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A REPORT ON A HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEMOLITION OF THE OLD NORTHRAND SUBSTATION AND RELATED STRUCTURES FOR THE DEVELOPMENT OF A NEW ESKOM SUBSTATION AT NORTHRAND, GAUTENG

For:

ESKOM GROUP CAPITAL LAND DEVELOPMENT SECTION

REPORT: APAC012/22

by:

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SUMMARY

APelser Archaeological Consulting was appointed by ESKOM Group Capital to conduct an Impact Assessment of the old Northrand Substation and its related structures for the construction of a new Substation at Northrand. The existing substation and related structures (workshop, transformer buildings, office and staff housing) are located east of Modderfontein, and was established in 1951. The old substation will be replaced by a modern substation.

The aims with the assessment were to determine the significance of the structures located here and to assess the impact of the proposed development on the site. Finally recommendations on the way forward and the obtaining of a required Demolition Permit from SAHRA needed to be given.

If the recommendations put forward at the end of this document are implemented, then, from a Heritage point of view, there would be no objection to the continuation of the proposed development.

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1. INTRODUCTION

APelser Archaeological Consulting was appointed by ESKOM Group Capital to conduct an Impact Assessment of the old Northrand Substation and its related structures for the construction of a new Substation at Northrand. The existing substation and related structures (workshop, transformer buildings, office and staff housing) are located east of Modderfontein, and was established in 1951. The old substation will be replaced by a modern substation.

The aims with the assessment were to determine the significance of the structures located here and to assess the impact of the proposed development on the site. Finally recommendations on the way forward and the obtaining of a required Demolition Permit from SAHRA needed to be given.

A. Pelser was accompanied during the assessment of the site by representatives of the client (ESKOM), who indicated the extent of the area and the proposed development, and provided access to the various structures associated with the Substation.

2. TERMS OF REFERENCE

The Terms of Reference for the study, based on the methodology employed by Heritage Impact Assessors, are normally to:

- 1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in the proposed development area;
- 3. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- 4. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
- 5. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
- 6. Review applicable legislative requirements;

In this instance APELSER ARCHAEOLOGICAL CONSULTING only had to focus on the old Northrand Substation, associated infrastructure and old staff housing.

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

3.1 The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites or scientific or technological value.

The national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and palaeontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof
- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the mentioned act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of this act deals with archaeology, palaeontology and meteorites. The act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial):

- a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- d. bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
- e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

a. destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

- b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations** (**Ordinance no. 12 of 1980**) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated to) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the **Human Tissues Act** (**Act 65 of 1983 as amended**).

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

3.2 The National Environmental Management Act

This act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

4. METHODOLOGY

4.1 Survey of literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources consulted in this regard are indicated in the bibliography.

4.2 Field survey

The assessment was conducted according to generally accepted HIA practices and in this case was aimed at assessing the historical significance of the structures located in the area of development, while taking into consideration the negative impacts of the proposed development (new Substation) on these resources. The location/position of all sites, features

and objects are determined by means of a Global Positioning System (GPS) where possible, while photographs are also taken where needed.

The assessment was undertaken mainly on foot, with client staff members accompanying the Specialist during the fieldwork. The client indicated the area that will be impacted by the development.

4.3 Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

4.4 Documentation

All sites, objects, features and structures identified are documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

5. DESCRIPTION OF THE AREA

The Northrand Substation site is located in the Ekhurhuleni Metropolitan Municipality, east of AECI's Modderfontein factory, in Gauteng. The substation contains various related structures including old office buildings, transformer building, workshop and staff housing. As a result the area has been completely changed from its original (prehistoric and early historic) condition over the years. The assessment focused on these structures.

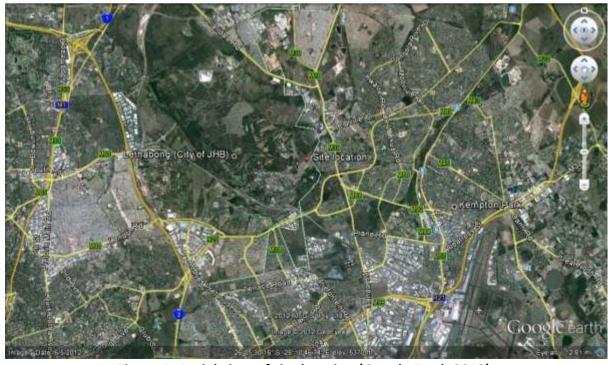


Figure 1: Aerial view of site location (Google Earth 2012).



