DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

ERF 18354, BRACKENFELL:

THE PROPOSED DECOMMISSIONING AND REDEVELOPMENT OF EVERITE WASTE CONSOLIDATION SITE

DFFE Application Reference Number: 14/12/16/3/3/1/2473
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DOCUMENT CONTROL SHEET

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DETAILS / EXPERTISE OF THE AUTHOR:	BSc Environmental Management (Zoology) (UNISA) BSc Hons Environmental Management (UNISA) **Marielle Penwarden** is an Environmental consultant at Chand with nine years' experience. She has a BSc Honours in Environmental Management (UNISA) and has experience in ISO9001 Quality Management Systems as well as NEC3 Engineering Contract management. She has worked on and managed several environmental authorisation processes such as Basic Assessments, Scoping and Environmental Impact Assessments, Section 24G applications, setback line applications, etc. inclusive of the supporting public participation, licensing, and compilation of Environmental Management Programmes (EMPr) required. These authorisation processes have been conducted for small, medium, and large-scale infrastructure projects such as a nuclear power station, wind farms, pipelines, roads, residential developments, etc. and have varied in complexity and controversy. She also has experience on Environmental Impact Assessments in Botswana as well as in the compilation of Site Environmental Management Plans and Waste Management Plans. Furthermore, Marielle has conducted numerous audits for the construction phase of small and medium-scale infrastructure projects. Prior to joining Chand, she worked as a Scientist for a large engineering organisation under the Mega Projects unit, which dealt with large projects of national importance.
CURRICULUM VITAE	See Appendix B
SIGNATURE OF AUTHOR:	

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

For the purposes of this document the following acronyms shall apply:

AAIA	Asbestos Approved Inspection Authority
AAR	Asbestos Abatement regulations
AEL	Air Emission Licence
CFA	Continuous Flight Auger
CFSF	Cape Flats Sand Fynbos
CoCT	City of Cape Town
DCI	Dynamic Cross Interaction
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning (Provincial Authority)
DFFE	Department of Forestry Fisheries and Environment (National Department)
DoEL	Department of Employment and Labour (Local)
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation (National Department)
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
ECO	Environmental Control Officer
EGL	Engineering Geological Layers
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
GN	Government Notice
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
K	Potassium
LED	Light Emitting Diode
MSDS	Material Safety Data Sheet
NAEIS	National Atmospheric Emissions Inventory System
NEMA	National Environmental Management Act (No 107,1998)
NHRA	National Heritage Resources Act, 1999, (Act No. 25 of 1999)
OMC	Optimum Moisture Content
POA	Power of Attorney
PPE	Personal Protective Equipment
PVC	polyvinyl chloride
RAC	Registered Asbestos Contractor
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SO_4	Sulphate

SAPS	South African Police Service
UV	Ultraviolet
WML	Waste Management License

DEFINITIONS

For the purposes of this document the following definitions and acronyms shall apply:

Affected Environment:
Those parts of the socio-economic and biophysical environment impacted on by the development

Asbestos:
Any of the following minerals – amosite, chrysotile, crocidolite, fibrous actinolite, fibrous anthophyllite, fibrous tremolite, or any mixture containing any of these minerals.

Batch plant:
Site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials.

Bund:
Enclosure under / around a storage facility to contain any spillage.

City of Cape Town (CoCT):
The Local Authority

Contractor:
The principal persons /company undertaking the decommissioning and construction of the development.

- The main contractor as engaged by the developer/ developer's representative;
- Selected subcontractors; and
- Any other contractor from time to time engaged by the developer directly in connection with the decommissioning and construction part of the works.

Contaminated water:
This refers to water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant personnel wash areas.

Construction camp:
This refers to the area designated for all temporary site offices, storage sheds and areas, parking areas, maintenance workshops, staff welfare facilities, accommodation, etc.

Engineer:

A person representing the Developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorized by the Developer to fulfil this role.

Environment:

Means the surroundings within which humans exist and that are made up of -

- The land, water and atmosphere of the earth;
- Micro-organisms, plant and animal life;
- Any part or combination of the above and the interrelationships among and between them; and
- The physical, chemical, aesthetic and cultural/social properties and conditions of the foregoing that influence human health and well-being.

Environmental Education Programme:

An environmental education course for the Contractor's management staff and labour force, which informs them of the requirements of the EMPr. The ECO will present and co-ordinate courses.

Environmental Control Officer (ECO):

The individual or company appointed by the developer to ensure the implementation of the EMPr and suitable environmental management practices on site for the duration of the decommissioning and construction phase of the project.

Environmental Management Programme (EMPr):

The Environmental Management Programme for the proposed decommissioning of the waste consolidation site and redevelopment for light industrial use in Brackenfell. It contains the Environmental Specifications for the project in terms of:

- Planning and design;
- Decommissioning activities;
- Pre-construction and construction activities;
- Operation or undertaking of the activity;
- Rehabilitation of the environment; and
- Closure where relevant.

Environmental Impact Assessment (EIA):

A process of collecting, analysing, interpreting, and communicating data as it pertains to possible impacts (positive and negative) upon the environment due to a development.

Environmental Officer (EO):

The person appointed by the Contractor to ensure implementation of the EMPr on site.

Material Safety Data Sheet (MSDS)

A form containing data regarding the properties of a particular substance.

Method Statement:

A written submission by the Contractor to the Engineer and ECO in response to the EMPr Specifications or a request by the Engineer. The Method Statement should set out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:

- Construction procedures,
- Materials and plant to be used,
- Getting the plant to and from site,
- How the plant/ material will be moved while on site,
- How and where material will be stored,
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications,
- Any other information deemed necessary by the Engineer.

Mitigation:

The implementation of practical measures to reduce adverse impacts

No-Go Areas:

Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

Potentially hazardous substance:

A substance which, in the reasonable opinion of the Engineer and the ECO, can have a deleterious effect on the environment.

Project Manager:

A person representing the developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer (see above), but may be any other person, such as an architect or project manager, authorised by the developer to fulfil this role.

Reasonable:

Unless the context indicates otherwise this refers to the term 'reasonable' in the opinion of the Engineer after they have consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation programmes" and "environmental management programmes" (both as defined in the National Environmental Management Act (No 107,1998) (NEMA)).

SAHRA:

South African Heritage Resource Agency - the statutory body responsible for heritage resource management.

Site:
The boundary and extent of decommissioning and development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the proposal to proceed successfully.

Solid waste:
This refers to all solid waste, including decommissioning and construction debris, chemical waste, excess cement concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Specification:
A technical description of the standards of materials and workmanship that the Contractor is to use in the Works to be executed, the performance of the Works when completed and the manner in which payment is to be made.

Top material:
This refers to any surface material in the decommissioning and construction area, whether it be soil, fine material or stones including vegetation.

Topsoil:
This refers to the top 300 mm of soil and may include vegetation and rocks.

Works:
The decommissioning and construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the execution and carrying to completion of the capping and redevelopment.

Table 1 Checklist for Report Contents against the Requirements of Appendix 4 of GN No. 326 of 7 April 2017

NO.	REQUIREMENTS:	INCLUDED IN REPORT:	SECTION REFERENCE
a	Details of the EAP who prepared the report, including the expertise of the EAP, including a curriculum vitae.	✓	Document Control Sheet
b	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	✓	Section 2
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; *Note there are no areas or buffers which need to be avoided.*	✓	Figure 14
d (i)	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	✓	Section 18.4

	through the environmental impact assessment process for all phases of the development including- Planning and design;		
(ii)	Pre-construction activities	✓	Section 18.4
(iii)	Construction activities;	✓	Section 18.4
(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	✓	Section 18.4
(v)	Where relevant, operation activities.	✓	Section 22
(f) (i)	A description of proposed impact management actions, identifying the way the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to- Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	✓	Section 18
(ii)	Comply with any prescribed environmental management standards or practices;	✓	Section 18 & 6
(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	NA	
(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	NA	
g	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f)	✓	Section 10.6 and 11
h	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	✓	Section 11
i	An indication of the persons who will be responsible for the implementation of the impact management actions;	✓	Section 10.2
j	The time period within which the impact management actions contemplated in paragraph (f) must be implemented;	✓	10
k	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	✓	Section 10.6 and 11
l	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	✓	Section 10.6 and 11
m (i)	An environmental awareness plan describing the manner in which- The applicant intends to inform his or her employees of any environmental risk which may result from their work;	✓	Section 12.2
(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	✓	Section 18
n	Any specific information that may be required by the competent authority.	NA	

1 BACKGROUND TO PROJECT & SITE LOCATION

The Everite Factory in Brackenfell was established in 1945 and closed in October 2000. During its operation, the factory produced asbestos wastes in the form of sludges, broken sheeting and reject pipes which would be disposed of at a site created for this purpose alongside the factory. The total site covered an area of about 70 ha, while the asbestos waste site covers an area of some 9 ha. The sited included various activities including the factory itself, the wastewater dam, the AC Pipes area, the moulded goods yard and the asbestos waste disposal site (Parsons & Associates, 2015).

The wastewater dam was used by the Everite factory both for the disposal of its effluent as well as a source of water. It was estimated some 30 000 m^3 used to be abstracted from the dam each month for use in the factory. The volume of effluent discharged into the dam was not measured. The property around the dam was sold in 2000 and water is no longer abstracted from the dam. Though no longer used as a source of water, the wastewater dam still forms part of the municipal stormwater management system of the area. Subsurface drainage from the site continues to flow into the dam. Discharged product and other waste generated by the factory were disposed in the waste disposal site directly east of the factory. The site was classified as a GCB+ facility and was issued with a permit by DWAF on 12 August 1992. Since closure of the factory in 2000, the site was used to dispose of waste generated during the factory clean-up process 2. In 2001 the asbestos waste site was reshaped, capped, and had vegetation established on it and is currently not used.

The disposal area was the upper platform area in FIGURE 1 below. Upon commencement of the decommissioning process in 2000, parts of the factory that had been contaminated with asbestos were deposited in the existing disposal area as well as in a lower section of the site. The findings of a geotechnical assessment indicate that asbestos wastes are up to a maximum of ~8m thick on the lower platform and ~6.5 m thick on the upper platform which, combined, cover about 10.29 Ha. This area is now referred to as the "Asbestos Waste Consolidation Site" (or "Asbestos Consolidation Area in FIGURE 2). It can be assumed for calculation purposes, and being conservative, the volume of asbestos waste on site is approximately 145,000 m^3 and the mass is about 250,000 tons. Subsequent to the consolidation of asbestos waste in the area in question, the site was capped with soil and secured with formalized drainage channels. However, official closure of the site with a closure permit from the regulatory authorities was never completed. Over the years that followed, the covering has been undermined through mole activity and asbestos wastes are being pushed to the surface.

A geotechnical assessment in 2011 confirmed that there is an existing capping layer of silty sand and builders' rubble ranging from 0.2 m to 1.5 m below surface over the asbestos waste areas. In the lower platform, this layer is underlain by a further capping layer comprising clayey sand with ferruginised gravel, extending to depths in the range of 0.4 m to 1.0 m below existing ground level.

The Everite waste consolidation site, hereafter referred to as 'the site', is situated south of the intersection of Kruisfontein and Old Paarl Roads. The site is accessed via Gemini Street and measures approximately 10.9 hectares in extent. Refer to FIGURE 2 for a locality plan.

FIGURE 1 THE OLD EVERITE FACTORY AREA (~MID 1990'S) SOURCE: MEGA GEOTECHNICAL ASSESSMENT, 2011

FIGURE 2 LOCALITY PLAN

Group Five commissioned the geotechnical investigation in 2010 in order to understand the latest condition of the site and identify opportunities and constraints to decommissioning and possible redevelopment. A Basic Assessment process and Waste Management License (WML) application was also carried out at the time, with a final report being submitted the then Department of Environmental Affairs (DEA) and the Department of Environmental Affairs and Development Planning (DEA&DP) in 2014. The Application lapsed as feedback from the then Department of Water and Sanitation on the final design was outstanding. The 2010 to 2014 investigations and assessments revealed a number of land use possibilities in terms of the proposed redevelopment and culminated in an authority feedback workshop to gauge the initial sentiment regarding the proposed redevelopment. In principle, future development of the site was agreed to by all authority representatives at the workshop. However, in order to ensure that any future development of the site is environmentally acceptable, it was agreed that the land should be 'capped' to prevent mole activity from exposing the buried asbestos waste.

Duro Brick Company (Pty) Ltd ("Duro Brick") owns the land and they intend to decommission the site (Erf 18354, Brackenfell) in the form of permanent capping, with further development of a light industrial park thereon. The intention is to make use of the existing contours/ slope of the site and to keep any excavations to a minimum. A critical part of the capping/ closure of the site to ensure that the asbestos is firmly in place is the proposed development as some of the roadways and foundations would form part of the capping layers and would be constructed on top of the capping. The proposed capping design has been crafted in the context of the proposed end-use of the site.

This closure of the site requires a WML in terms of the existing WML for the facility, which was issued in terms of the National Environmental Management: Waste Act (No. 59 of 2008). The WML must come from the National Department of Forestry, Fisheries and Environment (DFFE), in consultation with their colleagues at the National Department of Water and Sanitation (DWS).

Note that, while the previous 2010-2014 Basic Assessment process required Environmental Authorisation from the provincial DEA&DP in terms of the National Environmental Management Act (No. 107 of 1998), as amended, this is no longer the case because the EIA Regulations have since been amended and the Listed Activities triggered at the time are no longer applicable.

2 PROPOSED CAPPING AND RE-DEVELOPMENT

The preferred alternative (i.e. Alternative 2) proposed entails the capping of the full extent of the site, except for the retention pond and associated buffer area, as well as redevelopment on the site (which would provide a further capping layer).

The proposal has three key elements:

- Total capping proposed of up to approximately 95,000 m²;
- Redevelopment, with some occurring on top of the capping layer, of up to approximately 50,096 m²; and
- Retention pond and associated buffer area of approximately 14,250.9 m².

Note that the proposed development footprint can be divided into an area for roads and parking of approximately 18,091 m² and building footprints of approximately 32,005 m².

The intention is to have as limited excavation on the site as possible, in order to limit disturbance to the asbestos. The methodology to be implemented is described below. Refer also to the capping strategy included in Appendix C.

There are different capping strategies proposed for different areas of the site as they relate to the proposed industrial development. In sections where there would be no infrastructure (i.e. roads and buildings), like the green/landscaped areas, the capping layer would be more robust, while areas which would house development would have a thinner capping layer, with the layer works for the roads and foundations and platforms for the buildings providing an additional capping layer on top of the engineered capping layer or replacing certain of the capping layers.

Furthermore, in efforts to reduce the disturbance of asbestos on site as much as possible, the proposed capping and development would require minimal excavation, with compaction and importing of fill to realise the levels required. The method of compaction would also be undertaken using the best practice for minimising the risk of spread of asbestos during these works.

This EMPr contains measures for executing the works in a way that disturbs as little asbestos at any one time and includes measures such as clearing of the vegetation for specific areas of works at a time such that the entire site does not remain clear all in one go, use of an asbestos-certified Contractor, limiting access during the site, monitoring for airborne asbestos, external monitoring and reporting against conditions of approval throughout construction, etc.

2.1 Compaction for In-Situ Conditions

The in-situ terrain would be compacted before any fill and/or capping layers are placed and said terrain would be compacted to 95 % MOD AASHTO (Walters, 2020).

2.2 Proposed Capping

The capping layerworks to be undertaken in depend on the total fill required to achieve the final earthworks levels required for the proposed development (i.e. different components thereof, such as roads or building platforms, would need different levels) (Walters, 2020). Therefore, there is a different capping strategy proposed for each of the following areas:

- Green/ Landscaped Areas (i.e. the areas surrounding the proposed development structures, to be landscaped);
- Roads;
- Building Platforms;
- Services; and
- The Stormwater Pond.

The approach for each of these is described below.

2.3 Green Areas

Existing vegetation would be cleared from these areas and the proposed capping layer works would be constructed directly onto the compacted in-situ material (Walters, 2020). Vegetation clearing specifications (i.e. site clearing) have been included in this EMPr and must be followed. Note, that the required search and rescue of certain plants would take place in conjunction with the vegetation clearing. The capping layer is depicted in Figure 3 and would comprise the following:

- A cement stabilized layer to a thickness of 300 mm;

- A graded crushed stone layer to a thickness of 150 mm and cover this layer with another woven geotextile; and
- Loosely place a 200 mm layer of topsoil that will promote vegetation in the green areas.

As mentioned above, planting of landscaping vegetation as per Landscape Plan (noting that the final Landscape Plan would be approved as part of the Spatial Development Plan approval from the City of Cape Town Municipality) would then occur. The Draft Landscape Plan is included as Appendix D.

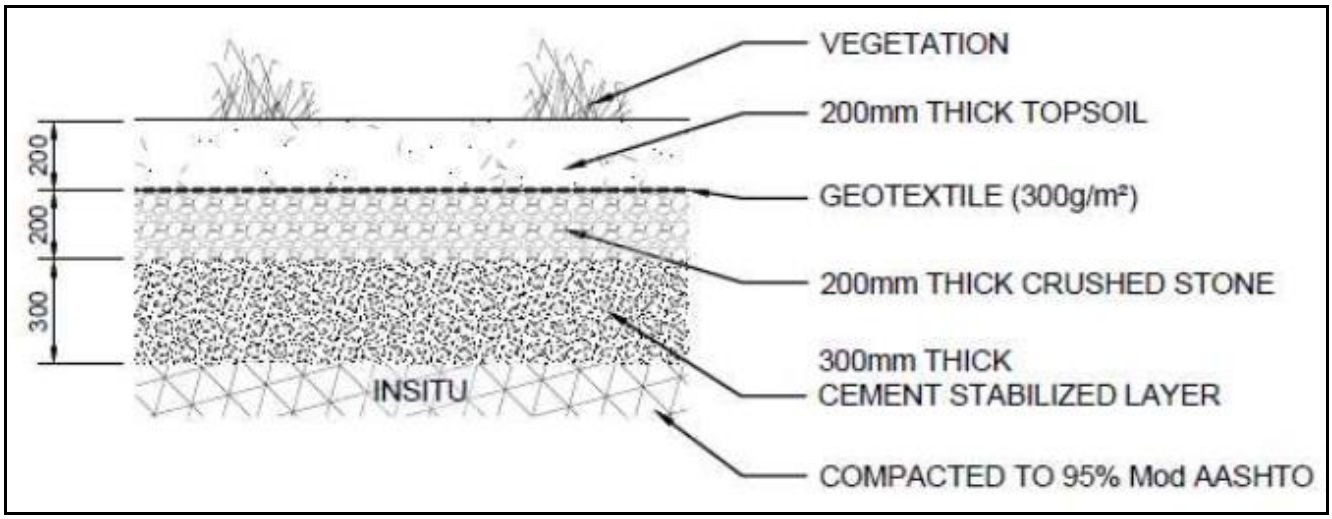

Figure 3 Proposed Capping layerworks for the Green Areas (source: Walters, 2020)

Due to the presence and thickness of this existing capping material as described above, J&W finds that an additional capping layer (barrier) of 500 mm is sufficient. Furthermore, one of the recommendations from the geotechnical assessment stated, "*Due to the likely compressible nature of the materials present on site, it is recommended that the platform levels remain more or less the same i.e. fills greater than 500 mm must not be constructed.*" There would be instances where services would need to be installed across green areas. Refer to "Services" below for a description thereof.

Furthermore, given the mole activity, which is prevalent on site, a rodent barrier would be installed along the entire perimeter of the site (Walters, 2020). This would entail the excavation of 1 m deep trench that would be lined with a HDPE geomembrane and backfilled with a cement stabilised material (Walters, 2020). The geomembrane would continue across the top of the trench and be place 100 mm up against the property boundary (Walters, 2020). The typical cross section of the proposed rodent barrier is indicated in Figure 4

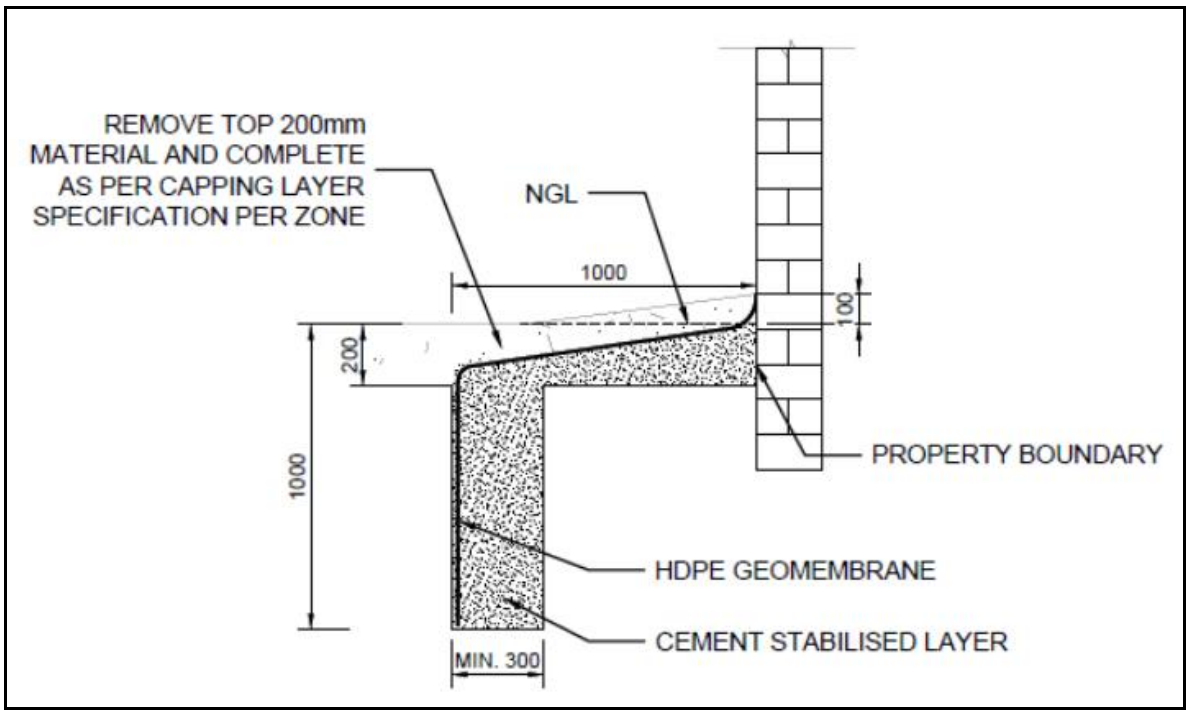

Figure 4 Typical cross-section of proposed roden barrier (source: Walters, 2020)

2.4 Roads

Walters (2020) explains that the roads can be classified into two categories, based on the proposed layerworks, namely main access roads (asphalt finish) and internal parking areas (brick paved finish). Typical road sections are shown in Figure 5 and Figure 6.

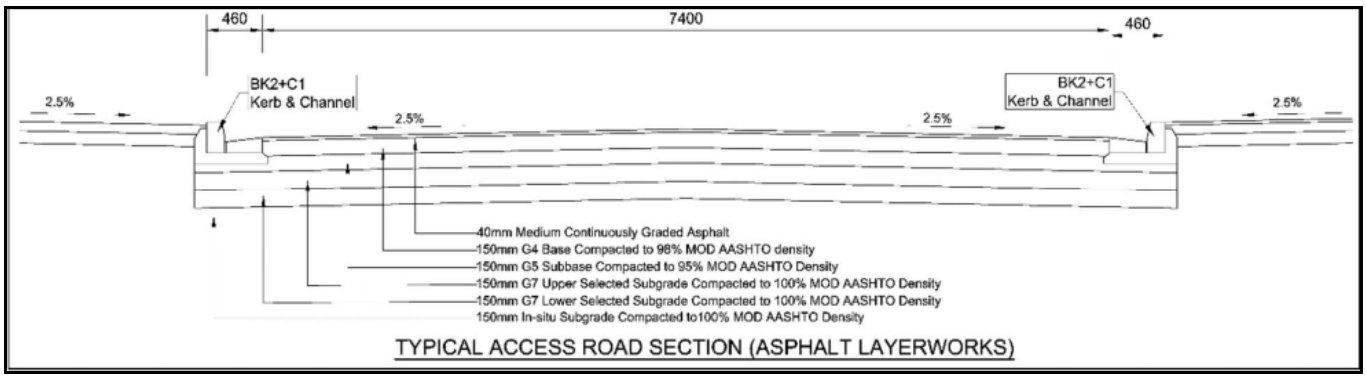

Figure 5 Proposed Road Layerworks: Asphalt- 640mm total thickness (source: Walters, 2020)

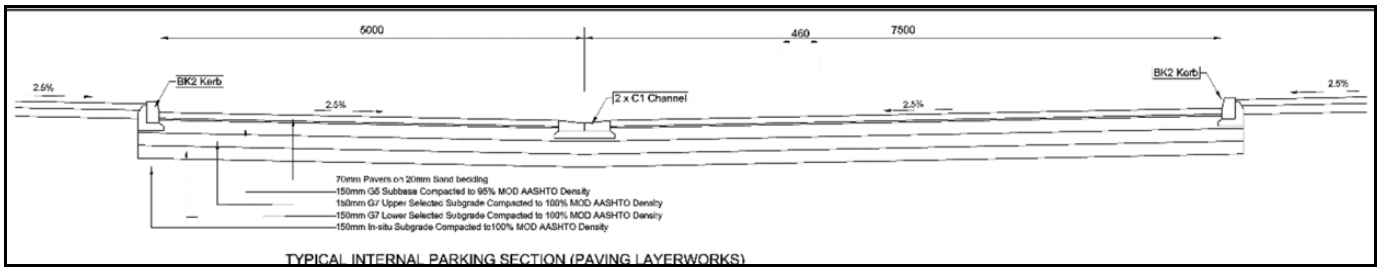

Figure 6 Proposed Road Layerworks: Brick Paving- 540mm total thickness (source: Walters, 2020)

The proposed road layerworks with the asphalt finish include the following layers:

- 40 mm Premix
- 150 mm G4
- 150 mm G5
- 150 mm Upper Selected
- 150 mm Lower Selected

Under the asphalt roads, the proposed capping as described above would be replaced by the abovementioned road layerworks (Walters, 2020). Where the total fill required to achieve final level is less than the proposed road layerworks thickness, excavation would be required into the in-situ material (Walters, 2020). This is illustrated in Figure 7 where the final level is approximately 70 mm below the existing level (Walters, 2020). This scenario would only be limited to a 135 m² area (Walters 2020) as the intention is to limit excavation into the asbestos as much as possible.

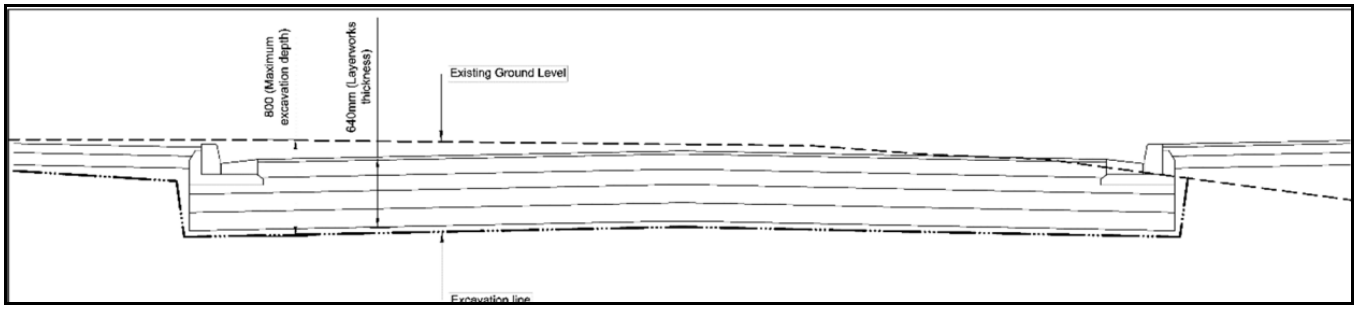

Figure 7 Excavation for road layerworks at depth (source: Walters, 2020)

The proposed road layerworks with the brick paving finish include the following layers:

- 70 mm Paver on 20 mm sand bedding
- 150 mm G5
- 150 mm Upper Selected
- 150 mm Lower Selected

Where the brick paving final earthworks, levels are close to the existing ground and excavation is required, the 200 mm thick crushed stone layer of the abovementioned proposed capping layerworks would be placed underneath the bricking paving layerworks are constructed (Walters, 2020).

