

DRAFT VERSION – FOR PUBLIC CONSULTATION ONLY

INTEGRATED HERITAGE IMPACT ASSESSMENT IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT 25 OF 1999): PROPOSED URBAN DEVELOPMENT ON A PORTION OF THE REMAINDER OF ERF 2833 (GREAT BRAK RIVER), MOSSEL BAY DISTRICT AND MUNICIPALITY



ON BEHALF OF: New Care Innovations (Pty) Ltd

FEBRUARY 2024

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PERCEPTION Planning

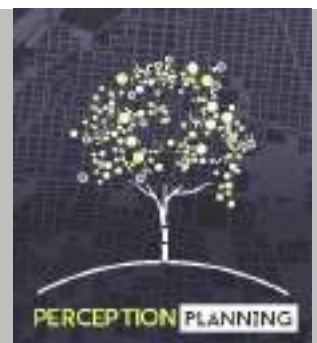
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URBAN & REGIONAL PLANNING- ENVIRONMENTAL PLANNING- HERITAGE IMPACT ASSESSMENT- URBAN DESIGN

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ABBREVIATIONS:

AIA – Archaeological Impact Assessment
APM – Archaeology, Palaeontology and Meteorites Committee of Heritage Western Cape
DCAS – Department of Cultural Affairs and Sport (WCG)
DEA&DP – Department of Environmental Affairs and Development Planning (WCG)
EA – Environmental Authorisation
ECO – Environmental Control Officer
EMPr – Environmental Management Programme Report
ESA – Early Stone Age
HIA – Heritage Impact Assessment
HWC – Heritage Western Cape
Ka/kyr – Thousand years ago
LSA – Later Stone Age
MSA – Middle Stone Age
NCW – Not Conservation Worthy
NGL – Natural Ground Level
NGSI – National Geo-Spatial Information, Department of Rural Development and Land Reform
NHRA – National Heritage Resources Act, 1999 (Act 25 of 1999)
NID – Notice of Intent to Develop
PHS – Provincial Heritage Site
SAHRA – South African Heritage Resources Agency
SAHRIS – South African Heritage Resources Information System
WCG – Western Cape Government
WHS – World Heritage Site

COVER: Collage of contextual panoramic images of the study area and its direct environs (Author).

1. INTRODUCTION

PERCEPTION Planning was appointed by Joe Bezuidenhout (SA ID 640716 5061 081) on behalf of New Care Innovations (Pty) Ltd (being the registered landowner) to compile and submit to Heritage Western Cape an Integrated Heritage Impact Assessment (HIA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) with relation to proposed development of a portion of the Remainder of Erf 2833, Great Brak River. The formal property descriptions are outlined below. Copies of the Power of Attorney, Title Deeds and SG Diagrams are attached as part of **Annexure 1**.

The cadastral land units subject to this proposal are:

- Remainder of Erf 2833 (Great Brak River), Mossel Bay District and Municipality, measuring 6,0372 ha, held under title deed T 10193/2022, and registered to New Care Innovations (Pty) Ltd.

1.1 **Brief background to administrative process**

Following submission of a Notice of Intent to Develop in respect of the proposed development of the property during September 2023, HWC on 23rd October 2023 (**Annexure 2**) responded as follows [sic]:

"You are hereby notified that, since there is reason to believe that the proposed urban development on Remainder Erf 2833, Great Brak Rivier, Mossel Bay will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of Section 38(3) of the NHRA be submitted. Section 38(3) of the NHRA provides

*(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. (Our emphasis)

This HIA must in addition have specific reference to the following:

- *Palaeontology impact assessment*

The HIA must have an overall assessment of the impacts to heritage resources which are not limited to the specific studies referenced above. The required HIA must have an integrated set of recommendations. The comments of relevant registered conservation bodies; all Interested and Affected parties; and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied."

This Integrated HIA report focusses on addressing the aspects mentioned in the Interim comment dated 23rd October 2023 whilst adhering to the requirements specified in terms of Section 38(3) of the NHRA.

2. DESCRIPTION OF THE STUDY AREA

The subject property (6,0371 ha in extent) is situated \pm 1km north of the coastline, \pm 230m north of the N2 National Road (eastbound), \pm 1.4km west of the Great Brak River, 1km west of Long Street and \pm 2.1km southwest of the historic village centre (river crossing/Lang Street/Amy Searle Street) as per **Figure 1**. Vehicular access to the property is directly from Sandhoogte Road off Long Street/the N2 National Road.

The property forms part of a generally south-facing hillside physically divided by a densely overgrown valley cutting diagonally across as illustrated through **Figure 2**. The property, furthermore, forms part of a natural valley defining the western approach to the village along Sandhoogte Road and accessing the western half of the village strung out along Long Street (**Figure 3**). The property, essentially located along the western periphery of the village, is zoned Agricultural Zone 1 as are adjoining smallholdings to the north, south and west. A cluster of larger erven, all zone Single Residential Zone 1, as well as a retirement complex, is situated to the south-east.

Fieldwork undertaken on 25th August 2023 included a foot survey along recent tracks made during efforts to eradicate alien vegetation. While Google Earth © imagery shows paddocks (and a small outbuilding) established on the southernmost portion up until c. 2021, the entire property was found to be densely

overgrown this limiting archaeological visibility. *No buildings or structures remain.* A narrow, paved access road, providing access to smallholdings directly north, follows the western cadastral boundary.



Figure 1: Study area location within a broader context (Google Earth, 2022, as edited)



Figure 2: Existing topography of the property as illustrated through 5m contours (CFM, as edited).



Figure 3: Study area shown within its closer urban context, illustrating surrounding fabric and semi-rural landscape character (Google Earth, 2022, as edited).



Figure 4: Study area and its direct environs (Google Earth, 2022, as edited).

Photographs of the study area and its environs are attached as part of **Annexure 3** to his report.

3. HERITAGE STATUTORY FRAMEWORK

3.1 Grading

References to grading as meant within the context of this Integrated Heritage Impact Assessment are based on the categories as prescribed by HWC¹ and summarised in Table 1 below. Gratings presented are (a) aimed at formulating responses with relation to the perceived provincial and/ or local cultural significance of heritage resources identified and (b) assigning the appropriate level of management responsibility applicable to such heritage resources.

Grading	Description of resource	Examples of possible Management Strategies	Cultural Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status.	May be declared as a Provincial Heritage Site by HWC	Exceptionally High Significance
III A	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
III B	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
III C	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other significance

Table 1: Summary of grading and possible mgmt. strategies for Grade II and III heritage resources (Source: HWC, 2016)

3.2 Methodology

This Integrated HIA process is undertaken in terms of Section 38(8) of the NHRA and in accordance with relevant HWC policies and guidelines and international practice principles. A flow diagram illustrating a normal, non-retrospective HIA process pertaining to development being proposed is as shown in **Figure 5** (overleaf).

Tasks undertaken during the compilation of this **Draft Integrated HIA** included, *inter alia*, the following:

- Liaise with project team including the landowner, environmental assessment practitioner (Cape EAPrac Environmental Consultants) and the local planning authority (Mossel Bay Municipality).
- Field work undertaken by the author on 25 August 2023.
- Undertake basic historic background research.
- Assimilate findings from heritage-related specialist inputs: Palaeontological Assessment (Prof Marion Bamford).
- Archaeological specialist input by Dr. Lita Webley.
- Contextual analysis of the site and its direct environs, identification, and mapping of spatial informants.
- Identification of possible heritage-related issues and concerns.
- Establishing cultural significance and recommending grading based on criteria set out in NHRA.
- Identification of heritage informants for decision making and input to the planning process.
- Undertake focussed public participation process with registered conservation body, local planning authority and other stakeholders as requested by HWC in the Interim Response to the NID and in accordance with the HWC Public Consultation Guidelines, June 2019.
- Incorporate outcomes emanating from public participation process and formulate appropriate response to comment received – to be included in the Final Integrated HIA report.
- Submission of Final Integrated HIA to HWC for adjudication.

