

HERITAGE IMPACT ASSESSMENT

HERITAGE IMPACT ASSESSMENT REPORT FOR THE
PROPOSED EXPANSION OF THE TISSUE
MANUFACTURING CAPACITY AT THE TWINSAVER
KLIPRIVER OPERATIONS BASE NEAR HENLEY ON
KLIP, GAUTENG PROVINCE

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***Disclaimer;** Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

SIGNED OFF BY: STEPHAN GAIGHER



MANAGEMENT SUMMARY

Site name and location: Proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base near Henley on Klip, Gauteng Province.

Municipal Area: Midvaal Municipality, which falls under the Sedibeng District Municipality.

Developer: Twinsaver Group (Pty) Ltd

Consultant: G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa.
38A Vorster St, Louis Trichardt, 0920

Date of Report: 20 May 2016

The purpose of the management summary is to distill the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the proposed expansion of the tissue manufacturing capacity at the Twinsaver Klipriver operations base, Gauteng Province.

The Twinsaver Group (Pty) Ltd (hereafter referred to as "Twinsaver") operates a Tissue Manufacturing facility located on Portions 23, 20 and 8 of the Farm Zwartkopjies no. 143 IR in Klipriver, Gauteng Province.

Twinsaver is planning to increase its existing Tissue Manufacturing capacity at its Klipriver operations based in Gauteng by installing an additional +25000 tons per annum of tissue making capacity.

The proposed additions will be constructed on Portions 23, 20 and 8 of the Farm Zartkopjies no. 143. Access roads to the proposed study area will not be required as the site is located in a fully developed area.

Approval for two possible locations for the Tissue Machine Building is required.

- Option 1 to the extent of approximately 3716 m² and
- Option 2 to the extent of approximately 3918 m².

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

Scope of Work

A Heritage Impact Assessment to determine the impacts on heritage resources within the study areas.

The following are the required to perform the assessment:

- A desk-top investigation of the area;
- Review of the available archaeological and historical literature covering the area, as well as previous cultural resource management studies in the area.
- Consultations with the SAHRIS database of heritage sites.
- A site visit to the proposed development site;
- Identify possible archaeological, cultural, historic, built and palaeontological sites within the proposed development area;
- Evaluate the potential impacts of construction and operation of the proposed development on archaeological, cultural, historical resources; built and palaeontological resources; and
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural, historical, built and palaeontological importance.

2016/05/20

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area. The study is based on archival and document combined with fieldwork investigations.

Findings & Recommendations

The area was investigated during a field visit on 20 May 2016 and previously through archival studies. No sites of heritage potential could be identified on the site. The site exists in a highly modified state and the development area is an asphalt covered surface making it impossible to determine whether there would be sub-surface sites here.

Fatal Flaws

No fatal flaws were identified.

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LIST OF ABBREVIATIONS

Bp.....	Before Present
EIA	Early Iron Age
ESA.....	Early Stone Age
Fm	Femtometre (10^{-15} m)
GPS.....	Geographic Positioning System
HIA	Heritage Impact Assessment
LIA.....	Late Iron Age
LSA	Late Stone Age
MYA	Million Years Ago
MSA	Middle Stone Age
NHRA.....	National Heritage Resources Act no 22 of 1999
SAHRA.....	South African Heritage Resource Agency
SAHRIS.....	South African Heritage Resource Information System
S&EIR	Scoping & Environmental Impact Reporting
Um.....	Micrometre (10^{-6} m)
WGS 84	World Geodetic System for 1984

HERITAGE IMPACT ASSESSMENT

HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED EXPANSION OF THE TISSUE MANUFACTURING CAPACITY AT THE TWINSAVER KLIPRIVER OPERATIONS BASE, GAUTENG PROVINCE.

INTRODUCTION

Legislation and methodology

G&A Heritage was appointed by Sivest to undertake a Heritage Impact Assessment (HIA) for the proposed expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base near Henley on Klip in the Gauteng Province.

Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

- (a) Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) Construction of a bridge or similar structure exceeding 50 m in length; and
- (c) Any development, or other activity which will change the character of an area of land, or water –
 - (1) Exceeding 10 000 m² in extent;
 - (2) Involving three or more existing erven or subdivisions thereof; or
 - (3) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
 - (d) The costs of which will exceed a sum set in terms of regulations; or
 - (e) Any other category of development provided for in regulations.

While the above describes the parameters of developments that fall under this Act., Section 38 (8) of the NHRA is applicable to this development. This section states that;

- (8) *The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.*

In regards to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

- (3) *The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:*
 - (a) *The identification and mapping of all heritage resources in the area affected;*
 - (b) *An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7;*
 - (c) *An assessment of the impact of the development on such heritage resources;*
 - (d) *An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*

- (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.*
 - (1) Ancestral graves,
 - (2) Royal graves and graves of traditional leaders,
 - (3) Graves of victims of conflict (iv) graves of important individuals,
 - (4) Historical graves and cemeteries older than 60 years, and
 - (5) Other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
- (h) Movable objects, including ;
 - (1) Objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
 - (2) Ethnographic art and objects;
 - (3) Military objects;
 - (4) Objects of decorative art;
 - (5) Objects of fine art;
 - (6) Objects of scientific or technological interest;
 - (7) Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
 - (8) Any other prescribed categories, but excluding any object made by a living person;
- (i) Battlefields;
- (j) Traditional building techniques.

A **'place'** is defined as:

- (a) A site, area or region;
- (b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- (c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'Archaeological' means:

- (a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- (b) Rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and
- (c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
- (d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means 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 trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this heritage impact assessment are as follows;

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- It was assumed that the site layout as provided by Sivest is accurate.
- We assumed that the public participation process performed as part of the Basic Assessment process was sufficiently encompassing not to be repeated in the Heritage Assessment Phase.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	No impact	None
	35	Archaeological, paleontological and meteor sites	No	None
	36	Graves and burial sites	No	None
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	No	N/A
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m ²	Yes	Option 1: approximately 3716 m ² Option 2: approximately 3918 m ²
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m ²	No	N/A
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

BACKGROUND INFORMATION

PROPOSED EXPANSION OF THE TISSUE MANUFACTURING CAPACITY AT THE TWINSAYER KLIPRIVER OPERATIONS BASE, GAUTENG PROVINCE.

PROJECT DESCRIPTION

Description of Existing Operations

Twinsaver operates a tissue manufacturing facility located on Portions 23, 20 and 8 of the Farm Zwartkopjies no. 143 IR in Klipriver, Gauteng Province.

The operation, known as the Klipriver Tissue Mill, produces approximately 23 000 tons per annum, (tpa) of tissue paper which is converted to various consumer products at the conversation facility located in Pretoria West. In doing so, the operations store and processes Virgin Pulp and Recycled Fibre in the production of Tissue Paper. Papermaking sludge is produced as a waste stream and is sent to a brick manufacture where sludge is mixed together with clay and fired in brick kilns. This method has been sanctioned by the South African Environmental Authorities and is considered to be environmentally friendly.

Drying and heating energy is provided by Process Steam and Natural Gas. Approximately 52 000 tpa of Process Steam (produced by firing coal in a 10t/hr. John Thompson 20 bar boiler) and 59 500 GJ heat energy (derived from combusting natural gas) is consumed annually. Electrical Energy is used to drive the machinery. The annual consumption equates to approximately 33 650 000 kWhr.

Water is used as the main transport and cleaning medium in the tissue manufacturing process. The operation consumes approximately 107 000 m³ per annum of potable water supplied by the Rand Water Board and 266 000 m³ per annum from various boreholes on the property. Approximately 80% of the water consumed is cleaned to municipal standards and returned to the municipal system.

Proposed Additions to the Existing Operations:

Twinsaver is planning to increase its existing tissue manufacturing capacity at its Klipriver operations base in Gauteng by installing an additional +/- 25 000 tons per annum of tissue making capacity.

The proposed additions will be constructed on Portions 23, 20 and 8 of the Farm Zwartkopjies no. 143 IR. Access roads of the proposed study area will not be required as the site is located in a fully developed area.

Approval for two possible locations for the Tissue Machine Building is required.

- Option 1 to the extent of approximately 3716 m² and
- Option 2 to the extent of approximately 3918 m².

Option 1 – New Tissue Machine Building constructed on the eastern side of the existing Pm3 Building.

- The Reel Storage Warehouse adjacent to the Pm3 building (eastern side) will be demolished to make way for the new Industrial Building (Footprint 1680 m²).
- Erect a New Industrial Building to house an additional Tissue Machine and Re-winder (Footprint 3522 m²).
- LPG Bulk Storage Facility (Capacity +/- 45 m³) (Footprint 200 m²).
- Extend the existing Boiler House to accommodate the installation of an additional 10t/hr. 20 bar Boiler (Footprint 178 m²).
- An effluent treatment clarifier to treat effluent to municipal specifications will be included in the new Industrial Building (Capacity 16 – 20 m³ / hr). The treated effluent will be sent to the municipal water works via the existing infrastructure.
- Site Services, like internal roads and storm water systems, will be upgraded accordingly (Footprint 4178 m²).