2.5 Building Platforms

Walters (2020) indicates that the proposed building platform areas can be categorised into the following three capping scenarios:

A. Final at, or just below the existing level (maximum excavation into the asbestos would be required here- refer to Figure 8);
B. Final level between 0 mm and 700 mm above existing level (intermediate excavation into the asbestos would be required here- refer to Figure 8); and
C. Final level more than 700 mm above existing level (no excavation into the asbestos would be required here).

Each scenario would entail varying degrees of excavation into the existing ground, from 700 mm excavation to no excavation into the existing ground (Walters, 2020) (refer to Appendix C). Excavation of 700 mm into the existing ground would require capping with

no additional fill (scenario A above, refer to Figure 9) while the scenario with no excavation would not require capping layerworks and only bulk earthworks (scenario C above) (Walters, 2020). These bulk earthworks would comprise of competent material constructed in 200 mm thick layer and compacted to 95% MOD AASHTO (refer to Figure 8) (Walters, 2020).

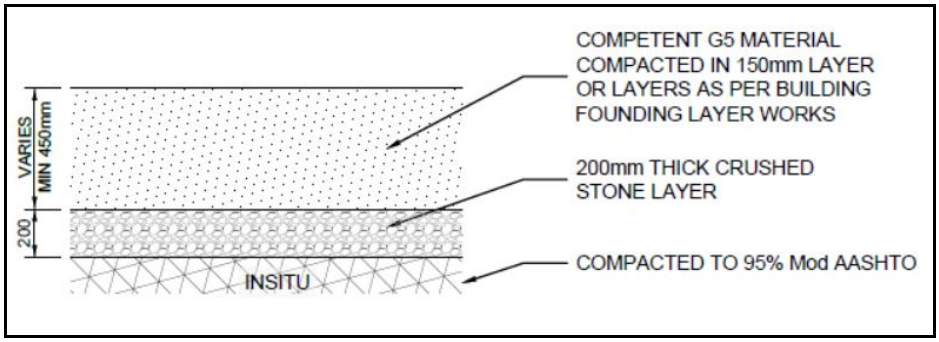

Figure 8 Excavation for road layerworks at depth (source: Walters, 2020)

The area where maximum excavation is required for building platforms would be limited to 25 m². Hence, Figure 8 is applicable for scenarios A and B described above and depicted in Figure 9 and Figure 10 respectively.

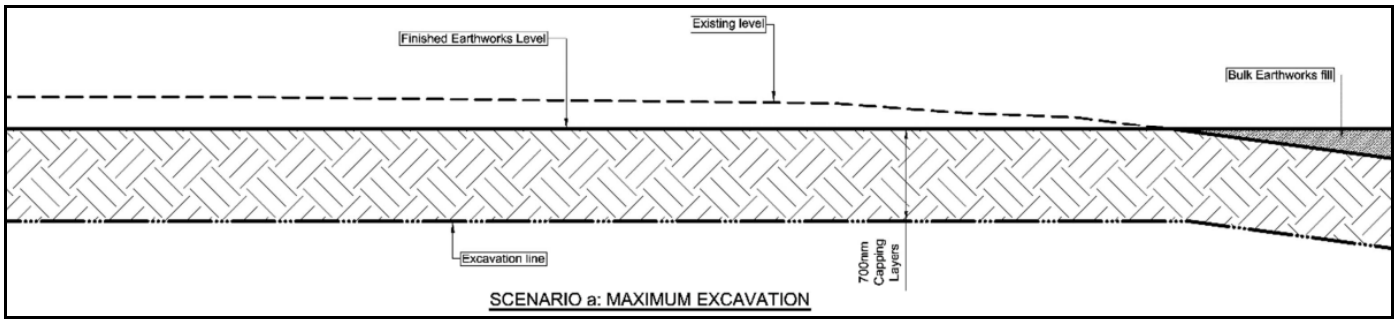

Figure 9 Maximum excavation scenario (source: Walters, 2020)

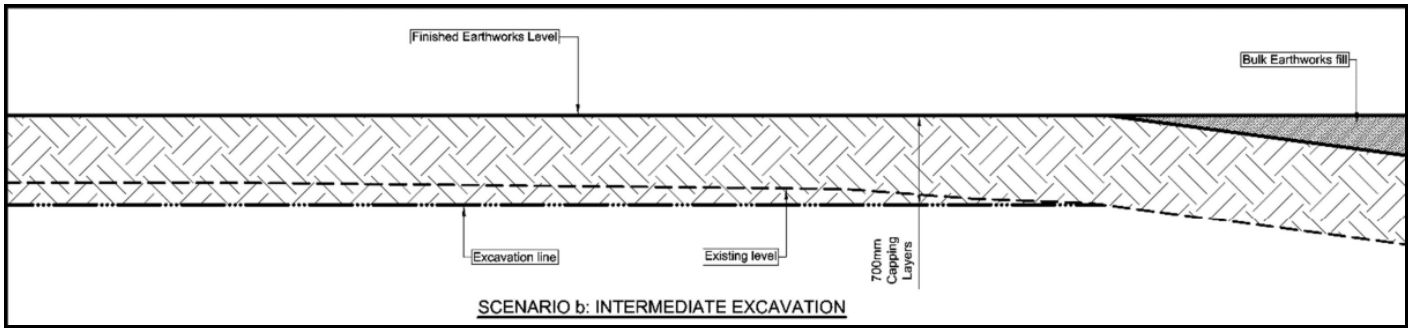

Figure 10 Intermediate excavation scenario (source: Walters, 2020)

2.6 Services

The proposed services would largely be located within the proposed earthworks and/or capping layers as described above (Walters, 2020). They would generally be to a maximum depth of 1 m (Walters, 2020).

The services would be located within roads or parking areas, or traverse across areas where no bulk earthworks would need to occur (Walters, 2020). It is in areas such as those where no bulk earthworks would be necessary (i.e. the green/landscaped areas) that the proposed services would be deeper than the proposed capping layers and so excavation into the existing ground and asbestos would be required (Walters, 2020).

However, there are instances where this would not be possible and so Walters (2020) provides three scenarios relevant to the proposed services, namely:

A. Deeper that the proposed capping layer, in areas of no bulk earthworks/roadworks (refer to Figure 11);
B. Within the existing ground under roads/parking (refer to Figure 12); or
C. Within the bulk earthworks fill, under roads/parking (refer to Figure 13).

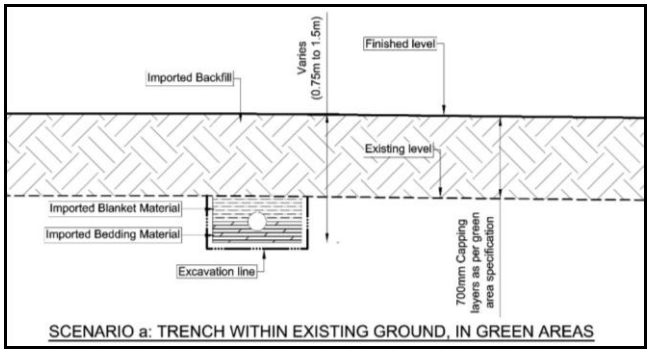

Figure 11 Scenario A: Services- Trench within existing round (Green Areas) (source: Walters, 2020)

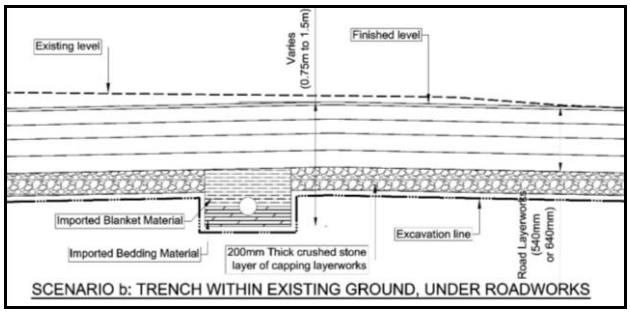

Figure 12 Scenario B: Services- Trench within existing round (Under road works) (source: Walters, 2020)

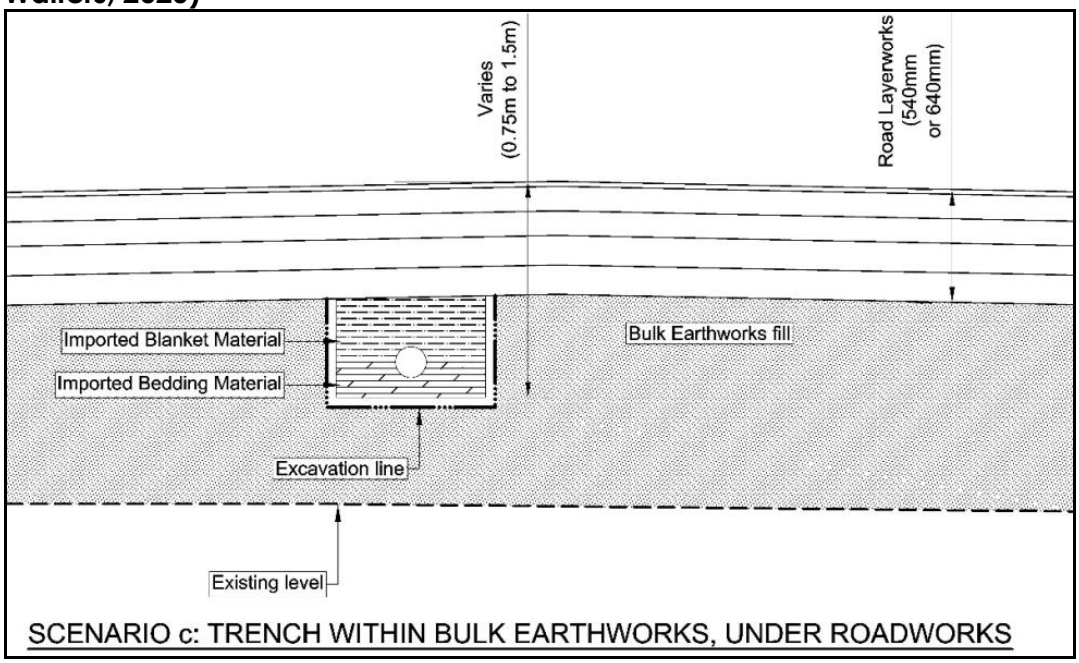

Figure 13 SCENARIO C: SERVICES- TRENCH WITHIN Bulk Earthworks (under roadworks) (SOURCE: WALTERS, 2020)

2.7 Stormwater Pond

The existing stormwater pond would need to be extended in length and widened. Walters, 2020), and this would require excavation into the existing pond embankment. The pond would include a drainage layer of 500 mm thick, clean drainage sand (Walters, 2020). Armorflex grass blocks would line the bottom and side slopes of the pond (Walters, 2020). The drainage layer would contain a series of 100 mm diameter subsoil drains. There would also be planting in the pond.

A vegetated buffer (i.e. a green area) would be provided around the pond and would be capped as per the "Green Areas" described above.

The total extent of capping proposed would be 95,000 m^2.

2.8 Access

There is currently access to the site. The existing access road would be used, and the site is only accessible via that single point/ gate (which is currently locked and accessed controlled). The site is accessed from Virgo Close, off Gemini Road in Brackenfell Industria. Access to the site is also restricted to personnel who are registered asbestos contractors or those who have been appropriately trained and passed the asbestos medicals required to access the site.

2.9 Proposed End Use

The proposed development would be a secure industrial estate comprising a combination of larger portions ranging from around 6095 m^2 to 10800 m^2 and smaller portions averaging 1500 m^2 with an internal road (refer to below) network, some green areas and a stormwater detention pond (refer to Figure 14) Refer to Figure 15 and Figure 16 below for images of larger and smaller units respectively. The proposed industrial park would be fenced around the perimeter, and have a single entrance and exit gate, which would be controlled by security personnel.

It is intended that when portions are sold, there would be a title deed condition (as well as an estate rule) which does not permit any future excavations be allowed. The proposed capping would not, therefore, be a final layer but rather the proposed roads, paved areas and factory floors (typically comprising concrete and cement slabs) would be developed on top of it with a view to adding further capping layers and that this would also physically limit and deter future excavations. Note that, Given the history of the site as a hazardous waste disposal facility, there are restrictions in place which prevents the sale of individual plots. The developer (Durobrick "(Pty) Ltd) is required to continue to manage the property as a whole. Individual erven would likely be rented to prospective tenants.

Figure 14 Proposed Development Plan (SOURCE: CHAMELEON ARCHITECTS, 2020)

Figure 15 Artist Render of Small Units (source: P. Smith, 02/09/2020)

Figure 16 Artist Render of Larger Unitys (Source: P. Smith, 02/09/2020)

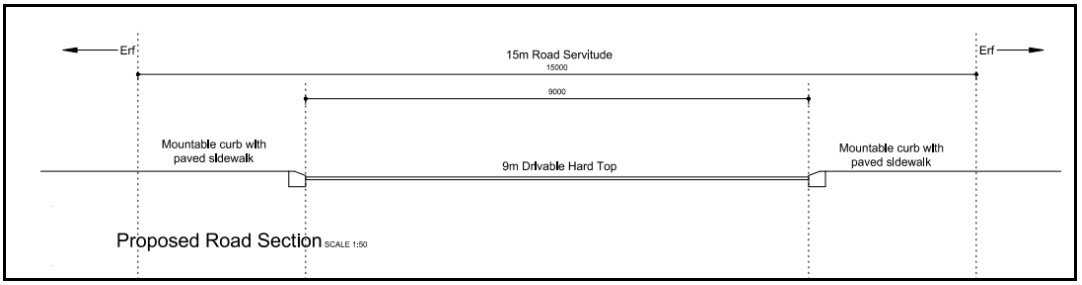

Figure 17 Proposed Road Cross-section (source: Chameleon Architects, 2020)

2.10 Servicing

The proposed development has existing water, sewer, and stormwater connections to the property. Internal reticulation would need to be installed for the proposed development

and there would be a stormwater pond in the north-west corner of the site (refer to Figure 18).

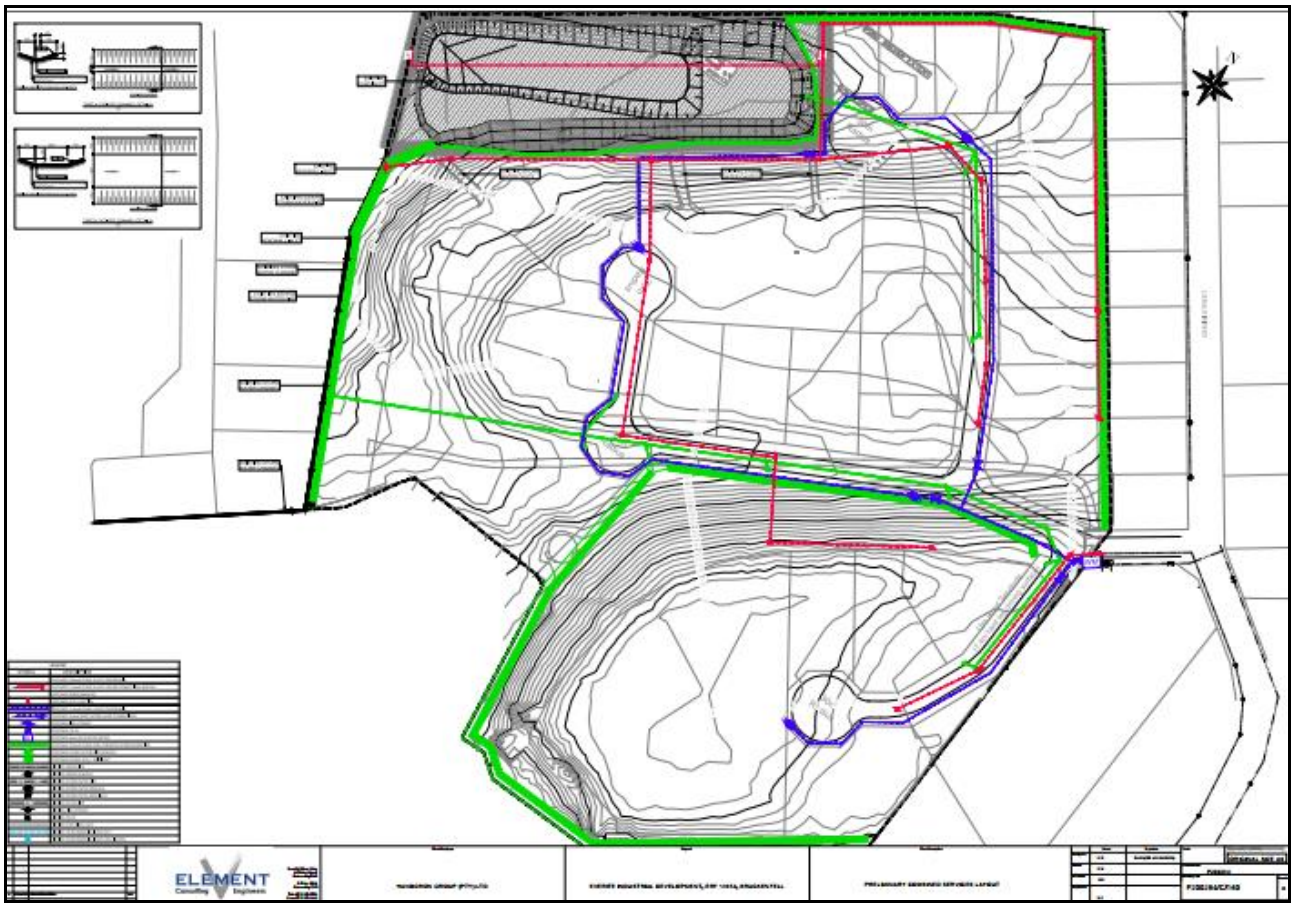

Figure 18 Proposed Services, Combined (Source: Element Consulting Engineers, 2020)

Trenches for services would also not be excavated into the asbestos as much as possible, but rather into the new, imported fill and road layer works, in order to limit disturbance of asbestos on site. However, there would be certain instances where excavation into the ground would be necessary.

Refer to "Services" under the proposed capping description above.

2.11 Landscaping

A vegetated buffer (i.e. a green area) would be provided around the storm water pond and would be capped as per the "Green Areas." Planting of landscaping vegetation as per a Landscape Plan would occur following capping.

A draft Landscape Plan has been prepared (refer to Appendix D). The Final Landscape Plan needs to be approved by the City of Cape Town before implementation and must take into consideration the landscaping specifications contained in this EMPr (refer to Table 5).

2.12 Road Upgrades

An additional right-turn lane is proposed at the Okavango Road/Old Paarl Road intersection, to be provided westbound along Old Paarl Road (refer to Figure 19). The northern approach would be widened to provide a new northbound acceleration lane along Okavango Road for the eastbound left-turn slip. A 2 m wide sidewalk would also be

provided along Old Paarl Road. It is also recommended that a sidewalk should be provided along the southern side of Leo Close and sidewalks should also be provided along the major internal roads.

Figure 19: PROPOSED UPGRADES AT OKAVANGO ROAD/OLD PAARL ROAD INTERSECTION (SOURCE: KROGSHEEPERS & ARANGIE, 2021)

3 THE AFFECTED BIOPHYSICAL ENVIRONMENT

3.1 Topography, Geology, Hydrology and Geohydrology

The site is located on the Cape Flats Aquifer and underlain by 20 m of clay resulting from the weathering of granites. Granite accounts for the hill on which much of the suburb of Brackenfell has developed. In places, the granite is highly weathered with BH126 encountering 20 m of clay interpreted to represent weathered granite. The granite - unconsolidated sand contact is in the vicinity of the Everite asbestos waste site. Unconsolidated sands cover much of the flat-lying area to the north and west of the site. As a result, little is known about the underlying bedrock. The published 1: 50 000 geological map indicates much of the area to be underlain by sediments belonging to the Malmesbury Group with sand thickness ranging from 3 m to almost 25 m. The geology (and hydrogeology) of the underlying hard rock aquifer system is unknown. This includes the lithology of the Malmesbury Group, the degree of weathering and the presence and position of the contact zone. Based on the generalised conceptual model of the Cape Flats Aquifer system, it was assumed the hydraulic properties of the unconsolidated sand are significantly greater than those of the underlying hard rock aquifer system. As a result, the hydrogeological investigations of the Everite site focused on the unconsolidated sand or primary aquifer system.

The study area is located on the northeastern extremities of the Cape Aquifer system, described in detailed Henzen (1973), Wright and Conrad (1995), Seyler (2008) and others. This aquifer is classified as a major aquifer system; but such a classification would not be applicable to the Everite asbestos waste site as (a) it is located on the transition between the minor granitic aquifer and the primary aquifer and (b) the saturated thickness of the sand is limited. A minor aquifer system classification is considered appropriate. Based on the generalized conceptual model of the Cape Flats Aquifer system it was assumed the hydraulic properties of the unconsolidated sand are significantly greater than those of the underlying hard rock aquifer system. Unconsolidated sands are considered transmissive and have hydraulic conductivities between 1 m/d and 5 m/d. The hydraulic conductivity of the underlying bedrock is expected to be an order of magnitude lower.

The primary aquifer has a more "Ca Alk" character with a lower EC and higher pH than that of groundwater from the granitic secondary aquifer (FIGURE 23). The granitic aquifer has a Na Cl character, a higher EC and is more acidic.

Based on a groundwater assessment in 2001, widespread groundwater contamination was detected across the site, with elevated electrical conductivity (EC) levels and concentrations of potassium (K) and sulphate (SO_4) being characteristic (Parsons & Associates, 2015). It was noted, however, that the elevated concentrations were not considered harmful substances (Parsons & Associates, 2015). It was not possible to delineate discrete plumes from individual sources of contamination and the extent of contamination could not be defined (Parsons & Associates, 2015). A further assessment was then undertaken in 2002 to delineate the extent of contamination and the study allowed for ambient groundwater quality to be defined, the nature of groundwater contamination to be characterised and the extent of the contamination plume to be delineated. No groundwater users were located down gradient of the Everite site. It was found that the plume had migrated 1 km west of the wastewater dam, but that no groundwater users had been impacted. Groundwater contamination has been detected in the area and the extent delineated, but it is not possible to distinguish between contamination emanating from the Everite site and the surrounding area (noting that it is an industrial area) (Parsons & Associates, 2015).

The extent of contamination at the Everite site was delineated in 2002 based on the maps presented in FIGURE 20 and FIGURE 21. The extent of contamination resulting from historic activities is demarcated in FIGURE 22. It is noted contamination emanating from the asbestos waste site could not be individually delineated because that contamination could not be differentiated from that caused by other activities on the Everite site.

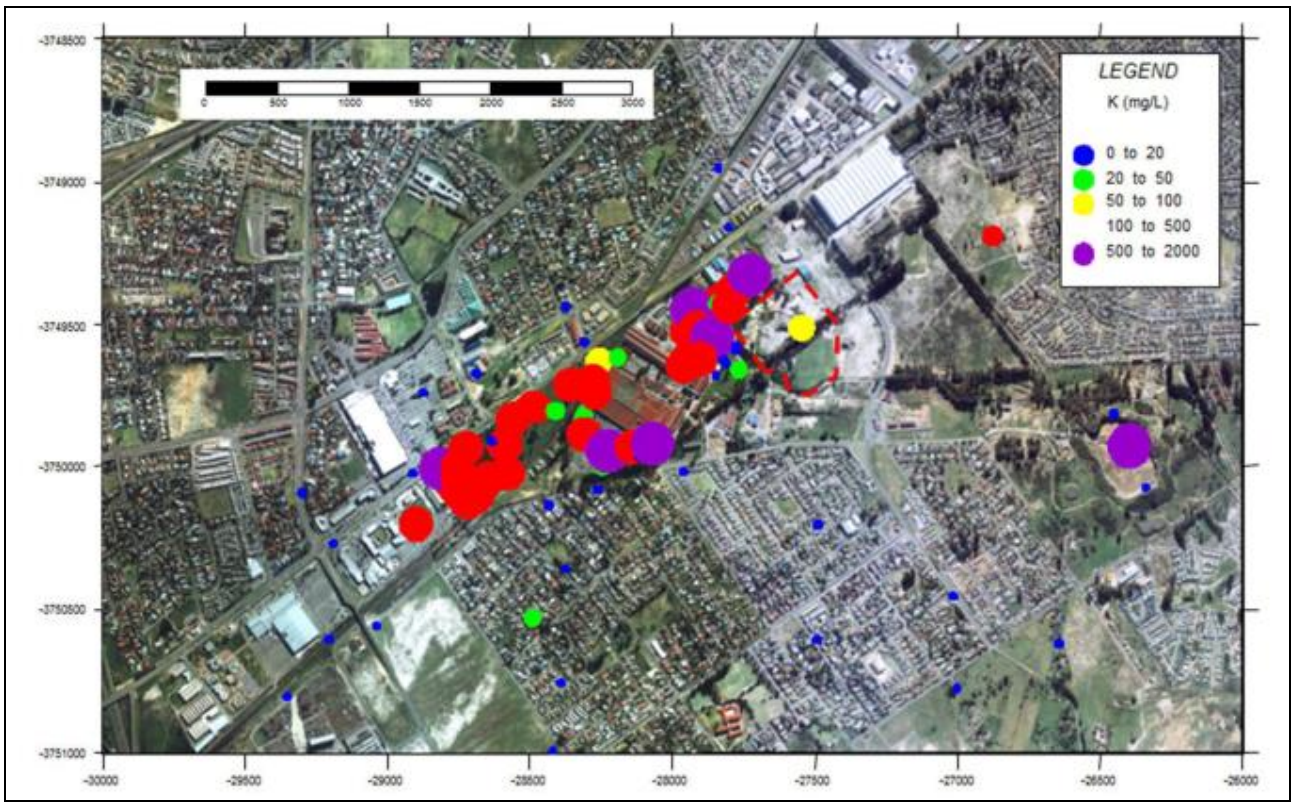

FIGURE 20 DISTRIBUTION OF POTASSIUM CONCENTRATIONS AT THE EVERITE SITE (SOURCE: PARSONS & ASSOCIATES, 2015)

