

## AFRICAN HERITAGE CONSULTANTS CC

2001/077745/23

#### DR. UDO S KÜSEL

Tel: (012) 567 6046 Fax: 086 594 9721 Cell: 082 498 0673 E-mail: udo@nconnect.co.za P.O. Box 652 Magalieskruin 0150

#### A. PHASE I CULTURAL HERITAGE RESOURCES IMPACT ASSESSMENT

#### (a) CULTURAL HERITAGE RESOURCES IMPACT ASSESSMENT FOR PORTION 15 OF THE FARM BOTESDAL 529 JQ LANSERIA WITHIN THE MOGALE CITY LOCAL MUNICIPALITY, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY GAUTENG PROVINCE

#### (b) **REPORT COMPILED BY**

Dr. Udo S. Küsel; African Heritage Consultants CC P.O. Box 652, Magalieskruin, 0150 Tel: (012) 567 6046; Fax: 086 594 9721; Cell: 082 498 0673 E-mail: ido@nconnect.co.za

#### (c) DEVELOPER AND CONSULTANT INFORMATION

#### Prepared for: Developer and owner

Open Energy Innovation (Pty) Ltd, West Wing, Cedar Road Gatehouse, Steyn City Dainfern, 2191 Ferdi van Niekerk Mobile: 082 717 3725; E-mail: <u>Ferdi@theopenwindow.co.za</u>

#### (d) Consultant:

LEAP Enviro (Imbrilinx CC P.O. Box 13185, Hatfield, 0028 Dr. Gwen Theron, Tel: 012 344 3582; E-mail <u>gwen.theron@leapenviro.co.za</u>

#### (d) Date of report: 22 November 201830 October 2013

## **B. EXECUTIVE SUMMARY**

The proposed development site lies near Lanseria Airport and is typical Highveld grassland with exotic trees on the eastern side. The site was inspected on foot.

On the eastern side a farm house and outbuildings were developed in the 1970/80's. All structures have been demolished and only ruins remain.

In the middle of the site are the foundations of a single demolished building.

No important Archaeological or Historical sites or graves were found on the proposed development site. There is no objection to the proposed development from a Cultural Historical Resources point of view.

If during construction any cultural heritage resources or graves are unearthed all work has to be stopped until the site has been inspected and mitigated by a Cultural Heritage Practitioner.

#### C. TABLE OF CONTENTS

		Page
A.	Title Page	01
B.	Executive Summary	02
C.	Table of Contents	03
D.	Background Information on the Project	04
E.	Background to the Archaeological History	05
F.	Description of the Property or Affected Environment	11
G.	Description of sites	14
H.	Description of the Artefacts, Faunal, Botanical or other Finds and Features	16
I.	Clear Description of Burial Grounds and Graves	16
J.	Field Rating	16
K.	Statement of Significance (Heritage Value)	16
L.	Recommendations and Conclusion	17
M.	Bibliography	17
N.	Appendices	18

• Maps

• 1/50 Map: Broederstroom 252 / DD Page:
--

- Locality and Google map: page 20
  Proposed development layout map: page 21

## D. BACKGROUND INFORMATION ON PROJECT:

## (a) Whether the report is part of a scoping report/EIA/HIA or not

Basic Assessment and Water Use Licence Application

## (b) Type of development (e.g. low cost housing project, mining etc).

Light industrial commercial development

## (c) Whether re-zoning and/or subdivision of land is involved.

Currently zoned 'Agricultural' to be rezoned 'Special'

## (d)Developer and consultant and owner and name and contact details;

#### Prepared for: Developer and owner

Open Energy Innovation (Pty) Ltd, West Wing, Cedar Road Gatehouse, Steyn City Dainfern, 2191 Ferdi van Niekerk Mobile: 082 717 3725; E-mail: <u>Ferdi@theopenwindow.co.za</u>

#### > Consultant:

LEAP Enviro (Imbrilinx CC) P.O. Box 13185, Hatfield, 0028 Dr. Gwen Theron, Tel: 012 344 3582; E-mail <u>gwen.theron@leapenviro.co.za</u>

### (e) Terms of Reference

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

## (f) Legislative requirements of Act 25 of 1999.

#### Protected sites in terms of the National Heritage Resources Act, Act No. 25 of 1999

The following are the most important sites and objects protected by the National Heritage Act:

• Structures or parts of structures older than 60 years.

