

WEST COAST FOSSIL PARK (SUB-PRECINCT 1)

SUBMISSION OF IMPACT ASSESSMENT REPORT,
AND PERMIT APPLICATION: SITE
DEVELOPMENT PLAN: SUB PRECINCT 1,
INCLUDING THE VISITOR'S CENTRE, FOSSIL
DIG SITE AND RELATED INFRASTRUCTURE:
(NHRA SECTION 27 [16, 18] & COMMENT IN
TERMS OF NEMA SECTION 24)

FARM 1223, SALDANHA BAY (WEST COAST)
MUNICIPALITY



Sketch proposal: West Facing elevation: Noero Architects 2013

Submitted to Heritage Western Cape by Melanie Attwell and Associates on behalf of the
West Coast Fossil Park Trust

16 April 2013
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STATEMENT OF INDEPENDENCE

This report is by *Melanie Attwell and Associates* with the assistance of Mr Graham Jacobs of *ARCON Heritage and Design*. The views expressed in the accompanying report are the objective, independent views and assessments of Ms Attwell and Mr Jacobs. Neither has business, personal, financial or other interest in the proposed development apart from remuneration for the work submitted.

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EXECUTIVE SUMMARY

This is a Heritage Impact Assessment for a Site Development Plan for Sub-Precinct 1, West Coast Fossil Park. The Site Development Plan is attached to a Land Use Application (Consent Use Application) to the Saldanha Bay Municipality. A Baseline Study was previously submitted to HWC and the heritage indicators conclusions and recommendations contained therein, endorsed.

The attached sketch proposals fall within the 830 ha West Coast Fossil Park Provincial Heritage Site. This includes a site development plan (SDP) prepared by NM & Associates, together with related design, landscape and service proposals to HWC for a permit in terms of Section 27 of the National Heritage Resources Act (NHRA). This approval should also serve as comment for the provincial Department of Environmental and Development Planning (DEADP) in accordance with NEMA.

The proposals have been subject to interrogation using the Phase 1 HIA heritage constraints and opportunities/design heritage indicators as yardsticks. Amendments to the proposals have been made throughout this process. Consequently, the heritage issues have largely been addressed and NHRA Section 38(3) has been fully complied with. The report therefore finds that heritage resources will not be affected by the proposals provided that archaeological and palaeontological monitoring is undertaken throughout the construction phase. This would relate to trenching for services, excavation and fill on the Sub-Precinct 1 overburden mound site and environs.

Any heritage-related constraints regarding the palaeontologically sensitive Quarry E have been addressed through design. Construction penetration of the site will not be permitted and circulation routes within E Quarry will be via elevated walkways attached to concrete piers. The new enclosures for the enlarged fossil dig site will be secured by means of stone filled gabions. No tree planting will be permitted within E Quarry and any vegetation clearance will be subject to an archaeological watching brief.

Development Options 1 and 3 of the sewerage proposals will not negatively impact on heritage resources. Option 2 for the sewerage proposals will also not impact negatively on heritage resources provided that they are amended to relocate the associated reed/bed/maturation pond to an area that would not be sensitive to heritage impacts. This means that the preferred sewerage option may be decided on factors other than heritage related considerations.

In terms of NHRA Section 27, the Report recommends the approval (subject to conditions) of the site development plan (SDP), the landscape sketch plan, the architectural sketch design proposals and the service proposals as outlined in this report and its Annexures. A NHRA Section 27 ('Annexure A') application is accordingly attached (refer Annexure 1 to this Report).

M Attwell
G Jacobs

1. INTRODUCTION

This document constitutes a heritage impact assessment (HIA) arising out of the development of the West Coast Fossil Park Site Development Plan (Sub-Precinct 1). It is submitted to APM and BELCom Heritage Western Cape for approval in terms of Section 27 of the National Heritage Resources Act (Act 25 of 1999); and comment in terms of the requirements contained within the National Environmental Management Act (NEMA) Act 106 of 1998. It should be read with the previously submitted *West Coast Fossil Park Precinct 1 Baseline Study*.¹

Sub-Precinct 1 forms the basis for this report. It is a 20 ha site situated within the West Coast Fossil Park. It, together with the remainder of the Park, which comprises some 830 ha, is a Provincial Heritage Site. (See Section 3: *Status of the Site*). It is also subject to environmental review (EIA Basic Assessment Report) in terms of Section 24 of the NEMA in a separate but parallel statutory process. This is because the application comprises a listed activity in terms of the NEMA Environmental Impact Assessment Regulations.² Because of the formal heritage protection of the site, Heritage Western Cape is the authorising and permitting agency in terms of Section 27 of the NHRA. This authorisation must be obtained from HWC for any proposal affecting the site, before any Record of Decision for the EIA can be issued by DEADP.

As Sub-Precinct 1 forms part of a Provincial Heritage Site, Section 27 (16 and 18) of the NHRA applies. The SDP, architectural sketch proposals and related Assessment are submitted to HWC for approval and a permit in terms of NHRA Section 27(18). The proposals form part of the Site Development Plan³ (SDP) and are described in **Section 8** and **Annexure 2** in this document. The report includes assessment in matters relating to the placement of services and infrastructure on certain sites potentially associated with archaeological and palaeontological resources; as well as the treatment of the overburden mound in preparation for the proposed development construction phase.

2. THE PROCESS TO DATE

2.1. Heritage

Melanie Attwell and Associates was appointed in 2012 to guide the heritage process in terms of the applicable legislation, to co-ordinate heritage studies in terms of industrial archaeology, archaeology and palaeontology; and to negotiate with the professional team regarding mechanisms to reduce impact on highly significant heritage resources.

2.1.1. *May 2012*: The Sketch Plans for Sub-Precinct 1 now submitted are part of the implementation of Planning Framework process outlined in an initial report submitted to HWC in May 2012⁴ and endorsed on 23rd May 2012.

¹ Melanie Attwell and Associates *West Coast Fossil Park Precinct One Baseline Study*, 22nd October 2012.

² GN 543 of 18th June 2010.

³ NM and Associates *West Coast Fossil Park Sub-Precinct One Site Development Plan* in preparation

⁴ Attwell West Coast Fossil Park: Outline of Methodology process and Scope of Work. 2012.

West Coast Fossil Park (Precinct One): Section 27 Application and Impact Assessment Review, March 2013, Melanie Attwell and Associates

It was decided in terms of the Notification of Decision of 23rd May that:

- Future considerations affecting the site would be dealt with jointly by BELCom and APM
- The Planning approach outlined in the report was endorsed. This included a package of plans approach and the agreement to allow the planning for the Interpretive Centre to run ahead of the broader planning framework for the full 830 ha site.

The Site Development Plan for Sub-Precinct 1 now submitted, is in accordance with the requirements for a “package of plans” approach and the agreement that the planning and design for the Interpretive (Visitors Centre) may proceed ahead of the broad planning for the full site.

2.1.2. *November 2012*: A Heritage Baseline study entitled *West Coast Fossil Park Precinct 1* was submitted to HWC (APM and Built Environment and Landscape Committees) in 2012 and endorsed. The NoD dated 30 November 2012 is attached as **Annexure 1** to this Report.

Both APM and BELCom provided an interim comment to the Phase 1 Baseline Study. The following was endorsed:

- The statement of significance
- The heritage related design indicators
- The adaptive re-use of the industrial infrastructure where possible
- The recommendations contained in the Report prepared by P Haarhoff⁵.

HWC (APM) queried issues relating to the course of the palaeo-Berg River and whether mining had occurred beneath the overburden⁶. These have been responded to by P Haarhoff and are contained in **Annexure 7** of this report. The matter is also discussed in **Section 9** of the Report, i.e. **Heritage Issues**. The report concludes that although there are studies in which the palaeo-Berg River has been conceptually mapped, a substantial amount of investigative work would be necessary before the relevant authorities might decide to enlarge the potential Grade 1 area and National Heritage Site. It should also be noted that such issues are outside the parameters of this report.

The process subsequent to the submission of the Baseline Report has been to interrogate the proposals made in line with the heritage related design informants and the vulnerabilities and opportunities presented by the site; particularly in terms of archaeology and palaeontology. The results of these impact assessments are contained in **Section 10** of this report i.e. Assessment of Impacts.

Subsequent to the submission of the Heritage Baseline Study a further sensitive area to the east of site D has been identified. The sensitive area has had implication for the Site Development Plan particularly as far as sewerage options are considered.

2.2. *The Planning Process: The Site Development Plan NM and Associates.*

⁵ Attwell, West Coast Fossil Park Baseline Study October 2012. Annexure 3.

⁶ HWC Interim comment 30 November 2012.

NM and Associates will be making a Land Use Application for Consent Use in order to use National Lottery funds to construct an Interpretive Centre with related infrastructure. Following this, the Trust will construct the new enlarged enclosures for the Fossil Dig site. The Site Development Plan (SDP) and Consent Use are to be submitted together.

The Consent Use is for an educational building or a series of educational buildings, i.e. The Interpretive Centre which is accompanied by exhibition space, a tourist shop and a restaurant, within an Agriculture Zone. The combined Consent Use application and Site Development Plan is due to be submitted to the authorities in April 2013.

The SDP focuses on the area known as Sub-Precinct 1 (**Diagram 01**) a 20 ha site where the Interpretive Centre will be constructed, and which also includes the fossil dig site. The SDP fixes the building footprint, servicing options in terms of access roads, water, electricity; and sewerage treatment. It also includes parking, pedestrian and visitor circulation. In these proposals the endorsed⁷ heritage related design indicators have been taken into account and have informed placement and design.

The Conceptual Framework⁸ identifies two main precincts. They are:

i) Sub-Precinct 1. This is divided into two smaller portions:

- Sub-Precinct 1 A. This is the previously used mining area which will be used in the future as a research and accommodation hub; and
- Sub-Precinct 1 B. This is the 20 ha area containing the Interpretive Centre and the Fossil dig site linked by pedestrian walkways. This is the first phase of the development process and the subject of this report. The following phase of this project will replace the existing covers on the fossil dig site. If sufficient research funding is obtained this site will be enlarged.

ii) Sub-Precinct 2: The rest of the site but excluding the Green Village. The SDP (NM& Associates 2013) is attached as **Annexure 2** to this Report.

3. SUB-PRECINCT 1: LIMITATIONS TO THE STUDY

3.1. General Limitations

- i) *This heritage impact assessment is tied to an SDP.* Consequently, proposals are at the sketch proposal stage only. However they are sufficient to address the key heritage-related issues, i.e. fixing the footprint of the Interpretive Centre; evaluating the visual impact of the proposal, identifying mechanisms for the planning of services and tourism facilities and identifying mitigation measures.
- ii) *The SDP refers to Sub-Precinct 1 only* although of necessity it also considers the surrounding environment with regard to servicing and landscaping.

⁷ NoD Case 120502 JL 01 30 November 2012

⁸ NM & Associates 2012.