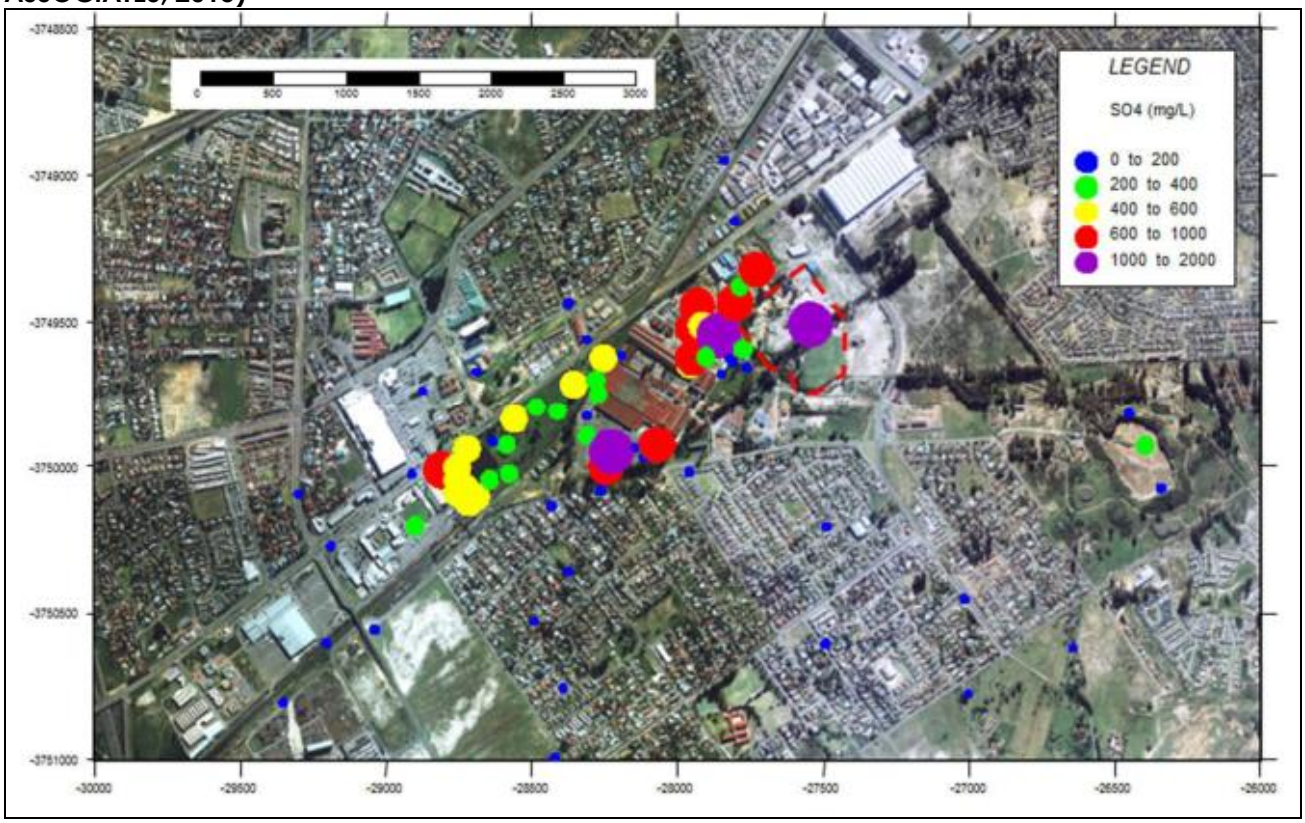

FIGURE 21 DISTRIBUTION OF SO_4 CONCENTRATIONS AT THE EVERITE SITE (SOURCE: PARSONS & ASSOCIATES, 2015)

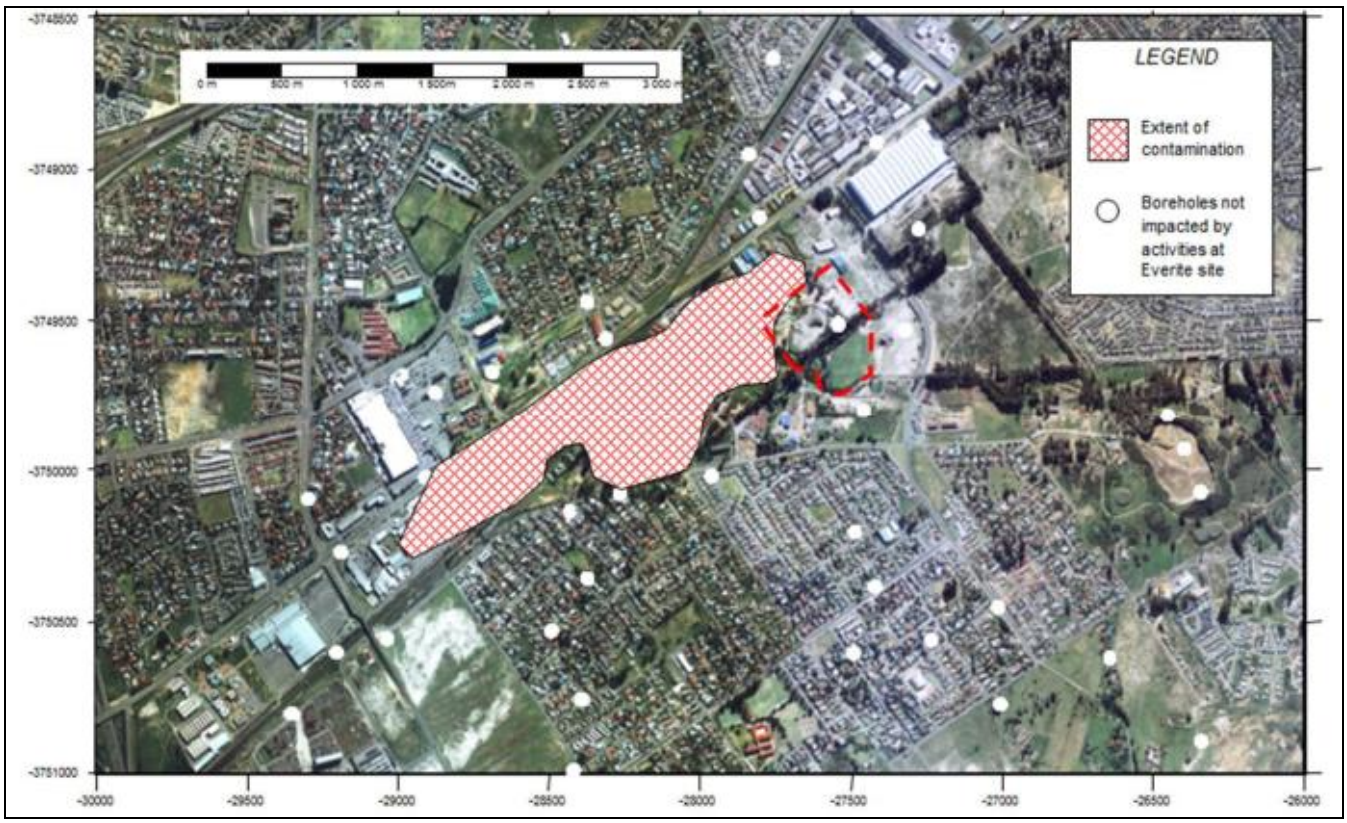

FIGURE 22 EXTENT OF GROUNDWATER CONTAMINATION RESULTING FROM HISTORIC ACTIVITIES AT THE EVERITE SITE (SOURCE: PARSONS & ASSOCIATES, 2015)

Potassium (K) and Sulphate (SO_4) – with an associated increase in EC – were identified as the groundwater contaminants resulting from historic activities across the site 4. Neither of these contaminants are considered particularly harmful, particularly at the concentrations observed during the various groundwater investigations.

It is documented in the literature that asbestos is practically immobile in the subsurface. The fibres are retarded from moving as they cannot pass through interstitial pores spaces in the subsurface. The expected migration rate of an asbestos fiber through soils by the forces of groundwater is approximately 1 to 10 cm per 3 000 to 40 000 years (NHDES, 2015). Thus, asbestos is not considered a groundwater contaminant of any significance 3. It is for this reason that asbestos was not specifically analysed for during the groundwater investigations of the Everite site.

There are no natural watercourses or shallow water table present on site. There is a man-made stormwater pond and some associated stormwater channels on the site (Belcher, 2012).

The natural gradient of the site has been altered to an artificial state by the deposition of asbestos wastes. Most of Lower Platform 1 area, including the adjacent (north side) slopes comprises asbestos wastes (Morris et al, 2011). Lower platform 2 area is mostly clean, other than some spill-over and minor surface contamination along the toe of the slopes up to the Platform 1 area (Morris et al, 2011). Refer to FIGURE 23 and FIGURE 24 for an indication of the levels of the platforms and asbestos below them. The site is generally underlain by fill and waste deposits overlying *in situ* subsoil deposits of Quaternary Age. The above is underlain by residual soils that grade with depth into weathered granite bedrock of the Cape Granite Suite. Over the asbestos waste areas there is a capping layer of greyish brown, loose, silty SAND with builder's rubble but with minor asbestos contamination (Morris et al, 2011). This

layer extends to depths in the range 0.2 to 1.5 m below EGL (Morris et al, 2011). In the lower platform, this layer is underlain by a further capping layer comprising an orange brown, medium dense, slightly clayey to clayey SAND with ferruginised gravel, extending to depths in the range 0.4 to 1.0 m below existing ground level (Morris et al, 2011). The fill below the capping layers generally comprises asbestos waste deposits in the form of sludge – both dry and wet, builder's rubble (pipes, bricks, etc.) and broken asbestos pieces mostly in a sandy matrix (Morris et al, 2011). However, in numerous inspection pits a compressible asbestos sludge layer was identified (Morris et al, 2011). The asbestos sludge ranges in thickness from ~ 0.6 to >4 m and forms a large part of the waste mix (Morris et al, 2011). The fill comprising asbestos products and sludges was observed to extend to depths of approximately 8.5 m below EGL in one of the boreholes sampled. Thereafter, the *in-situ* sub-soils commonly comprise a layer of loose to medium dense, sandy subsoils alternating with bands of clayey layers. Residual sub-soils were encountered at depths in the range 11.3 to 25.6 m below EGL and generally comprised a reddish orange-brown, to orange yellow, stiff to very stiff, silty clay to clayey silt (Morris et al, 2011). Weathered bedrock was only identified in one of the boreholes at a depth of 27.2 m below EGL and generally comprised an orange yellow stained red, completely to highly weathered, moderately to highly fractured, extremely soft to very soft rock granite of the Cape Granite Suite (Morris et al, 2011). Groundwater seepage was not noted at levels higher than 5 m during the geotechnical assessment, but groundwater was identified in three boreholes at 9m, 11.2 m ad 7.45 m below existing ground level and it was noted that groundwater may occur over the solidified layers of asbestos sludge in the more porous (loose) zones (Morris et all, 2011).

The original fall of the site was approximately 1:21. Refer to the cross section of the site in FIGURE 23 below.

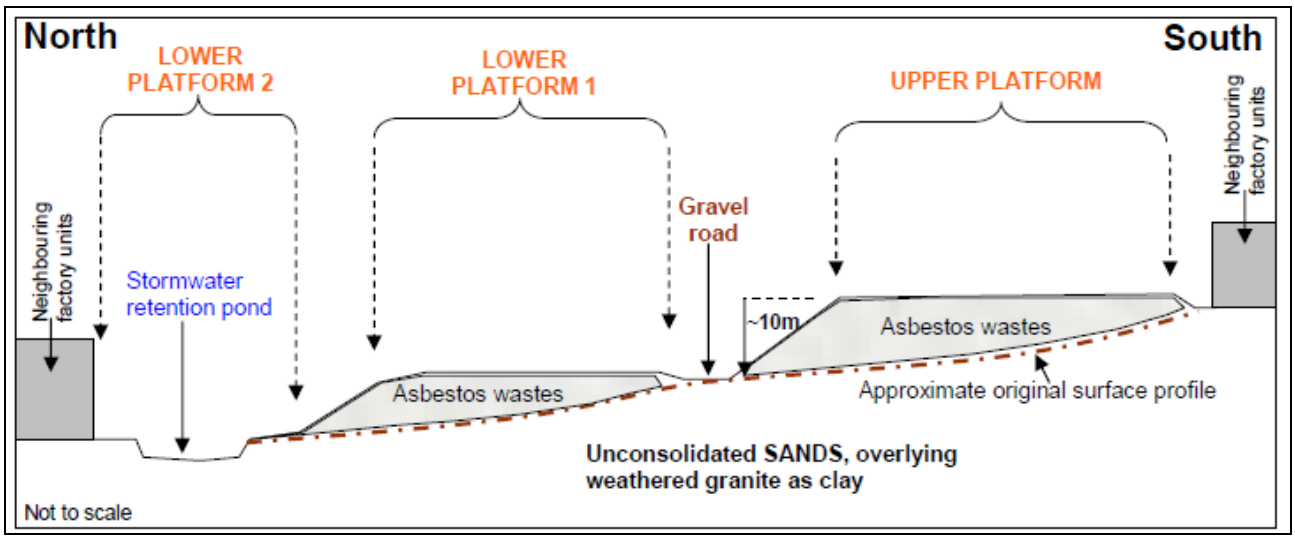

FIGURE 23 NORTH-SOUTH CROSS SECTION OF THE ASBESTOS WASTE CONSOLIDATION AREA (*SOURCE: MEGA GEOTECHNICAL ASSESSMENT, 2011)*

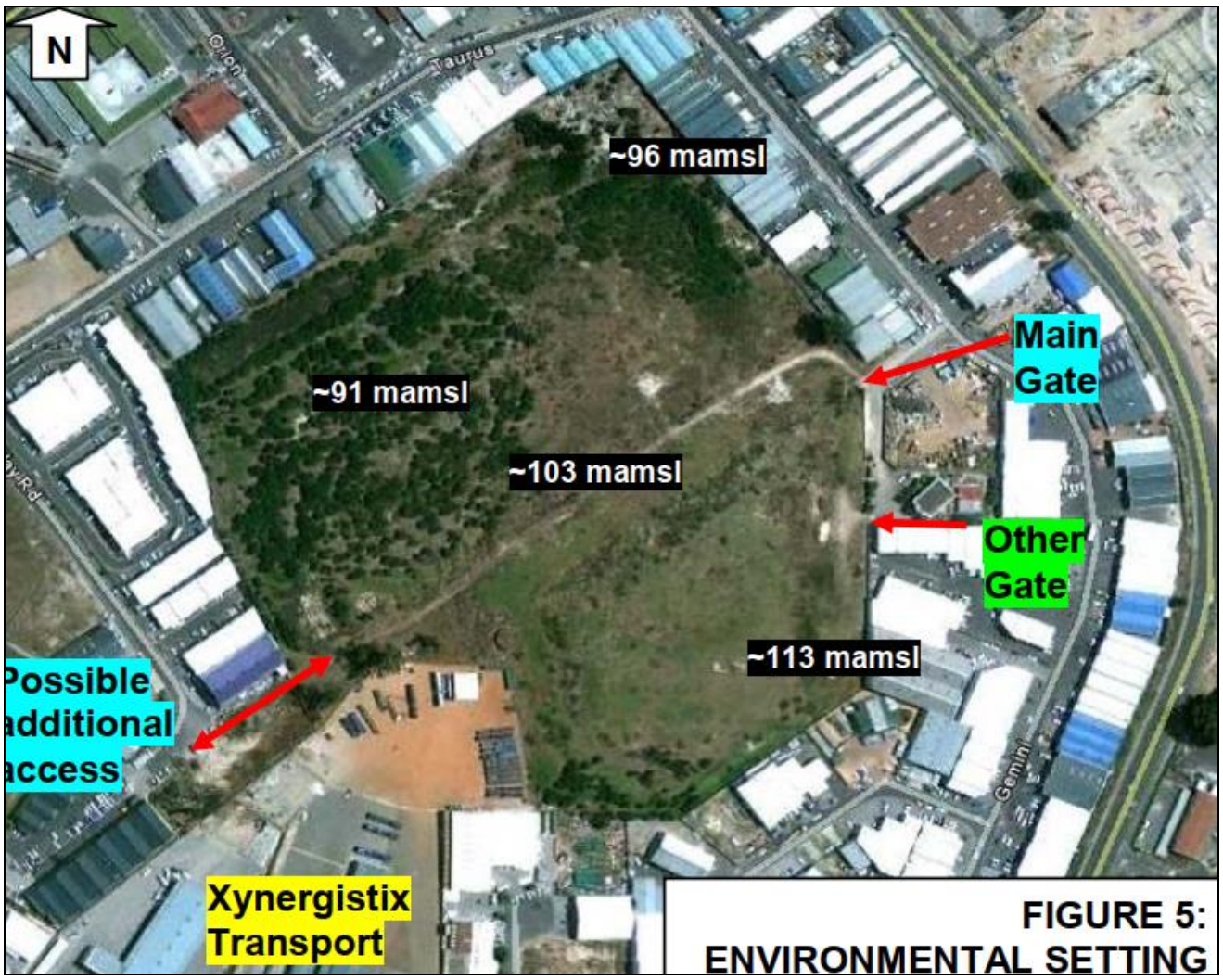

FIGURE 24 IMAGE INDICATING LEVELS OF THE PLATFORMS (SOURCE: MORRIS ET AL, 2011)

The site uses an artificial fill to dispose of asbestos waste and, in its current state, is sensitive to erosion. This would be resolved by the capping and redevelopment of the site. It should be noted that the soil is already contaminated by the previous disposal activities on the site.

With regard to its location in the landscape, the site would historically have been of the lower end of the side slope of a hill, however that has been altered through the creation of the various platforms as described above.

Morris et al (2011) confirm that the previous capping on the site has been compromised by mole activity and that it is hosts much alien vegetation. They also note that there were no unacceptable airborne exposure risks at the time, which has been corroborated by OHMS (2021). Development of light industrial facilities on the site would be possible, but the site would require re-engineering for development and there would be some long-term annual maintenance and management required for the site (Morris et al, 2011). The re-engineering and re-development would require an EIA process and input from civil engineers, asbestos specialists, and town planners in order to execute it in terms of applicable law.

Most of Lower Platform 1 area, including the adjacent (north side) slopes comprises asbestos wastes (Morris et al, 2011). Lower platform 2 area is mostly clean, other than some spill-over and minor surface contamination along the toe of the slopes up to the Platform 1 area (Morris et al, 2011). The site is generally underlain by fill and waste deposits overlying *in situ*

subsoil deposits of Quaternary Age. The above is underlain by residual soils that grade with depth into weathered granite bedrock of the Cape Granite Suite.

3.2 Existing Capping Layer

There is capping currently in place on the site which was completed in 2001/2002. The intention of the capping at the time was to provide a high integrity, sustainable cover to prevent the exposure of asbestos-containing waste, to prevent uncontrolled access to the site as well as to make provision for the continued monitoring and maintenance of the site after closure. The end use of the site, at the time, was envisaged to be a green area with strict access control.

The capping comprises a 300 mm compacted sand layer, followed by a 200 mm compacted clay layer and a 200 mm top-soil layer (refer to FIGURE 25).

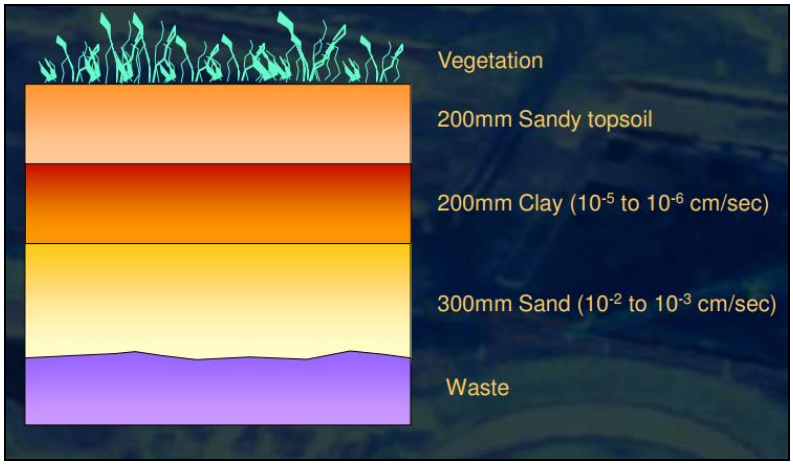

FIGURE 25 CURRENT CAPPING ON SITE (SOURCE: J&W)

There was some reshaping that was undertaken on site and then the capping was carried out.

3.3 Surface Water

There is a large artificial pond in the north-western corner of the site which was previously constructed to manage stormwater runoff from the site (Belcher, 2012). Numerous drains have been constructed on the elevated portion of the site to channel stormwater into this pond and there is a small drainage channel along the outer edge of the northern and eastern portions of the property (Belcher, 2012). Refer to FIGURE 26. There are, therefore, no natural systems on the site and this has been confirmed by DWS as well.

FIGURE 26 SURFACE WATER ON SITE (SOURCE: BELCHER, 2012)

The stormwater pond is overgrown with bulrush (*Typha capensis)* and it has little significance in terms of biodiversity but is important to the functioning of the site as a stormwater management measure and provides habitat for a number of birds (Belcher, 2012). The drainage lines hold no particular importance (Belcher, 2012). Belcher (2012) recommends that a buffer of 15 m be maintained between the delineated edge of the retention pond and any development. This recommendation is incorporated into the proposed development plan for the industrial park (refer to Figure 3).

3.4 Flora and Fauna

This site contains consists of natural veld with a heavy infestation of alien species and is dominated by alien species (see Appendix D for a map which illustrates the areas of the site which contain sensitive indigenous vegetation) (Turner, 2012).

The proposed site would previously have comprised Cape Flats Sand Fynbos, which is Critically Endangered and is therefore a conservation priority (Turner, 2012). The site is now highly infested with alien invasive species, predominantly *Acacia saligna* (Port Jackson) and *Pennisetum clandestinum* (Kikuyu grass) however, a severely degraded Cape Flats Sand Fynbos vegetation community does still exist in the extreme north-eastern corner of the site (Turner, 2012) (refer to FIGURE 27). This portion of the site corresponds with the area that was identified as generally asbestos-free in the geotechnical assessment (Turner, 2012).

Five indigenous plant taxa were identified in this area of which one (*Lampranthus explanatus*) is IUCN Endangered (Turner, 2012). While Turner (2012) indicates that restoration of this vegetation patch would be most desirable from a botanical perspective, it is concluded that relocation of the sensitive species to the nearby would be acceptable (Turner, 2012).

FIGURE 27 GOOGLE IMAGE WITH EXISTING WATER CATCHMENT AREA (RED), CONTAINMENT POOL (BLUE) AND REMNANT CFSF VEGETATION COMMUNITY (GREEN), WHICH IS ABOUT 1,800M² IN EXTENT (SOURCE: TURNER, 2012)

Should the proposed decommissioning and development be approved, *Lampranthus explanatus* plants would be relocated to the nearby Bracken Nature Reserve and should also be provided to other specialists to create an ex-situ population, to provide the best option in terms of the likelihood of long-term survival of these species and the population strain found on the site.

Retention of the vegetation on the site is not possible, given the need to secure the site from existing mole activity bringing asbestos to the surface. The only area in which capping need not be applied is the stormwater pond (void of mole activity). Vertical mole barriers will prevent lateral movement of moles and related exposure of asbestos around the stormwater pond. The capping technique proposed is not compatible with the retaining of this portion of vegetation.

Turner (2012) also indicates that 'taaibos' occurs on the south-western site boundary and an indigenous grass was identified in the north-western and western portions of the site, noting that it is likely that this species was introduced for soil stabilisation purposes.

With respect to fauna found on the site, indigenous Southern Double-collared Sunbirds (*Cinnyris chalybeus*) and Cape Weavers (*Ploceus capensis*) have been identified on site, especially in the north-western portion of the site in the vicinity of the stormwater pond (Turner, 2012). Cape Weavers were observed making use of *A. saligna* plants for nest-building, surrounding this pool (Turner, 2012). Turner (2012) notes that such corridors or "islands" of vegetation can provide important ecosystem services for especially birds, especially given the pace of habitat destruction in the SW Cape lowlands, as well as climate change which impacts bird migrations, e.g. Southern Double-collared Sunbirds have been recorded up to 34 km distant from ringing sites (Hockey et al, 2005). The Cape dune mole-rat is another indigenous species which is active on the site (Turner, 2012). Alien fauna, such as Guinea Fowl, also make use of the site (Turner, 2012).

3.5 Heritage/ Cultural/ Historic Features

The specialist found no heritage resources on the site (Baumann, 2012). Therefore, there are no signs of culturally or historically significant elements on the site in terms of Section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999) (NHRA) and no triggers in terms of Section 38 of the NHRA (Bauman, 2012, HWC, 2012). There are also no structures older than 60 years which would be affected.

3.6 Asbestos on Site: Ground and Air

Given the disturbance of the site by moles (the moles bring the asbestos to the surface through burrowing and then the asbestos flattens around the mole hill over time) and birds (birds dust bathe and in some cases this occurs in the asbestos around the mole hills, which spreads it further), asbestos in the form of conglomerate debris as well as fibre and asbestos chip (debris for asbestos items e.g. Roof sheets, gutters and rainwater pipes etc.) has made its way to the surface of the site in certain areas (OHMS, 2021). The sandy areas, in particular, therefore reveal large quantities of asbestos debris and the areas where most asbestos debris were observed is the high lying area to the south of the site (OHMS, 2021). There was also asbestos debris observed in the central area of the property, these areas are not compacted soil but generally loose soil (OHMS, 2021). Other areas of the property are compacted with a type of hardcore backfill and clay deposits are visible (OHMS, 2021).

The asbestos is currently in a stable state but will release regulated asbestos fibres if disturbed or if extensive weathering takes place (OHMS, 2021). The grass, weeds and shrub growth which covers most of the property currently assists with natural encapsulation of asbestos fibres for this moment in time (thereby reducing risk of airborne asbestos) (OHMS, 2021).

Air samples for asbestos have been taken on the property which tested negative under normal prevailing weather conditions (all air samples taken have tested negative), and so no wetting process is required at this moment time (OHMS, 2021). It has, however, been recommendation that continuous weekly air monitoring for asbestos on the site be carried out to scientifically prove that there is no release of asbestos into the environment, and if asbestos in air is detected, mitigating controls will be recommended.

4 DESCRIPTION OF SURROUNDING ENVIRONMENT

TABLE 2 summarises the land uses and/or prominent features surrounding the site, within approximately 500 m thereof as well as how they have been considered in the proposal.

TABLE 2 SURROUNDING LAND USES

Medium density residential	The site is secured around the entire perimeter and located within an industrial area and would, therefore, not encroach into the medium density residential area. The intention is also to secure the asbestos on site in order to eliminate risk of the asbestos becoming airborne, which would be beneficial to the surrounding residential

	communities.
High density residential	The site is secured around the entire perimeter and located within an industrial area and would, therefore, not encroach into the high-density residential area. The intention is also to secure the asbestos on site in order to eliminate risk of the asbestos becoming airborne, which would be beneficial to the surrounding residential communities.
Retail, commercial and warehousing	The site is secured around the entire perimeter and located within an industrial area and would, therefore, not encroach into the retail, commercial and warehousing area. The intention is also to secure the asbestos on site in order to eliminate risk of the asbestos becoming airborne, which would be beneficial to the employees who work in the surrounding area.
Light industrial	The proposal is congruent with light industrial use and would, therefore, not affect the surrounding light industrial area, but rather add to it. The intention is also to secure the asbestos on site in order to eliminate risk of the asbestos becoming airborne, which would be beneficial to the employees who work in the surrounding area.
Government building- Note that this refers to the traffic department	The proposal would not affect the traffic department.
Railway Line	Given the existing industrial development between the site and the railway line, it is unlikely that any impacts on the railway line would occur as a result of the proposed development.
Landfill - As described above, the site itself was previously used as a dumpsite for asbestos containing wastes, so this is not so much a surrounding land use, as it is a previous land use for the site	The proposal would serve to contain the asbestos on site and eliminate risk of the spread thereof.
Nature Conservation Area- the Bracken Nature Reserve is located approximately 800m southeast of the site.	The proposal would serve to contain the asbestos on site and eliminate risk of the spread thereof.
Protected Area- Bracken Nature Reserve, as above	The proposal would serve to contain the asbestos on site and eliminate risk of the spread thereof.

5 SUMMARY OF IMPACTS

The impacts assessed are summarised in TABLE 3 and TABLE 4, noting that these indicate the significance of each impact with the implementation of the mitigation measures contained in this EMPr.

