



## Application for Amendment

### of an Environmental Authorisation or Environmental Management Programme in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment Regulations, 2014 (as amended on 7 April 2017)

**September 2017**

(For official use only)	
EIA/WML/AEL Reference Number:	
EIA/WML/AEL NEAS Reference Number:	
Exemption Reference Number:	
Exemption NEAS Reference Number:	
Date Received by Department:	
Application fee amount:	
Specific Fee Reference Number:	
Application fee paid on:	

#### PROJECT TITLE

<b>False Bay Coastal Study, Strand seawall and lengthening of rock revetment</b>
DEADP reference: E12/2/4/1-A3/475-2071/11

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**Note the following:**

1. The content of the Department's Circular EADP 0028/2014 (dated 9 December 2014) on the "One Environmental Management System" and the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") Environmental impact Assessment ("EIA") Regulations, 2014 (as amended), any subsequent Circulars, and guidelines must be taken into account when completing this Form.
2. This form must always be used for applications for amendment of an Environmental Authorisation or an Environmental Management Programme where this Department is the competent authority.
3. This form is current as of **September 2017**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department. Visit the Department's website at <http://eadp.westerncape.gov.za/> to check for the latest version of this form.
4. An **application fee is applicable (refer to note 12 below as well as section 1 on page 3)**.
5. Only the **holder** of an Environmental Authorisation may apply for an amendment to the Environmental Authorisation in question.
6. An Environmental Authorisation can only be amended if the Environmental Authorisation in question **is still in force/is still valid on the day of receipt of such amendment application by the competent authority**. The competent authority shall not accept or process an application for amendment of an Environmental Authorisation if such Environmental Authorisation is not valid on the day of receipt of such amendment application.
7. A copy of the Environmental Authorisation and /or approved Environmental Management Programme (EMPr) which is the subject of the amendment application must be submitted together with this form.
8. If, in addition to this application, an application for a variation/transfer/renewal of a Waste Management License in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("the Waste Act") and/or a variation/transfer/renewal of an Atmospheric Emission License in terms of the National Environmental: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA") must also be submitted, then separate application forms in terms of the applicable legislation must be completed and submitted simultaneously to the relevant authorities, but a single assessment process must be undertaken. Copies of such applications must be attached to this Application Form.
9. The required information must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. The tables may be expanded where necessary.
10. The use of "not applicable" in the form must be done with circumspection. Incomplete applications or applications that do not meet the requirements in terms of Chapter 5 of the NEMA EIA Regulations, 2014 (as amended), must be **resubmitted**.
11. Unless protected by law, all information contained in, and attached to this application, will become public information on receipt by the Department. Upon request, the applicant/EAP must provide any interested and affected party with the information contained in or submitted with the application form.
12. An application for amendment lapses if the applicant fails to meet any of the timeframes prescribed in terms of the EIA Regulations, 2014. If authorisation is required from a number of different authorities, the authorities might also require that an integrated process be followed. As such, it is recommended that the applicant/EAP approach the Department prior to submission of the application for guidance on the process to be followed – in this regard it must be noted that the Department has developed a **Notice of Intent** form to be submitted to the Department to allow for informed guidance by the Department but also for determination of the application fee and the provision of a specific fee reference number;
13. This form must be submitted to the Department at the details provided below. If the application for amendment to the EMPr relates to a Waste Management Licence, this form must also be submitted for the attention of the Director: Waste Management (tel: 021 483 2756 and fax: 021 483 4425) at the same postal address as the Cape Town Office. If the application for amendment to the EMPr relates to an Atmospheric Emission Licence, this form must also be submitted for the attention of the Director: Air Quality Management (tel: 021 483 2798 and fax: 021 483 3254) at the same postal address as the Cape Town Office.

**DEPARTMENTAL DETAILS**

CAPE TOWN OFFICE: REGION 1 (City of Cape Town & West Coast District)	CAPE TOWN OFFICE: REGION 2 (Cape Winelands District & Overberg District)	GEORGE OFFICE: REGION 3 (Central Karoo District & Eden District)
<p><b>Applications, requests for specific fee reference numbers and queries must be sent to the following details:</b>  <b>Department of Environmental Affairs and Development Planning</b></p> <p><b>Attention: Directorate: Development Management (Region 1)</b>  <b>Private Bag X 9086</b>  <b>Cape Town,</b>  <b>8000</b>  <b>Tel: (021) 483-5829</b>  <b>Fax (021) 483-4372</b></p> <p><b>Registry Office</b>  <b>1<sup>st</sup> Floor Utilitas Building</b>  <b>1 Dorp Street, Cape Town</b></p>	<p>Applications, requests for specific fee reference numbers and queries must be sent to the following details:</p> <p>Department of Environmental Affairs and Development Planning            Attention: Directorate: Development Management (Region 2)            Private Bag X 9086            Cape Town,            8000            Tel: (021) 483-5842            Fax (021) 483-3633</p> <p>Registry Office            1<sup>st</sup> Floor Utilitas Building            1 Dorp Street, Cape Town</p>	<p>Applications, requests for specific fee reference numbers and queries must be sent to the following details:</p> <p>Department of Environmental Affairs and Development Planning            Attention: Directorate: Development Management (Region 3)            Private Bag X 6509            George,            6530            Tel: (044) 805-8600            Fax (044) 874-2423</p> <p>Registry Office            4<sup>th</sup> Floor, York Park Building            93 York Street, George</p>

**1. Fees**

If the relevant application fee was already confirmed with the Department and a specific fee reference number obtained following the submission of a **Notice of Intent** to the Department, then all that is still required is:

- for the Specific Fee Reference number to be provided:

Not Applicable, See **Appendix 1: Motivation for Exemption of Application Fee**, page 19

- to confirm the fee paid:

R

and

- for the proof of payment to be attached to this application form.

**OR**

If the relevant application fee was not already confirmed with the Department and a specific fee reference number not yet obtained:

- An applicant must pay a fee for the processing of EIA applications as set out in the Fee Regulations<sup>1</sup> published in terms of sections 24(5) and 44(1) of the National Environmental Management Act, 1998 (Act No. 107 of 1998). A fee of **R2 000** is applicable to an application for amendment of Environmental Authorisation applications and the transfer and the renewal of a waste management licence.
- **An applicant is excluded from having to pay the application fee if:**
  - The activity is a community based project funded by a government grant; or
  - The applicant is an Organ of State.
- Where an applicant is **not required** to pay a fee, the applicant must inform the Department in writing by attaching proof thereof and a motivation to the application form.

**Department of Environmental Affairs and Development Planning banking details:**

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<b>Bank:</b>	<b>Nedbank</b>
<b>Branch Code:</b>	<b>145209</b>
<b>Account Number:</b>	<b>145 204 5003</b>
<b>Type of Account:</b>	<b>Current Account</b>
<b>Status:</b>	<b>Tax exempted</b>

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- **NB: Your specific fee reference number MUST be used as a deposit reference when making a payment.**
- You are required to complete the information in the **Request for a specific fee reference number** form attached to this application form as Appendix 1 and submit the form to the Department as directed. This must be done prior to completing the rest of the application form in order to obtain the specific fee reference number required for the payment of the application fees. Once a specific fee reference number has been obtained from the Department, it must be inserted into the application form and proof of payment attached when the application form is submitted to the Department. An application may not be submitted without the specific fee reference number and proof of payment. The Department will respond to a request for a specific fee reference number in writing.
- If there is uncertainty as to the application process that must be followed the Department should be approached for guidance prior to submission of the application.
- In the event that any **refunding of fees paid is required**, the "BAS Entity Maintenance" form must be completed, which can be obtained from the Department. Any refund must first be confirmed with the Department.
- Please refer to the national guideline *Guidance Document on the Fee Regulations* (April 2014), obtainable from <http://www.environment.gov.za/legislation/guidelines> for more information.

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<sup>1</sup> Government Notice No. 141 published in Government Gazette No. 37383 on 28 February 2014 and No. R. 43 and R. 44 published in Government Gazette No. 38417 on 23 January 2015 refer.



## 2. Background Information

Highlight the Departmental Region in which the application falls	<b>CAPE TOWN OFFICE: REGION 1 (City of Cape Town &amp; West Coast District)</b>	CAPE TOWN OFFICE: REGION 2 (Cape Winelands District & Overberg District)	GEORGE OFFICE: REGION 3 (Central Karoo District & Eden District)
Name of applicant:	The City of Cape Town		
RSA Identity/ Passport Number:			
Name of contact person for applicant (if other):	Ben de Wet		
RSA Identity/ Passport Number:			
Company/ Trading name (if any):			
Company Registration Number:			
Postal address:	PO Box 298		
	Cape Town	Postal code: 8000	
Telephone:	(021) 400 5036	Cell:	
E-mail:	Ben.dewet@capetown.gov.za	Fax: (021) 400 4554	
SPECIFIC FEE REFERENCE NUMBER:	Not applicable, see Appendix 1: Motivation for Exemption of Application Fee, page 19		
Company of Environmental Assessment Practitioner (EAP):	Pieter Badenhorst Professional Services cc		
EAP name:	Helene Botha		
Postal address:	P.O. Box 1058		
	Wellington	Postal code: 7654	
Telephone:	(021) 8737228	Cell: 076 800 4959	
E-mail:	heleneb@iafrica.com	Fax: ( )	
EAP Qualifications:	Pieter Badenhorst - 43 years experience (16 @ CSIR) in environmental management; report writing; project management; facilitation Helene Botha – BSc (Hons) in Zoology, currently a consultant in environmental management with 2.5 year experience. Currently busy with Masters in Environmental Management at North West University.		
EAP Registrations/Associations:	Pieter -IAIAsa, Pr Eng, SAICE		
Name of landowner:	Department of Public Works		
Name of contact person for landowner (if other):	F Johnson		
Postal address:	Private Bag X9027		
	Cape Town	Postal code: 8000	
Telephone:	(021) 402 2338	Cell:	
Name of Person in control of the land:	City of Cape Town		
Name of contact person for person in control of the land:	Dennis de Villiers		
Postal address:	PO Box 19		
	Somerset West	Postal code: 7129	
Telephone:	(021) 850 4406	Cell:	
E-mail:	Dennis.devilliers@capetown.gov.za	Fax: (021) 850 4500	

**Note:** In instances where there is more than one landowner, please attach a list of landowners, with their contact details, to the back of this form.

Municipality in whose area of jurisdiction the proposed activity will fall:	City of Cape Town: Roads and Stormwater		
Contact person:	Dennis de Villiers		
Postal address:	PO Box 19		
	Somerset West	Postal code: 7129	
Telephone	(021) 850 4406	Cell:	
E-mail:	Dennis.devilliers@capetown.gov.za	Fax: (021) 850 4500	

**Note:** In instances where there is more than one Municipality involved, please attach a list of Municipalities, with their respective contact details, to the back of this form.

Property location of all proposed sites:	Strand Beachfront (approximately 2.65 km)		
Farm/Erf name(s) & number(s) (including portion) of all proposed sites:	Beach Road Strand – public road and public parking		
Property size(s) (m <sup>2</sup> ) of all proposed sites:	Not applicable, Forms part of Coastal Public Property according to ICM Act, therefore no Erf nr is available		
Development footprint size(s) in m <sup>2</sup> :	Approximately 2700m <sup>2</sup>		
SG Digit code(s) of all proposed sites:	Not applicable		
Coordinates of all proposed sites: Latitude (S)	34°	7'	6.98"
Longitude (E)	18°	49'	39.81"

**Note:** Coordinates must be provided in degrees, minutes and seconds using the Hartebeesthoek94 WGS84 co-ordinate system. Where numerous properties/sites are involved (e.g. linear activities), you may attach a list of property descriptions and street addresses to this form.

Street address of all proposed sites:	Strand Beach Road		
Magisterial District or Town:	Strand		
Closest City/Town:	Strand	Distance	(km) 1
Current zoning of all proposed sites:	Transport 2 – public road and public parking		

**Note:** In instances where more than one zoning is applicable, attach a list or map of the properties that indicates their respective zoning to this form.

Is a rezoning application required?	YES	NO
Is a consent use application required?	YES	NO
Locality map:	<p>A locality map must be attached to the application form, as an Appendix. The scale of the locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map. The map must include the following:</p> <ul style="list-style-type: none"> <li>• an accurate indication of the project site position as well as the positions of the alternative sites, if any;</li> <li>• road names or numbers of all the major roads as well as the roads that provide access to the site(s)</li> <li>• a north arrow;</li> <li>• a legend;</li> <li>• the prevailing wind direction; and</li> <li>• GPS co-ordinates (Indicate the position of the proposed activity with the latitude and longitude at the centre point for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should be to at least three</li> </ul>	

	decimal places. The projection that must be used in all cases is the WGS-84 spheroid in a national or local projection)
Landowner(s) Consent:	<p>If the applicant is not the owner or person in control of the land on which the activity is proposed to be undertaken, and the proposed amendment will impact on the activity undertaken/to be undertaken on the land or if the amendment relates to the transfer of rights and obligations, he/she must obtain written consent from all landowners or persons in control of the land (of the site and all alternative sites). This must be attached to this document as Appendix 2.</p> <p><b>Note:</b> The consent of the landowner or person in control of the land is not required for: a) linear activities; b) an activity directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral resource; or c) strategic integrated projects ("SIPs") as contemplated in the Infrastructure Development Act, 2014 (Act No. 23 of 2014).</p>
Project Plan (e.g. Gantt chart)	<p>A project schedule must be submitted as an Appendix, and must include milestones for:</p> <ul style="list-style-type: none"> <li>• public participation (dates for advertisements, workshops and other meetings, obtaining comment from organs of state including state departments);</li> <li>• the commencement of parallel application processes required in terms of other statutes and where relevant, the alignment of these application processes with the EIA process;</li> <li>• the submission of the key documents (e.g. Basic Assessment Report, Scoping Reports, EIA Reports and Environmental Management Programmes).</li> </ul> <p><b>Note:</b> All the above dates must take into account the statutory timeframes for authority responses that are stipulated in the NEMA EIA Regulations, 2014 (as amended). Possible appeals may impact on project timeframes/milestones. Regulation 45 states that "An application in terms of these Regulations lapses, and a competent authority will deem the application as having lapsed, if the applicant fails to meet any of the time-frames prescribed in terms of these Regulations, unless extension has been granted in terms of regulation 3(7)." It is recommended that the Department be approached for guidance on the process to be followed, prior to submitting an application.</p>

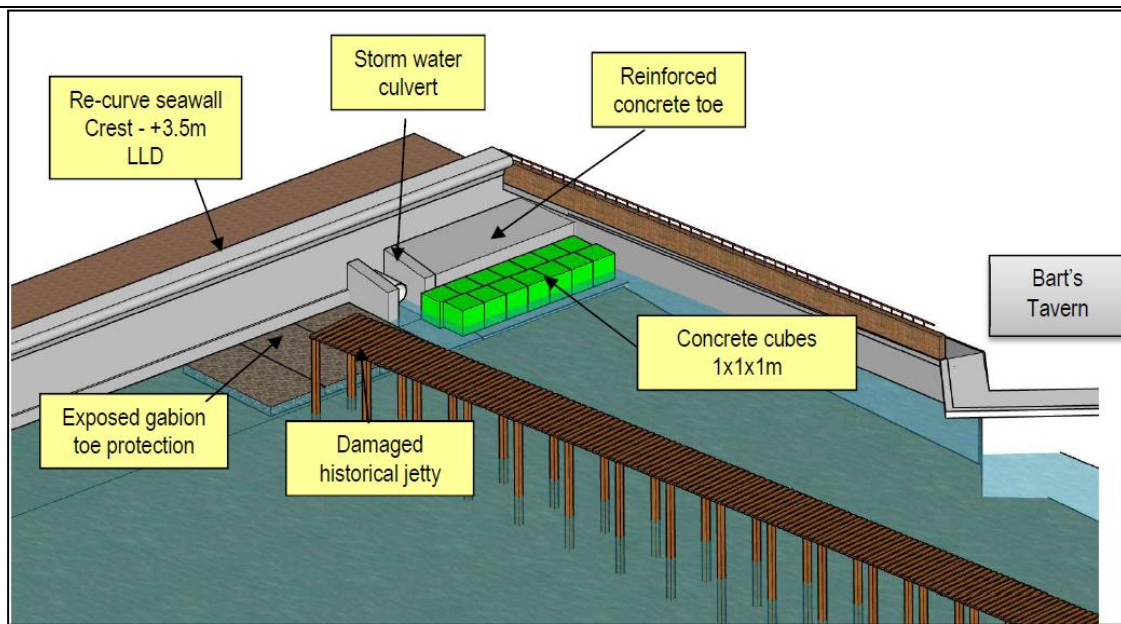
### 3. Details of the Environmental Authorisation/EMPr to Be Amended

