



**ENVIRONMENTAL MANAGEMENT  
PROGRAMME**

PROPOSED NEW BULK OUTFALL  
SEWER IN MONTAGUE GARDENS,  
CAPE TOWN

DEA&DP REF. 16/3/3/1/A1/20/3002/22

**APPLICANT**

CITY OF CAPE TOWN

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## REPORT DETAILS



### ENVIRONMENTAL MANAGEMENT PROGRAMME

<b>Report title:</b>	<b>Environmental Management Programme: Proposed New Bulk Outfall Sewer in Montague Gardens, Cape Town</b>
<b>Date:</b>	May 2025
<b>Prepared for:</b>	City of Cape Town Municipality
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<b>Purpose of report:</b>	This Environmental Management Programme for the proposed new bulk outfall sewer in Montague Gardens, Cape Town is prepared as part of a Basic Assessment of the proposed development.  It prescribes control methods to mitigate and manage negative environmental impacts and enhance positive impacts associated with the construction and operation of the development and provides a programme for monitoring the performance of personnel in applying such methods.
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# 1. INTRODUCTION

This Environmental Management Programme (EMPr) has been prepared for the proposed new bulk outfall sewer in Montague Gardens, Cape Town. The preparation of an EMPr is a requirement of the National Environmental Management Act (107 of 1998 as amended, NEMA) and the Environmental Impact Assessment Regulations, 2014 (as amended).<sup>1</sup> This EMPr was submitted to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) as part of an application for environmental authorisation for the proposed development referred to above. Environmental authorisation was subsequently granted by the Department of Environmental Affairs and Development Planning on 22 June 2022.

Following a decision on the application for environmental authorisation, this EMPr is intended as a “living” document and should continue to be updated regularly, as needed.

The purpose of an EMPr is defined in the Integrated Environmental Management (IEM) Guideline Series (Department of Environmental Affairs and Development Planning, 2005) as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced”.

The objectives of this EMPr are thus:

- to prescribe the best practicable control methods to mitigate and manage negative environmental impacts and enhance positive impacts associated with the construction and operation of the development; and
- to provide a programme for monitoring the performance of personnel in applying such methods.

## 1.1 PROJECT DESCRIPTION

The City of Cape Town intends to construct a new HDPE lined reinforced concrete gravity bulk outfall sewer around the eastern and northern boundaries of the Montague Gardens Industrial area. The existing sewer which requires rehabilitation is currently at risk of failure and poses a fatal risk to road users of the road underneath which the sewer is located. The footprint of the proposed sewer is approximately 48 000 m<sup>2</sup>.

The general methodology will include clearing of vegetation for launch pits and intermediate manholes. Preparation of sections where microtunneling will be used and preparation of areas where open trenching will be used will follow. Stabilisation of exposed areas will be undertaken.

## 1.2 ENVIRONMENTAL SENSITIVITIES AND SITE LAYOUT

### Terrestrial Biodiversity Assessment

An assessment of the terrestrial biodiversity impacts was undertaken by Christopher Cupido, a SACNASP-registered professional botanist. The assessment found that the vegetation along a relatively small section of the proposed sewer route is Cape Flats Sand Fynbos, a critically

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<sup>1</sup> GN. No 326 of 2017

endangered ecosystem albeit in this section degraded and transformed by inter-alia dumping and trampling.

The site does not support any plant or faunal species of Conservation Concern. Overall, much of the indigenous plant species diversity is fairly low to moderate. A section of the site contains some conservation-worthy indigenous plant species (See area with sensitive vegetation in Figure 1 below) and has been designated an area with some valuable plant species. The development of the site is unlikely to lead to the loss of irreplaceable botanical or faunal resources, and the ecological impact of the proposed development is assessed as negative, but within acceptable limits particularly if mitigation measures are implemented.



**Figure 1: Map showing the section containing degraded Cape Flats Sand Fynbos vegetation. The peach colour indicates the area with some valuable plant species**

### **Aquatic Specialist**

An aquatic impact assessment was undertaken by Toni Belcher, a SACNASP-registered ecologist. The assessment found that there were four watercourses that occurred in proximity to the site namely:

- Duikersvlei Canal which is a modified channel
- A small depression wetland adjacent to the Duikersvlei Canal
- A small artificial depression wetland which formed because of stormwater runoff from the railway line and an old, excavated channel
- Rietvlei, a natural estuarine wetland associated with the lower Diep River which lies approximately 300 m west of the site

Only the small depression wetland adjacent to the Duikersvlei Canal was assessed further by the specialist. The specialist assessed impacts relating to habitat disturbance and modification as well as water quality impacts. It was recommended that a 15 m buffer be applied between the proposed sewer and the wetland amongst other mitigation measures. This was incorporated into

the design of the proposed sewer. The specialist found the impacts of the proposed activity to be negligible provided the mitigation measures provided are adhered to.

### **Heritage Specialist**

A Notification of Intent to Develop was prepared and submitted to Heritage Western Cape due to the applicability of Section 38 of the National Heritage Resources Act (25 of 1999) to the activity. Heritage Western Cape responded confirming that no further assessment was required. Possible elements that could be encountered during earthworks on the site include evidence of graves and human burials (low probability), archaeological material (low probability), and paleontological material (low to moderate probability).

A sensitivity map is provided in Figure 2, showing the proposed development footprint, superimposed on the environmental sensitivities.