TABLE 3 COMPARATIVE SUMMARY OF ANTICIPATED IMPACTS, WITH MITIGATION, FOR THE DECOMMISSIONING/CONSTRUCTION PHASE

Impact	Significance After Mitigation		
	Alternative 1	**Alternative 2 (Preferred)**	**Alternative 3 (No-go)**
Design / Decommissioning / Construction Phase (duration: short-term)			
Biological: Loss of botanical resources	Medium (-)	Medium (-)	Low (+)
Geographical and Physical: Stormwater quality impairment	Low (-) to negligible	Low (-) to negligible	No impact
Biological: Modification of wetland habitat	Very Low (-) to negligible	Very Low (-) to negligible	No impact
Socio-economic: Provision of jobs	Low (+)	Low (+)	No impact
Nuisance Impacts: Dust and Noise associated with decommissioning/ construction works	Low (-)	Low (-)	No impact
Nuisance and Physical: Visual associated with decommissioning/ construction works	Low (-)	Low (-)	No impact
Social: Impacts on health from asbestos handling during decommissioning	Low (-)	Low (-)	No impact
Social and Physical: Risks associated with transport of asbestos during decommissioning	Low (-)	Low (-)	Low (-)
Physical and Resource Use: Depletion of hazardous landfill space as a result of generation of solid and liquid hazardous waste	Low (-)	Low (-)	Very Low (-)
Natural Resource Use: Depletion of Natural Resources through use as material in the development/construction phase	Low (-)	Low (-)	No Impact
Contamination of soil and groundwater	Insignificant	Insignificant	Insignificant

TABLE 4 COMPARATIVE SUMMARY OF ANTICIPATED IMPACTS, WITH MITIGATION, FOR THE OPERATIONAL PHASE

Impact	Significance After Mitigation		
	Alternative 1	**Alternative 2 (Preferred)**	**Alternative 3 (No-go)**
Operational Phase (duration: long-term)			
Geographical and Physical: Flow modification	Neutral	Neutral	No impact
Physical: Water quality impairment	Low (-) to negligible	Low (-) to negligible	No impact
Socio-economic: Provision of job opportunities	No impact	Medium (+)	No impact
Aesthetics: Visual and sense of place	No impact	Neutral	No impact
Nuisance Impacts: Noise	No impact	Very Low (-)	No impact
Social and Physical: Traffic	No impact	Low (-)	No impact
Social: Negative effects of possible airborne asbestos fibres exposed by mole activity on human health should capping not occur.	No impact	No impact	High (-)

Note that the significance of the impacts with mitigation are assessed under the key assumption that the mitigation measures contained in this EMPr are all implemented. It is clear that impacts are generally higher before mitigation, and this emphasises the importance of adhering to the requirements in this document as it is a mechanism to ensure that impacts would be kept to low negative and positive levels of significance. It this EMPr is not implemented, then impacts would be higher, and this would not be acceptable.

6 STATUTORY APPROVALS

The required approvals in terms of applicable legislation are tabled below. It must be ensured that all required approvals are in place prior to the commencement of decommissioning and construction.

LEGISLATION	ADMINISTERING AUTHORITY	AUTHORISATION TYPE
National Environmental Management Act, 2008 (Act No. 107 of 1998) (NEMA)	DFFE	Environmental Authorisation
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMA)	DFFE	Waste Management License
City of Cape Town Municipal Planning By-Law, 2015	City of Cape Town	Land use application to the City of Cape Town (CoCT) for subdivision and rezoning for the proposed re-development of the site.

7 BACKGROUND TO THE EMP

In accordance with section 24N of the requirements of the National Environmental Management Act (Act 107 of 1998), as amended, (NEMA) the decommissioning and construction activities must be carried out in accordance with an **Environmental Management Programme (EMPr)**. This document contains the EMPr for the proposed decommissioning and redevelopment of the Everite waste consolidation site.

8 OBJECTIVES OF THE EMPr

The aim of an EMPr is to facilitate appropriate environmental management practices during the decommissioning, construction and operational phases of a project. To achieve this, the EMPr must specify the limitations the contractor must abide by, detail the issues that should be taken cognisance of and indicate specific actions that must and must not be undertaken so as to ensure that the environment is not unnecessarily damaged. The EMPr thus specifies the framework within which the Contractor must carry out their operations.

In addition, the EMPr provides a clear indication of the environmental management requirements of each of the role players involved during the decommissioning and construction phase of the development. Guidance for the implementation of the EMPr is provided with respect to the required Method Statements which should be implemented to achieve compliance with the Environmental Specifications. Corrective actions and penalties in the event of non-compliance with the EMPr are also defined.

Furthermore, the EMPr provides operational specifications that the Developer must meet.

9 COMPONENTS OF THE EMP

The EMPr consists of the following components:

Section 1: Introduction	Provides background information regarding the site, the proposed decommissioning and development and the EMPr.
Section 2: Implementation of the EMPr	Provides details of the communication and organisational structures within which the EMPr will be implemented, responsibilities of key role players, and provides the terms of reference for the ECO.
Section 3: Environmental Management Specifications for Design, Planning, Decommissioning and Construction Phase	Provides all design, planning, decommissioning, and construction phase environmental management requirements applicable to the Developer, principal decommissioning/construction contractors, and their subcontractors. The proposal also entails closure specifications for the decommissioning and construction phase.
Section 4: Environmental Management Specifications for Operational Phase	Provides all operational phase environmental management requirements applicable to the proposed redevelopment.

10 IMPLEMENTATION OF THE EMPR- DESIGN, PLANNING, DECOMISSIONING AND CONSTRUCTION

10.1 INTRODUCTION

This document describes mitigation measures in detail, identifying specific people or organisations to undertake specific tasks, in order to ensure that impacts on the environment are minimised during the various phases of this project. The EMPr is applicable to all works comprising the proposed decommissioning and redevelopment of the site. This includes works outside of the site boundaries that form part of the project works. It is a living document implying that information gained during decommissioning and construction activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed ECO (Environmental Control Officer) will monitor compliance with the EMPr and other Conditions of Approval contained in the Waste Management Licence and Environmental Authorisation issued by DFFE, as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this EMPr and are thus to be included into the official contract documentation. The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr during the decommissioning and construction phase. The ECO in turn will immediately inform the Engineer and Developer and, if necessary the Local Authority, of such events.

10.2 ROLES AND RESPONSIBILITIES

The key role-players during the decommissioning and construction phase of the development, for the purposes of environmental management on site include, but are not limited to: the Developer, the Engineer, the principle Contractors (direct appointments including Civil Works contractor, Building Contractor, Landscape Contractor etc.) the Environmental Control Officer and representatives of the relevant Authority/ies.

Details of the responsibilities of each of the key role-players have been provided in **clause 2.2.1** to **clause 2.2.4.** Lines of communication and reporting between the various parties are illustrated in FIGURE 28 below.

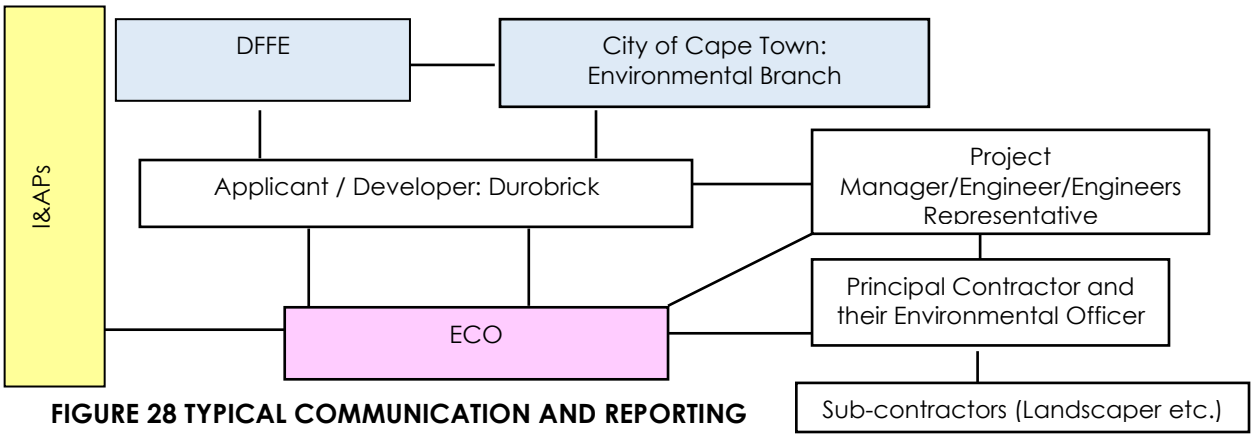

FIGURE 28 TYPICAL COMMUNICATION AND REPORTING

10.3 The Developer

The Developer refers to the Applicant, Durobrick, and its appointed facilitators by whom permission to proceed with the proposed decommissioning and redevelopment is being requested, and who would thus ultimately be responsible for compliance with all conditions of approval or any aspect thereof by any authority.

With respect to the decommissioning and construction phase of the development, the Developer is to:

- Ensure that the EMPr is included in all Contract documentation, particularly with regard to the appointment of the Contractor. The EMPr is also to be provided to the Contractor when requested to quote for the works in order to ensure financial provision has been made for the specifications contained herein.
- Ensure that the proposed capping and re-development is undertaken as per the intention and design philosophy as described in this report.
- Ensure that the decommissioning and development footprint is contained within site limits.
- Ensure that the EMPr is included in all Contract documentation, particularly with regard to the appointment of the Contractor. The EMPr is also to be provided to the Contractor when requested to quote for the works in order to ensure financial provision has been made for the specifications contained herein.
- Ensure that the proposed decommissioning and development is carried out as per the intention and design philosophy as described in this report.
- Ensure that the development footprint is contained within site limits.
- Ensure that all relevant approvals and permits have been obtained prior to the start of decommissioning and construction activities on site;
- Ensure that the EMPr has been approved by the DFFE prior to the start of decommissioning and construction activities on site;
- Ensure that DFFE have been notified of the date on which decommissioning and construction activities will be starting, one week prior to commencement of the activity;
- Ensure that decommissioning and construction activities start prior to the expiration date of the Waste Management Licence and Environmental Authorisation issued by the DFFE and failing which the approval of the decommissioning and development by the department would lapse; and
- Appoint a suitably qualified and experienced independent Environmental Control Officer prior to the start of decommissioning and construction activities on site, for the duration of the decommissioning and construction phase.
- Engage with the surrounding workers or adjacent landowners on an ad-hoc basis throughout the decommissioning and construction phase on important matters arising that may have an impact on them, as required.
- Liaise with those residing in the surrounding areas as and when valid complaints, issues or concerns are raised in relation to the decommissioning and construction works.

With respect to the operational phase of the development, the Developer is to:

- Ensure all mitigation measures as prescribed by specialists and enforced by the Environmental Authorisation are in place prior to site handover.

10.4 The Project Manager/ Engineer

For the purposes of this document, "The Engineer/ the Project Manager" refers to the engineer for the decommissioning and redevelopment, or any other person authorised by the Developer, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Engineer/ Project Manager are to:

- Ensure that the requirements as set out in this EMPr and by the relevant Authorities are adhered to and implemented;
- Ensure that the proposed capping and re-development is undertaken as per the intention and design philosophy as described in this report.
- Ensure that the development footprint is contained within site limits.
- Assist the ECO in ensuring that the conditions of the EMPr are being adhered to and promptly issue instructions requested by the ECO, to the Contractor. All site instructions relating to environmental matters issued by the Engineer/ Project Manager are to be copied to the ECO;
- Assist the ECO in making decisions and finding solutions to environmental problems that may arise during the decommissioning and construction phase;
- Review and approve decommissioning and construction Method Statements with input from the ECO;
- Order the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise);
- Issue penalties for transgressions of Environmental Specifications; and
- Provide input into the ECO's on-going internal review of the EMPr.

10.5 The Contractor

For the purposes of this document "The Contractor" refers to any directly appointed company or individual (by the Developer) undertaking the implementation of the works. The Contractor will be responsible for the day-to-day implementation of the EMPr. During decommissioning and construction regular compliance audits will need to be undertaken, which must be undertaken by appropriately qualified environmental practitioners.

The Contractor is to:

- Compile the required Method Statements for submission to the Engineer and the ECO for approval;
- Ensure implementation of all applicable Environmental Specifications, including all additional requirements related with approved Method Statements, during all works on site, failing which penalties, as outlined in the EMPr may be imposed by the ECO via the Engineer/ Project Manager;
- Execute the proposed capping and re-development as per the intention and design philosophy as described in this report.
- Ensure that the capping and redevelopment footprint and related construction works footprint is contained within site limits.
- Ensure that all its sub-contractors, employees, suppliers, or agents etc. are fully aware of the environmental requirements detailed in the Environmental Specifications of this

EMPr (the main contractor will be held liable for any penalties incurred by sub-contractors).

- Liaise closely with the Engineer/ Project Manager and the ECO and ensure that the works on site are conducted in an environmentally sensitive manner;
- Nominate a member of personnel as the Contractors' Environmental Officer (EO) who will be responsible for enforcing the EMPr specifications on a daily basis. This individual shall liaise closely with the ECO and inform the Engineer, as well as the ECO, should environmental issues on site arise, e.g. dumping, pollution, littering and damage to vegetation;
- The Contractors' Environmental Officer is to complete a weekly site inspection checklist in accordance with the requirements of the EMPr, to be supported by photographic evidence, and provide this to the ECO each week;
- Make provision for inspections of the site by any Authority and/or any party authorised by the Project Manager or the ECO; and
- Carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the EMP.

Upon failure by the contractor or contractor's employee to show adequate consideration to the environmental aspects of this contract, monetary penalties for breach of the EMPr (and thus the contract) may be imposed by the ECO via the Project Manager or to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

Note that it is recommended that of 30 days should be set-aside in the decommissioning program for the recovery of archaeological material where/if discovered.

10.6 Environmental Control Officer (ECO)

A suitably qualified ECO shall be employed by the Developer throughout the duration of the decommissioning and construction phase.

During the decommissioning and construction phase of the project, the ECO is to:

- Ensure that the Contractor has a copy of the EMPr and all agreed Method Statements;
- Ensure that the Stormwater Management Plan has been approved by the City of Cape Town and is being duly implemented.
- Check that the proposed capping and re-development is being executed as per the intention and design philosophy as described in this report.
- Check that the capping and development footprint is contained within site limits.
- Assist the Project Manager in identifying the need for or applying for special or required permits.
- Review weekly environmental checklists submitted by the Contractor's Environmental Officer.
- Undertake fortnightly site inspections (frequency may change as required) to audit compliance of all parties with the requirements of the EMPr;
- Conduct more frequent site inspections, as required, particularly if the Contractor's Environmental Officer's checklists are incomplete, not submitted timeously or show evidence of significant non-compliance with the conditions of the EMPr.

- Be present on site during the demarcation of the no-go areas. This may require additional site visits beyond the site inspections detailed above if such activities are not aligned with the site inspection.
- Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required site instructions to the Contractor;
- Environmentally educate and raise the awareness of the Contractor and their staff as to sensitive areas of the site and facilitate the appropriate attitude during works on Site;
- Review and approve decommissioning/construction/landscaping Method Statements together with the Engineer/Landscape Architect;
- Assist the Contractor in finding environmentally responsible solutions to problems;
- Recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;
- Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;
- Act as the contact person between the Developer, the CoCT: Environmental Unit, DFFE, D:EA&DP and the public with regard to environmental matters;
- Report to the CoCT: Environmental Unit, D:EA&DP and DEDFFEA, where required, regarding the implementation of the EMPr, compliance with the Conditions of Approval contained in the Environmental Authorisation and implementation of the relevant mitigation measures contained in the EMPr;
- Keep a register of complaints and record and manage any community comments or issues, having reported these first to the Engineer;
- Undertake photographic monitoring of the decommissioning and construction site;
- Keep records of all activities/ incidents on site concerning the environment in a site diary;
- Complete temporary and permanent site closure checklists;
- Take immediate action on site to stop works where significant and irreparable damage is being inflicted on the environment, and inform the Engineer/ Project Manager immediately of the occurrence and action taken; and
- Undertake a continual internal review of the EMPr and make recommendations to the Engineer and Developer.

The ECO has the authority to recommend to the DFFE and/or D:EA&DP that works be stopped, if in his/her opinion serious harm to, or impact on, the environment is imminent, is likely to occur or has occurred. Furthermore, the ECO may also recommend that works be stopped if such actual or potential harm or impact is in contravention of this EMPr and which is, or may be, caused by decommissioning and construction, or related works.

Upon failure by the Contractor or Contractor's employees to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

The ECO shall keep a site diary in which events and concerns of environmental significance are to be recorded. The ECO will compile a monthly audit report containing such events, concerns and general compliance of the Contractor with the EMPr. This report will be submitted to the Engineer and if it is deemed necessary, to CoCT: Environmental Unit, D:EA&DP and DFFE. The ECO is also required to attend regular site

meetings of the project management team to report on environmental issues and minute requirements.

The ECO will be responsible for the compilation of temporary and Final Closure Checklists for the project, to be completed prior to temporary site closures (e.g. December / January builders holidays) and when all works related to the project have been completed and the site has been cleared of all decommissioning and construction related debris, materials or equipment not forming part of the permanent works. This final Checklist will audit the Contractor's compliance with the EMPr throughout the duration of the decommissioning and construction phase and this Checklist, together with a Final Closure Audit Report will be submitted to the CCT: Environmental Unit and DFFE in order to achieve "environmental closure" of the site.

10.7 Management Agent of the Development

The Management Agent (MA) will be the landowner of the site, Durobrick (Pty) Ltd, who will be responsible for ensuring the objectives listed in the operational section of the EMPr are implemented.

11 MONITORING AND REPORTING

11.1 ECO Diary Entries

The ECO will maintain a site diary that relates to environmental issues as they occur on site for record keeping purposes. Comments from this diary will form part of reports presented at site meetings by the ECO.

11.2 Site Instructions

Site Instructions, stipulating recommended actions required to improve compliance with the EMPr by the Contractor will be issued by the ECO to the Project Manager, who in turn will ensure that the Contractor is informed of the said instruction.

The audits by the ECO as well as the ECO's review of the Contractor's Environmental Officer's checklists would inform the logging of site instructions.

Comments made by the ECO in the Site Instruction Book are advisory and all site instructions required may only be issued by the Project Manager. Site Instructions will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

11.3 Contractor's Environmental Officer Checklist

The Contractors' Environmental Officer is to complete a weekly site inspection checklist in accordance with the requirements of the EMPr, to be supported by photographic evidence, and provide this to the ECO each week.

The ECO is to review the checklist and revert to the Contractors' Environmental Officer if there are any issues identified.

11.4 External Audits by the ECO

The ECO will undertake fortnightly site inspections for the duration of the decommissioning and construction phase. The ECO must also be present on site during the demarcation of the no-go areas, these may form part of the initial audits/ environmental education, or separate visits, depending on the timing of the works.

The ECO may need to conduct more frequent site inspections, as required, particularly if the Contractor's Environmental Officer's checklists are incomplete, not submitted timeously or show evidence of significant non-compliance with the conditions of the EMPr.

11.5 Monthly Monitoring Reports

The ECO will compile a monitoring checklist to facilitate checking against the requirements of the EMPr, which will be used to record the site visits. Monthly monitoring reports will be compiled in which events, concerns, and general compliance of the Contractor with the EMPr will be recorded. This report will be submitted to the Project Manager and to the authorities (i.e. D: EA&DP and City of Cape Town Municipality).

During the decommissioning/ construction phase, the ECO must report to the City of Cape Town Municipality's Environmental Resource Management Department and D:EA&DP, DFFE, where required, regarding the implementation of the EMPr, compliance with the Conditions of Approval which would be contained in the Environmental Authorisation and Waste Management License and implementation of the relevant mitigation measures contained in the EMPr.

Should the EMPr require further updates (with the exception of the items listed in the "NOTE" on the first page), the manner and frequency for updating the EMPr must be done as follows:

An application for amendment to the EMPr must be submitted to the competent authority if any further amendments are to be made to the EMPr, other than potential amendments mentioned in the environmental authorisation, possible recommendations from DWS and/or the town planning approvals. Further changes may only be implemented once the amended EMPr has been authorised by the competent authority.

11.6 Temporary Site Closure Report

If the site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO.

The Contractor's Safety Officer(s) (in terms of the Occupational Health and Safety Act) are to check the site and report to the Project Manager regarding the following:

Fuels / flammables / hazardous materials stores:

- Ensure fuel stores as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;

- Fire extinguisher serviced and accessible;
- Secure area from accidental damage e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed; and
- Adequate ventilation.

Other:

- All trenches and manholes secured;
- Fencing and barriers in place per the Occupational Health and Safety Act (No. 85 of 1993);
- Notice boards applicable and secured;
- Security persons briefed and have facility for contact;
- Traffic management is applied in terms of safety for road users and pedestrians;
- Night hazards checked e.g. reflectors, lighting, traffic signage;
- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.;
- Pipe stockpile wedged / secured;
- Any scaffolds are secure; and
- Inspection schedule and log by security or contracts staff.

The ECO is to check and report to the Project Manager:

- Wind and dust mitigation in place e.g. straw, brush packs, irrigation;
- Slopes and stockpiles at stable angle;
- Any landscaped areas' watering schedules & supply secured;
- Fuels/hazardous substances stores secure;
- Cement and materials stores secured;
- Toilets empty and secured;
- Refuse bins empty and secured (lids);
- Any oil or hydrocarbon spills are treated e.g. Spill Sorb or Enretech #1 powder;
- Drip trays empty & secure (where possible); and
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the site.

11.7 Decommissioning Site Closure Report

The ECO will compile a Decommissioning Final Closure Checklist for site closure auditing purposes. Once the decommissioning/capping of the site is complete and the site has been cleared of all related debris, materials, and equipment the ECO will undertake an audit and report on the condition of the site and the adequacy of site decommissioning and clean-up. The decommissioning component of the development and site will be regarded as being "closed" on agreement between the ECO and the Project Manager that the Contractor has met all requirements to "make good".

11.8 Construction Site Closure Report

The ECO will compile a Construction Final Closure Checklist for site closure auditing purposes. Once the site has been cleared of all construction related debris, materials, and equipment the ECO will undertake an audit and report on the condition of the site and the adequacy of site clean-up / restoration/rehabilitation measures. The construction site will be regarded as being "closed" on agreement between the ECO and the Project Manager that the Contractor has met all requirements to "make good"

12 COMMUNICATION STRUCTURES ON SITE

12.1 Site Meetings during Decommissioning and Construction Phase

The ECO is required to attend regular site meetings of the project management team to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole, and minute requirements.

The ECO will present a summary report outlining the main decommissioning and construction activities that relate to the environment, at this meeting.

The minutes of these meetings will form part of the EMPr records. These minutes will reflect environmental queries, agreed actions and dates of eventual compliance by the Contractor.

The following people should attend these meetings:

- Developer's Representative;
- Project Manager;
- Landscape Architect (when applicable);
- the ECO (on a monthly basis); and
- Contractor(s) representative.

12.2 Environmental Education Programme and Health and Safety Induction

The Contractor in consultation with the ECO shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the EMPr within seven days from the commencement date of decommissioning and construction. This presentation should take cognisance of the level of education, designation, and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental "do's and don'ts" and how they relate to the site. Management on site e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the decommissioning and construction phase of the EMPr document itself, will benefit from a separate presentation dealing with these issues. The ECO may call upon the services of a specialist environmental education translator should this be required.

Environmental awareness training courses shall be run for all personnel on site. Courses shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an

attendance register on completion that clearly indicates participants' names, a copy of which shall be filed in the (site) environmental file.

The Contractor's general site staff shall attend an initial presentation of approximately 45 minutes, and approximately half an hour a month thereafter for the duration of the contract shall be allowed for employees to attend any follow-up lectures, should this be deemed necessary by the ECO. In addition, all new staff and sub-contractor's employees that spend more than 1 day a week or four days in a month are to attend the environmental education program within 1 (one) week of commencement of work on site. The Contractor shall on request of the ECO provide documented proof (signed attendance registers) that all employees have received such training. The ECO will conduct competency testing on site to gauge the personnel's understanding of the EMPr specifications.

The cost, venue and logistics for this/ these course/s shall be for the Contractor's responsibility.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel involved with the works.

The initial environmental awareness training course shall be presented by the ECO. Subsequent courses to be held as and when required should be presented by the Contractor's Environmental Officer or the Health and Safety Officer.

The following points should be highlighted:

- The strict access control and health and safety requirements for working with asbestos, specifically for the decommissioning of the site;
- The need to observe the buffer and remain out of no-go areas;
- The importance of managing run-off and erosions, particularly toward the stormwater pond; and
- How to deal with finding an animal (e.g. snake) on the site.

In addition to the environmental education programme, a health and safety induction must be provided by a suitably experienced accredited asbestos inspection authority at the commencement of decommissioning works. All staff who will be working on the site are to attend this induction and must be informed about the potential asbestos exposure risk and the health and safety precautions that need to be taken. Refer to **Clause 3.6.15** for further details.

13 METHOD STATEMENTS

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the EMP, when called upon to do so by the Engineer or ECO.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMP.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable); and
- **When** - the sequencing of actions with due commencement dates and completion date estimates.
- **Who** – the person responsible for undertaking the works described in the Method Statement;
- **Why** – a description of why the activity is required.

All Method Statements are to be undertaken to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the CCT: Environmental Unit.

A list of some of the Method Statements that the Contractor may need to submit during the course of the decommissioning and construction contract has been provided in **Section 3** of this EMP, along with an indication of those which the ECO may require the Contractor to provide prior to the start of works on site (see Appendix A for a Method Statement Template).

14 LEGISLATIVE FRAMEWORK

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the National Environmental Management Act (No. 107 of 1998), as amended.)

The requirements of this EMPr do not release the Developer from the requirements of any legislation that may be applicable to the project. A list of Legislation applicable to the project (although not limited to those listed) has been provided below for guidance:

- National Environmental Management Act (No. 107 of 1998), as amended;
- National Environmental Management: Waste Act (No. 59 of 2008);
- National Heritage Resources Act (No. 25 of 1999);
- National Water Act (No. 36 of 1998);
- Occupational Health and Safety Act (No. 85 of 1993);

- Asbestos Regulations 2001
- Hazardous Substances Amended Act (No. 53 of 1992);
- National Environmental Management: Air Quality Act (39 of 2004);
- City of Cape Town Air Pollution Control Bylaw;
- City of Cape Town Integrated Waste Management Bylaw(2009);
- City of Cape Town Water Bylaw (2006);
- National Building Regulations SANS 10400:1990; and
- The Identification and Classification of Dangerous Goods SANS 10228:2012.

Depending on the nature of the industrial operations from the prospective occupiers of redevelopment, further authorisations / approvals / permits may be required in terms of environmental legislation. The onus is on the person planning to undertake these activities to obtain the necessary approval prior to commencement of decommissioning and construction/operation of the facilities where such activities will be undertaken. These may include, but are not limited to:

- Environmental Authorisation in terms of the National Environmental Management Act (No.107 of 1998), as amended
- Waste Licence in terms of the National Environmental Management: Waste Act (No. 59 of 2008)
- Air Emissions Licence in terms of the National Environmental Management: Air Quality Act (No. 39 of 2004)

15 DISPUTE RESOLUTION

Any disputes or disagreements between role players on site (regarding environmental management) will firstly be referred to the Project Manager. If no resolution on the matter is possible then the matter will be referred to the City of Cape Town Municipality Environmental Resource Management for clarification.

Where a dispute still persists this shall be referred for arbitration to a panel of persons, consisting of one specialist environmental consultant, one qualified engineer, one official of the D:EA&DP and one legal practitioner of no less than 4 years' experience in environmental issues whose decision by simple majority will be final and binding on the parties. Representatives of the Developer, the Project Manager, Contractor and ECO should appoint the panel by mutual agreement. This arbitration will be informal ("the informal arbitration") and will be finalised within a period of 48 hours from the date of the ruling of the ECO, the purpose being to ensure that disagreements are rapidly resolved and thereby to limit any prejudice to the Contractor or the other parties to this agreement in the decommissioning and construction process. In the event of a deadlock in the aforesaid panel, the legal practitioner forming part of the panel will have a casting vote.

16 COMMUNITY RELATIONS

All third party or public queries and/or complaints relating to the works will be handled by the Developer and ECO, who will in turn engage the Project Manager to agree on the way forward. In addition, the Developer shall be responsible for dissemination of information to the community and the media (press releases, notice boards, etc.).