3.1. Is the Environmental Authorisation/Environmental Management Programme still in force/still valid?	<b>YES</b>	<del>NO</del>
3.2. If yes, until when is the Environmental Authorisation/EMPr valid/ when does the Environmental Authorisation/EMPr expire?	EA expires June 2019	
3.3. Who is the holder of the Environmental Authorisation?	City of Cape Town	
3.4. When was the EMPr approved?	26 June 2014	

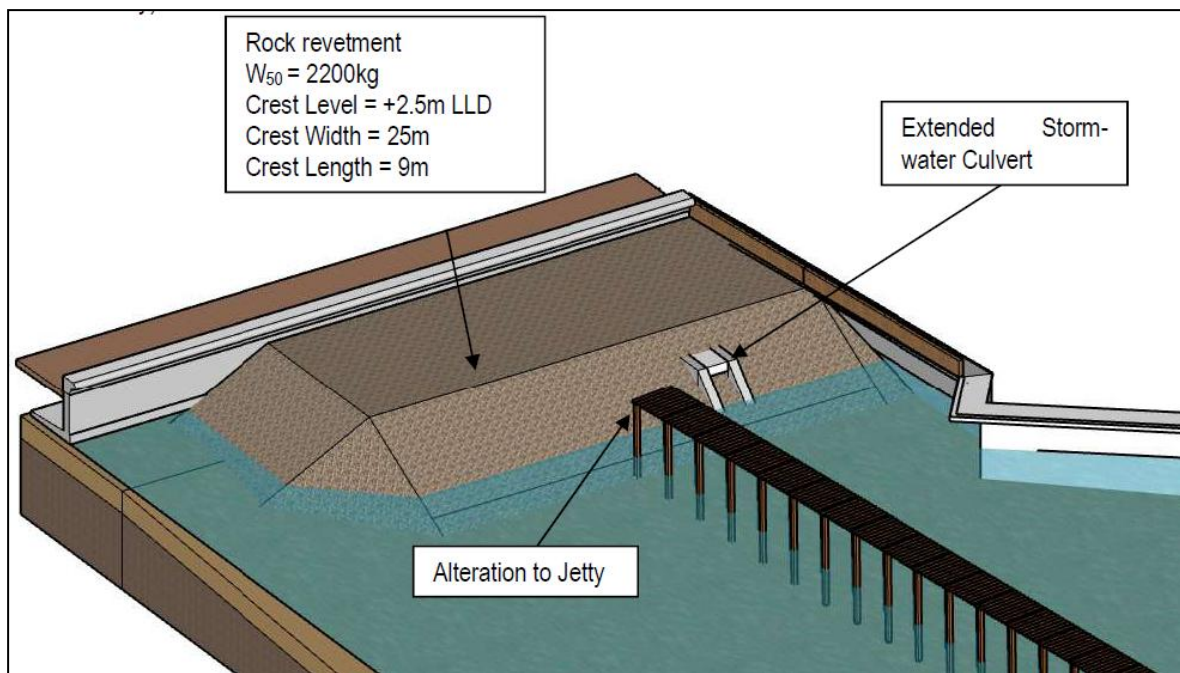
**Note:** A copy of the Environmental Authorisation/EMPr must be attached to this form.

### 4. Amendment Applied For

<p>4.1. Describe the amendment(s) that are being applied for:</p> <p>After the completion of the seawall (as approved by the Environmental Authorisation DEADP reference: E12/2/4/1-A3/475-2071/11) it was evident that wave overtopping and high wave heights occur at the western edge of the Strand Pavilion – Bart's Corner. The area west of the Strand Pavilion where wave overtopping and high wave energy is prevalent is referred to as "Bart's Corner". Bart's Corner is situated at coordinates 34° 7'6.98"S; 18°49'39.81"E</p> <p>Due to the foreshore channel ("Die Poort") and the geometry of the Pavilion, high wave heights occur at Bart's Corner, and subsequently; wave overtopping, seawall toe scour and wave reflection off the seawall is experienced.</p> <p>WML Coast was appointed to investigate possible remedial actions to decrease the wave overtopping and related hydraulic and morphological phenomenon at this location which is prevalent with the current installed components, as seen in Figure 1. After physical model testing and further assessment, it is proposed to amend the installation to revetment with the following parameter as seen in Figure 2:</p> <ul style="list-style-type: none"> <li>• Revetment length = 9m</li> <li>• Revetment width = 25m (refer to Figure 6)</li> <li>• Armourstone mass, M50 = 2200kg</li> <li>• Revetment crest level = 2.5m LLD (Note, the crest level will be confirmed during detail following a more detailed wave overtopping assessment.</li> <li>• Revetment slope = 1:2 (V:H)</li> <li>• Revetment toe level -1.7m LLD (0.5m trench in bedrock, excavation in bedrock required for revetment toe stability)</li> </ul>
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**Figure 1: Description of major components currently installed at Bart's Corner**



**Figure 2: Proposed conceptual seawall revetment at Bart's Corner, isometric view**

4.2. Provide a concise motivation for the application for amendment:

WML Coast conducted a site visits to Bart's Corner on the 30th of January 2017 coinciding with low tide and high tide. The 30th of January coincided with a spring tide. The site (and problem) description is based on the observed behaviour and physical properties of the interest area during the site visits.

Bart's corner is subject to 4 occurrences which are all related:

1. Wave overtopping (refer to Figure 3 and Figure 4)

- Wave overtopping occurs due to wave impact on the toe-structure of the seawall and due to conventional overtopping during high sea water levels (and associated large

waves);

- The new seawall is not operating optimally in this corner due to (i) the eroded foreshore and associated greater water depth at the toe and (ii) wave convergence at the corner due to the layout of the existing structures and the foreshore characteristics;

#### 2. Wave splash-back (refer to Figure 3)

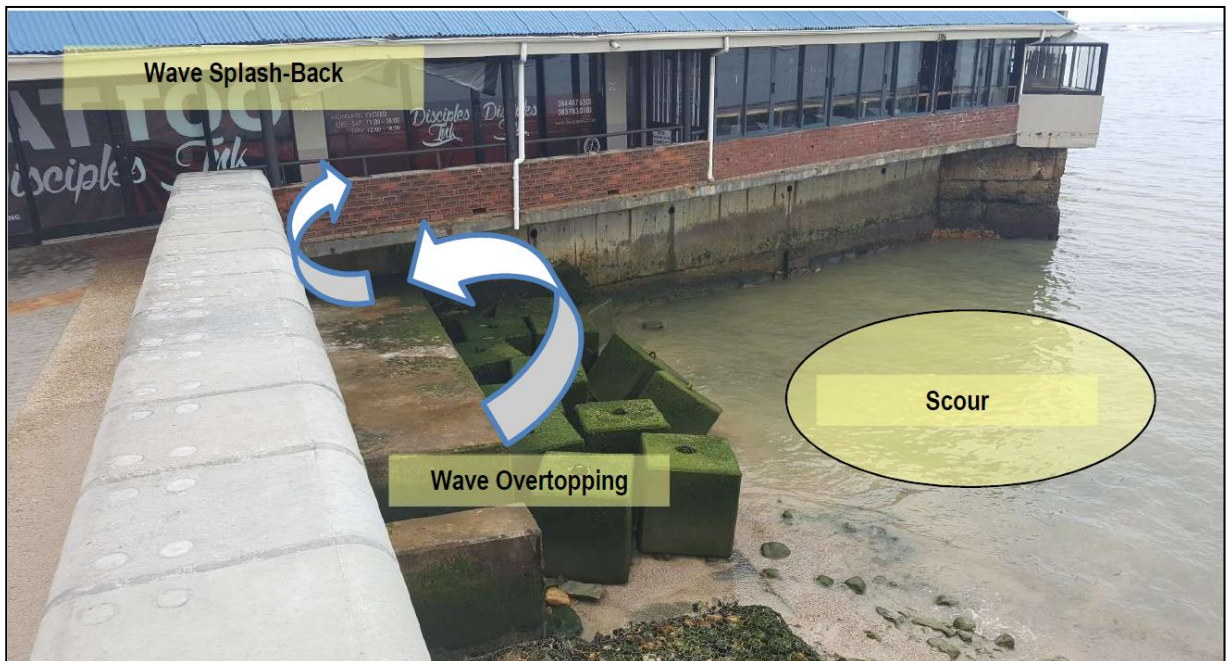
- The re-curve seawall reflects the oncoming water. However, due to the relative low height of the Strand Pavilion brick wall, the water diverts directly onto the Pavilion's walkway;

#### 3. Wave reflection (refer to Figure 4 and Figure 5)

- The structure reflects oncoming waves during high water levels
- The beach has already been eroded and does not dissipate the oncoming waves
- The constant reflection and associated high wave energy promotes scour at Bart's corner.

#### 4. Scour (refer to Figure 3 and Figure 6)

- The seawall is being undermined by scour at Bart's corner; which poses a structural risk to the seawall;



**Figure 3: Bart's corner during MLWS - 30 January 2017**





Figure 4: Wave reflection and wave overtopping at Bart's corner during MHWS - 30 January 2017



Figure 5: Wave reflection at Bart's corner during MHWS - 30 January 2017



**Figure 6: Aerial view of Bart's Corner. Yellow line – assumed natural coastline, red area – scour zone (Google Earth, 2017).**

Based on the above, the preferred option for the mitigation of the wave overtopping and scour at Bart's corner is a conventional Rock Revetment (indicated as Option 2 in Appendix 6: Design Report, page 44) in front of the new (existing) seawall.

The rock revetment is recommended for the following reasons:

- The construction site is easily accessible from land;
- The new (existing ) re-curve seawall will not have to be altered (for the immediate future);
- The revetment will protect the seawall from being undermined;
- The revetment is unlikely to have any or minimal downstream influence on the coastline hydraulics or morphology (note, behaviour is difficult to predict without physical and numerical modelling);
- The revetment will absorb much of the wave action and mitigate the wave reflection phenomenon which is prevalent at Bart's corner;
- The stability of the rock revetment has been proven in practice (emergency rock revetment east of the Strand Pavilion) and during physical model testing for various sea states (MMD, 2013);
- The addition of a rock revetment in front of the seawall will potentially reduce overtopping considerably (MMD, 2013);
- The rock revetment can easily be modified in response to long term sea level rise or altered foreshore bathymetry (MMD, 2013).



## 5. Non-Substantive or Substantive Amendment?

Is the proposed application for a non-substantive (in terms of Part 1 of Chapter 5 of the EIA Regulations, 2014 (as amended)) or a substantive amendment (in terms of Part 2 of Chapter 5 of the EIA Regulations, 2014 (as amended))?	<b>Substantive</b>	<b>Non-substantive</b>
5.1. Will the proposed amendment change the scope of the Environmental Authorisation?	<b>YES</b>	<b>NO</b>
5.2. Will the proposed amendment increase the level or nature of the impacts, which impacts were assessed and considered when the initial application for Environmental Authorisation was made.	<b>YES</b>	<b>NO</b>
5.3. Does the proposed amendment relate to a proposed change of ownership or transfer of rights and obligations? <b>Note:</b> If yes, a letter by the person to whom the rights and obligations are to be transferred, must be submitted with this form indicating that the person: (a) accepts the rights and obligations contained in the Environmental Authorisation and (b) has the ability to implement the mitigation and management measures and to comply with the conditions of the Environmental Authorisation.	<b>YES</b>	<b>NO</b>
5.4. Does the proposed change, on its own, constitute a listed activity?	<b>YES</b>	<b>NO</b>

## 6. Impacts Associated With the Proposed Amendment

For **substantive amendments** (in terms of Part 2 of Chapter 5 of the EIA Regulations, 2014 (as amended)), a report on an assessment of all impacts related to the proposed change (including the advantages and disadvantages associated with the proposed change) and measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and any proposed changes to the EMPr (including an amended EMPr with the proposed changes effected) must be submitted to the Department:

- within 90 days of receipt of the application by the Department, which report has been subjected to a public participation process which must be agreed to with the Department; or
- within 140 days of receipt of the application by the Department, as significant changes have been made or significant new information has been added to the report, which changes or information was not contained in the report consulted on during the initial public participation process which was agreed to with the Department and undertaken as part of the amendment application and that the revised report will be subjected to another public participation process of at least 30 days.

6.1. Describe the proposed assessments that will be undertaken to inform the application for the substantive amendment:
No further assessments are proposed other than the requirements stated in the NEMA EIA Regulations, Section 32(1).  Prior to the construction of the new seawall numerous physical model tests were performed in 2012 by the Institute of Water and Environmental Engineering of the University of Stellenbosch (MMD, 2013). The physical model tests investigated the hydraulic and physical (stability) response of various seawall configurations. The physical modelling exercise consisted of a total of 62 test cases, testing a total of 10 seawall configurations. The physical model tests were conducted in a 40m long, 1m wide wave flume.  As part of the new seawall study the design water levels were estimated, taking into consideration sea level rise and storm surge. Further details with regards to design water levels and the physical model testing are described in the Concept Design Report in Appendix 6: Design Report, page 44. The proposed mitigation measures developed as part of this assessment were to a large extent based on the findings of the physical model studies. The typical seawall configurations developed during the physical model testing were modified for the specific site conditions at Bart's Corner. The final layout and dimensions of the proposed mitigation measures will be confirmed during detail design.

For **non-substantive amendments** (in terms of Part 1 of Chapter 5 of the EIA Regulations, 2014 (as amended)), answer the questions below:

6.2. Explain why the proposed amendment will not change the scope of the Environmental Authorisation:
6.3. Explain why the proposed amendment will not increase the level or nature of the impacts, which impacts was assessed and considered when the initial application for Environmental Authorisation was made:

## 7. Proposed Public Participation Process

For **substantive amendments** (in terms of Part 2 of Chapter 5 of the EIA Regulations, 2014 (as amended)), the proposed change must be brought to the attention of potential and registered interested and affected parties, including Organs of State which have jurisdiction in respect of any aspect of the relevant activity, and the interested and affected parties must be given a minimum period of 30 days to comment on the report on the assessments of the impacts, the proposed mitigation measures and proposed changes to the EMP. The public participation process to be followed **must be agreed to by the Department** prior to undertaking the public participation.

<p>7.1. Describe the proposed method of bringing the proposed amendment to the attention of the potential and registered interested and affected parties:</p> <p>The Proposed Public participation included the following:</p> <p><b>INFORMATION AND REPORTING FOR THE PROCESS</b></p> <p>A notice that included the Assessment Report will be made available and distributed by registered post and by hand delivery to all registered I&amp;APs and neighbours for the 30 day commenting period, which will be from from 14 November 2017 until 14 December 2017. The notice also informed all I&amp;AP's of the availability of the Assessment Report for the proposed amendment which could be obtained from the EAP and the EAP's website. Comments received will be placed in the Final Assessment Report. The actual comments received on the Assessment Report, as part of the public participation will be shown in Appendix 7.4: Actual Comments Received, page 80 . Digital copies will be made available to those who requested it.</p> <p>Hard copies or digital copies of the report will be sent to CapeNature, DEA&amp;DP: Coastal Development Unit, Department of Environmental Affairs (Oceans and Coasts), Department of Transport and Public Works, City of Cape Town, Department of Water and Sanitation and Heritage Western Cape.</p> <p><b>I&amp;AP DATABASE</b></p> <p>The I&amp;AP database in Appendix 7.1: I&amp;AP list was compiled from registered and listed I&amp;APs from the original application process. The database will be updated to include new I&amp;AP's that have submitted comments on the Draft Assessment Report</p> <p><b>COMMENTS AND RESPONSES</b></p> <p>The actual comments received on the draft report will be included in Appendix 7.4: Actual Comments Received. The comments and response sheet is included in Appendix 7.5: Comments &amp; Responses Sheet.</p>
<p>7.2. Describe the proposed process to provide the interested and affected parties with an opportunity to comment on the report:</p> <p>The Proposed Public participation included the following:</p> <p><b>INFORMATION AND REPORTING FOR THE PROCESS</b></p> <p>A notice that included the Assessment Report will be made available and distributed by registered post and by hand delivery to all registered I&amp;APs and neighbours for the 30 day commenting period, which will be from from 14 November 2017 until 14 December 2017. The notice also informed all I&amp;AP's of the availability of the Assessment Report for the proposed amendment which could be obtained from the EAP and the EAP's website. Comments received will be placed in the Final Assessment Report. The actual comments received on the Assessment Report, as part of the public participation will be shown in Appendix 7.4: Actual Comments Received, page 80 . Digital copies will be made available to those who requested it.</p> <p>Hard copies or digital copies of the report will be sent to CapeNature, DEA&amp;DP: Coastal Development Unit, Department of Environmental Affairs (Oceans and Coasts), Department of Transport and Public Works, City of Cape Town, Department of Water and Sanitation and</p>

Heritage Western Cape.