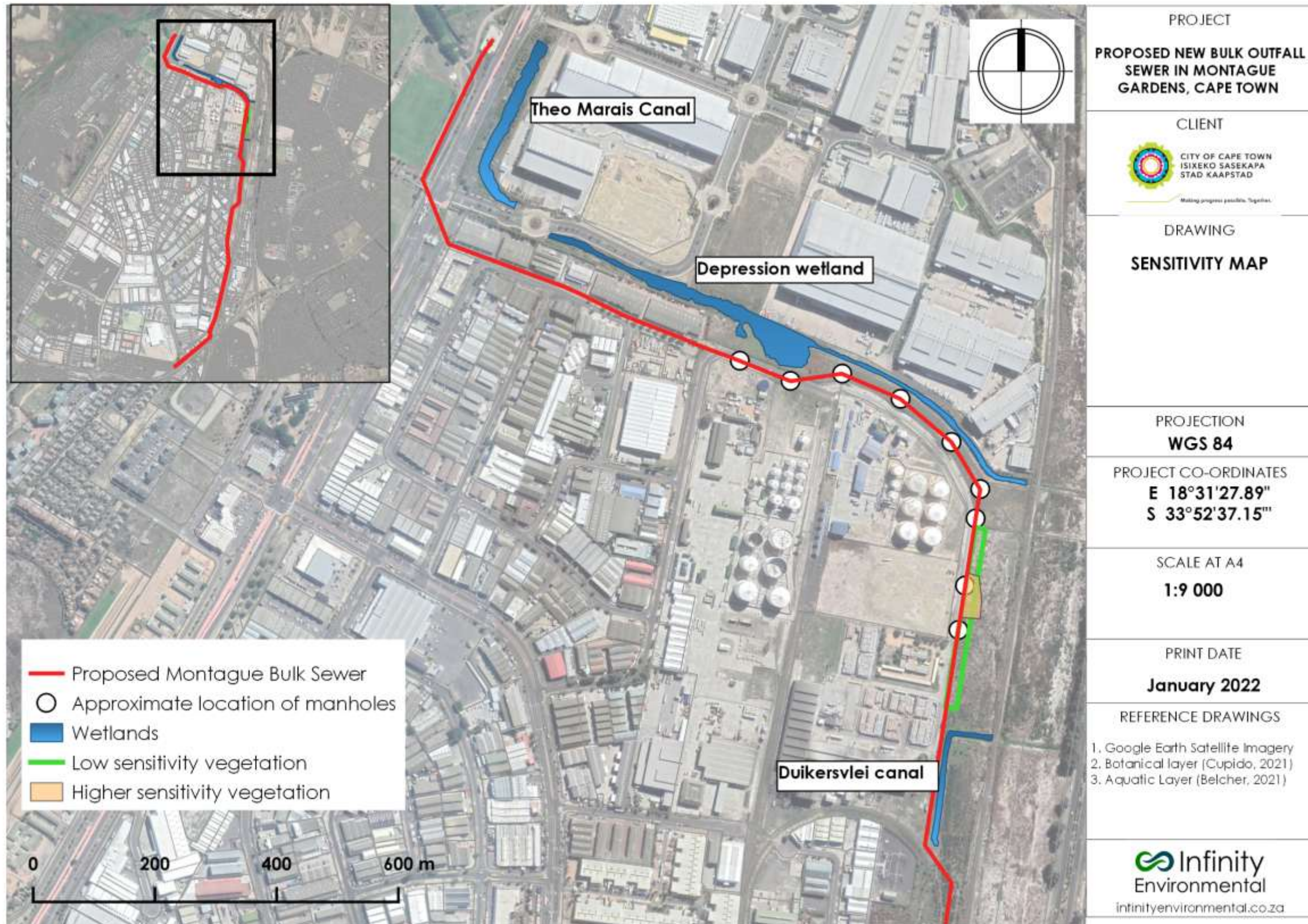


Figure 2. Proposed sewer superimposed on Sensitivity map

### 1.3 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioner (EAP) based on specialist assessment as well as best practice environmental management requirements. Details of the EAP who prepared the EMPr are as follows:

Author	Qualification	Professional registrations	Years of experience	Relevant expertise
<b>Jeremy Rose</b>	B.Sc. (Hons) Environmental and Geographical Science	Registered E.A.P. 2019/1116 Member of IAAsa	Eight	More than 40 EIAs or EMPrs
<b>Kakale Munamati</b>	B.Sc (Hons) Biological Sciences	Candidate Natural Scientist (SACNASP) - 119287	Four	More than 10 EIAs or EMPrs

Jeremy Rose has eight years' experience in the field of environmental management and impact assessment and has managed multiple EIAs and Basic Assessments in South Africa. He holds an Honours degree in Environmental and Geographical Science and is an Environmental Assessment Practitioner duly registered with the Environmental Assessment Practitioners Association of South Africa.

**Table 1. EIA team**

Role	Organisation	Name
<b>Environmental Assessment Practitioner</b>		
<b>Appointed EAP</b>	Infinity Environmental	Jeremy Rose
	Infinity Environmental	Kakale Munamati
<b>Specialists</b>		
<b>Terrestrial biodiversity</b>	KC Phyto Enterprises CC	Christopher Cupido
<b>Freshwater ecologist</b>	Toni Belcher	Toni Belcher
Heritage	City of Cape Town	Daleen van Zyl

## 1.4 IMPACTS IDENTIFIED DURING THE EIA

Impacts associated with the proposed development have been identified and assessed as indicated in Table 2.