The Contractor shall keep a "Complaints Register" on site to record any complaints received and action taken. The Register shall contain all contact details of the person who made the complaint and information regarding the complaint itself. Copies of all entries into the complaints register should be kept in the environmental site file. The Contractor shall notify the Developer (or Project Manager) and ECO immediately of complaints lodged.

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified by the ECO. Such boards shall include contact details for the ECO for complaints by members of the public, in accordance with details provided by the Engineer.

17 SOCIAL RESPONSIBILITIES

The Developer and Contractor(s) shall encourage and implement wherever possible the procurement of locally based labour, skills, and materials. Historically disadvantaged individuals should also be employed as far as possible.

18 DESIGN, DECOMMISSIONING AND CONSTRUCTION PHASE

18.1 SCOPE

The Environmental Specifications contained in this EMPr covers the requirements for controlling the impact on the environment of the proposed decommissioning and construction activities.

This section of the document describes mitigation measures, identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the environment are minimised during the decommissioning and construction phase of this project. This section of the EMPr is applicable to all works comprising the decommissioning and re-development of the light industrial park and associated infrastructure and landscaping. It is an open-ended document implying that information gained during decommissioning and/or construction activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed ECO will monitor compliance with section 10 of the EMPr and other Conditions of Approval contained in the Environmental Authorisation and Waste Management License issued by DFFE, as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this EMPr and are thus to be included into the official contract documentation with contractors. The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr. The ECO in turn will immediately inform the Engineer/ Project Manager and Applicant and, if necessary, the environmental branch of the Local Authority, of such events.

18.2 TASKS TO BE UNDERTAKEN PRIOR TO DECOMMISSIONING AND CONSTRUCTION

A plant search and rescue must be undertaken plants of species *L. explanatus* must be relocated to the Bracken Nature Reserve. A Method Statement must be drawn up in consultation with a botanical specialist in this regard.

18.3 METHOD STATEMENTS REQUIRED

The following initial Method Statements shall be provided by the Contractor and submitted to the ECO at least 7 working days before site establishment, with the exception of **Handling of Asbestos** which is to be compiled by a suitably experienced accredited asbestos inspection authority:

- **Site Camp and Site Division**

The location, layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be detailed and presented in a drawing. Cognisance must be taken of the environmental management requirements set out in this EMPr in developing this plan.

- **Vegetation/ Site Clearing**

Method and schedule for vegetation clearing during site establishment and decommissioning and works, disposal procedure for cleared material, as well as topsoil management. Note specific requirements regarding alien vegetation eradication and relocation of *Lampranthus explanatus* plants to Bracken Nature Reserve.

- **Access/Haul Routes**

Details, including a drawing, showing where and how the access points and routes will be located and managed during the decommissioning/construction phase, including traffic safety measures that will be utilised.

- **Fuel Storage and Use**

The design, location and construction of the fuel storage and service areas as well as for the filling and dispensing from storage tanks and management of drip trays.

- **Handling of Asbestos**

Safe work procedures that will be followed during the decommissioning phase to prevent exposure to any buried asbestos wastes that are uncovered. This pertains also to all excavation works on site. Cognisance must be taken of the requirements of the Asbestos Regulations 2001 in this regard. This Method Statement must be submitted to the Department of Labour for approval, prior to commencement of the works.

- **Solid Waste Management**

Expected solid waste types, sorting methods, quantities, methods and frequency of collection and disposal, as well as location of disposal sites. Include details of the proposed recycling program.

- **Contaminated Water**

Methods of minimising, controlling, collecting and disposing of contaminated water.

- **Stormwater Management**

Methods of managing and controlling, stormwater runoff during decommissioning and construction.

- **Hazardous Substances**

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

- **Cement and Concrete Batching**

Location, layout and preparation of cement / concrete mixing areas including the methods employed for the mixing of concrete, particularly the containment of runoff water from such areas and the method of transportation of concrete.

- **Dust**

Details on the methods employed for reducing dust on the site.

- **Trenching**

Details on the methods employed for trenching, depths of trenches, supporting structures for trenches, time-line regarding the duration at which they would remain open, phasing for excavation and in-filling, details of slopes areas for fauna to escape (if they fall in), search and rescue plan for fauna that fall in trenches (to include examples of types of fauna and the manner in which they would be dealt with). Noting that trenching for services should be carried out to the proposed project description.

- **Emergency Procedures**

Emergency procedures for fire, accidental leaks and spillages of hazardous substances (including fuel and oil). Include details of risk reduction measures to be implemented including firefighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

- **Noise mitigation methods**

Detail the steps to be implemented to reduce/avoid noise impacts on the surrounding areas.

- **Additional Method Statements required**

Any additional Method Statements that may be required by the Project Manager and ECO during decommissioning and construction are to be provided by the Contractor within a minimum of 10 working days prior to the commencement of works or activities to which they apply.

The ECO may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the ECO, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the specifications or any legislation. The ECO may request this in response to issues raised by the Developer, Engineer/ Project Manager or Contractor, as well as in response to audits or the weekly checklists submitted by the Contractor's Environmental Officer.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel and Sub-contractors. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any obligations or responsibilities in terms of the contract. No claim for delay or additional cost incurred by the Contractor shall be entertained should the inadequacy of a Method Statement be the cause.

18.4 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The environmental management requirements take account of the findings of the Environmental Impact Assessment (EIA), together with the typical measures needed to prevent or at least minimise potential adverse environmental effects associated with decommissioning and construction activities. Method Statements must take account of these requirements. Additional measures may be identified during decommissioning and construction and Method Statements would be required in this regard. Environmental management requirements cover the following:

- Detail Design Measures;
- Documentation, Planning and Programming;
- Site Camp/ Site Establishment;
- Site Access, Access Routes, and Traffic Management;
- Soil, Stormwater, and Ground Water Pollution Management and Erosion Control;
- Hazardous substances (including Asbestos and Cement) Management;
- Waste Management;
- Noise Management;
- Dust Management;
- Labour Relations, Facilities and Site Health and Safety;
- Aesthetics/ Visual;
- Protection of Natural Features and Fauna;
- Protection of any Paleontological and Archaeological Resources;
- Incident management;
- Resource Use (Raw Materials and Resources);
- Site Clean-up and Rehabilitation; and
- Landscaping Implementation.

It should be noted that the decommissioning and construction phase is anticipated to continue for approximately 14 months, however the programme may shift.

Table 5 Environmental Specifications

ISSUE	MANAGEMENT / MITIGATION MEASURES
DETAIL DESIGN MEASURES: Management Statement and objective: To ensure that the final designs are in line with the considerations contemplated in the environmental assessment phase. Impact Management Outcomes: No deviations from the below.	
Stormwater	• Ensure that the final Stormwater Management Plan is approved by the City of Cape Town Municipality. • The water quality impacts during the operational phase should primarily be dealt with through the design of the storm water system and through implementation of a storm water management plan (Belcher, 2012). The storm water management plan should address aspects such as: Introduce suitable indigenous wetland vegetation and habitat diversity within storm water systems (Belcher, 2012). An opportunity is possible to specifically deal with this mitigation measure within the storm water channels between the aquatic features/storm water dams (Belcher, 2012). These connecting systems should preferably not be piped but be created drainage features (Belcher, 2012). • Litter transported in the storm water systems should be prevented from entering the storm water pond (Belcher, 2012). • Storm water run-off should also be reduced as far as possible (see mitigation measures described below) to reduce erosion of soils on the steeper gradient slopes (Belcher, 2012). The intensity of storm water run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. Storm water discharges should be dissipated before entering the storm water pond and should not be direct piped discharges (Belcher, 2012). • Reduce run-off on the site through encouragement of surfaces that allow for infiltration where possible rather than impervious surfaces (Belcher, 2012). • The storm water pond in the north-western corner of the site should be retained and a 15 m buffer retained from the wetland edge. Limited disturbance should be allowed within the buffer zone. The rehabilitation of disturbed areas must take place as soon as possible post construction (Belcher, 2012). • Storm water run-off should not be discharged directly into the wetland area but should be allowed to dissipate through the buffer area (Belcher, 2012).
Landscaping	• The Draft Landscape Master Plan must be submitted to the City of Cape Town: Environmental and Heritage Management Branch for approval prior to implementation. • All alien vegetation should be cleared around this area (i.e. the stormwater pond and 15 m buffer) and

	landscaping is not encouraged (Belcher, 2012). It is believed that this area will naturally recover from the direct (dust, pollution) and indirect (change in passive infiltration of the vicinity) disturbances (Belcher, 2012). • Appropriate CFSF wetland species for re-establishment around the water containment pool include Salix mucronate (Salicaceae, "Cape Willow") to accommodate Cape Weavers; and *Restionaceae* species such as *Elegia nuda* and *Elegia recta* (Turner, 2012). The 15 m buffer-zone can be planted with *Erica mammosa* (present at Kenilworth Racecourse and Northpine) to cater for Southern Double-collared Sunbirds; *Willdenowia incurvata* (Restionaceae) and *Metalasia muricata* (Asteraceae, "Blombos") to accommodate wind and insect pollen vectors (Turner, 2012). • Given a relocation imperative for *L. explanatus*, immediate re-establishment of plants at Bracken nature Reserve should be supervised by an authorised representative of that nature reserve, bearing in mind that rescued plants need to be planted in loose quartzitic sand – the habitat of the species (Turner, 2012). The following aspects are to be noted when finalising the Landscape Plan: • Plants: Only indigenous vegetation is allowed in all landscaped areas and the landscaping of road reserves to increase the amount of green space. Locally indigenous wetland species must be used in the vicinity of the wetland. The Bracken Nature Reserve plant specialist should be consulted for examples of plants to be used in landscaping. Refer also to the Plant Species list contained in Appendix F and guidance on the procedure to be followed for the collection of seeds and cuttings from the nature reserve contained in Appendix F No declared invasive alien species may be used. Only locally occurring indigenous vegetation that blend in with the surrounding environment is allowed to be utilised. The use of alien invasive species is prohibited. Plants must be of acceptable health and vigour as directed by the Landscape Architect and must be free of pests, diseases and weed seed. • Scope: Landscaping shall be undertaken under the direction of the landscape architect for the project in accordance with the landscape master plan and design approach. • Materials: All materials must be approved by the Landscape Architect who shall be informed of the source of imported topsoil, organics, chemical fertilisers, sand, stone etc. They shall have the authority to reject imported material if deemed necessary. No materials containing invasive plant seeds, litter or contaminants may be imported. • Chemical fertilizers and pesticides: Only approved pesticides shall be used for this development. Chemical fertilisers should be avoided in favour of the use of organic fertilizers. All chemicals and pesticides shall be strictly handled as per the manufacturers' instructions. • Topsoil: Topsoil shall not be compacted in any way, especially not by vehicles driving over it. • Timing of planting: The Contractor shall not begin planting until all construction activities in the area to be vegetated have been completed. (The planting for indigenous vegetation is late autumn and

	winter.). • Preparation of ground surfaces: Prior to the planting of the Site, the Contractor shall remove all remnants of building materials, concrete foundations, timber and other foreign debris from the planting areas. • Establishment: Establishment shall consist of maintaining the surface to the required slopes and levels without erosion or sedimentation, watering, weeding, composting, pruning, and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site. Establishment shall commence immediately after planting and shall continue until a satisfactory cover has been achieved.
Site Plan	• The proposed capping and redevelopment are to be developed as per the intention and design philosophy as described in this report. • The final Site Plan is to be approved by the City of Cape Town Municipality prior to commencement of construction. • The final approved (by City of Cape Town Municipality) Site Plan is to be provided to the DFFE for their information prior to the commencement of construction. • The storm water pond in the north western corner of the site should be retained and a 15 m buffer retained from the wetland edge. Limited disturbance should be allowed within the buffer zone. The rehabilitation of disturbed areas must take place as soon as possible post construction (Belcher, 2012). • If development proceeds within the green polygon (refer to FIGURE 27), mandatory relocation of *L. explanatus* (EN) to Bracken Nature Reserve is advised (Turner, 2012). In this case, restoration and maintenance of the blue polygon is suggested. • If development proceeds in the green polygon (refer to FIGURE 27), decommissioning (capping) and development of the greater site should not encroach upon the area contained within the blue polygon (Turner, 2012). Note that this is addressed in the capping and site development plan. • The development activities should not occur within the 1:50 year flood line (Belcher, 2012).
Resource Use	• Energy efficient lighting technology should be used as far as possible to reduce the energy requirements of the development. • Energy efficiency should be included in the design and development and water heating would have to comply with SANS 204. This could be achieved through a combination of strategies such as heat pumps, solar power, consideration of natural ventilation in the design, energy efficient air-conditioning systems, etc. Examples of ways to achieve this include: o Energy efficient LED light fittings to reduce the electrical consumption of the property. o Heat pumps could be used for hot water generation.

	○ Natural ventilation should be used as far as possible in the design. ○ Air-conditioning units could be the inverter type, which is more efficient than the normal type.
Decommissioning	• If future, should a decision regarding the future securing of the site through re-engineering and/or development be delayed for 6 months or more, consideration must then be given to clearing the existing vegetation and establishing a proper capping or hard surfacing of the site so as to stop mole activity from exposing subsurface asbestos (Morris et al, 2011). This will make a major contribution in stopping the further exposure and contamination risk posed by exposed asbestos (Morris et al, 2011). *Note that this aspect is addressed through the proposed capping design/ decommissioning which is the subject of this application.*
Monitoring and Measurement	• In the interim and with intervals not exceeding 6 months (i.e. winter and summer seasonal monitoring), background airborne asbestos monitoring should be implemented and performed under various wind conditions to establish whether unacceptable asbestos fibre distribution does not occur (Morris et al, 2011). This is prudent due to the slow deterioration of friable asbestos sludge with time and also given the precarious vegetation cover (Morris et al, 2011). Note that this is presently being undertaken, the latest results are in the Basic Assessment Report. • The level of the groundwater in the boreholes should thus be re-measured into the future – this however is not a crucial issue at this stage for this report and future planning (Morris et al, 2011). Note that this was carried out in the groundwater assessment, and future monitoring is required during operations. • Monitored natural attenuation remains the preferred method of remediating the detected impacts (Parsons & Associates, 2015). It is recommended that 3 monitoring boreholes be re-established at the asbestos waste site and quarterly sampling be undertaken for 2 years to define seasonal variation (Parsons & Associates, 2015). Thereafter, the need for further monitoring can be assessed in light of observations to that point (Parsons & Associates, 2015).
Transport, Access, and Parking Considerations	• An additional right-turn lane must be provided westbound along Old Paarl Road and the northern approach should be widened to provide a new northbound acceleration lane along Okavango Road for the eastbound left-turn slip lane (Krogsheepers & Arangie, 2021). • Sidewalks should be provided along the southern side of Leo Close and sidewalks should also be provided along the major internal roads (Krogsheepers & Arangie, 2021) • Parking should be provided in accordance with the latest City of Cape Town zoning scheme requirements (Krogsheepers & Arangie, 2021). • Access is proposed via the existing Leo Close off Gemini Street (Krogsheepers & Arangie, 2021).
Services	• The chosen route for the sewage pipelines (or the bulk water supply line) should be located outside of the wetland and buffer area (Belcher, 2012).

Geotechnical considerations	• The excavation and handling of asbestos wastes requires special attention to manage the health and safety issues, and thus it will be necessary to include the services of a suitably experience contaminant hydrogeologist in the design and project execution phases (Morris et al, 2011). There are many 'tricks and traps' to work of this nature that will govern the success of compliance to health and safety needs and the success of the engineering works (Morris et al, 2011). *Note that this has been addressed through the groundwater assessment as undertaken as part of this Basic Assessment process.* • In order to prevent excessive settlement of surface beds, the loadings of these buildings will need to be restricted (Morris et al, 2011). Regular periodic maintenance of surface beds not suspended is considered likely (Morris et al, 2011). The remainder of the platforms and embankments could be covered with a hard standing for parking etc (Morris et al, 2011). *Note that this has been considered in the design of the site development plan.* • Morris et al (2011) advises that the following foundation options will be suitable for light industrial type structures: o Ground Improvement: Ground improvement can be considered for the red hatched area shown in FIGURE 29 where fills are generally in the range 0 to 2 m thick and limited asbestos contamination is present. These areas were restricted to the toe of the upper platform and to the north and east of the lower platform. *Note that this has been considered in the proposed site development plan, noting that normal industrial development has not been suggested, but rather light industrial development.*

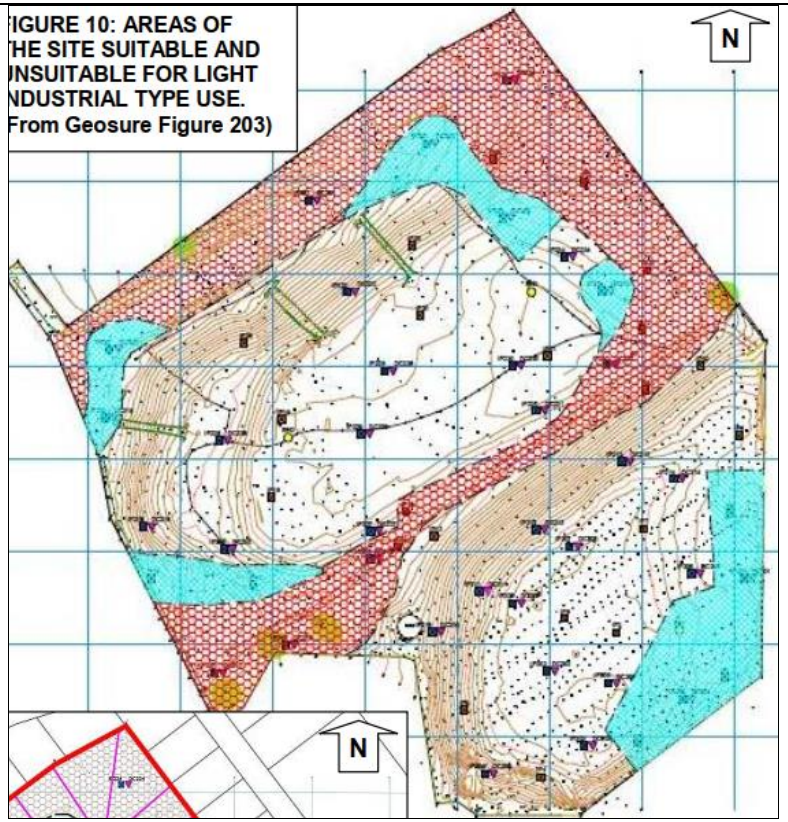

FIGURE 29 AREAS CONSIDERED UNSUITABLE FOR NORMAL INDUSTRIAL DEVELOPMENT INDICATED IN WHITE (SOURCE: MORRIS ET AL, 2011)

The following can be considered:

- Undercut site to a maximum depth of 1.6 m such that most or the entire fill contaminated with asbestos waste has been removed. Localised sections may require excavations to go down to at least 2 m in order to remove all asbestos waste. Note: a large part of this area is not contaminated with asbestos.
- Excavations should extend to at least 2 metres beyond the footprint of the proposed structure.
- Care must be taken not to destabilise the embankments when undercutting and

	construction may need to progress in limited sections (e.g. strip-mining) in order to promote stability of these. ▪ The undercut asbestos waste will need to be disposed to a licensed landfill site or alternatively, dependent on the design of embankments, used as backfill with a clean cover behind retaining walls. ▪ The bottom of the excavation should then be compacted to at least 95% Modified AASHTO dry density. ▪ Carefully sort material from excavation to be used in backfill. Only granular soils must be used in backfill. The maximum particle size should not exceed 75 mm, as this tends to negatively affect compaction. ▪ Import a G7 material or better to make up deficit due to material being spoiled. ▪ Backfill may consist of selected granular material from the excavations or imported G7 material compacted to not less than 95% of Maximum Mod AASHTO dry density. ▪ These should be replaced in layers not exceeding 250 mm (depending on energy of compaction equipment being used) and should be compacted to at least 95% Modified AASHTO dry density to +2% of OMC. ▪ Footings will need to be founded at 600 mm below ground level. There should be at least 1.0m of re-compacted material beneath the underside of footing. A maximum nett allowable bearing pressure of 75 kN/m^2 is considered applicable for the above foundation treatment. Settlement of a 1m wide footing is likely to be in the range 10 to 20 mm, with differential settlement taken as 50%. ▪ Strict quality assurance will be required throughout this process. ▪ Alternatively, ground improvement can be restricted for individual footings where re-compacted soils to at least 1.5 times the plan dimension of the footings to at least 1.6 m depth can be constructed (localised section may require depths of up to 2 m in order to remove all compressible asbestos waste). The advantage of this latter method is that disposal volumes of asbestos waste will be considerably less. However, the downside of this method is that loading of floor slabs may need to be restricted and these may be prone to excessive settlement and may require higher maintenance costs. ▪ One consideration for the above is that permission be sought to encapsulate below the concrete slabs and roadways any asbestos material that may be present in the soils, as long as appropriate compaction occurs when layering – this is a feasible option as the hazards and risks can be managed. Services can be installed during the earthworks and

	title deed restriction can place restrictions on any excavation in the area. o <u>Piled Foundations</u> ▪ **Pressure grouted CFA piles:** It is considered that conventional CFA piles will not be suitable for this site due to the presence of asbestos pipes and other waste products that will obstruct piling. However, this can be overcome by excavating at each pile position and disposing the waste material to a licenced landfill. The excavation should then be filled with a clean granular backfill free of boulders and rubble in which a CFA pile can be installed. The minimum pile diameter should be restricted to 300 mm. ▪ **DCI Piles:** It would be important to ensure that DCI are not founded in compressible clay layers. Vibration associated with the driving of these piles can cause damage to nearby structures. There are means of overcoming these negative features and this should be discussed with the piling contractor and addressed in the detailed pile design. DCI piles are rated as fair to good in handling boulders. However, should the rubble present in the fill obstruct piling then excavation and removal of the rubble followed by replacement with a granular soil free of rubble and boulders will be required (as described for the CFA pile). The driving of DCI piles may cause liquefaction in the subsoils and this will need to be carefully monitored by installing piezometers that measure pore pressures. Typical pile sizes and working loads are given as a guideline for budgeting purposes only in the geotechnical report as 355 mm diameter with a typical working load of 500 kN, 410 mm diameter with a typical working load of 750 kN, and a 520 mm diameter with a typical working load of 1200 kN. The minimum pile diameter should be 355 mm. ▪ **Percussion Piles:** This pile type has excellent penetration ability through boulders and hence should penetrate the rubble easily. However, it is noted that this pile is not particularly suited to soft ground conditions and the suitability of this pile should be discussed with the piling contractor. Another negative feature is that the pile is relatively expensive when compared to the above piles. It is considered that an unlined pile will be suitable for the site conditions (i.e. the pile will be formed with a temporary casing that will then be removed once the concreting/grouting operations are completed). A summary of the allowable load capacities for various diameters are given in FIGURE 30.

Diameter (mm)	Typical Working Load (kN)
250	300
300	450
350	600
400	800

FIGURE 30 SUMMARY OF ALLOWABLE PILE LOADS FOR ROTAPILES (SOURCE: MORRIS ET AL, 2011)

- Pile Testing Requirements

A detailed pile design must be carried out by the piling contractor It is considered good practice to carry out pile load tests, which is the only reliable means of determining a pile's load capacity. Whereas a pile load test on such a project will only be carried out on possibly two piles, integrity tests are relatively inexpensive and should be carried out on all the piles. It must be noted that the integrity tests check the integrity of the pile shaft for any structural defects but do not indicate the load settlement characteristics. For smaller diameter piles, the frequency response test method is recommended and for larger diameter piles, cross-hole sonic logging is recommended. All aspects of integrity testing should be discussed with the relevant professional prior to finalising in the tender or contract documents.

- Trenchability Assessment- Soft excavation in terms of SANS 1200 is generally anticipated at this site to at least the depth of the field tests carried out. However, the presence of builder's rubble and asbestos may result in slower excavation rates. Hence, consideration will need to be given to making an allowance for intermediate and hard excavations.
- General Earthworks-
  - It is recommended that all earthworks be carried out in accordance with SANS 1200 (current version). All vegetation should be cleared from areas over which fills are to be built.
  - Fills should be placed in layers not exceeding 200 mm loose layer thickness and compacted to a minimum of 95% maximum Modified AASHTO dry density. Boulders and rubble larger than 75 mm should not be included in the fill material. Large boulders and rubble within the fill could affect compaction, cause piping within the fill and may also affect foundation excavations. Density control of fill material should be undertaken at regular intervals during fill construction.
  - The material should be worked within a close range of the Optimum Moisture Content (OMC) level, i.e. -2% to +2% of optimum, otherwise if the material's moisture content is well above the OMC, (particularly in clayey soils) it will heave under construction traffic.

	The asbestos sludge if exposed at surface soils may be impassable to construction traffic particularly if it has high moisture contents. ▪ Where fill is required it should be placed on horizontal benches cut into the existing slope when it is steeper than 1 vertical in 6 horizontals, with a minimum bench width of 3 metres. ▪ Unstable sidewall conditions were observed in several inspection pits. Thus, all temporary excavations formed will need to be battered back at least 1 in 1 (45º) or preferably shored particularly when deeper than 1.5 m. All excavations must be inspected and approved for stability before workers enter. o Drainage- ▪ The most important factor in the promotion of a stable site is the control and removal of surface water from the site. It is important that the design of the stormwater management system allow for the drainage of accumulated surface water. ▪ Surface water on the platforms should be directed to and collected in open lined drains or piped off the site into the stormwater reticulation system. Run-off from roofs should be piped from gutters through downpipes and discharged into the stormwater reticulation system. ▪ Both during and after construction, the site should be well graded to permit water to readily drain away and to prevent ponding of water anywhere on the surface of the ground. All terraces and earthworks in general should be sloped to a gradient to prevent ponding and ingress of water into the subsurface soils. ▪ The use of earth bunds along fill edges is recommended. This prevents stormwater from overtopping and damaging fill embankments. o Dynamic Compaction- ▪ During discussion with various professionals involved, dynamic compaction was discussed as a way of improving the founding characteristics of the site. This method is considered high risk for the following reasons: ▪ It is understood that the upper and lower platforms have been constructed in a similar manner to mine tailings dams albeit in a more haphazard manner in that there are pockets of coarse rubble interspersed with finer sludge (slurry) and fine to medium-grained sands. ▪ The sludge has a high moisture content (>100%) with in many cases void ratios in excess of 4 with a concomitant low bulk density. These are not typical of soils and the behaviour

	of these cannot be easily predicted using soil mechanic models. ▪ Compacting this waste body will squeeze out the pore water thus saturating layers and may lead to liquefaction of fines and possibly failure of the embankments. Hence, dynamic compaction or any other form of compaction over the central waste body in both platforms is not recommended. ▪ There are ways of preventing liquefaction during dynamic compaction such as the formation of stone columns that will readily drain saturated soils. However, this is now becoming more of a complex geotechnical solution for the site and tends to lose the primary focus, which is to secure the asbestos waste safely, and thereby preventing human exposure. ▪ It must be borne in mind that the more complex the geotechnical solution for the site, the higher the risk of failure and thus exposure to asbestos. Notwithstanding the higher cost implication.
EMPr	• The presence of snakes on the site must also be considered when working in this area, particularly Cape cobras, boomslangs and puff adders. Several snakes (Cape cobra) were seen during the site assessment work (Morris et al, 2011). *Note that this aspect is covered in this EMPr in terms of faunal management.* • The water quality impacts during the construction phase in particular should be addressed through the Environmental Management Plan, which is implemented by an on-site Environmental Officer (Belcher, 2012). *Note that this is addressed through this EMPr.*

ISSUE	MANAGEMENT / MITIGATION MEASURES
DOCUMENTATION, PLANNING AND PROGRAMMING REQUIREMENTS: Management Statement and objective: To ensure that the works schedule is appropriately planned to limit adverse impact on the environment. Impact Management Outcomes: No deviations from the below.	
Planning and Statutory Processes	• Morris et al (2011) states that the following planning and urban design needs apply: o A market survey of land use and facility requirements in the area. This should consider the need for additional small industrial type units, need for vehicle parking – given the close proximity of the large Shoprite warehouses, there may be a need for an area to park the distribution trucks that service this warehouse, need for small storage units – given the expansion of residential areas along the N1, plus the proximity to the Okavango fly-off to the N1, the site may be

	desirable for small storage units. The purpose of the market survey is to establish what sort of mix of light industrial use would be best to accommodate in the available areas of the site and to determine what the financial returns would be on such. o Based on the above, and informed by specific engineering needs (next point, 6.2), it will be necessary to refine the site layout plans taking into consideration services and road access (traffic) issues. o It will also be necessary to consider land use zoning issues. The land is currently zoned industrial, thus these fits with the recommended way forward. o Environmental needs- undertake the necessary process in terms of NEMA. *Note that the above have been conserved in the proposed site development plan, the town planning process which needs to be undertaken, as well as this current Basic Assessment process.*
Programming/ Timing of Works	• Construction activities should preferably be carried out in the dry season to ensure that the contaminated run-off can easily be managed on site (Belcher, 2012).
Development as Proposed	• The ECO is to ensure that the proposed capping and redevelopment including services, landscaping and transport requirements as detailed in this EMPr (including those measures prescribed in "Detail Design Measures" above). Constant checking against these requirements as construction occurs in the relevant area must be carried out by the ECO.
Pre-construction site documentation	• The Contractor shall appoint an Environmental Officer who shall be responsible for undertaking a daily site inspection to monitor compliance with the Environmental Specifications contained in this EMPr. The Contractor shall submit the name of the Contractor's Environmental Officer to the Engineer and ECO for their approval seven days prior to the date of the environmental awareness training course. • The site should be photographed by the EO prior to commencement of works to note the general condition thereof.
Asbestos Control	• Before any site activities takes place, a decontamination unit must be established on site. • All other persons entering the site (Engineers and the professional team members) must have had asbestos training by a competent person. Training must be specific to the site and conditions of asbestos exposure on the site (OHMS can offer this services). • All persons entering the site must have asbestos medicals carried out by an Occupational medical practitioner. • An asbestos plan must be drawn up by the Approved Inspection Authority in compliance with the asbestos abatement regulations 2020 stating how the asbestos contaminated site activities must be carried out. This plan must be submitted to the local department of Employment and Labour (DoEL). • The asbestos contaminated site must be managed by an AAIA (Asbestos approved Inspection

	authority- OHMS) and all site activities during the site excavations up to final capping and foundations works being completed must be carried out by a registered asbestos contractor.