- Archaeological sites and objects.
- Paleontological sites.
- Meteorites.
- Ship wrecks.
- Burial grounds.
- Graves of victims of conflict.
- Public monuments and memorials.
- Structures, places and objects protected through the publication of notices in the Gazette and Provincial Gazette.
- Any other places or objects, which are considered to be of interest or of historical or cultural significance.
- Geological sites of scientific or cultural importance.
- Sites of significance relating to the history of slavery in South Africa.
- Objects to which oral traditions are attached.
- Sites of cultural significance or other value to a community or pattern of South African history
- > Application is being completer under the National Environmental Management Act

## E. BACKGROUND TO THE ARCHAEOLOGY AND HISTORY OF THE AREA

Ecology



Geology: (See McCarthy & Rubidge, 2005, for full description.)

The remains of two pre-Pangean continents, the Kaapvaal Craton and the Zimbabwean Craton collided some 2700 million years ago. This resulted in the tilting of the Kaapvaal Craton and the erosion and winnowing of heavy metals into a shallow sea. The area shaded in pink is an estimated shape of the Transvaal Craton, while the orange area is an enlargement of the central goldfields. (McCarthy and Rubidge, p 102.)

If it had not been for the mineral composition of the geological under-build of the region it is very possible that this geological structure would not have existed: i.e. the gold deposits, and their associated

minerals, that were deposited along the MAIN REEF. The origins of these geological phenomena are rather complex which possibly only a few geologists would understand. See

McCarthy and Rubidge, p.102.... 'The rocks of the Witwatersrand Supergroup were originally widely distributed over the Kaapvaal Craton, but much has been removed by erosion, leaving only the scattered remains shown in Fig. 02. The enlarged inset shows the main area of preservation of the Witwatersrand Supergroup basin. The major goldfields occur in an arc around the western and northern sides of the basin. The locations of these goldfields were determined by earth movements along faults such as the Thabazimbi-Murchison (TML) Line, the Rietfontein (RIET) Fault, the Sugerbush (SHB) Fault and the Border (BORD) Fault. The authors further state that between 2 700 and 2 000 million years ago the crust tilted again, trapping the gold deposits against one side of the Trandvaal basin. With the impact of the Vredefort meteorite, large portions of the gold-bearing geological structures were infolded by the impact phenomena, effectively shielding it against erosion and therefore preserving large portions of the original deposits.

Although the gold of the Zimbabwe Craton was discovered and utilised by Africans more than a thousand years ago, the central goldfields were only discovered in 1886 after the Pilgrims Rest, Baberton and Magaliesberg alluvial fields were identified in the 1870s.



The two most important reasons for the central South African Goldfields: dilution of heavy minerals into an ancient maritime environments and the Vredefort meteorite impact event. (McCarthy and Rubidge, p 103 and 136.)



Johannesburg is located on the intersection of two different veldt type zones as illustrated above, with a third located towards Heidelberg. (Acocks map, Veldt Types of Southern Africa.)

According to Acocks three of his original veldt types are present in and around Johannesburg. Veldt type 61 to the north of Johannesburg which consist of three variations, i.e. (a) the Eastern, (b) Central and (c) Western categories. In Johannesburg it is Type 61 (b) that concerns us. Apparently it is possible that this type is a

derivative of an *Acacia caffra* savannah which it still is in parts. It is a sparse and tall tufted type with the forbs playing an important part, and is extremely sour. It is the veldt type of the Witwatersrand and the high undulating country sloping down to the Magaliesberg. The rocks are mainly quartzite, shale, dolomite, chert and granite. The soils are poor and acid, either stony or sandy with an altitude of 1450 to 1750 metres above sea level. Rainfall is in the region of 750 mm per annum and the winters are cold and frosty. Combined with continuous burning the veldt is particularly sour and supports wiry grazing, not particularly edible for livestock. At the Rietvlei research station though, it was shown that the veldt was particularly suitable for intensive farming.