**Table 2. Key Impacts identified during the EIA process**

	Alternative 1 (preferred)		Alternative 2: No-go	
	Without mitigation	With mitigation	Without mitigation	With mitigation
<b>PLANNING, DESIGN AND CONSTRUCTION PHASE</b>				
<b>Wetland and habitat disturbance or modification and water quality impacts</b>	Low negative	Negligible	Medium negative	Negligible
<b>Damage of degraded vegetation and habitat</b>	Low negative	Low negative	No impact	No impact
<b>Alteration and loss of ecological processes including ecosystem services</b>	Low negative	Low negative	No impact	No impact
<b>Noise and vibration impacts</b>	Low negative	Very low negative	No impact	No impact
<b>Dust impacts</b>	Low negative	Very low negative	No impact	No impact
<b>Traffic impacts</b>	Low negative	Very low negative	No impact	No impact
<b>Visual impacts</b>	Low negative	Very low negative	No impact	No impact
<b>Construction phase employment creation</b>	Medium positive	No impact	No impact	No impact
<b>OPERATIONAL PHASE</b>				
<b>Wetland habitat disturbance/modification and water quality impacts</b>	Low negative	Negligible	Medium negative	No impact
<b>Damage of degraded vegetation and habitat</b>	Low negative	Low negative	No impact	No impact
<b>Sewer spills</b>	Low negative	Very low negative	Medium negative	Low negative

## 2. APPROACH TO THE EMPr

### 1.5 LEGISLATIVE COMPLIANCE

A key objective of the EMPr is to satisfy the requirements of Section 24N of the NEMA, as amended, and Appendix 4 of the amended NEMA EIA Regulations published in Government Notice No. R 326 of 7 April 2017. These regulations prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the competent authority. An overview of where the requirements are addressed in this EMPr is presented in Table 3 and Table 4.

**Table 3. Compliance with NEMA Section 24N Requirements**

Section 24N of NEMA	EMPr section
(2) The environmental management programme must contain- (a) information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in section 24 (1A), including environmental impacts or objectives in respect of— (i) planning and design; (ii) preconstruction and construction activities; (iii) the operation or undertaking of the activity in question; (iv) the rehabilitation of the environment; and (v) closure, if applicable;	Sections <b>Error! R eference source not found.</b> , 5, 6
(b) details of— (i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Section 1
(c) a detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1 to 6
(d) information identifying the persons who will be responsible, or the implementation of the measures contemplated in paragraph (a);	Section 3 and <b>Error! R eference source not found.</b> to 6
(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	Sections <b>Error! R eference source not found.</b> to 6
(f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and	Section 4
(g) a description of the manner in which it intends to— (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; and (iii) comply with any prescribed environmental management standards or practices.	sections <b>Error! R eference source not found.</b> to 6
(3) The environmental management programme must, where appropriate— (h) set out time periods within which the measures contemplated in the environmental management programme must be implemented; (i) contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; (j) develop an environmental awareness plan describing the manner in which—	sections <b>Error! R eference source not found.</b> to 6  Section 5

(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.	
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**Table 4. Compliance with EIA Appendix 4 Requirements**

<b>Appendix 4 of EIA Regulations</b>	
1. An EMPr must comply with section 24N of the Act and include- (a) details of- (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.3
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.4 and sections <b>Error! Reference source not found.</b> to 6: 1 <sup>st</sup> column of table
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 2
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Sections <b>Error! Reference source not found.</b> and 6: 2 <sup>nd</sup> column of table
(e) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Sections <b>Error! Reference source not found.</b> and 6: 3 <sup>rd</sup> column of table
(f) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sections <b>Error! Reference source not found.</b> and 6: 4 <sup>th</sup> column of table
(g) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Sections <b>Error! Reference source not found.</b> and 6: 5 <sup>th</sup> column of table
(h) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 3 and Sections <b>Error! Reference source not found.</b> and 6: 6 <sup>th</sup> column of table
(i) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Sections <b>Error! Reference source not found.</b> and 6: 5 <sup>th</sup> column of table
(j) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Sections <b>Error! Reference source not found.</b>

	<b>found.</b> and 6: 4 <sup>th</sup> column of table
(k) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Sections <b>Error! R</b> <b>eference source not</b> <b>found.</b> and 6, responsible parties noted in Section 3.
(l) an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 5
(m) any specific information that may be required by the competent authority	Not applicable

## 1.6 CONTENT OF THE EMPr

Where applicable, each section of the EMPr is divided into three phases of the project life cycle, namely:

- The Design Phase, which will partly coincide with and follow the EIA;
- The Construction Phase, which begins with commencement of physical activities on site and ends when the development has been fully constructed; and
- The Operational Phase, which begins when the first component or phase of the development begins its normal operations, after construction.

There is likely to be overlap between the above phases. A decommissioning phase is not included, as it is not anticipated that the development will be decommissioned.

The EMPr includes the findings and recommendations of the EIA Process and specialist studies. The EMPr may be updated with additional information or actions during the design, construction, and operational phases if applicable. A standardised approach is followed, in which outcomes are set, followed by management actions aimed at achieving the objectives. Management actions are accompanied by monitoring requirements, responsibilities, and targets where applicable. A tabular format is used for ease of reference.