- iii) *Future NHRA permit applications:* This report has been prepared on the basis that no further permit applications to HWC will be required for the architectural and landscaping proposals in Sub-Precinct 1, provided that they remain substantially in accordance with the SDP, the architectural sketch proposals in this application, and do not adversely impact on archaeological and/or palaeontological resources.
- iv) *Location of archaeological/palaeontological material:* Due to the nature of archaeology and palaeontology it is not possible to anticipate fully where archaeological material may be located. Therefore this study has worked on the assumption that the entire site is sensitive unless disturbed in the past by road works and mining related activities. In addition, the study has advised the avoidance of impacts on any sites deemed by the Archaeological and palaeontological advisors to be sensitive. All excavation whether for foundations or trenching is to be undertaken in areas considered less sensitive and all excavation and trenching is to be accompanied by a “watching brief”. Building and founding methodologies has been adjusted accordingly.
- v) *Mechanisms for sewerage management and the sites associated with this have yet to be fully decided.* At present there are three opinions including the clients preferred option (the septic tank option). This is not the specialist advisor’s preferred option. In these cases, options have been reviewed in terms of their impact on heritage resources only. It is proposed that this issue, which has potential impacts on palaeontological resources if poorly placed, be re-submitted as an addendum at a later stage to HWC if required.
- vi) *Planning issues that do not affect heritage resources have been mentioned only in passing.* The reports affecting traffic and electrical services have not been included as Annexures to this Report but are available on request.
- vii) *Future plans for fossil digs:* Future plans for the fossil dig site are included, although this will form the second phase of an implementation strategy. This is because the Lotto funding is limited to the development of a Visitor’s or Interpretive Centre.

3.1. The Grading of Heritage Resources within the Study Area

The Baseline Study (Attwell 2012) outlined the complexities of grading a variety of types of heritage resources. However for the purposes of this report the grading of heritage resources contained within Sub-Precinct 1 has relevance.

3.2. General Caveats.

The following caveats apply.

- i) *Archaeology/paleontology potentially contained within the overburden mound.* This material would not be in situ and specialists have no idea without investigation of how much exists within the overburden mound.
- ii) *Archaeological scatters within the Precinct.* Not all identified.

Within these caveats the following grading of heritage resources may be applied:

- iii) *Landscape (aesthetic and historical significance)*: the mature avenues of eucalyptus trees as identified in Recommend Grade IIIC (of some contextual regional significance).
- iv) *Archaeology*: Scientific and historical significance Archaeological sites on the blowout site: Recommend Grade 2. It should be noted that the blow out site is outside Sub-Precinct 1 but within the WCFP.
- v) *Palaeontology*: Fossil beds and surrounding sites including potential areas for excavation under the boardwalk (Currently formally declared as a PHS, but possibly Grade 1). There is a strong case for this site to be considered as of international significance. It should be noted that the potential exists for further excavation of the sivathere bone excavations which may further extend the range of possibilities and significances presented by the site.

3.3. Comment

The most significant resources within Sub-Precinct 1 are the palaeontological resources. Every effort should be made within the SDP and related proposals to ensure they are not adversely affected in any way, while at the same time opening up future research possibilities. More specifically, the recommendations regarding the protection of archaeological and palaeontological resources contained in The West Coast Fossil Park Heritage Baseline Study (**Annexure 3**) should be adhered to. These should be read with the heritage related design informants (**Section 5**) and include the following:

4. THE STATUS OF THE STUDY AREA

The West Coast Fossil Park is owned by the West Coast Fossil Park Trust, an Association not for gain, and is assisted in its mandate by a Trust Committee consisting of academics and public-spirited individuals. Members of the Committee have contributed in depth to the current choice of the site and the planning of the Interpretive Centre on Sub-Precinct 1 within the ambit of the medium and long term vision of the Trust as well as mechanisms for the protection of the unique archaeological and palaeontological resources.

The Park comprises Remainder Portions 15, 29, 45 and 47 of Farm 185, and Portion 1 of Farm 188 constituting Consolidated Farm No 1223 Saldanha Bay. It is a rehabilitated mining area 830 ha in extent that contains internationally renowned fossil deposits dating back about 5 -10 million years. The full 830 ha site including the core 14 ha known fossil dig site was declared Provincial Heritage Site on 23rd March 2012. Current discussions are underway to have the Park declared a National Heritage Site, but the process has been delayed through capacity constraints on the part of the National body, the South African Heritage Resources Agency (SAHRA).

In terms of a decision made by the West Coast Fossil Park Trust (subsequently ratified by HWC on 23rd May 2012) a portion of the Park has been identified for planning in terms of a “fast track” approach intended to allow for the planning, design and implementation of the interpretive centre, as well as related infrastructure.

This planning framework proposed a series of stages or a “package of plans” approach which allowed the West Coast Fossil Park Trust the flexibility to plan for the visitor’s centre first, followed by additional planning proposals affecting the wider site to implement the West Coast Fossil Park Trust’s Master plan.

As a result, a 20 ha site entitled “Sub-Precinct 1” (**Diagram 02**) has been chosen and extracted from the site that will include the Interpretive Centre (Sub-Precinct 1B). The preparation of the SDP for this Precinct is currently underway and forms part of this application.

4.1. The Study Area

The Precinct entitled Sub-Precinct 1 includes an overburden dump and the fossil rich E Quarry. It is close enough to the fossil bed for visitor comfort while distant enough to enhance protection of fossil exhibits. The constant presence of the E Quarry and the view from the site of the overburden mound have guided and informed the design of the Interpretive Centre. The SDP for Sub-Precinct 1 proposes a signature building below the ridge of the existing overburden dump facing west and overlooking the dramatic “E” Quarry and surrounding landscape.

The Interpretive Centre will comprise a series of four structures situated along the north-south axis of the overburden mound and facing west. The different structures which follow a visitor movement pattern will be linked by an internal “street”.

The proposal will use an existing but partially modified road network. Roads no longer required will gradually be absorbed back into the landscape. Services will be laid along existing road networks to minimise archaeological and palaeontological impacts. The proposals contained within the Site Development Plan including the design for the Interpretive Centre respond favourably to the Heritage Related Informants and there are no major points of contention from a heritage perspective. Issues which have arisen are discussed in **Section 9: Heritage Issues**.

4.2. The Significance of the Study Area

The impact assessment is required to measure the impact of the proposal against the significance of the site.

The Statements of significance of the study area are contained in the Baseline Study (2012). The following in relation to Sub-Precinct 1 (which includes the fossil dig site), have relevance

The West Coast Fossil Park (industrial area) is of **some industrial significance** particularly as a result of the phosphate open mining activity which revealed the significant palaeontological material at E Quarry.

The West Coast Fossil Park in the vicinity of Sub-Precinct 1 is of **limited botanical (scientific significance)** as the site is a disturbed one and plant species are neither endangered nor rare.



Figure: Heritage Informants

FIGURE 1: West Coast Fossil Park Heritage informants with the additional sensitive area to the east of Site D identified.

The West Coast Fossil Park in the vicinity of Sub-Precinct 1 is of **considerable landscape significance** with the landforms from the overburden dumps to the excavated E Quarry providing a dramatic example of the change to the landscape by mining and revealing the stratigraphy and geology of the area. These landforms both channel and contain views as one moves through the site. The landscape is often varied and generally flat with long views. The landforms including the overburden dumps,

identified avenues of eucalyptus trees and the dominant road system provide structure in an otherwise formless landscape.

The HWC statement of significance which accompanied the PHS declaration (2012) has relevance and captures the **outstanding palaeontological significance** of the site. It states:

“The West Coast Fossil Park at Langebaanweg is a five million year old fossil bed that was discovered in the floor of an open cast phosphate mine in the 1960s. Since then, researchers at the Iziko: South African Museum have amassed over one million vertebrate fossils from controlled excavations, surface collecting and bulk sampling in different parts of the mine. These fossils have achieved international acclaim by scientists for their superb preservation, abundance and richness in diversity to the extent that this locality is now widely regarded as possibly the most important Early Pliocene terrestrial fossil occurrence in the world.”

Subsequent to the submission of the Heritage Baseline Study a further sensitive area to the east of site D has been identified. The sensitive area has had implication for the Site Development Plan particularly as far as sewerage options are considered.

For Paleontological areas of significance see **Diagram 02 (NM&A)**

5. HERITAGE RELATED DESIGN INDICATORS

The Impact Assessment Review measures the proposal against the following endorsed heritage related design indicators. See also **Diagrams 03A & 03B** for graphic representations of these heritage indicators.

i) **Heritage Indicator 1: Archaeological/Palaeontological Integrity.**

New development within Sub-Precinct 1 is to promote and consolidate its archaeological/palaeontological integrity within a physical context that is potentially of national, if not international significance.

New development is to be located, oriented and constructed in a manner that offers a low likelihood of negative impacts on archaeological and palaeontological resources, while maximizing opportunities for site interpretation.

ii) **Heritage Indicator 2: Spatial Geometries & Relationships.**

New development within Sub-Precinct 1 is to compliment and capitalize on existing spatial geometries and relationships in order to bring structure and coherence to what is currently an unstructured landscape.

The new visitor's centre is to be located where it can capitalize on focal points, axial relationships, spatial thresholds, channelled views and strategic outlooks as identified in **Diagrams 03A & 03B** of this study.

iii) **Heritage Indicator 3: Retention and Consolidation of Existing Tree Patterns.**

Existing tree belts and clusters are to be retained and consolidated, particularly where marking primary road alignments and established development clusters.

This would include road alignments flanked by primary place-defining trees as identified in **Diagrams 03A & 03B**, and development clusters such as in the vicinity of the existing visitor's centre and mock dig site. Gums trees are to be used for replanting and/or consolidating existing tree belts and clusters within and around Sub-Precinct 1. Where new tree plantings are envisaged, these need not necessarily be gums, provided that they are shade providing and generally characteristic of the region.

iv) **Heritage Indicator 4: Consolidation of Existing Road Systems**

Maximize the use and consolidation, where possible, of the existing road and track networks within and around Sub-Precinct 1.

The purpose is not only to minimize, new construction footprints, cut and fill, for palaeontological reasons as established in i) above, but also to reduce general disturbance and gratuitous interventions in the landscape.

v) **Heritage Indicator 5: Location of the New Visitor's Centre with regard to Site Interpretation.**

The location for the new visitor's centre must be suitable for promoting the interpretation of the precinct's archaeological/palaeontological (pre-)history and the discovery of its fossil finds through the past mining activities conducted here.

The visitor's centre should be strategically located within Precinct 1 to enable visitors to relate easily to the site's history by capitalizing on key outlooks and approaches as identified in **Diagrams 03A & 03B** of this study.

vi) **Heritage Indicator 6: Development and Infrastructure Footprints.**

Minimize new development and infrastructure footprints within and around Sub-Precinct 1.

