 9498
Cellular no:	072 288 5496
E-mail address:	johan.nel@digbywells.com
Postal address:	Private Bag X10046, Randburg, 2125

2.3.3 Landowners

Table 2-4: Landowner information of Portion 195 of Franspoort 332-JR and Erf 6149 of Mahube Valley X20

ITEM	CONTACT DETAILS
Title Deed Owner	City of Tshwane Metropolitan Municipality

3 TERMS OF REFERENCE

The Heritage Statement was completed based on the Terms of Reference received from ILISO on 6th August 2013. In addition, the NHRA legislative framework as well as other relevant legislation and best practice were considered. The various legislation and standards are discussed below.

3.1 Client Terms of Reference

ILISO requested Digby Wells complete a Heritage Statement in support of a NID that will be incorporated into environmental assessment reports for the environmental authorisation of

the project in accordance with Section 2 (4) a; 24 (1) c and 24 (7) b of the NEMA and Section 38 of the NHRA.

3.2 Legal Framework review

The Heritage Statement adheres to the requirements of the NHRA and NEMA. These are discussed below.

3.2.1 National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The NEMA stipulates under section 2 (4)(a) that sustainable development requires the consideration of all relevant factors including (iii) the disturbance of landscapes and sites that constitute the nation's cultural heritage must be avoided, or where it cannot be altogether avoided, is minimised and remedied. Under Sections 23 (2) b it states that "identify, predict and evaluate the actual and potential impact on the...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". Sections 24 (1) c and 24 (7) b state "the potential impact on...the cultural heritage 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."

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

The HIA was completed in terms of Section 38(8) of the NHRA where impacts on potential heritage resources must be assessed as part of the EIA required under Sections 23 (2) b; 24 (1) c and 24 (7) b of the NEMA.

The HRM approach developed and implemented by Digby Wells is founded on Section 38(1) and 38(2) of the NHRA. These sections of the NHRA require that HRAs be notified as early as possible of any developments that may exceed certain minimum thresholds. The heritage specialist is required to provide the HRA with sufficient information regarding the proposed development in order for the HRA to determine whether a comprehensive HIA is required. The HRA should respond within 14 days whether or not a HIA is required, and if required should state which specialist studies should be included.

4 METHODOLOGY AND SCOPE OF WORK

The following methodology was used in this Heritage Statement. It follows South African standards, guidelines and best practise as per the Association of South African Professional Archaeologists (ASAPA) and SAHRA Minimum Standards.

4.1 Literature Review

Relevant and available published works such as academic journals, academic books, unpublished theses and reports, previous palaeontological and heritage assessments, and websites were reviewed.

4.2 Historical Layering

A review of historical aerial imagery was completed. Aerial imagery was overlaid to assess the changes in the receiving environment over time. The historical aerial imagery from Google Earth was also used to show very recent changes within the surrounding area.

4.3 Heritage Screening Assessment

A Heritage Screening Assessment (HSA) was completed on the 20 August 2013. The HSA is a field survey primarily aimed at ground truthing and characterising the current environment, verifying heritage resources identified during the desktop study, and if found, identifying additional heritage resources within the project boundaries. The HSA survey was predominantly a pedestrian survey at the project area provided by ILISO.

4.3.1 Site Naming

Sites identified during the ground truthing were named using the Digby Wells project number, followed by the map sheet number and reference to the relevant NHRA section suffixed with the site number: **ILI2395/2628CBS.35-001**. This number may be shortened on any plans or maps to the NHRA reference number suffixed with the site number: **S.35-001**.

5 STATE OF RECEIVING ENVIRONMENT/CULTURAL LANDSCAPE

The receiving environment and cultural landscape were characterised through a review of relevant literature and a field-based heritage screening survey.

5.1 Geological Setting

The proposed Stoffel Park Bridge Upgrade Project is underlain by ancient Precambrian sedimentary rocks of the Transvaal Supergroup, and in particular by the Silverton Formation of the Pretoria Group. The Silverton Formation mudstones are situated in-between the sandstone-dominated Daspoort Formation and the Magaliesburg Formation within the upper part of the Pretoria Group succession.