**I&AP DATABASE**

The I&AP database in Appendix 7.1: I&AP list was compiled from registered and listed I&APs from the original application process. The database will be updated to include new I&AP's that have submitted comments on the Draft Assessment Report

**COMMENTS AND RESPONSES**

The actual comments received on the draft report will be included in Appendix 7.4: Actual Comments Received. The comments and response sheet is included in Appendix 7.5: Comments & Responses Sheet.

**8. Applications In Terms Of Other Legislation**

Are there any amendments to or approvals of permissions, licenses or other approvals required in terms of any other legislation?	<del>YES</del>	<b>NO</b>
--	----------------	-----------

If yes, please complete the table below:

Type of amendment or approval required. (List the applicable legislation & amendment or approval required)	Name of the Competent authority responsible for administering the applicable legislation	Application submitted (Yes / No)	Status of application (e.g. pending/ granted/ refused)

**9. Declarations**  
**9.1. THE APPLICANT**

**Note:** Duplicate this declaration where there is more than one applicant.

I....., in my personal capacity or duly authorized thereto hereby declare/affirm all the information submitted or to be submitted as part of the application is true and correct, and that I:

- am fully aware of my responsibilities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), the Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) (Government Notice No. 326 refers) and any relevant specific environmental management Act and that failure to comply with these requirements may constitute an offence in terms of relevant environmental legislation;
- appointed the Environmental Assessment Practitioner ("EAP), if applicable, which:
  - meets all the requirements in terms of Regulation 13 of GN No. 326; or
  - meets all the requirements other than the requirement to be independent in terms of Regulation 13 of GN No. 326 but a review EAP has been appointed who does meet all the Regulation 13 of GN No. 326 requirements;
- act as the EAP for this application as no environmental impact assessment or part thereof is required as part of such amendment application;
- will provide the EAP and specialist, where applicable, and the competent authority with access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the NEMA EIA Regulations, 2014 (as amended) and other environmental legislation including but not limited to –
  - costs incurred in connection with the appointment of the EAP or any person contracted by the EAP;
  - costs incurred in respect of the undertaking of any process required in terms of the regulations;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the regulations;
  - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
  - the provision of security to ensure compliance with applicable management and mitigation measures;
- am responsible for complying with conditions that may be attached to any decision(s) issued by the competent authority; and
- hereby indemnify, the government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action for which the applicant or EAP is responsible in terms of the NEMA EIA Regulations, 2014 (as amended) and any specific environmental management Act.

**Note:** If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

---

Signature of the applicant:

Date:

---

Name of company (if applicable):

## 9.2. The Environmental Assessment Practitioner (“EAP”) (Where Applicable)

I ....., as the appointed environmental assessment practitioner (“EAP”) hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another EAP that meets the general requirements set out in Regulation 13 of GN No. 326 have been appointed to review my work (Note: a declaration by the review EAP must be submitted);
- in terms of the remainder of the general requirements for an EAP, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant, the specialist (if any), the Department and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to registered interested and affected parties and that participation will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations, 2014 (as amended).

---

Signature of the EAP:

Date:

---

Name of company (if applicable):

## **Appendix 1: Motivation for Exemption of Application Fee**

The following is stated in The National Environmental Management Act, 1998 (Act No. 107 Of 1998) No.37383 3, 28 February 2014 Regarding Fees For Consideration And Processing Of Applications For Environmental Authorisations And Amendments Thereto, in:

*Sub - Regulation 4(3): **an organ of state** and / or a community based project funded by a government grant are excluded from payment of the fee. The burden is on the applicant to contact the relevant authority and advise that he will not be paying a fee. In such an event, notification that the exclusion is applicable must be submitted with the application form. The applicant is responsible for providing proof and motivation in the event where an exclusion applies.*

The applicant, City of Cape Town, is regarded as an organ of state and hereby informs the competent authority in writing that exclusion of application fees apply to this application.

## **Appendix 2: Consent**

Not applicable as the nature of the project is linear.



## Appendix 3: Environmental Authorisation

From:

To:\*00866721916

26/06/2014 14:49

#248 P.001/021



DIRECTORATE: LAND MANAGEMENT  
REGION 2

**EIA REFERENCE:** E12/2/4/1-A3/475-2071/11  
**ENQUIRIES:** Ayesha Hamdulay  
**DATE OF ISSUE:** 2014-06-26

The Municipal Manager  
City of Cape Town  
P O Box 1694  
**CAPE TOWN**  
8000

**Attention: Mr Nico Meyer**

Tel.: (021) 400 1341

Fax: (021) 400 4554

Dear Sir

**APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT AMENDMENT REGULATIONS, 2010: THE PROPOSED CONSTRUCTION OF A SEA WALL ALONG APPROXIMATELY 2,65KM OF BEACH FRONT, DUNE REHABILITATION AND THE EXPANSION OF THE EXISTING REVETMENT, STRAND.**

With reference to your application for the abovementioned, find below the outcome with respect to this application.

### ENVIRONMENTAL AUTHORISATION

#### DECISION

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Amendment Regulations, 2010, ("NEMA

10<sup>th</sup> Floor, 1 Dorp Street, Cape Town, 8001  
Tel: +27 483 0756/3185 fax: +27 21 483 4372  
Electronic Mail: [Ayesha.Hamdulay@westerncape.gov.za](mailto:Ayesha.Hamdulay@westerncape.gov.za)

Private Bag X9086, Cape Town, 8000  
[www.westerncape.gov.za/eadp](http://www.westerncape.gov.za/eadp)

EIA Regulations") the competent authority herewith **grants environmental authorisation** to the applicant to undertake the activity specified in section B below with respect to the preferred alternative, as described in the amended final Basic Assessment Report ("BAR") dated November 2013.

The granting of this environmental authorisation (hereinafter referred to as the "environmental authorization") is subject to compliance with the conditions set out in section E below.

#### **A. DETAILS OF THE APPLICANT FOR THIS ENVIRONMENTAL AUTHORISATION**

The Municipal Manager  
City of Cape Town  
% Mr Nico Meyer  
P O Box 1694  
**CAPE TOWN**  
8000

Tel.: (021) 400 1341  
Fax: (021) 400 4554

The abovementioned company is the holder of this environmental authorisation and is hereinafter referred to as "the applicant".

#### **B. LIST OF ACTIVITIES AUTHORISED**

Government Notice No. R544 of 18 June 2010 –

Activity Number: 9

Activity Description:

*"The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water -*

- (i) with an internal diameter of 0,36 metres or more; or*
  - (ii) with a peak throughput of 120 litres per second or more,*
- excluding where:*

- a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or*

- b. where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse."

Activity Number: 14

Activity Description:

"The construction of structures in the coastal public property where the development footprint is bigger than 50 square metres, excluding

- (i) the construction of structures within existing ports or harbours that will not increase the development footprint or throughput capacity of the port or harbour;
- (ii) the construction of a port or harbour, in which case activity 24 of Notice 545 of 2010 applies;
- (iii) the construction of temporary structures within the beach zone where such structures will be demolished or disassembled after a period not exceeding 6 weeks."

Activity Number: 16

Activity Description:

"Construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater, in respect of –

- (i) fixed or floating jetties and slipways;
  - (ii) tidal pools;
  - (iii) embankments;
  - (iv) rock revetments or stabilising structures including stabilising walls;
  - (v) buildings of 50 square metres or more; or
  - (vi) infrastructure covering 50 square metres or more –
- but excluding
- (a) if such construction or earth moving activities will occur behind a development setback line; or
  - (b) where such construction or earth moving activities will occur within existing ports or harbours and the construction or earth moving activities will not increase the development footprint or throughput capacity of the port or harbour;
  - (c) where such construction or earth moving activities is undertaken for purposes of maintenance of the facilities mentioned in (i)-(vi) above; or
  - (d) where such construction or earth moving activities is related to the construction of a port or harbour, in which case activity 24 of Notice 545 of 2010 applies."

Activity Number: 17

Activity Description:

*"The planting of vegetation or placing of any material on dunes and exposed sand surfaces, within the littoral active zone for the purpose of preventing the free movement of sand, erosion or accretion, excluding where the planting of vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation or where such planting of vegetation or placing of material will occur behind a development setback line."*

Activity Number: 18

*"The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from:*

- (i) a watercourse;*
- (ii) the sea;*
- (iii) the seashore;*
- (iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater-*  
*but excluding where such infilling, depositing, dredging, excavation, removal or moving;*
  - (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or*
  - (b) occurs behind the development setback line."*

Activity Number: 43

*"The expansion of structures in the coastal public property where the development footprint will be increased by more than 50 square metres, excluding such expansions within existing ports or harbours where there would be no increase in the development footprint or throughput capacity of the port or harbour."*

Activity Number: 45

*"The expansion of facilities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater, for –*

- (i) fixed or floating jetties and slipways;*
- (ii) tidal pools;*
- (iii) embankments;*
- (iv) rock revetments or stabilising structures including stabilising walls;*
- (v) buildings by more than 50 square metres;*

- (vi) infrastructure by more than 50 square metres;
  - (vii) facilities associated with the arrival and departure of vessels and the handling of cargo;
  - (viii) piers;
  - (ix) inter- and sub-tidal structures for entrapment of sand;
  - (x) breakwater structures;
  - (xi) coastal marinas;
  - (xii) coastal harbours or ports;
  - (xiii) structures for draining parts of the sea or estuary;
  - (xiv) tunnels; or
  - (xv) underwater channels –
- where such expansion will result in an increase in the development footprint of such facilities but excluding where such expansion occurs:
- (a) behind a development setback line; or
  - (b) within existing ports or harbours where there will be no increase in the development footprint or throughput capacity of the port or harbour."

The abovementioned activity is hereinafter referred to as "the listed activities".

The applicant is herein authorised to undertake the following alternative related to the listed activity:

The proposed development entails the construction of a new beach wall. The project is located on the Strand beach front, to the East and West of the Strand Pavilion, stretching from Lourens River to Greenways Estate; and included is the lengthening of the existing rock revetment and dune rehabilitation.

Beach wall: The purpose of the project is to prevent overtopping of the seawall and resultant damage to properties. To the western side of the Pavilion the seawall is protected from high waves by the beach and flat rocky foreshore but the wall is in areas so low that frequent overtopping of waves and sand is encountered. The same applies to the wall on the eastern side of the Pavilion, especially close to Greenways where protection through the existing revetment had to be implemented after the 2008 storms. Closer to the Lourens River the beach is much wider with an existing dune protection. This dune is, however, degraded through poor protection of the dune and vegetation.

The proposed design is to construct a new sea wall with a crest level of 3.5m above Land Levelling Datum ("LLD") for an approximate length of 2.65km. The seawall will be built along

with the expansion of the sleeping revetment structure to increase its performance to an acceptable short term overtopping solution should the beach be washed away. The beach level will be retained at the current 2m beach level, which occurs along most of the beachfront. This will further enhance the overtopping performance of the wall whilst at the same time maintaining the beach as an attractive amenity.

The selection of the preferred design of the new wall and its height is based on the modelling studies at the University of Stellenbosch and coastal engineering calculations. Future expected sea level rise is an important factor to take into account with the design of the seawall. The following sea level rise values were adopted for the purpose of the laboratory model studies:

- 25cm by 2030
- 55cm by 2060 and
- 80cm by 2100

It was found in the model tests that the existing rock revetment and seawall combination has acceptable overtopping during the worst storm in 20 years. Due to sea level rise the overtopping during the same "20 year" storm becomes heavier and unsafe over the next decades. To prevent this, the seawall behind the rocks needs to be raised at a later stage by 0.6m almost to the level of the top of the existing rocks.

The construction of a beach wall to prevent erosion and overtopping during storm conditions will be implemented in phases. Phase 1 (a, b, c and d) will commence immediately with other phases following afterward. Please note that Phase 1d (expansion of the rock revetment) will be similar in design to the existing rock revetment. The construction of the seawall will also involve landscaping and changes to the seawall alignment to create spaces for public movement.

Revetment: A rock revetment was placed east of the Pavilion where the beach narrows significantly. The existing structure is 165m long and 10m wide and has been legalized through a rectification process. The existing revetment will thus now be extended approximately 90m to the west and 40m to the east. The expansion of this rock revetment will effectively minimise the wall height required for coastal protection as the wave energy is reduced by the rock toe before the wave reaches the sea wall behind.

Dunes: From a coastal protection perspective the existing dunes are deemed appropriate and must be left in place. This is also by far the most cost-effective option as the

maintenance of these dunes is not an expensive solution and is currently, to some degree, already in progress.

Services: No new services will be created and no additional services capacity will be required.

Access: Access will be from the existing Beach Road next to the beachfront.

Stormwater: All storm water outlets within the study area will be replaced with new outlet structures at the same location as the existing outlets when the new beach wall is built. The new storm water outlets will have a minimum size of 900mm in diameter, or equivalent 900x900mm if replaced by a box culvert.

Sewer line: The new sewer pipe will match the specifications of the existing sewer pipe and will also be a 350 diameter pipe. The existing sewer line along the Strand beachfront has previously been undermined during storm events. It will be moved behind the new seawall in areas where the sewer pipe has an invert level above 0m LLD. The existing sewer pipeline and manholes with invert level higher than 0m LLD will be decommissioned and removed. The design of the wall follows modelling studies conducted. The Eurotop Manual (2007) gives recommendations on the allowable mean overtopping discharges for different circumstances and uses. It was decided that for the purposes of the Strand an overtopping discharge of 1l/s/m is the proposed design condition for a 2011 1/20 year return period using existing data (not allowing for any sea level rise). Therefore the design allow for adaptation in future once sea level rise occurs and the wall no longer offers adequate protection.

### C. PROPERTY DESCRIPTION AND LOCATION

The listed activities will take place along approximately 2,65km of beach front, Strand.

Co-ordinates:

- Starting point of the activity 34° 06' 05.70" South  
18° 48' 50.91" East
- Middle point of the activity 34° 06' 57.88" South  
18° 49' 25.39" East
- End point of the activity 34° 07' 34.52" South  
18° 50' 02.76" East

Hereinafter referred to as "the site".

#### D. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Pieter Badenhorst professional Services CC  
% Nerine Coertzen  
P O Box 1058  
**WELLINGTON**  
7654

Tel: (021) 873 7228  
Fax: (086) 672 1916

#### E. CONDITIONS OF AUTHORISATION

1. This environmental authorisation is valid for a period of **five years** from the date of issue. The holder must commence with the listed activity within the said period or this environmental authorisation lapses and a new application for environmental authorisation must be submitted to the competent authority, unless the holder has lodged a valid application for the amendment of the validity period of this environmental authorisation, before the expiry of this environmental authorisation. In such instances, the validity period will be automatically extended ("the period of administrative extension") from the day before this environmental authorisation would otherwise have lapsed, until the amendment application for the extension of the validity period is decided. The listed activity, including site preparation, may not commence during the period of administrative extension.
2. The listed activity, including site preparation, may not commence within 20 (twenty) calendar days of the date of issue of this environmental authorisation. In the event that an appeal notice and subsequent appeal is lodged with the competent authority, the effect of this environmental authorisation may be suspended until such time as the appeal is decided.
3. The applicant must in writing, within 12 (twelve) calendar days of the date of this decision and in accordance with regulation 10(2)–
  - 3.1 Notify all registered interested and affected parties of –
    - 3.1.1 The outcome of the application;



- 3.1.2 The reasons for the decision as included in Annexure 1;
  - 3.1.3 The date of the decision; and
  - 3.1.4 The date of issue of the decision;
- 3.2 Draw the attention of all registered interested and affected parties to the fact that an appeal may be lodged against the decision in terms of Chapter 7 of the Environmental Impact Assessment Amendment Regulations, 2010 detailed in section F below;
- 3.3 Draw the attention of all registered interested and affected parties to the manner in which they may access the decision. And
4. Seven calendar days notice, in writing, must be given to the competent authority before commencement of construction activities.
  - 4.1. The notice must make clear reference to the site details and EIA Reference number given above.
  - 4.2. The notice must also include proof of compliance with the following conditions described herein:  
  
**Conditions: 2, 3 and 13.**
5. The holder is responsible for ensuring compliance with the conditions by any person acting on his/her behalf, including an agent, sub-contractor, employee or any person rendering a service to the holder.
6. Any changes to, or deviations from the scope of the description set out in section B above must be accepted or approved, in writing, by the competent authority before such changes or deviations may be implemented. In assessing whether to grant such acceptance/approval or not, the competent authority may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder to apply for further authorisation in terms of the applicable legislation.
7. The applicant must notify the competent authority in writing, within 24 hours thereof if any condition herein stipulated is not being complied with.