Figure 2: Closer view of Northrand Substation location and layout.



Figure 3: View of main substation buildings.



Figure 4: View of staff housing from the substation area.



Figure 5: Another view of substation infrastructure.

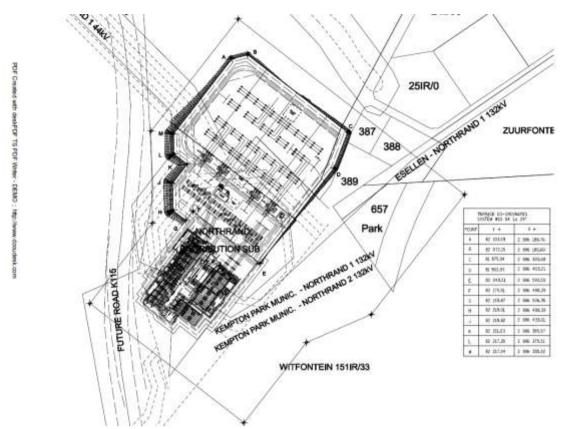


Figure 6: Layout plan of Northrand Substation (Courtesy ESKOM).

6. DISCUSSION

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided basically into three periods. It is however important to note that these dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago Middle Stone Age (MSA) less than 300 000 – 20 000 years ago Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125).

The Iron Age is the name given to the period of human history when metal was mainly used to produce artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D. Late Iron Age (LIA) 1000 – 1850 A.D. Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D. Middle Iron Age (MIA) 900 – 1300 A.D. Late Iron Age (LIA) 1300 – 1840 A.D.

The historical period started with the moving into the area of people who could read and write (European travellers, missionaries, the Voortrekkers).

In his 2008 HIA for the proposed Esselen-Northrand-Chloorkop ESKOM Strengthening Project Dr. Robert de Jong provided the following chronology for the prehistory and history of the project area (De Jong 2008: 20-21)

500 000 years BP: Early Stone Age communities

200 000 years BP: Evidence of Middle Stone Age communities at Halfway House

30 000 years BP: Evidence of Late Stone Age communities at Halfway House and along the Jukskei River.

350-600 AD: Tswana communities live in Midrand area

1100-1200 AD: San communities live in Midrand area

1500 AD: Tswana communities return to area

1830s: Displacement of Tswana communities by Matabele kingdom (Mzilikazi)

1840s: Voortrekker settlement

1850s - 1860s: Grants of Mooifontein, Zuurfontein, Modderfontein, Klipfontein and

Rietfontein to first Boer farmers

1891-1892: Construction of Germiston-Pretoria railway line

1896: Zuid-Afrikaansche Fabriek voor Ontplofbare Stoffen opened by President Kruger at Modderfontein

1899-1902: Anglo-Boer War

1903: Kempton Park established

1924: African Explosives and Industries established at Modderfontein

1934: Rand Extension Undertaking ceded to Victoria Falls Power Co Ltd

1939: Spartan industrial township established

1940: Esselen Park established

1942: South African and British governments build first chlor-alkali plant at Chloorkop

1944: AEI becomes AECI

1946: Cresslawn township established

1947: Greater Rand Extension Undertaking authorised

1948: Birchleigh township established

1949: Chloorkop industrial township established

1950: Klipfontein Organic Products (KOP) established at Chloorkop

1950: Restonvale Agricultural Holdings established

1950: Edleen township established

1950: Kempton Park sewage treatment plant established (now redundant)

1951: North Rand substation established as coupling point between Rand Undertaking and Johannesburg municipality

1957: Tembisa township established

1958: Esselen substation completed as distribution station

1964: Allen Grove township established

1966: Glenmarais township established

1968: Birch Acres township established

1968: Birchleigh North township established

1968: Norkem Park township established

1969: Terenure township established

1972: Esther Park township established

1972: Apollo-Esselen-Jupiter 275 KV lines completed

1977: Expansion of Esselen substation

1973: Aquachlor established at Chloorkop

1978: Van Riebeeck Park township established

1994: Ultrafloc established at Chloorkop

1999: AECI becomes AEL

No Stone Age or Iron Age sites, features or objects are known to occur in the assessment area, with the Northrand substation itself established in 1951 only. This is the only known historical resource here, and as it is older than 60 years of age it is protected by the National Heritage Resources Act (Act 26 of 1999).