The purpose is to minimize, new construction footprints on sensitive sites, cut and fill, primarily for palaeontological reasons as established in i) above. For this reason, above ground suspended construction supported on posts/pilotis would be favoured for large structures over trench-founded constructions. However where a site is not considered palaeontologically or archaeological sensitive, trench founded or slab construction would be acceptable.

vii) **Heritage Indicator 7: Use of Locally derived Energy Sources and Local Materials.**

Maximize the use of natural and locally derived energy sources and locally sourced materials for new development within the precinct and surrounding areas.

Apart from the obvious green benefits, the purpose is to avoid overhead visual intrusions and minimize extended trenched service lines through the precinct. The building and services should, wherever possible, promote and enhance sustainability principles.

viii) **Heritage Indicator 8: Architectural Response to Local Climatic Conditions**

The architecture of the new visitor's centre must reflect a pragmatic response to regional climate and local physical conditions.

A stylistically driven pursuit of architectural form should be avoided in favour of a vernacular design approach. This may apply to all new structures within the precinct. Built forms should be in direct response to site environmental conditions.

ix) **Heritage Indicator 9: Architectural Response to Landscape**

The architecture of the new visitor's centre must reflect a direct response to the nature of the landscape and spatial characteristics of Sub-Precinct 1, while at the same time being a landmark structure in a landscape generally devoid of building landmarks.

On one level, the nature of the landscape of Sub-Precinct 1 and the Park in general is of a place lacking in structure, coherent spatial linkages and distinctive orientation points. On another level, the Park exists within a modified area displaying strong but deceptive rural characteristics. Ultimately, it is the substantial lack of architectural cues and form generators other than the broadly horizontal stretches of tree belts and cliff faces set against amorphous overburden backdrops that define the nature of the area. The new visitor's centre therefore presents an opportunity for creating an orienting element within this landscape, i.e. with the ability to bring coherence and spatial continuity to the system of spatial relationships highlighted in **Diagrams 03A & 03B**. This means that the proposed building could indeed be designed as a well-placed landmark as opposed to blending in with its surroundings.

x) **Heritage Indicator 10: Landscaping and Visual Intrusions**

Visual intrusions affecting the spatial qualities of Sub-Precinct 1 are to be removed/transformed or otherwise mitigated.

This situation applies specifically to the electricity substation almost on axis with the main entrance road into the site. The relocation of this installation would be encouraged although costs could well make this option unrealistic. Less costly mitigation would be to screen the substation using belts of trees.

6. SUB-PRECINCT 1: SKETCH PROPOSALS ATTACHED TO THE SITE DEVELOPMENT PLAN

6.1. *The Site Development Plan and Related Sketch Plans: NM & Associates (Annexure 2)*

NM & Associates have prepared a Site Development Plan for Sub-Precinct 1, which accompanies the planning application to the West Coast Municipality. The SDP lays down the parameters for the development and integrates the specialist proposals into a single set of documents. This is the study that forms the basis for the DEADP Environmental Assessment and is also the study that is submitted to HWC for comment in terms of Section 27 (NHRA) as part of the package of plans approach agreed to by APM and BELCom in 2012.

The SDP for Sub-Precinct 1 therefore includes the following inputs which are relevant to the heritage process and which have guided the planning framework:

- Heritage with particular reference to areas of archaeological and palaeontological significance
- Environmental inputs particularly those affecting biodiversity and, sustainability.

The SDP has focused on setting up the necessary preconditions and services to allow the establishment and opening of the Interpretive Centre in line with the requirements of the Lotto Grant. Focus on the fossil dig site itself, which also falls within Sub-Precinct 1, will follow as part of a subsequent implementation phase. In the meantime however the SDP sets up the links between the Interpretive Centre, the mine floor and the fossil dig site through a series of panoramic views and linked walkways extending through the mined valley floor from the Interpretive Centre to the fossil dig site. The dig site is to be upgraded and extended.

The design intent of the Interpretive Centre has followed an operational model in terms of visitor movement, museum planning, interpretive centre exhibits, the visual and functional link between the dig site, and the interpretive centre. The site for the interpretive centre is the result of a carefully considered choice of a number of options.⁹ A key component in the site choice has been to ensure that physical impacts on sensitive heritage areas are kept to a minimum. The current site for the Interpretive Centre is situated on the west facing slopes of the overburden mound facing Quarry “E” and the Fossil Dig Site.

The SDP includes a strong link to the fossil dig site which will be upgraded in terms of visitor facilities as a further phase in the implementation of plans for the site.

Sub-precinct 1 has a number of advantages including the fact that as the Interpretive Centre is situated on an overburden mound which is less sensitive, impacts on significant archaeological and palaeontological sites is kept to a minimum. The site carries a number of challenges including the fact that it is west facing and that the overburden mound requires a degree of stabilization. These issues have been addressed through the design and geotechnical components of the study.

Specialist studies have included electrical, roads and traffic, socio-participatory studies, landscape architecture, museological, architectural, environmental and botanical, sewerage and geotechnical studies (the latter in relation to the overburden mound) As a result the design concept has evolved with these inputs. Most inputs have taken heritage constraints and informants into account. The following are summarized below

6.1.2. Interpretive Centre: Noero Architects: (Full text in Annexure 8).

The intention of the design of the Interpretive Centre is to create a series of smaller buildings to avoid the domination of the landscape by a single large entity. The landscape itself therefore features substantially as a design informant for the Centre which is wrapped around north-south the overburden mound and facing the dramatic “E Quarry”.

⁹ See M Attwell West Coast Fossil Site Baseline Study October 2012 pages 26-29
West Coast Fossil Park (Precinct One): Section 27 Application and Impact Assessment Review,
March 2013, Melanie Attwell and Associates

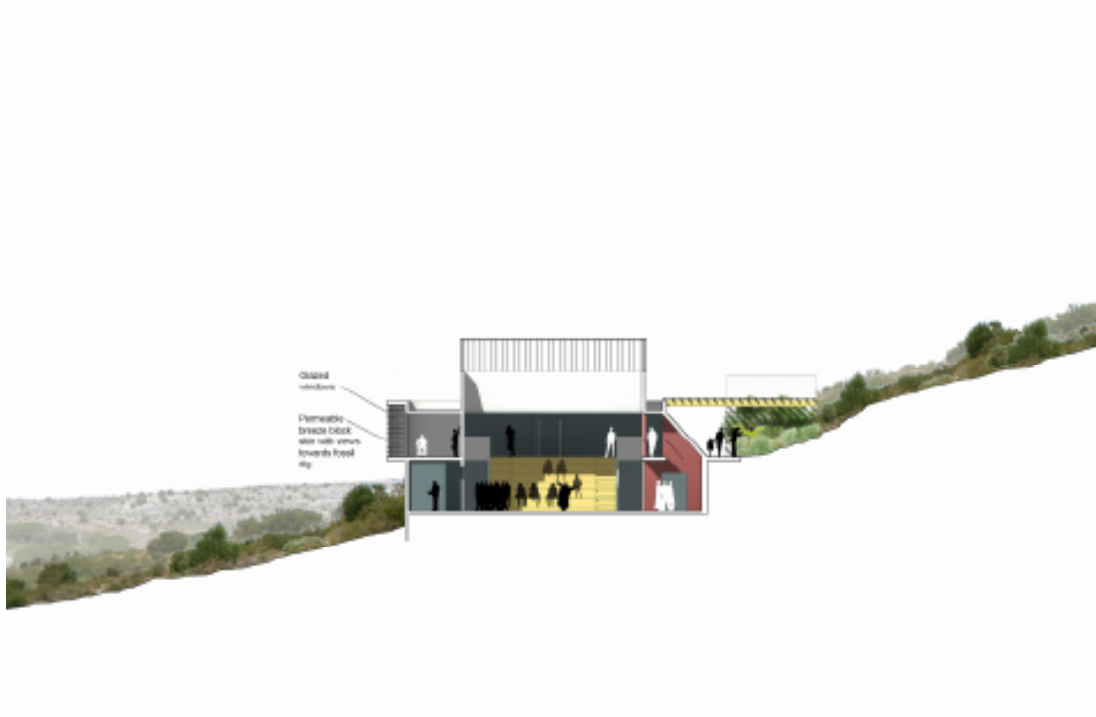


FIGURE 2: A cross section of the interior display/exhibition area: Noero Architects 2013 (See Annexure 8 for larger image).



FIGURE 3: Cross Section of the proposed administration and restaurant sections linked by an internal “street”. Noero Architects 2013 (See Annexure 8 for larger image).

The design ensures maximum views of “E Quarry” while keeping the harsh light and heat to manageable levels. The series of four buildings is situated along the 38 metre contour line and never rises above the top contour of the overburden mound, allowing the landscape to maintain primacy. Visitor entry is at the 38m contour line. The buildings therefore extend from the 31m contour line at the lowest level to the top

contour of 46m. The series of buildings are orientated towards the “E” Quarry and the fossil dig site allowing the site itself to form a significant part of the exhibit.

i) First Phase: The Interpretive Centre

The site for the Interpretive Centre was chosen after a long process of consultation and has been endorsed by HWC. The series of four buildings constructed along the north south axis on the overburden mound are to be strung out along a 5m “street”. The decision was to break up the differing requirements for the site into a series of buildings thereby reducing visual impact and imposition on the landscape

It is proposed that the buildings follow the curve of the overburden dump allowing panoramic views towards Quarry “E”.

After a series of investigations including a geotechnical analysis it was decided not to tie the buildings to a series of pilings but to rather undertake compaction of the overburden mound. This was because it was found that it would be necessary to drill into the rock beneath the overburden mound which is deemed to be palaeontologically sensitive. For a full explanation of this process see **Section 9** “Heritage Issues” and Annexure Six (6.2): “Compaction v Piling”

ii) Movement Patterns

The buildings have been designed and sequenced around visitor movement patterns, allowing maximum use of all spaces and avoiding the “bunching” of crowds particularly in and near the sensitive fossil beds.

From the entrance, the visitor moves south to an orientation space, to the interpretive centre. The entrance plaza allows for panoramic views across the excavated valley floor and the fossil dig site. An education “garden” illustrating plants species of 5 million years ago is planned before the visitor accesses the entrance. The exhibition space is situated at a lower level and the visitor is then led to a circular platform where there are further views of the dig site.

A series of elevated boardwalks will lead the visitor down to the fossil dig site. The boardwalks are grounded by means of concrete piers which do not penetrate the “E Quarry”. The exact siting and direction of the boardwalks will be decided with the assistance of the resident specialist and curator, Ms P Haaroff, to ensure that visitors are able to view known material scatters along the walk.

iii) Materials

Materials for the buildings will be neutral and drawn from the site. It is intended to use different kinds of plastering to echo the horizontal geological layering of the site. The base of the building will be in a darker plaster but the intention generally is to echo the calcrete surfaces of the landscaping in the plaster finishes.