¹ Grading: Purpose and Management Implications, Heritage Western Cape, 16th March 2016

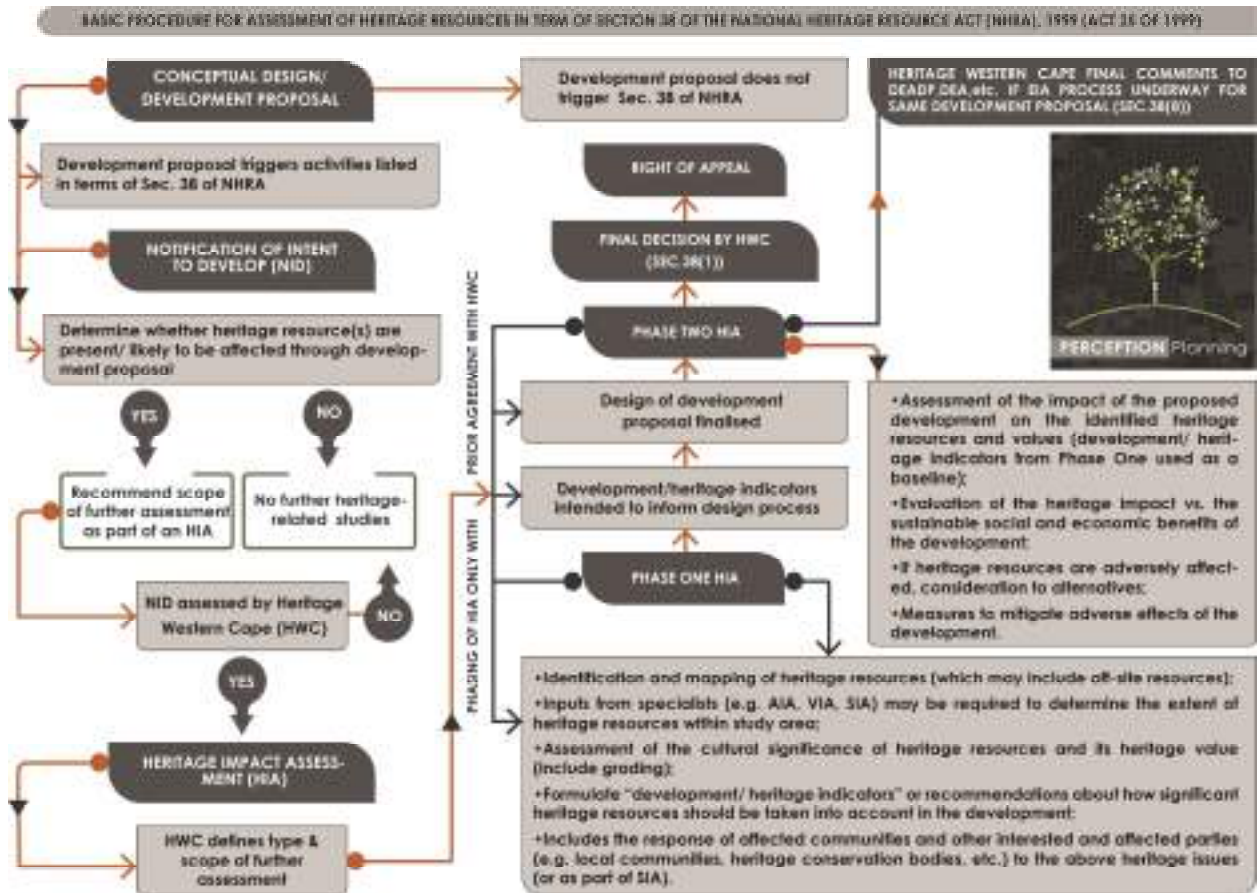


Figure 5: Flowchart illustrating a typical HIA process in terms of Section 38 of the NHRA (Act 25 of 1999).

4. PROPOSED DEVELOPMENT

According to information made available by JV Townplanner² the proposal is for rezoning of the property from Agricultural Zone I to make provision for a residential development comprising of the components outlined below. Copies of the conceptual site development plan are attached as **Annexure 4** to this report.

- 32 General residential erven located along the lower-lying, southern portion of the property;
- 12 Single residential erven located along the higher-lying, northern portion of the property;
- The densely overgrown valley diagonally crossing the property will be retained as Open Space Zone III;
- Private roads to access to the two precincts;
- Ancillary engineering infrastructure and services.

Two alternatives have been submitted and they differ only on their access roads:

- Non-mitigated SDP
- Preferred SDP
- The No-Go Option is also assessed in Table 2.

The Non-mitigated Alternative (Annexure 4.1 dated October 2022) includes 37 residential units zoned as General Residential Zone II (0.83ha and 13.74% of the total area) and a further 14 residential units zoned as Single Residential Zone I (surface areas of 1.44ha and 23.84% of the total area). The Open Space Zone consists of 2.28ha or 37.75% of the total property. The Non-mitigated SDP also has a single access road running through the property, while the second access road (Lakmanstraat) follows the northern perimeter fence.

The Preferred Alternative (Annexure 4.2 dated September 2023) comprises 32 residential units zoned as General Residential Zone II (0.83ha and 13.74% of the total area) and 12 residential units zoned as Single Residential Zone I (0.32ha and 5.30% of the total area). The Open Space Zone consists of 3.56ha or 56.94% of the total property. It has two access points from Tarrantaalstraat, one to the north and one to the south of the ravine running diagonally across the study area.

² SDP Dated September 2023

The overall development footprint of the 2023 layout is therefore much lower than the 2022 layout. The number of residential units has been reduced while the Open Space Zone has increased substantially in size, taking into consideration all the sensitive areas in terms of fauna, flora, and biodiversity.

Site Development Plans pertaining to the proposed development are attached as part of **Annexure 4** to this report.

5. SPATIAL PLANNING CONTEXT

According to the recently approved Mossel Bay Municipality Spatial Development Framework and Environmental Management Framework (2022) (hereafter "MSDF"), Great Brak River is situated within the designation Urban Edge and is earmarked for "Urban Expansion No. 68" (**Figure 6**) comprising of "Medium to High Density Residential, Business along the main road" (MB Mun, 2022:110).

The proposal therefore seems to be consistent with the spatial proposals outlined in the current MSDF applicable to the Great Brak River area.



Figure 6: Location of Erf 2833, Great Brak River (yellow arrow) in relation to an extract from the MSDF applicable to the Great Brak River area (MB Mun, 2022 as edited).

6. HERITAGE RESOURCES AND ISSUES

This section of the report adheres to HWC's interim comments dated 23rd October 2023 as well as the requirements specified in terms of Section 38(3) of the NHRA.

6.1 Historic Background

Basic historic background research focussed on primary sources obtained through the Deeds Office, Surveyor General's Office, relevant secondary sources as well as as research previously undertaken by historian Kathleen Schulz.

6.1.1 Brief account of the early history of Groot Brak

In 1777 the Dutch East India Company (DEIC) established a woodcutter's post in the vicinity of George. The reason for establishing the post was twofold. Illicit harvesting from the Outeniqua forests warranted monitoring and wood for construction in Cape Town was in short supply. However, transporting the wood by wagon for shipping was problematic due to the many river crossings that had to be made to get to Mossel Bay.

The Groot Brak River spanned some 800ft and was often swollen during the rainy season. The Groot Brak weir or crossing area must have accommodated wagons waiting to cross the river since the time of colonization of the area. An outspan was developed on the eastern banks of the Groot Brak River, opposite the farm Wolwedans. The date of the establishment of the outspan site has not been established but is marked on the 1814 diagram as such and is also described on the 1901 cadastral series.

In 1811 George was established as a town and an economic society began to grow, warranting easier access routes to Outeniqualand. In 1844, Donald Moodie (Acting Civil Commissioner of George) was commissioned to build a wooden bridge across the Groot Brak River, which apparently did not hold up for long. It was recorded that in 1849, 193 wagons and 30 carts crossed the bridge giving an indication of the amount of traffic moving within the districts at the time.

The British period (c. 1806 - 1880) saw agricultural intensification in the area and various quitrent grants were issued in order to formalise use of land for hunting and grazing purposes. Wolwedans and various other farms that had already been used for agricultural purposes for decades were surveyed during this period. In 1812 Wolwedans is described as a "Pos-stasie", an "Outspan" is shown on an 1814 survey diagram and in 1816 the farm Voorburg was established as a quitrent farm. In 1850 a causeway was built across the Groot Brak River that replaced the wooden bridge.

It was in 1851 that Richard Searle was employed to maintain the causeway and manage the assigned toll. Richard Searles brother Charles arrived from England and jointly the brothers established a tannery business in the village in 1859. Early industrial development in the village included the construction of water furrows in 1874, establishment of a water-driven corn mill in 1975 and establishment of the "Good Hope Wool Washery" in 1876 (site next to washery in 1887 became a tannery). By the 1850's a small village had developed along the eastern bank of the river.

From this time onward the village has been well known for making shoes and tanning leather³. (The factory is home to the well-known 'Grasshopper' brand of shoes). The position of the original crossing is still used to access what is now known as Groot Brak village.

Expansion of worker's housing related to the Searles & Co Factory during the 1920's to 1940's led to the establishment of suburbs such as Greenhaven, Die Heuwel and adjoining Sunnybrae. Implementation of racial-based ideological policies between the period after WW2 and the 1970's saw the establishment of Die Toue which formed part of a predominantly coloured residential area on the outskirts of Great Brak, which was known as Ouwerf. In 1969 the Group Areas Act proclaimed "Die Toue" a coloured residential area – the area was later expanded and became known as Greenhaven (Baumann, N and Winter, S, 2003).

6.1.2 Early farm Wolwedans

From a colonial perspective, the western portion of the village Great Brak River was established on land deducted from the farm Wolwedans, the ownership of which spans back to the 18th century (**Figure 8**). Owners during the Dutch period included: Burgert van Wyk (1731 – 1751), Hendrick & Cornelius van Watt (1762) and "Heemraad" Cornelis van der Watt (1815)⁴. Other early farms during this period, used primarily for grazing and hunting, also included e.g. Voorburg - 1748, Rhebokfontein - 1762 and Sorgfontein - 1779⁵.