The predominant argillaceous lithofacies of the Silverton Formation comprises mudstones, laminated claystones and siltstones, and graded mudstones and siltstones. One theory suggests that these sedimentary rocks were deposited in an offshore marine environment where the mudstones, claystones and siltstones carried in suspension were swept out to sea and gradually settled on the ocean floor (Eriksson, Altermann, Eberhardt, Arend-Heidbrinck, & Bumby, 2009). The Silverton Formation contains the Machadodorp Lava. According to Button (Button, 1973), the contact of the Silverton Formation with the Machadodorp Lava is

gradational with volcanic ash-rich intervals (tuff) and shale beds. In addition, there are minor beds of chert and carbonate while sandstones become commoner in the upper part of the succession that was deposited under shallower, shoaling conditions (Almond, 2011).

5.2 Palaeontological Potential

The sedimentary rocks of the Silverton Formation are likely to contain assemblages of organic-walled microfossils such as phytoplankton however there are no formal studies on these microfossils (Almond, 2011; Fourie, 2012). The sedimentary rocks of the Silverton Formation are not known to contain any macrofossils (Almond, 2011). It is concluded that the palaeontological sensitivity of the Silverton Formation sediments in the Stoffel Upgrade Project area is very low.

5.3 Literature review

Only one previous Heritage Impact Assessment has been conducted within the project area and no significant heritage resources were identified during the study (Schalkwyk, 2008). Few significant archaeological and palaeontological resources are expected to occur within the project area as it has been extensively altered due to residential and urban activity.

5.4 Historical layering

Historical aerial photographs indicate that the area surrounding the existing pipe bridge and river was predominately farmland in 1948. The present day dirt road was a dirt road with no infrastructure surrounding it in 1948 (Figure 5-1). Since 1948, there has been a great deal of development with the establishment of Mamelodi. In 2007 a large shopping centre complex was built as shown in Figure 5-2 and by 2009, the informal settlement of Stoffel Park had been established as seen in Figure 5-3. As such the project area has gone through years of transformation rendering the possibility of *in situ* heritage resources to a very low possibility.