ISSUE	MANAGEMENT / MITIGATION MEASURES
SITE CAMP/ SITE ESTABLISHMENT: Management Statement and objective: To ensure that the site camp is located and laid out in an environmentally sensitive manner, which also does not adversely affect activity on site and around the site Impact Management Outcomes: No deviations from the below and no damage to the stormwater pond or buffers, or harm to fauna as a result of the location and set-up of the site camp.	
Site Division	• The Contractor shall restrict all their activities, materials, equipment, and personnel to within the area specified. • A Method Statement detailing the layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) and a drawing of the layout of these shall be submitted. The Method Statement which must be approved by the Engineer and ECO. • Prior to commencement of construction works, a systemic herbicide, such as focus ultra should be applied to eradicate the *kikuyu* grass. • Materials should be stored in piles that do not exceed 1.5 m in height and should be protected from the wind (such as using shade-cloth). • All manufactured and / or imported material shall be stored within the Contractor's camp. All lay down areas outside of the construction camp shall be subject to the Engineer's approval. • Keep clearing to a minimum. • All stationary plant and equipment must have drip trays under them at all times. Drip trays are to be in good condition (i.e. no cracks or holes) and they are to be cleaned regularly (i.e. at least weekly). • The Contractor should restrict all activities, materials, equipment, and personnel to the specified areas on site. • Construction and staff vehicles must be parked within the site boundaries in a designated area. Construction vehicles must have drip trays placed underneath during non-working hours. All plant must be maintained and leak-free. • Likely disturbance to surrounding users of the roads must be considered and kept to a minimum. • Appropriate emergency, environmental and health and safety signage should be put up at the site camp.

	• Should night-lighting be required (e.g. security) these should be of the low UV emitting types, such as most LEDs.
Site Demarcation	• The Contractor shall erect and maintain suitability secure permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities. • Appropriate warning and safety signage (to be advised by the accredited asbestos inspection authority) must be erected. • Access to the site by unauthorised personnel is prohibited given the hazardous content on the property.
Eating Areas	• The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient bins, as specified in Waste Management requirements shall be present in this area.
Structures	• The Contractor shall supply and maintain adequate and suitable sheds or containers for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weather-proof, adequately ventilated and provided with raised floors. • All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.
Lights and Lighting	• The Contractor shall ensure that any lighting installed on the site for their activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area. • Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area or interfere with road and traffic on adjacent roads.
Workshop, Equipment Maintenance and Storage	• All maintenance of plant shall be performed off site. If it is necessary to do maintenance on site, the Contractor shall obtain the approval of the Engineer prior to commencing activities and ensure that there is no contamination of the surrounding soil or vegetation. • When emergency repairs are carried out on equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). • All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the site entirely. • The washing of equipment shall be restricted to urgent or preventative maintenance requirements only.
Site Clearance- Vegetation Clearance	• Prior to commencement of construction on the site, a plant search and rescue and translocation must

and Translocation of *Lampranthus explanatus*	be undertaken. In particular all *Lampranthus explanatus* plants are to be relocated to the nearby Bracken Nature Reserve. The reserve manager should be contacted in this regard: Tshepo Mamabolo (021) 444 0380. • In addition to the translocation, cuttings of the *Lampranthus explanatus* must be taken and propagated by specialist botanists to create an ex-situ population. • The translocation, taking of the cuttings and the immediate re-establishment of plants at Bracken Nature Reserve must be undertaken by a specialist botanist (Turner, 2012), and must be undertaken in collaboration with an authorised representative of that nature reserve as well as a representative from the CCT:Biodiversity Management Staff. This exercise must be conducted following the first heavy winter rains following Environmental Authorisation (if granted). • Bear in mind that rescued plants need to be planted in loose quartzitic sand – the habitat of the species (Turner, 2012). • In addition to the above translocation during the winter following Environmental Authorisation (if granted), a plant search and rescue shall be undertaken by a botanist in late winter / early spring (July – September) when most geophytic species are flowering. Conservation-worthy plants shall be rescued and donated to the Bracken Nature Reserve (contact details above). • The majority of the existing vegetation on site will need to be cleared in order to properly cap the site. Vegetation clearance of the site should preferably be phased as it becomes necessary to work in certain areas, rather than clearing of entire sections initially. If this is not practical and the works areas of the site are cleared at the start of the contract, it is to be stabilized immediately to control dust and prevent erosion. • Alien invasive vegetation should be cleared from the retention pond and buffer area. • Prior to commencement of construction works, a systemic herbicide, such as focus ultra should be applied to eradicate the kikuyu grass. • Cleared vegetative material is not to be dumped anywhere other than an approved waste disposal site. It is likely that the cleared vegetation will classify as hazardous due to the fact that asbestos matter will be caught up in the vegetation when it is removed. Given the potentially hazardous content of vegetative material, it is not to be chipped for mulch. • Plant material removed from the site is not to be burnt for disposal on site unless a burning permit has been obtained from the local authority.
Site Clearance- General	• Care must be taken that the topsoil that will be removed and stockpiled on site is not contaminated by asbestos waste brought to the surface by mole activity. • Topsoil on site should not be used for future landscaping use, given the asbestos content. Topsoil for landscaping purposes should therefore be imported.

	• Constructed areas should be covered with suitable vegetation cover as soon as possible after construction is completed (Belcher, 2012).
Establishment of no-go areas and protection of ecological system	• Before Site decommissioning and/or development, the area/s demarcated by the red and/or green polygons (refer to FIGURE 27 should be buffered by 15 m along the length of their respective southern boundaries (Turner, 2012). All alien vegetation and existing surface rubble and tipped rubbish should be cleared from the red, blue and/or red polygon areas (Turner, 2012). • Clearing or felling of invasive alien trees should take place within the buffer area and wetland (Belcher, 2012). Advice of a botanist should be obtained to compile a programme on the removal and control of alien invasive plants (Belcher, 2012). • The existing stormwater retention pond in the north-western corner of the site and a buffer of 15m from its delineated edge is considered a "No Go" area for the duration of the decommissioning and construction phase. • The Contractor shall ensure that, insofar as they have the authority, no person, machinery, equipment or material enters the "no-go" areas at any time. Should access be required for specific activities (e.g. landscaping etc.) permission must be sought from the Engineer and ECO. • The no-go areas will be demarcated with a temporary, but structurally secure fence to the satisfaction of the Engineer and the ECO prior to the commencement of construction so as to prevent unauthorised entry into this area.

ISSUE	MANAGEMENT / MITIGATION MEASURES
SITE ACCESS, ACCESS ROUTES AND TRAFFIC MANAGEMENT Management Statement and objective: To avoid and/or minimise impacts on the local road network and road users any such impacts are appropriately dealt with to prevent further impacts in the longer term. To avoid construction related impacts to other road users associated with the movement of construction vehicles. Impact Management Outcomes: No disruptions to traffic on local networks such that complaints are elicited, no damage to vehicles and related claims and no nuisance to surrounding caused by dust.	
General	• Use existing roads and tracks to access the site during construction. • Access to the site must be carefully managed to avoid unauthorised entry onto the site, and to prevent loitering of construction contractors beyond the development area. • The Contractor shall control the movement of all vehicles and plant including that of their suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of

	traffic, and comply with all relevant laws and specifications. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the site. • All construction vehicle movement shall as far as possible be limited to off-peak hours wherever possible. Delivery of materials or collecting waste shall be scheduled outside of peak periods. • Where necessary, additional traffic control measures should be implemented. • Construction of the infrastructure is to be undertaken during a limited duration to prevent protracted construction impacts to parties making use of the site. • Subsequent to construction works, all access routes must be inspected and any repairs/cleaning necessary as a result of the construction works must be undertaken. • The Contractor shall control the movement of all vehicles and plant including that of their suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and comply with all relevant laws and specifications. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the site. • All construction vehicle movement shall be restricted to off-peak hours wherever possible. On gravel or earth roads on or within 500 m of the site, the vehicles of the Contractor and their suppliers shall not exceed a speed of 40 km/h. • All access and haul routes shall be cleared from sand and/or mud deposited by construction vehicles associated with this project. • Stormwater drains in access routes shall be protected to prevent soil particles or other foreign substances entering the stormwater system. • All trucks and other construction machinery operating on site during the decommissioning phase should be jet washed prior to any outbound journey as a precautionary measure to remove any asbestos fibres. Cognisance should be taken not to generate standing wash-water pools which could lead to areas of mud, as this would be transported out onto the public roads when trucks leave the site.

ISSUE	MANAGEMENT / MITIGATION MEASURES
SOIL, STORMWATER AND GROUND WATER POLLUTION MANAGEMENT AND EROSION CONTROL Management Statement and objective: To prevent groundwater, stormwater, and soil pollution associated with the handling storage and use of hazardous materials or materials that have the potential to cause environmental harm and to prevent and control erosion on site as a result of decommissioning and construction activities. Impact Management Outcomes: No non-conformances, no pollution to stormwater, soil and groundwater as a result of the construction activities, as well as effective erosion control.	
Prevention of impacts on water systems	• Refer to the no-go areas in the "Site Camp Establishment" table. No vehicles, machinery, personnel, construction material, cement, fuel, oil, bitumen, or waste should be allowed into these no-go areas, unless express permission is granted by the ECO for specific activities. • Do not impede the movement of aquatic and riparian biota. • All potential pollutants should be kept away from the stormwater pond and buffer. • All stockpile of building materials (e.g. sand) must be protected to prevent erosion by wind and water. Stockpiles should not be higher than 1.5m. • All soil stockpiles should be covered (e.g. with geotextile or plastic sheeting) and not exceed a maximum height of 1.5 m.
Prevention of soil and ground water pollution	• The Contractor shall prevent pollution of surface or ground water as a result of construction activities. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water from excavations, construction water, water carrying soil or other particles or waste products, etc. • No residues from cleaning activities or any other form of contaminated water may be released onto bare soil or into vegetated areas. Such wastewater must be appropriately contained and disposed. • Any incident that may result in the pollution of a water resource must be reported to the Department of Human Settlements, Water and Sanitation immediately. • Drip trays shall be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). Drip trays shall be inspected and emptied daily and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. Drip trays must be free of cracks/ holes / punctures to ensure no spillage from these receptacles. • Stationary equipment (such as generators etc.) must also be placed inside drip trays whilst in use. • Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the Engineer immediately of any pollution incidents on site.

	• A Method Statement shall be required for all wash areas where hydrocarbon, hazardous materials and pollutants are expected to be used. This includes, but is not limited to, paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Engineer. The Method Statement must include details of planned water quality monitoring to identify wastewater characteristics such that contamination of the surrounding environment can be prevented. • Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Project Manager. • Water containing potential pollutants such as cements, concrete, lime, chemicals, fuels, and hydrocarbons shall be contained and discharged into an impermeable storage facility for evaporation and ultimate removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fule/hydrocarbon storage areas. • The washing of vehicles is strictly prohibited on the site. • The site office, toilets, material storage/stockpiling, storage or stockpiling of spoil material and all temporary waste storage areas should be located at least 50 m away from the stormwater pond and in areas approved by the ECO. • Bulk storage of fuel/hydrocarbons is strictly prohibited, and the temporary storage of such substances will be limited as far as possible. Note that storage of fuel in volumes greater than 200 litres is subject to a flammable substance permit, obtainable from the local fire chief. All storage areas for such substances shall be bunded, covered and have an impermeable surface and shall be in areas approved by the ECO. • Refuelling of plant/equipment must be undertaken on a concrete platform with secondary containment. The necessary decanting equipment must be used to prevent spills and leaks whilst refuelling. • Storage facilities for chemicals should be bunded and situated in high lying areas to avoid spillages and damage from flood events.
Spills and spill control	• A Method Statement must be put in place for the handling of spills and leaks. The Contractor shall ensure that employees are aware of the procedure to be followed in this regard and shall make the necessary materials and equipment for dealing with spills and always leaks available on site. Clean-up and remediation must occur immediately after a spill incident. • All fuel, oil or hydraulic fluid spills are to be reported to the Project Manager or ECO immediately. • In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. Should a leak emanate from equipment (such as earth moving equipment), the machinery shall be parked on a hard surface until such time as a repair can be made, to prevent contamination of bare ground.

	• The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle the volume of a spill similar to the volume of the largest container on site used for storage of such substances that are not stored and / or used inside a bunded area. This material must be approved by the Project Manager prior to any refuelling or maintenance activities.
Erosion prevention, sedimentation control	• Prior to the start of decommissioning and construction, a system must be put in place to manage runoff from the site during the construction period. Berms, trenches, temporary piping and settlement ponds could all be used. • Exposed surfaces should be compacted, and ideally re-vegetated, as quickly as possible. • The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the decommissioning and construction activities. Where erosion and/or sedimentation occurs, whether on or off the site, despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Engineer/ Project Manager. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer/ Project Manager. • The Contractor shall be vigilant during periods where strong winds prevail (especially during the dry summer months) to manage dust generation in accordance with the Dust Control Regulations. No potable water shall be used for dust suppression purposes while water restrictions apply. • The most effective erosion prevention measure is to limit the duration of surface exposure and to minimise the extent of disturbed areas. This can be achieved by phasing works so as to only remove vegetation cover when it becomes necessary to work in an area. Other wind erosion mitigation measures include sprinkling of water (any bylaws must be adhered to) in order to prevent dust for short periods only and should be done daily (note that over watering may cause erosion), applying (in serious cases) chemical (biodegradable) dust suppression, identifying and stabilising key access points prior to commencement of construction, directing most construction traffic to stabilised roadways within the project site, and/or paving or chemically stabilising access points where unpaved traffic surfaces adjoin paved roads.
Stormwater	• A Method Statement has to be submitted to the ECO for the management of stormwater on site following rain events. Care should be taken not to cause siltation of the existing stormwater retention pond and neighbouring infrastructure in the area. Contaminated runoff from the construction site should be prevented from entering the water features, where possible (Belcher, 2012), and the stormwater system. • Stormwater runoff should not be discharged directly into the retention pond but should be allowed to

	dissipate through the 15 m buffer area. The chosen route of the sewage pipelines and bulk water supply line should also be located outside the retention pond and buffer area. • Alien invasive vegetation should be cleared from the retention pond and buffer area using D:EA&DP approved methods. The area shall be planted with locally indigenous wetland species. In this regard, the City of Cape Town's "SUDS Landscaping and Indigenous Plant Species Guideline" should be consulted for suitable species which should be propagated from locally available material by a specialist indigenous nursery. A copy of this document and more information can be obtained from CCT: Catchment, Stormwater and River Management Department at csrm.secretary@capetown.gov.za or 021 400 1205.

ISSUE	MANAGEMENT / MITIGATION MEASURES
HAZARDOUS SUBSTANCES (INCLUDING ASBESTOS AND CEMENT) MANAGEMENT Management Statement and objective: To prevent pollution or fire associated with the handling storage and use of materials deemed hazardous to human health or the environment. Impact Management Outcomes: No non-conformances and no pollution of soil, groundwater and/or stormwater as a result of the decommissioning and construction activities. No fires as a result of the handling / use of fuel.	
Hazardous substances handling, use and storage	• The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no-go" areas) required, to comply with the specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications. • Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover (e.g. tarpaulin or similar) to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean ups resulting from the failure by their employees or suppliers to properly secure transported materials. • All manufactured and / or imported material shall be stored within the Contractor's camp. All lay down areas outside of the construction camp shall be subject to the Engineer's approval. • No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 50 m of the no-go areas. • All fuel is to be temporarily stored within a demarcated and bunded area. No refuelling of vehicles or machinery is to take place outside of this demarcated area unless authorised by the Engineer/ Project Manager. The ECO and Engineer/ Project Manager shall be advised of the area that the Contractor intends using for the storage of fuel. • The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected. • Tanks containing fuels shall be situated on a smooth impermeable surface (such as plastic, concrete, or any suitably similar material) base with a bund (if plastic, it must have sand on top to prevent perishing) to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% x the total capacity of the largest storage tank / vessel inside the bund. • The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. An Enretech or similar hydrocarbon absorption/remediation product approved by the ECO shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall

	have overhead cover to prevent rain from entering the bunded area. • The Contractor shall ensure that there is adequate and appropriate fire-fighting equipment at the fuel stores. • The Contractor shall always keep fuel under lock and key. • Areas or containers for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the municipal fire prevention officer in terms of the Municipality's community fire safety by-law (e.g. a Flammable Liquid License). • If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use. • When parked, a drip tray must be placed under the temporary fuel storage tanker (bowzer) to contain incidental drips and spills. • Where reasonably practical, plant shall be refuelled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical, refuelling must take place on a concrete / hard standing area or over a drip tray. • During fuel delivery, a trained individual must always be present during offloading of product. An emergency cut off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut off switch to prevent fuel tank overfills. • Vehicles using the temporary fuel storage tanker must be located on a concrete hard standing area for fuel containment. • Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. • The relevant Material Safety Data Sheets (MSDS) shall be available on site. • Procedures detailed in the MSDSs shall be followed in the event of an emergency. • Cement mixers shall have drip trays to contain oil and fuel leaks – these must be cleaned regularly. • If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling, and disposal procedures of the materials. • No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on site. Brush / roller wash facilities shall be established to the satisfaction of the Project Manager. A Method Statement, approved by the Engineer/ Project Manager, is required. • No smoking shall be allowed in the vicinity of the stores. Symbolic safety signs depicting "No Smoking",

	"No Naked Lights" and "Danger" are to be provided and are to conform to the requirement of SANS 1186. The volume capacity of the tank shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SANS 0232 part 1. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.
Spill Clean-up Material	• The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb / breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refuelling or maintenance activities.
Working with cement and concrete	• Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. The permitted location of the batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the ECO. • A Method Statement indicating the layout and cement handling methods is required. • No mixing of concrete may occur close to (less than 50 m) the stormwater pond. • Cement mixers shall have drip trays to contain oil and fuel leaks – these must be cleaned regularly. • Cement is to be stored in a secure weatherproof location to avoid contamination of the environment. • All runoff from batching areas shall be strictly controlled so that contaminated water does not enter stormwater, or groundwater or any water courses. Dagga boards and mixing trays should be used at all mixing and supply points. • The wash-water from cleaning of equipment and flushing of mixers shall be contained so as to not result in pollution of the surrounding environment. • Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment. • Settling tanks for the evaporation of contaminated water should be constructed with an impermeable surface. Sediment should be left to dry out before being removed to the hazardous waste skip. • Suitable screening and containment shall be in place to prevent wind-blown contamination associated with bulk cement silos, loading and batching. • All visible remains of excess concrete shall be stockpiled until a practical load is accumulated and should then be physically removed to an approved Municipal waste site. • The cement mixing area should not be located in such a way that run-off will enter into the stormwater pond or stormwater system.
Asbestos Handling	• Before any site activities takes place, a decontamination unit must be established on site (OHMS, 2021). • Water must be always available on site in the form of a water bowser or site standpipe before any site

	activities take place in order to keep the soil damp. This is for to mitigate any airborne fibres being released during any soil disturbance (OHMS, 2021). • All site activities ranging from removal of the trees, weeds, grass and all excavations and earth works must be carried out by a registered asbestos contractor (RAC) until the asbestos has either been removed or capped. This too includes all machine operators (OHMS, 2021). • All other persons entering the site (Engineers and the professional team members) must have had asbestos training by a competent person. Training must be specific to the site and conditions of asbestos exposure on the site (OHMS can offer this services) (OHMS, 2021). • All persons entering the site must have asbestos medicals carried out by an Occupational medical practitioner (OHMS, 2021). • Only authorized persons may enter the site under asbestos control conditions. This requires full asbestos personal Protective equipment being worn (OHMS, 2021). • Eating, drinking or smoking on site is prohibited (OHMS, 2021). • On exiting the property, all persons must follow the decontamination process where decontamination of themselves must be carried out through the decontamination unit (OHMS, 2021).=. • An asbestos plan must be drawn up by the Approved Inspection Authority in compliance with the asbestos abatement regulations 2020 stating how the asbestos contaminated site activities must be carried out. This plan must be submitted to the local department of Employment and Labour (DoEL) (OHMS, 2021). • The asbestos contaminated site must be managed by an AAIA (Asbestos approved Inspection authority- OHMS) and all site activities during the site excavations up to final capping and foundations works being completed must be carried out by a registered asbestos contractor (OHMS, 2021). • During any site activities asbestos in air monitoring must be carried out daily both personal on the employees and static monitoring to ensure that no asbestos in becoming airborne and is exposing DFFE. • The appointed AAIA will issue an asbestos clearance certificate at the end of all site works stating that the site is safe for re-occupation only after successful capping of the site and that there is no further excavations going to be undertaken (OHMS, 2021). • Any asbestos contaminated material is to be removed (including plants), it must be disposed of as asbestos waste at a certified waste disposal site for asbestos (Vissershok) and in accordance with the asbestos abatement regulations and the Environmental conservation act, 1989, the environmental management act, 2008 and the Un transport of hazardous goods or UN orange book. • Labelling of any asbestos waste must be done in accordance with the asbestos abatement regulation 2020 (OHMS, 2021). • It must be noted that in terms of the Asbestos Abatement regulations (AAR) AAR 24 (a), no person may

	sell, reuse, reinstall, or recycle any asbestos or asbestos containing materials (OHMS, 2021). • Any excavation work must be supervised from a health and safety perspective by an accredited asbestos inspection authority and it will be necessary to compile a method statement plus inform the Department of Labour of the intended activities (Morris et al, 2011).

ISSUE	MANAGEMENT / MITIGATION MEASURES
WASTE MANAGEMENT Management Statement and objective: To prevent pollution/contamination associated with the generation and temporary storage of general waste, hazardous waste construction rubble and litter generated by the workforce on site. Impact Management Outcomes: No non-conformances and no pollution of soil, groundwater and/or stormwater as a result of waste generation and management activities.	
General requirements	• Construction related waste will typically include general waste (such as plastic packaging, strapping, and lunch wrappers.), rubble (like broken bricks, tiles, waste concrete) and limited quantities of hazardous waste items (e.g. paint tins, oily rags etc.). There would also be hazardous waste in the form of asbestos, of which small quantities may need to be spoiled off site. • The Contractor shall be responsible for the establishment of an integrated waste management system that is acceptable to the Engineer/ Project Manager and ECO, and a Method Statement is required in this regard. The Method Statement must include a description of the estimated quantity and types of waste, a description of the services required to store, collect, transport, and dispose of waste and a procedure for separating recyclable and non-recyclable material. The local authority must be notified of any changes to the estimated quantities and types of waste. • No refuse, building rubble or waste material will be disposed of by burying. • Construction waste must be sorted into recyclable and non-recyclable waste. • The Contractor will be responsible for ensuring the removal of the waste to Municipal-approved recycling facilities (where possible), as well as the final disposal of non-recyclable wastes at a registered landfill facility. • On-site waste segregation shall take place. Waste shall be sorted into the following categories: - Paper / cardboard; - Metals; - Non-recyclable general waste; - Glass; and - Hazardous waste. • Suggested contacts for information on recycling collection points include the following: - Plastic containers: Plastics Federation (021) 591 5512; - Cans and tins: Collect-a-Can (021) 534-7010; - Glass: Consol Glass (021) 888 4000; - Motor and cooking oils: Oilkol (086) 110 1961;

	- Paper: Nampak 0800 018 818; and - Organic waste: Reliance Compost (021) 872 5962.
Storage, handling, and disposal of general waste	• Waste may be temporarily stored on site in a central waste storage area that is weatherproof and scavenger-proof, and which both the Project Manager and the ECO have approved. • All waste shall be sorted in the waste handling / storing area. The location of the waste storage area shall be approved by the ECO. • Colour-coded or clearly marked skips / bins will be utilised in order to differentiate the various waste types suitable to each receptacle. • General waste must be removed from the site at least once every two weeks if it does not pose a risk to human health. • Waste may only be disposed of at a licenced landfill site approved by the Project Manager and the ECO or to legitimate recycling facilities. • Waste disposal receipts and/or certificates must be obtained and filed in the environmental file and submitted with the monthly audit reports as evidence. • As far as possible, materials used or generated by construction shall be recycled. **Recycling ensures that we do not waste valuable resources** **Recycling can also create employment opportunities**
Litter prevention and housekeeping	• Litter and general waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger-and weather-proof bins. • The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not deposited by employees anywhere on the site except in refuse bins. Adequate refuse bins shall be distributed to the designated eating areas on site. • The Contractor shall provide enough bins with lids on site to store the waste produced daily. Bins shall not be allowed to become overfull and shall be emptied as required, but at least weekly, to prevent overtopping. • The Contractor shall provide dedicated resources to clean up the Contractor's camp and working areas daily and ensure that refuse is placed within the central waste storage area to prevent spreading as a result of wind. • Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or have been fitted with lids. • Wind-blown litter beyond the site boundary that are in the opinion of the ECO emanating from works on site must be cleared as part of the waste management of the site.
Storage, handling, and disposal of	• Hazardous and general waste must be stored separately and in a location a minimum of 50 m from the

hazardous waste (including asbestos and soil containing asbestos)	stormwater pond. • Petroleum, chemical, asbestos and other harmful and hazardous waste is to be stored in an enclosed and bunded area. In the case of asbestos waste, the area must be lined with an impermeable material. • This waste shall be disposed of at a hazardous waste disposal site as approved by the Local Authority. • The Contractor shall retain copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal. Storage, transportation and disposal etc is also controlled through other relevant legislation which must be complied with e.g. Occupational Health & Safety Act. • Hazardous waste may not be disposed to a General Landfill site and waste must be removed by a registered hazardous waste Contractor for disposal to a licensed hazardous waste landfill. This must be done at least once every three months in accordance with the limit applicable to the temporary storage of hazardous waste if it does not pose a risk to human health. • Any asbestos contaminated material is to be removed (including plants), it must be disposed of as asbestos waste at a certified waste disposal site for asbestos (Vissershok) and in accordance with the asbestos abatement regulations and the Environmental conservation act, 1989, the environmental management act, 2008 and the Un transport of hazardous goods or UN orange book. • Labelling of any asbestos waste must be done in accordance with the asbestos abatement regulation 2020 (OHMS, 2021). • Asbestos waste Loads on trucks are to be securely covered and trucks are to be appropriately labelled.
Storage, handling, and disposal of vegetative waste	• Cleared vegetative material is not to be disposed anywhere other than a licenced composting facility or licenced waste disposal site. • Any invasive alien plant species, which are removed from the site, are not to be chipped for mulch if they are in a seed-bearing state. Such material is to be disposed of at a suitable waste disposal site. • Plant material removed from the site is not to be burnt for disposal on site given the proximity to other activities on the site.
Storage, handling, and disposal of builder's rubble	• In accordance with the integrated waste management approach to be followed through the decommissioning and construction phases of the development, materials used or generated by construction or the construction areas of other projects on the site shall be re-used as far as possible. **Clean** builders' rubble and soil/sand/rock may therefore be used as infill material / backfill material at the ECO's discretion. • All builders' rubble is to be removed from the works area on a weekly basis, unless approved otherwise by the ECO. • The Contractor shall provide resources to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least twice a week, or more frequently if specifically

	required. • Rubble shall be temporarily stockpiled in a waste skip or a central stockpile and shall be removed from site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site. • No plastics, shrink wrap, paint buckets or any other debris that do not constitute clean building rubble, shall be stored at such stockpile sites.