While the earliest diagram indicates that the farm Wolwedans was transferred to C van der Watt during 1814⁶, the quitrent grant states that he had been occupying the farm previously on loan via the Dutch East India Company loan system. The extent of Wolwedans was originally 2,632 morgen (±2,254 hectares). The Groot Brak River formed the easterly boundary of the farm. **Figure 6** shows the approximate location of Erf 2833 in relation to the early (1814) farm boundaries along, "het wegt naar Outeniqualand" (the road to Outeniqualand). Land use within the proximity the described as "weyland" (grazing grounds).

In 1834 Hendrik and Cornelis van der Watt, sons of deceased Heemraad Cornelis van der Watt sold Wolwedans to Johannes Gerhardus Terblans⁷. In 1852 two sons of Johannes Gerhardus Terblans namely Hercules, Hendrik inherited the farm along with Daniel Terblans (Pieter's son) and Philip Peo⁸. The farm was held jointly until 1870 when Daniel Cornelius Terblans either bought or inherited one of the first subdivided portions of Wolwedans named Zandhoogte measuring 551 morgen 450 sq rds. (approximately 472 hectares). No buildings are described on the diagram, but that does not necessarily mean that none were present⁹. Between 1834 and 1902, members of the Terblans family owned and occupied the farm Wolwedans. A deeds search confirms that by the year 1902 Wolwedans was held in 160th shares, indicating that there must have been several cottages on the farm accommodating these family members.

³ The Story of Great Brak River ; Margaret Franklin pub. 1975.

⁴ Cape Town Deeds Office (CTDO): George Quitrents 1/9 dated 3rd January.

⁵ Conservation study for the villages of Groot Brak, Friemersheim, Herberdsdale and Brandwacht, N Baumann and S Winter, July 2003

⁶ SG Diagram 392/1863

⁷ CTDO: Title deed number 209/1834 dated 21st November

⁸ CTDO: Title deed number 9/1852 dated 1st December.

⁹ CTDO: Title deed number 193/1871 dated 28th January



Figure 7: Approximate location of study area in relation to 1814 SG Diagram of the early farm Wolwedans (SGO as edited).



Figure 8: Location of study area in relation to the early farm Wolwedans and transposed onto 1880-1900 SG Mapping (NGSI as edited)

Figure 8 (above) shows the location of Erf 2833 along the early western approach road into Great Brak River village, and in relation to the early farm Wolvedans, as transposed onto 1880 – 1900 SG Mapping for the area.

Historic background research did not identify or highlight any other significant heritage-related aspects related to these particular land parcels. It is unlikely that detailed archival research would provide further meaningful insight into former use and/or broader understanding of heritage-related themes of the area.

6.2 Archaeology

An archaeological impact assessment (AIA) was undertaken on the property as part of an earlier proposal by a previous landowner to develop a residential estate comprising of 26 Single residential units and 24 Group Housing units (Kaplan, 2009). While HWC's comments/ decision in relation to the report could not be located, findings and recommendations following from the AIA were as follow:

"Forty-two Early Stone Age and Middle Stone Age tools were documented during the archaeological impact assessment. All the tools were found in, or just outside the boundary of a large horse paddock alongside Sandhoogte Road. Each of the occurrences has been recorded with a GPS waypoint and photographed in-situ. The tools comprise mostly flakes and chunks while one (MSA) core and one hammerstone were also found. A small cluster of MSA flakes (n = 8) was also documented. The tools, mainly isolated finds, occur in a disturbed or secondary context and have been rated as having low local significance. Several studies done in the Great Brak River area have documented low density scatters of similar types of tools. The Archaeological Impact Assessment has identified no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to proposed construction activities. Early Stone Age and Middle Stone Age tools may be exposed during earth moving operations, but it is maintained that these impacts are not likely to be significant. The probability of locating important archaeological remains on the steep hill slopes of the site is also considered to be low." (Kaplan, 2009)

6.3 Palaeontology

A desktop palaeontological assessment (PIA) in relation to the proposal was undertaken by Prof Marion Bamford (Department of Witwatersrand) and is attached to this HIA as **Annexure 5**.

6.3.1 Geology and lithology

The project lies in one of the Mesozoic onshore basins along the southern coast of Soth Africa (Figure 4). Along the newly formed southern coast of South Africa, during the Late Jurassic and early Cretaceous, thick deposits accumulated in the complex graben and half-graben basins (Shone, 2006). Much of the material has since eroded away but the Uitenhage Group sediments can be found in the Mossel Bay Basin, Plettenberg Bay Basin, Gamtoos Basin and Algoa Basin. Cape Supergroup sediments underlie the Uitenhage Group and are much older. The project footprint does not intersect these older rocks or the even older intrusive granites.

The Uitenhage Group has been divided into the basal Enon Formation that is composed of large clasts of rocks from the inland together with sandstones and shales, the mostly terrestrial Kirkwood Formation composed of shales and siltstones, and the upper mixed terrestrial and marine Sundays River Formation (Shone, 2006).

Along the coast are windblown and dune sands that are difficult to date because they are transported and reworked. Generally considered to be of Quaternary age, and Holocene in the upper layers (Roberts et al., 2006), they are partially vegetated and stabilised.

6.3.2 Palaeontological Potential

The palaeontological sensitivity of the area under consideration is presented in **Figure 9**. According to the SAHRIS palaeo-technical report for the Western Cape (Almond and Pether, 2008), the Enon Formation has transported bone fragments, teeth and coalified wood. McLachlan and McMillan (1976) and Shone (1976) reported poorly preserved abraded bone fragments, silicified fossil wood and charcoaled from the Enon Formation (re-reported in Muir et al., 2017).

Since this formation has large to small boulders of different rock types that are well rounded, they have been transported from some distance inland. This means that the abraded fossils must also have been transported from some distance so they would be out of primary context. Such poorly preserved, abraded and transported fossils are of very limited scientific value.

The very highly sensitive palaeosensitivity coding for the Enon Formation should rather be downgraded to moderately sensitive (green). It is unlikely that any fossils, even poorly preserved, would be found on the land surface that is covered by soils and vegetation as is the case for the Great Brak River area according to the aerial photographs and site visit observations in the BID document.

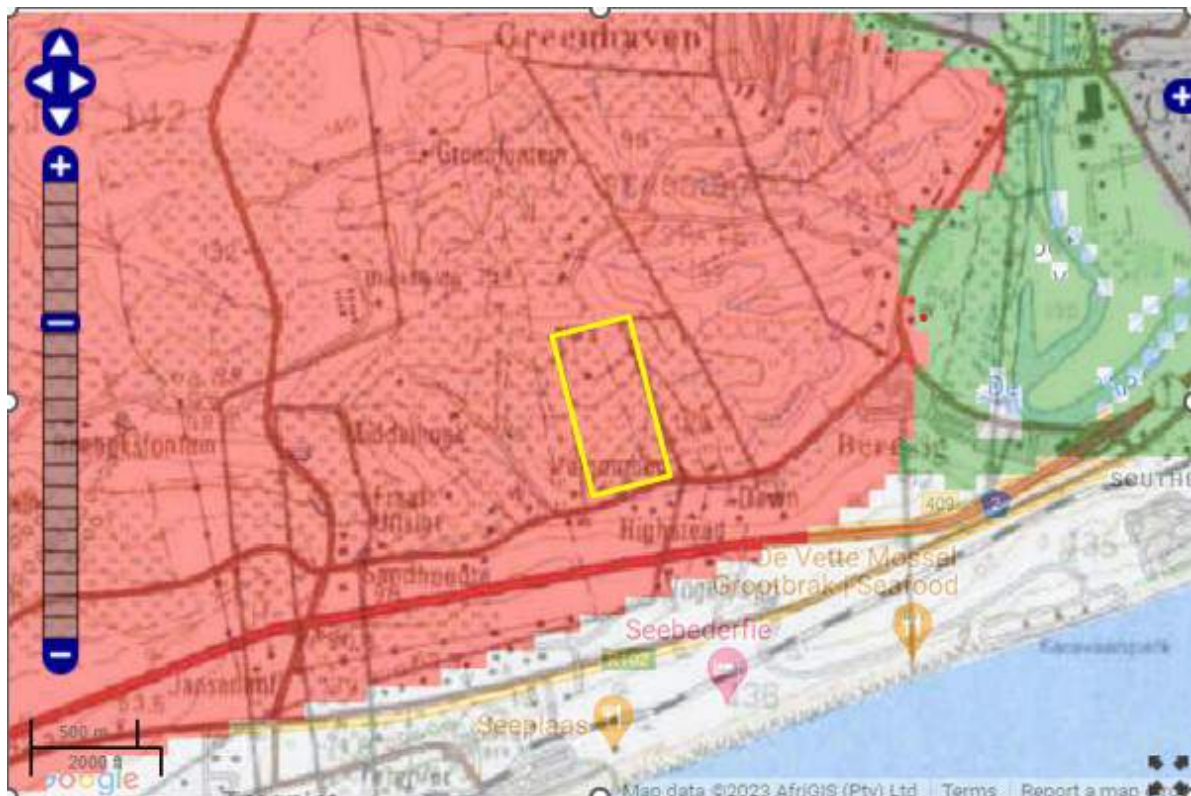


Figure 9: SAHRIS palaeosensitivity map for the site for the proposed development on a portion of RE Erf 2833, Great Brak River shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

6.4 Cultural landscape context

Although the NHRA does not clearly define the term "cultural landscape", it briefly refers to it in the schedule of definitions. A working definition suggested by Winter, S (2004) is:

"A place of cultural significance, which engenders qualities relating to its aesthetic, architectural, historical, scientific, social, spiritual, linguistic, technological, archaeological or palaeontological value"¹⁰

The following alternative definition offers insight into the complexity of cultural landscapes from a broader, holistic perspective (Green, B.H., 1995):

"The concept of landscape gives expression to the products and processes of the spatial and temporal interaction of people with the environment. It may thus be conceived as a particular configuration of topography, vegetation cover, land use and settlement pattern which establishes some coherence of natural and cultural processes and activities".