Results of fieldwork

The field assessment focused on the Substation and the related structures such as the office, transformer building, workshop, distribution station and old staff housing on the premises.

According to de Jong (in his 2008 HIA for the Esselen-Northrand-Chloorkop ESKOM Strengthening Project) the Northrand substation was established in 1951 as a coupling point between the then Rand Expansion Undertaking and the Johannesburg Municipality (p.20). As a result the site (and possibly some of the buildings here) would be older than 60 years of age and therefore would be protected by the National Heritage Resources Act of 1999. His assessment of the substation and related structures provided it with a Significance Rating of 2, a Condition Rating of 2 and as a result of this a Sensitivity Rating of 4 (De Jong 2008: 3-4). His assessment indicated that damage or disturbance of the sites' historic fabric should be avoided and if this could not be guaranteed that the site be documented in detail prior to damage or destruction (p. 4).

As ESKOM is planning to develop a new, modern Substation at Northrand, with the associated infrastructure, it is unavoidable that the old structures will have to be demolished. A. Pelser's assessment of the site therefore focused on the significance of the structures at Northrand and recommending required mitigation measures to minimize the definite negative impacts of the development on the site.

The Northrand substation site contains a range of buildings and structures associated with it, including the substation infrastructure, transformer and Distribution Station, Control Room/Rotary Room/Generator Plant, workshops, office and staff housing. Over the years since its development there have been many changes and additions to the structures, and although there could be some original elements still present it is believed that the significance of the site and structures had been diminished as a result. The same applies to the equipment and working electrical machinery of the substation. Much of the original has been replaced

over the years and ESKOM will have to replace the current ones with new, modern ones for the new substation.

The staff housing (dating to around the same time as the substation) has similarly been changed over time although some structural elements dating to the time (1950's) still remain. Significance changes and damage to these structures has occurred over the last year since ESKOM staff was asked to vacate in anticipation to the new development. Doors, windows and other elements have been removed subsequently, although it is highly unlikely that any significant historical elements were lost as a result.



Figure 7: The main Control Room/Rotary Room/Distribution station.



Figure 8: Back view of the same building.



Figure 8: Entrance sign at the building.



Figure 9: Machinery/control boards.



Figure 10: View of small office building and workshop.



Figure 11: Closer view of office building.



Figure 12: Structure (possibly old reservoir).

Now functioning as store room.



Figure 13: Staff bathrooms.



Figure 14: Workshop/office buildings.



Figure 15: Equipment in storage. Some of these could be collected for museum/display purposes.



Figure 16: One of the staff houses on the property.



Figure 17: Front door entrance to one of the houses.



Figure 18: Original window in one of the houses.



Figure 19: Another view of one of the houses.



Figure 20: Fire-place in one of the houses.



Figure 21: More buildings at the current office block.

Based on the impact assessment conducted during November 2012 the following can be concluded. Although the Northrand Substation was originally established in 1951, and is therefore (just) older than 60 years of age, the structures on it is less significant due to the fact that it has been changed and added to over the years since its inception. This includes structural changes, as well as changes to the machinery and equipment used in the running of an electrical substation. In the last year since ESKOM staff has vacated the staff housing on the premises much damage has also been caused through the removal of structural elements such as door and windows. However, due to the fact that this substation and the building associated with it is older than 60 years of age the substation does have some heritage significance from a scientific or technical point of view as it is a remnant of earlier Electricity production and supply. With changing technology the equipment used in the past will

inevitably be replaced and something of this nature needs to be preserved. The building style in which the substation was constructed is also something of the past and for that reason it is recommended that something should be preserved for posterity. The following is therefore recommended:

- 1. that a selection of outdated equipment, machinery and operations manuals be made by a Heritage Specialist for donation to a Museum for specialized curation.
- 2. that a display panel/Information Plaque on the history of the original Northrand Substation be erected on the premises of the new Substation so that this information is preserved for posterity. This display could include a selection of old equipment