Figure 5-1: Aerial image of the Stoffel Park project in 1948

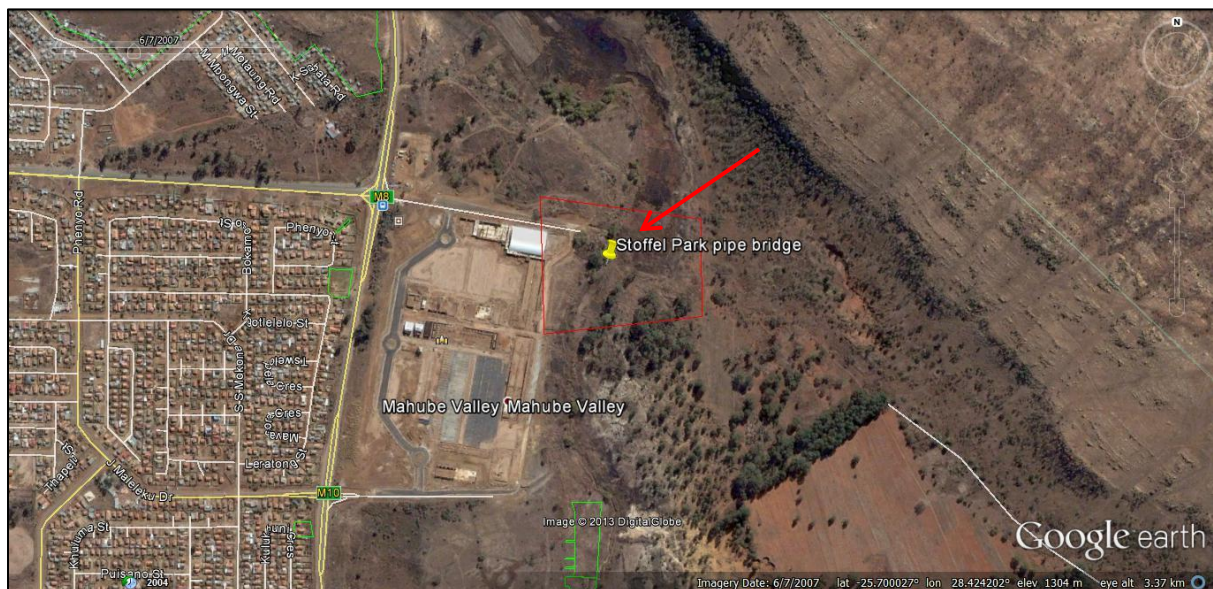


Figure 5-2: Google Earth image of the Stoffel Park project area (indicated by the arrow) in 2007 with the retail centre in the process of construction.

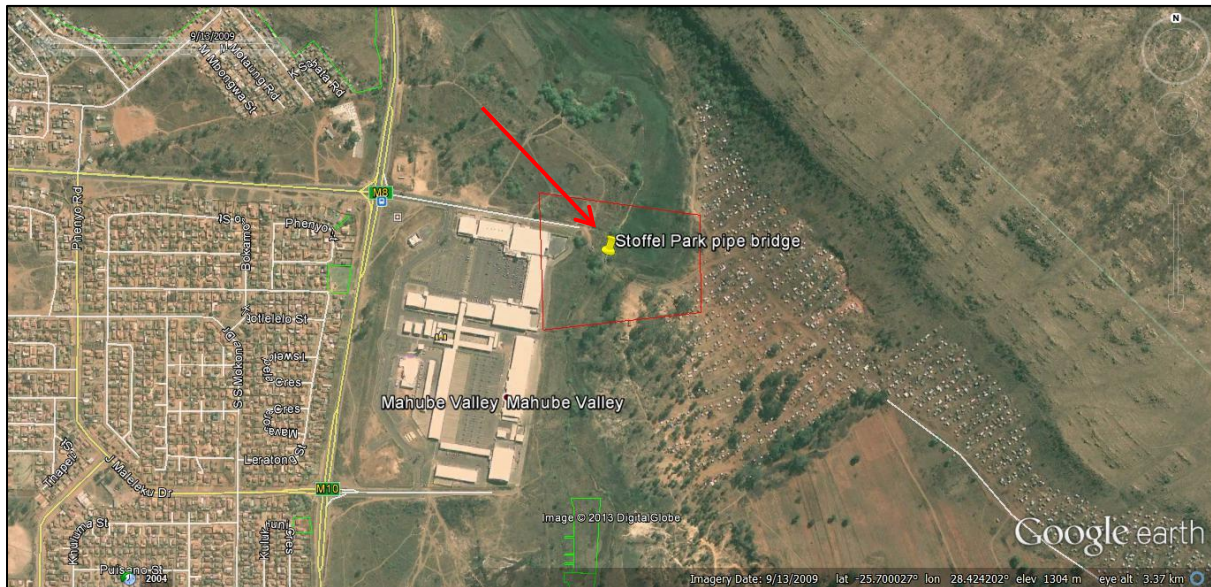


Figure 5-3: Google Earth image of the Stoffel Park project area (indicated by the arrow) in 2009 with newly settled informal settlement to the east of the project area

5.5 Heritage Screening Assessment

A HSA survey was conducted on the 20 August 2013 by means of pedestrian surveys. The project area has been subjected to flooding and illegal refuse dumping (Figure 5-4). The road across the bridge was undergoing grading at the time of the heritage screening assessment (Figure 5-5). A section of exposed bedrock was identified approximately 25 m from the project area; however no palaeontological resources were identified (Figure 5-6).