A series of long thin buildings linked by the common “street” allow for the use of environmentally friendly (passive) energy systems such as the use of natural lighting, and natural ventilation.

The building faces west. Heat penetration is therefore problematic but has largely been overcome through applied design interventions. The proposal of a breeze block screen allows the barrier against excessive heat penetration while allowing some views across the landscape. The planting of trees near the east facing courtyard will also provide protection from excessive heat.

ii) Extent

The Accommodation Schedule below provides a high level breakdown of each building and the activities to be accommodated in each respectively.

Accommodation Schedule			
	Building component	Notes	Area of covered space
Interpretive Centre	Multipurpose Education centre	Multipurpose teaching spaces, storage, staff ablutions and kitchen	184m ²
	Visitors Centre and Administration	Includes offices, a boardroom, ticket office, visitor toilets, staff toilets and kitchen, shop, library	468.5m ²
	Restaurant	Kitchen with internal and external eating areas, staff toilets, storage,	173m ² with external seating area of 130m ²
	Museum / Exhibition Centre	Museum / exhibition space, office, store, interactive lab. Note: this may decrease in size depending on funds available	1198m ²
Internal	SUBTOTAL		2023.5m ²
External	Play Park	External play area associated to the restaurant	±70m ²
	Parking Area		± 42 visitor parking bays, ± 8 staff parking bays, ± 8 bus parking bays
Fossil Dig	Fossil Dig		1197m ²

6.1.3. Second Phase (presented in sketch plan and to be constructed as a Phase 2 project)

A second phase to the work consists of the replacement and enlargement of the existing enclosures for the fossil dig sites. To ensure that no fossil sites are affected, attachment of roof coverings will be via a system of gabions that will not penetrate the ground surface. The roof will be made of lightweight galvanized steel sections. Visitors will be led along two elevated walkways from where they may view the fossil sites. Coverings will be translucent to allow for natural light but will ensure low heat penetration.

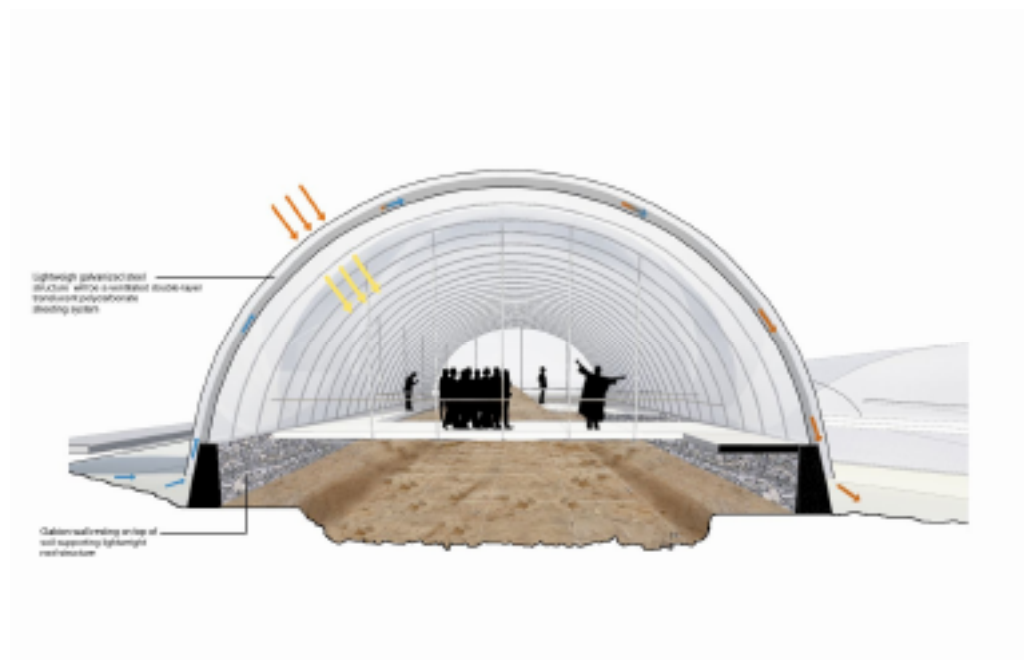


FIGURE 4: Fossil Dig Site Representation of the proposed extended roof structure: (Noero Architects 2013).

6.2. Landscaping (For a full analysis refer to Annexure 3 [OvP])

OvP Landscape Architects has listed a number of objectives to address and inform landscape issues for the Fossil Park. They noted the importance of:

- developing opportunities for learning and responding to the narrative of the site
- maximizing the regional qualities of identity of the West Coast area. This is proposed through the use of indigenous (pre-human, pre-modified) vegetation
- Introducing or re-introducing “indigenous” vegetation. The focus would be on “water-wise” vegetation
- Creating shade areas near heavily used visitor areas
- Creating landscape structure by using and retaining existing landscape features, which impose structure on a generally disturbed ad hoc series of landscape events such as overburden mounds, roads networks related to now defunct mining uses, and unexplained changes in topography. The creation of structure would include as well as allow the retention of belts of eucalyptus trees which remain from the agricultural and mining periods.
- Using “E Quarry as the focal point and as a place-making element. This is achieved through the process of framed views. The visitor is guided through the site by a series of pathways and elevated boardwalks.

The landscape plan considered the introduction of all alien trees including eucalyptus as having a negative impact on the landscape because they prevent the reseedling of indigenous plant species. The plan however notes the structuring role of eucalyptus trees. However, they remain a strong visual element in a landscape devoid largely of such defining visual elements. The proposal is to replant such trees where they remain a strong defining element but remove self seeded trees or those that do not contribute to the structuring of the site.

penetrate the earth at the lower path; and the upper path of laterite with a granite edging.

6.3.3. Tree Planting

The intention (in keeping with the vision of the West Coast Fossil Park Trust) is to promote sustainability using indigenous vegetation where possible to “restore” the landscape to a pre-modified condition. Where shade is necessary around well-used areas, certain selected water wise tree species have been chosen for that purpose. The strong tree belts of eucalypts are to remain where they form a definitive pattern in the landscape.

Planting is based on encouraging biodiversity on the site and “restoring” a landscape to indigenous pre-human origins. The proposal intends to take cognisance of the agricultural past by extending the existing olive groves. Crop trees however were not planted in this area as agricultural activity was largely wheat and cattle based. In addition, because trees do not occur naturally in this area, the plan proposes the introduction of shade trees around the buildings and parking areas.

The landscape plan also proposes the re-creation of a 5-million-year-old, sub-tropical type landscape in a space within the interpretive centre for educational purposes.

In terms of natural existing landscapes, the plan proposes re-planting vegetation in natural and wetland areas which are regarded as being of high landscape significance. Interventions attached to the wetland areas will be relatively minor but will focus on alien control.

It should be noted that any proposed re-vegetation will need to be kept to a minimum or eliminated altogether on the floor of “E Quarry” because of potential impact on fossils.

6.3.4. Landscape and identity.

The landscape proposal notes the link between landscape and regional identity and proposes to use landscape elements in “revealing the site and adding to a unified identity as well as integrating the buildings into the natural landscape”. To this end, the plan proposes the use of natural and local elements as a palette to integrate the building into the environment. Such a palette would be sturdy enough to withstand the harsh conditions of the site. Such materials would include calcrete and laterite for road and parking surfaces with granite edging and markers. The “upper paths”, including the path for the disabled, or paths outside the mined valley floor, would be composed of these materials. However the “lower paths” or boardwalks along the palaeontologically sensitive mined valley floor would be composed of timber with pre-cast concrete footings which would not penetrate the mined valley floor.

6.3.5. Planting in “E” Quarry, landscape management in wetland and natural areas

The landscape plan proposes “high priority” alien eradication and succession management to ensure a strong bio-diversity element. The plan proposes “highly controlled planting” in the identified palaeontologically sensitive environments of the

mined floor of “E” Quarry. The plan notes the wetlands as being ecologically sensitive. Landscaping around the relatively saline wetland areas will focus on alien eradication and the development of amenities such as paths, and a bird hide. For further comment on this approach see Section “Heritage Issues”.

6.4. Services (For sketch proposals and Report, refer **Annexure Five** [Storey Engineers])

Report with addendum on the Provision of Engineering services Rev 1) and **Diagram 04**: NM Associates: SDP including services.

6.4.1. Roads

Access to the site will remain at the existing entrance off the R45. Cars will be directed to the new parking area. The road network is a remnant of mining operations and follows a distribution pattern developed through that function. The intention of the current proposal is to use the existing road network in order to save costs and work with already disturbed sites.

The road network is mostly porous with the exception of the access road between the gate and the Blue Building (The current visitors’ centre and administration block). It is proposed that this remains asphalt or at least the first section up to the substation.

Where new roads are to be constructed and parking areas developed, it is proposed that the road surfaces be of laterite with swales on the edges to accommodate increased run off be used. Where using the existing soft surfaced roads it is proposed that a weak laterite wearing course and swales on the edges that accommodate surface run-off be permitted. These swales can also act as filters, cleaning the water before it enters more sensitive areas. The parking area is outside any archaeological or palaeontologically sensitive areas.

Footpaths outside of sensitive Paleontological areas will be surfaced in the same manner. Where paths are located on sensitive areas boardwalks will be installed. The building will use an oxidation pond at the site yet to be determined for the treatment of sewerage. The existing road network will be retained and used. Services will be run along the existing road system to ensure minimal impact on potential heritage resources.

6.4.2. Water: (See **Annexure 5**: Storey Engineering (Pty) Ltd, Report on the Provision of Civil Engineering Services C11070 2013)

The water distribution main is situated near the site entrance at the R45. It is proposed that a new water pipe be installed. This will be aligned along the existing road network in a trench with a minimum of 900mm covering the new pipe. This trench will be separate to the electrical trenching. Use of the existing road network is intended to reduce impact on sensitive archaeological areas but utilizing already modified and disturbed routes. There is also a water storage facility proposed close to the Interpretive Centre, for fire fighting purposes. This will be situated in the overburden area and not on sensitive ground.

Water to the Fossil Dig site will run from the Interpretive Centre to the dig site above ground so that there be no penetration of sensitive areas. The supply pipe will be attached to the boardwalk.