Key terms used in the EMPr include:

- **Impact:** The potential positive or negative impact of the development that needs to be enhanced, mitigated or eliminated (as appropriate) to a desired state
- **Outcomes (objectives):** The desired state after mitigation or management
- **Management Actions:** The actions needed to achieve the objectives of enhancing, mitigating or eliminating impacts; taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation
- **Monitoring:** The key monitoring actions required to check whether the outcomes are being achieved, taking into consideration methodology, frequency and responsibility.

The EMPr is structured as indicated in Figure 3. It includes a construction-phase EMPr and an operational phase EMPr.



Figure 3. Schematic of EMPr structure

## 1.7 OVERARCHING OBJECTIVE

The overarching objective, from which the detail contained in this EMPr flows, is **to construct and operate the project in a manner that -**

- **Reduces** the risk of pollution or damage to ground or surface water, ecosystems, soils and air
- **Minimises** nuisance and disruption to people residing in, working in or moving through the area

- **Adheres** to all relevant environmental legislation.

### 3. PROJECT ROLES AND ORGANISATIONAL STRUCTURE

The general roles to be defined are those of the:

- Authorisation holder
- Environmental Control Officer
- Contractor (Principal Contractor / Project Manager); and

The specific titles referred to may vary, but the intent of this section is to broadly define expectations and responsibilities for key role players in the implementation of the EMPr.

#### 3.1 AUTHORISATION HOLDER

The City of Cape Town is the holder of the Environmental Authorisation, and will therefore be responsible for ensuring that the conditions of the authorisation are fully adhered to. The Authorisation Holder has appointed an Environmental Control Officer and Contractor for the construction phase, and will appoint an Environmental Manager for the operational phase. The responsibility for the implementation of this EMPr lies with the Authorisation Holder. Commonly, responsibilities borne by the Authorisation Holder are delegated to a project manager. Key responsibilities include ensuring that:

- The ECO is provided with the necessary information in order to adequately undertake their responsibilities.
- This EMPr is included in the contractual agreements with all contractors and subcontractors,
- Method Statements requested by the ECO are provided timeously.
- Corrective action is implemented as required; and
- Appropriate records and information regarding compliance with the EMPr requirements are maintained and made available to the ECO.

#### 3.2 ENVIRONMENTAL CONTROL OFFICER

An independent Environmental Control Officer (ECO) has been appointed for the duration of the construction phase of the development to ensure compliance with the EMPr and conditions of the EA. The ECO's role also includes monitoring compliance with other environmental legislation, the monitoring of environmental impacts, and the keeping of accurate records.

The ECO shall update the EMPr when necessary and shall compile a monitoring checklist or protocol based on the EMPr. The ECO's role includes the following aspects:

- Periodic environmental audits during the construction phase of the proposed project to monitor and record environmental impacts and nonconformances, and to monitor site activities to ensure adherence to the specifications contained in the EMPr, using a monitoring checklist.
- Maintain a record of site visits and audits, a copy of the environmental authorisation (should it be granted) and other permits and licenses, a register of non-conformances, and a copy of previous environmental audits.
- Prior to construction commencement, the ECO must meet on site with the Contractor representative to confirm designated development and the section of indigenous vegetation

in the sensitive area which will not be cleared or removed and to confirm the method statements required.

- Request and review Method Statements from the contractor and sub-contractors prior to the commencement of the activities concerned.
- Ensure that the contractors and sub-contractors and their employees have received the appropriate environmental awareness training.
- Meet with the contractors to discuss the implementation of this document.
- Identify appropriate corrective measures if transgressions occur.
- Keep a register of monitoring activities and results
- Assist in finding environmentally acceptable solutions to construction problems.
- Identify and make amendments to the EMPr where appropriate.
- Conduct an environmental inspection on completion of the construction period and prepare a close-out report.

### **3.3 CONTRACTOR**

The role of the Contractor is as follows:

- The Contractor shall ensure that all employees, contractors and sub-contractors are made aware of the EMPr and their responsibilities.
- Prior to construction commencement, the Contractor must meet on site with the ECO representative to confirm designated development and no-go areas and to confirm the method statements required.
- Liaise with the ECO and Authorisation Holder (or representative) and ensure that works on site are conducted in an environmentally sensitive manner in accordance with this EMPr.
- Maintain on site a copy of this EMPr and all environmental authorisations and licenses pertinent to the development on site.
- Ensure that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage because of a contravention of the specifications contained in the EMPr, to the satisfaction of the Project Owner's ECO.
- Ensure that all employees (permanent and temporary) and all sub-contractors that work on the site for longer than two days, receive environmental awareness training within one week of being on site.
- Designate an Environmental Officer (or employ a designated suitably qualified individual to fulfil the role of an Environmental Officer) to monitor and report on the daily activities on-site during the construction period.

The Contractor and individual contractors may designate Environmental Officers to liaise with the ECO on environmental matters.

## 4. CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

The outcomes, management measures, and monitoring requirements detailed in this section are applicable to the design and construction phases of the proposed development.