Figure 5-4: Existing Stoffel Park Project pipe bridge



Figure 5-5: Existing Stoffel Park Project area being levelled by a grader (shown by arrow) at time of heritage screening assessment



Figure 5-6: Exposed bedrock approximately 25 m from the Stoffel Park Project area. No palaeontological resources were identified in this bedrock.

6 DISCUSSION

Based on the results of the literature review, historical layering and site visits, it is evident that the cultural heritage sensitivity of the project area is very low due to residential and urban activities. The project area is highly disturbed due to construction activities and dumping.

The palaeontological sensitivity of the Silverton Formation sediments in the Stoffel Upgrade Project area is very low. The proposed replacement of the existing informal bridge with a low level bridge structure will not compromise local fossil heritage. It is therefore recommended that exemption from further specialist palaeontological studies is granted for the Stoffel Park Project.

The area has been severely impacted on by surrounding residential and construction activities such as the construction of the shopping centre and there is no potential for in-situ palaeontology and heritage resources to be present with the project area.

7 SOURCES OF RISK

The following sources of risks were identified for the project.

Table 7-1: Sources of risk for the Stoffel Park project

NEMA Listed Activity	NHRA Trigger	Potential risk
Linear development		
GNR 544 (11) The construction of infrastructure covering 50 square meters or more where such construction occurs within a watercourse or within 32 m of a watercourse	38 (1) e Other triggers, e.g.: in terms of other legislation, (i.e.: National Environment Management Act, etc.)	<ul style="list-style-type: none"> ■ Low risk as more than 95 % of proposed project area is located in brownfield areas; ■ Most heritage resources have already been assessed in previous assessments and mitigation measures are in place.

8 RECOMMENDATIONS FOR FURTHER STUDIES

Based on the results and findings of discussed above, the likelihood of any heritage and/or palaeontological resources occurring in and near the proposed Stoffel Park Project is negligible. Consequently, no sources of risk or impacts were identified and therefore no additional heritage studies or assessments are recommended.

Should any heritage resources and/or substantial fossil remains such as microfossils or microbial mounds be encountered or exposed during construction the ECO should safeguard these, preferably *in situ*, and alert SAHRA as soon as possible so that appropriate action can be taken by a professional archaeologist/palaeontologist.

Digby Wells thus proposes that a Letter of Exemption from any additional heritage assessments with regard to the Stoffel Park Project be issued to ILISO on behalf of the City of Tshwane. Exemption should be considered for archaeological, palaeontological and built environment studies, as well as burial grounds and graves.

9 REFERENCES

- Almond, J. E. (2011). *Proposed Haverfontein Wind Energy Project near Carolina, Albert Luthuli Local Municipality, Mpumalanga Province (DEA Reference Number 12/12/20/2018)*. Terra Wind Energy: Unpublished report.
- Button, A. (1973). *A study of the stratigraphy and development of the Transvaal Basin in the eastern and northeastern Transvaal. Unpublished Ph. D Thesis*. Johannesburg: University of the Witwatersrand.
- Eriksson, P. G., Altermann, W., Eberhardt, L., Arend-Heidbrinck, S., & Bumby, A. J. (2009). The Silverton Formation (Pretoria Group, Transvaal Supergroup), South Africa. In W. Altermann, & P. L. Corcoran (Eds.), *Precambrian Sedimentary Environments: A model approach to ancient depositional systems*. Oxford, UK: Blackwell Publishing.
- Fourie, H. (2012). *Gumeni - Bosloop 132 kV line - Eskom*. Royal Haskoning DHV: Unpublished report.
- Schalkwyk, J. v. (2008). *Heritage Impact Assessment: Mahube Valley Development*. Pretoria: National Cultural History Museum.