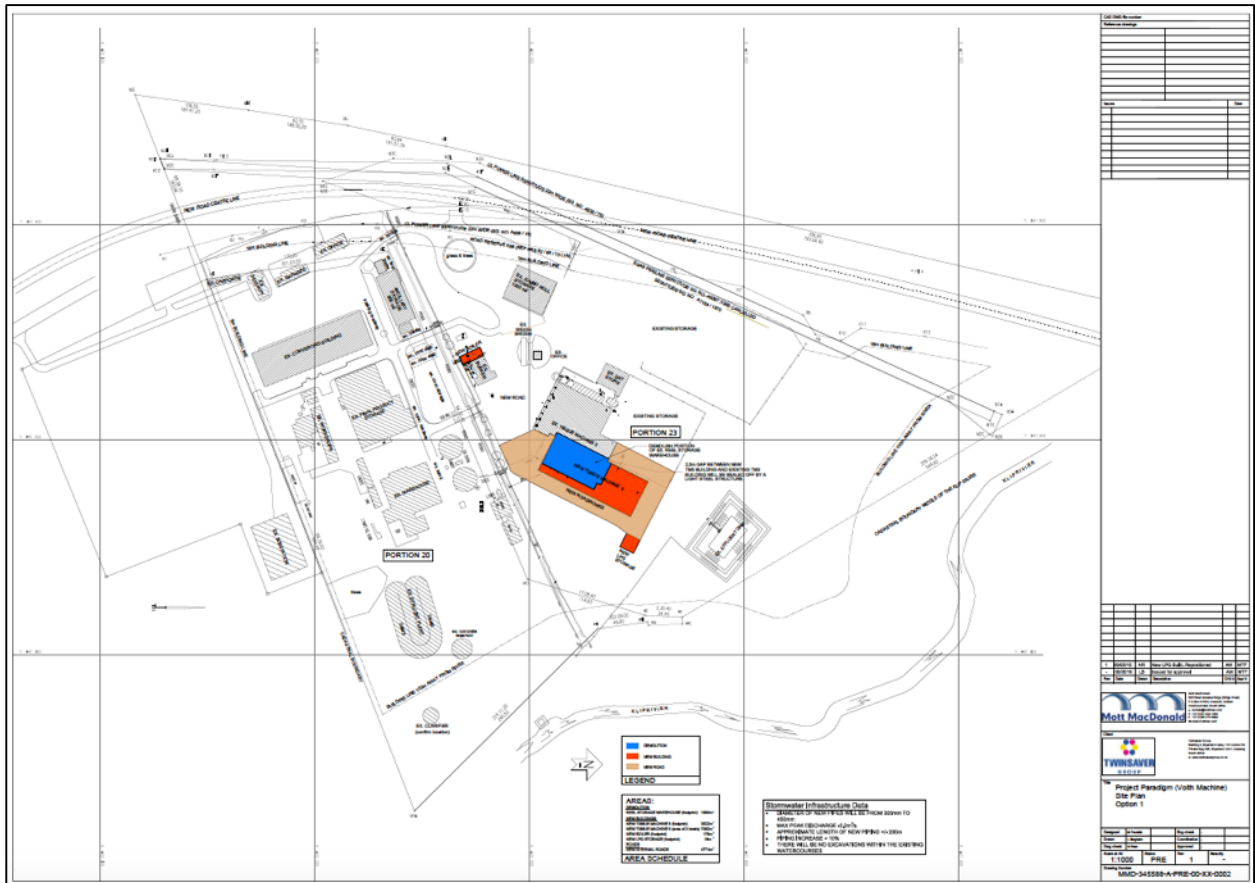


Figure 1: Twinsaver Site Plan Option 1

Option 2 – New Tissue Machine Building constructed on the western side of the existing Pm3 Building.

- The weighbridge and offices will be demolished to make room for the new Industrial Building (Footprint 169 m²).
- Erect a new Industrial Building to house an additional Tissue Machine and Re-winder (Footprint 3522 m²).
- LPG Bulk Storage Facility (Capacity +/- 45 m³) (Footprint 200 m²).
- Extend the existing Boiler House to accommodate the installation of an additional 10t/hr. 20 bar Boiler (Footprint 178 m²).
- An effluent treat clarifier to treat effluent to municipal specifications will be included in the new Industrial Building (Capacity 16 – 2- m³ / hr). The treated effluent will be sent to the municipal water works via the existing infrastructure.
- Relocate the weighbridge and build a new office (Footprint 202 m²).
- Site Services, like internal roads and storm water systems will be upgrades accordingly (Footprint 12305 m²).

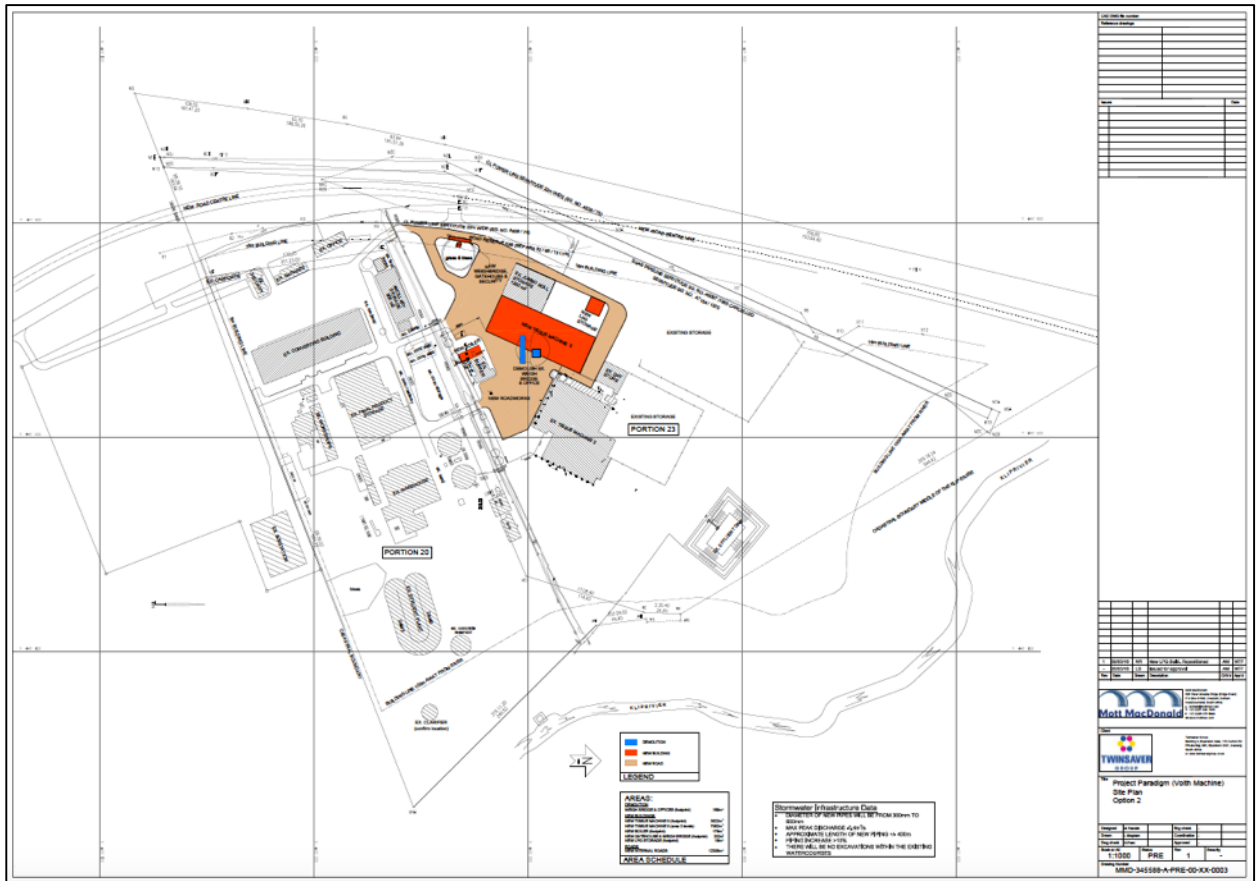


Figure 2: Twinsaver Site Plan Option 2

SITE LOCATION

The Twinsaver Klipriver Operations Base is near Henley on Klip in the Gauteng Province. The site is located on Portions 23, 20 and 8 of the Farm Zwartkopjies no. 143 IR IR in Eikenhof, east of the R59 (Sybrand van Niekerk Freeway) on Vereeniging Road.

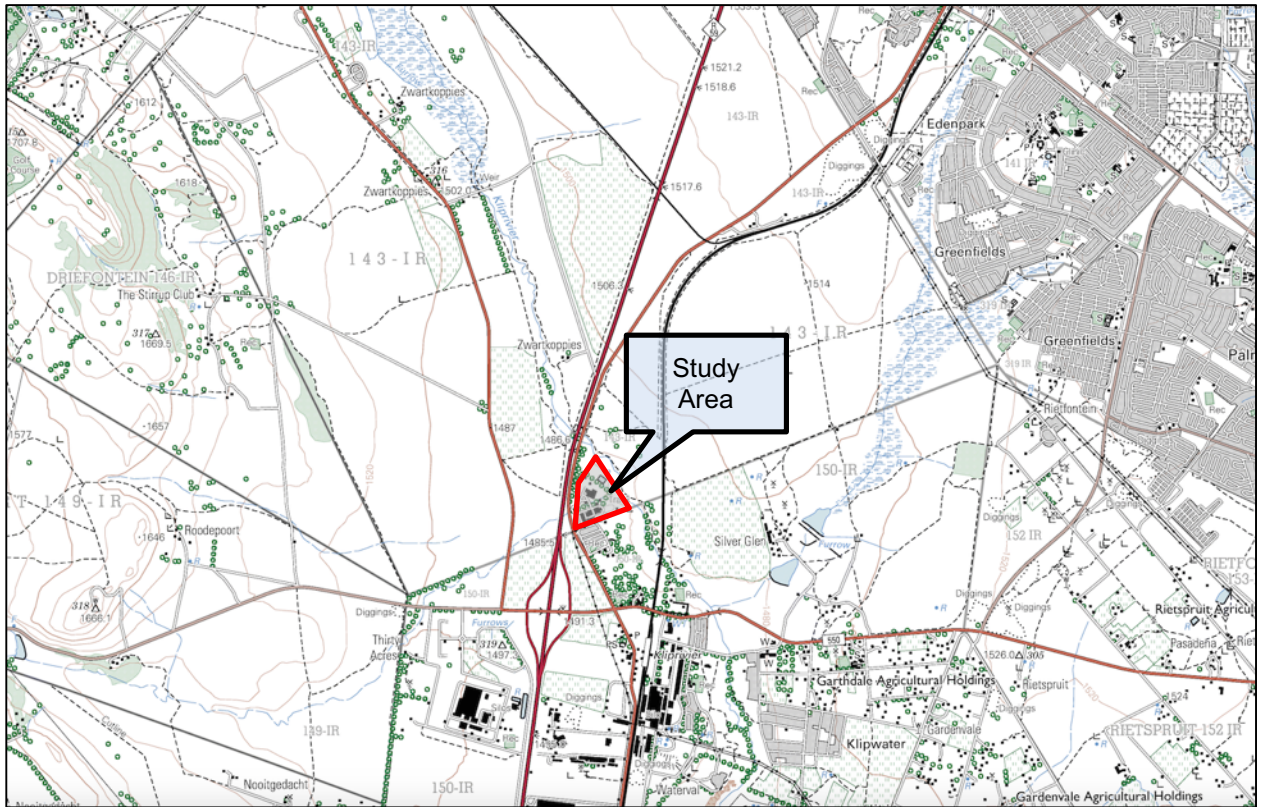


Figure 3. Site Location Map



Figure 4. Aerial View of Proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base, Gauteng Province

ALTERNATIVES CONSIDERED

Two options are investigated as described in the Project Description.

GPS TRACK PATHS



Figure 5. GPS Track paths followed

HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENT

REGIONAL CULTURAL CONTEXT

PALEONTOLOGY

The entire study area of the proposed development is underlain by rocks of the Malmani Subgroup of the Transvaal Supergroup, which are Precambrian in age. In the traverse area this Subgroup comprises mainly chert and quartzite (Rubidge, 2008).