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
<b>4.1. Wetland habitat disturbance or modification and water quality impacts including coastal impacts on the estuary</b>	<ul style="list-style-type: none"> <li>Prevention of pollution of wetlands</li> </ul>	4.1.1. Should manholes be placed within 30 m of the aquatic features, they should be sealed to minimize spills.	ECO should monitor the manhole construction to ensure that manholes are sealed  ECO to monitor location of stockpiles  ECO to monitor works should monitor works should they occur in the winter months.  ECO will be appointed.  ECO to monitor the site during the closeout inspection.  ECO to review the method statement.	<ul style="list-style-type: none"> <li>Before completion of construction</li> <li>At each site inspection</li> </ul>	<ul style="list-style-type: none"> <li>ECO and contractor</li> </ul>
		4.1.2. No stockpiling of material should take place within the recommended buffer area.			
		4.1.3. The construction works should preferably take place in the drier months of the year. If this is not possible adequate measures should be put in place to prevent materials and contaminated runoff from the construction works from washing into the wetland area. The works should be undertaken under the guidance of an Environmental Control Officer to ensure that good housekeeping measures are in place to minimise the impact on the adjacent areas.			
		4.1.4. All waste materials associated with construction activities should be removed from the area after the construction phase is complete.			
		4.1.5. Where applicable, clearing of invasive alien plants within the construction area should be undertaken during construction activities.			
		4.1.6. The contractor must compile a method statement detailing how sewer spills during the construction phase will be contained, managed and how the receiving environment will be remediated.			
		4.1.7. A method statement for the control of erosion and sedimentation must be compiled by the			

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
		<p>Contractor for review by the ECO and approval by the engineer.</p> <p><b>Temporary Diversion Works – Theo Marais Sports Complex</b></p> <ul style="list-style-type: none"> <li>• Sheet pile walls to be constructed in such a way as to maintain a watertight seal;</li> <li>• Diversion channel is to be constructed in such a way as to create a seal prior to cutting of the sewer pipe to ensure that when the sewer pipe is cut, no spills occur;</li> <li>• Sheetpiles should extend below the invert level of the pipeline. The concrete floor should be cast from sheet pile to sheet pile to ensure that the floor is completely covered and no leakage into soil can occur;</li> <li>• The diversion channel and by-pass pipeline should be sized to accommodate peak flows from the Montague Drive Bulk Sewer;</li> <li>• The invert level of the existing Montague Drive Bulk Sewer and the proposed bulk sewer is lower than the invert level of the Theo Marais Canal. This will ensure that no sewage flows into the Theo Marais Canal;</li> <li>• The Contractor will install and, for the duration that the temporary works are in place, maintain the necessary erosion protection immediately upstream and downstream of the temporary works. This will typically entail using Kaytech geobags;</li> <li>• Demolished / excavated embankments will be reinstated to their original condition upon completion of the works and removal of the temporary works;</li> <li>• Repair of the canal by reinstating the paver lining on the left bank of the Theo Marais Canal just past Manhole MH52 will be undertaken in</li> </ul>	ECO monitoring during site inspections		

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
		<p>line with the approved City of Cape Town Maintenance Management Plan;</p> <ul style="list-style-type: none"> <li>Construction of the diversion chamber is to occur on a dry surface area to ensure no pollution of the Theo Marais Canal.</li> <li>All fuel driven portable equipment shall be placed on drip trays to prevent spillage of petrochemicals during refuelling.</li> <li>No Hazardous Chemical substances, including fuels and oils, shall be stored within 30 meters of the wetland (or other water courses or canals) on site.</li> <li>A petrochemicals spill kit shall be retained on site in case of accidental spillages of fuels and oils.</li> <li>Portable toilets shall not be placed within 30 meters of the wetland (or other water courses or canals) on site.</li> </ul>			
<p><b>4.2. Damage of degraded vegetation and habitat</b></p> <p><b>4.3. Alteration and loss of ecological processes including ecosystem services</b></p>	<ul style="list-style-type: none"> <li>Prevent loss of conservation-worthy vegetation</li> <li>Prevent significant change to the ecological processes of the indigenous vegetation ecosystem on the site</li> </ul>	<p>4.3.1. Prior to construction, the contractor must determine the amount of indigenous vegetation to be cleared from the sensitive area indicated in Figure 1. The remaining section containing indigenous vegetation which will not be cleared should be fenced to a specification to be confirmed in consultation with the ECO and Engineer. Fencing must be durable, visible, and maintained for the duration of the contract.</p> <p>4.3.2. Implement erosion control measures during and post-construction, including silt fencing, which must be installed around the area where launch pits will be constructed. The silt fence should be constructed before vegetation clearing and in accordance with the following specifications:</p> <p>(i) Geotextile / bidim affixed to stakes installed at intervals of not more than three</p>	<p>Monitor activities adjacent to higher sensitivity vegetation area and monitor durability of fencing</p> <p>ECO to review specifications for the silt fence or prior to implementation to confirm.</p> <p>ECO to maintain photographic</p>	<p>As required prior to construction during construction</p> <p>As required during construction</p>	<p>ECO and Contractor</p>

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
		<p>metres and to a height of at least 40 cm above ground, with at least 10 cm installed within a trench and backfilled.</p> <p>(ii) Runoff should pass through the bidim as diffuse flow, not beneath it.</p> <p>4.3.3. Ensure that all surplus building material is removed from the site after construction;</p> <p>4.3.4. A method statement for the clearing of indigenous vegetation must be compiled by the contractor for review by the ECO and approval by the engineer. The method statement should include information about the area where indigenous vegetation will not be removed and detail on the fencing of this section thereof.</p>	<p>records of site before and after construction to ensure that all building material is removed after construction</p> <p>ECO to ensure a method statement is in place and is approved by the engineer prior to vegetation clearing commencing.</p>	<p>Before vegetation clearing in the sensitive area</p>	