8. The draft Environmental Management Programme ("EMP") dated September 2013, included in the BAR as Appendix H, is hereby approved and must be implemented.

An application for amendment to the EMP must be submitted to the competent authority if any amendments are to be made to the EMP, and these amendments may only be implemented once the amended EMP has been authorised by the competent authority. The EMP must be included in all contract documentation for all phases of implementation.

9. A copy of the environmental authorisation and the EMP must be kept at the site where the listed activity will be undertaken. Access to the site referred to in section C above must be granted and, the environmental authorisation and EMP must be produced to any authorised official representing the competent authority who requests to see it for the purposes of assessing and/or monitoring compliance with the conditions contained herein. The environmental authorisation and EMP must also be made available for inspection by any employee or agent of the applicant who works or undertakes work at the site.
10. The applicant must submit an application for amendment of the environmental authorisation to the competent authority where any detail with respect to the environmental authorisation must be amended, added, substituted, corrected, removed or updated. Further, the rights granted by this environmental authorisation are personal rights (i.e. not attached to a property, but granted to a natural or juristic person). As such, only the holder may undertake the activity authorised by the competent authority. Permission to transfer the rights and obligations contained herein must be applied for in the following manner.
  - 10.1. The applicant must submit an originally signed and dated application for amendment of the environmental authorisation to the competent authority stating that he/she wishes the rights and obligations contained herein to be transferred, and including (a) confirmation that the environmental authorisation is still in force (i.e. that the validity period has not yet expired or the activity was lawfully commenced with); (b) the contact details of the person who will be the new holder; (c) the reasons for the transfer; (d) an originally signed letter from the proposed new holder acknowledging the rights and obligations contained in the environmental authorisation and indicating that he/she has the ability to implement the mitigation and management measures and to comply with the stipulated conditions.

- 10.2. The competent authority will issue an amendment to the new holder either by way of a new environmental authorisation or an addendum to the existing environmental authorisation if the transfer is found to be appropriate.
11. Non-compliance with a condition of this environmental authorisation or EMP may result in suspension of this environmental authorisation and may render the holder liable for criminal prosecution.
12. Notwithstanding this environmental authorisation, the holder must comply with any other statutory requirements that may be applicable to the undertaking of the listed activities.
13. The holder must appoint a suitably experienced environmental control officer ("ECO"), or site agent where appropriate, for the construction phase of implementation before commencement of any land clearing or construction activities to ensure compliance with the EMP and the conditions contained herein.
14. An integrated waste management approach, which is based on waste minimisation and incorporates reduction, recycling, re-use and disposal, where appropriate, must be employed. Any solid waste must be disposed of at a landfill licensed in terms of the applicable legislation.
15. No surface or ground water may be polluted due to any actions on the site. The applicable requirements with respect to relevant legislation pertaining to water must be met.
16. The applicable requirements with respect to relevant legislation pertaining to occupational health and safety must be adhered to.
17. Should any heritage remains be exposed during excavations or any actions on the site, these must immediately be reported to the Provincial Heritage Resources Authority of the Western Cape, Heritage Western Cape ("HWC") (in accordance with the applicable legislation). Heritage remains uncovered or disturbed during earthworks must not be further disturbed until the necessary approval has been obtained from Heritage Western Cape. Heritage remains include: archaeological remains (including fossil bones and fossil shells); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artifacts and

bone remains; structures and other built features; rock art and rock engravings; shipwrecks; and graves or unmarked human burials.

A qualified archaeologist must be contracted where necessary (at the expense of the applicant and in consultation with the relevant authority) to remove any human remains in accordance with the requirements of the relevant authority.

18. The following mitigation measures recommended in the amended final BAR must be adopted and implemented:
  - 18.1. Stormwater manholes must be regularly cleaned of sand to ensure optimum operation of the outlets to the sea.
  - 18.2. Cross sections must be surveyed from at least 10 sites along the beach in summer and winter every year to generate a database of beach erosion/accretion. These sites must be at the existing revetment and phases 1 (a, b, c) and 6 other. The other sites must be identified during construction of the first phase and must be aimed to identify the future priority phases.
  - 18.3. Construction must take place in phases: The wall must be split up into 300-350m portions between major intersections, namely; Parking to Sarel Cilliers, Sarel Cilliers to Burnard and Burnard to Big Blue, with the extension of the revetment running concurrently with one of these portions.
  - 18.4. A section measuring 25m from the existing wall to the sheet piling or sand berm must be demarcated. Half the road and pavement must be used for the construction site.
  - 18.5. Sheet piling with rock or alternatively a sand berm must be used to protect the excavation and construction work. This sheet piling and rock or sand berm must be installed from the sea side. After construction has been completed the section's sheet piling and rock must be removed from the sea side and moved to the next section.
  - 18.6. The construction of the excavation, reno mattress and seawall must run concurrently with no more than 10m of the excavation exposed before installation of the reno, and no more than 10m of the reno exposed before installation of the seawall.
  - 18.7. Excavation, blinding, installation of reno mattress and placing of concrete units must be done in sequence, with the one not running ahead of the other by more than 20m to avoid the risk of rework.
  - 18.8. The road side must be protected by fencing and temporary new jersey barriers. One lane is to be kept open and other traffic must be diverted around the block, or by flagmen/stop and go.

- 18.9. All excavated sand must be stockpiled and used for backfill. Sand must be stockpiled on the beach and along the site area not yet constructed. The contractor is to time the work so that installation of seawall, excavation and backfill is optimised.
  - 18.10. All rubble, contaminated excavation material and construction waste must be removed to an approved landfill site.
  - 18.11. The new sewage line must be installed behind the existing wall in the portions where the existing sewerage line is above 0m LLD (above the founding of the seawall).
  - 18.12. Where a new line is being installed the existing must be decommissioned and removed, together with the manholes. This decommissioning must take place after the new sewerage lines have been tested and linked up to the tie-in points.
19. No vehicles may be used on the beach unless the required permits have been obtained. Machinery on the beach is discouraged due to the impact on coastal breeding birds and coastal ecology.

## F. APPEALS

Appeals must comply with the provisions contained in Chapter 7 of the NEMA EIA Regulations.

### 1. An appellant must –

- 1.1. submit a notice of intention to appeal to the Minister, within 20 (twenty) calendar days of the date of the decision;
- 1.2. submit the appeal within 30 (thirty) calendar days after the lapsing of the 20 (twenty) calendar days contemplated in regulation 60(1), for the submission of the notice of intention to appeal; and
- 1.3. within 10 (ten) calendar days of having lodged the notice of intention to appeal, provide each person and organ of state registered as an interested and affected party in respect of the application, or the applicant, with –
  - 1.3.1. a copy of the notice of intention to appeal form; and

- 1.3.2. a notice indicating where and for what period the appeal submission will be made available for inspection by such person, organ of state, or applicant, on the day of lodging it with the Minister, and that a responding statement may be made on the appeal within 30 (thirty) calendar days from the date the appeal submission was lodged with the Minister.
2. A person, organ of state or applicant who submits a responding or answering statement in terms of regulation 63 must within 10 (ten) calendar days of having submitted the responding or answering statement, serve a copy of the statement on the other party.
3. If the person, organ of state or applicant fails to meet a timeframe with respect to the requirements as detailed above, the person, organ of state or applicant must immediately submit a written explanation to the Ministry providing a concise explanation for the non-compliance.
4. All notice of intention to appeal and appeal forms must be submitted by means of one of the following methods:

By Post: Western Cape Ministry of Local Government, Environmental Affairs  
and Development Planning  
Private Bag X9186  
Cape Town  
8000

By Facsimile: (021) 483 4174

By Hand: Attention: Mr Jaap de Villiers (Tel: (021) 483 3721)  
Room 809  
8<sup>th</sup> Floor Utilitas Building, 1 Dorp Street, Cape Town, 8001

5. A prescribed notice of intention to appeal form and appeal form as well as assistance regarding the appeal processes is obtainable from the office of the Minister at: Tel. (021) 483 3721, E-mail [Jaap.deVilliers@westerncape.gov.za](mailto:Jaap.deVilliers@westerncape.gov.za) or URL <http://www.westerncape.gov.za/eadp>.

**G. DISCLAIMER**

The Western Cape Government, the Local Authority, committees or any other public authority or organisation appointed in terms of the conditions of this environmental authorisation shall not be responsible for any damages or losses suffered by the holder, developer or his/her successor in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance with the conditions as set out herein or any other subsequent document or legal action emanating from this decision.

Your interest in the future of our environment is appreciated.

Yours faithfully



**MR. ZAAHIR TOEFY**

**DIRECTOR: LAND USE MANAGEMENT (REGION 2)**

DATE OF DECISION: 25/06/2014

Copied to: (1) P. Badenhorst  
(2) D. de Villiers  
(3) R. Omar

(Pieter Badenhorst Professional Services CC)  
(City of Cape Town)  
(Dept. of Environmental Affairs)

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## ANNEXURE 1: REASONS FOR THE DECISION

In reaching its decision, the competent authority, *inter alia*, considered the following:

- a) The information contained in the application form dated 14 November 2011, which was received by this Department on 22 November 2011, the draft BAR received by this Department on 01 August 2012, the final BAR and the EMP, submitted together with the final BAR dated November 2013, the rejection of the final BAR letter issued on 31 January 2014, the additional information received by this Department on 14 February 2014 and 07 March 2014, the amended final BAR and the EMP, submitted together with the final BAR, dated November 2013, and the S24G decision issued on 08 May 2014;
- b) Relevant information contained in the Departmental information base, including, the Guidelines on Public Participation, Alternatives and Exemptions (dated March 2013);
- c) The objectives and requirements of relevant legislation, policies and guidelines, including Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- d) The comments received from Interested and Affected Parties ("I&AP's") and the responses provided thereon as included in the comments and responses report;
- e) The sense of balance of the negative and positive impacts and proposed mitigation measures.

No site visits were conducted.

All information presented to the competent authority was taken into account in the consideration of the application for environmental authorisation. A summary of the issues which, according to the competent authority, were the most significant reasons for the decision is set out below.

### 1. Public Participation

The Public Participation Process included:

- Identification of and engagement with Interested and Affected Parties ("I&AP's"), including adjacent land owners, CapeNature, the Ward Councillor, City of Cape Town representative, Heritage Western Cape, The Department of Environmental Affairs (Oceans and Coast), The DEADP Directorate: Pollution and Waste Management, The Department of Public Works, Deeltitvelvereniging and Ratepayers Association;



- Fixing five site notice boards at different locations along the beach front where the listed activities are to be undertaken;
- Giving written notification to I&AP's as well as State Departments;
- The placing of a newsletter advertisement in the local newspaper ("The DistrikPos" on 19 July 2012);
- A copy of the draft BAR was made available to all I&AP's, including hard copies sent to all relevant State Department's and Organs of State to comment between 19 July 2012 to 21 September 2012;
- Allowing a 40 day commenting period during which I&AP's could submit comments to Pieter Badenhorst Professional Services CC;
- An Open day was held in the Function Room of the Municipal Buildings in Strand on 30 July 2012;
- Additionally another open day was held in the Function Room of the Municipal Buildings in Strand on 14 October; and
- Submitting the Final BAR to I&AP's for a 21 day comment period.

All the concerns raised by interested and affected parties were responded to and adequately addressed during the public participation process. Specific management and mitigation measures have been considered in this environmental authorisation and in the EMP to adequately address the concerns raised.

The Department is satisfied with the public participation process conducted by the Environmental Assessment Practitioner which has met the minimum legal requirements in terms of the NEMA, 1998 (Act No. 107 of 1998).

## 2. Alternatives

### Alternative 1:

#### **AN L-SHAPED CONCRETE SEAWALL WITH AN EXPANSION OF THE EXISTING SLEEPING ROCK REVETMENT AND DUNE STABILIZATION (PREFERRED ALTERNATIVE)**

Overall, only one locality alternative is available since the proposed project will be a linear activity undertaken in one location. A number of design / layout alternatives were evaluated and the L-shaped concrete sea wall with a sleeping revetment to the east and minimal dune stabilization to the west was selected to optimally counteract the overtopping that is currently a problem on site. The other alternatives, including a mass concrete wall, sloping porous wall, vertical porous wall, dune stabilization, groynes, off shore breakwater and beach replenishment were not feasible.

The option of building the sea wall with a sleeping revetment was selected as the preferred alternative for the following reasons:

- An L-shaped seawall in itself does not perform adequately in terms of overtopping; however the addition of a rock toe will sufficiently enhance the overtopping in the short term for sand to be replaced by nourishment;
- The amount of sand required for nourishment is not significantly large, and it could be sourced along the beach near Lourens River, as this is where the long shore transported sand is deposited in the natural course of sediment transfer;
- The porous rock armoured toe for the sea wall is considered a very robust coastal engineering solution;
- The L-shaped seawall is easily integrated with other structures and it is recommended to integrate it with access to the beach, a promenade, and to move the current sewer pipeline behind the new wall;
- The seawall is also considered a long-lasting solution and maintenance-free in the medium term, and relatively maintenance free in the longer term, with beach nourishment expected to be required only every few years;
- The Promenade will maintain the beach as an attractive amenity;
- It is not a curvilinear structure therefore loss of beach is minimized;
- This alternative has the best cost to benefit ratio;
- None to minimal parking loss; and
- The layout design includes future traffic development as planned for by the City of Cape Town.

#### **Beach Wall**

This entails the construction of an L-shaped concrete seawall for approximately 2.65km with a crest level of 3.5m above LLD. The seawall will be built so as to allow the beach level to be retained at the current 2m, which occurs along most of the beachfront.

#### **Dune Stabilisation**

A portion of Strand beach closer to Lourens River, west of the proposed beach wall, currently has a stabilised dune showing some signs of distress. This portion of beach is both wide enough and limited enough for dune stabilisation to remain the preferred coastal protection alternative in this area. This solution will require informing and educating the public, with the provision of adequate signage.

#### **Revetment**

The proposal includes the expansion of the existing rock revetment east of the proposed sea wall as the expansion of the sleeping revetment structure at its toe will serve as a short term overtopping

solution should the beach be washed away. Furthermore, this will allow the sand to be replaced by nourishment and require minimal maintenance in the long term. The existing rock revetment will be expanded by 90m to the west and 40m to the east.

**Alternative 2:**

**MASS CONCRETE GRAVITY WALL**

The mass concrete wall is considered a robust coastal engineering solution; however, this is not a feasible option because:

- This type of structure relies on its own weight for stability and requires a stiff base to prevent wall settlement or tilting.
- Adequate toe protection is required in order to prevent undermining of the wall.
- These walls are generally more expensive than reinforced concrete walls; however they are more durable due to the lack of reinforcement.
- Not very effective for wave energy dissipation and splash-up.
- Construction will require traffic accommodation and large amount of in-situ construction.
- Due to in-situ construction the finish of the wall may not be as appealing as an L-shaped gravity wall.

**Alternative 3:**

**VERTICAL POROUS WALL**

Vertical porous walls usually consist of stone or rock kept in place by a mesh or framework. They are useful when reducing wave reflections, which is a crucial design criterion. They offer a quick, cheap solution, but this is not a feasible option because:

- They are considered a poor long term coastal engineering solution.
- Not very durable and thus require high maintenance.
- Sensitive to toe erosion and has a high visual impact.

**"No-Go" Alternative:**

This option has been considered, but is not a viable option and therefore an application is required for the revetment and beach wall. The main reason why it is not viable is because:

- The road and related infrastructure would have been exposed to following storms with similar damage as experienced during June 2008;
- It does not prevent ongoing erosion; and
- It does not prevent overtopping and future damage to infrastructure and neighbouring properties.

### 3. Impacts, assessment and mitigation measures

#### 3.1. Biodiversity and Biophysical Impacts:

The temporary turbidity expected during construction is to be mitigated through the use of sheet piling with rocks on the sea side during construction to contain the construction works.