6.2.3. Sewerage Options (Annexure 5): Storey Engineering, Report on the Provision of Civil Engineering Services C11070 2013)

Sewerage is a critical issue as natural drainage could have an impact on sensitive areas if poorly situated. A key issue in this instance has been to ensure that whatever sewerage mechanism is used, physical impacts on sensitive below ground deposits is avoided. A number of options for the treatment of sewerage have been considered. At present these options have been narrowed down to three.

i) *Option 1: Oxidation Ponds.* This involves the waste passing through a series of shallow dams. The size of the ponds is determined by the volumes involved. At least 5 dams/ponds would be involved and .5 ha would be needed for the process. The discharge from the ponds will pass into a reed bed. This is the most passive of the systems as no power would be involved. It is proposed that this option be situated in a shallow dip to the east of the Interpretive Centre. This will not be visible from the Interpretive Centre. This is the specialists preferred option for the treatment of sewerage.

ii) *Option 2: Package Treatment Plant.* These comprise a number of manufactured units. The treatment process is proprietary and would be dependent on the supplier's process and equipment. The proposal is to locate this option near the new parking area for proximity to electrical power which will be required. The maturation ponds and reed beds would be some distance away. The current proposal has the maturation pond in a sensitive area as it is situated in an area of known deposits. Should this option be adopted it could only be done if the maturation ponds be moved a considerable distance away from the sensitive areas. Subsequent to the identification of an additional sensitive area east of the overburden mound a further refinement to this option has been proposed. It has been proposed¹⁰ that the option would still be viable if the maturation pond or reed bed can be located outside the sensitive areas and specifically to the north in the areas previously disturbed by mining operations. The effluent from the package treatment plant can be transported to the maturation pond in a pipe installed below the existing road. A further proposed alternative would be to locate the package treatment plant and the maturation pond in the disturbed area to the north with raw effluent transported from the Interpretive Centre in a pipe installed below ground to be routed along the existing road.

iii) *Option 3: The Septic tanks Option.* This option would allow for large storage tanks (about 33 cu m) to be situated on the overburden mound. There would be French drains and soak-aways to the south away from the building. This is the client's preferred option.

6.2.4. Electricity

Given the estimated load of approximately 199kVA for the new IC development, it is proposed that the existing 100kVA transformer is upgraded to a 315kVA mini-sub at

¹⁰ Letter P Storey to NM&A 4 April 2013

the building site. A new 11kV supply cable will be installed in a trench below the existing road network, 900mm below the surface as with the water supply. The telecoms cables, where required, will be laid in the same trench. Should the “package treatment” sewerage option be considered, this could be supplied by a PV system.

At the Fossil Dig site the low voltage supply cables will be fixed to the underside of the boardwalk between the Dig Site and the Interpretive Centre to avoid the need to disturb the potentially sensitive ground in this portion of the park.

As a result of the Park’s stated aim towards improved sustainability, buildings will incorporate solar water heaters for the ablutions, showers and the restaurant. Energy efficient lighting will be installed throughout the development and the new buildings will utilise passive cooling and lighting systems as far as possible.

7. PUBLIC CONSULTATION

7.1. Consultation Process to date. For the Report on the public Consultation Process See RAINN **Annexure 4**.

The National Heritage Resources Act (Act 29 of 1999) makes requirement for “the results of consultation with communities affected by the development and other interested parties regarding the impact of the development on heritage sources” (section 38 (3) [e]).

RAINN was appointed to run the public consultation workshops and prepare the relevant socio-economic profiles of the communities affected, including the Green Village. Their brief was to provide specialist services to conduct and facilitate specialist services to conduct and facilitate inputs to the professional team as a whole and specifically to support the heritage and environmental specialists’ scope of work as required by the project.

This report submitted in 2013 serves as an integrated report on research undertaken, which was focused on gathering primary research data through:

- a series of stakeholder engagement sessions with a broad range of relevant stakeholders; plus
- a rapid scan of the adjacent local community, Green Village, on community-based knowledge of the socio-economic realities within their landscape.

This work was to support the EIA and HIA processes, particularly those issues affecting stakeholder participation. It was also intended to identify, inform and engage a limited stakeholder group including the inhabitants of the Green Village, about the nature of the WCFP proposals; and to acquire inputs into the proposal itself. It was also an economic research document undertaken to gain knowledge of the existing socio-economic environment in the vicinity of the West Coast Fossil Park.

A full stakeholder participation process was subsequently undertaken in December 2012. This included workshops to gather primary research information with relevant

stakeholder groups and detailed workshops requiring input from professional and expert groups. Nine meetings were held. These were:

- Meeting One: Education officials
- Meeting Two: Staff management and volunteers at the WCFP
- Meeting Three: Service providers and tourism professional
- Meeting Four: Neighbours and landowners
- Meetings Five and Eight: Archaeology Palaeontology and heritage
- Meeting Six: Conservation and Environment
- Meeting Seven: Local and District Municipalities and tourism agencies
- Meeting Nine: Residents of the Green Village

Two workshops affecting heritage-related matters were held on 3rd and 6th December 2012 respectively. Both SAHRA and HWC were invited to attend the meetings. In total, nineteen specialists attended the meetings. Issues raised were the following:

- The pivotal importance of the fossil dig to the Park's future
- The Interpretive Centre and the Dig site should be seen and planned for as a single entity
- It is important of a design concept of how the fossil dig site is linked to the interpretive centre
- The capacity of the dig site to absorb increased visitor numbers is important. There will be a conservation problem or tipping point if the fossil dig site is required to accommodate too many visitors
- The different precinct and areas need to be carefully managed to cater for future growth in visitor numbers.

No major issues or objection emerged during the public engagement process and the proposal has received strong support from the general and specialist members of the public, as well as the local communities.

See **Annexure 4** for a full list of issues and concerns throughout the Public Consultation Process.

7.2. Heritage Comment and Outcomes Resulting from Issues Raised.

Participants focussed their attention of the most significant of the sites – the fossil dig site rather than the Interpretive Centre. There was concern that the emphasis was placed on improvement of the tourism related and visitor related aspects of the intervention without concomitant focus on management of impacts on the deeply significant and vulnerable parts of the Park. In so doing they emphasised the significance of the Park as a research facility, the need to link the new visitors centre in a considered and careful way and the need to consider capacity constraints within the dig site itself. The focus of the project is on the Interpretive Centre for reasons attached to the conditions of the Lotto application. However, the expert response was strongly in favour of strong links between the Dig Site and the Interpretive Centre, careful attention to visitor numbers management and optimal conditions for the conservation of the fossils contained within the Dig Site.

In response to the issues raised during the consultation process, the following should be noted:

- Although only the first phase will be implemented at this point the design concept strongly links the Interpretive Centre and the Fossil Dig site
- Visitor movement will be managed in terms of a pedestrian flow contained within the design of the Centre itself, to ensure that visitors are “strung out” along the routes and interior spaces which should result in minimal congestion within the Fossil Dig Site
- A new structure is proposed for the Fossil Dig which will enlarge the visitor area. The proposal is for a lightweight structure anchored by means of stone gabions which will not penetrate of dig floor. The proposal is for a well ventilated area with natural lighting
- The upgrading of the Fossil Dig site will be undertaken as soon as funds become available.

8. THE SDP: THE SKETCH PLAN OPTIONS

There are three options¹¹ proposed within the SDP for review by HWC and DEADP. All three are the same in terms of design of the Interpretive Centre, roads and landscaping but differ in relation to the options affecting the treatment and placement of sewerage options.

The Three Options are

8.1. Option 1

- Site “D” Location of IC West slope of overburden mound.
- Buildings to be founded using dynamic compaction rather than the stabilization and anchoring of the structures on piles extending into the overburden.
- Buildings situated between 38m and 46m contour line.
- Comprises a series of four buildings situated on the overburden mound linked together along a north south axis and grouped around a 5m interior pedestrian “street”.
- Permeable breeze block screens in Interpretive Centre and west façade of Administration block

Buildings are:

- Multi purpose education centre 184 sq m
- Visitor’s centre and administration building 468.5 sq m
- Restaurant 173 sq m
- Museum exhibition space 1198 sq m

Exterior spaces include:

- Playpark (or external gathering space) 70sq m
- Parking area comprising
- 42 visitor parking bays,
- 8 bus parking bays and

¹¹ This excludes the “no development” option.

- 8 staff parking bays

Fossil Dig site:

- Covering extended by 50% to allowed increased research/investigation
- Founded on stone-filled gabions supporting new roof structure.
- Existing barrel shape roof form to remain with arched roof structures of lightweight galvanised steel sections supporting translucent polycarbonate roof sheeting
- Timber walkways linking Fossil Dig site to Interpretive Centre

Access and paths

- Circulation orientation space with optional exit and route points
- Circulation from car park via cut in overburden mound
- Multi purpose education facility compromises entry point
- Access to dig site via circular route of boardwalks from lower level of interpretive centre. Exact route of boardwalks to be decided in consultation with archaeologists/palaeontologists.

Landscaping

- Tree planting of selective indigenous species
- Retention in part of eucalyptus tree belts
- Development of interior “5million year old” garden facility
- Soft road surfacing of laterite
- Parking facility surfaced in laterite
- Upper and lower pedestrian link between Interpretive Centre and Fossil dig site
- Rehabilitation of natural landscape away from pedestrian areas

Roads

- Use of existing road network
- Placement of service beneath existing road network

Sewerage:

- Waste stabilization ponds: use of a minimum of five ponds
- Reed bed
- Inflow of 20.6 kl per day
- Area required about .5 ha in extent
- Located in overburden mound away south-east of Interpretive Centre

8.2. Option 2

Same as Option 1, except for:

Sewerage Option 2: Package Treatment Plant consisting of:

- Manufactured units relative to specific treatments.
- Package Plant to be located above ground near new parking area in proximity to electrical connection
- Maturation ponds and reed beds located outside archaeologically and palaeontologically sensitive areas

- Area required is 500 sq metre and 0.25 for stabilisation pond and reed bed.

8.3. Option 3

Same as Option 1, except for:

Sewerage Option 3: Septic Tank Option (Clients Preferred option) consisting of:

- Septic Tanks to be located in overburden mound neat transport for vehicles to de-sledge, away from sensitive areas (archaeology and palaeontology)
- Tanks 30 m2 in extent
- French Drains and soakaways located south of the building complex.

8.4. Option 4

There is also a fourth option as required in terms of NEMA is the no-go option. This option is regarded as unlikely, bearing in mind the need to utilise the funding proposed by the Lotto grant, the public good arising out of such an development, the improvement of needed tourism facilities and jobs in the West Coast; and the strong need to appropriately showcase, explain and exhibit unique archaeological and palaeontological resources in the creation of a world class Museum facility.

8.5 Summary Statement

None of these options are located in archaeologically or palaeontologically sensitive areas except for part of Option 2 which includes a reed bed/maturation pond in an area of known palaeontological sensitivity. The reed bed can be moved (refer S: Heritage Issues) and if done, would not result in negative heritage impacts, resulting in all three options having similar (Low-No) impacts.

The compaction option for the Interpretation Center's founding system has been identified by palaeontological experts as the least invasive for potential palaeontological resources in that area. This means that there are no fundamental differences in any of the three development options with regard to heritage impacts.

9. HERITAGE ISSUES

A number of heritage related issues have emerged during the course of studies and proposals affecting the site. These issues affect the review of impacts and the route taken in terms of the planning for the site. Heritage related concerns and limitation have largely been taken into account or responded to during the development of the sketch proposals.