ISSUE	MANAGEMENT / MITIGATION MEASURES
NOISE MANAGEMENT Management Statement and objective: To avoid and/or minimise impacts on the surrounding land users and ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents. Impact Management Outcomes: No disruptions or nuisance to other users of the site or adjacent to the site by noise from the construction site. Effective complaints handling. No repeat complaints received.	
Management of potential noise disturbance	• Noise, at a level typically associated with construction activities, would be experienced by surrounding land users during construction works: • The Contractor's attention is drawn to the Noise Regulations as promulgated in terms of the relevant Local Authority bylaws. • The Contractor must note that noise complaints received by the City of Cape Town Noise Control Administration outside the allocated times as stipulated in the National Building Regulations will be dealt with in terms of the Western Cape Noise Control Regulations, 2013. • All noise and sounds generated by machinery must adhere to SABS 0103 specifications. • In terms of noise legislation, a noise exemption permit needs to be obtained if the limits as contemplated in legislation will be exceeded for any given period. This requires obtaining of signatures from affected parties within a 150 m radius of a site. • Working hours must be restricted to normal daily working hours considered in the construction regulations. Should works be necessitated outside of these hours, surrounding users of the site must receive timeous notification. • Machinery to be fitted with silencers and no sound amplification equipment such as sirens, loud hailers and hooters may be used on site except in emergencies. • No amplified music shall be allowed on site. • No noise generating work may take place at night unless prior approval was granted by the local

ISSUE	MANAGEMENT / MITIGATION MEASURES
NOISE MANAGEMENT Management Statement and objective: To avoid and/or minimise impacts on the surrounding land users and ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents. Impact Management Outcomes: No disruptions or nuisance to other users of the site or adjacent to the site by noise from the construction site. Effective complaints handling. No repeat complaints received.	
	municipality and notification was sent to the surrounding residents. Should there be a need to work outside these hours, an application for noise exemption needs to be submitted to the nearest City of Cape Town Health Office for consideration. • The Contractor shall take preventative measures, such as screening, muffling, timing, and pre-notification of affected parties to minimise complaints regarding noise. • The Contractor shall control the movement of all vehicles and plant including that of their suppliers so that they remain on designated routes/haul roads, so as not to cause an undue environmental damage.

ISSUE	MANAGEMENT / MITIGATION MEASURES
DUST MANAGEMENT Management Statement and objective: No unacceptable levels of dust. To avoid and/or minimise impacts on the surrounding users and activities and to ensure that any such impacts are appropriately dealt with to prevent further impacts in the longer term. To prevent wind and water erosion and/or sedimentation of any features surrounding the site. To provide a forum for any Interested and/or Affected Parties to raise their concerns and log complaints for remediation action and prevention of similar incidents. Impact Management Outcomes: No nuisance to surrounding users of the site and site activities caused by dust. Effective complaints handling. No repeat complaints received.	
Prevention of dust nuisance	• All Local Authority Bylaws as well as the National Dust Control Regulations, Notice R.827 of 2013 must be adhered to. • Land clearing and planting/construction should be phased as far as possible such that land is not left open and unplanted for long periods of time. • The Contractor shall take all reasonable measures to minimize any dust nuisance and inconvenience to or interference with the public (or others) as a result of the execution of the works. A Method Statement will be required in this regard as determined by the Project Manager and ECO. • During windy and dry conditions, dust suppression methods must be employed, for example on project roads. NOTE: The use of potable water for dust suppression is not permitted when water restrictions are in

	place and discouraged even when water restrictions are not in place. • Stockpiles of materials as well as the loads on all trucks transporting any material that could lead to dust pollution should be covered with a tarpaulin or similar cover to minimise dust / windblown sand. • In extreme cases, a dust suppression product (e.g. dustex) should be used. • Excavation, handling, and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. • All access and haul routes/ roads shall be cleared from debris deposited by construction vehicles associated with this project. • The Contractor shall be responsible for any clean-ups resulting from the failure by their employees or suppliers to properly secure transported materials. • The Contractor shall take preventative measures, such as screening, dust control, timing, and pre-notification of affected parties to minimise complaints regarding dust. • If, in the reasonable opinion of the ECO, excessive dust is noted or complaints regarding dust exceed 1 complaint a week, the ECO may request dust fallout monitoring to be undertaken to determine the need for additional control measures.

ISSUE	MANAGEMENT / MITIGATION MEASURES
LABOUR RELATIONS, FACILITIES AND SITE HEALTH AND SAFETY Management Statement and objective: To ensure the safety of all site personnel as well as the surrounding users of the site. Impact Management Outcomes: No injuries / incidents on site and emergency situations managed effectively. No safety breaches.	
Employment	• Make use of local previously disadvantaged individuals for the bulk of the unskilled labour as well as for the skilled labour, where feasible.
General safety	• Environmental awareness training courses shall be run for all personnel on site. All new staff and sub-contractors' employees that spend more than 1 day a week or four days in a month must attend the environmental education program within 1 (one) week of commencement of work on site. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be handed to the Project Manager. • The Contractor shall at all times observe proper and adequate safety precautions on the site. • Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.

Environmental Awareness Training	• Environmental awareness training courses shall be run for all personnel on site. Courses shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participants' names, a copy of which shall be filed in the (site) environmental file. • Refer to Section 12.2 for further details in this regard. • The Contractor shall erect and maintain information posters for the information of their employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at the eating areas and any other locations specified by the Engineer.
Health and Safety Induction	• A health and safety induction concerning asbestos and the Asbestos Regulations is to be provided by the appointed accredited asbestos inspection authority prior to the commencement of site works. • Ensure that all contractors required to perform work at the asbestos waste consolidation site be informed about the potential asbestos exposure risks and the requirement to wear at minimum suitable and approved dust masks (i.e. type FFP2) (Morris et al, 2011). • All other persons entering the site (Engineers and the professional team members) must have had asbestos training by a competent person. Training must be specific to the site and conditions of asbestos exposure on the site (OHMS can offer this services). • All persons entering the site must have asbestos medicals carried out by an Occupational medical practitioner. • The Occupational Exposure Limit should be discussed. • Workers must comply with the safe practices set by the Department of Labour in this respect. • The induction must also explain the precautions to be taken to prevent the health risks associated with exposure (e.g. wearing the prescribed respiratory equipment), the importance of good housekeeping and personal hygiene and the safe work procedures that are to be followed on site as per the Method Statement that is to be compiled by the accredited asbestos inspection authority. • A record of this training must be kept for as long as the relevant staff are working on the site on which they could be exposed to asbestos.
Fire Safety	• No fires may be lit on site. Any fires, which occur, shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. Burning is not permitted as a disposal method for waste. • The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for their

	approval seven days prior to the date of the environmental awareness training course. • The Contractor shall ensure that there is basic firefighting equipment available on site at all times.
General site security	• No unauthorised firearms are permitted on site and access to the work site by unauthorised persons is to be prevented by the Contractor as far as is practical. • The work site is to be secured and access by members of the public is to be prevented. • The Occupational Health and Safety Act (Act 85 of 1993) and the requirements of the Construction Regulations must be complied with. • Apart from any security staff who may be required to stay overnight at the Contractor's camp, no personnel will be permitted to live on site. • Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires), access to toilet facilities and communication equipment.
Trenching	• Trenching for services must be carried out in accordance with the project description in this EMPr. Where any approved Waste Management License or Environmental Authorisation differs, then the description in the EMPr is superseded by said approval. • Any trenching required for the provision of services to the site shall be done in an environmentally sensitive manner. • Trenching for services should be done in accordance with the engineering specifications (SANS 1200DB). • Trenching shall be kept to a minimum through the use of single trenches for different services. • The planning and selection of trench routes shall be undertaken in liaison with the Project Manager and cognisance should be given to minimising the potential for soil erosion. • Trench routes within permitted working areas shall be clearly defined and marked beforehand with, for example, painted stakes. • Trench lengths shall be kept as short as practically possible before backfilling and compacting. • Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner. • Where there is a particularly high erosion risk, anti-erosion measures shall be implemented e.g. a fabric such as Geojute (biodegradable). In addition, the ECO and Landscape Architect must be consulted if the removal of any landscape planting is unavoidable. • Measures should be instituted to safeguard workers in service trenches from collapse of the sidewalls of the trenches (see safeguarding measures below). • Trenches should be safeguarded against the collapse of sidewalls by means of support plates against the walls which in turn is mounted with support arms. The support plates / panels should be adjustable to

	accommodate trenches of various depths. • Subsurface services should be designed and constructed so that they are located sufficiently far from buildings that their backfilled trenches do not interfere with the foundations of other structures. • Trenches must be built with slopes that allow fauna that fall in to escape. • All trenches shall be checked each morning before commencement of works for trapped animals, in which case, the animal shall be safely removed, in consultation with the ECO.
Ablution facilities	• Toilet and washing facilities must be located a minimum of 50 m from the stormwater pond. • Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. • Latrine and ablution facilities and first-aid services shall comply with the regulations of the local authority concerned and shall be maintained in a clean and sanitary condition to the satisfaction of the ECO. • The Contractor shall provide suitable sanitary arrangements at the Contractor's Camp and approved points around the designated work area to allow easy access to all employees on site. • No staff members are permitted to commence with work on a site without suitable toilet facilities available for them. • Sanitary facilities shall be located within 150 m from any point of work. • One chemical toilet is to be provided on site for every 15 contract personnel at each working area. These toilets must have doors and locks and shall be secured to the ground to prevent them blowing over. • Toilet paper shall always be provided. • Toilets are to be emptied as and when required and always prior to builders' holidays. • The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. • Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. • The Contractor shall maintain the toilets in a clean, neat, and hygienic condition. If the Contractor fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the Project Manager may order the Contractor to suspend any or all work on the site until these requirements are met. No payment shall be made for any delays or disruption of the works caused thereby nor shall extensions of time be granted for such delays.
Eating Areas	• The Contractor shall designate eating areas to the approval of the Project Manager which shall be clearly demarcated. Enough tamper- and wind- proof bins shall be present in this area. • The Contractor shall erect and maintain information posters for the information of their employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters

	shall be erected at the eating areas and any other locations specified by the Project Manager.
Drinking Water	• The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site, then the Contractor shall import drinking water to the site.
Working Hours	• Working hours must be restricted to normal daily working hours considered in the construction regulations and the National Building Standards SANS 10400:1990. • If works are to take place outside of normal working hours, the ECO and the Project Manager are to be notified and disturbance to the surrounding land users is to be prevented. • Note that legislation requires the Contractor to obtain approval for carrying out works at night. This entails obtaining signatures from everyone within a 150 m radius of a site. Furthermore, the Project Manager will, where required, notify the relevant Authority of work done outside of normal working hours.

ISSUE	MANAGEMENT / MITIGATION MEASURES
AESTHETICS (VISUAL) Management Statement and objective: To ensure that visual impacts are avoided as far as possible, and where these cannot be altogether avoided, that it is reduced to acceptable limits. Impact Management Outcomes: No unacceptable visual impacts occur as a result of decommissioning and construction activities.	
Site Housekeeping	• The Contractor shall take appropriate measures to ensure that decommissioning and construction activities do not have an unreasonable impact on the aesthetics of the area. • Should it be deemed necessary, the ECO may request that activities which may have a high visual impact be suitably screened off to the surrounding environment. Site construction hoarding / fencing should be neutral in colour and free of excessive branding. • The decommissioning and construction phase is to be of limited duration. The duration period will be confirmed in the detailed Method Statement and approved by the Engineer. This is to ensure that the site does not become a permanent building site. • The Contractor shall supply and maintain adequate and suitable sheds or containers for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weather-proof, adequately ventilated and provided with raised floors. • All site establishment components (as well as equipment) shall be positioned to limit visual intrusion surround users and the size of the area disturbed.

	• The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection. • The Contractor shall ensure that any lighting installed on the site for their activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area. Site lighting should be kept to a minimum and should not be flood type lighting where possible, particularly over the stormwaterpond. • Neon, spot, or up- lighting are visually inappropriate. Light sources should be screened and filtered as far as possible. • Construction signage should not be excessively sized or located along sensitive visual corridors. • Excavation machinery and trucks should be stored and kept out of sight of surrounding residential areas and scenic routes where possible. • Construction signage should not be excessively sized or located along sensitive visual corridors. • Excavation machinery and trucks entering and leaving the site should take care not to leave rubble, sand, rock, branches, and the like on roads linking to the site.

ISSUE	MANAGEMENT / MITIGATION MEASURES
PROTECTION OF NATURAL FEATURES AND FAUNA • Management Statement and objective: To protect any protected plant species on the property and prevent harm to fauna found on the site. Appropriate temporary storage and stockpiling of topsoil to prevent erosion, sedimentation, and dust pollution. • Impact Management Outcomes: No removal of vegetation and/or other impacts on any vegetative cover in the area outside of site limits. No death of any animals on the site or as a result of actions of removing fauna off site.	
Flora- Translocation of remaining Cape Flats Sand Fynbos	• The plant search and rescue shall be undertaken as described in "Site Camp/ Site Establishment- **Site Clearance- Vegetation Clearance and Translocation of *Lampranthus explanatus" of this EMPr***.
General	• Trapping, poisoning and/or shooting of animals is strictly forbidden. • No domestic pets or livestock are permitted on site with the exception of a guard dog used by the security services.
Site Clearance	• Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement. • All clearing activities must deploy search and rescue teams in front of clearing machinery and clearing should take place toward the stormwater pond and/or proposed green areas.

	• For the landscaped areas, following implementation of landscaping, the site must be inspected at least weekly for alien and invasive seedlings, and these removed and destroyed.
Management of potential disturbance to fauna	• Site inspections are to be conducted prior to the commencement of clearing activities to allow for any faunal species to be removed from the area. • Assist (harmless) animals in moving: When animals are observed and they appear to be trapped or unable to escape to a safe area, they should be assisted in so doing. Animals that are potentially dangerous should be moved with the help of knowledgeable and experienced persons. It is recommended that the Cape Reptile Club (Secretary: Marcel Witberg: 082 784 7314) be approached for the contact details of a local person who would be able to be on site at short notice, should a situation arise. This person should be put on standby for the period of site clearance. • If animal species are encountered in the course of site clearing or earth moving activities the ECO or the Contractor's Environmental Officer (if the ECO is not on site) must be consulted so that any animals vulnerable to injury can be moved. • Hunting of any animal species is strictly prohibited. • If any dangerous species are encountered, the ECO must be consulted regarding their removal and all Contractor employees shall be moved away from the area until a professional can remove the animal in a safe manner. • Do not leave holes and trenches open for extended periods of time. Holes and trenches should be left open for as short a period as possible, because such cavities act as pitfall traps for small animals. Trenches must be built with slopes that allow fauna that fall in to escape. • Workers must not be allowed to trap animals on site. • Prevent employees/workers from killing snakes, and hunting reptiles, amphibians, mammals and birds through environmental training and awareness. • Educate workers which snakes are venomous/nonvenomous and differentiate between defensive and aggressive behaviour. Workers must not kill snakes.

ISSUE	MANAGEMENT / MITIGATION MEASURES
PROTECTION OF ANY PALEONTOLOGICAL AND ARCHAEOLOGICAL RESOURCES Management Statement and objective: Protection of archaeological and/or palaeontological resources on the site. Impact Management Outcomes: No non-conformances and no impacts on such resources and proper execution of the excavation thereof.	
General	• Should any evidence of burials or archaeological material be discovered during earth-moving activities, all works must be stopped immediately, and Heritage Western Cape be notified without undue delay. The ECO must also be notified. Failure to notify the ECO of a find will result in a penalty. • Note that potential heritage, archaeological or paleontological material could be graves, human burials, stone hand tools, remnants of old structures not previously visible, old ceramic shards etc. • If any human remains are discovered during earth moving activities, they are to be treated with respect and the South African Police Service contacted immediately. Should the SAPS indicate that the remains are older than 60 years, SAHRA should be notified. An archaeologist should be contracted to remove such remains at the expense of the developer. A maximum of 30 days should be set-aside in the construction program for the recovery of archaeological material where/if discovered. The contact details for the SAHRA are as follows: 111 Harrington Street, Cape Town, 8001 P O Box 4637, Cape Town, 8000 Tel: (021) 462 4502 Fax: (021) 462 4509 Email: director@sahra.org.za

ISSUE	MANAGEMENT / MITIGATION MEASURES
INCIDENT MANAGEMENT Management Statement and objective: To guide the way in which emergencies and/or environmental incidents are handled on site and remediate any damage appropriately. To prevent the starting of fires on site. Impact Management Outcomes: No non-conformances and no adverse impacts on the environment as a result of emergency situations and/or environmental incidents. No fires started on the site. Swift response to incidents.	
General	• Method Statements are required for the management of fire incidents as well as for accidental leaks and spills.
Prevention of fires	• No fires shall be permitted on site. Notices are to be prominently displayed that no fires are allowed. Any fires that occur, shall be reported to the Project Manager immediately.

	• Burning is not permitted as a waste disposal method. • Smoking shall only be permitted in designated smoking areas, depicted by the appropriate signage. Such areas shall not be located close to fire hazards. Notices are to be prominently displayed prohibiting smoking in areas that are deemed fire hazards. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. • The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until they can no longer control it. • A fire evacuation route is always to be clearly demarcated and kept clear of obstruction. The Contractor shall ensure that their employees are aware of the procedure to be followed in the event of a fire. • The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Project Manager for their approval seven days prior to the date of the environmental awareness training course. • The Contractor shall supply all site offices, kitchen areas, workshop areas, materials, stores, and any other areas identified by the ECO with tested and approved firefighting equipment. Firefighting equipment is to be maintained in good working order. • Welding, gas cutting or cutting of metal will only be permitted within specifically designated and adequately marked areas on the site. These sites are to be approved by the ECO. • All flammable material is to be stored in a suitable lockable storage area and combustible materials may not accumulate on site. • Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided and are to conform to the requirement of SABS 1186. The volume capacity of any fuel tanks shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1. • Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product. • In the event of a fire emergency: o The site supervisor or worker should sound the fire alarm; o The site supervisor or worker should notify the Brackenfell Fire Station (021 417 0151); o All workers on site should go to the designated emergency assembly point; o The Fire Officer shall do a head count of all workers and ensure all personnel are present; and o When the Fire Brigade arrives, the Fire Officer shall provide them with all the information they

	require regarding the incident.
Accidental Leaks and Spillages	• The Contractor shall ensure that their employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Project Manager and the relevant authorities (i.e. DFFE, DEA&DP, City of Cape Town). • Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Project Manager and ECO. • The site shall have a suitable number of spill kits available. A spill kit (with the supply of absorbent material) shall be readily available at works areas to absorb any emergency hydrocarbon spills, and where possible be designed to encapsulate minor hydrocarbon spillage. There are several products on the market, which are designed and suitable as absorbents and encapsulators of hydrocarbons. The following are examples of those products used to contain incidental spillage: - Spill-Sorb – oil and chemical absorbent and encapsulating products - Drizzat Pads - Enretech Powder – absorbent and encapsulator - Peat moss
	• Treatment and remediation of spill areas shall be undertaken to the satisfaction of the ECO. In the event of a spill: - The source of the spillage shall be isolated. - The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, and sawdust or other absorbent materials. - Cordon off and ensure safety of the spillage area. - Notify the Project Manager, ECO, and the Pollution Control Inspectorate (if serious spillage has occurred in a sensitive environment). - The ECO (in consultation with the Pollution Control Inspectorate where necessary) shall determine the need for further remedial actions. - All cleared materials will be treated as hazardous waste and disposed of as such, in accordance with the waste management specifications of this EMPr.

ISSUE	MANAGEMENT / MITIGATION MEASURES
RESOURCE USE (RAW MATERIALS AND RESOURCES) Management Statement and objective: To prevent excessive and unnecessary use of natural resources and wasting of natural resources during the decommissioning and construction phase. Impact Management Outcomes: Development of an attitude towards a reduction in natural resources consumption where feasible and possible	
Water Use	• Conduct activities in accordance with any water restrictions set by the local Municipality in terms of the applicable By-Law which may be in place at the time. • At the time of writing this document, the Western Cape is on the tail-end of a severe drought. With that in mind, Contractors are encouraged to use treated effluent water for construction activities as far as possible. Contractors may approach the Municipality for the use of treated effluent water. • The use of drinking water for non-structural work such as dust control, is prohibited. • As far as possible, limit the use of potable water to activities which require them. • It is suggested that a temporary storage tank for rainwater be set up at the construction camp, which could collect rainwater during the construction phase for use in the works. This would, however, only apply if construction takes place during the winter months (i.e. June to August). • Dripping taps/ leaking pipes should be addressed immediately to limit waste of water.
Energy/Fuel Use	• Plant should not be left running while not in use.
Construction Materials	• Make use of locally supplied building materials where possible. • Reclaimed building materials should be used where possible. • No materials containing invasive plant seeds, litter or contaminants may be imported. The Supplier shall be informed of the sites of origin of imported gravel, sand, stone, etc. and shall have the authority to reject imported material if deemed necessary. • Durable building materials to increase the lifespan of the capping and development should be used. • Low VOC paints and building materials should be used. • Adequate storage facilities for raw materials should be provided in order to minimise damage during construction works. • Where possible, suppliers with a green footprint or certification are to be used.

ISSUE	MANAGEMENT / MITIGATION MEASURES
SITE CLEANUP AND REHABILITATION Management Statement and objective: To prevent impacts on the environment as a result of the conclusion of decommissioning and construction activities and any related impacts requiring rehabilitation actions prior to the contractors leaving the site. Impact Management Outcomes: Provision of a decommissioned asbestos dump site and redevelopment whereby all construction-related materials are no longer evident and rehabilitation of all disturbed areas, both on and off-site.	
Site clean-up and rehabilitation	• The rehabilitation of disturbed areas must take place as soon as possible post construction (Belcher, 2012). Constructed areas should be covered with suitable vegetation cover as soon as possible after construction is completed (Belcher, 2012). • All topsoil and sand brought onto the site should be inspected for seedlings throughout construction. Seedlings must be removed regularly. • Once construction is complete, the green areas of the site plan should be fully planted. • Any waste material should be removed from the site during and after construction works is complete. • After construction, any areas within the maintenance footprint that have been degraded from their condition prior to construction and as a result of the construction activities must be restored to their former condition. • The Contractor shall ensure that all temporary structures, equipment, materials, waste, and facilities used for construction purposes are removed upon completion of the project. • The site clean-up shall be to the satisfaction of the Project Manager/Engineer and the ECO. • Where appropriate, the Contractor shall employ a suitably qualified person to rehabilitate areas damaged by construction activities during the project. • The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Project Manager/Engineer. • The Contractor's procedure for rehabilitation shall be approved by the ECO and the Project Manager/Engineer and where required, the Local Authority environmental representative. • No fencing or loose rope should be left on site.
Landscaping	• Landscaping must be carried out in accordance with an approved Landscape Plan (approved by the City of Cape Town).

ISSUE	MANAGEMENT / MITIGATION MEASURES
LANDSCAPING IMPLEMENTATION Management Statement and objective: To ensure landscaping is carried out in terms of an approved Landscape Plan Impact Management Outcomes: No deviation from the approved Landscape Plan, which would provide green areas on the site	
Implementation of the Landscape Plan	• Landscaping must be carried out in accordance with an approved Landscape Plan (approved by the City of Cape Town). Note that the aspects listed below would be superseded by the approved Landscape Plan, where there are differences or opposing requirements. • **Plants**: Only indigenous vegetation is allowed in all landscaped areas and the landscaping of road reserves to increase the amount of green space. Locally indigenous wetland species must be used in the vicinity of the wetland. The Bracken Nature Reserve plant specialist should be consulted for examples of plants to be used in landscaping. No declared invasive alien species may be used. Only locally occurring indigenous vegetation that blend in with the surrounding environment is allowed to be utilised. The use of alien invasive species is prohibited. The Bracken Nature Reserve plant species list should be consulted for examples of plants to be used in landscaping. Plants must be of acceptable health and vigour as directed by the Landscape Architect and must be free of pests, diseases and weed seed. • **Scope:** Landscaping shall be undertaken under the direction of the landscape architect for the project in accordance with the landscape master plan and design approach. • **Materials:** All materials must be approved by the Landscape Architect who shall be informed of the source of imported topsoil, organics, chemical fertilisers, sand, stone etc. They shall have the authority to reject imported material if deemed necessary. No materials containing invasive plant seeds, litter or contaminants may be imported. • **Chemical fertilizers and pesticides:** Only approved pesticides shall be used for this development. Chemical fertilisers should be avoided in favour of the use of organic fertilizers. All chemicals and pesticides shall be strictly handled as per the manufacturers' instructions. • **Topsoil:** Topsoil shall not be compacted in any way, especially not by vehicles driving over it. • **Timing of planting**: The Contractor shall not begin planting until all construction activities in the area to be vegetated have been completed. (The planting for indigenous vegetation is late autumn and winter.). • **Preparation of ground surfaces**: Prior to the planting of the Site, the Contractor shall remove all remnants of building materials, concrete foundations, timber and other foreign debris from the planting areas. • **Establishment**: Establishment shall consist of maintaining the surface to the required slopes and levels

	without erosion or sedimentation, watering, weeding, composting, pruning, and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site. Establishment shall commence immediately after planting and shall continue until a satisfactory cover has been achieved.

18.5 PENALTIES AND BONUSES

Where the Developer fails to ensure that the Project Manager and Contractor are not provided with this EMPr or where an ECO is not appointed prior to commencement of construction works, a fine of R50, 000.00 (excl. VAT) should be imposed and the Environmental Authorisation should be suspended or revoked (this would be at the discretion of the DFFE) until such time as the situation has been rectified to the satisfaction of the DFFE. Furthermore, a retrospective audit of the construction activities should be carried out against the specifications of the EMPr by an independent, suitably qualified ECO at the expense of the Developer. The retrospective audit should also suggest fines in line with those recommended in the EMPr for any non-compliances and should be provided to the Local Municipality and DFFE for comment.