STONE AGE

No substantial number of Stone Age sites from any period of the Stone Age is known to exist in this area – primarily as a result of a lack of research and general ignorance amongst the layman in recognizing stone tools that often may occur. However, it is possible that the first humans in the Benoni area may have been preceded by *Homo erectus*, who roamed large parts of the world during the Acheulian period of the Early Stone Age, 500 000 years ago. The predecessors of *Homo erectus*, *Australopithecus*, which is considered to be the earliest ancestor of modern humans, lived in the Blaauwbank Valley around Krugersdorp (today part of the Cradle of Humankind – a World Heritage Site) several million years ago.

During the Middle Stone Age, 200 000 years ago, modern man or *Homo sapiens* emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods. This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time (Mitchell 2002). Two Middle Stone Age sites at the Witboek Spruit (Brakpan) were researched 17 years ago, but no information on this discovery has been published.

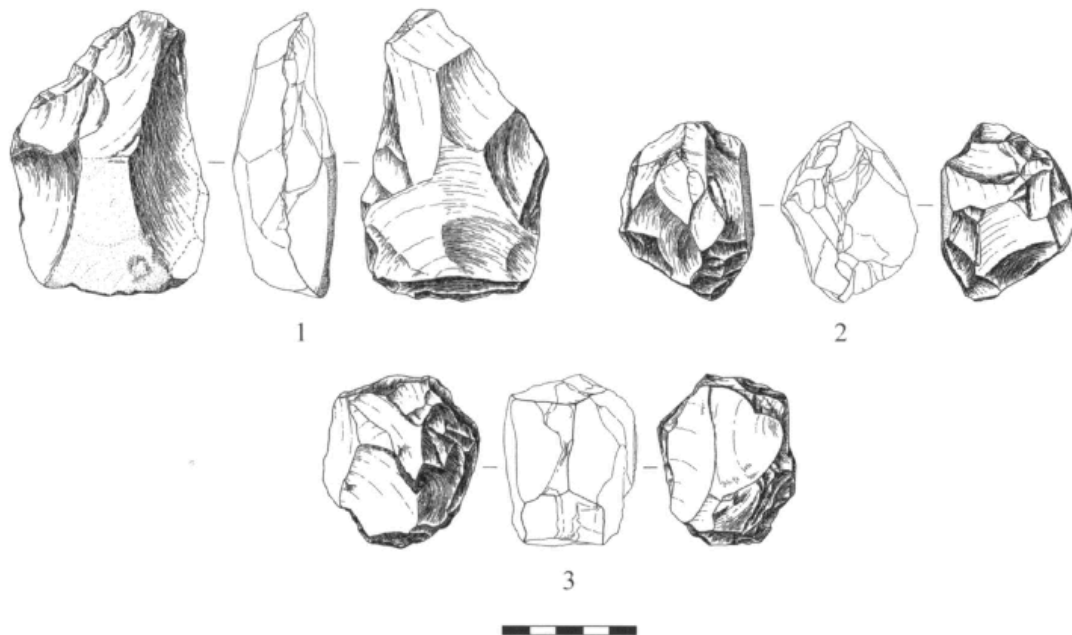


Figure 6. (1) handaxe on flake; (2) thick discoidal core; (3) polyhedral core (Pollarolo, Kuman, Bruxelles, 2010)

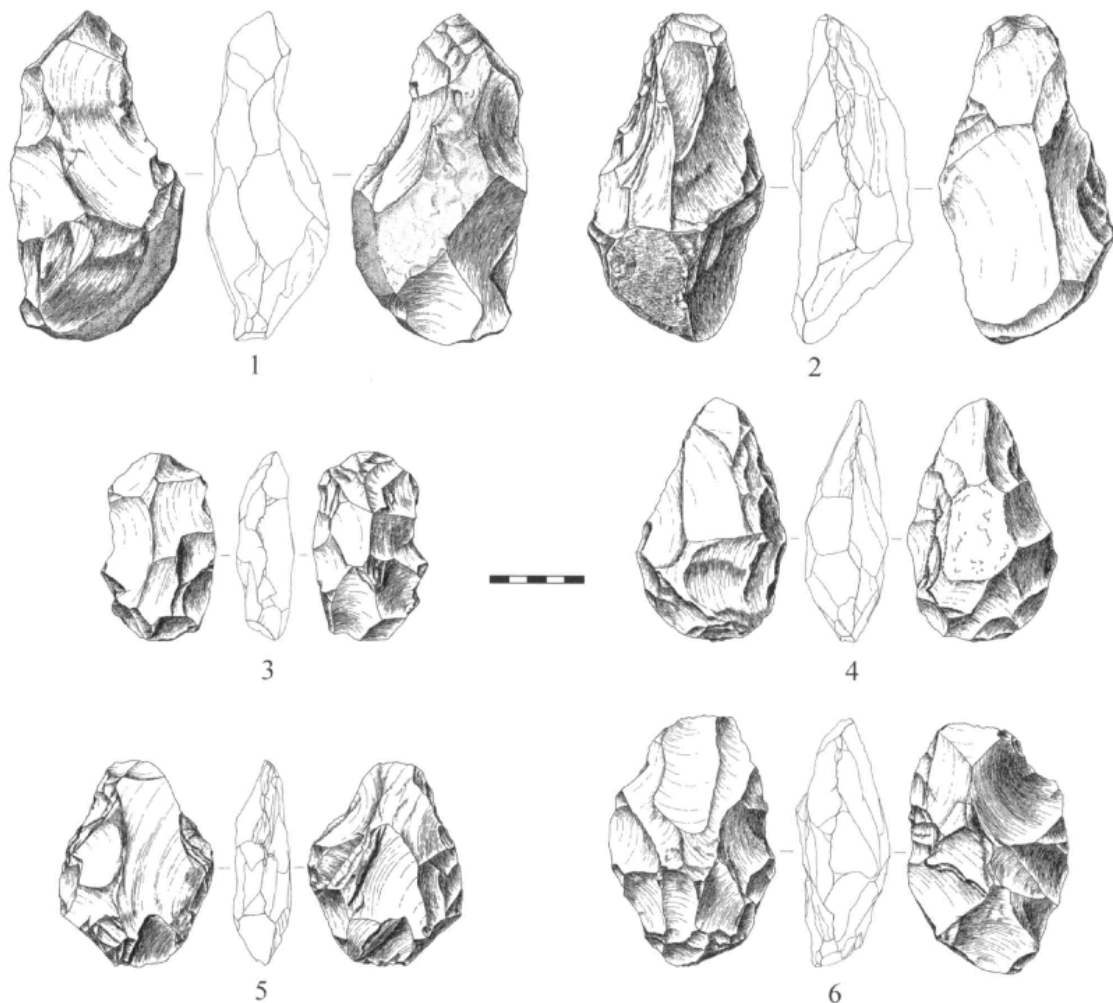


Figure 7. (1,2) Handaxes with large side removal; (3-6) handaxes (Pollarolo, Susino, Kuman, Bruxelles, 2010)

The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. San hunter-gatherer bands with their small (microlithic) stone tools may have lived in Eastern Gauteng, as a magnificent engraving site near Duncanville attests to their presence in Vereeniging, south of, but close to Ekurhuleni. Stone Age hunter-gatherers lived well into the 19th century in some places in SA, but may not have been present in Brakpan when the first European colonists crossed the Vaal River during the early part of the 19th century. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanization, industrialization, agriculture and other development activities during the past decades (Morris 2004).

Reverent Patterson discovered some Stone Age deposits in Benoni during 1933, close to the train station. These were probably from the Middle to Late Stone Age.

IRON AGE

A considerable number of Late Iron Age, stone walled sites, dating from the 18th and the 19th centuries (some of which may have been occupied as early as the 16th century), occur along and on top of the rocky ridges of the eastern part of the Klipriviersberg towards Alberton. These settlements and features in these sites, such as huts, were built with dry stone, reed and clay available from the mountain and the Klip River (Mason 1968, 1986).

The Late Iron Age sites within Ekurhuleni's south-eastern border are a 'spill-over' from a larger concentration which are located further towards the west, in the Witwatersrand, while large concentrations of stone walled sites are also located directly to the south of Johannesburg, in the mountainous area around the Suikerbosrand in Heidelberg. The stone walled settlements are concentrated in clusters of sites and sometimes are dispersed over large areas making them vulnerable

to developments of various kinds. A site consists of a circular or elliptical outer wall that is composed of a number of scalloped walls facing inwards towards one or more enclosures. Whilst the outer scalloped walls served as dwelling quarters for various family groups, cattle, sheep and goat were stocked in the centrally located enclosures. Huts with clay walls and floors were built inside the dwelling units. Pottery and metal items are common on the sites. However, iron and copper were not produced locally on these sites (Killick 2004).

THE HISTORIC ERA

The Cradle of Humankind, Maropeng, is only about 70km northwest of the study area, thus it seems possible that the ancestor of modern humans, *Australopithecus Africanus*, roamed the area.

Sotho and Tswana speaking people lived in the region before a Voortrekker named Sarel Marais bought the western section of the Farm Rietvlei in 1850, where the Kliprivierberg Nature Reserve is located today (approximately 15km northwest of the study area).

The discovery of gold on the Farm Langlaagte in the Witwatersrand in February 1886 triggered an influx of people to the area.

Railroads were constructed to serve the mines in the Witwatersrand area. The Cape Town to Johannesburg line was completed in 1892 with connections from East London and Port Elizabeth. The Durban to Johannesburg line was completed in 1895.

The Jameson Raid (29 December 1895 – 2 January 1896) was carried out by the British colonial leader, Leander Starr Jameson on the Transvaal Republic. Jameson was defeated at Doornkop (in present day Soweto), some 30km northwest of the study area.

After the occupation of Bloemfontein, the British High Command ordered Lord Roberts to move against the Transvaal Republic as quickly as possible. The main British forces reached the banks of the Vaal River on the 25th of May 1900.

The area is also linked to the third day of the Battle of Johannesburg that took place from 27 to 29 May 1900. The ridge was taken by cavalry under command of Lt Gen John French while a nearby ridge, now covered by several Soweto suburbs, was taken by seven infantry battalions, including the City Imperial Volunteers and Gordon Highlanders of Lt Gen Ian Hamilton.

Robert's strategy for occupying Johannesburg was to mount a three prong attack on the town. Lord Kitchener and his troops were instructed to move up the main Durban/Johannesburg railway line and attack from the East, a mounted force of over 20 000 men, under the command of Major-General French and Colonel Ian Hamilton was instructed to attack Johannesburg from the west, while Roberts with his infantry forces would follow the main Vereeniging/Johannesburg road and attack from the south.

The Boer forces who had occupied Vereeniging decided that they were badly outnumbered and retired to the area around the Kliprivier railway station (just 1km from the study area). Their departure meant that the British troops could move into Vereeniging without a shot being fired. The British forces then started moving towards Johannesburg.