The following are heritage issues and areas of debate which have emerged during the course of negotiation and assessment of the impact of the proposal on heritage resources:

9.1. Queries emerging from the APM and BELCom Submission (Annexure 7)

The NoD from Heritage Western Cape in response to the West Coast Fossil Park Baseline Heritage Study queried two issues. The first concerns the potential course of

the palaeo-Berg River. The Second concerns the question of whether and how much mining had occurred beneath the overburden mound on which the Interpretive Centre will be situated. The latter has a direct impact upon the piling versus compaction options which have been addressed in this report. (See item 9.2. below).

i) The course of the palaeo-Berg River and the extension of the proposed Grade 1 area.

P Haarhoff notes that B. Hendey has indicated in various publications where he thinks three distinct positions of the lower course of the palaeo-Berg river might have had its channels within “E” Quarry. (See Appendix 1: Hendey 1980 Fig 26; Hendey 1981 Figs 2, 4, 6, 7, 11). He states that when the LQSM was deposited, the river channel was to the south-east and south of “E” Quarry; so it was not actually exposed in the Quarry itself (Hendey 1981 Fig 6). The second position of the channel was about 500m further north, cutting diagonally across “E” Quarry from north-east to south-west. This channel is associated with Bed 3aS of the MPPM. The third position, slightly north of Bed 3aS, is associated with Bed 3aN (Hendey 1980 Fig 26; Hendey 1981 Fig 6.) and this change might have affected a relatively short section of the river – only maybe as little as the last kilometre from the mouth. The mouth was probably in the same position for both of these channels. It is generally agreed (QB Hendey, R Smith, D Stynder, J Compton *pers.comm.*) that much more detailed work on the sediments is required in order to map both the upper and lower reaches of the palaeo-Berg river in more detail and more accurately. Indeed, there is ongoing discussion regarding whether it was the palaeo-Berg river flowing into “E” Quarry or whether the ancient drainage pattern in this region was more like a delta.

In response to the query it can be concluded that further research work needs to be undertaken before evidence is sufficiently accurate to make conclusions about the course of palaeo-Berg River and before any conclusions can be reached as to how to extend the Grade 1 site proposal.

ii) The extent to which mining has occurred beneath the overburden mound

Haarhoff¹² notes that that mining beneath the overburden has been extensive (QB Hendey *pers comm.*). Aerial photographs give a clear indication that this is so. According to Brett Hendey (*pers.comm.*) many of the LQSM fossil sites have been covered by this bank of overburden. These sites were identified by Hendey (1981) as a river channel, tidal flats, marsh and floodplain. Fossils associated with these sites include pollens; abundant marine, estuarine and freshwater invertebrates and a wide variety of vertebrates. Examples of the more common vertebrates include a tortoise (*Chersina sp.*); francolin (Phasianidae – at least two species); a rhinoceros (*Ceratotherium praecox*); a giant pig (*Nyanzachoerus kanamensis*); a boselaphine antelope (*Mesembriportax acrae*); a seal (*Homiphoca capensis*); and giraffids (*Giraffa sp.*, and *Sivatherium hendeyi*).

Haarhoff also notes that within the overburden mound itself there may be displaced fossil remnants. She notes: “fossils are associated with the Langebaan Formation and hence could potentially be located within the proposed building site”.

The conclusion is that although mining in this area was extensive the area beneath the overburden mound remains sensitive. As a result, investigations have been

¹² See Annexure 7.

undertaken by geo-technical specialists to ensure that the founding systems for the Interpretive Centre do not impact the floor of the site beneath the overburden. In terms of deposits remaining by accident within the overburden mound itself, although they would be out of context, they would still need to be recorded and collected by an authorised specialist. Interventions would need to be in response to heritage related indicator one which stated, “New development within Sub-Precinct 1 is to promote and consolidate its archaeological and palaeontological integrity within a physical context that is of national if not international significance”.

The mechanisms to protect the excavated area beneath the overburden mound and deposits within the mound itself are referred to in **Section 11 Mitigation of Impacts**

9.2. Interpretive Centre: Compaction vs Piling Option. (Annexure 6)

The affected heritage related design informant (Informant six) stated that in order to minimise a construction footprint on sensitive sites, “suspended construction and supported by posts piles would be favoured for large structures over trench founded constructions”. However, this would not apply “where a site is not considered palaeontologically or archaeologically sensitive”.¹³ The initial intention had been to use a piling option for the founding mechanisms for the buildings comprising the interpretive centre group.

Based on an investigation of the overburden mound, M van Wieringen & Associates, Consulting Geotechnical Engineers proposed three options:

- i) Excavation of the loose fill material down to the naturally consolidated dense material which is likely to be of the order of 3.5m below ground level at the front of the buildings. Conventionally constructing the foundations at this level and then backfilling and compacting the excavated material back to platform level. This would require excavations of a minimum of 3.5m deep at the front of the building. The sides of the excavations in the loose material will tend to collapse and rest at a safe angle of 30 degrees with the result that it will probably be more effective to excavate the entire lower half of the site and backfill and compact the material back around the foundations and foundation walls.
- ii) Founding the buildings on piles socketed into or founded on the firm mine pit floor, which is about 5-7m below ground level. While this option seemed at first glance to be the most positive founding solution, it had a number of drawbacks. The piles will be either socketed into or founded on the firm mine floor, about 5-7m below ground level. We have been told that this is undesirable as valuable existing fossils could be disturbed or obliterated in this process. It was considered likely to be the most expensive option, as it required specialised plant and machinery. The fill material below and surrounding the buildings will continue to settle over the years relative to the building which will require the ground floor slabs to be reinforced. This was considered to be the most expensive and inflexible of the options.
- iii) Cut the building platforms and then carry out dynamic or rapid impact compaction from the surface to improve the loose upper 3.5m of fill. Foundations are then placed at shallow depths in the improved fill. In this process the loose

¹³ M Attwell WCFP, Baseline Study pp41-42. 2012

material is compacted from the surface of the cut platform using dynamic or rapid impact compaction. Foundations are placed at shallow depth in the compacted fill and surface bed slabs may be placed on the fill with a minimised risk of differential settlements. Dynamic compaction may only be required over a portion of the building platforms as the cut areas are close to the dense material. If this founding method is used then the dynamic compaction should be expanded, at relatively low cost, to include the walkways and parking area which will require ground improvement in any case. This will create a more stable environment for surrounding external works and services. This option is called the dynamic compaction option.

Although the initial intention had been to use a piling option for the founding mechanisms for the buildings, it was concluded that this would be problematic and it would be necessary to penetrate into the rock floor beneath the overburden mound and extend the height of the piling (Option 2). The rock beneath the overburden mound is considered by specialists to be a highly sensitive and potentially vulnerable area from a heritage (palaeontological) perspective. The architects wished to avoid drilling or penetration into the rock floor.

Since the rock floor (or pit level) was regarded as significant for palaeontological reasons and the overburden mound might contain deposits (although not in situ), both option 2 and 3 were considered as having some impact on deposits although clearly the major requirement need to protect the rock floor. As a result it was decided to secure the advice and comment of an outside specialist. Dr Deano Stynder from the University of Cape Town was approached to deliver a judgement on both the significance of the deposits within the overburden mound and a comment regarding the potential dynamic compaction might have on the rock deposits.

His response is attached as **Annexure 6**. In his evaluation, Dr Stynder concluded that the dynamic compaction option would have the least adverse impact on the valuable fossil material which might remain beneath the overburden mound. He stated, “So in sum, I support the dynamic compaction method as the one that would cause least damage to valuable *in situ* fossil material during the construction of the West Coast Fossil Park Interpretive Centre. However, the geotechnical engineers would have to be absolutely certain about stress wave penetration depth to prevent destruction of fossil material below the overburden mound”¹⁴.

In response M van Wieringen and Associates noted that the compaction method and the degree and hence depth of densification, will be tailored to only achieve densification of the loose fill and not below it. This is dictated by cost as the deeper the compaction the more the cost. This will not cause fracturing of fossils in the underlying *in situ* ground and lowermost fill. Even within the densified fill, only fossils within the uppermost metre or where excavated, are likely to be pulverized as below that hard lumps are likely to remain mostly intact.¹⁵ This letter is also attached as Annexure 7.2. to this report.

Dr Stynder was less concerned with the potential remnant deposits within the overburden mound as they were no longer in situ. Mitigation measures proposed by Ms

¹⁴ Letter Independent Expert Opinion: Dr D Stynder University of Cape Town 28th March 2013.

¹⁵ Letter M van Wieringen and Associates, Consulting Geotechnical Engineers to M Attwell 4th April 2013.

P Haarhoff¹⁶ which required a suitably qualified person to be present at the time of excavation of the overburden mound, would allow for any archaeological and palaeontological material to be located, identified and removed during this process.

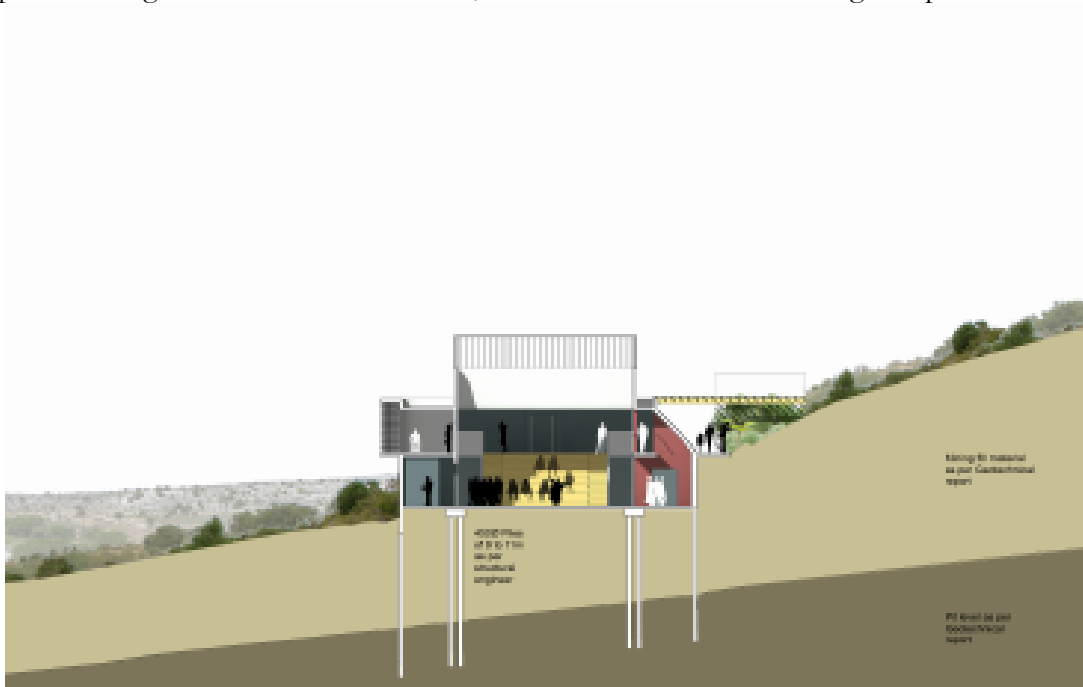


FIGURE 7: Option 2: The Interpretive Centre on the overburden mound: The piling option on 9 to 11 metre piles penetrating the rock floor. Noero Architects, 2013. (Option 1 not shown)