Construction of the beach wall will prevent overtopping and resulting flooding and damage to private and municipal properties as well as roads and infrastructure.

Reduced beach area and access above the high water mark will be mitigated by constructing the structure as narrow and close to the existing wall as practically feasible.

#### 3.2. Visual / Sense of Place / Noise:

Temporary construction noise will be mitigated through only allowing work during normal working hours.

There will be a visual impact during construction, but it is only short term.

#### 3.3. Socio-economic:

Additional job opportunities will be created during the construction phase, which will only be a temporary impact.

Damage to road and infrastructure will be prevented by the revetment.

#### 3.4 Traffic:

Sheet piling and rocks will be placed to prevent driving on the beach.

The beach wall will permanently provide protection against flooding and will stop erosion.

Flooding of the road and low lying properties and underground parking garages will be prevented.

The structure will cause a low to moderate visual impact which will be mitigated through the usage of landscaping and low level of construction.

The revetment will be constructed with natural rocks that in time will be partly covered by sand.

### National Environmental Management Act Principles

The National Environmental Management Act Principles (set out in section 2 of the NEMA, which apply to the actions of all organs of state, serve as guidelines by reference to which any organ of state must exercise any function when taking any decision, and which must guide the interpretation, administration and implementation of any other law concerned with the protection or management of the environment), *inter alia*, provides for:

- The effects of decisions on all aspects of the environment to be taken into account;
- The consideration, assessment and evaluation of the social, economic and environmental impacts of activities (disadvantages and benefits), and for decisions to be appropriate in the light of such consideration and assessment;
- The co-ordination and harmonisation of policies, legislation and actions relating to the environment;
- The resolving of actual or potential conflicts of interest between organs of state through conflict resolution procedures; and
- The selection of the best practicable environmental option.

In view of the above, the NEMA principles, compliance with the conditions stipulated in this environmental authorisation, and compliance with the EMP, the competent authority is satisfied that the proposed listed activities will not conflict with the general objectives of integrated environmental management stipulated in Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and that any potentially detrimental environmental impacts resulting from the listed activities can be mitigated to acceptable levels.

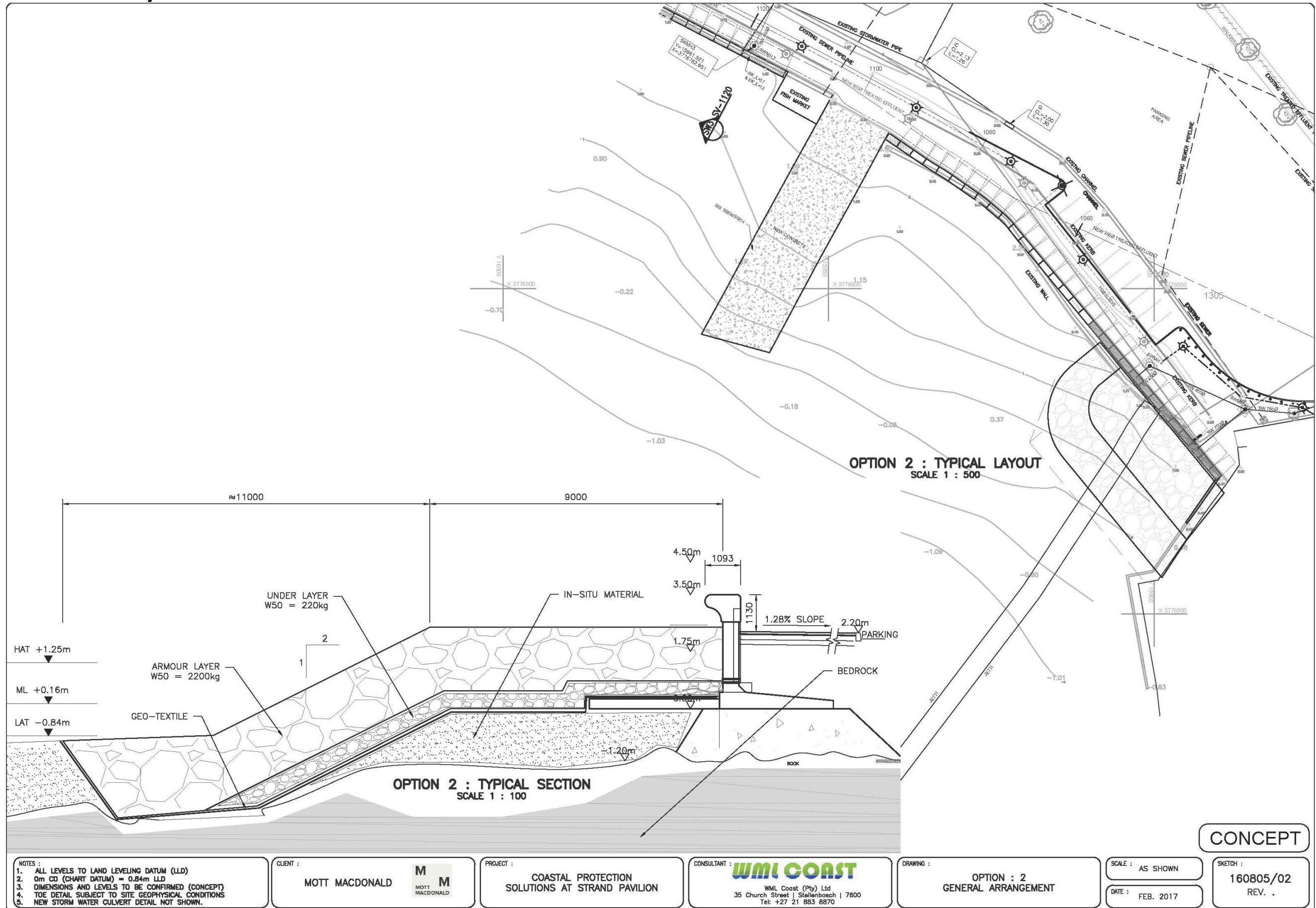
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Appendix 5: Amended Project Plan



## Appendix 6: Design Report

### Strand Pavilion

Strand, South Africa

## Coastal Protection Solutions



*Prepared for*



*Prepared by*

**WML Coast (Pty) Ltd**






**28 March 2017**





# Quality Management

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# 1 INTRODUCTION

## 1.1 Background

Mott MacDonald Africa was appointed for the design of the new re-curve wall and upgrades to the existing slipway along the Strand Beach front (west of the Strand Pavilion). After the completion of the seawall it was evident that wave overtopping and high wave heights occur at the western edge of the Strand Pavilion – Bart's Corner. Due to the foreshore channel ("Die Poort") and the geometry of the Pavilion, high wave heights occur at Bart's Corner, and subsequently; wave overtopping, seawall toe scour and wave reflection off the seawall is experienced. WML Coast was appointed to investigate possible remedial actions to decrease the wave overtopping and related hydraulic and morphological phenomenon at this location.

This report will investigate the following:

- Impact of no remedial action at the interest area – do nothing
- Conceptual solutions to minimise wave overtopping and their estimated costs:
  1. Raise the existing seawall and construct a rock toe
  2. Construct a seawall revetment
  3. Construct a small berm breakwater in the nearshore area
- Comparison of proposed mitigation measures
  - Aesthetics
  - Constructability
  - Cost
  - Durability
  - Environmental and social impact
  - Hydraulic and morphological aspects
    - Scour prevention
    - Wave overtopping
    - Wave reflection
- Conclusions and recommendations

## 1.2 Basis of Design

Prior to the construction of the new seawall numerous physical model tests were performed in 2012 by the Institute of Water and Environmental Engineering of the University of Stellenbosch (*MMD, 2013*). The physical model tests investigated the hydraulic and physical (stability) response of various seawall configurations. The physical modelling exercise consisted of a total of 62 test cases, testing a total of 10 seawall configurations. The physical model tests were conducted in a 40m long, 1m wide wave flume. As part of the new seawall study the design water levels were estimated, taking into consideration sea level rise and storm surge. Further details with regards to design water levels and the physical model testing are described in Sections 2.4.2 and 3.1 of this report.

The proposed mitigation measures developed as part of this assessment were to a large extent based on the findings of the physical model studies. The typical seawall configurations developed during the physical model testing were modified for the specific site conditions at Bart's Corner. The final layout and dimensions of the proposed mitigation measures will be confirmed during detail design.

## 2 SITE CHARACTERISTICS

### 2.1 Interest Area

The area west of the Strand Pavilion where wave overtopping and high wave energy is prevalent is referred to as "Bart's Corner". Bart's Corner is situated at coordinates 34° 7'6.98"S; 18°49'39.81"E

The Strand seawall adjacent to the Strand Pavilion is shown on Figure 1, Bart's corner can be seen on Figure 2.



Figure 1: Strand seawall adjacent to Strand Pavilion



Figure 2: Bart's corner

### 2.2 Problem Description

WML Coast conducted a site visits to Bart's Corner on the 30th of January 2017 coinciding with low tide and high tide. The 30th of January coincided with a spring tide. The site (and problem) description is based on the observed behaviour and physical properties of the interest area during the site visits.

Bart's corner is subject to 4 occurrences which are all related:

1. Wave overtopping (refer to Figure 3 and Figure 4)
  - Wave overtopping occurs due to wave impact on the toe-structure of the seawall and due to conventional overtopping during high sea water levels (and associated large waves);
  - The new seawall is not operating optimally in this corner due to (i) the eroded foreshore and associated greater water depth at the toe and (ii) wave convergence at the corner due to the layout of the existing structures and the foreshore characteristics;
2. Wave splash-back (refer to Figure 3)
  - The re-curve seawall reflects the oncoming water. However, due to the relative low height of the Strand Pavilion brick wall, the water diverts directly onto the Pavilion's walkway;
3. Wave reflection (refer to Figure 4 and Figure 5)
  - The structure reflects oncoming waves during high water levels
  - The beach has already been eroded and does not dissipate the oncoming waves
  - The constant reflection and associated high wave energy promotes scour at Bart's corner.
4. Scour (refer to Figure 3 and Figure 6)
  - The seawall is being undermined by scour at Bart's corner; which poses a structural risk to the seawall;



Figure 3: Bart's corner during MLWS - 30 January 2017



Figure 4: Wave reflection and wave overtopping at Bart's corner during MHWS - 30 January 2017



CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER



Figure 5: Wave reflection at Bart's corner during MHWS - 30 January 2017



Figure 6: Aerial view of Bart's Corner. Yellow line – assumed natural coastline, red area – scour zone (Google Earth, 2017).

## 2.3 Local Beach Regime

The seawall at Bart's Corner is not operating as designed due to the eroded foreshore. The scour at Bart's Corner is likely due to various factors coinciding. The following is deemed the likely causes:

- Decreased sediment budget within the area; removal of sand off the roads, removal of dunes for construction of flats etc.
- Decreased sediment discharge into the ocean from the rivers due to prolonged dry periods and likely increased sediment trapping within the river catchments (catchment development decreases sediment yield).
- The Pavilion is located head-on to "Die Poort" (a channel between the adjacent rocky outcrops), it is therefore subject to higher incoming wave energy than the surrounding areas, the shape of the bay is evident of this. See the Figure below.
- The primary longshore transport direction is east-west, the Pavilion therefore starves Bart's Corner of sediments. Thereby promoting scour.
- The scouring has a compounding effect as the wave heights increase with a deeper foreshore.
- Sea level rise exacerbates the problem and is the reason for the new seawall in the first place.



Figure 7: Coastal processes at Strand Pavilion.



## 2.4 Current Seawall Configuration

The current seawall configuration at Bart's Corner is illustrated in the Figure below.

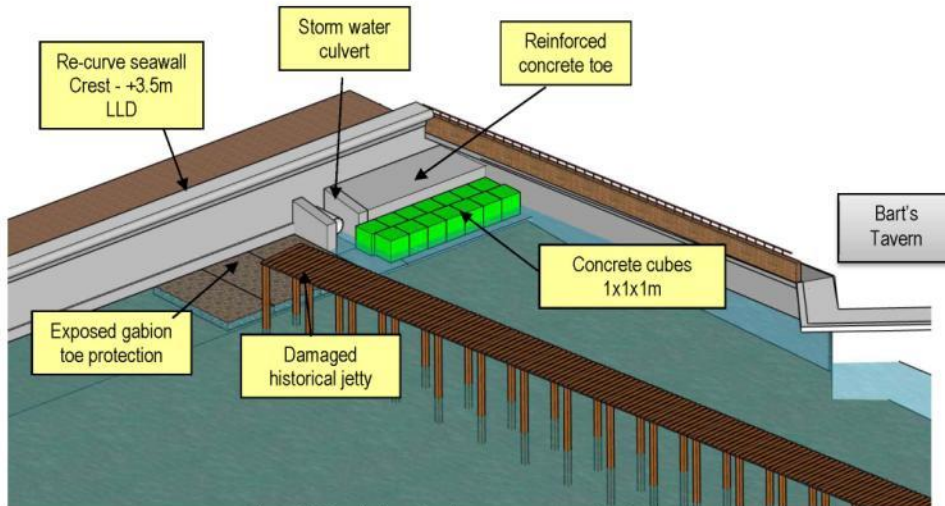


Figure 8: Description of major components at Bart's Corner

The seawall (and beach) at Bart's corner has a few differentiating features from the rest of the adjacent seawall:

- A stormwater culvert is present (the seawall has various stormwater culverts at predetermined intervals)
- The scour at the interest area has exposed the toe protection gabions of the seawall
- The seawall has a reinforced concrete toe for added stability
- There are 1mx1mx1m concrete blocks placed on the extended concrete toe of the seawall. These blocks were placed as an interim measure to mitigate the overtopping at Bart's Corner. The concrete blocks have been displacement by wave action.

Based on a recent beach survey conducted on 30 January 2017 and the as-built drawings of the seawall, the beach level in front of Bart's corner is approximately -0.35m LLD.

Results from DCP (dynamic cone penetration) testing which was previously performed along the seawall, indicated that the bed rock at Bart's corner is at a level of approximately -1.2m LLD. DCP test results for the seawall can be seen in the Figure 9 below:

Refer to the following drawings for the as-built configuration at Bart's Corner

- Figure 10: Pavilion Side Elevation of the seawall at Bart's Corner (MMD, 2013).
- Figure 11: Typical Section A-A at Bart's Corner, refer to Figure 10 for section location (MMD, 2013).
- Figure 12: Typical Section B-B at Bart's Corner, refer to Figure 10 for section location (MMD, 2013).

CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

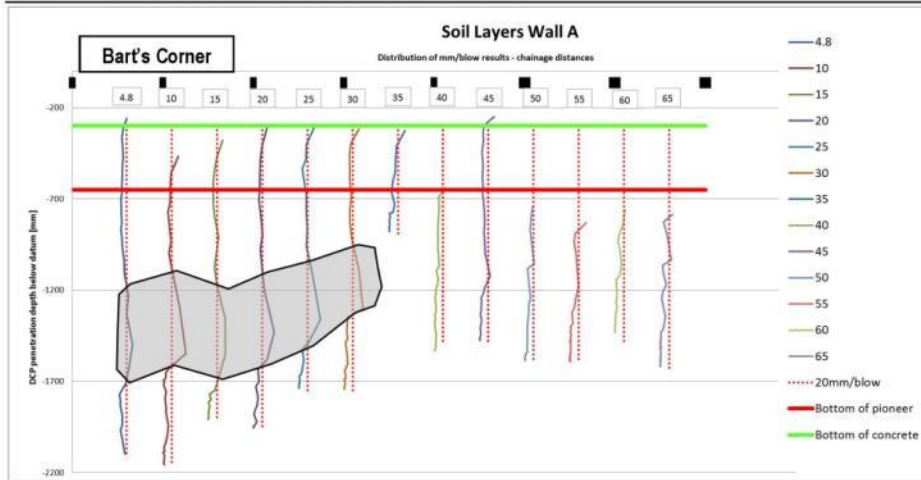


Figure 9: DCP test summary along Seawall A of the new Strand seawall project (Personal communication, City of Cape Town, 2016).