Boer intelligence sources had kept the Boer High Command informed about the movement of the British forces. This information enabled the Boer to prepare their defenses in preparation of the arrival of the Brits. General Oosthuizen was charged with impeding the progress of French and his troops in the west. The arrival of General Koos de la Rey and his troops saw a substantial increase the size of the number of Boer forces in the west. Commandant Havemann had been tasked with erecting barbed wire barricades on the western slopes of the Klipriviersberg. Generals Grobler and Lemmer were subsequently appointed to command of the area covering the main Vereeniging/Johannesburg main road. General Fourie was appointed commander of the troops on the eastern flank.

The advance force of British troops arrived at the Gatsrandberg on 27 May 1900 and immediately came under fire from Boer forces. The barrage of rifle fire was so intense that the British had to retreat beyond the range of the Boer guns. The arrival of the main British force on 28 May 1900 enabled the British to cross the Klip River. Led by inaccurate intelligence information they were soon in trouble. Unaware that seven canons under the command of Capt. Von Dalwig had been carefully positioned on the slopes of the Klipriviersberg, overnight, the advancing British forces were cut to pieces once they came within range of the canons. The effectiveness of the barrage forced the British forces to retreat beyond the range of the canons.

The arrival of a cavalry regiment, field canons and machine guns greatly improved the British fire power, however, in spite of this the Boers were able to force the enemy to retreat. Meanwhile, on the western flank the Boers had managed to halt the advance of French and Hamilton. General Fourie had engaged the British forces led by Lord Kitchener in the east. The Boers had every reason to be very proud of their efforts and there was a feeling of optimism that the British could be defeated.

However, the Boers had badly underestimated the size and strength of the British war machine. On the 30th of May 1900, the British had over 32 canons shelling Boer positions and the infantry troops were making steady progress in their attempt to overrun Boer positions.

The Boer high command met to assess their position and agreed that because of the sheer weight of numbers facing them, defeat was inevitable and that there was no point in continuing to resist the British onslaught and an order for a general retreat of Boer forces was issued. First to leave the scene of the battle were the troops defending the western flank. The British troops immediately occupied Doornkop and because it was dusk they did not press home the advantage. Not only did the Boer forces escape but had they pressed home the advantage that they had gained they could have occupied Johannesburg.

Following a request by Dr. F.E.T. Krause, that the British delay their occupation of Johannesburg by 24 hours in order to allow all the Boer forces to leave the town. On 31 May 1900 British forces entered Johannesburg (www.samilitary.co.za).

The study area lies 16km south of Alberton. At the age of 13, a boy named Johannes (Jan) Petrus Meyer bought 11 hectares of his father's farm Elandsfontein. He later build his house on the land and in 1890 started a general store at the farmhouse. The house was not harmed during the war and can still be seen from the N12 freeway.

General Hennie Alberts purchased a farm after the war and named it Alberton.

*Soweto is a township of the city of Johannesburg. The name derived from the English syllabic abbreviation for **South West Townships** (the name was officially adopted in 1963).*

Black mine workers were accommodated in separate areas on the outskirts of Johannesburg, such as Brickfields.

In 1904 British-controlled city authorities removed black South African and Indian residents of Brickfields to an "evacuation camp" at Klipspruit municipal sewage farm (not Kliptown, a separate township) outside the Johannesburg municipal boundary, following a reported outbreak of plague. Two further townships were laid out to the east and the west of Johannesburg in 1918. Townships to the south west of Johannesburg followed, starting with Pimville in 1934 (a renamed part of Klipspruit) and Orlando in 1935.

After the National Party gained power in 1948 and began to implement apartheid, the pace of forced removals and the creation of townships outside legally designated white areas increased. The Johannesburg council established new townships to the southwest for black Africans evicted from the city's freehold areas of Martindale, Sophiatown and Alexandra. Some townships were basic site and service plots, while at Dube middle-class residents built their own houses. The first hostel to accommodate migrant workers evicted from the inner city in 1955 was built at Dube. The following year houses were built in the newly proclaimed townships of Meadowlands and Diepkloof (www.sahistory.co.za).

In 1956 townships were laid out for particular ethnic groups as part of the state's strategy to sift black Africans into groupings that would later form the building blocks of the so-called "independent homelands".

Soweto came to the world's attention on 16 June 1976 with the Soweto Uprising, when mass protests erupted over the government's policy to enforce education in Afrikaans rather than their native language. Police opened fire in Orlando West on 10,000 students marching from Naledi High School to Orlando Stadium. The rioting continued and 23 people were killed.

The impact of the Soweto protests reverberated through the country and across the world. In their aftermath, economic and cultural sanctions were introduced from abroad. Political activists left the country to train for guerrilla resistance. Soweto and other townships became the stage for violent state repression.

In response, the apartheid state started providing electricity to more Soweto homes, yet phased out financial support for building additional housing.

Soweto became an independent municipality with elected black councilors in 1983, in line with the Black Local Authorities Act. Previously the townships were governed by the Johannesburg council, but from the 1970s the state took control.

Black African councilors were not provided by the apartheid state with the finances to address housing and infrastructural problems. Township residents opposed the black councilors as puppet collaborators who personally benefited financially from an oppressive regime. Resistance was spurred by the exclusion of blacks from the newly formed Parliament (which did include Whites, Asians and Coloreds). Municipal elections in black, coloured, and Indian areas were subsequently widely boycotted, returning extremely low voting figures for years. Popular resistance to state structures dates back to the Advisory Boards (1950) that co-opted black residents to advise whites who managed the townships.

In Soweto, popular resistance to apartheid emerged in various forms during the 1980s. Educational and economic boycotts were initiated, and student bodies were organized. Street committees were formed, and civic organizations were established as alternatives to state-imposed structures. One of the most well-known "civics" was Soweto's Committee of Ten, started in 1978 in the offices of The Bantu World newspaper. Such actions were strengthened by the call issued by the ANC's 1985 Kabwe congress in Zambia to make South Africa ungovernable. As the state forbade public gatherings, church buildings like Regina Mundi were sometimes used for political gatherings.

In 1995, Soweto became part of the Southern Metropolitan Transitional Local Council, and in 2002 was incorporated into the City of Johannesburg.

A series of bomb explosions rocked Soweto in October 2002. The explosions, believed to be the work of the Boeremag (a right wing extremist group) damaged buildings and railway lines, and killed one person (www.soweto.co.za).

Sources:

www.sahistory.org.za

www.samilitary.org

www.soweto.co.za

www.elbertonrecord.co.za

CULTURAL LANDSCAPE

The cultural landscape in the study area is mostly industrial, agricultural and associated mining activities and the specific sites are severely altered making it impossible to comment on the possible existence of sub-surface sites.

Although some of the buildings on the property date from the early 1900's, none of these are in danger of being altered. The one building that is to be altered dates from 1997.



Figure 8. Farm silo dating from early to middle 1900's (not to be altered)



Figure 9. Maintenance building dating from 1957



Figure 10. Boiler to be moved



Figure 11. Building to be altered dating from 1991



Figure 12. Bond store dating from 1976 (not to be altered)



Figure 13. Channel running from Kliprivier



Figure 14. Proposed area for LPG Storage

PREVIOUS STUDIES

An extensive research into the SAHRIS database resulted in the identification of the following heritage related studies that have been performed over the last decade in the study area.

- Khandhela, N. 2014. Heritage Impact Assessment Report for the Proposed Expansion of Waterval Water Treatment Works, Midvaal Local Municipality, Gauteng Province.
- Musetsho, D. 2013. Draft Scoping Report for the Proposed Establishment of a Subsidised Residential Development. South of Albertson, Thokoza / Pam Ridge Area, Farms Rietfontein 152IR and Rietspruit 153IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Birkholtz, P. 2010. Phase 1 Heritage Assessment for the Proposed Construction of a pipeline at the Lethabo Pumping Station.
- Birkholtz, P. 2010. Proposed Development of New Sedimentation and Flocculation Tanks at the Vereeniging Pumping Station, Vereeniging, Gauteng.
- Van Vollenhoven, A. 2010. Report on the Heritage Impact Assessment for a Proposed Housing Development in Eden Park West and Eden Park Ext 1, Ekurhuleni, Gauteng Province.
- Van Schalkwyk, J. 2013. Basic Cultural Heritage Assessment for the Proposed Vehicle Licensing Facility, Katlehong, Ekurhuleni Local Municipality, Gauteng Province.

- Mdungazi, N. 2016. Cultural Heritage Impact Assessment for the Proposed Thintwa Storm Water Attenuation Pond and Canal Development, Thokoza Region, Gauteng Province.
- Pelser, A. 2012. Heritage Impact Assessment Report for the Henley-on-Klip General Landfill Closure Application, Midvaal Local Municipality, Gauteng.
- Fourie, W. 2009. Archaeological Impact Assessment De Deur Estate Housing Project, Midvaal, Gauteng.
- Fourie, W. 2006. Heritage Impact Assessment: Albertsdal Extension 4 on Portions 35, 36, and 40 of the arm Palmietfontein 141 IR, Gauteng Province.
- Pelser, A. 2016. Letter of Exemption for full HIA & short Report: Proposed Walkerville Estate / Walkerville Mews on Part of the Remainder of Portion 174 (of Portion 29) of the Farm Faraosfontein 372IQ, near Walkerville, Gauteng.
- Fourie, W., van der Walt, J. 2007. Walkerville Ext. 1: Proposed Residential Development on Holding 16 Walkerville AH, Johannesburg, Gauteng Province.
- Pelser, A. 2008. Letter of Exemption from full Phase 1 Archaeological and Palaeontological Assessment: Plot 46 Road 6 Iron Side Agricultural Holdings (Apple Orchard), near Walkerville, Gauteng – Development of Chicken Abattoir on Plot.
- Pelser, A. 2012. Report of a Phase 1 HIA for a Proposed Retirement Village Development on Portion 174 of Faraosfontein 372 IQ near Walkerville, Gauteng.
- Khan, S., Higgitt, N., du Piesanie, J., Nel, J. 2013. Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, South of Johannesburg.
- Huffman, T. 2002. Archaeological Assessment of Stone-walled Settlements on the Meyersdal Nature Estate, Klipriviersberg, Alberton.
- Pelser, A. 2011. A Heritage Impact Assessment Study for the Proposed Expansion of the Meyerton Waste Water Treatment Works near Meyerton, Midvaal Local Municipality, Gauteng.
- Kruger, N. 2014. Archaeological Impact Assessment (AIA) of Portions of the Farms Witkoppies 373 IR, Farm Slangfontein 372 IR and Erf 303 of Highbury Township for the Proposed Glen Douglas Dolomite Burning Plant, Meyerton, Gauteng Province.
- Van Vollenhoven, A. 2011. A Report on a Phase 1 Heritage Impact Assessment (HIA) for the Proposed Sicelo Substation and Power Line in the Meyerton Area, Gauteng Province.
- Pelser, A. 2013. Basic Assessment Report for an Atmospheric Emissions Licence Application. R&D Furnace, DMS Powders, Meyerton Portion 4 of Kookfontein 545IQ, Gauteng.
- Van Schalkwyk, J. 2013. Cultural Heritage Assessment for the Establishment of the Proposed Paramount Park Township, Meyerton Region, Midvaal Local Municipality, Gauteng Province.
- Rubidge, B. 2008. Installation of Water Pipeline at Klipriver – Palaeontological Impact Assessment.