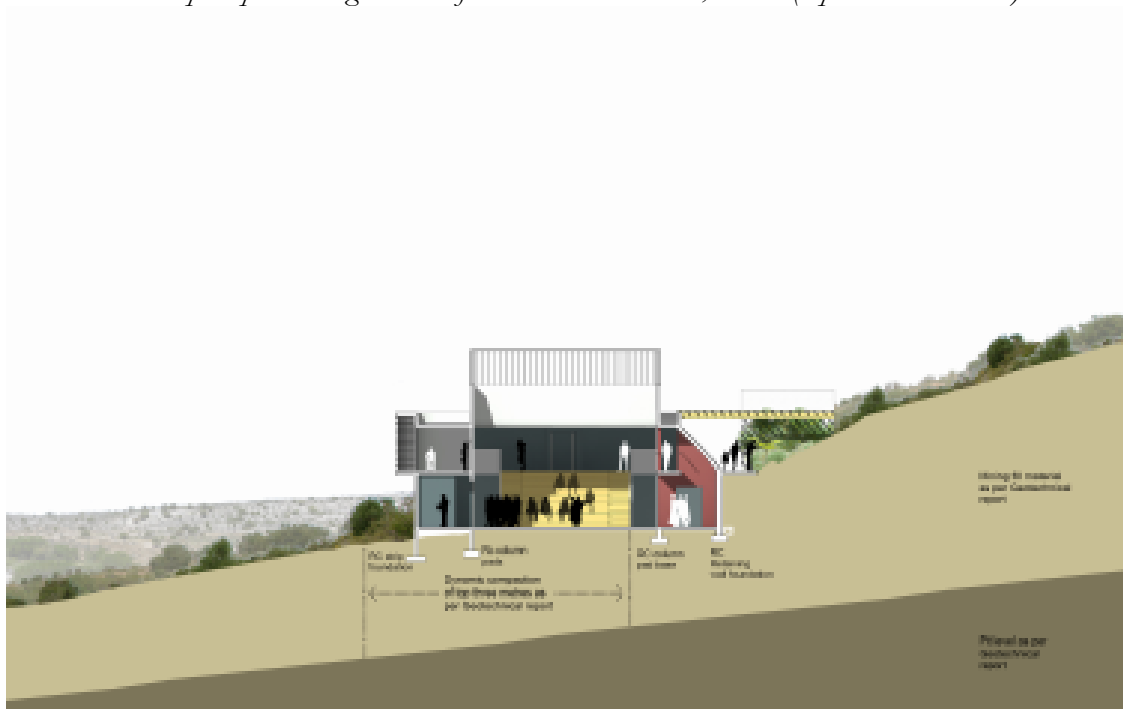


FIGURE 8: Option 3. The Interpretive Centre: The dynamic Compaction option showing compaction of top three metres over overburden mound. Noero Architects, 2013.

9.3. The Cultural Landscape Significance and the Landscape Plan

¹⁶ M Attwell West Coast Fossil Park Baseline Study 2012 Annexure 3
 West Coast Fossil Park (Precinct One): Section 27 Application and Impact Assessment Review, 32
 March 2013, Melanie Attwell and Associates

The motivation attached to the Landscape Plan raises a number of issues that have a heritage impact, particularly relating the evaluation of the cultural landscape. It has been established (See Section 10.1 below: Heritage Impact Assessment) that a modified landscape and the types of modification that result are considered to have heritage significance. The powerful modifications to the landscape through mining activity have resulted in a modified landscape of broad excavated valleys, large overburden mounds, soft edged mining roads a level of informality or “ad hoc-ness” or lack of formalism in terms of spaces; and above all, the deep excavated floor of the E Quarry. In terms of a cultural landscape analysis, these modifications have value and should be considered as an “area of opportunity”¹⁷ in terms of the landscape plan.

Consequently, the mining landscape is of cultural landscape significance not only because it revealed the palaeontological landscape beneath it, but also because the mining activity resulted in a deeply modified landscape type. This landscape could be considered to “thematically link places within the landscape” and contribute to a sense of identity and historical layering.

The West Coast regional landscape is composed of rolling hills, long vistas harsh light and treeless spaces. These treeless spaces, the result of geographical and climactic conditions, are relieved in the regional contexts by the windbreaks and avenues of alien vegetation including the strong presence of eucalyptus trees. Such elements in the absence of any competition contribute strongly to the sense of regional identity.

Into this a dominant paradigm of the landscape plan to “restore” to a pre-human pre-modified landscape types should be considered with caution. While there is a strong impetus to plant indigenous vegetation or reasons of sustainability and being “water wise” this should be seen as another modification to the landscape, a new layer of human modification rather than the restoration of a timeless environment. As a result, the various layers of modification, mining, pastoral and a recreated indigenous landscape, should co-exist. As has been achieved in the architecture for the proposal, the landscape plan should be at ease with the regional qualities of landscape even if they are not necessarily indigenous.

Consequently the following should be considered

- The removal of hard road edges for a softer edge
- Avoid excessive tree planting to soften what is a harsh landscape
- The retention of eucalyptus tree avenues and belts and mechanisms to replace dead or senescent alien trees where necessary. This refers to tree belts and copses identified as significant in the Baseline Study. This has been addressed in the landscape plan.
- No trees to be planted in or on the perimeter of Quarry E
- A reduction of new formal plantings, particularly at the entrance to the WCFP off the R45 (This strictly speaking is outside the scope of this study which refer to Sub Precinct 1 only).

It should be noted that while visitor comfort in terms of shade and protection from harsh light and heat is necessary. It should be achieved at the small scale relating in particular to the landscape treatment at the entrance to the visitor centre. At a large scale

¹⁷ M Attwell West Coast Fossil Park Baseline study 2012 page 40

the landscape should be allowed to remain a relatively bleak and ‘unpretty’ landscape as that, after all, is it’s cultural identity.

The Landscape Plan has accommodated the human landscape through the retention of the significant belts of the eucalyptus trees. However, in terms of cultural landscapes, there may be further mechanisms to explore and retain mining and pastoral related identity and to bring to the fore the regional qualities of the area.

9.4. Soak-aways and reedbeds: Impacts of the Sewerage Option

In an a process which has taken sensitive sites, areas of archaeological palaeontological and heritage significance into account in full, the only potential issue of physical impact on buried (or in some cases) surface deposits, has been the question of the placement of the reed maturation ponds, reed beds and soak-aways linked to the treatment of sewerage. This is because any such system placed close to or within a sensitive area has the potential to contaminate or otherwise adversely affect sub surface archaeological and palaeontological deposits. Options 1 and 3 have minimal impact on sensitive areas.

Option 2, which initially positioned a maturation pond in a sensitive area, has been rethought to accommodate the repositioning of the reed bed/maturation pond to the previously disturbed areas to the north. Should this be achieved, all three of the sewerage option could be assessed as having low impact on heritage resources of high significance. However should the reed bed or maturation pond remain in its current position the impact for Option Two on heritage resources will be high.

10. ASSESSMENT OF IMPACTS

10.1. Measurement against the HWC Endorsed Heritage Design Indicators

This report assesses the development proposals for Sub-Precinct 1 as addressed in the following documentation:

NM& Associates: (Annexure 2)

- West Coast Fossil Park: SDP
- Fig 2.1. Site Development Plan

OvP (Annexure 3)

- Landscape Site Development Plan 2013/04/06 No 307-06

Services: Storey Engineers (Pty Ltd)

- Sewerage Option 1 Waste Stabilization Ponds C11070/c/005/1 2013.03.10
- Sewerage Option 3 Septic Tank Proposal for WCFP Arup 2013/04/09
- Water Supply C 11070/c/004 2013.03.08

Noero Architects

- WCFP Elevation
- Site Development Plan 2013/03/11 rev 2

- SDP Ground Floor and First Floor Plan B Rev 1 2013/03/11
- SDP Smaller Site Area A Rev 2 2013/03/11
- Admin and Restaurant Cross Sections 2013/03/11
- Interpretive Centre Cross Section 2013/ 03/11

Development Options 1, 2 &-3 have been measured against the heritage-related design indicators set out and summarized in **Table 1** attached. Note that the findings in this table apply to all three options simultaneously, as there was found to be no substantial difference in their potential impacts on heritage resources, apart from in one instance, which has been specifically identified (i.e. relating to Sewerage Option 2).

Table 1 indicates clearly that the development options perform HIGHLY with regard to these indicators.

The impact status of the proposals is predominantly POSITIVE in relation to the heritage indicators, with only some aspects identified as NEUTRAL and none identified as NEGATIVE.

10.2. Impacts during Construction and Operational Phases

Arising from the findings in Table 1, the following tables below and overleaf distinguish between impacts and recommended mitigation during the Operation and Construction phases of the project.

10.2.1. Impact: West Coast Fossil Park Interpretation/Visitor's Centre

IMPACT & MITIGATION	CONSTRUCTION PHASE	OPERATIONAL PHASE
Extent of Impact	Provincial/National	Provincial/National
Duration of Impact	Long Term	Long Term
Intensity of Impact	LOW with Mitigation	LOW
Probability of Occurrence	Highly Probable	Highly Probable
Status of Impact	NEUTRAL to POSITIVE with mitigation	POSITIVE
Accumulative Impact	POSITIVE	HIGH POSITIVE
Degree of Confidence	HIGH	HIGH
Significance of Impacts	LOW in areas of high cultural significance	LOW in areas of high cultural significance
Mitigation	<p>Trenching and excavation of overburden mound to be subject to a watching brief. ECO to liaise directly with consultant archaeologist/palaeontologist.</p> <p>Dynamic compaction to be conducted in accordance with the significance of the site. Detailed construction environmental and heritage management plans to be drawn up prior to construction: to include details affecting archaeo/palaeo watching brief.</p>	<p>Focus on optimal tourism experience vs capacity of site to absorb visitor numbers.</p> <p>Development of a Museum Management and collections plan.</p> <p>Ongoing monitoring of visitor impacts on heritage resources.</p>

Significance of Impacts with Mitigation	LOW	LOW-NONE
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10.2.2. Impact: Dig Site and Walkways in E Quarry

IMPACT & MITIGATION	CONSTRUCTION PHASE	OPERATIONAL PHASE
Extent of Impact	National	National
Duration of Impact	Short Term	Long Term
Intensity of Impact	LOW	LOW
Probability of Occurrence	Highly Probable	Highly Probable
Status of Impact	NEUTRAL to POSITIVE with mitigation	POSITIVE
Accumulative Impact	HIGH POSITIVE	HIGH POSITIVE
Degree of Confidence	HIGH	HIGH
Significance of Impacts	LOW-NO Significance with mitigation.	LOW-NO Significance with mitigation.
Mitigation	<p>Detailed construction environmental and heritage management plan (EMP) to be drawn up prior to construction: to include details affecting archaeo/palaeo watching brief.</p> <p>No trenching or digging to be undertaken in Quarry E without an HWC permit.</p> <p>Services to Fossil Dig site to be placed beneath elevated walkways.</p>	<p>No tree planting in E Quarry.</p> <p>Removal of vegetation to be undertaken in the presence of an archaeologist.</p> <p>Signage to direct visitors to remain on walkways and paths.</p> <p>Development of a detailed plan to control conditions within the covered fossil dig site.</p>
Significance of Impacts with Mitigation	LOW	LOW-NONE
EMP Requirements	Full archaeological watching brief as part of EMP.	