Cultural landscapes relate to the imprint created on a natural landscape through human habitation and cultivation over an extended period of time, as defined by a human geographer (Carl O. Sauer, 1925):

"The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape is the result".

Essentially then cultural landscapes create a broad (spatial and temporal) relational framework within which all other heritage resources are rooted. The definition of cultural landscapes therefore enables broader understanding of the spatial and spiritual evolution of a landscape over time as expressed through perceivable "patterns" or associations relating to aspects such as socio-historic aspects, land use, settlement pattern, built form, vegetation cover, topography etc.

Given the limited nature of available primary and/or secondary archival sources pertinent to the particular property, analysis of early aerial photography was found useful to inform our understanding from a cultural landscape context. While archival sources provided some insight into historic use of the study area, analysis

¹⁰ Baumann & Winter Heritage Consultants (2004)

of earliest available aerial photography (1940) does provide some insight into traditional (Pre-Modern) land use patterns.



Figure 10: Approximate study area boundaries imposed onto compilation of 1940 aerial photography (Source: Flight Series 140 of 1940, NGS)

The following patterns are evident from 1940 aerial imagery (**Figure 10**):

- Imagery shows the property within an early coastal landscape context, prior to construction of the N2 National Road.
- The property's location in relation to the railway line between Mossel Bay and George, the coastal road (R102) and the western approach road to the village (i.e. Sandhoogte Road) is evident.
- *No significant structures/ buildings can be distinguished on the property.* However, several buildings are noted directly south of the Sandhoogte Road as well as further west along the valley.
- Much of the property has clearly been transformed through cultivation/ agricultural activities by this time (save for the natural valley diagonally crossing the property).
- A narrow track extending northwards from Sandhoogte Road traverses the property, following the upper slopes of the natural valley.

Intermittent views of the higher-lying portion of the property are likely to be possible from the N2 National Road though such views would be viewed within context of existing development within its direct proximity (including a visually intrusive driveway on the adjoining property (see Annexure 2)). Predominant land use directly north, south, and west of the property comprise of agricultural smallholdings/ rural occupation. The area is however earmarked for urban expansion in the current Mossel Bay MSDP, 2022.

7. SIGNIFICANCE AND GRADING

7.1 Archaeology

An earlier AIA for the property by Kaplan (2009) recorded several Early and Middle Stone tools but he has commented that several studies completed in the Great Brak River area have documented low density scatters of similar types of stone tools. Kaplan (2009) did not consider the significance or grading of these stone tools but his conclusion, that there would be no significant impacts, indicates that he considers that they were likely to be of Grade III or NCW status.

In the event of the chance discovered of human remains, these would be of high significance at the local level (Grade IIIA).

7.2 Palaeontology

Conclusions outlined in the desktop palaeontological impact assessment undertaken by Prof Marion Bamford include the following:

- From the SAHRIS map above the area is incorrectly indicated as very highly sensitive (red). It is unlikely that any fossils occur in the soils that cover the area.
- The very highly sensitive coding for the Enon Formation should rather be downgraded to moderately sensitive (green)
- It is unlikely that any fossils, even poorly preserved, would be found on the land surface that is covered by soils and vegetation as is the case for the Great Brak Rivier area according to the aerial photographs and site observations in the BID document.

7.3 Cultural landscape context

The study area is situated within the urban edge and comprise areas already transformed/ occupied and designated for "urban expansion" in the most recent MSDF (2022). The proposal would therefore not negatively impact on any cultural landscape that may be considered of local cultural significance.

8. ASSESSMENT OF IMPACTS

8.1 Archaeology

The Archaeological Impact Assessment has identified no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to proposed construction activities. Early Stone Age and Middle Stone Age tools may be exposed during earth moving operations, but it is maintained that these impacts are not likely to be significant. The probability of locating important archaeological remains on the steep hill slopes of the site is also considered to be low." (Kaplan, 2009)

8.1.1 Recommendations: Archaeology

Based on the above, it is our contention that while no further archaeological surveys are recommended, the following standard clause must apply:

The standard clause applies:

- If during ground clearance or construction, any archaeological material or human graves are uncovered, work in that area should be stopped immediately and the ECO should report this to Heritage Western Cape (Tel: 021 483 9689). The heritage resource may require inspection by the heritage authorities, and it may require further mitigation in the form of excavation and curation in an approved institution.

8.2 Palaeontology

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old to contain fossils or are the wrong kind (soils and conglomerates). Furthermore, the material to be excavated soil and this does not preserve fossils. Since there is an extremely small chance that transported fossils from the Enon Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

8.2.1 Recommendations: Palaeontology

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. There is a very small chance that fossils may occur in the underlying conglomerates of the Enon Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations for amenities, infrastructure and foundations have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

8.2.2 Summary Fossil Finds Procedure

"Should fossil bones and teeth be encountered in the deposits, work must cease at the site and the works foreman and the ECO for the project must be informed immediately. Scattered, unearthed parts/fragments of the find must be retrieved and returned to the main find site which must be protected from further disturbance. Heritage Western Cape must be informed and supplied with contextual information:

- *A description of the nature of the find.*
- *Detailed images of the finds (with scale included).*
- *Position of the find (GPS) and depth.*
- *Digital images of the context. i.e. the excavation (with scales).*

HWC and an appropriate specialist palaeontologist will assess the information and liaise with the owner, the environmental consultants and the ECO and a suitable response will be established. In the event of a significant fossil find, a professional palaeontologist must be appointed to undertake the excavation of the

fossils and to record their contexts. Said palaeontologist must also undertake the recording of the stratigraphy and sedimentary geometry of the exposures and must undertake the compilation of the detailed report.

A permit from HWC is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection, and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit will immediately be made to HWC. The application requires details of the registered owners of the sites, their permission, and a site-plan map. All fossil finds must be recorded, and the fossils and their contextual information (a report) must be deposited at a SAHRA/HWC-approved institution."

8.3 Cultural landscape

Intermittent views of the higher-lying portion of the property are likely to be possible from the N2 National Road though such views would be viewed within context of existing development within its direct proximity (including a visually intrusive driveway on the adjoining property (see Annexure 2). Predominant land use directly north, south, and west of the property comprise of agricultural smallholdings/ rural occupation. The area is however earmarked for urban expansion in the current Mossel May MSDF, 2022.

Given its location within the urban edge and having been earmarked for "urban expansion" in the Mossel Bay SDF (2022) (refer to Section 5 of this report), it is argued that the value of this property from a broader cultural landscape context has already been compromised and that, from this perspective, its cultural significance may be considered of no local (site-specific) cultural significance.

No specific recommendations are therefore made in this regard.

8.4 Assessment of Alternatives

The two alternatives, as well as the No-Go Option are considered below.

Heritage Resources			
Alternative	Preferred Alternative	Non-mitigated Alternative	No-Go Option
PLANNING, DESIGN AND DEVELOPMENT PHASE			
Potential impact and risk:			
Nature of impact:	Potential destruction of heritage resources	Potential destruction of heritage resources	N/A
Extent and duration of impact	Permanent	Permanent	N/A
Consequence of impact or risk	Loss of heritage resources	Loss of heritage resources	N/A
Probability of occurrence:	Low	Low	None
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	None
Indirect impacts:	None	None	None
Cumulative impact prior to mitigation:	Low	Low	N/A
Significance rating of impact prior to mitigation:	Low	Low	N/A
Degree to which impact can be avoided:	No	No	
Degree to which impact can be managed	Yes	Yes	N/A
Degree to which impact can be mitigated:	Low impacts. Fossil Finds Protocol proposed.	Low impacts. Fossil Finds Protocol proposed	N/A
Proposed mitigation:	None proposed	None Proposed	N/A
Residual impacts:	None	None	N/A
Cumulative impact post mitigation:	None	None	N/A
Significance rating of impact after mitigation:	Low	Low	N/A
OPERATIONAL PHASE			
Potential impact and risk:			
Nature of impact:	Potential destruction of heritage resources	Potential destruction of heritage resources	N/A
Extent and duration of impact	Permanent	Permanent	N/A
Consequence of impact or risk	Loss of heritage resources	Loss of heritage resources	N/A
Probability of occurrence:	Low	Low	None
Degree to which the impact may cause irreplaceable loss of	Low	Low	None