Rocky ridges carry Bushveld vegetation dominated by *Protea caffra, Acacia caffra, Celtis africana* and sometimes *P. welwitschii* as well as a large number of South Bushveld shrubs in smaller numbers. A typical plant of the hills is *Xerophyta retinervis*. In sheltered valleys and sinkholes there are traces of temperate or transitional forest, with species such as *Celtis africana, Kiggeleria africana, Halleria lucida, Leucosidea sericea, Buddleja salviifolia* and *Cassinopsis ilicifolia*, for example in the Fountains Valley in Pretoria, which is in great contrast to the traces of tropical forest a few miles away in the kloofs of the northern slopes of the Magaliesberg. For the extremely long lists of grass species and succulent species see page 114 of Acocks.

Acocks describes his type 48 as *Cymbopogon-Themeda* grass-veldt. It also consists of two regions, north and south, the south being a moderately dense grass-veldt, and the north a sparser more tufted veldt. Altitude varies between 1350 and 2000 m above sea level with summer rainfall of between 450 and 750 mm per annum severe frosty winters. Amongst the grasses that generally occur are *Setaria flabellate, Themeda triandra, Heteropogon contortus*, a number of *Eragrostis* species and others (*Acocks p 100-101*)

The greatest impact that this vegetative composition had on the development of the goldfields was that there was no wood available for either shelter, construction work, heating or food

<sup>&</sup>lt;sup>1</sup> The author is aware of the updated version of Acocks's work by Mucina &

Rutherford, 2010, but for the purposes of this publication Acocks version is preferred.

preparation. This resulted in the transport of wood from other parts of the region, the planting of millions of trees and the discovery and development of the regional coal fields.

The Kimberley Reef deposit is within the Witwatersrand Supergroup and forms part of the Kimberley Reef system. The West Rand Syncline passes through the approximate centre of the West Wits tenement forming the Emerald and Lancaster/Princess Limbs with northeast/southwest and east-west orientations respectively. Gold mineralisation is hosted within moderately dipping (30-45degree) conglomerates, surrounded by immature sandstones. The conglomerates were formed by debris flow and sheet flood deposits which have then been reworked by braided stream channels, concentrating the gold. The outcrop extends to far eastern extent of mining right area with the projected outcrop extending into the defunct and dry Tudor Dam. The area is highly faulted due to close proximity of the Witpoortjie fault which separates the West Rand Basin from the Central Rand Basin.

\* The attached plan indicates current mining contours where open pits already exist, as well as the outcrop position of the reef within the dry dam area.

The Sterkfontein Valley landscape in Western Gauteng comprises a band of important palaeoanthropological sites that include Sterkfontein, Swartkrans, Kromdraai, Malapa, Coopers B, Wonder Cave, Drimolen, Gladysvale, Gondolin, Plover's Lake, Haasgat, Bolt's Farm and Minnaars Caves. This area has been declared a World Heritage Site (UNESCO) and is known as the Cradle of Humankind. In terms of section 27 of the National Heritage Resources Act, No. 25 of 1999, the South African Heritage Resources Agency (SAHRA) has declared this region as a National Heritage Site.

Ongoing research since the mid-1900s have not only resulted in the recovery of a plethora of hominin remains, but also delivered some of the most important fossils for reconstructing the evolutionary development of humankind. The main South African sites have produced the remains of several hundreds of hominins that frequented this area from over 2 to 3.3 million years ago. At several of the hominin localities recent finds in known and also in previously unexplored sections have opened up new research avenues. This has furthermore resulted in more collaborative research projects with international scholars.

The fossil remains of these hominins and animal fauna occur in breccias, a hard conglomerate of lime and bone. Some major fossil finds have been discovered through activities centred on the extraction of limestone from the breccias. Unprofitable materials and rocks extracted through historic limestone mining were dumped in piles nearby. Some of these dumps have yielded important hominin specimens and the faunal remains of extinct animals associated with this period. The limestone kilns are also of historic significance, for example the kilns at Drimolen and Gladysvale are good examples (WRC report 2010).

The hominin sites in Gauteng are located in the remnants of a row of dolomitic hills. Caverns in the Karst System were formed in the dolomite when calcium carbonate or lime was dissolved out of the rock (WRC report 2010). During dry periods the water table dropped and such caverns became air-filled. Cracks in the dolomite became enlarged by rain water filtering through the rock until an opening formed between the cavern and the surface. Once this gap has opened, objects, soil and organic matter on the surface can fall into the cavern. This builds up to form a

talus cone of bone and other material, which becomes hardened by the lime that drips out of the surrounding dolomite (Van der Ryst 2009).