Cultural Significance: Low to Medium

Heritage Significance: Grade III

Field Rating: General protection C (IV C). Phase 1 is seen as sufficient recording and it may

be demolished (low significance)

Mitigation: See above

Probability of Impact: Probable Duration of Impact: Long term Scale of Impact: Site and region Significance of Impact: High Magnitude of Impact: High

7. CONCLUSIONS AND RECOMMENDATIONS

In conclusion it is possible to say that the assessment of the Northrand Substation and related structures were conducted successfully. Although the substation was originally established in 1951, and is therefore older than 60 years of age, the site and structure is not of high significance due to the changes and additions to the original structures over the years. Recent damage to the staff housing on the premises has also diminished its significance.

It is believed that the proposed development of the new ESKOM Northrand Substation can continue, taking cognizance of the following recommendations:

- 1. that a selection of outdated equipment, machinery and operations manuals be made by a Heritage Specialist for donation to a Museum for specialized curation.
- 2. that a display panel/Information Plaque on the history of the original Northrand Substation be erected on the premises of the new Substation so that this information is preserved for posterity. This display could include a selection of old equipment

Finally, a Demolition Permit should be applied for from SAHRA. Obtaining this permit could require a Public Participation Process of advertisement of ESKOM's intent to demolish.

8. REFERENCES

Aerial views of Northrand Substation location: Google Earth 2012

Layout Map of Northrand Substation: ESKOM

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Republic of South Africa. 1998. **National Environmental Management Act** (no 107 of 1998). Pretoria: The Government Printer.

APPENDIX A

DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B

DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE:

Historic value: Important in the community or pattern of history or has an association

with the life or work of a person, group or organization of importance in

history.

Aesthetic value: Important in exhibiting particular aesthetic characteristics valued by a

community or cultural group.

Scientific value: Potential to yield information that will contribute to an understanding of

natural or cultural history or is important in demonstrating a high degree

of creative or technical achievement of a particular period

Social value: Have a strong or special association with a particular community or

cultural group for social, cultural or spiritual reasons.

Rarity: Does it possess uncommon, rare or endangered aspects of natural or

cultural heritage.

Representivity: Important in demonstrating the principal characteristics of a particular

class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or 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.

APPENDIX C

SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Low A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.

- Medium Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of

context.

- High Any site, structure or feature regarded as important because of its age or

uniqueness. Graves are always categorized as of a high importance. Also any

important object found within a specific context.

Heritage significance:

- Grade I Heritage resources with exceptional qualities to the extent that they are of national significance

- Grade II Heritage resources with qualities giving it provincial or regional importance

although it may form part of the national estate

- Grade III Other heritage resources of local importance and therefore worthy of

conservation

Field ratings:

i. National Grade I significance	should be managed as part of the national estate
ii. Provincial Grade II significance	should be managed as part of the provincial estate
iii. Local Grade IIIA	should be included in the heritage register and not be
	mitigated (high significance)
iv. Local Grade IIIB	should be included in the heritage register and may be
	mitigated (high/ medium significance)
v. General protection A (IV A)	site should be mitigated before destruction (high/
	medium significance)
vi. General protection B (IV B)	site should be recorded before destruction (medium
	significance)
vii. General protection C (IV C)	phase 1 is seen as sufficient recording and it may be
	demolished (low significance)

APPENDIX D

PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – Grade I and II

Protected areas - An area surrounding a heritage site

Provisional protection – For a maximum period of two years

Heritage registers – Listing Grades II and III

Heritage areas – Areas with more than one heritage site included

Heritage objects – e.g. Archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states Structures – Older than 60 years Archaeology, palaeontology and meteorites Burial grounds and graves Public monuments and memorials

APPENDIX E

HERITAGE IMPACT ASSESSMENT PHASES

- 1. Pre-assessment or Scoping phase Establishment of the scope of the project and terms of reference.
- 2. Baseline Assessment Establishment of a broad framework of the potential heritage of an area.
- 3. Phase I Impact Assessment Identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.
- 4. Letter of Recommendation for Exemption If there is no likelihood that any sites will be impacted.
- 5. Phase II Mitigation or Rescue Planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.
- 6. Phase III Management Plan For rare cases where sites are so important that development cannot be allowed.