resources:			
Indirect impacts:	None	None	None
Cumulative impact prior to mitigation:	Low	Low	N/A
Significance rating of impact prior to mitigation:	Low	Low	N/A
Degree to which impact can be avoided:	No	No	
Degree to which impact can be managed	Yes	Yes	N/A
Degree to which impact can be mitigated:	Low impacts. Fossil Finds Protocol proposed.	Low impacts. Fossil Finds Protocol proposed	N/A
Proposed mitigation:	None proposed	None Proposed	N/A
Residual impacts:	None	None	N/A
Cumulative impact post mitigation:	None	None	N/A
Significance rating of impact after mitigation:	Low	Low	N/A
DECOMMISSIONING AND CLOSURE PHASE			
Potential impact and risk:			
Nature of impact:	Potential destruction of heritage resources	Potential destruction of heritage resources	N/A
Extent and duration of impact	Permanent	Permanent	N/A
Consequence of impact or risk	Loss of heritage resources	Loss of heritage resources	N/A
Probability of occurrence:	Low	Low	None
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	None
Indirect impacts:	None	None	None
Cumulative impact prior to mitigation:	Low	Low	N/A
Significance rating of impact prior to mitigation:	Low	Low	N/A
Degree to which impact can be avoided:	No	No	
Degree to which impact can be managed	Yes	Yes	N/A
Degree to which impact can be mitigated:	Low impacts. Fossil Finds Protocol proposed.	Low impacts. Fossil Finds Protocol proposed	N/A
Proposed mitigation:	None proposed	None Proposed	N/A
Residual impacts:	None	None	N/A
Cumulative impact post mitigation:	None	None	N/A
Significance rating of impact after mitigation:	Low	Low	N/A

Table 2: Impact Assessment Table comparing the Preferred Alternative with the Non-Mitigated Alternative and the No-Go Option.

The comparative assessment of impacts between the Preferred Alternative and the Non-Mitigated Alternative (Table 2) indicates that there is unlikely to be any difference in the impacts between these two options on the heritage resources of the area. However, the 2023 mitigated layout would have a lower overall developmental footprint.

8.5 Cumulative impacts

With respect cumulative impacts, it is not possible to speculate what palaeontological impacts may have occurred during development in Great Brak River prior to the implementation of the NHRA (No 25 of 1999). The few impact assessment reports which are available, suggest that impacts would have been low, and therefore cumulative impacts would also have been low.

From a cultural landscape perspective, the proposed development is similar to the existing development which surrounds the site. No cumulative impacts are anticipated to the cultural landscape of the broader Great Brak River area.

8.6 Socio-economic development

Section 38(3)(d) of the NHRA requires an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefit to be derived from the development.

The development is likely to create limited temporary employment opportunities during the construction phase though this should be viewed within the context of the findings following from this HIA essentially

concluding that the proposal is unlikely to negatively impact any significant heritage resources on the study area or its direct proximity.

9. PUBLIC PARTICIPATION PROCESS

The study area is situated within the jurisdiction of Mossel Bay Municipality and within an area covered by two local conservation bodies registered with HWC in terms of Section 25 of the National Heritage Resources Act, 1999 (Act 25 of 1999).

9.1 Scope of public participation

The public participation process (PPP) will be conducted in accordance with requirements outlined in the HWC Public Consultation Guidelines, June 2019, extended over a period of 30 days. Proof of public consultation will be attached as part of **Annexure 6** to this report:

- Formal notice published in local press (Mossel Bay Advertiser)
- Details regarding the proposal circulated to the local planning authority (Mossel Bay Municipality);
- Details regarding the proposal circulated to the local conservation bodies (Mossel Bay Heritage and the Simon van der Stel Foundation: Southern Cape);
- Four A3 laminated public notices were installed across the site for the duration of the PPP.

Contact details of interested and affected parties are listed in the table below.

Organisation / Department	Contact Person	E-mail
Mossel Bay Municipality (Planning & Building Control)	Mr. Raimo Fernandez	rfernandez@mosselbay.gov.za
Mossel Bay Heritage	Ms. Carina Wiggill	heritage@visitmosselbay.co.za
Great Brak River Museum	Mr. Rene de Kock	Chair.Heritage@Ourheritage.org.za
Simon v/d Stel Foundation (Southern Cape)	Dr. Natie de Swardt	natiedes@telkomsa.net

10. RECOMMENDATIONS

This report satisfies the requirements of Section 38(3) of the NHRA Act 25 of 1999 for a Heritage Impact Assessment, namely:

- 1) Identification and mapping of all heritage resources in the area affected;
- 2) 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;
- 3) Results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources.

It is recommended that HWC endorse the findings of this HIA report including the following Conditions of Approval, to be assimilated into future outcome(s) of the NEMA process currently underway:

No	Heritage Indicators/ Conditions of Approval
10.1	There is no significant difference between the two SDP assessed (Preferred Alternative and the Non-Mitigated Alternatives) in terms of heritage constraints. However, the Preferred Alternative will have a lower overall development footprint.
10.2	If any human remains or significant archaeological materials are exposed during development activities, then the find should be protected from further disturbance and work in the immediate area should be halted and Heritage Western Cape must be notified immediately. These heritage resources are protected by Section 36(3)(a) and Section 35(4) of the NHRA (Act 25 of 1999) respectively and may not be damaged or disturbed in any way without a permit from the heritage authorities. Any work in mitigation, if deemed appropriate, should be commissioned and completed before construction continues in the affected area and will be at the expense of the developer. The above recommendations should be included in the Environmental Management Program (EMPr) for the proposed residential development.
10.3	The HWC Chance Fossil Finds Protocol to be implemented and included in the Environmental Management Programme Report.

PERCEPTION Planning
19th February 2024



SE DE KOCK
Hons (TRP) EIA Mgmt (IRL) PrPln PHP

PROJECT TEAM AND STATEMENT OF INDEPENDENCE

With relation to the authors' appointment as an independent specialist responsible for the compilation of an Integrated Heritage Impact Assessment in terms of Section 38(3) of the National Heritage Resources Act, 1999 (Act 25 of 1999) for this project, it is hereby declared that the undersigned:

- Acts as an independent specialist in this application;
- Regards the information contained in this report as it relates to my specialist input/study to be true and correct;
- Have and will not have any vested interest in the proposed activity proceeding;
- Does not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- Have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- Is fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- Is aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.

It is certified that SE de Kock has 25 years' professional experience as urban planner (3 years of which were abroad) and 15 years' experience as professional heritage practitioner. He is professionally registered/ affiliated as follows:

- Professional Heritage Practitioner (Association for Professional Heritage Practitioners)
- Professional Planner (South African Council for Planners, South African Planning Institute)

Dr Lita Webley is a professional member of the Association of Southern African Professional Archaeologists (ASAPA) since 1989, including the Cultural Resource Management section of the same association (ASAPA professional member # 175). She is an accredited Principal Investigator for Stone Age archaeology, coastal & shell midden archaeology and Colonial Period archaeology, Field Director for Grave Relocation.

Dr Marion Bamford holds a PhD in Paleobotany (University of the Witwatersrand, 1990) and is a professional member of, *inter alia*, the Palaeontological Society of Southern Africa, the Royal Society of Southern Africa (2006) and the International Organization of Palaeobotany (1993). Presently, she is a Professor; Director of the Evolutionary Studies Institute, a Member of the Management Committee of the NRF/DST Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg.

Contributing heritage specialists' Declarations of Independence are contained in their respective reports.

REFERENCES and ACKNOWLEDGEMENTS

1. Baumann, N. and Winter, S. (2003). *Conservation study for the villages of Groot Brak, Fremersheim, Herbertsdale and Brandwacht*. 1st ed. Cape Town: Mossel Bay Municipality, pp.13, 23.
2. Cape National Geo-Spatial Information, Department of Rural Development and Land Reform, Mowbray
3. Cape Town Archives
4. Cape Town Deeds Office
5. Franklin, M. (1975). *The story of Great Brak River*. Cape Town and Johannesburg: C. Struik Publishers.
6. Kaplan, J. (2009) *Archaeological Impact Assessment: Proposed Development Erf 2833, Great Brak River, Southern Cape*. Unpublished Report.
7. Schulz, K. (2008). *Historic background research: Early farm Wolwedans, Great Brak River*.
8. Surveyor General Office

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Hendrik Van Rooyen Attorneys
Ov Kollege Building
55 Church Street
Stellenbosch
7600

Prepared by me.


CONVEYANCER
HENDRIK VAN ROOYEN
LPCM 58349

Deeds Office Registration fees as per Act 47 of 1937		
	Amount	Office Fee
Purchase Price	R 2 700 000,00	R 1 778,00
As of		
Reason for exemption	Category Exemption	Exemption (1 to 5) See Reg Act/Proc

T 000010193 / 2022

DEED OF TRANSFER

BE IT HEREBY MADE KNOWN:

THAT ANNECKE LOUW (80989)

appeared before me, REGISTRAR OF DEEDS at CAPE TOWN, he/she, the said Appearer, being duly authorised thereto by a Power of Attorney granted to him/her by

SECTOR FIVE TRADING 76 PROPRIETARY LIMITED

Registration Number 2003/016618/07

dated 28 January 2022

and signed at STELLENBOSCH

Hendrik Van Rooyen Attorneys


DATA/VERIFY
18-01-2022
LEGAL EXECUTIVE
Legal Suite Version 4.5410
DeedsOfTransferConventional.doc

AND the said Appearer declared that his/her principal had on 20 November 2021 truly and legally sold by Private Treaty and that he/she, the said Appearer in his/her capacity aforesaid, did, by these presents cede and transfer to and on behalf of:

NEWCARE INNOVATIONS PROPRIETARY LIMITED
Registration Number 2018/053092/07

its successors in title or assigns in full and free property.