The australopithecines are important because of their place as ancestors to *Homo*. Fossil remains of *Australopithecus africanus* are found mainly at Sterkfontein. Faunal correlation and radiometric dating techniques have been used to date the sites and associated fossils (Van der Ryst 2009). A recent study of paleaomagnetism on the cave formations suggests that the oldest Sterkfontein M4 deposits and *A. africanus* fossils are 2.85-2.58 million years old (Herries & Shaw 2010).

The finds in 2008 of *Australopithecus sediba* at Malapa comprise more than 220 bones of early hominins representing more than five individuals, including the remains of babies, juveniles, and adult specimens. *A. sediba* dates to around 1.95 million years (Herries & Shaw 2010) and exhibits a mosaic of anatomical features that show some important differences relative to the other australopithecines and early *Homo*. The most recent find at Sterkfontein is that of the 3.5 million year old australopithecine known as 'Little Foot'. It is the most complete hominin fossil yet found in southern Africa.

Swartkrans has the largest sample of the robust line *Australopithecus paranthropus* (also known as *robustus*). They lived at the same time as early *Homo*. They are found mainly at Swartkrans, Kromdraai and Drimolen and are between 1 and <2 million years old. Some of the bone fragments recovered from Sterkfontein exhibit regular marks that match those made during experiments to find underground plants by digging in the soil with a bone (Van der Ryst 2009).

The Earlier Stone Age lithic industries that were developed by hominins are known as the Oldowan and Acheulean (Thackeray & Braga 2005; Kuman et al. 1997). Bone tools are also a feature of these early assemblages. A study of wear patterns on long-bone bone flakes suggests their use in termite collecting (Backwell & d'Errico 2001; d'Errico et al. 2001). However, we cannot be sure which of the early hominin species produced the tools. The hand morphology of the early South African hominins exhibits precision gripping that would have enabled tool manufacture (Van der Ryst 2013). The robust australopithecines were the contemporaries of stone tool-making members of the genus *Homo*. Both *Paranthropus robustus* and early *Homo* are represented at some of the sites, e.g. Kromdraai B (Thackeray 2012), and at Swartkrans. Specimens of *Homo* species have also been discovered at Swartkrans and at the Sterkfontein Extension Site. The fossils show such diversity that there is growing consensus that more than one species of early *Homo* could have existed (Jurmain et al. 2013). Middle Stone Age and Later Stone Age (LSA) lithic and faunal occurrences at these localities are also being studied. These include the LSA of Lincoln Cave (Reynolds et al. 2007).

The value of the Cradle of Humankind as a tourist destination resulted in the development of interpretative and community centres as well as accommodation in the conservancy of the Cradle of Humankind that benefit tourism as well as local stakeholders (Seliane 2009).

#### Mining developments and the associated infrastructure

Activities centred on gold mining resulted in the establishment of Krugersdorp (1887) and growth of the Krugersdorp area. There is a wealth of information on the mining history of the Witwatersrand that cannot be dealt with in this study. The mineral wealth has also resulted in important historic political and social developments that culminated into several confrontations and even the Anglo-Boer War. The Krugersdorp area witnessed many of these, as is evident in heritage remains such as blockhouses (www.sahra.org.za/node/13296) and the Paardekraal Monument (www.sahra.org.za/node/336968).

The related transport history is also well-represented by the old NZASM station (www.sahra.org.za/node/33691), and also by exhibits in the SA National Railway and Steam Museum (www.sahra.org.za/node/13449) at Krugersdorp. Other minerals such as uranium and manganese are also mined within the area. The intensive mining resulted in large mine dumps, some of which are currently reworked. Some of the historic mining concerns have been declared as sites with heritage status. Environmental concerns that address the rehabilitation of mine dumps and tailings also provided new impetus for heritage mitigation on the Witwatersrand (see for example van der Walt 2013).