10.2.3. Provision of Services to Interpretation/Visitor's Centre and Fossil Dig Site

IMPACT & MITIGATION	CONSTRUCTION PHASE	OPERATIONAL PHASE
Extent of Impact	Provincial/National	Provincial/National
Duration of Impact	Long Term	Long Term
Intensity of Impact	LOW	LOW with appropriate management.
Probability of Occurrence	Highly Probable	Highly Probable
Status of Impact	NEUTRAL with mitigation	NEUTRAL with appropriate management.
Accumulative Impact	POSITIVE	POSITIVE
Degree of Confidence	HIGH	HIGH
Significance of Impacts	LOW-NO Significance with mitigation.	LOW-NO Significance with appropriate management.
Mitigation	To be addressed in the detailed construction environmental and heritage management plan (EMP). EMP to include details	

	affecting archaeo/palaeo watching brief. No trenching or digging to be undertaken in Quarry E area without an HWC permit.	
Significance of Impacts with Mitigation	LOW	LOW-NONE
EMP Requirements	Full archaeological watching brief as part of EMP.	
DISCUSSION: Cumulative impact of the development on the cultural landscape is reduced by the omission of the development proposals, although the area contains no individual heritage resources.		

11. CONCLUSIONS AND RECOMMENDATIONS

11.1. Observations and Findings

- i) *Exercising the No-Go Option:* The No-Go Option is not considered realistic. The development is very necessary to consolidate and improve the research, public educational and amenity components of a site that has national, if not international significance.
- ii) *Identifying the Preferred Development Option:* There is nothing of a heritage-related nature to distinguish between the three development options for the precinct. (Differences that do exist relate to three sewerage options, all of which would not negatively impact on heritage resources provided that the location of the settlement pond in Option 2 can be relocated to an area without archaeo/ palaeo sensitivity).
- iii) *Performance of the Proposals in relation to the HWC Endorsed Heritage Indicators:* The proposals have an overwhelmingly high conformance rating with regard to all heritage indicators. Aspects requiring mitigation essentially relate to ensuring that impacts on archaeo and palaeo environments are minimized through monitoring.
- iv) *Significance of the Sub-Precinct:* The significance of Sub Precinct 1 is primarily archaeological and palaeontological. As a result, impacts on such resources need to be carefully planned and site managed.
- v) *Impacts on Archaeo/Palaeo Resources in General:* The impact on the unique archaeological and palaeontological resources is regarded as low. The benefit in terms of learning and experiential qualities is regarded as high.
- vi) *Impacts on Palaeo-sensitive mine floor:* Investigations into the impact of dynamic compaction will not adversely affect the palaeo-sensitive mine floor.
- vii) *Impacts related to the Proposed New Development:* Substantial efforts have been made in terms of placement of buildings on the overburden mound, founding systems, servicing and use of existing road systems, to minimise impact on valuable heritage: particularly palaeontological and archaeological) resources.

- viii) *Impacts related to the Proposed Sewerage System:* Monitoring for seepage contamination will need to be carried out in the long term, particularly where settlement ponds are even the broad vicinity of archaeo/palaeo sensitive area.
- ix) *Impacts on the Fossil Dig and E Quarry Sites:* Impacts on the Fossil Dig Site and Quarry E have been minimised by ensuring that no penetration of the quarry floor occurs in the development of walkways and the provision of services, which are to be located on the underside of the elevated walkway.
- x) *Sewerage Infrastructure Options:* The sewerage option is yet to be decided. Provided that no archaeological/ palaeontological resources are affected, this matter can be addressed as an environmental/cost issue. None of the amended sewage options contain serious flaws, which would adversely affect heritage resources.
- xi) *Mitigation of Development Impacts:* Mitigation has to a significant extent already been incorporated into the development proposals (both architectural and landscaping). This is as a result of extensive consultation between the architects, landscape architects, IAP's, environmental and heritage specialists.
- xii) *Mitigation of Construction Impacts:* The site is nonetheless highly sensitive during the Construction Phase. For this reason, a specialist on site archaeologist is to maintain a watching brief during digging, trenching, excavation, and removal of vegetation in consultation with the ECO. Should material of significance be noted HWC are to be informed with a view to a localised cease works to allow investigation to continue.
- xiii) *Impacts on Landscape:* The landscape plan allows for a degree of visitor comfort while retaining some of the dominant landscape elements, including the belts of trees and the overburden mounds. These contribute to a unique sense of place. The dramatic and stark qualities of the landscape are significant.
- xiv) *Probability of negative heritage impacts:* There is a LOW probability of negative heritage impacts occurring in terms of the current development proposals, provided that appropriate archaeo and palaeo watching briefs are executed, and that management of newly revealed deposits are conducted in accordance with the National Heritage Resources Act.
- xv) *Cumulative Impacts:* Cumulative impacts are consequently identified as overwhelmingly POSITIVE.

11.2. Management of Impacts

Management of impacts both during construction and throughout the operation and management of the project are essential. To this end a Conservation Management Plan will need to be drawn up focussing on the following:

- i) Procedures for monitoring and if necessary collecting and removing fossil material by a suitably qualified palaeontologist under permit;

- ii) Professional monitoring of trenching, excavation and foundation preparation as part of an EMP;
- iii) Capacity analysis and visitor control relating to the dig site. This may be in terms of the management of conditions within the covered fossil dig site itself and an analysis of visitor movement and control;
- iv) Appropriate control and directional signage at crucial points along the visitor routes; and
- v) Future mapping and the investigation of future research facilities as priority issues.
- vi) The implementation of the Second phase involving the Fossil Dig Site should be undertaken as soon as possible in order to ensure optimal conditions for the fossils.

11.3. *Recommendations*

Given that:

- The No-Go Option for development is not considered realistic;
- The development proposals are substantially in accordance with the heritage indicators;
- The nature of these proposals and their impacts on the sub-precinct (including cumulative impacts) will be largely positive; and
- Negative heritage impacts can, with mitigation, be kept well within acceptable levels with a high degree of confidence;

It is recommended that:

The development proposals for alterations to the West Coast Fossil Park: Sub-Precinct 1, including a proposed new Interpretation/Visitors Centre and improvements to the Fossil Dig Site and introduction of related infrastructure, be approved substantially in accordance with the following documentation:

NM& Associates: (Annexure 2)

- West Coast Fossil Park: SDP
- Fig 2.1. Site Development Plan

OvP (Annexure 3):

- Landscape Site Development Plan 2013/04/06 No 307-06

Services: Storey Engineers (Pty Ltd)

- Sewerage Option 1 Waste Stabilization Ponds C11070/c/005/1 2013.03.10
- Sewerage Option 3 Septic Tank Proposal for WCFP Arup 2013/04/09

- Water Supply C 11070/c/004 2013.03.08

Noero Architects:

- WCFP Elevation
- Site Development Plan 2013/03/11 rev 2
- SDP Ground Floor and First Floor Plan B Rev 1 2013/03/11
- SDP Smaller Site Area A Rev 2 2013/03/11
- Admin and Restaurant Cross Sections 2013/03/11
- Interpretive Centre Cross Section 2013/ 03/11

Subject to the following conditions:

- i) That any changes to the abovementioned Spatial Development Plan, Architectural Sketch Plans and Service Plans deemed by HWC to be substantial changes, will require the approval of HWC, for which a further submission to HWC will be required;
- ii) That detailed building plans be submitted to HWC for approval once these have been finalized;
- iii) That a Heritage Conservation Management Plan be submitted for the Fossil Dig Site and Quarry E once detailed planning and implementation is underway for this phase; and
- iv) That a suitably qualified palaeontological and/or archaeological specialist conduct a watching brief during all site excavation and preparation within the Precinct.

12. SOURCES CONSULTED

Hendey, Q B, <i>Langebaanweg</i> :	<i>A Record of Past Life</i> : SAM Cape Town, 1982
Melanie Attwell and Associates:	<i>West Coast Fossil Park: Preliminary Outline of methodology, Process and Scope of Work, Farm 1223 Saldanha Bay (West Coast Municipality)</i> . Report submitted in terms of Section 27[16],[18] National Heritage Resources Act.
Melanie Attwell and Associates	<i>West Coast Fossil Park Precinct 1 Baseline Study</i> Section 27 NHRA Farm 1223, Saldanha Bay Municipality. 22nd October 2012.
NM and Associates	<i>West Coast Fossil Park: Site Development Plan in Context</i> , April 2013.
Pendulum Consulting	<i>Transportation Impact Assessment in Support of the Land Use Application to Permit the Development of an Interpretive Centre at the West Coast Fossil Park</i> Farm 1223 Saldanha. 18th March 2013.

Storey Eng (Pty) Ltd

West Coast Fossil Park Conceptual Framework: Report on the Provision of Civil Engineering Services, Rev 1, C11070 MP02 March 2013.

Triocon Consulting Engineers

West Coast Fossil Park Interpretive Centre Land Use Application. Engineering Services, March 2013.

13. LIST OF ANNEXURES

- Annexure 1: Interim Comment BELCom and APM 30 November 2012
- Annexure 2: NM and Associates, West Coast Fossil Park, SDP in Context
- Annexure 3: OvP Landscape Architects
- Annexure 4: RAiNN Public Consultation
- Annexure 5: Storey Engineers: Report with addendum on the Provision of Engineering services Rev 1
- Annexure 6: The Compaction v Piling options: Archaeological and palaeontological implications
 - 6.1. Letter Dr D Stynder to M Attwell 26th March 2013
 - 6.2. Letter M van Wieringen to M Attwell
- Annexure 7: WCFP P Haarhoff: Response to HWC
- Annexure 8: Sketch proposals for the Interpretive Centre Noero Architects
- Annexure 9: Criteria for the Assessment of Impacts on Heritage Resources
- Annexure 10: HWC NHRA Section 27 Permit Application.