**REMAINDER ERF 2833 GREAT BRAK RIVER
IN THE MUNICIPALITY AND DIVISION MOSSEL BAY
WESTERN CAPE PROVINCE**

IN EXTENT: 6,0372 (SIX COMMA ZERO THREE SEVEN TWO) HECTARES

FIRST TRANSFERRED by Deed of Transfer Number T50845/2004 with Diagram LG No 5859/2003 relating thereto and held by Deed of Transfer Number T69514/2005

I. **AS INDICATED** by the figure AxDEFGHJ on Diagram LG 5859/2003:

- A. **SUBJECT** to the conditions referred to in Deed of Transfer Number T21752/1975.
- B. **ENTITLED** to the benefit of the conditions contained in Deeds of Transfers Nos T7046/1913, T7047/1913, T7408/1913 and T7049/1913 which refer to a right of way over the properties thereby transferred.

II. **AS INDICATED** by the figure xBCD on Diagram LG No 5859/2003.

- A. **SUBJECT** to the conditions referred to in Deed of Transfer Number T22636/1977.
- B. **SUBJECT** to the terms of the following endorsement dated 22nd February 1952 endorsed on Deed of Transfer Number T6317/1935.

"Registration of Servitude:

By Deed of Transfer Number 2281/1952 dd this day the Remdr of Cedar Villa - 8,2956 morg held under Para 1 hereof is entitled to a right of way over Portion 81 1,001 mgn thereby transferred along the road 20' in width marked on the boundary AE of Diagram 4719/1950 of Portion 81 thereto annexed as will more fully appear on reference to the said Deed of Transfer."

III. IN RESPECT OF THE WHOLE PROPERTY

- A. **SUBJECT** to a servitude road 20 metres wide the western boundary of which is indicated by the line AH on Diagram LG No 5859/2003 in favour of the remainder of portion 124 of the farm Wolwedans No 129 extent 7,9467 hectares held by Certificate of Consolidated Title Number T74618/1989.



WHEREFORE the Appearer, renouncing all the right, title and interest which the said

SECTOR FIVE TRADING 76 PROPRIETARY LIMITED

heretofore had to the premises, did, in consequence also acknowledge him, to be entirely dispossessed of, and disentitled to, the same, and that, by virtue of these presents, the said

NEWCARE INNOVATIONS PROPRIETARY LIMITED,

its successors in title or assigns now is and henceforth shall be entitled thereto, conformably to local custom, the State, however, reserving its rights, and finally acknowledging the purchase price of the property hereby transferred to be the sum of

R2 700 090,00 (TWO MILLION SEVEN HUNDRED THOUSAND RAND).

IN WITNESS WHEREOF I, the said Registrar of Deeds together with the Appearer, have subscribed to these presents, and have caused the Seal of Office to be affixed thereto.

THUS DONE AND EXECUTED at the Office of the REGISTRAR OF DEEDS at CAPE TOWN on 15 March 2022



q. q. Signature of Appearer

In my presence:



Registrar of Deeds



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POWER OF ATTORNEY

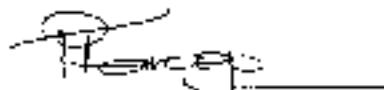
I, **Joe Bezuidenhout (SA ID 640716 5061 087)**, being the Representative of **New Care Innovations (Pty) Ltd (WH & E De Villiers)** (being the Registered Owner) of the property **REMAINDER OF ERF 2833 (GREAT BRAK RIVER), MOSSEL BAY DISTRICT AND MUNICIPALITY**, hereby nominate **Stéfán de Kock** of **PERCEPTION Planning**, with power of substitution, to be my agent in name, place and stead, (as set out in their quotation dated 30th October 2023) to sign on my behalf and submit to the appropriate authorities the following application, which mandate shall, without limiting the generality of the a foregoing, include:

- a.) Integrated Heritage Impact Assessment and Palaeontological Impact Assessment with relation to development of a portion of the above property, as required through Heritage Western Cape's Interim Comments dated 25th October 2023 in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999).

I hereby accept the Terms of Agreement as set out in abovementioned quotation dated 30th October 2023.

Signed at Mossesdale on 17 Jan 2024


Representative


Witness


Witness



Photo 1: North-facing view of the study area from Sandhoogte Road.



Photo 2: South-facing view from Sandhoogte Road showing existing smallholdings directly opposite the property.



Photo 3: Northeast-facing view of the lower portion of the property as seen from the existing paved access road following the western cadastral boundary.



Photo 4: South-facing view across the lower portion of the property showing existing development between Sandhoogte Road and the N2 National Road, the latter of which runs along the crest of the hill visible in the background.



Photo 5: West-facing view from the lower portion of the property showing densely overgrown property to the west.



Photo 6: East-facing view of the upper portion of the property showing the natural valley and existing residential complex in the background, left.



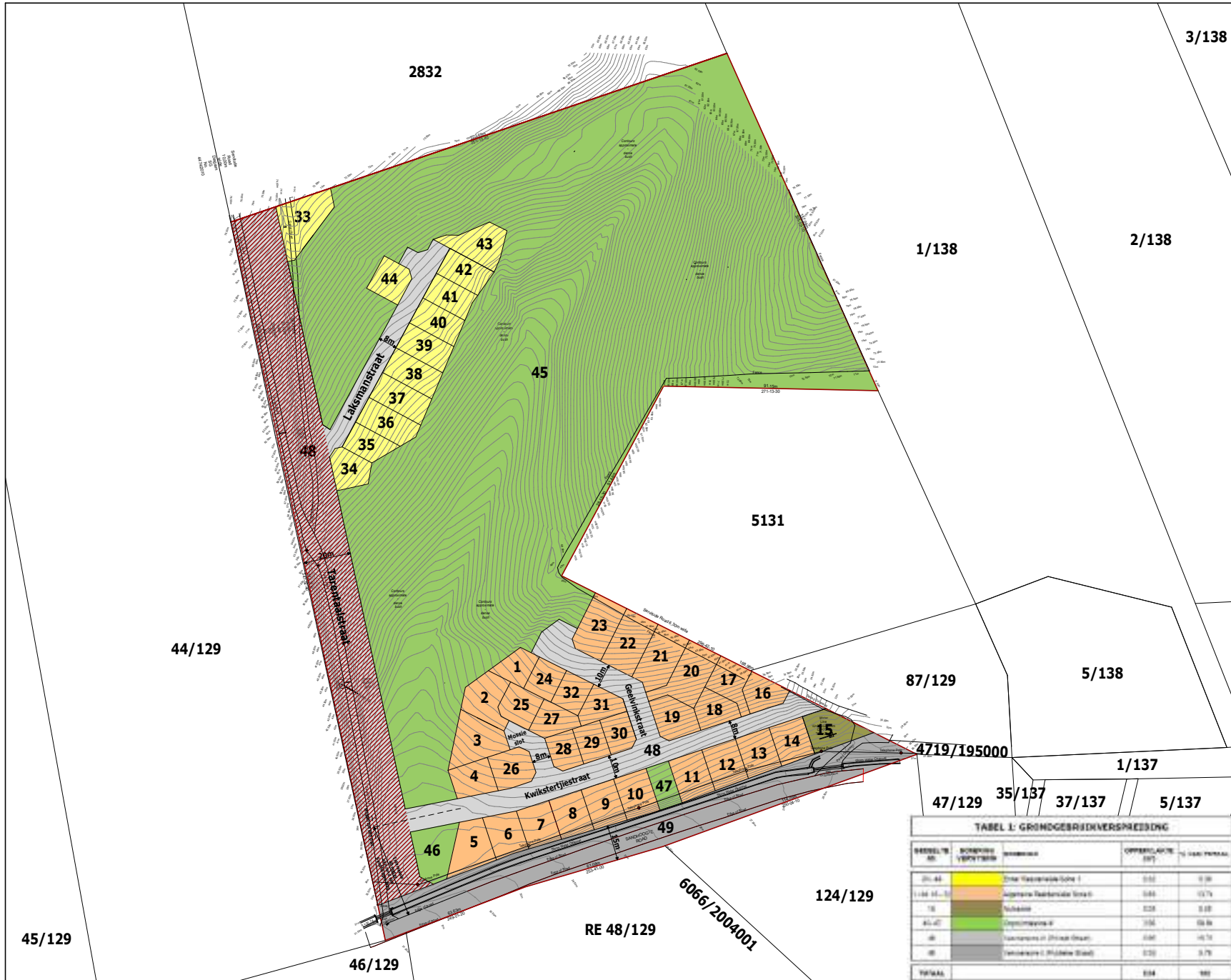
Photo 7: East-facing view along Sandhoogte Road taken from the existing vehicular access to the property illustrating its location along the entrance to Great Brak River.