FINDINGS

Fieldwork Results

Although the proposed area for development has been highly altered through industrial and agricultural activities, the structures associated with these should still be investigated for heritage significance. It was found that although there are historic buildings on the property, the proposed development would have no adverse effect on these. The structures that are to be altered date from the early 1990's and therefore hold no historical value.

METHODOLOGY

This study defines the heritage component of the EIA process being undertaken for the Expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base, Gauteng Province. It is described as a first phase Heritage Impact Assessment (HIA). This report attempts to evaluate both the accumulated heritage knowledge of the area as well as information derived from direct physical observations.

INVENTORY

Inventory studies involve the in-field survey and recording of archaeological resources within a proposed development area. The nature and scope of this type of study is defined primarily by the results of the overview study. In the case of site-specific developments, direct implementation of an inventory study may preclude the need for an overview.

There are a number of different methodological approaches to conducting inventory studies. Therefore, the proponent, in collaboration with the archaeological consultant, must develop an inventory plan for review and approval by the SAHRA prior to implementation (*Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy 1984*).

EVALUATING HERITAGE IMPACTS

A combination of document research as well as the determination of the geographic suitability of areas and the evaluation of aerial photographs determined which areas could and should be accessed.

After plotting of the site on a GPS the areas were accessed using suitable combinations of vehicle access and access by foot.

Sites were documented by digital photography and geo-located with GPS readings using the WGS 84 datum.

Further techniques (where possible) included interviews with local inhabitants, visiting local museums and information centers and discussions with local experts. All this information was combined with information from an extensive literature study as well as the result of archival studies based on the SAHRA (South African Heritage Resource Agency) provincial databases.

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with effected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRIS (South African Heritage Resources Information System) Database of Heritage Studies
- Internet Search
- Historic Maps
- 1939, 1944, 1957, 1979, 1995, 2002 and 2010 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo survey
- Google Earth 2016 imagery
- Published articles and books
- JSTOR Article Archive

FIELDWORK

Fieldwork for this study was performed on the 20th of May 2016. Most of the areas were found to be accessible on foot. The survey was tracked using GPS and a track file in GPX format is available on request.

The study was mainly focused on systematic field surveys of the study area.

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference. The image, figure 3 on page 16, shows the GPS track paths for both the on-foot and car reconnaissance of the study area.

The study area was surveyed using standard archaeological surveying methods. The area was surveyed using directional parameters supplied by the GPS and surveyed by foot. This technique has proven to result in the maximum coverage of an area. This action is defined as;

'an archaeologist being present in the course of the carrying-out of the development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works' (DAHGI 1999a, 28).

Standard archaeological documentation formats were employed in the description of sites. Using standard site documentation forms as comparable medium, it enabled the surveyors to evaluate the relative importance of sites found. Furthermore GPS (Global Positioning System) readings of all finds and sites were taken. This information was then plotted using a **Garmin Colorado** GPS (WGS 84- datum).

Indicators such as surface finds, plant growth anomalies, local information and topography were used in identifying sites of possible archaeological importance. The importance of sites was assessed by comparisons with published information as well as comparative collections.

MEASURING IMPACTS

In 2003 the SAHRA (South African Heritage Resources Agency) compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

TYPE OF RESOURCE

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

TYPE OF SIGNIFICANCE

HISTORIC VALUE

It is important in the community, or pattern of history

- o Important in the evolution of cultural landscapes and settlement patterns
- o Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
- o Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
- o Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

It has strong or special association with the life or work of a person, group or organisation of importance in history

- o Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery

- o Importance for a direct link to the history of slavery in South Africa.

AESTHETIC VALUE

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

- Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- Importance for its creative, design or artistic excellence, innovation or achievement.
- Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

SCIENTIFIC VALUE

It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

(a) Does the site contain evidence, which may substantively enhance understanding of culture history, culture process, and other aspects of local and regional prehistory?

- internal stratification and depth
- chronologically sensitive cultural items
- materials for absolute dating
- association with ancient landforms
- quantity and variety of tool type
- distinct intra-site activity areas
- tool types indicative of specific socio-economic or religious activity
- cultural features such as burials, dwellings, hearths, etc.
- diagnostic faunal and floral remains
- exotic cultural items and materials
- uniqueness or representativeness of the site
- integrity of the site

(b) Does the site contain evidence which may be used for experimentation aimed at improving archaeological methods and techniques?

- monitoring impacts from artificial or natural agents
- site preservation or conservation experiments
- data recovery experiments
- sampling experiments
- intra-site spatial analysis

(c) Does the site contain evidence which can make important contributions to paleoenvironmental studies?

- topographical, geomorphological context
- depositional character
- diagnostic faunal, floral data

(d) Does the site contain evidence which can contribute to other scientific disciplines such as hydrology, geomorphology, pedology, meteorology, zoology, botany, forensic medicine, and environmental hazards research, or to industry including forestry and commercial fisheries?

SOCIAL VALUE / PUBLIC SIGNIFICANCE

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

(a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- integrity of the site
- technical and economic feasibility of restoration and development for public use
- visibility of cultural features and their ability to be easily interpreted
- accessibility to the public

- opportunities for protection against vandalism
- representativeness and uniqueness of the site
- aesthetics of the local setting
- proximity to established recreation areas
- present and potential land use
- land ownership and administration
- legal and jurisdictional status
- local community attitude toward development

(b) Does the site receive visitation or use by tourists, local residents or school groups?

ETHNIC SIGNIFICANCE

(a) Does the site presently have traditional, social or religious importance to a particular group or community?

- ethnographic or ethno-historic reference
- documented local community recognition or, and concern for, the site

ECONOMIC SIGNIFICANCE

(a) What value of user-benefits may be placed on the site?

- visitors' willingness-to-pay
- visitors' travel costs

SCIENTIFIC SIGNIFICANCE

(a) Does the site contain evidence, which may substantively enhance understanding of historic patterns of settlement and land use in a particular locality, regional or larger area?

(b) Does the site contain evidence, which can make important contributions to other scientific disciplines or industry?

HISTORIC SIGNIFICANCE

(a) Is the site associated with the early exploration, settlement, land use, or other aspect of southern Africa's cultural development?

- (b) Is the site associated with the life or activities of a particular historic figure, group, organization, or institution that has made a significant contribution to, or impact on, the community, province or nation?
- (c) Is the site associated with a particular historic event whether cultural, economic, military, religious, social or political that has made a significant contribution to, or impact on, the community, province or nation?
- (d) Is the site associated with a traditional recurring event in the history of the community, province, or nation, such as an annual celebration?

PUBLIC SIGNIFICANCE

- (a) Does the site have potential for public use in an interpretive, educational or recreational capacity?
 - visibility and accessibility to the public
 - ability of the site to be easily interpreted
 - opportunities for protection against vandalism
 - economic and engineering feasibility of reconstruction, restoration and maintenance
 - representativeness and uniqueness of the site
 - proximity to established recreation areas
 - compatibility with surrounding zoning regulations or land use
 - land ownership and administration
 - local community attitude toward site preservation, development or destruction
 - present use of site
- (b) Does the site receive visitation or use by tourists, local residents or school groups?

OTHER

- (a) Is the site a commonly acknowledged landmark?
- (b) Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?
- (c) Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?
- (d) Is the site representative of a particular architectural style or pattern?

DEGREES OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

There are several kinds of significance, including scientific, public, ethnic, historic and economic, that need to be taken into account when evaluating heritage resources. For any site, explicit criteria are used to measure these values. Checklists of criteria for evaluating pre-contact and post-contact archaeological sites are provided in Appendix B and Appendix C. These checklists are not intended to be exhaustive or inflexible. Innovative approaches to site evaluation which emphasize quantitative analysis and objectivity are encouraged. The process used to derive a measure of relative site significance must be rigorously documented, particularly the system for ranking or weighting various evaluated criteria.

Site integrity, or the degree to which a heritage site has been impaired or disturbed as a result of past land alteration, is an important consideration in evaluating site significance. In this regard, it is important to recognize that although an archaeological site has been disturbed, it may still contain important scientific information.

Heritage resources may be of scientific value in two respects. The potential to yield information, which, if properly recovered, will enhance understanding of Southern African human history, is one appropriate measure of scientific significance. In this respect, archaeological sites should be evaluated in terms of their potential to resolve current archaeological research problems. Scientific significance also refers to the potential for relevant contributions to other academic disciplines or to industry.

Public significance refers to the potential a site has for enhancing the public's understanding and appreciation of the past. The interpretive, educational and recreational potential of a site are valid indications of public value. Public significance criteria such as ease of access, land ownership, or scenic

setting are often external to the site itself. The relevance of heritage resource data to private industry may also be interpreted as a particular kind of public significance.

Ethnic significance applies to heritage sites which have value to an ethnically distinct community or group of people. Determining the ethnic significance of an archaeological site may require consultation with persons having special knowledge of a particular site. It is essential that ethnic significance be assessed by someone properly trained in obtaining and evaluating such data.

Historic archaeological sites may relate to individuals or events that made an important, lasting contribution to the development of a particular locality or the province. Historically important sites also reflect or commemorate the historic socioeconomic character of an area. Sites having high historical value will also usually have high public value.

The economic or monetary value of a heritage site, where calculable, is also an important indication of significance. In some cases, it may be possible to project monetary benefits derived from the public's use of a heritage site as an educational or recreational facility. This may be accomplished by employing established economic evaluation methods; most of which have been developed for valuating outdoor recreation. The objective is to determine the willingness of users, including local residents and tourists, to pay for the experiences or services the site provides even though no payment is presently being made. Calculation of user benefits will normally require some study of the visitor population (*Smith, L.D. 1977*).

RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

REPRESENTIVITY

- It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects.
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

The table below illustrates how a site's heritage significance is determined

Spheres of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific Community			

ASSESSMENT OF HERITAGE POTENTIAL

ASSESSMENT MATRIX

DETERMINING ARCHAEOLOGICAL SIGNIFICANCE

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (J) and Whitelaw (1997) for assessing archaeological significance has been developed for Eastern Cape settings (Morris 2007a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon and, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example

the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes any trace, even of only Type 1 quality, could be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Table 1: Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deaon, NMC as used in Morris)

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky Surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near features such as hill/dune	On old river terrace
L4	Sandy ground, coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early buildings but have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Loping floor or small area	Flat floor, high ceiling
Class	Archaeological traces	Type 1	Type 2	Type 3
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell of bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5m thick	Deposit >0.5 m thick

Table 2: Site attributes and value assessment (adopted from Whitelaw 1997 as used in Morris)

Class	Landforms	Type 1	Type 2	Type 3
1	Length of sequence /context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte / ecofacts
2	Presence of exceptional items (incl. regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

ASSESSING SITE VALUE BY ATTRIBUTE

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by

ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

IMPACT STATEMENT

ASSESSMENT OF IMPACTS

A heritage resource impact may be broadly defined as the net change between the integrity of a heritage site with and without the proposed development. This change may be either beneficial or adverse.

Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource. For example, development may have a beneficial effect by preventing or lessening natural site erosion. Similarly, an action may serve to preserve a site for future investigation by covering it with a protective layer of fill. In other cases, the public or economic significance of an archaeological site may be enhanced by actions, which facilitate non-destructive public use. Although beneficial impacts are unlikely to occur frequently, they should be included in the assessment.

More commonly, the effects of a project on heritage sites are of an adverse nature. Adverse impacts occur under conditions that include:

- (a) destruction or alteration of all or part of a heritage site;
- (b) isolation of a site from its natural setting; and
- (c) introduction of physical, chemical or visual elements that are out-of-character with the heritage resource and its setting.

Adverse effects can be more specifically defined as direct or indirect impacts. Direct impacts are the immediately demonstrable effects of a project which can be attributed to particular land modifying actions. They are directly caused by a project or its ancillary facilities and occur at the same time and place. The immediate consequences of a project action, such as slope failure following reservoir inundation, are also considered direct impacts.

Indirect impacts result from activities other than actual project actions. Nevertheless, they are clearly induced by a project and would not occur without it. For example, project development may induce changes in land use or population density, such as increased urban and recreational development, which may indirectly impact upon heritage sites. Increased vandalism of heritage sites, resulting from improved or newly introduced access, is also considered an indirect impact. Indirect impacts are much more difficult to assess and quantify than impacts of a direct nature.

Once all project related impacts are identified, it is necessary to determine their individual level-of-effect on heritage resources. This assessment is aimed at determining the extent or degree to which future opportunities for scientific research, preservation, or public appreciation are foreclosed or otherwise adversely affected by a proposed action. Therefore, the assessment provides a reasonable indication of the relative significance or importance of a particular impact. Normally, the assessment should follow site evaluation since it is important to know what heritage values may be adversely affected.

The assessment should include careful consideration of the following level-of-effect indicators, which are defined below:

- magnitude
- severity
- duration
- range
- frequency
- diversity
- cumulative effect
- rate of change

INDICATORS OF IMPACT SEVERITY

Magnitude

The amount of physical alteration or destruction, which can be expected. The resultant loss of heritage value is measured either in amount or degree of disturbance.

Severity

The irreversibility of an impact. Adverse impacts, which result in a totally irreversible and irretrievable loss of heritage value, are of the highest severity.

Duration

The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

Range

The spatial distribution, whether widespread or site-specific, of an adverse impact.

Frequency

The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from cultivation may be of recurring or on-going nature.

Diversity

The number of different kinds of project-related actions expected to affect a heritage site.

Cumulative Effect

A progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts.

Rate of Change

The rate at which an impact will effectively alter the integrity or physical condition of a heritage site. Although an important level-of-effect indicator, it is often difficult to estimate. Rate of change is normally assessed during or following project construction.

The level-of-effect assessment should be conducted and reported in a quantitative and objective fashion. The methodological approach, particularly the system of ranking level-of-effect indicators, must be rigorously documented and recommendations should be made with respect to managing uncertainties in the assessment. (Zubrow, Ezra B.A., 1984).

PALAEONTOLOGICAL SITES

The palaeontology of the Kliprivier in this area was investigated by Professor Bruce Rubidge of the University of the Witwatersrand during July 2008 for a proposed pipeline route. It was his finding that areas in and round the Kliprivier (which borders the proposed development) "...because most of the area is covered by thick soil, it is unlikely that excavation to lay the pipeline will damage any palaeontological heritage. As all the rock exposures along the road revealed only silicified rocks it is unlikely that there will be any Quaternary sinkhole or cave deposits in the area affected..."(Rubidge, 2008).

The proposed development will not be intruding on bedrock and therefore it is not anticipated that any paleontological deposits will be affected.

POST-CONTACT SITE

No sites associated with the post-contact era will be affected by the proposed development.

BUILT ENVIRONMENT

Although some structures on the property dates to the early 1900's, these will not be affected directly or indirectly or visually by the proposed development.

HISTORIC SIGNIFICANCE

No	Criteria	Significance Rating
1	Are any of the identified sites or buildings associated with a historical person or group? No	N/A
2	Are any of the buildings or identified sites associated with a historical event? No	N/A
3	Are any of the identified sites or buildings associated with a religious, economic social or political or educational activity? No	N/A
4	Are any of the identified sites or buildings of archaeological significance? No	N/A

5	Are any of the identified buildings or structures older than 60 years? No	N/A
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ARCHITECTURAL SIGNIFICANCE

No	Criteria	Rating
1	Are any of the buildings or structures an important example of a building type? No	N/A
2	Are any of the buildings outstanding examples of a particular style or period? No	N/A
3	Do any of the buildings contain fine architectural details and reflect exceptional craftsmanship? No	N/A
4	Are any of the buildings an example of an industrial, engineering or technological development? No	N/A
5	What is the state of the architectural and structural integrity of the building? No	N/A
6	Is the building's current and future use in sympathy with its original use (for which the building was designed)? N/A	-
7	Were the alterations done in sympathy with the original design? N/A	-
8	Were the additions and extensions done in sympathy with the original design? N/A	-
9	Are any of the buildings or structures the work of a major architect, engineer or builder? No.	N/A

SPATIAL SIGNIFICANCE

Even though each building needs to be evaluated as a single artefact the site still needs to be evaluated in terms of its significance in its geographic area, city, town, village, neighbourhood or precinct. This set of criteria determines the spatial significance.

No	Criteria	Rating
1	Can any of the identified buildings or structures be considered a landmark in the town or city? No	-
2	Do any of the buildings contribute to the character of the neighborhood? No	-
3	Do any of the buildings contribute to the character of the square or streetscape? No	-
4	Do any of the buildings form part of an important group of buildings? No	-

IMPACT EVALUATION

This HIA Methodology assists in evaluating the overall effect of a proposed activity on the heritage environment. The determination of the effect of a heritage impact on a heritage parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the heritage practitioner through the process of heritage impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

DETERMINATION OF SIGNIFICANCE OF IMPACTS

Significance is determined through a synthesis of impact characteristics, which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

IMPACT RATING SYSTEM

Impact assessment must take account of the nature, scale and duration of effects on the heritage environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact will be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

RATING SYSTEM USED TO CLASSIFY IMPACTS

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

NATURE		
Including a brief description of the impact of the heritage parameter being assessed in the context of the project. This criterion includes a brief written statement of the heritage aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).

3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on a heritage parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which heritage resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the heritage parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		

This describes the cumulative effect of the impacts on the heritage parameter. A cumulative effect/impact is an effect, which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects.
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects.
3	Medium Cumulative impact	The impact would result in minor cumulative effects.
4	High Cumulative Impact	The impact would result in significant cumulative effects.
INTENSITY / MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the heritage parameter. The calculation of the significance of an impact uses the following formula:		
(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		
The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.

29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

ANTICIPATED IMPACT OF THE DEVELOPMENT

ALL HERITAGE SIGNIFICANT SITES

IMPACT TABLE FORMAT		
Heritage component	<i>Heritage sites of significance</i>	
Issue/Impact/Heritage Impact/Nature	<i>Proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base, Gauteng Province</i>	
<i>Extent</i>	<i>Local</i>	
<i>Probability</i>	<i>Unlikely</i>	
<i>Reversibility</i>	<i>Totally Reversible</i>	
<i>Irreplaceable loss of resources</i>	<i>Insignificant loss of resources</i>	
<i>Duration</i>	<i>Medium term</i>	
<i>Cumulative effect</i>	<i>Low cumulative effect</i>	
<i>Intensity/magnitude</i>	<i>Low</i>	
<i>Significance Rating of Potential Impact</i>	<i>8 points. The impact will have a low negative impact rating.</i>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	1	1
Reversibility	2	2
Irreplaceable loss	1	1
Duration	2	2
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	8 (low negative)	8 (low negative)
Mitigation measure	<i>Should any graves be identified during the construction phase of the project the attached recommendations should be followed in the mitigation of them.</i>	

ASSESSING VISUAL IMPACT

Visual impacts of developments result when sites that are culturally celebrated are visually affected by a development. The exact parameters for the determination of visual impacts have not yet been rigidly defined and are still mostly open to interpretation. CNDV Architects and The Department of Environmental Affairs and Development Planning (2006) have developed some guidelines for the management of the visual impacts of wind turbines in the Western Cape, although these have not yet been formalised. In these guidelines they recommend a buffer zone of 1km around significant heritage sites to minimise the visual impact.

Due to the fact that the project will mainly involve sub-surface infrastructure it is not anticipated that any visual impacts will be encountered.

ASSUMPTIONS AND RESTRICTIONS

- It is assumed that the South African Heritage Resources Information System (SAHRIS) database locations are correct
- It is assumed that the paleontological information collected for the project is comprehensive.
- It is assumed that the social impact assessment and public participation process of the Basic Assessment will result in the identification of any intangible sites of heritage potential.

ASSESSMENT OF IMPACTS

IMPACT STATEMENT

PALEONTOLOGICAL SITES

No impact anticipated.

Mitigation

None.

BUILT ENVIRONMENT

Some structures associated with rural living were identified;

- Brick outbuildings (modern and historic)
- Barb-wire fences (modern)
- Mud-brick huts (modern)
- Dirt roads (modern)
- Footpaths
- Surfaced roads (modern)
- Corrugated iron buildings and sheds (modern)

Mitigation

None of the structures will be affected by the pipeline construction activities.

CULTURAL LANDSCAPE

The following landscape types were identified during the study.