#### Graves and cemeteries

The mining industry required intensive labour. African migrant and also Chinese labourers were accommodated in hostels and the many workers who died on the Witwatersrand were buried in cemeteries near the mines. Some of these have been mitigated, but many graves are still being found. The dense development around Krugersdorp also resulted in many formal cemeteries and informal graves of mostly labourers. Many of these were subsequently exhumed and reburied (Nienaber 2005, Permit No. 80/05/04/010/51) or analysed for research projects (SAHRIS Permit ID 97 for Crown Mines Burial Ground, Johannesburg) or not impacted upon (Van Schalkwyk 2007). There are also World War II graves in the area.

(www.environment.co.za/documents/environment-reports/state-of-the-environmentmogale/heritage.pdf).

#### General

The intensive agricultural and industrial developments of this area resulted in the destruction of many prehistoric and historic features. Archaetnos (2011) concurs that in areas that have been surveyed a lack of heritage features may be accounted for by such destruction of evidence. Van Schalkwyk (2007) in a survey for the proposed Rietvallei 180 IQ Development recorded historic structures but did not recommend any mitigation as these would not be impacted upon. In another survey no heritage resources were found to be present (Van Schalkwyk 2009).

Huffman (2007) recorded historic structures on 1:50 000 map 2627BB that were probably older than 60 years (Site 2: 26 03 21.4S 27 50 22.6E) and recommended that these should be recorded by an architectural historian. Two European farmer complexes and labour housing were recorded on the same map in a later HIA (Huffman 2009). At the time of survey the graves from the

European cemetery had been removed. During this survey he also noted ephemeral lithics with low significance.

The nearby Munsieville was established in 1911 and Kagiso in 1926. Archbishop Desmond Tutu lived for some time in Munsieville while Kagiso was home to the Reverent Dr Chikane. (www. environment.co.za/documents/environment-reports/state-of-the-environment-mogale/heritage.pdf).

## F. DESCRIPTION OF THE PROPERTY OF AFFECTED ENVIRONMENT

#### (a) Details of area surveyed:

• Full location Data for Province, Magisterial District/Local Authority and property (e.g. farm/erf) name and number etc.;

#### Portion15 of the Farm Botesdal 529 JQ Lanseria within the Mogale City Local Municipality City of Johannesburg Metropolitan Municipality Gauteng Province

• Location map(s)/ orthophotos of the general area. These must include the map name and number (e.g. 3313 DC Bellville). Maps must include at least a 1:50 000 and (if) available also a 1:10 000 (i.e. most detail possible). Large scale colour satellite photos make a useful addition. Maps should be preferable at least A4 size.

1/50 000 Broederstroom 2527 DD



• Either the Location Map or the Site Map must have the polygon of the area surveyed marked on it and full geographical co-ordinates for all relevant points and where applicable, indication of the area to be developed (footprint).



#### **Co-ordinates of the site investigated:**

- 1. Northern corner S25° 56' 40.26" & E27° 54' 33.96"
- 2. Eastern corner S25° 56' 52.14" & E27° 54' 39.81"
- 3. Southern corner S25° 56' 56.86" & E27° 54' 25.37"
- 4. Western corner S25° 56' 51.21" & E27° 54' 20.63"

#### (b) Description of the Methodology

The site was inspected on foot. The visibility was good as the grass was still short after the winter. The site was recorded.

## G. DESCRIPTION OF SITES MAPPED

The proposed development site is west of Lanseria Airport. The vegetation is typical highveld grassland with exotic trees on the eastern side. The highest point of the site is on the eastern side gradually falling towards the west – see photographs.







The original farmhouse and outbuildings were built in the 1970/80's. All structures have been demolished and only ruins remain – see photographs.







In the middle of the site are the foundations of another building that was demolished.



No archaeological sites or graves were found on the site investigated.

## H. DESCRIPTION OF THE ARTEFACTS, FAUNAL, BOTANICAL OR OTHER FINDS AND FEATURES

Not applicable

# I. CLEAR DESCRIPTION OF BURIAL GROUNDS AND GRAVES

Not applicable

## J. EVALUATION AND RATING (FIELD RATING)

Not applicable

## K. STATEMENT OF SIGNIFICANCE (HERITAGE VALUE)

Not applicable

## L. RECOMMENDATIONS AND CONCLUSION

No important Archaeological or Historical sites or graves were found on the proposed development site.