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
<b>4.4. Noise and vibration</b>	<ul style="list-style-type: none"> <li>Avoid unnecessary noise generation</li> <li>Avoid causing a nuisance to adjacent landowners</li> </ul>	4.4.1. All construction equipment utilised, and activities undertaken must be compliant with the Western Cape Noise Control Regulations, P.N. 200/2013.	Monitor activities and record and report non-compliance	Ongoing throughout construction	<ul style="list-style-type: none"> <li>ECO and Contractor</li> </ul>
		4.4.2. Restrict construction activities generating noise outputs of 85 dB (A) or more to the hours of 08h00 to 18h00 Mondays to Saturdays. Should the Contractor need to do this work outside of these hours, the approval of the ECO must be obtained, and surrounding communities must be informed prior to the work taking place.	Monitor via site audits and record incidents and non-compliance.	Monthly	<ul style="list-style-type: none"> <li>ECO</li> </ul>
		4.4.3. No amplified music shall be allowed on Site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low to be unobtrusive. The Contractor shall not use sound amplification equipment on Site, unless in emergency situations.	Maintain complaints register on site. If two or more noise complaints are received, the ECO must investigate whether the noise generated on site exceeds thresholds outlined in the Western Cape Noise Control Regulations	Once-off prior to construction and as required during the construction phase.	<ul style="list-style-type: none"> <li>ECO</li> </ul>
		4.4.4. If excessive noise is expected on the boundary of the site, neighbouring businesses must be informed in writing and in advance of when the high noise levels will occur and for how long they will occur.			
		4.4.5. If noise levels at the site boundary are excessively high (i.e., above 70 dBA during the day, as stipulated in SANS 10103 Table 2 for industrial districts), machinery must be fitted with silencers.			
		4.4.6. The Contractor must post signage indicating contact details of the Contractor and/or ECO on the site to allow for reporting of complaints.			
		4.4.7. In the event of rock blasting, the blast must be covered with a sufficient overburden of soft soil. The soil should be fine with no large rocks and boulders.			

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
		<p>4.4.8. Blasting near the industrial and private structures will require zero fly rock. Controlling fly rock, and ground vibration should be prioritised.</p> <p>4.4.9. Neighbours must be notified in advance of blasting operations.</p> <p>4.4.10. Monitoring of the blast operations by a suitably qualified person is recommended.</p> <p>4.4.11. A dilapidation survey of all buildings along the route should be undertaken to enable confirmation of any changes due to blasting and excavations.</p>			

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
<b>4.5. Dust</b>	5. Prevent wind erosion and resultant dust impacts on surrounding area.	<p>5.1.1. Microtunneling in some sections will significantly mitigate the generation of dust and nuisance thereof</p> <p>5.1.2. Dust generated from all activities related to the proposed construction activities must comply with the National Dust Control Regulations (GN No. R. 827 of 1 November 2013), promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) by ensuring that construction activity do not produce dust in excess of stipulated thresholds to the detriment of the environment and human health. .</p> <p>5.1.3. The movement of site personnel and machinery over exposed soil should be minimised particularly in proximity to high-use roads such as Montague Drive and Koeberg Road.</p> <p>5.1.4. Exposed surfaces should be stabilized immediately. Areas left bare for longer than two weeks must be covered to reduce windblown dust.</p> <p>5.1.5. Works should be staged to minimise the area of disturbed ground at any given time, before working on other areas</p> <p>5.1.6. Screening and/or temporary fencing to control the movement of sand on the site should be installed if necessary.</p> <p>5.1.7. Non-potable water should be used for short-term dust stabilisation.</p> <p>5.1.8. Excavation, handling, and transportation of erodible materials must be avoided under high wind conditions.</p>	<ul style="list-style-type: none"> <li>Review works programme in advance</li> <li>Check that minimal and defined routes are used for access and that vehicle access is prevented</li> <li>Monitor activities and record and report non-compliance.</li> </ul>	During site inspections	Contractor and ECO