Appendix A: Curriculum Vitae of Specialist



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NATASHA HIGGITT

Ms Natasha Higgitt
Assistant Heritage Consultant
Social Department
Digby Wells Environmental

1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2010)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

3 EMPLOYMENT

- July 2011 to Present: Assistant Heritage Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

4 FIELD EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape

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*Non-Executive

- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape
- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

5 PROJECT EXPERIENCE

- Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, south of Johannesburg, Gauteng Province for Erm Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Platreef Platinum Project, Mokopane, Limpopo for Platreef Resources (Digby Wells Environmental)
- Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, near Witbank, Mpumalanga Province for Jones and Wagner Consulting Civil Engineers (Digby Wells Environmental)
- Heritage Statement Report for the Wilgespruit Bridge Upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement Report for the Kosmosdal sewer pipe bridge upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)



- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mquma Municipality, Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association: Member



Appendix B: Location and Site Maps

HSR & NID for River Crossing Project Stoffe Park Pipe Bridge 1 : 250 000

Legend

 Stoffe Park Pipe Bridge



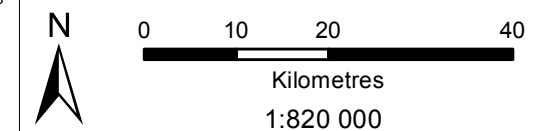
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Date: 13/08/2013



HSR & NID for River Crossing Project

Stoffel Park Pipe Bridge

1 : 50 000

Legend

 Stoffel Park Pipe Bridge



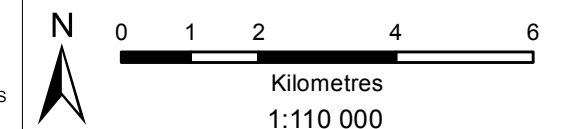
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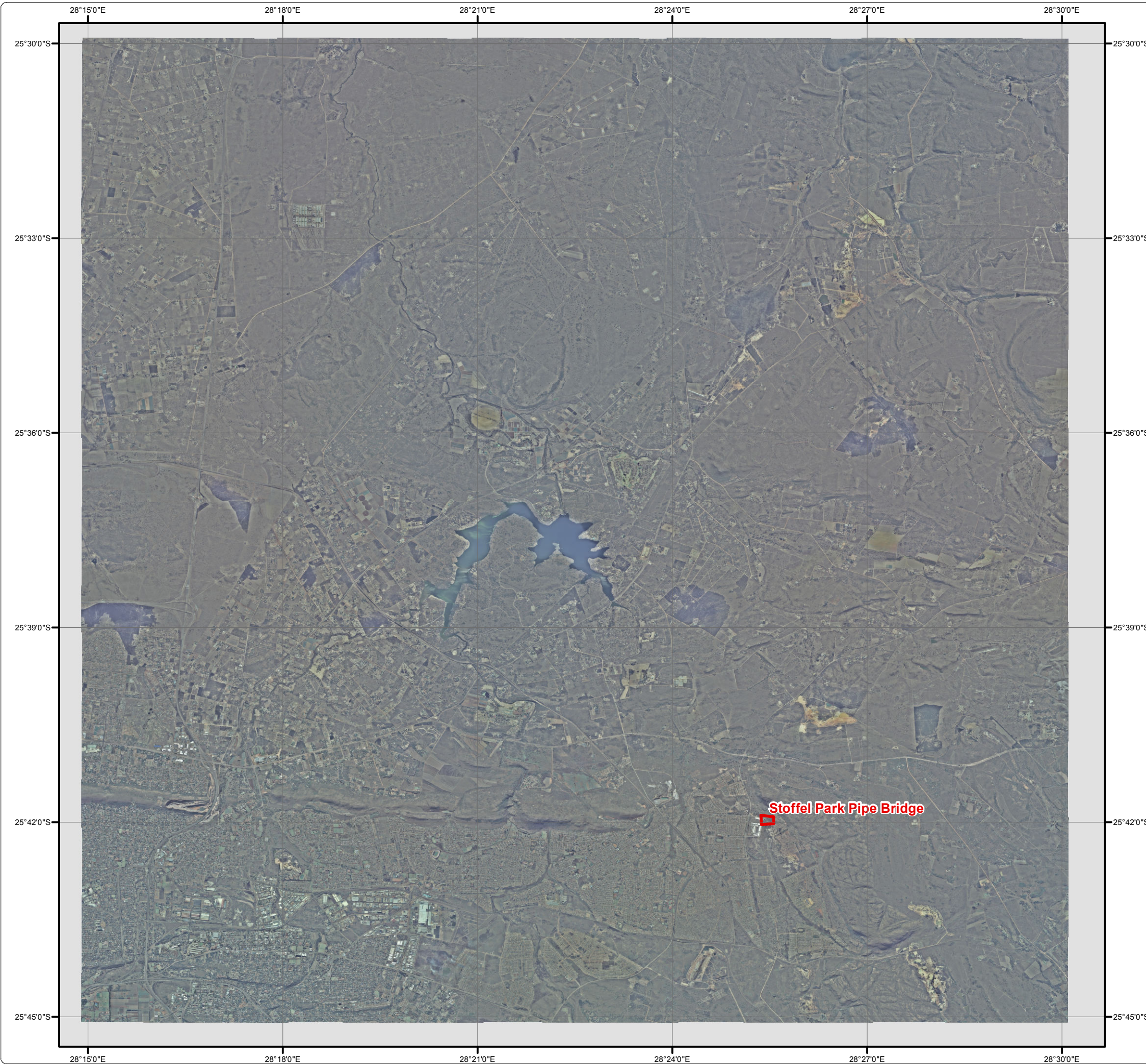
HSR & NID for River Crossing Project