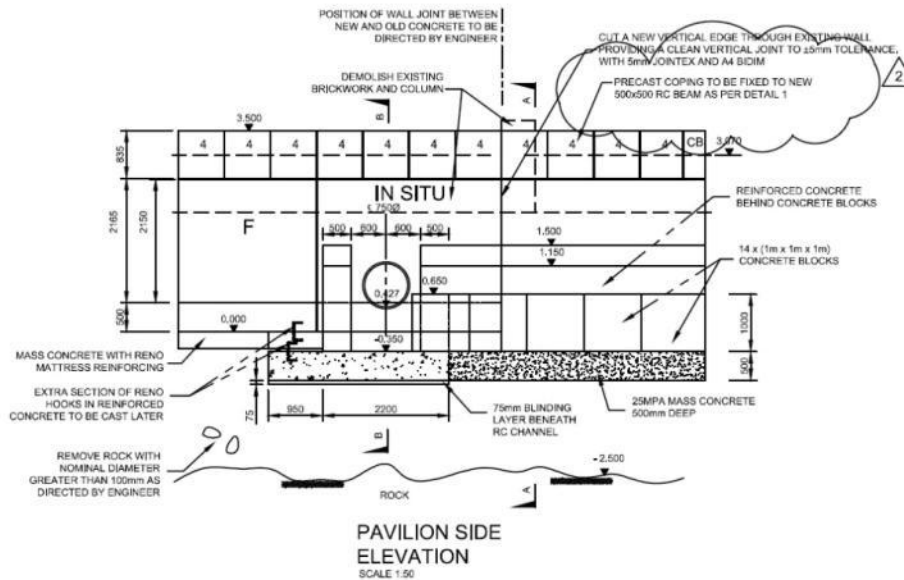


Figure 10: Pavilion Side Elevation of the seawall at Bart's Corner (MMD, 2013).

CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

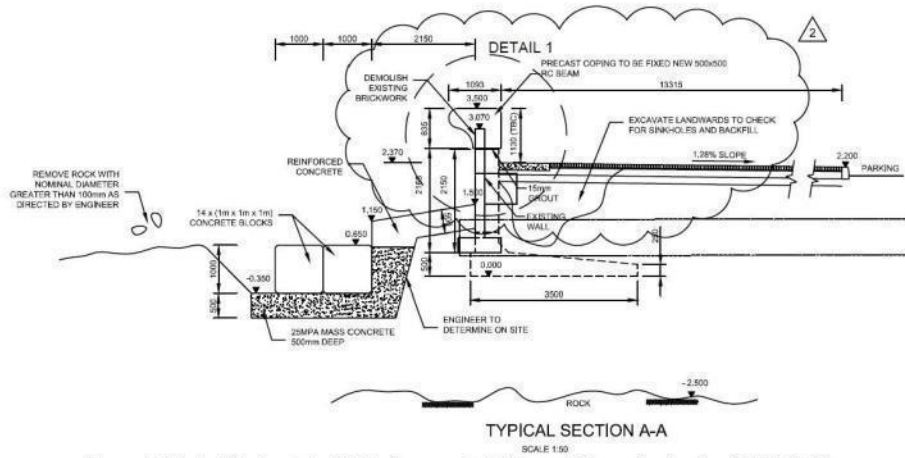


Figure 11: Typical Section A-A at Bart's Corner, refer to Figure 10 for section location (MMD, 2013).

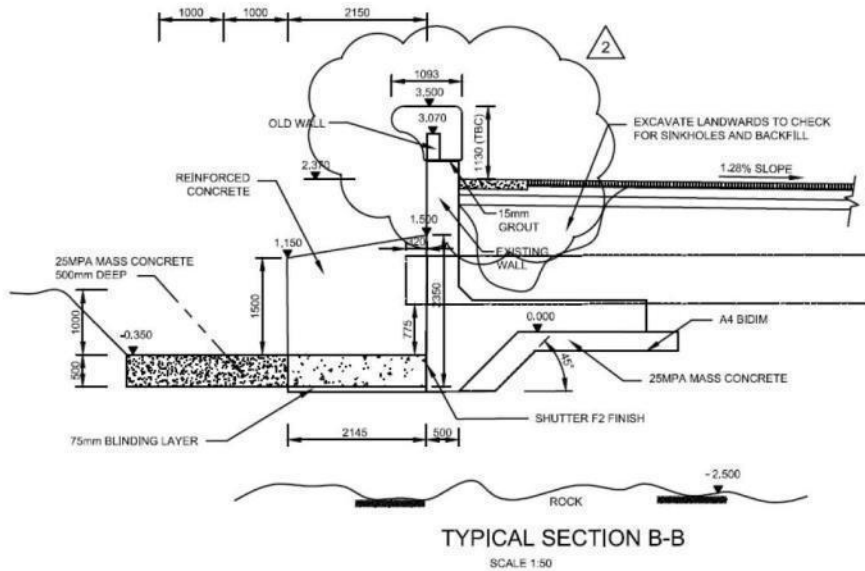


Figure 12: Typical Section B-B at Bart's Corner, refer to Figure 10 for section location (MMD, 2013).

## 2.5 Environmental Criteria

### 2.5.1 Bathymetry

The seabed at the Strand foreshore has a very gentle slope and typically the water depth is only approximately 1 m at distance of 200 m offshore. Due to the shallowness of the foreshore, the significant wave height is depth limited. Generally, waves on a gentle foreshore will break as spilling waves, with more than one breaker line.

### 2.5.2 Water levels

The Table below lists the astronomical tide levels measured at Simon's Town and considered to be representative to the Strand Pavilion site.

Table 1: SANHO tidal levels for Simon's Town (2017)

Description	Relative to MSL (m LLD*)	Relative to CD (m CD)
Highest Astronomical Tide (HAT)	+1.25	+2.09
Mean High Water of Spring Tide (MHWS)	+ 0.95m	+1.79m
Mean High Water of Neap Tide (MHWN)	+ 0.45m	+1.29m
Mean Level (ML)	+0.16m	+1m
Mean Low Water of Neap Tide (MLWN)	-0.11m	+0.73m
Mean Low Water of Spring Tide (MLWS)	-0.6m	+0.24m
Lowest Astronomical Tide (LAT)	-0.84m	+0m

\*LLD = Land Levelling Datum is often referred to as MSL. It is the datum level for the project and used in the Strand Municipality as datum for surveys on land.

The Table above indicates that the maximum tidal variation seldom exceeds 1.8 metres, with the average tidal variation about 1 metres. Variations of the absolute water level because of meteorological conditions together with wind and wave setup can however, occur. Tides are semi-diurnal (two tides per day).

The extreme water level conditions, considering expected storm changes as well as the effects of sea level rise for future timelines, have been determined by Mott MacDonald PDNA (MMD, 2013) for the design of the new seawall. These design water levels are listed in Table 2 below.

## CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

Table 2: Strand seawall design water levels (MMD, 2013)

STRAND SEAWALL STUDY - WATER LEVELS FOR DESIGN										
Year	Return period storm surge				ML increase from SLR (cm)	MHWS above ML (cm)	Return period water level			
	1/1year	1/20 years	1/50 years	1/100 years			1/1year	1/20 years	1/50 years	1/100 years
	(cm)						(cm) above LLD			
2011	48	72	78	84	0	79	143	167	173	179
2035	51	76	83	89	27	79	173	198	205	211
2060	54	81	88	94	55	79	204	231	238	244
2110	57	86	93	100	80	79	232	261	268	275

ML = Mean of all astronomical tidal levels  
MHWS = Mean High Water of Spring Tide  
LLD = Land Levelling Datum (as at 2010)  
\* Assumes LLD of 2010 remains as constant datum level and ML is 16 cm above LLD in 2010.  
SLR = Sea level rise due to global warming

### 2.5.3 Wind

From a recent study conducted for the design of the seawall, (MMD, 2013), the winds at the Strand approach predominantly from ESE due to the mountain sheltering during all seasons, except for winter when the northerly wind dominates. In summer the ESE wind blows for almost 30% of the time while in winter this reduces to 10% and the wind blows from N for almost 25% of the time. However, for this assessment, the effect of wind-setup was not considered.

### 2.5.4 Waves

False Bay provides natural shelter from the offshore wave conditions and thus the majority of the waves at Strand propagate from a south-westerly direction. Due to the bathymetry of the Strand the design wave conditions are water level dependent (depth limited). Large offshore waves break on the outer reefs and sand banks and large wave conditions never reach the shoreline (MMD, 2013). As part of the detailed study of the coastline (Gordon's Bay to Zeekoewlei) which was conducted during 2013 (MMD, 2013), the extreme wave conditions were predicted at the -10m contour at the Strand. The estimated wave heights are listed in the Table below:

Table 3: Extreme wave heights ( $H_s$  (m)) for - 10m contour off the Strand (MMD, 2013)

Return period	Wave Height (m)
Once per year	1.3
Once per 10 years	1.6
Once per 20 years	1.7
Once per 50 years	1.8
Once per 100 years	1.9
Once per 250 years	2.0
Once per 1000 years	2.1

A wave period of 11s was assigned to all conditions as representative for the design wave climate, based on a previous assessment conducted in 2013 (MMD, 2013).

## 3 PROPOSED OPTIONS

### 3.1 Introduction

The following remedial actions were investigated:

- Do nothing
- Raise the existing seawall
- Construct a seawall revetment
- Construct a small berm breakwater in the nearshore area

The conceptual layouts and cross-sections of the proposed solutions were based on the physical model study and the design guidelines of the CIRIA Rock Manual (2007). The environmental design criteria are given in Section 2.5 of this report.

Conceptual cross-sections for each of the options are illustrated in Appendix A. Note dimensions and layouts shall be finalised during detail design.

The results from the physical model study of the various proposed sea wall options were used to estimate the hydraulic and physical (structural stability) performance of the proposed solutions. Note, a berm breakwater for coastal zone protection was not investigated in the physical model study. The complete physical model study consisted of a total of 62 test scenarios conducted on 10 seawall/revetment configurations ("SERIES").

Refer to Table 5 for a description of the physical model configurations and their results.

As part of the physical model study, overtopping volumes were determined for all the seawall configurations. For reference, overtopping volume limits and recommended guidelines are described in Table 4. As a guideline for directing test choices a rate of 1.0 l/s/m in the 1 in 20-year event (year 2011) was adopted as a desired limit (overtopping performance is discussed in Table 5).

## CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

For reference the overtopping volume of the Strand seawall at Bart's Corner with the current (eroded) beach level was predicted as approximately 8 l/s/m for a 1 in 20-year sea level (year 2011) during the previous physical tests.







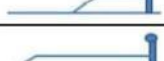



Table 4: Limits of overtopping per the EurOtop Manual (EurOtop, 2007)

Limits for overtopping for pedestrians		
	Aware pedestrian, clear view of the sea, not easily upset or frightened, able to tolerate getting wet, wider walkway	q = 0.1 l/s/m
	Trained staff, well shod and protected, expecting to get wet, overtopping flows at lower leaves only, no falling jet, low danger of fall from walkway	q = 1 - 10 l/s/m
Limits for overtopping for vehicles		
	Driving at moderate or high speed, impulsive overtopping giving falling or high velocity jets	q = 0.01 – 0.05 l/s/m
	Driving at low speed, overtopping by pulsating flows at low flow depths, no falling jets, vehicle not immersed	q = 10 - 50 l/s/m
Limits for overtopping for damage to revetment seawalls		
	Damage to grassed or lightly reclamation cover	q = 50 l/s/m
	Damage to paved or armoured promenade behind seawall	q = 200 l/s/m



## CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

Table 5. Summary of Strand seawall physical model test configurations and results (MMD, 2013).

Series	Tests	Description	Overtopping Performance
	1 1-9	Existing revetment - +2.6m LLD Crest	Overtopping volumes are acceptable up to the 1 in 20 years return period storm at present but become dangerous at 1 in 100 years. The dangerous overtopping will occur at least annually in 25 years' time (2035) with adopted global warming estimates.
	2 10-11	Existing revetment, raised crest - +2.6m LLD Crest	With the back seawall raised to +3.2m LLD (0.6m higher than present), overtopping volumes become safe beyond the 1 in 100 years return period storm event (2011) and the 1 in 5 years storm event in 25 years' time (2035) but will exceed dangerous overtopping volumes at least annually in 50 years' time (2060)
	3 12-18	Beach at +0.0m LLD, varying seawall crest height	Without revetment and with a new curved crest seawall (e.g. east of the pavilion) and with a low beach level (0m LLD) storm events up to the 1 in 20 years storm (2011) will only give acceptable overtopping with a seawall crest height of +4.5m LLD.
	4 43-45, 47	Beach at +0.5m LLD, varying seawall crest height	Raising the beach level by 0.5m (to +0.5m LLD) provides acceptable overtopping in the 1 in 20 years storm (2011) at a seawall crest height of between 3.5m and 4.0m LLD (0.5-1.0m lower than in series 3 with a lower beach at 0.0m LLD)
	5 19-21, 37-41, 48-50, 55-56	Beach at +1.0m LLD, varying seawall crest height, beach slope 1:20	Raising the beach level by a further 0.5m (to +1.0m LLD) provides acceptable overtopping in the 1 in 20-year storm (2011) at a seawall crest height of 3.3m LLD
	6 22, 51-54	Beach at +1.5m LLD, varying seawall crest height	Raising the beach level by a further 1.0m (to +2.0m LLD) provides acceptable overtopping for the 1 in 100-year storm (2011) at a seawall crest height of 3.6m LLD
	7 58-62	Beach at +2.0m LLD, varying seawall crest height	The steep sloping beach to the same beach level at the wall (+2m LLD) provides higher overtopping and the 1 in 100-year storm (2011) exceeds the safe overtopping criterion at the seawall
	8 23-24, 29	New revetment (short), low crest, varying seawall crest height	The addition of rock revetment reduces overtopping volumes considerably. Even with a short, low revetment there is considerable reduction. Longer and higher revetment progressively provides much less overtopping for the same wall height. The addition of progressive revetments could be an adaptive defence strategy for long term sea level rise.
	9 25-28, 35-36, 42	New revetment (long), low crest, varying seawall crest height	
	10 30-34	New stepped revetment, varying seawall crest height	



## 3.2 Option 0 - Do nothing

### 3.2.1 Overview

In this Report Section the option to "do nothing" is described. The predicted overtopping volume of the Strand seawall at Bart's Corner with a beach level of 0m LLD was predicted by the physical model study as approximately 8 l/s/m for a 1 in 20-year sea level (year 2011). This overtopping volume is approximately 8 times more than the desired overtopping volume. Note, the current beach level at Bart's Corner is approximately -0.35m LLD and therefore it is considered that the actual wave overtopping is most likely greater than the estimated overtopping from the physical model study.

### 3.2.2 Advantages

- No further design or construction cost for new infrastructure;
- No possible business loss (temporary) due to construction activities at the Strand Pavilion;
- No EIA requirement;
- No construction impact on historical jetty;

### 3.2.3 Disadvantages

- Overtopping will frequently occur at the interest area which poses a safety risk and/or inconvenience to guests and personnel at the Strand Pavilion. Note that severe overtopping during extreme conditions can lead to trauma and injuries;
- Overtopping will likely become worse with sea level rise and further erosion of the foreshore. This will lead to increased wave height and reduced freeboard of the seawall;
- Possible damage to Strand Pavilion property – possible flooding of shops and associated damage (i.e. corrosion);
- Possible loss of business during storm events – customers will avoid flooded splashing areas;
- Possible damage to parking area if severe flooding occurs;
- Due to the ongoing scour at Bart's Corner, damage to the seawall is highly likely if no additional scour protection is erected/constructed at toe of the seawall.

## 3.3 Option 1 - Raised Seawall

### 3.3.1 Overview

Raising the seawall will decrease the overtopping volume and the construction thereof is relatively slightly less expensive compared to constructing a large rock revetment structure. The zone of high wave energy is however unresolved and future persistent scour may occur leading to instability of the seawall and/or ongoing maintenance. Therefore, if the seawall is raised additional scour protection will be required at the toe of the structure to ensure the feasibility of this option. The scour protection will necessitate the extension of the current storm-water culvert.

Raising of the seawall will necessitate the destruction of the upper segment of the seawall to facilitate the extension. The overtopping of vertical seawalls with different crests heights and sea bed profiles were investigated as part of the physical model study conducted for the construction of the seawall.

### 3.3.2 Conceptual Design

With the beach level at approximately 0m LLD the crest level of the seawall should be raised to at least 4.5m LLD (current level is +3.5m LLD). At this crest level, acceptable overtopping rates be achieved for the 1:20 year design water level for the 2011 sea-level if the effect of the revetment is ignored -note revetment is beneficial to overtopping volumes (see Table 5). The predicted overtopping volume for this seawall configuration is approximately 0.7 l/s/m. Refer to Figure 13 for a representation of the current seawall height in relation to the surrounding environment.