Photo 8: Southeast-facing view along Sandhoogte Road – existing streetscape directly opposite the property.



Photos 9, 10: West-facing view along Sandhoogte Road – i.e. travelling towards Mossel Bay. North-facing view from the N2 National Road (eastbound lane) showing partial view of the property (just left of centre).



AANSOEK:

- Aansoek word in terme van Artikel 15(2)(a) van die Verordening op Grondgebruikbeplanning vir Mosselbaai Munisipaliteit, 2021 gedoen vir die hersiening van die Restant van Erf 2832 Groot Brakrivier vanaf Landbouzone I na 'n Onderverdelingsgebied bestaande uit Enkel Residensiële Sone I erwe (± 0,32 hektaar), Algemene Residensiële Sone I erwe (± 0, 83 hektaar), 1 Nutssone erf (± 0, 03 hektaar), 3 Oopruimtesone II erwe (± 3, 56 hektaar), 'n Vervoersone III erf (Privaat Straat) (± 0, 95 hektaar) en 'n Vervoersone II erf (Publieke straat) (± 0, 35 hektaar).
- Aansoek word in terme van Artikel 15(2)(d) van die Verordening op Grondgebruikbeplanning vir Mosselbaai Munisipaliteit, 2021 gedoen vir die onderverdeling van die Onderverdelingsgebied in die volgende erwe:
 - 12 Enkel Residensiële Sone I erwe (Gedeeltes 33 tot 44);
 - 31 Algemene Residensiële Sone I erwe (Gedeeltes 1 tot 14 en 16 tot 32);
 - 3 Oopruimtesone II erf (Gedeelte 45 - 47);
 - 1 Vervoersone III (Privaat Straat) erf (Gedeelte 48); en
 - 1 Vervoersone II (Publieke Straat) erf (Gedeelte 49).

NOTA

Serwituit: Reg van Weg (Landmeter Generaal - Diagram - Nummer 5859/2003), 20 meter wyd. Serwituit word gehandhaaf om vrye toegang tot Erf 2832 Groot Brakrivier te verseker.

N

SKAAL IN METER

PROJECT NO: 2832

VOORGESTELDE HERSOENING EN ONDERVERDELING: RESTANT VAN ERF 2832 GROOT BRAKRIVIER

DOOR: J. VAN WOLFF

HERSOENING EN ONDERVERDELINGSPLAN

PROJECT NO.	DWG. NO.	REVISIE NO.	DATE OF PRINT
ERF 2832 G BRAX	P.2	3	06.02.2024

SCALE	PROJECT DATE	DRAWN BY	CHECKED BY
NTS	SEPT 2023	AA	JV

JV PROFESSIONAL ENGINEERS AND ARCHITECTS

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TABEL 1: GRONDGEBRUIKVERSPREIDING

BESKRYFTE SONE	BESKRYFTE SONE	OPPERFLAKTE (M ²)	% VAN TOTAAL
1/1	Enkel Residensiële Sone I	102	0,37
1/2	Algemene Residensiële Sone I	100	0,37
1/3	Nutssone	228	0,83
1/4	Oopruimtesone II	156	0,56
1/5	Vervoersone III (Privaat Straat)	100	0,37
1/6	Vervoersone II (Publieke Straat)	120	0,43
TOTAAL		276	1,00



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AANSOEK:

- Aansoek word in terme van Artikel 15(2)(a) van die Verordening op Grondgebruikbeplanning vir Mosselbaai Munisipaliteit, 2021 gedoen vir die hersonering van die Restant van Erf 2832 Groot Brakrivier vanaf Landbouzone I na 'n Onderverdelingsgebied bestaande uit Enkel Residensiële Sone I erwe (± 1.44 hektaar), Algemene Residensiële Sone I erwe (± 0.83 hektaar), Oopruimtesone II erwe (± 2.28 hektaar), 'n Vervoersone III erf (Privaat straat) (± 1.44 hektaar) en 'n Vervoersone II erf (Publieke straat) (± 0.35 hektaar).
- Aansoek word in terme van Artikel 15(2)(d) van die Verordening op Grondgebruikbeplanning vir Mosselbaai Munisipaliteit, 2021 gedoen vir die onderverdeling van die Onderverdelingsgebied in die volgende erwe:
 - 14 Enkel Residensiële Sone I erwe (Gedeeltes 35 tot 51);
 - 37 Algemene Residensiële Sone I erwe (Gedeeltes 1 tot 37);
 - 3 Oopruimtesone II erwe (Gedeeltes 52 tot 54);
 - 1 Vervoersone III (Privaat Straat) erf (Gedeelte 55), en
 - 1 Vervoersone II (Publieke Straat) erf (Gedeelte 56).

NOTA

Servituut: Reg van Weg (Landmeter Generaal Diagram Nummer 5859/2003), 20 meter wyd. Servituut word gehandhaaf om vrye toegang tot Erf 2832 Groot Brakrivier te verseker.

44/129

1/138

2/138

151/129

87/192

5/138

4719/195000

1/137

35/137

47/129

37/137

5/137

124/129

RE 48/129

6066/2004001

45/129

46/129

NOORGEESTELDE HERSONERING EN ONDERVERDELING: RESTANT VAN ERF 2832 GROOT BRAKRIVIER

HERSONERING EN ONDERVERDELINGSPLAN

PROJECT No: ERF 2832 - MOS
 DWG No: P.1
 REVISION No: 1
 DATE OF PRINT: 24.10.2022

SCALE: NTS
 PROJECT DATE: OKT 2022
 DRAWN BY: AA
 CHECKED BY: JV

JV

TABEL 1: GRONDGEBRUIKSWYSPREIDING

GRONDGE- BRUIKSWY- SPREIDING	WETTELIK VOORGEWYS	TOEGELATE GRONDGE- BRUIK	OPGEWYSDE OPPER- VLAKTE (m²)	PER SENT TOEGELATE
10 - 14	Enkel Residensiële Sone I	1.44	10.84	100%
15 - 37	Algemene Residensiële Sone I	2.28	12.74	100%
38 - 54	Oopruimtesone II	2.28	17.75	100%
55	Vervoersone III (Privaat Straat)	1.44	1.44	100%
56	Vervoersone II (Publieke Straat)	0.35	0.35	100%
TOTAAL		8.84	33.26	100%

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**Palaeontological Impact Assessment for the
proposed Urban development on a portion of the
Remainder of Erf 2833 (Great Brak River)
Mossel Bay District,
Western Cape Province**

Desktop Study (Phase 1)

For

Perception Planning

21 January 2024

Prof Marion Bamford

Palaeobotanist

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Johannesburg, South Africa

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Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf, PSSA
Experience: 35 years research and lecturing in Palaeontology
27 years PIA studies and over 350 projects completed

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Perception Planning (Pty) Ltd, George, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

A handwritten signature in blue ink, appearing to read 'M Bamford', with a horizontal line underneath it.

Signature:

Executive Summary

A Palaeontological Impact Assessment was requested for the proposed Urban development on a portion of the Remainder of Erf 2833 (Great Brak River), Mossel Bay District, Western Cape Province

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The property lies entirely on the Enon Formation (Uitenhage Group) conglomerate and sandstones that are incorrectly indicated as very highly sensitive for palaeontology. The fossil record is based on one repeated record of abraded and poorly preserved silicified wood, bones and teeth that have been transported and deposited. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling activities have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very high	Low	Paleontological Impact Assessment	Section 7.2. SAHRA Requirements

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1. Background

PERCEPTION Planning was appointed by the registered landowner, New Care Innovations (Pty) to compile and submit to Heritage Western Cape a Notice of Intent to Develop (NID) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) with relation to proposed development of a portion of the property.

The property is the Remainder of Erf 2833 (Great Brak River), Mossel Bay District and Municipality, measuring 6,0372 ha, held under title deed T 10193/2022, and registered to New Care Innovations (Pty) Ltd (Figures 1-3).

According to information provided the proposal is for rezoning of the property from Agricultural Zone I to make provision for a residential development comprising of the components outlined below. A copy of the conceptual site development plan is shown in Figure 3.

- 32 General residential erven located along the lower-lying, southern portion of the property;
- 12 Single residential erven located along the higher-lying, northern portion of the property;
- The densely overgrown valley diagonally crossing the property will be retained as Open Space Zone III;
- Private roads to access to the two precincts;
- Ancillary engineering infrastructure and services

A Palaeontological Impact Assessment was requested for the Great Brak River urban development project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein.

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6).

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
ai	Details of the specialist who prepared the report,	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
k	Any mitigation measures for inclusion in the EMPr	Section 8, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 6
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 6, 8
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A



Figure 1: Google Earth map of the general area to show the relative land marks. The Groot Brak River urban development project is shown by the yellow polygon.



Figure 2: Google Earth Map of the proposed urban development on Erf 2833 Great Brak River with the sections shown by the yellow dotted outline. Maps supplied by Perception Planning.



Figure 3: Proposed layout of development on a portion of Erf 2833 , Great Brak River.

2. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.