There is no objection to the proposed development from a Cultural Historical Resources point of view.

If during construction any cultural heritage resources or graves are unearthed all work has to be stopped until the site has been inspected and mitigated by a Cultural Heritage Practitioner.

## M. **BIBLIOGRAPHY**

- 1/50 000 Map: Broederstroom 2527 DD
- Google map.
- Archaeological database of the National Cultural History Museum Pretoria.
- Archaetnos Culture & Cultural Resource Consultants. 2011. A report on a Heritage Impact Assessment for the proposed establishment of the Homes Haven Ext. 40 Township Holding 34, Diswilmar Agricultural Holdings, Krugersdorp, Gauteng. For Mr Rocky Warby.
- Backwell, LR & d'Errico, F. 2001. Evidence of termite foraging by Swartkrans early hominids. *Proceedings of the National Academy of Science* 98(4): 1358-63.
- d'Errico, F, Backwell, LR & Berger, LR. 2001. Bone tool use in termite foraging by early hominids and its impact on our understanding of early hominid behaviour. *South African Journal of Science* 97:71-5.
- Herries, AIR & Shaw, J. 2010. Palaeomagnetic analysis of the Sterkfontein palaeocave deposits: Implications for the age of the hominin fossils and stone tool industries. *Journal of Human Evolution* 1-17.
- Huffman, TN. 2007. Archaeological Assessment of Van Wyks Restant, Krugersdorp. Prepared for Seaton Thompson and Associates.
- Huffman, TN. 2009. Archaeological Assessment of the Witpoortjie Project, Krugersdorp. Prepared for Seaton Thompson and Associates.
- Jurmain, R, Kilgore, L & Trevathan, W. 2013. *Physical anthropology. The essentials*. 9<sup>th</sup>ed. Wadsworth Cengage Learning.
- Kuman, K., Field, AS & Thackeray, JF. 1997. Discovery of new artefacts at Kromdraai. *South African Journal of Science* 93:187-193.
- McCarthy, 2005. The Story of Earth and Life. Southern, A. & Rubidge, B
- Reynolds, SC, Clarke, RJ and Kuman, KA. 2007. The view from the Lincoln Cave: Midto Late Pleistocene fossil deposits from Sterkfontein hominid site, South Africa. *Journal of Human Evolution* 53(3): 260-271.
- Seliane, M. 2009. Cultural heritage impact assessment of the proposed WRDM mul tipurpose community centre at portion 26 of the farm Kromdraai 520 JQ. SAHRIS.
- Thackeray, F. 2012. A report based on fieldwork and research regarding Kromdraai A and B. SAHRIS.
- Thackeray, F & Braga, J. 2005. Early *Homo*, 'robust' australopithecines and stone tools at Kromdraai, South Africa. In: D'Errico, F & Backwell, L (eds) *From tools to symbols*.

From early hominids to modern humans, pp 229-235. Johannesburg: Wits University Press.

- Van der Ryst, MM. 2009. Archaeology and fossils: the study of human evolution. Unisa Study Guide AGE2701.
- Van der Walt, J. 2013. Archaeological Impact Assessment for the proposed filling station on Erf 330 Crown Extension 18, Crown Mines, Gauteng. Prepared for Marinda le Roux.
- Van Schalkwyk, J. 2007. Heritage Impact Assessment for the planned Rietvallei 180 IQ Development, Krugersdorp Municipal District, Gauteng Province. Prepared for Prism Environmental Management Services.
- Van Schalkwyk, J. 2009. Heritage impact assessment for the proposed Mostyn Park Extension 5 Development, Krugersdorp Magisterial District, Gauteng. Prepared for Envirokey Environmental Consultants.
- WRC REPORT NO. KV 241/10. ISBN 978-1-77005-969–6. MAY 2010. The Karst System of the Cradle of Humankind World Heritage Site. A collection of 13 papers by the South African Karst Working Group.
- www.environment.co.za/documents/environment-reports/state-of-the-environment-mogale/heritage.pdf).

## N. APPENDICES

- 1/50 Map: Broederstroom 2527 DD Page: 19
- Locality and Google map: page 20
- Proposed development layout map: page 21

1/50 000 Map: Broederstroom 2527 DD



Portion 15 of the Farm Botesdal 529 JQ