		<p>5.1.9. Exposed sand should be stabilised if it is to remain exposed for more than two weeks and should be planted with indigenous grass species when bulk earthworks are completed.</p> <p>5.1.10. Stockpiles of sand and stone must be effectively stabilised and must be covered or sealed if dust generation is apparent.</p> <p>5.1.11. All vehicles transporting sand and spoil must have tarpaulins covering their loads to reduce spillage and windblown dust.</p> <p>5.1.12. Off-road vehicle and plant movements within the site must be avoided as far as possible, and strict speed limits must be enforced to reduce dust generation.</p> <p>5.1.13. Dust fallout monitoring in terms of the National Dust Regulations, should be undertaken should it become evident that the dust mitigation measures are not effectively and efficiently managed and controlled during all phases of the proposed project.</p> <p>5.1.14. Should the need arise; the City's Air Quality Officer will call for the implementation of a Dustfall Monitoring Programme, which will require the holder of the Environmental Authorisation to submit monitoring reports at his discretion. The dustfall rates must prove compliance with the prescribed dustfall rates.</p> <p>5.1.15. Should dustfall results show dustfall rates to be above permissible standards, the Dust Management Plan may need to be amended and submitted to the City's Air Quality Officer for review, approval and authorisation.</p> <p>5.1.16. The following sections of the City of Cape Town Air Quality Management By-law 7662: 2016 as amended must be implemented:</p> <p>5.1.16.1. Section 4: Duty of care (Reasonable measures to prevent air pollution).</p> <p>5.1.16.2. Section 19 (Authorisation of open burning and burning of material).</p>			
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		<p>5.1.16.3. Section 25 Emission caused by open burning (Prohibition of emissions that cause nuisances), and</p> <p>5.1.16.4. Section 26 (Dust Emissions)</p> <p>5.1.17. Site screening methods, if deemed necessary, may be implemented to minimise potential dust nuisances.</p> <p>5.1.18. A method statement for the management of dust during construction must be compiled by the contractor for review by the ECO and approval by the Engineer.</p>			
<b>5.2. Traffic impacts</b>	6. Prevent increased traffic congestion particularly along high-use roads	<p>6.1.1. Adherence to a Traffic Management Plan to minimise traffic congestion.</p> <p>6.1.2. Use of flag persons to direct traffic when construction vehicles are moving</p>	<p>7. Review Traffic Management Plan</p> <p>8. Observe flow of traffic during site inspections</p>	<p>Before construction</p> <p>During site inspections</p>	ECO and contractor
<b>8.1. Visual impacts</b>	<ul style="list-style-type: none"> <li>Minimise visual disturbance</li> </ul>	<p>8.1.1. Manage stockpile and laydown areas for cleanliness and appearance.</p> <p>8.1.2. Roof and screen waste areas.</p> <p>8.1.3. Avoid unnecessary signage or advertisement on site.</p>	<p>9. Review method statement for site camp establishment for locational and visual management measures</p> <p>10. Monitor by visual inspections.</p>	<ul style="list-style-type: none"> <li>Immediately prior to construction</li> </ul> <p>Weekly</p>	<ul style="list-style-type: none"> <li>ECO</li> </ul> <p>ECO / Contractor</p>
<b>10.1. Waste impacts</b>	<ul style="list-style-type: none"> <li>Manage waste in accordance with legislation and best practice methods.</li> <li>Minimise the production of general waste</li> <li>Prevent pollution or</li> </ul>	<p>10.1.1. Contractor is to prepare and implement a waste management plan for the construction phase.</p> <p>10.1.2. Designate a waste management area, which should be an area of hardstanding with a roof and sides or consist of separate bins and skips.</p> <p>10.1.3. Litter and construction waste should be collected on site by the end of each day and stored in bins, skips, or other suitable storage area.</p>	<p>11. Waste removal and disposal to be monitored. Monitor via site audits and record noncompliance and incidents.</p> <p>12. Monitor waste disposal slips and waybills via</p>	<ul style="list-style-type: none"> <li>Weekly</li> </ul>	<ul style="list-style-type: none"> <li>Contractor and ECO</li> </ul>

	contamination due to improper waste handling or storage on site.	<p>10.1.4. Food waste must be stored in bins or skips that are covered and cannot be accessed by flies or rodents.</p> <p>10.1.5. Waste should be separated into hazardous, general, and recyclable waste streams, with clearly designated bins and skips for each waste type.</p> <p>10.1.6. Hazardous wastes, including materials contaminated with oils and hydrocarbons, must be removed from site by a suitably licensed contractor and manifests provided.</p> <p>10.1.7. Other non-hazardous solid waste (e.g., refuse) to be disposed of at a licensed landfill.</p> <p>10.1.8. A suitable waste contractor must be appointed to collect waste from site on a regular basis for correct disposal. Proof of disposal (waybills or waste disposal slips) must be retained and kept on file for auditing purposes.</p> <p>10.1.9. If the volumes of waste stored exceed 80m<sup>3</sup> for hazardous waste and/or 100m<sup>3</sup> for general waste the National Environmental Management: Waste Act (NEM:WA) National Norms and Standards for the Storage of Waste in terms of Government Notice (GN) No. 926 of 29 November 2013 must be adhered to.</p> <p>10.1.10. All rubble and waste is to be removed from site regularly and completely removed from site at the end of the construction phase.</p> <p>10.1.11. A method statement for the management of waste should be prepared by the contractor for review by the ECO and approval by the engineer.</p> <p>10.1.12. A method statement for the management of waste during the construction phase should be compiled by the contractor for review by the ECO and approval by the engineer.</p>	site audits and record non-compliance and incidents.		
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<b>12.1. Spoil and material handling</b>	13. Comply with environmental legislation regarding the disposal of waste, including construction waste and spoil	13.1.1. If offsite spoil will be required during the construction period, identify potential spoil sites at the commencement of construction and ensure that spoiling of material will comply with the NEMA and the National Environmental Management: Waste Act.	14. Method statement to be prepared at least two months prior to any anticipated spoiling, and ECO to confirm if proposed sites are compliant.	At commencement and as required thereafter	Contractor and ECO
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## 5. ENVIRONMENTAL AWARENESS TRAINING PLAN

This section outlines the training by which the applicant (via its appointed contractor during the construction phase) will inform its employees of environmental risks and the way risks must be dealt with to avoid pollution or degradation of the environment. It may be adapted as needed to suit the circumstances in which it is implemented.