The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources include records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases; eg <https://sahris.sahra.org.za/map/palaeo>
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representativity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

3. Geology and Palaeontology

i. Project location and geological context



Figure 4: Geological map of the area around the Erf 2833 urban project, Great Brak River indicated within the yellow rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 3322 Oudtshoorn.

Table 2: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006; Johnson et al., 2006; McCarthy et al., 2006; Robb et al., 2006; van der Westhuizen et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Quaternary ca 1.0 Ma to Present
Ke	Enon Fm + younger, Uitenhage Group	Conglomerate, sandstone, siltstone, clay	Upper Jurassic to Early Cretaceous
Op	Peninsular Fm, Table Mountain Group, Cape SG	Sandstone	Ordovician
Nmg	Unnamed intrusive granite	Gneissic granite and granodiorite	Proterozoic
Nk	Victoria Bay Fm, Kaaimans Group	Feldspathic quartzite	Proterozoic

The project lies in one of the Mesozoic onshore basins along the southern coast of South Africa (Figure 4). Along the newly formed southern coast of South Africa, during the Late Jurassic and early Cretaceous, thick deposits accumulated in the complex graben and half-graben basins (Shone, 2006). Much of the material has since eroded away but the Uitenhage Group sediments can be found in the Mossel Bay Basin, Plettenberg Bay Basin, Gamtoos Basin and Algoa Basin. Cape Supergroup sediments underlie the Uitenhage Group and are much older. The project footprint does not intersect these older rocks or the even older intrusive granites.

The Uitenhage Group has been divided into the basal Enon Formation that is composed of large clasts of rocks from the inland together with sandstones and shales, the mostly terrestrial Kirkwood Formation composed of shales and siltstones, and the upper mixed terrestrial and marine Sundays River Formation (Shone, 2006).

Along the coast are windblown and dune sands that are difficult to date because they are transported and reworked. Generally considered to be of Quaternary age, and Holocene in the upper layers (Roberts et al., 2006), they are partially vegetated and stabilised.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 5. According to the SAHRIS palaeotechnical report for the Western Cape (Almond and Pether, 2008), the Enon Formation has transported bone fragments, teeth and coalified wood. McLachlan and McMillan (1976) and Shone (1976) reported poorly preserved abraded bone fragments, silicified fossil wood and charcoalified from the Enon Formation (re-reported in Muir et al., 2017).

Since this formation has large to small boulders of different rock types that are well rounded, they have been transported from some distance inland. This means that the

abraded fossils must also have been transported from some distance so they would be out of primary context. Such poorly preserved, abraded and transported fossils are of very limited scientific value.

The very highly sensitive palaeosensitivity coding for the Enon Formation should rather be downgraded to moderately sensitive (green).

It is unlikely that any fossils, even poorly preserved, would be found on the land surface that is covered by soils and vegetation as is the case for the Great Brak River area according to the aerial photographs and site visit observations in the BID document.



Figure 5: SAHRIS palaeosensitivity map for the site for the proposed development on a portion of RE Erf 2833, Great Brak River shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

From the SAHRIS map above the area is incorrectly indicated as very highly sensitive (red). It is unlikely that any fossils occur in the soils that cover the area.

4. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 3:

Table 3a: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	L	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	L	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	H	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	M	-
	L	Soils do not preserve fossils; so far there are no records from the Enon Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
	DURATION	L
M		-
H		Where manifest, the impact will be permanent.

PART B: Assessment		
SPATIAL SCALE	L	Since the only possible fossils within the area would be transported fossil wood or bones in the conglomerate, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	-
	L	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the Enon Formation conglomerates that will be excavated. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old to contain fossils or are the wrong kind (soils and conglomerates). Furthermore, the material to be excavated is soil and this does not preserve fossils. Since there is an extremely small chance that transported fossils from the Enon Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

5. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils.

6. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. There is a very small chance that fossils may occur in the underlying conglomerates of the Enon Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations for amenities, infrastructure and foundations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very High	Low	Paleontological Impact Assessment	Section 7.2. SAHRA Requirements

7. References

- Almond, J.E., Pether, J. 2008. Palaeontological Heritage of the Western Cape; interim report. SAHRA Report. 23pp.
- McLachlan, I.R. and McMillan, I.K., 1976. Review and stratigraphic significance of southern Cape Mesozoic palaeontology. *Transactions of the Geological Society of South Africa* 79, 197-212.
- Muir, R.A., Bordy, E.M., Reddering, J.S.V., Viljoen, J.H.A., 2017. Lithostratigraphy of the Enon Formation (Uitenhage Group), South Africa. *South African journal of Geology* 102, 273-280.
- Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. *Geological Society of southern Africa, Annexure to Volume LXXII*. 72pp + 25 plates.
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- Thamm, A.G., Johnson, M.R., 2006. The Cape Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 443 – 460.

8. Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 6). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a HWC permit must be obtained. Annual reports must be submitted to HWC as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to HWC once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

9. Appendix A – Examples of fossils from the Early Cretaceous



Figure 6: Photographs of examples of fossil bones and silicified wood that might be found in the ebon formation conglomerates.

10. Appendix B – Details of specialist

Curriculum vitae (short) - Marion Bamford PhD January 2024

Present employment: Professor; Director of the Evolutionary Studies Institute.
Member Management Committee of the NRF/DSI Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa

Telephone : +27 11 717 6690
Cell : 082 555 6937
E-mail : marion.bamford@wits.ac.za ;
marionbamford12@gmail.com

ii) Academic qualifications

Tertiary Education: All at the University of the Witwatersrand:

1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.

1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.

1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.

1986-1989: PhD in Palaeobotany. Graduated in June 1990.

iii) Professional qualifications

Wood Anatomy Training (overseas as nothing was available in South Africa):

1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps

1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer

1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) Membership of professional bodies/associations

Palaeontological Society of Southern Africa

Royal Society of Southern Africa - Fellow: 2006 onwards

Academy of Sciences of South Africa - Member: Oct 2014 onwards

International Association of Wood Anatomists - First enrolled: January 1991

International Organization of Palaeobotany - 1993+

Botanical Society of South Africa

South African Committee on Stratigraphy - Biostratigraphy - 1997 - 2016

SASQUA (South African Society for Quaternary Research) - 1997+

PAGES - 2008 -onwards: South African representative

ROCEEH / WAVE - 2008+

INQUA - PALCOMM - 2011+onwards

v) Supervision of Higher Degrees

All at Wits University

Degree	Graduated/completed	Current
Honours	13	0
Masters	13	3
PhD	13	7
Postdoctoral fellows	14	4

vi) Undergraduate teaching

Geology II - Palaeobotany GEOL2008 - average 65 students per year

Biology III - Palaeobotany APES3029 - average 25 students per year

Honours - Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology;

Micropalaeontology - average 12 - 20 students per year.

vii) Editing and reviewing

Editor: *Palaeontologia africana*: 2003 to 2013; 2014 - Assistant editor

Guest Editor: *Quaternary International*: 2005 volume

Member of Board of Review: *Review of Palaeobotany and Palynology*: 2010 -

Associate Editor: *Cretaceous Research*: 2018-2020

Associate Editor: *Royal Society Open*: 2021 -

Review of manuscripts for ISI-listed journals: 30 local and international journals

viii) Palaeontological Impact Assessments

27 years' experience in PIA site and desktop projects

Selected from recent projects only - list not complete:

- Beaufort West PV Facility 2021 for ACO Associates

- Copper Sunset MR 2021 for Digby Wells
- Sannaspos PV facility 2021 for CTS Heritage
- Smithfield-Rouxville-Zastron PL 2021 for TheroServe
- Glosam Mine 2022 for AHSA
- Wolf-Skilpad-Grassridge OHPL 2022 for Zutari
- Iziduli and Msenge WEFs 2022 for CTS Heritage
- Hendrina North and South WEFs & SEFs 2022 for Cabanga
- Dealesville-Springhaas SEFs 2022 for GIBB Environmental
- Vhuvhili and Mukondeleli SEFs 2022 for CSIR
- Chemwes & Stilfontein SEFs 2022 for CTS Heritage
- Equestria Exts housing 2022 for Beyond Heritage
- Zeerust Salene boreholes 2022 for Prescali
- Tsakane Sewer upgrade 2022 for Tsimba
- Transnet MPP inland and coastal 2022 for ENVASS
- Ruighoek PRA 2022 for SLR Consulting (Africa)
- Namli MRA Steinkopf 2022 for Beyond Heritage
- Adara 2 SEF 2023 for CTS Heritage
- Buffalo & Lyra SEFs 2023 for Nextec
- Camel Thorn Group Prospecting Rights 2023 for AHSA
- Dalmanutha SEFs 2023 for Beyond Heritage
- Elandsfontein Residential 2023 for Beyond Heritage
- Waterkloof Samancor 2023 for Elemental Sustainability
- Zonnebloem WTP 2023 for WSP
- Elders Irrigation 2023 for SRK
- Leghoya WEFS 2023 for Red Cap & SLR

ix) **Research Output**

Publications by M K Bamford up to January 2024 peer-reviewed journals or scholarly books: over 175 articles published; 5 submitted/in press; 14 book chapters.

Scopus h-index = 32; Google Scholar h-index = 40; -i10-index = 121 based on 7261 citations.

Conferences: numerous presentations at local and international conferences.