The scour protection will consist of armour rock layers, the rock revetment details are as follows:

- Revetment length = 9m
- Revetment width = 25m (refer to Figure 6)
- Armourstone mass,  $M_{60} = 2200\text{kg}$
- Revetment crest level = 1.75m LLD (Note, the crest level will be confirmed during detail following a more detailed wave overtopping assessment.
- Revetment slope = 1:2 (V:H)
- Revetment toe level -1.7m LLD (0.5m trench in bedrock, excavation in bedrock required for revetment toe stability)

During construction of the new raised seawall the Strand Pavilion brick promenade brick wall hand railing must be demolished and replaced with a concrete (or similar) wall. Refer to Figure 14 for a conceptual sketch of the raised seawall and new concrete wall.

The new recurve seawall should span a distance of at least 25m (approximate length of eroded coastline, refer to Figure 6) from Bart's Corner. The "splash back" wall should span a length of at least 8m.

From physical model study results it is apparent that the with low seabed (foreshore) levels the overtopping is significant. If the seawall is raised overtopping performance will be improved if a rock revetment is placed in front of the seawall.

CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

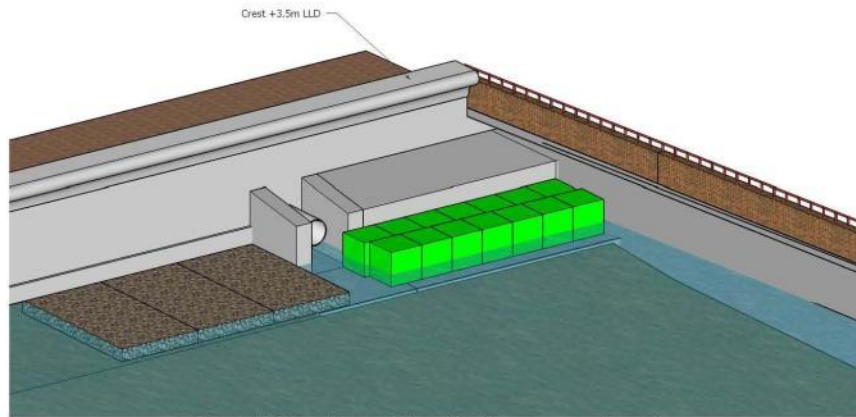


Figure 13: Seawall west of Strand Pavilion current configuration.

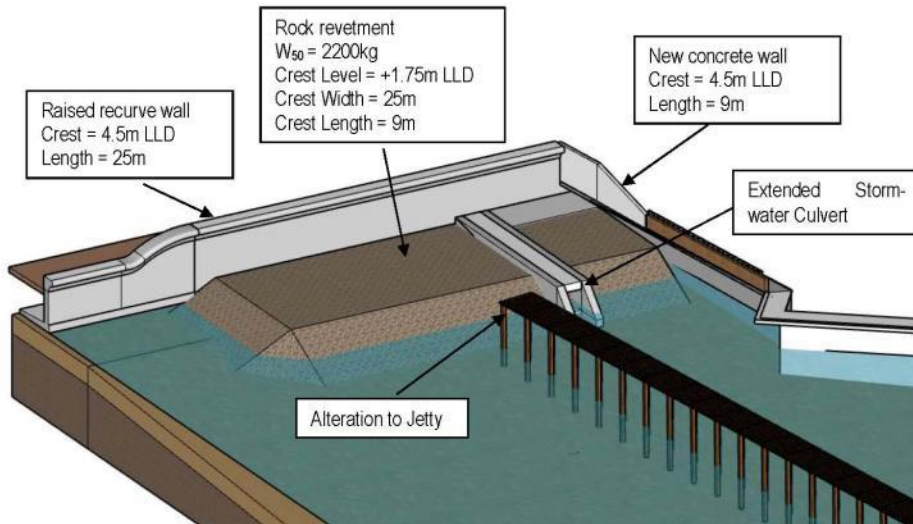


Figure 14: Raised seawall west of Strand Pavilion proposed conceptual configuration.

### 3.3.3 Advantages

- Slightly lower construction cost than large revetment;
- The construction site is accessible from land – limited marine work envisaged;
- Possibly only a basic environmental assessment required if any (to be confirmed by an environmental practitioner);
- Overtopping will be limited to a large extent (subject to height of seawall and extent of rock toe);
- The rock revetment can easily be modified in response to long term sea level rise or altered foreshore bathymetry (MMD, 2013).

### 3.3.4 Disadvantages

- Raised seawall will have potential impact on aesthetic aspects;
- Walkway cantilever slab structural capacity might be low – will be accounted for in detail design;
- Demolishing of existing brick wall of the pavilion and construction of a concrete (or equivalent) wall;
- Alteration to historical jetty required;
- Construction of new concrete storm-water culvert.
- Depending on the geophysical characteristics (i.e. bedrock level), rock excavation may be required for toe construction.

## 3.4 Option 2 - Seawall Revetment

### 3.4.1 Overview

Numerous tests were conducted on a seawall plus rock revetment configuration (see MMD, 2013). The general trend from test results were that the longer and higher the revetment, the more favourable the overtopping results. Length was however considered more beneficial than height during previous studies.

The construction of a rock revetment in front of the seawall will necessitate construction of a new concrete culvert for the storm-water outlet. The storm-water culvert should be founded on the bedrock and extended to the toe of the rock revetment structure. The large extent of the rock revetment will also require the dismantling/removal of a portion of the historical jetty in addition, depending on the geophysical characteristics (i.e. bedrock level), rock excavation may be required for toe construction.

### 3.4.2 Conceptual Design

The proposed rock revetment armour stone size is based on the existing rock revetment east of the Strand Pavilion, refer to Figure 15. The dimensions are however altered to integrate with the existing bathymetry and infrastructure at Bart's corner. The armour stone sizing was verified with the Hudson and van Der Meer armour stability formulas (see CIRIA, 2007) and the applicable physical and environmental parameters. Armour stone median mass ( $W_{50}$ ) of 2.2t and slope V:H 1:2 was used. The toe of the revetment should be founded a depth of 0.5m into the bedrock (bedrock starts at approximately -1.2m LLD).

A physical model of length 9m, beach level 0m LLD and crest level +1.5m LLD delivered an overtopping volume of approximately 1 l/s/m for the 1 in 20-year design water level (2011). Note the designated revetment length is much higher and better (smaller) overtopping volumes can be expected.

CONCEPT DESIGN REPORT - COASTAL PROTECTION AT BART'S CORNER

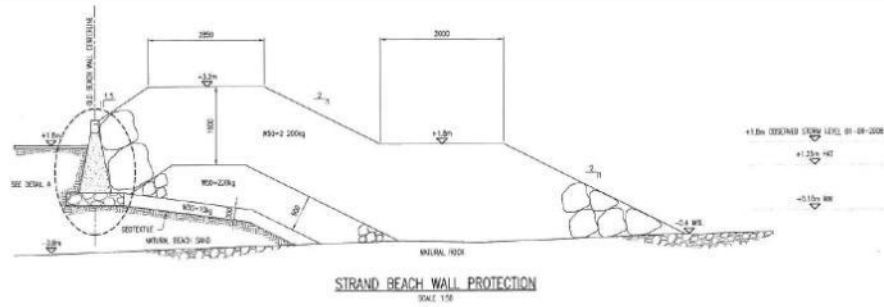


Figure 15: Strand Beach wall protection east of the Strand Pavilion (MMD, 2013).

The conceptual revetment layout is illustrated in Figure 16 and Figure 17.

Revetment parameters:

- Revetment length = 9m
- Revetment width = 25m (refer to Figure 6)
- Armourstone mass,  $M_{50} = 2200\text{kg}$
- Revetment crest level = 2.5m LLD (Note, the crest level will be confirmed during detail following a more detailed wave overtopping assessment)
- Revetment slope = 1:2 (V:H)
- Revetment toe level -1.7m LLD (0.5m trench in bedrock, excavation in bedrock required for revetment toe stability)

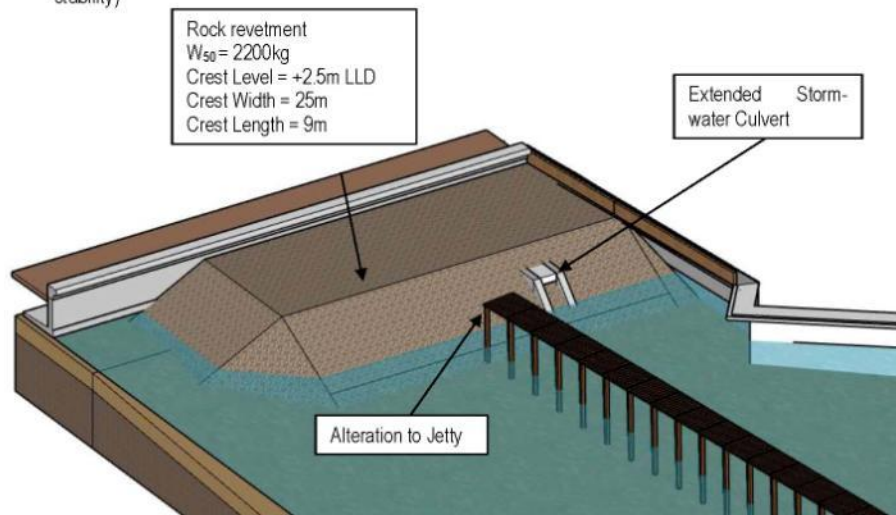


Figure 16: Proposed conceptual seawall revetment at Bart's Corner, isometric view.

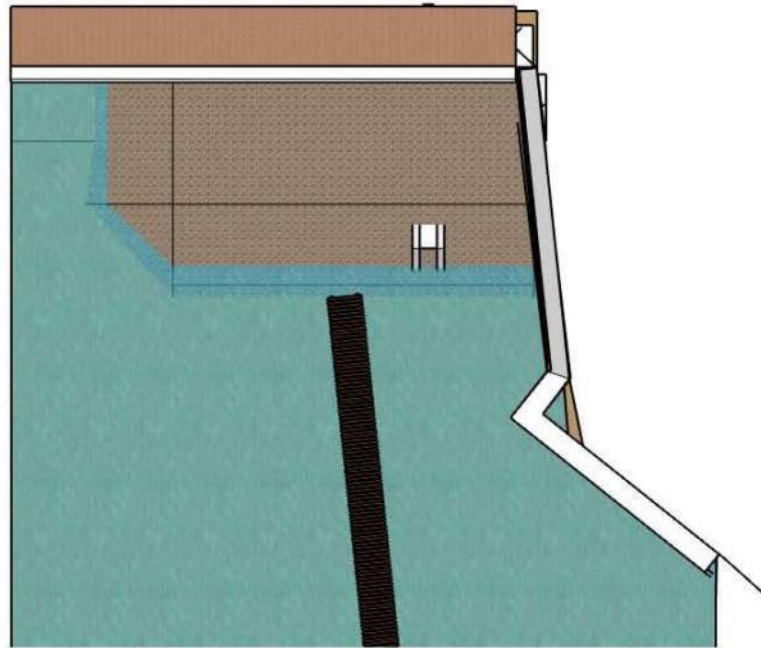


Figure 17: Proposed conceptual seawall revetment at Bart's Corner, plan view.

### 3.4.3 Advantages

- The construction site is accessible from land – limited marine work envisaged;
- The new (existing) seawall will not have to be altered (for the immediate future);
- The revetment will protect the seawall from being undermined;
- The revetment is unlikely to have a downstream influence on the coastline hydraulics or morphology (note, behaviour is difficult to predict without physical and numerical modelling);
- The revetment will absorb most the wave action and mitigate the wave reflection phenomenon which is prevalent at Bart's corner;
- The stability of the rock revetment has been proven in practice (emergency rock revetment east of the Strand Pavilion) and during physical model testing for various sea states (MMD, 2013);
- The addition of a rock revetment in front of the seawall reduces overtopping considerably (MMD, 2013);
- The decreased wave energy at Bart's Corner will promote the deposition of sediment and decrease the foreshore depth, thereby decreasing overtopping potential;
- The rock revetment can relatively easily be modified in response to long term sea level rise or altered foreshore bathymetry (MMD, 2013);

### 3.4.4 Disadvantages

- Pavilion hand railing should be upgraded as the large revetment rock will damage the existing brick wall and railing during construction and large swells;
- Possible demolishing of existing concrete toe (to be avoided if possible) to facilitate uniform revetment rock layering and to acquire the correct rock layer thicknesses. To be confirmed during detail design;
- Extension of storm water culverts (2 culverts are present at the proposed revetment), the extension of the stormwater culverts are expected to be complex;
- Revetment may be considered to have a negative aesthetic impact;
- No beach will be formed at Bart's Corner
- Revetment will necessitate the removal of a portion of the old wooden (historical) jetty

## 3.5 Option 3- Berm Breakwater

### 3.5.1 Overview

The construction of an offshore berm breakwater protects the enclosed area from wave action thereby reducing the wave energy. An example of a series of offshore breakwater built along a coastline can be seen in Figure 18 below. Various structure types are available for offshore breakwaters, they are broadly listed below:

- Rubble mound breakwater
- Caisson breakwater
- Concrete armour units



Figure 18: Example of offshore breakwaters (CIRIA, 2007)

The berm breakwater will initiate the development of a beach at Bart's Corner if implemented correctly. When constructing a breakwater strong rip currents can be created which may cause scour or pose a hazard to water users. The proper implementation of an offshore breakwater can only be determined by means of physical and numerical models of the area. No previous physical model studies with regards to berm breakwaters in the nearshore or offshore zone were conducted for this project.

### 3.5.2 Conceptual Design

Breakwater design is based on the water depth, wave climate and structure configuration (porosity, slope angles, dimensions). The conceptual layout and cross-section of the conceptual breakwater were determined by the methods recommended by the CIRIA Rock Manual (2007). A berm breakwater is deemed applicable for Bart's Corner. For simplicity, the breakwater will consist of one rock grading. *Note that it is proposed that the berm breakwater is in the nearshore zone at approximately -1 m LLD at therefore not wat is typically considered as the "offshore" zone.*



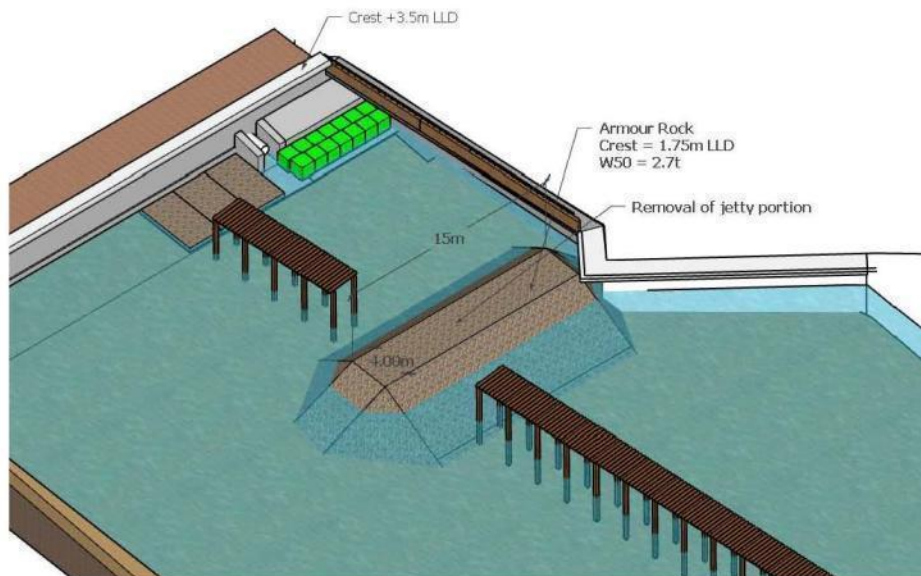


Figure 19: Conceptual sketch of berm breakwater offshore of Bart's Corner.

**Berm breakwater parameters:**

- Revetment crest length = 15m
- Revetment crest width = 4m (see Figure 6)
- Armourstone mass,  $M_{50} = 3000\text{kg}$
- Revetment crest level = 1.75m LLD
- Revetment slope = 1:2 (V:H)
- Revetment toe level = subject to prevailing seabed conditions.