Stoffel Park Pipe Bridge

1 : 10 000

Legend

 Stoffel Park Pipe Bridge



Stoffel Park Pipe Bridge

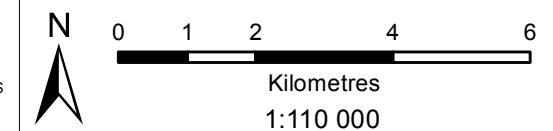
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Geographic Coordinate System Ref #: mp.LI12395.201308.038
Datum: WGS 1984 Revision Number: 1
Date: 13/08/2013



HSR & NID for River Crossing Project Stoffel Park Pipe Bridge Historical Layering

Legend

 Stoffel Park Pipe Bridge



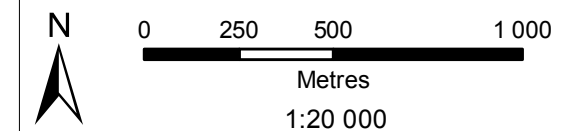
Photo Year : 1948



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Projection: Transverse Mercator Ref #: mp.LI12395.201308.039
Datum: Hartbeeshoek 1994 Revision Number: 1
Central Meridian: 29°E Date: 13/08/2013



HSR & NID for River Crossing Project Stoffel Park Pipe Bridge Geology

Legend

-  Stoffel Park Pipe Bridge
-  Major Town
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Railway Line
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake

Geology

-  Bierkraal Magnetite Gabbro, Rustenburg Layered
-  Daspoort Fm, Pretoria Grp
-  Dwyka Grp, Karoo Spgrp
-  Eccca Grp, Karoo Spgrp
-  Lebowa Granite Sui, Bushveld Cplx
-  Loskop Fm, Transvaal Spgrp
-  Magaliesberg Fm, Pretoria Grp
-  Malmansi Sbgp, Chuniespoort Grp
-  Mokolian Erathem
-  Pienaars River Cplx
-  Pretoria Grp, Transvaal Spgrp
-  Pyramid Gabbro-Norite, Rustenburg Layered Sui
-  Rashoop Granophyre Sui, Bushveld Cplx
-  Rayton Fm, Pretoria Grp
-  Silverton Fm, Pretoria Grp
-  Strubenkop Fm, Pretoria Grp
-  Vaalian Erathem
-  Vlakfontein Sbsuite & Kolobeng Norite, Rustb.
-  Wilge River Fm, Waterberg Grp



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Datum: WGS 1984 Revision Number: 1
Date: 12/08/2013