Course	Required attendees	Presented by	Course content	Timing	Records to be kept
<b>15.1. Construction phase Environmental Awareness Training for managers</b>	16. Project Manager appointed by the authorisation holder 17. Principal contractor's contract manager, site agents, and assistant site agents (as applicable) 18. Contractor's designated environmental officer or SHE representative	ECO	19. Overview of environmental authorisations and permits granted 20. Basic environmental law 21. Roles of the ECO, authorisation holder, project manager, and contractor 22. Purpose and content of method statements 23. Site sensitivities, including locations and sensitivity of wetland areas 24. Management actions and measures for the construction phase as detailed in this EMPr 25. Record keeping requirements 26. Emergency procedures 27. Reporting and compliance monitoring	Prior to commencement of construction	<ul style="list-style-type: none"> <li>Declaration of adherence to Construction phase EMPr, signed by Contractor's representative</li> <li>Register of attendance</li> </ul>
<b>27.1. Environmental Awareness Training for site personnel</b>	28. All site staff and personnel, including temporary staff and visitors to site 29. Maximum of 20 attendees at any one session	Contractor's designated environmental officer	Environmental dos and don'ts, including: 30. Access to work areas, location and identification	Before any staff member begins work on site	<ul style="list-style-type: none"> <li>Register of attendance, identifying all attendees by name and ID number, the topics</li> </ul>

Course	Required attendees	Presented by	Course content	Timing	Records to be kept
			of no-go areas, if applicable. 31. Damage to or picking of vegetation 32. Managing animals found on site 33. Smoking and fires 34. Storing and handling fuels and oils 35. Storing and handling chemicals 36. Management of cement, cement bags, slurry, and wash water 37. Dust and noise 38. Water wastage 39. Waste management and litter 40. Waste site management 41. Ablution facilities 42. Plant and machinery maintenance and load management 43. Accident and incident reporting		covered, the presenter, and the date and time.

## 6. OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

The Montague Drive Bulk Outfall Sewer, in the operational phase will likely have potential impacts on the recipient community. These impacts will be due to sewer spills during the operation of the sewer while most of the impacts will be associated with maintenance activity. The outcomes, management measures, and monitoring requirements detailed in this section are applicable only to the operational phase of the proposed development.

### IMPACT MANAGEMENT AND MONITORING

Environmental aspect or impact	Outcomes	Management Actions	Monitoring		
			Method	Frequency	Responsibility
<b>44.1. Wetland habitat disturbance and water quality impacts</b>	<ul style="list-style-type: none"> <li>Prevent pollution of wetlands from sewer spills</li> </ul>	<p>44.1.1. The pipeline should be regularly monitored and maintained by the Municipality to ensure that any problems with the pipeline are rectified before they can impact the Duikersvlei canal, associated wetland, and other watercourses.</p> <p>44.1.2. Where applicable, clearing of invasive alien plants within the construction area should be undertaken with follow-up monitoring and control being undertaken along the sewer line for at least 3 years after construction.</p> <p>44.1.3. Buffer zones should be maintained, to minimize pollution of the wetland.</p>	<ul style="list-style-type: none"> <li>Ensure that a sewer spill response procedure is in place</li> </ul>	<ul style="list-style-type: none"> <li>As required</li> </ul>	<ul style="list-style-type: none"> <li>Authorisation holder</li> </ul>
<b>44.2. Sewer spills</b>	<ul style="list-style-type: none"> <li>To minimise sewer spills</li> <li>Where sewer spills cannot be avoided, to contain sewer spills</li> </ul>	<p>44.2.1. The manholes of the sewer should be sealed</p> <p>44.2.2. A sewer spill response protocol should be compiled and approved by the municipality before the completion of the construction phase</p> <p>44.2.3. Regular maintenance and monitoring of the sewer</p>	<ul style="list-style-type: none"> <li>Ensure that a Sewer Spill Response Protocol is in place.</li> <li>Regular monitoring of the sewer</li> </ul>	<ul style="list-style-type: none"> <li>At least annually</li> <li>Per the sewer spill response protocol</li> </ul>	<ul style="list-style-type: none"> <li>Authorisation holder</li> </ul>

## MAINTENANCE MANAGEMENT

Impact of Sewer Maintenance	Outcomes	Management Measures	Monitoring		
			Method	Frequency	Responsibility
<b>44.3. Impact of maintenance activity on indigenous vegetation</b>	<ul style="list-style-type: none"> <li>Minimise loss of higher sensitivity indigenous vegetation</li> </ul>	<p>44.3.1. Maintenance activity, where possible, should not result in damage to vegetation in the section identified as a higher sensitivity vegetation area.</p> <p>44.3.2. Maintenance vehicles should avoid, if possible, the section identified as a high sensitivity vegetation area</p> <p>44.3.3. Should maintenance activities require the clearing of vegetation in excess of 300 m<sup>2</sup>, environmental authorisation will be required.</p>	<ul style="list-style-type: none"> <li>Ensure that maintenance activities occur in permitted areas</li> </ul>	<ul style="list-style-type: none"> <li>As required</li> </ul>	<ul style="list-style-type: none"> <li>Authorisation holder</li> </ul>
<b>44.4. Impact of maintenance activity on wetlands</b>	<ul style="list-style-type: none"> <li>To prevent pollution of wetlands</li> </ul>	<p>44.4.1. Maintenance vehicles should not drive over wetland areas</p> <p>44.4.2. No maintenance equipment should be in the wetland area</p> <p>44.4.3. Where maintenance activity occurs due to sewer spills or causes sewer spills, these should be contained immediately to prevent pollution of wetlands. The City of Cape Town Sewer Spill Response Protocol/Standard Operating Procedure for management of sewer spills should be implemented if sewer spills occur.</p>	<ul style="list-style-type: none"> <li>Monitor location of maintenance equipment and vehicles</li> <li>Ensure that sewer spill management is in accordance with the Sewer Spill Response Protocol</li> </ul>	<ul style="list-style-type: none"> <li>As required</li> </ul>	<ul style="list-style-type: none"> <li>Authorisation holder</li> </ul>