Landscape Type	Description	Occurrence still possible?	Identified on site?
1 Paleontological	Mostly fossil remains. Remains include microbial fossils such as found in Barberton Greenstones	No	No
2 Archaeological	Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites	No	No
3 Historic Built Environment	<ul style="list-style-type: none"> - Historical townscapes/streetscapes - Historical structures; i.e. older than 60 years - Formal public spaces - Formally declared urban conservation areas - Places associated with social identity/displacement 	No	No

4 Historic Farmland	<p>These possess distinctive patterns of settlement and historical features such as:</p> <ul style="list-style-type: none"> - Historical farm yards - Historical farm workers villages/settlements - Irrigation furrows - Tree alignments and groupings - Historical routes and pathways - Distinctive types of planting - Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting. 	No	No
5 Historic rural town	<ul style="list-style-type: none"> - Historic mission settlements - Historic townscapes 	No	No
6 Pristine natural landscape	<ul style="list-style-type: none"> - Historical patterns of access to a natural amenity - Formally proclaimed nature reserves - Evidence of pre-colonial occupation - Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages - Historical structures/settlements older than 60 years - Pre-colonial or historical burial sites - Geological sites of cultural significance. 	No	No
7 Relic Landscape	<ul style="list-style-type: none"> - Past farming settlements - Past industrial sites - Places of isolation related to attitudes to medical treatment - Battle sites - Sites of displacement, 	No	No
8 Burial grounds and grave sites	<ul style="list-style-type: none"> - Pre-colonial burials (marked or unmarked, known or unknown) - Historical graves (marked or unmarked, known or unknown) - Graves of victims of conflict - Human remains (older than 100 years) - Associated burial goods (older than 100 years) - Burial architecture (older than 60 years) 	No	No
9 Associated Landscapes	<ul style="list-style-type: none"> - Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes - Sites associated with displacement & contestation - Sites of political conflict/struggle - Sites associated with an historic event/person - Sites associated with public memory 	No	No
10 Historical Farmyard	<ul style="list-style-type: none"> - Setting of the yard and its context - Composition of structures - Historical/architectural value of individual structures - Tree alignments - Views to and from - Axial relationships - System of enclosure, e.g. defining walls - Systems of water reticulation and irrigation, e.g. furrows - Sites associated with slavery and farm labour - Colonial period archaeology 	No	No
11 Historic institutions	<ul style="list-style-type: none"> - Historical prisons - Hospital sites - Historical school/reformatory sites - Military bases 	No	No

12 Scenic visual	- Scenic routes	No	No
13 Amenity landscape	- View sheds - View points - Views to and from - Gateway conditions - Distinctive representative landscape conditions - Scenic corridors	No	No

Mitigation

It is recommended that the development designs take into account the positive and negative characteristics of the existing cultural landscape type and that they endeavor to promote the positive aspects while at the same time mitigating the negative aspects.

RESOURCE MANAGEMENT RECOMMENDATIONS

Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to the high state of alterations in some areas as well as heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered:

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);
- Bone concentrations, either animal or human;
- Ceramic fragments such as pottery shards either historic or pre-contact;
- Stone concentrations of any formal nature.

The following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above:

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
- All construction in the immediate vicinity (50m radius of the site) should cease.
- The heritage practitioner should be informed as soon as possible.
- In the event of obvious human remains the South African Police Services (SAPS) should be notified.
- Mitigation measures (such as refilling etc.) should not be attempted.
- The area in a 50m radius of the find should be cordoned off with hazard tape.
- Public access should be limited.
- The area should be placed under guard.
- No media statements should be released until such time as the heritage practitioner has had sufficient time to analyze the finds.

CONCLUSION

Two options were investigated for the proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Klipriver Operations Base, Gauteng Province. It was found that neither of the proposed options would have any detrimental effect on the heritage value of the study area. It is therefore insignificant from a heritage point of view which of these are chosen.

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HISTORICAL MAPS

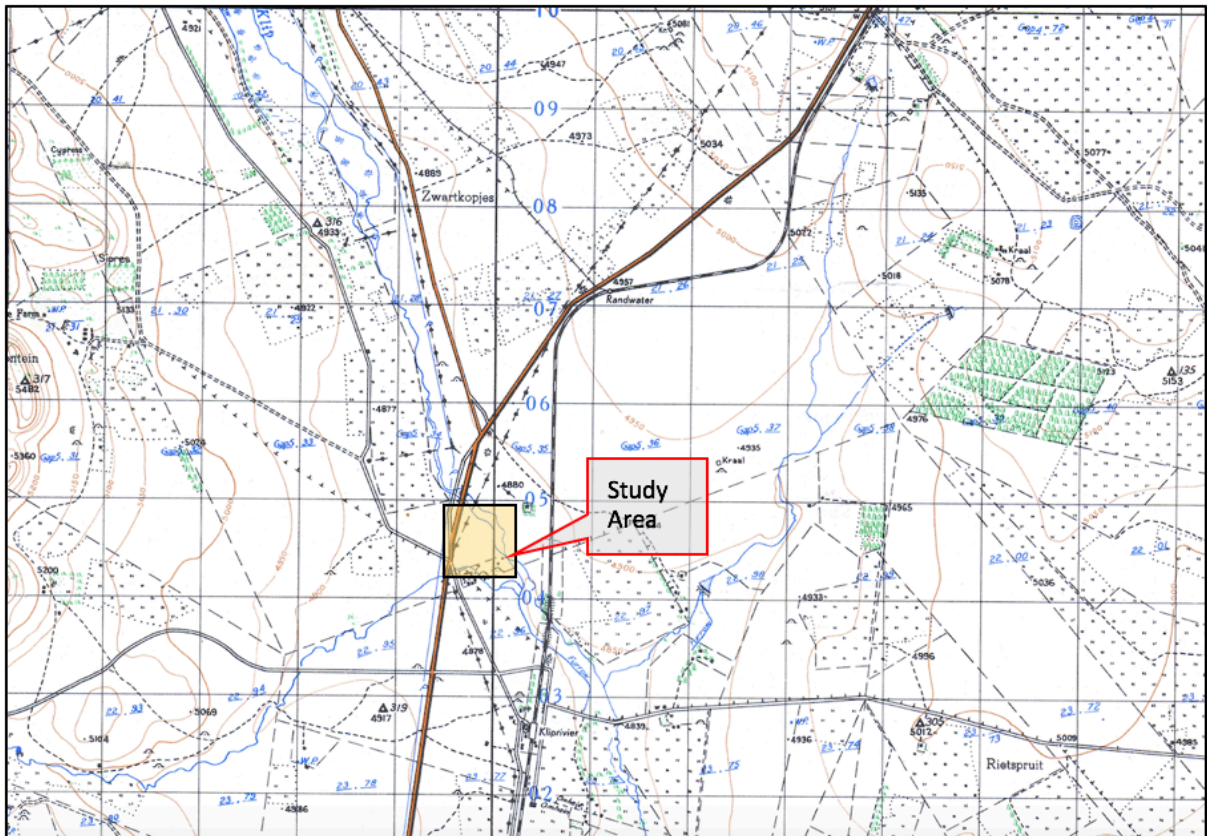


Figure 15. Historical Map: 2628 AC 1939

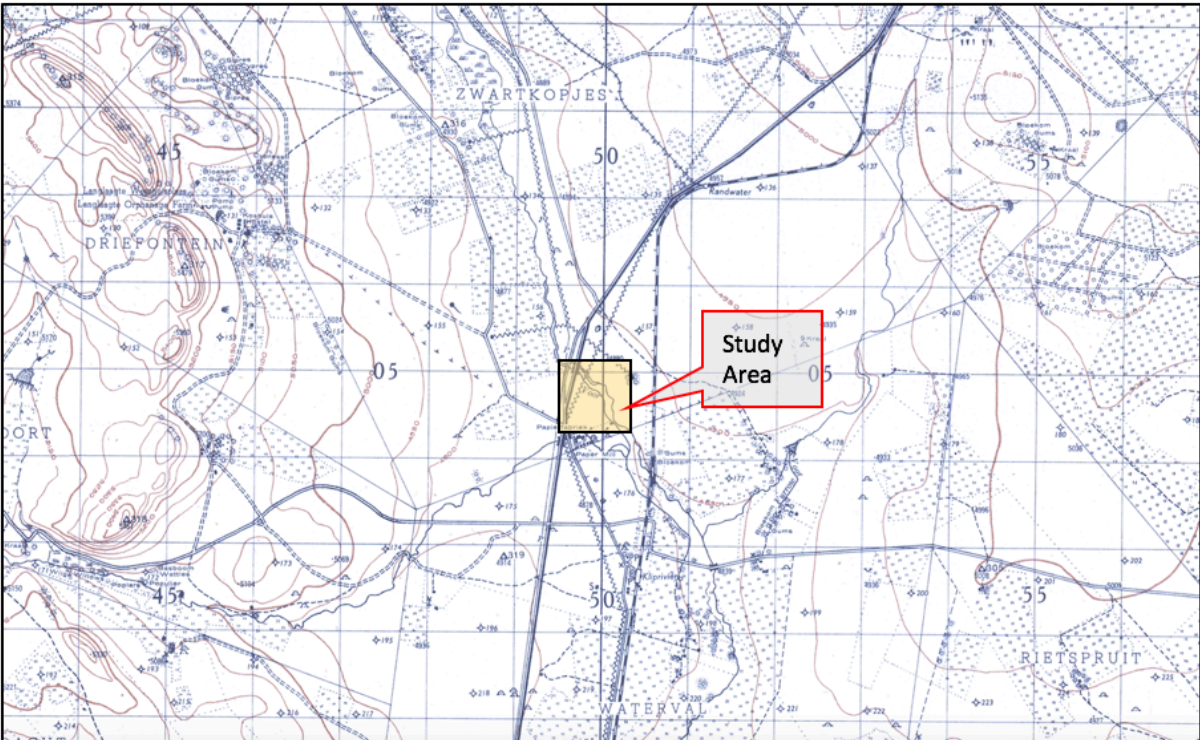


Figure 16. Historical Map: 2628 AC 1944

(Note on map 2628 AC 1944 – “Papierfabriek” noted in the Study Area)