### 3.5.3 Advantages:

- Elegant solution
  - If designed and constructed properly a natural beach will form at Bart's corner
  - Beach will be aesthetically pleasing
  - Demolition/modification of old jetty possibly avoided
- The current stormwater culverts will not require any modifications

### 3.5.4 Disadvantages

- Marine work
  - Possible high construction cost
  - Reach to construction site possible from land with correct equipment.
- Offshore breakwater may have an impact on the hydraulic and in-turn morphological processes and subsequently the coast line. To assess the potential impact(s), expensive field studies, numerical and physical modelling will be required;
- Effect of a berm breakwater will require an EIA study
- Removal of section of old jetty required

### 3.6 Cost Estimate

The estimated cost of each of the proposed options are given in *Table 6* below.

*Table 6: Option cost estimates*

	Estimated Cost (R) – no site mobilization	Estimated Cost (R) – site mobilization required
<b>Option 1</b>	R 1 200 000	R 1 800 000
<b>Option 2</b>	R 1 320 000	R 2 000 000
<b>Option 3</b>	R 1 050 000	R 1 600 000

### 3.7 Option Comparison

The following criteria will be used for option comparison:

- Aesthetics
- Constructability
- Cost
- Durability
- Environmental and social impact (ESI)
- Hydraulic and morphological aspects
  - Scour prevention
  - Wave overtopping
  - Wave reflection

Each option was allocated a ranking per criteria, whereas "1 point" represents the most favourable (i.e. most advantageous/positive impact) and "4 points" present the least favourable (i.e. most negative potential impact). From this basic analysis, the revetment option is deemed the most favourable option. The scoring and ranking results are listed in the Table below. It should be noted that the criteria were not weighted (i.e. the options were evaluated based on the assumption that all criteria are equally important). However, the comparison can be revised should the client wish to allocate a specific weighting to criteria.

*Table 7: Comparison of proposed conceptual solutions*

Option	Aesthetics	Constructability	Cost	Durability	ESI	Hydraulic & Morphological	Total
Do nothing	3	1	1	4	2	4	15
Raise seawall	4	2	2	2	3	2	15
Revetment	2	3	4	1	1	1	12
Offshore breakwater	1	4	3	3	4	3	18

## 4 CONCLUSIONS & RECOMMENDATIONS

A number of potential overtopping mitigation solutions can be successfully constructed at Bart's Corner. For this assessment, it was considered that the most feasible solution shall be an option which minimize wave overtopping significantly and requires minimal maintenance over a long-term period

Based on the above, the preferred option for the mitigation of the wave overtopping and scour at Bart's corner is a conventional Rock Revetment (Option 2) in front of the new (existing) seawall.

The rock revetment is recommended for the following reasons:

- The construction site is easily accessible from land;
- The new (existing ) re-curve seawall will not have to be altered (for the immediate future);
- The revetment will protect the seawall from being undermined;
- The revetment is unlikely to have any or minimal downstream influence on the coastline hydraulics or morphology (note, behaviour is difficult to predict without physical and numerical modelling);
- The revetment will absorb much of the wave action and mitigate the wave reflection phenomenon which is prevalent at Bart's corner;
- The stability of the rock revetment has been proven in practice (emergency rock revetment east of the Strand Pavilion) and during physical model testing for various sea states (MMD, 2013);
- The addition of a rock revetment in front of the seawall will potentially reduce overtopping considerably (MMD, 2013);
- The rock revetment can easily be modified in response to long term sea level rise or altered foreshore bathymetry (MMD, 2013).

## 5 REFERENCES

CIRIA. 2007. The Rock Manual. The use of rock in hydraulic engineering (second edition)

EurOtop (2007). Wave overtopping of sea defences and related structures: Assessment Manual. Environment Agency, UK; Expertise Netwerk Waterkeren, the Netherland; and Kuratorium für Forschung im Küsteningenieurwesen, Germany.

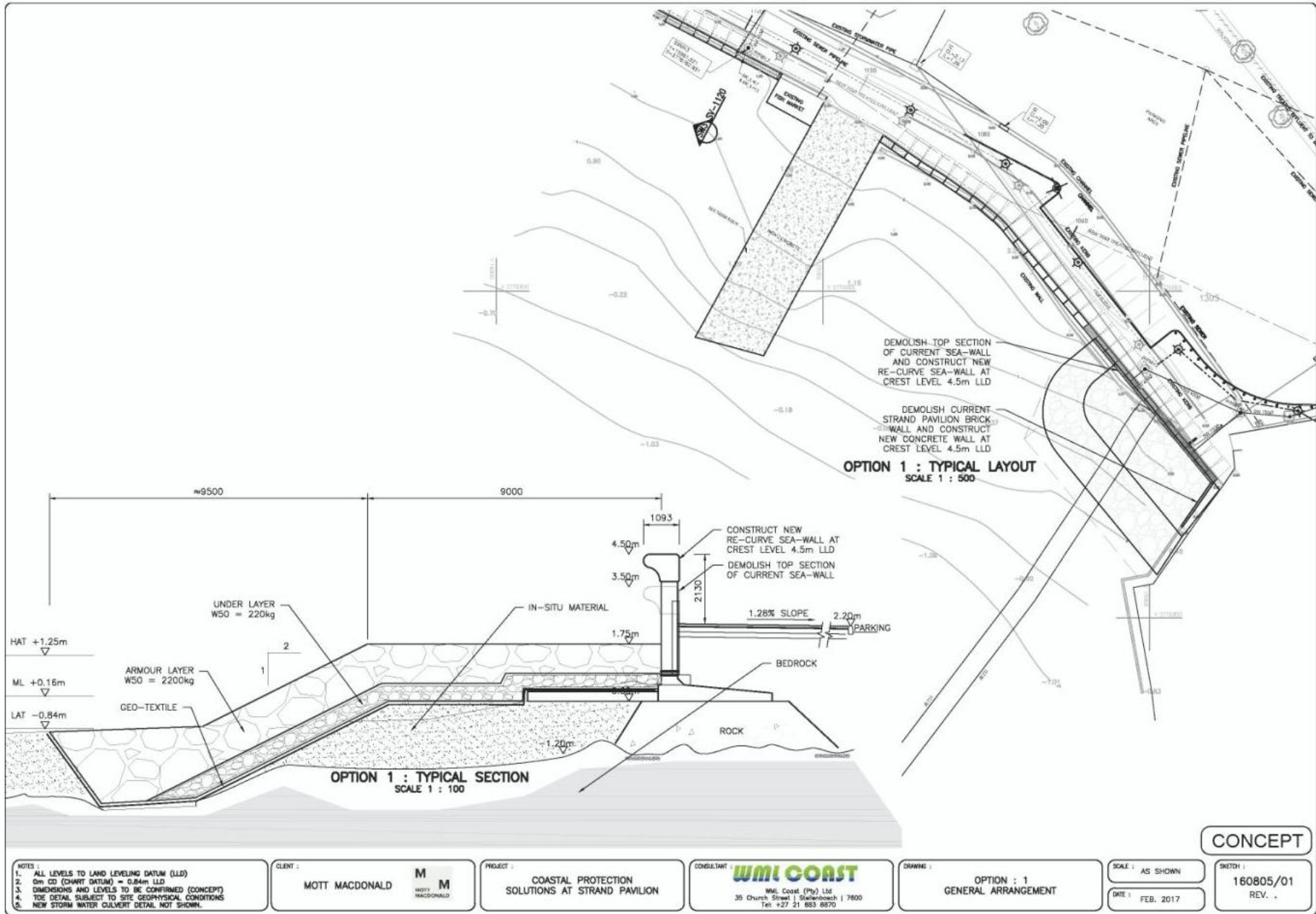
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SANHO (2017) South African Tide Tables, South African Navy Hydrographic Office, 2017.

## 6 APPENDIX A – CONCEPTUAL LAYOUTS AND CROSS-SECTIONS

A



CONCEPT

NOTES:  
1. ALL LEVELS TO LAND LEVELING DATUM (LLD)  
2. 0m CD (CHART DATUM) = 0.84m LLD  
3. DIMENSIONS AND LEVELS TO BE CONFIRMED (CONCEPT)  
4. TIDE DETAIL SUBJECT TO SITE GEOPHYSICAL CONDITIONS  
5. NEW STORM WATER CULVERT DETAIL NOT SHOWN.

CLIENT:  
**MOTT MACDONALD**

PROJECT:  
COASTAL PROTECTION SOLUTIONS AT STRAND PAVILION

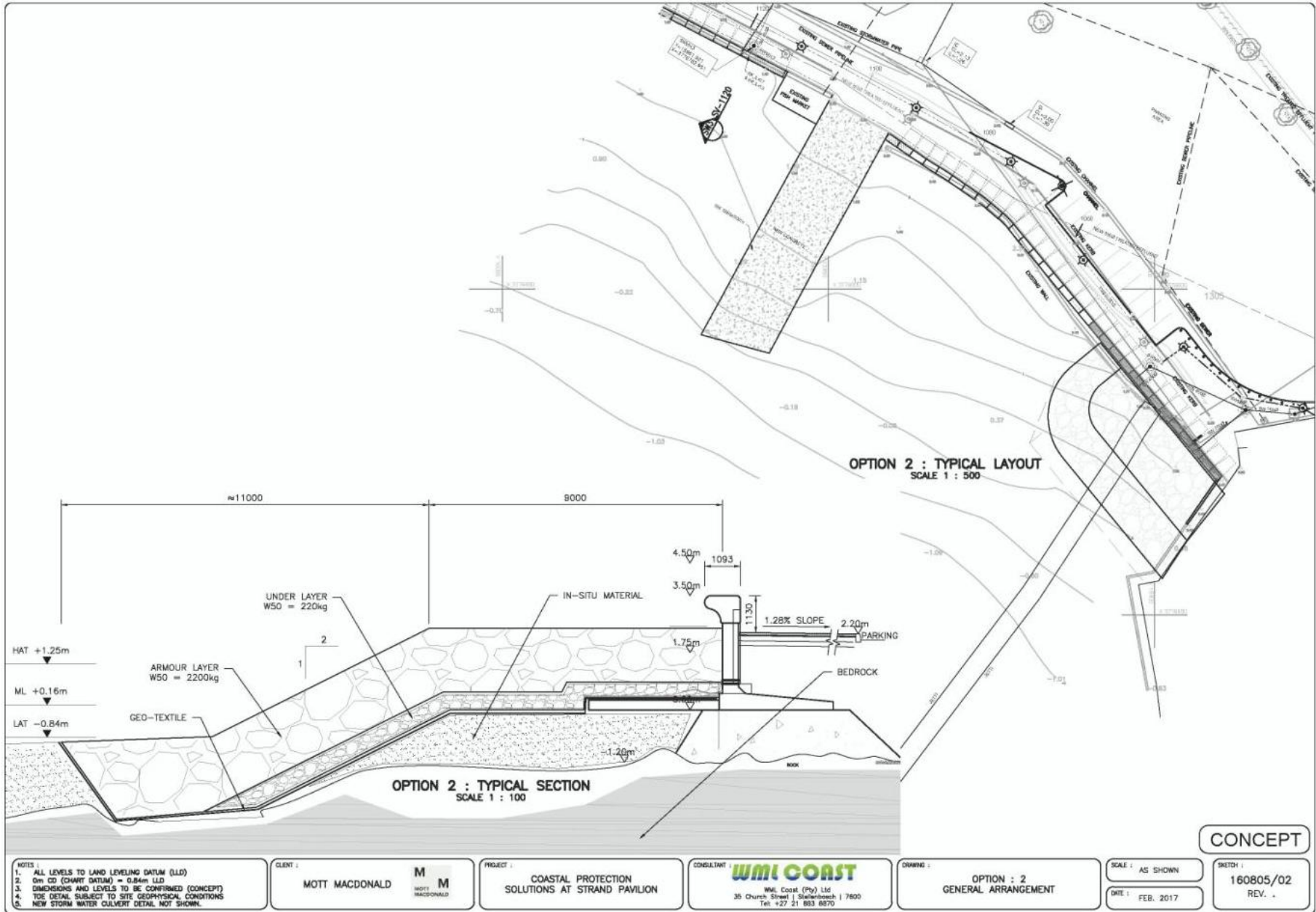
CONSULTANT:  
**WMI COAST**  
WMI Coast (Pty) Ltd  
35 Church Street | Seaford | 7600  
Tel: +27 21 883 8870

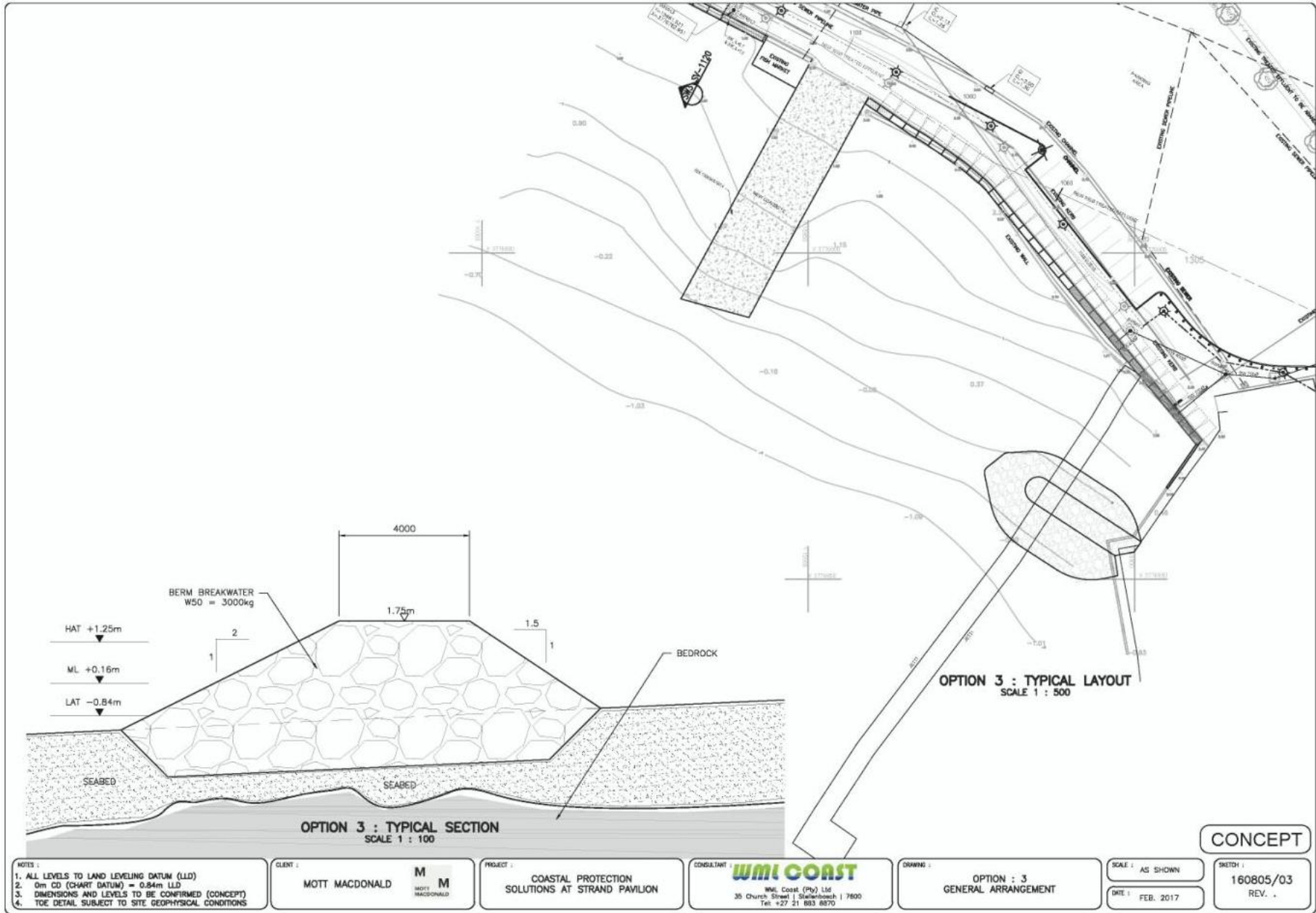
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OPTION : 1  
GENERAL ARRANGEMENT

SCALE : AS SHOWN  
DATE : FEB. 2017

SKETCH :  
160805/01  
REV. .







**Appendix 7: Public Participation Process**  
**Appendix 7.1: I&AP list**

## **Appendix 7.2: Proof of Notifications sent to I&APs**

Will be included in final Assessment Report submitted

### **Appendix 7.3: Notifications sent to I&APs**

Will be included in final Assessment Report submitted

## **Appendix 7.4: Actual Comments Received**

Will be included in final Assessment Report submitted



## **Appendix 7.5: Comments & Responses Sheet**

Will be included in final Assessment Report submitted