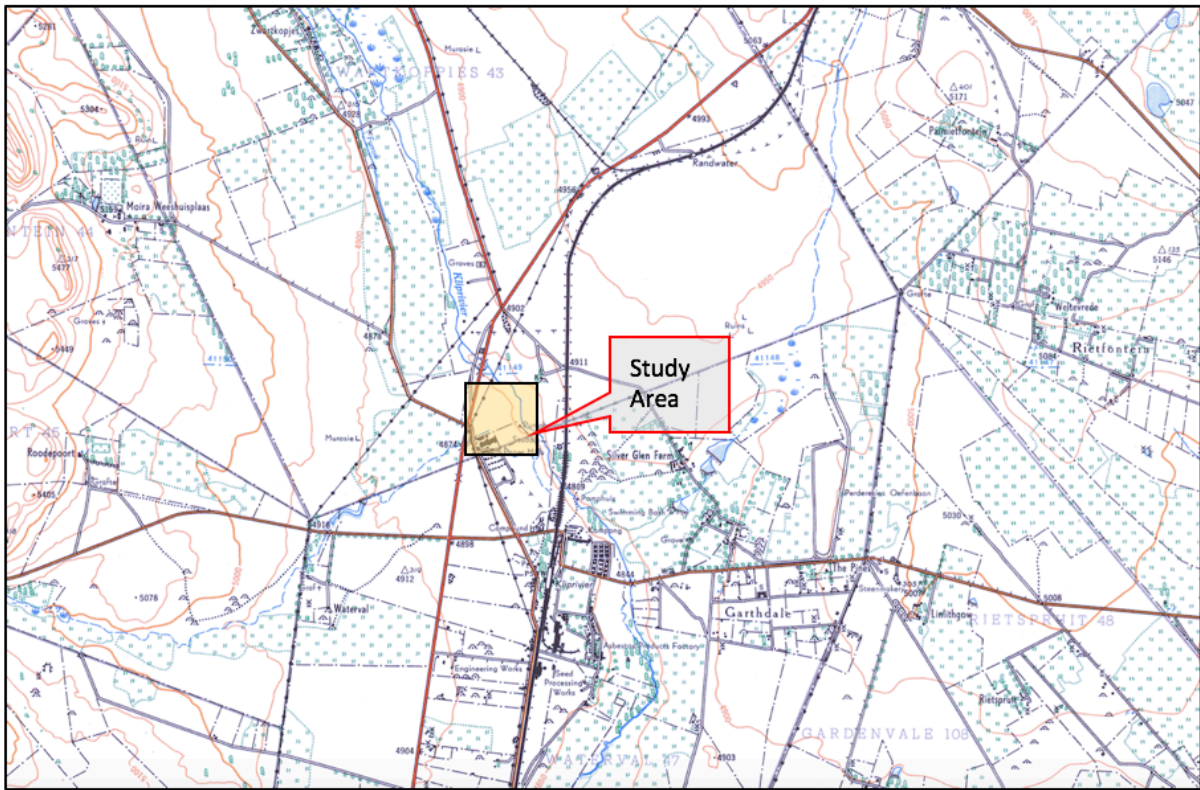


Figure 17: Historical Map 2628 AC 1957

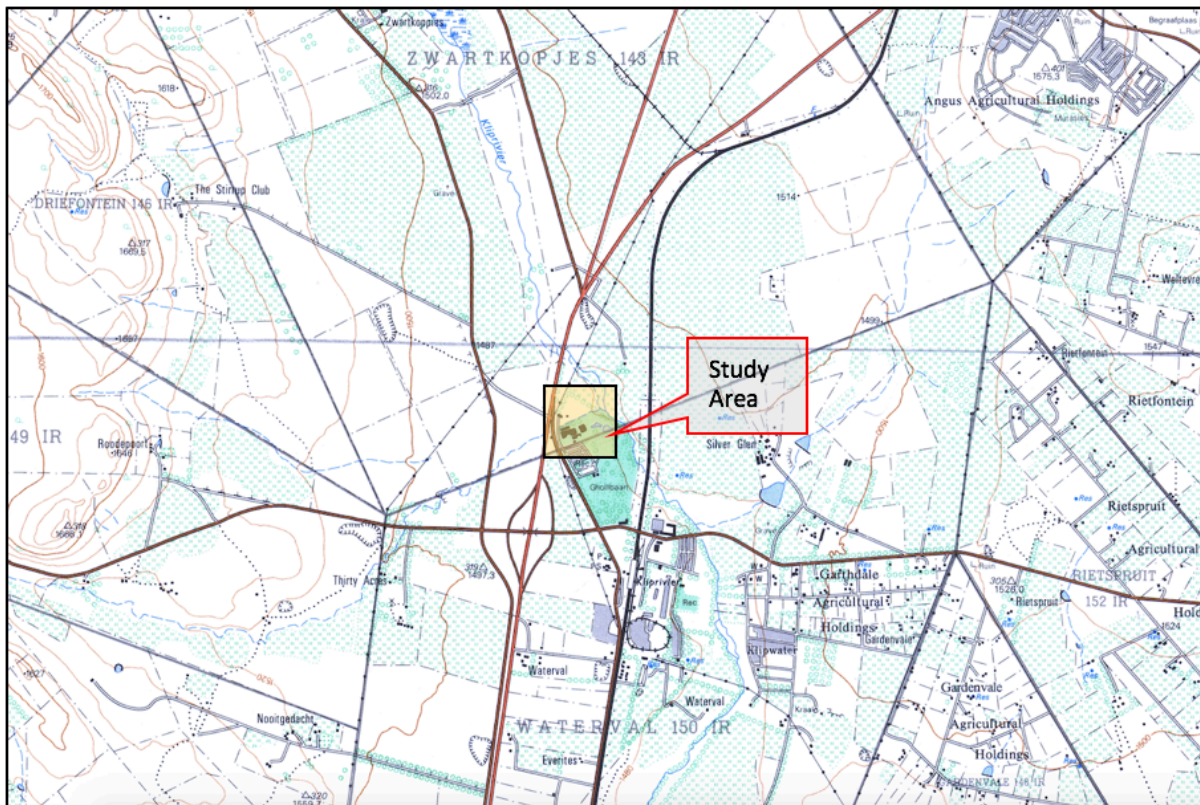


Figure 18. Historical Map 2628 AC 1979

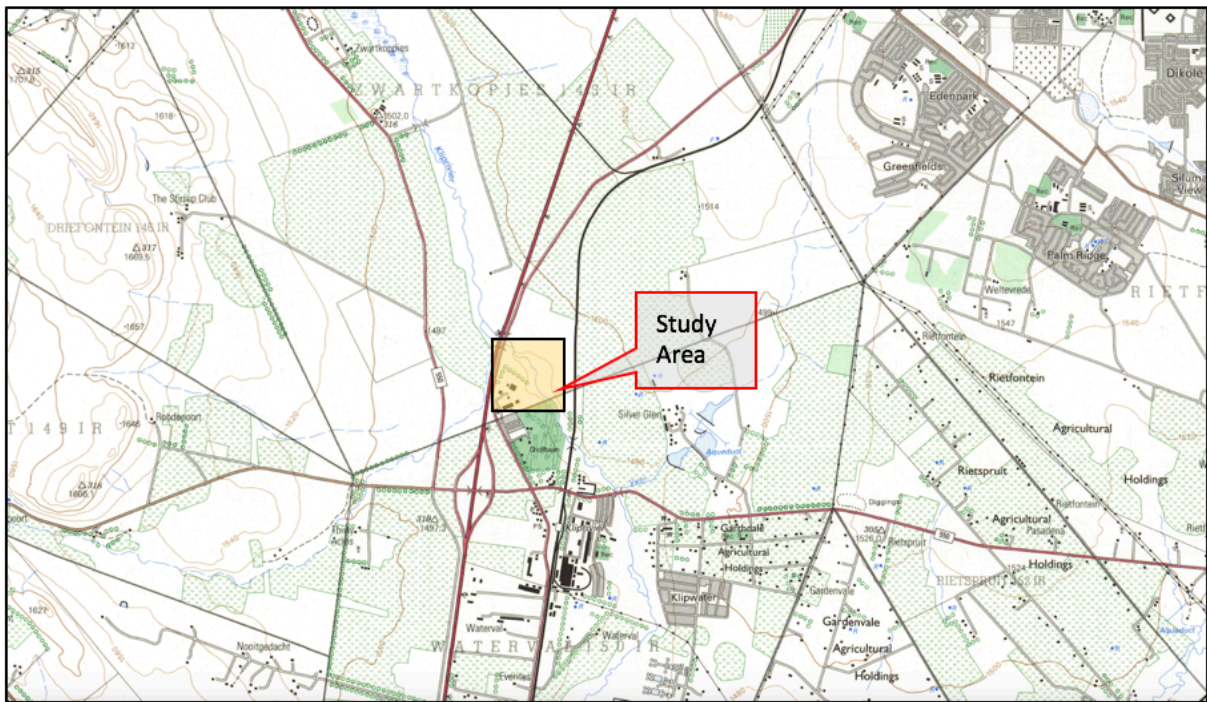


Figure 19. Historical Map: 2628 AC 1995

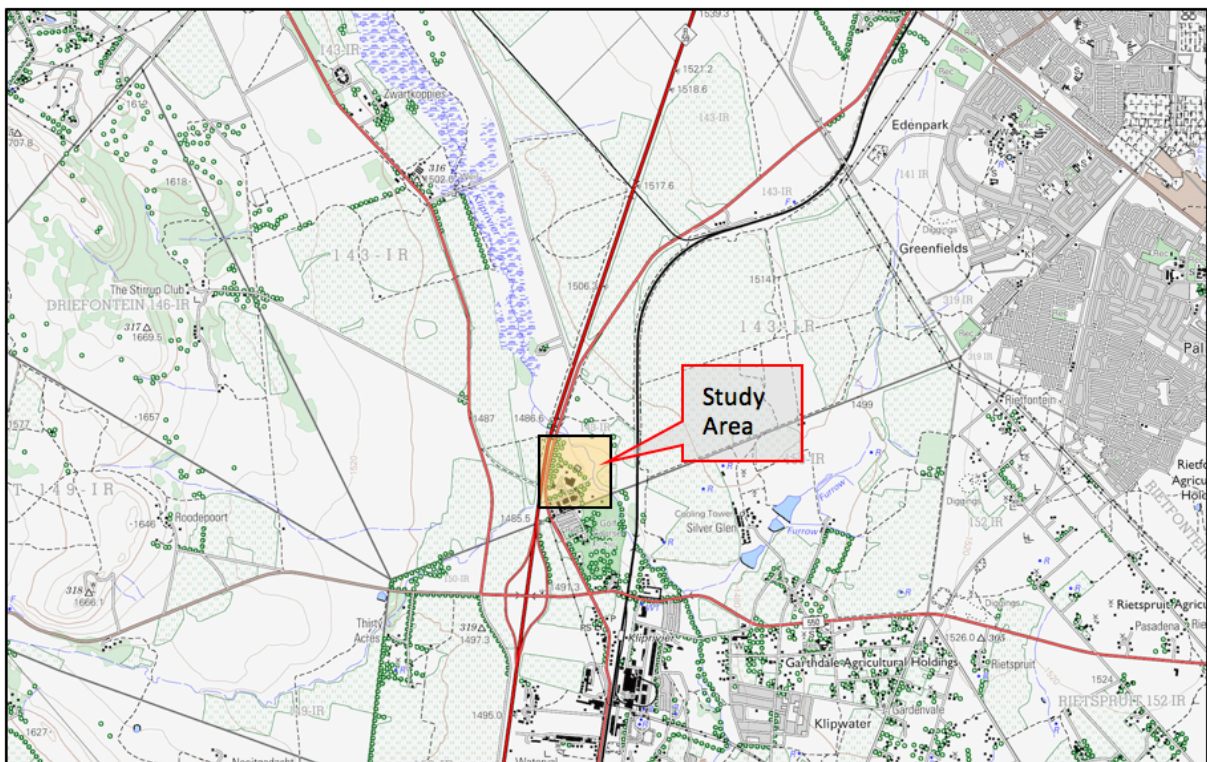


Figure 20. Historical Map: 2628 AC 2002