This penalty is to be paid to a local environmental non-profit, as approved by the ECO and authorities.
Where the Contractor inflicts damage upon the environment or fails to comply with any of the Environmental Specifications contained within this EMPr, they shall be liable to pay a penalty for breach of the conditions of the Environmental Specifications which form part of the works contract.
The Contractor is deemed NOT to have complied with these Environmental Specifications if:

- There is evidence of contravention of the Environmental Specifications within the boundaries of the site, site extensions and haul/ access roads;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the Project Manager within a specific time; or
- The Contractor fails to respond adequately to complaints from the public.

Penalties shall be issued per incident and per individual for the Contractor's responsibility. The amount of the penalty shall be determined by the ECO, in consultation with the Project Manager. The Project Manager shall inform the Contractor of the contravention and they shall notify the consulting quantity surveyor to deduct such a penalty from monies due under the Contract prior to the issuing of the monthly payment certificates.
Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties (not an exclusive list) shall be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications and shall be imposed by the Project Manager on the Contractor for contraventions of the Environmental Specifications by individuals or operators employed by the Contractor and/or their sub-contractors. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment, as indicated in the table below:

OFFENCE	PENALTY
Contractor's Environmental Officer fails to complete and provide ECO with weekly environmental checklist	R1,000 per week not submitted, with 50% added to each subsequent transgression
A Contractor fails to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr	R 500- R5000
The Contractor fails to produce Method Statements on identified aspects of the project prior to commencement of that aspect	R 5,000 per Method Statement
The Contractor's Environmental Site File is incomplete/non-existent	R 500, doubling with every week not done
The Contractor fails to keep activities within the site boundaries	R 1,000
Dust and/or erosion occurs because of lack of appropriate implementation of mitigation measures	R 200
Green waste is not disposed of at an approved waste site or composting facility	R400
Trespassing of people into no-go areas	R 500
Trespassing of machinery or equipment into no-go areas	R 500 – R 2 000
Delivery drivers are off-loading without supervision	R 1000
Loads for transporting are unsecured or uncovered	R 500
Temporary storage of fuel used for construction purposes is not within specifications	R 100- R3,000
Fuel is dispensed with the incorrect equipment	R 900
Individuals are smoking in the vicinity of the fuel stores	R 400
Appropriate safety signs (e.g. Danger) are not displayed	R 500
There is a lack of firefighting equipment at the fuel stores	R 1000
The storage areas fail to comply with standard fire safety regulations	R 400
Inadequate supply of material to absorb / breakdown and encapsulate minor hydrocarbon spillage	R 1,000- R6,000
An integrated waste management system is not established	R 1000- R2000
Waste is buried as a means of disposal	R 1000- R4000
There is evidence of littering	R 100 per item
Appropriate scavenger and weatherproof bins are not supplied	R 1,000- R3000
Bins are overflowing	R 500 per bin
Refuse is not removed or disposed of at an approved site	R 100-R1000
Empty cement bags are not removed from the construction area and placed under cover or discarded in the hazardous waste stream	R 1,000- R3000
Hazardous waste is not stored in an enclosed area	R 3000
Hazardous waste is not disposed of at a hazardous waste disposal facility	R 500 – R3000
Rubble is not appropriately stored in a skip or central stockpile	R 500
Materials that do not constitute clean building rubble are stored at the stockpiling site	R 200
An individual makes use of areas other than the designated facilities for ablutions	R 200
Latrine facilities and first-aid services are not in a sanitary condition	R 500
Insufficient provision of toilets	R 1000
Toilet waste (sewage) is discharged or buried in the environment	R 1000 – R2000
Potential pollutants are not stored safely away to prevent pollution of ground or surface water	R 500- R2000
Washing of vehicles or cement chutes occurs on site	R 800
Hazardous chemical substances are not stored in secondary	R 800- R2000

containers	
Paint products, chemical additives or cleaners are being disposed of on site	R 200 – R 3000
Adequate sheds/ dry containers for the storage of materials are not provided	R 500
Maintenance of plant occurs on site when only emergency maintenance is permitted	R 200
Emergency maintenance is performed without efforts to prevent contamination of the surrounding environment	R 100 – R1500
Individuals fail to repair leaking equipment immediately	R 100 per item
Drip trays are not provided in construction areas under all relevant plant/equipment	R 100 – R500 per absent drip tray
Drip trays are cracked, compromised or leaking	R 100 – R500 per absent drip tray
Effective silencing devices are not in use to reduce noise impacts	R 50
Amplified music is heard on site	R 50
Failure to provide environmental awareness training to all site personnel	R 1000 per staff member/ worker
Necessary Information posters (procedures for ensuring compliance) are not displayed	R 500 per week not displayed
Lighting of fires occurs on site	R 200 – R 10 000
Smoking occurs outside of designated areas	R 20 – R 50
Unnecessary spillage of cement due to inadequate prevention measures, or haphazard working procedures	R 500 – R 1 500
Spillage of cement products are not rectified to the satisfaction of the ECO	R 50 – R 1000
Cement is not stored in a suitable weatherproof location	R 4000
Polluted runoff is reaching groundwater/stormwater	R 200 – R 6 000
Screening and suitable containment is not in place /constructed in the concrete batching area	R 100 – R 40000
Hydrocarbon spills are not isolated, contained, cleared, and rehabilitated	R 100 – R 6 000
Appropriate safety precautions are not implemented	R 20 – R 1 000
Unauthorised firearms are present on site	R 1 000
Personnel other than security staff are living on site	R 1 000
Animals are being trapped, poisoned, shot, or harmed	R 1,000 – R 5,000
Erosion or sedimentation caused by construction is not rectified	R 400 – R 6 000
The ECO is not notified of heritage or archaeological remains found	R 8 000
Trenching is conducted without the specified environmental specifications	R 1000
Failure to avoid stormwater impacts through the adequate protection of stormwater inlets	R 100 per inlet
Unapproved materials are used for landscaping (e.g. invasive plant seeds)	R 50 – R 2000
All elements of the site are not removed during clean-up for closure	R 100 – R 3000
A specialist is not employed for rehabilitation where necessary and previously advised by the ECO	R 500- R2000
The site not demarcated as required	R 300- R3000
Water wastage	R 100 – R 3000
Method statements not appropriately and/or fully implemented	R 500 – R 6,000 per Method Statement
Speed limit on site not adhered to	R 100
A plant operator ignoring a verbal warning to have an oil leak from machinery repaired	R300.00

For each subsequent similar offence, the penalty shall be doubled in value to a maximum value of R100 000.00.

The following penalties are suggested for transgressions where damage has been done to the environment:

a.	Erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%
b.	Oil spills	A penalty equivalent in value to the cost of clean-up operation plus 20%
c.	Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus 20%.
d.	Damage to archaeological finds	A penalty to a maximum of R 100 000 shall be paid for any damage to any archaeological sites/finds

All monies collected through penalties shall be held an environmental fund by the Developer and be accounted for. A summary page is to be included with the monthly payment certificates as a record of penalties issued to date. A portion of these funds may be used for token monetary bonuses to individual site staff members that have shown exceptional diligence in applying good environmental practice on the site. The remaining funds shall be allocated for the purposes of contributing to environmental education efforts in the local community e.g. for environmental books for the library, posters, excursions or trees for the local school or environmental resource material for the local public library. The Developer, in consultation with the ECO, Engineer and possibly the local authority, will make a final decision regarding the precise allocation of all penalty funds. Documentation accounting for all penalty funds obtained and how these funds were utilized shall be copied to CCT: Environmental Unit, D: EA&DP and DFFE, together with the environmental closure documentation on completion of the project.

19 MEASUREMENT AND PAYMENT

- **Basic Principles**

No separate measurement and payment will be made to cover the costs of complying with the provisions of these Environmental Specifications except in the case of the points noted below and as scheduled items. Such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting their tender.

Some of the important cost items have been listed below to assist the Contractor in making provision for implementation of the Environmental Specifications. This list is by no means exhaustive and should only be used as a guideline.

a) **Protection of stock piles from blowing or washing away:** The spraying or covering of stockpiles, including the supply of the spray or cover material, as required.

b) **Trench shielding / protection:** Including all required support structures and resources required.

c) **Storage of fuel and oils:** The supply, construction, installation, transport, upkeep and removal of all facilities required for storage and management of fuel and oils.

d) **Cement laden water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for the management of wastewater from concrete operations.

e) **Contaminated water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing contaminated water.

f) **Storm water and flood management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing storm water run-off from the site and protection of works from flooding.

g) **Bunding and management of run-off from workshop areas and supply of drip trays for stationary and "parked" plant**: The supply, construction, installation, transport, upkeep and removal of all facilities required for bunding and managing the run-off from workshop areas as well as all drip trays required.

h) **Dust management**: The supply, application, transport, upkeep and removal of all materials required to ensure that dust is adequately controlled.

i) **Solid waste management:** The supply, application, transport, upkeep and removal of all materials required to ensure that solid waste is adequately controlled (including a waste sorting and recycling program).

j) **Fire control:** The supply, transport, upkeep and removal of all material required for fire control.

k) **Eating areas:** The supply, construction, installation, transport, upkeep and removal at the end of the construction of all eating areas structures.

l) **Ablutions**: The supply, maintenance, regular emptying and removal of toilets.

m) **Site demarcation:** The supply, installation and removal at the end of the construction of all temporary fences.

- **Scheduled items**

a) **Provision of venue and staff attendance at the environmental awareness training course**

The provision of a venue (note that the site could be a suitable venue) and attendance at the environmental training course will be measured as a lump sum.

The sum shall cover all costs incurred by the Contractor in providing the venue and facilities and in ensuring the attendance of all relevant employees and sub-contractors, at the training.

b) **Method Statements: additional work**

No separate measurement and payment will be made for the provision of Method Statements but, where the Engineer requires a change on the basis of their opinion that the proposal may result in, or carries a greater than warranted risk of damage to the environment in excess of that warranted by the Environmental Specifications, then any

additional work required, provided it could not reasonably have been foreseen by an experienced Contractor, shall be valued accordingly.

20 OPERATIONAL PHASE

20.1 SCOPE, RESPONSIBILITY, AUDITING AND REPORTING

20.2 Roles and Responsibilities

The responsibility of the requirements of Section 11 of the EMPr ultimately lies with the holder of the Environmental Authorisation, namely the Applicant, although the Owners' Association would largely be responsible for the implementation thereof. The local and/or provincial environmental authorities may at any given time conduct site visits to audit compliance with these specifications.

The Operational EMPr immediately comes into effect upon the commencement of any operations on site related to the SDF, and not only once the entire SDF has been developed.

- **The Applicant**

The Applicant/Proponent/Landowner is ultimately responsible for the implementation of the requirements of the EA and this EMPr.
It is the responsibility of the Applicant to clearly communicate all requirements of this EMPr to any and all Developers and land users involved in the proposal, including the Property Owners' Association (POA), if one is to be formed. The EMPr should be included in all contracts, tender documents and leases.
In addition, prior to handing over to the POA, the Applicant must:

- Ensure that the operational phase measures are included in contracts with any land users of the site and that a POA is established to carry out the operational requirements of the EMPr.

Note that, immediately upon completion of the construction of the stormwater facilities, regular maintenance is required. Should a POA not yet be established, **the Applicant is to take responsibility for this task**.

Note also that the management of open and green buffer areas is to be the Applicant's responsibility until such time as a POA is established.

Should a POA or Owner's Association not be established (which is a decision that would be taken by the Applicant and landowner), then the responsibility for all actions required by a POA/Owners' Association will fall upon the Applicant and these words are then considered to be used interchangeably within this document to refer to the same entity.

- **The Property Owners' Association**

The POA would be established to manage the site. For the purpose of this document, the POA represents the body corporate of the development (i.e. the light industrial park) elected by the various land users and owners to manage the affairs of the site. The POA, and the business owners and land users thereby represented, are ultimately responsible for compliance with all conditions of the operational phase of the EMPr or any aspect thereof by any authority.
The responsibilities of the POA are to:

- Ensure that the requirements, as set out in section 11 of this EMPr, are adhered to and implemented;
- Ensure that the requirements of in section 11 of this EMPr are understood by all new tenants, owners and service providers;
- Remediation of non-compliances, in consultation with a suitable specialist and/or environmental consultant as well as covering the cost of this;
- Issue of penalties for transgressions of in section **Error! Reference source not found.** of this EMPr;
- Accurate and up-to-date record keeping; and
- Provide input into the independent environmental consultant's and ECO's on-going review of the OEMP and audits of the site.

- **The ECO**

The ECO is to be appointed by the POA responsible for ensuring that the Operational aspects of the EMPr are being implemented on site by the POA during the operational audit (and any further audits as required by the authorities).

The ECO has the authority to recommend changes in the EMPr (subject to the approval by the DFFE) and issue penalties against non-compliance with the EMPr.

20.3 Auditing and Reporting

Compliance with the operational EMPr must be audited by an independent environmental professional. Initially, 6-monthly compliance audits must be carried out until the site is fully developed. It should be noted that, during this time, specifications for construction and operation may be relevant given that certain components of the site plan may be operational while others are still under construction. Audit reports must be submitted to the DFFE and the Applicant.

Following this, due to the limited nature of operational activities and associated impacts, as well as the fact that mitigation for the adverse operational impacts would be implemented (and therefore audited) during the design and development phase, independent compliance auditing by an environmental professional is not warranted during the operational stage (once all construction in terms of the Site Plan is complete), however this is at the DFFE's discretion.

It is further noteworthy that the listed activities triggered by the proposed development would occur within the decommissioning and development (i.e. construction) phase and not the operational phase.

It is advised that a single operational audit be conducted by a suitably qualified, independent professional six to nine months following completion of construction of the proposed industrial park in order to ensure that the proposal remains developed as planned and also to ensure that the landscaping has established and that the stormwater system is operating appropriately. The audit report should be submitted to the DFFE & City of Cape Town and this could serve to inform their requirements for any potential future operational audits. The audits would only pertain to those areas of the site which have become operational and the scope of the audits would increase as additional phases of construction are completed and move into the operational phase. In other words, only one audit is required six months after the initial commencement of some operational activities on site and additional operational aspects are to be considered as part of each

biennial audit thereafter. This approach may be applied to the entire development, unless otherwise required by the local municipality or the DFFE.

20.4 Environmental Management System

It is suggested that the POA establish an Environmental Management System (EMS) for the site in order to make the implementation of the various requirements easier and more efficient as well as to keep track of when operational audits are due. However, this should not be a formal condition of approval.

20.5 Record Keeping

A copy of the EMPr shall be kept on file and made available on site where tenants and visitors can easily access the document. Furthermore, the Owners' Association of the development shall keep records of the following:

- Routine implementation and maintenance schedules, budgets, and costs;
- Monitoring Reports;
- Complaints received and responses made;
- Minutes of meetings;
- Audit reports and reviews of the EMPr; and
- Changes to the EMPr.

All records should be kept with all the documentation of the Owners' Association.

20.6 Operational Phase Reporting

Monitoring and auditing of the operational phase would be up to the discretion of the competent authority, given that the operational phase would be relatively benign. However, it is recommended that a single audit be conducted by an independent professional six months once the site is fully developed in order to determine whether the impacts have been successfully mitigated. A report detailing the findings thereof should be provided to the DFFE, upon receipt of which, the DFFE would indicate the need and frequency for future operational audits.

21 FUNDING

All the initial and on-going requirements of the EMPr must be funded by the Applicant, through an Environmental Management Fund. This fund must be set up either by the Applicant or derived from a levy on the tenants of the site.

22 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The Environmental Specifications for the operational phase comprise of the following:

- Visual/Aesthetics Preservation
- Stormwater Management

- Solid Waste Management Plan
- Risk and Incident Management Plan
- Complaints Management Plan
- Noise and Odour Management
- Emissions
- Resources Use Management Plan- Water
- Resource Use Management Plan- Electricity (Energy Conservation Plan)
- Landscape Maintenance

VISUAL/AESTHETICS PRESERVATION
Management Statement and objective: To prevent degradation of visual appearance of the site over time. Impact Management Outcomes: No reduction in aesthetic appearance over time.
• Light spillage and pollution should be kept to a minimum. To this end all external lights must be directed in such a way that no light spillage occurs. • No naked light sources, i.e. the light bulbs themselves, should be visible from outside the site. Only reflected light should be visible away from the site. This is especially true of any security lighting that may be installed. (Note that lights with translucent shields are considered to be direct sources of light and should also not be used where they can be seen away from the site). • Low-intensity lighting should be used, which is not directed towards the stormwater retention pond. • Signage indicating speed limits within the site must be placed to ensure that all vehicle drivers are aware of speed limits. • Ensure regular maintenance of structures and landscaped areas.

STORMWATER MANAGEMENT
Management Statement and objective: To ensure continued functioning of the stormwater systems Impact Management Outcomes: No blockages or flooding within the stormwater system
• Management of stormwater during the operational phase must be in accordance with the Stormwater Management Plan. In terms of the stormwater management design, suitable indigenous wetland vegetation and habitat diversity should be introduced within the stormwater system i.e., within stormwater channels between the stormwater pond. These connecting features should preferably not be piped but be created drainage channels. A plan must be developed and adhered to for the rehabilitation and monitoring of this area. • Stormwater run-off should be reduced as far as possible by promoting surfaces on the site that allow for infiltration as opposed to impervious surfaces. • Businesses must report problems with the storm water systems to the City of Cape Town so that these can be addressed. As far as possible, occupiers/tenants must be educated to ensure that no materials, fluids, or substances are allowed to enter the storm water system that could have a detrimental effect on any flora, fauna and aquatic life that may establish in the retention pond. This could be done by information boards placed at the stormwater retention pond. • Protective screens, grates and catch pits should be cleaned prior to winter rains and after heavy rains. • Proper maintenance of retention pond must occur to prevent sedimentation, which restricts the functioning and effectiveness thereof. Tenants are to ensure that they do not impede or block the flow of storm water. • Monitored natural attenuation remains the preferred method of remediating the detected impacts (Parsons & Associates, 2015). It is recommended that 3 monitoring boreholes be re-established at the asbestos waste site and quarterly sampling be undertaken for 2 years to

define seasonal variation (Parsons & Associates, 2015). Thereafter, the need for further monitoring can be assessed in light of observations to that point (Parsons & Associates, 2015).

SOLID WASTE MANAGEMENT PLAN

Management Statement and objective: To prevent pollution associated with the generation and temporary storage of general waste, hazardous waste and litter generated by the workforce on site.

Impact Management Outcomes: No non-conformances and no pollution of soil, groundwater and/or stormwater as a result of waste generation and management activities.

- The POA is to remain aware of all tenants business activities and to keep meticulous record of those tenants who utilize products that are harmful to humans or to the environment, as well as the disposal of residues or effluents generated by these products.
- General waste generated during the operational phase will comprise typical domestic waste generated by administrative and housekeeping operations as well as waste associated with convenience stores and take-away food outlets, such as paper, lunch wrappers, packaging material etc and also waste from business such as paper, packaging, etc. The hazardous waste will comprise of empty oil cans / tins, oily rags, spent fluorescent tubes, etc.
- The POA is to put up signage to encourage recycling as well as waste minimisation.
- Encourage tenants to establish small kitchens with crockery and cutlery so that staff are not tempted to use disposal materials.
- The reduce, reuse and recycle approach should be implemented in waste management for the site.
- An integrated waste management system must be implemented, and this must be underpinned by the following waste management hierarchy:

- All general waste material (e.g. non-hazardous waste) should be contained in lined general waste bins.
- Any hazardous waste will be stored in separate lined waste bins. The bins would be marked as hazardous and flammable.
- Note that hazardous waste volumes are not to exceed 20 kg per day.
- Opportunities should be provided to facilitate the collection of recyclable waste products such as paper, glass and tin at central points, for collection by relevant organisations.
- Although it is not anticipated that any waste temporarily stored on site (as no waste would permanently be held on site) would exceed 80 m^3, if it does, then the National Norms and Standards for the storage of Waste in terms of Government Notice (GN) No. 926 of 29 November 2013 would apply and the applicant would be required to register the facility on, and subsequently continue to update, the Department's Integrated Pollutant and

Waste Information System.

- Waste storage and sorting areas must be enclosed such that the activity is contained within the allocated footprint area.
- Windblown litter from the waste storage and sorting areas must be monitored and removed from adjacent properties daily.
- The handling of waste must take place on a hardened surface.
- The POA must educate businesses as far as possible about the need for proper waste management as well as the available systems to manage this.
- All indoor waste not suitable for recycling is to be placed in outdoor bins for collection by the Local Authority, as part of their regular collection system.
- Bins must have lids to prevent scavengers and distribution of refuse by wind.
- Bins must be kept within the grounds of individual complexes until collection time. No burying or burning of waste may take place on site.
- No waste of any type may be dumped on any road or verge or in any open space.
- Any garden refuse generated by landscaped areas is to be removed to an approved waste disposal site in the greater area.
- No garden clippings or any other waste or refuse material may be dumped.
- All paints or any other chemicals must be disposed of at a licensed landfill site. The fouling of any road with any substance by any person is prohibited.
- No residues from cleaning of hard surface or any other form of contaminated water shall be allowed to enter the storm water system.

RISK AND INCIDENT MANAGEMENT PLAN

Management Statement and objective: To prevent incidents, guide the way in which emergencies and/or environmental incidents are handled on site and remediate any damage appropriately.

Impact Management Outcomes: No non-conformances, no injuries and no adverse impacts on the environment as a result of emergency situations and/or environmental incidents.

- Any emergency incident, originating at the facility (e.g. any spill or leak of product into the ground and /or watercourses), which falls within the definition of section 30 (1)(a) of the NEMA must immediately be reported to all relevant authorities, including this Department's Directorate: Pollution and Chemicals Management (Mr. Simon Botha, Tel: 021- 4830752, Simon.Botha@westerncape.gov.za).
- A detailed Emergency Plan must be developed by the Applicant/Owners' Association within two months of the commencement of the operation phase for industrial areas.
- An "emergency" shall be defined as an occurrence such as a fire, bomb threat, product spillage, explosion, crash or a natural disaster (i.e. earthquake, floods etc.) that could result in injury, loss of life or damage to property and the environment.
- Staff that will use and handle hazardous substances, fuels and chemicals must receive the required training in this regard.
- All the necessary personal protective equipment (gear) (PPE) must be issued to employees.
- All required health and safety signage must be displayed.
- Although the detailed Emergency Plan would be compiled for the industrial areas upon commencement of operations, the following incident management measures should be implemented/included:
    - The Applicant/Owners' Association is responsible for the appointment of an Emergency Controller for each industrial area and the necessary control personnel to lead the following action groups:
        - Emergency Controllers;
        - Evacuation Group;
        - Fire Group; and

- First Aid Group.

- These groups should have their own teams to effectively complete their tasks.
- The Emergency Controller should also be responsible for the liaison with the security personnel in order to obtain registers of people who have accessed the site.
- The responsibilities of the Emergency Controllers will be as follows:
  - Emergency planning;
  - Revision of emergency plans on a regular basis;
  - Designation of emergency personnel;
  - Training of emergency personnel;
  - Emergency communications;
  - Emergency exercises/drills;
  - Assume overall command during the emergency; and
  - Provide the emergency services with details relating to the emergency.

- The Evacuation and Deputy Evacuation Leader are responsible to the Emergency Controller and shall have the following responsibilities:
  - Line Leaders to report to Evacuation Leaders with their lines.
  - Ensure that roll-call sheets for employees in their respective areas are up to date;
  - Request notification of absenteeism from the relevant organisations;
  - Ensure that evacuation takes place in an orderly fashion;
  - Ensure that evacuation is done via the safest route;
  - Ensure that public areas, offices, toilets, storage areas, etc. are physically checked for people;
  - Close doors in the event of fire evacuation and open doors if evacuation is as a result of a bomb threat; and
  - Report to the Emergency Controller on a regular basis.

- The Fire Team Leader is responsible to the Emergency Controller for the following:
  - Ensure that breathing apparatus is readily available;
  - Control or extinguish fire without endangering the lives of the team members;
  - Conduct visual searches to identify suspicious objects;
  - Organise fire teams and their equipment;
  - Assist the Emergency Services if requested to do so;
  - Close down of Service (electricity, gas, water or air), if required/applicable; and
  - Report to the Emergency Controller on a regular basis.

- The First Aid team leader is responsible to the Emergency Controller for the following:
  - Collect first-aid equipment and organise teams to assemble outside at a safe area;
  - Assess the situation;
  - Ensure treatment of the injured;
  - Report to the Emergency Controller on a regular basis; and
  - Ensure the adequate training of the first aid team.

- The following procedure should be followed after an emergency:
  - The team leaders must inform the Emergency Controller either verbally or in writing concerning their duties.
  - Damage assessment reports must be compiled and forwarded to the Manager.
  - The Emergency Controller shall inform the HR representative, or if such a representative is unavailable, the relatives of any injured person or employee.

- Emergency contact numbers are to be on display and clearly visible at a number of points throughout the site.
- Emergency Assembly points are to be clearly signed throughout the site.
- No fires shall be permitted on site.

- Smoking shall not be permitted in those areas where it is a fire hazard. Notices are to be prominently displayed prohibiting smoking in such areas.
- A fire evacuation route for each industrial area is to be clearly demarcated and kept clear of obstruction at all times. The Manager of each organisation/facility shall ensure that employees are aware of the procedure to be followed in the event of a fire.
- The Manager of each organisation/facility shall ensure that all offices, kitchen areas, storage areas, and any other areas identified in the detailed Emergency Plan with tested and approved firefighting equipment. Firefighting equipment is to be maintained in good working order to the satisfaction of the local fire authorities.
- The Manager of each organisation/facility shall ensure that employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the relevant authorities if the spill is significant and poses a risk to the surrounding property, particularly the open space corridor. In the event of suspicion of contamination of the stormwater pond or groundwater, it is important to notify the DWS and the DFFE.
- The Applicant/ Owners' Association shall ensure that all facilities on site shall have a supply of absorbent material (i.e. spill kits) readily available to absorb any emergency hydrocarbon spills, and where possible be designed to encapsulate minor hydrocarbon spillage.
- In the event of a fuel leak or spill:
  - Upon discovery of a minor fuel leak, the employees should:
    - Advise the supervisor/manager immediately;
    - Get another employee to notify the Facilities/Operations manager;
    - Switch off any source of ignition; and
    - Warn fellow employees.
  - When there is a large fuel spill, the actions above should be taken with the additional activation of the fire alarm.
  - Note the wind direction and do not move downwind of the leak. All employees and patrons/visitors must stay away from the area of the fuel leak.
  - Evacuate the building in a calm and orderly manner and go to the assembly point.
  - Ensure all visitors leave the building and assist any who may struggle (e.g. elderly, disabled).
  - Call the fire brigade or ambulance if necessary.
  - All employees will follow instructions given to them by senior management, security personnel or the fire brigade and ambulance staff.
  - Should a significant spill occur in the open space/environmental corridor area, the DWS and the DEA&DP should be notified immediately.

- In the event of a fire/explosion emergency:
  - In the event of a minor fire which poses no threat to employees, the employee should:
    - ask another employee to tell the facilities/operations manager about the fire;
    - activate the fire alarm, manually if it has not yet activated; and
    - douse the fire with a suitable fire extinguisher.
  - In the event of a large fire or an explosion being discovered, the employee should:
    - inform security and the facilities/operations manager, and
    - Switch on the fire alarm.
  - If possible and where there is no danger to life, all fuel and electrical equipment must be switched off.
  - Advise the supervisor and/or manager as soon as possible.
  - If instructed, evacuate the building in a calm and orderly manner, and go to the assembly point.
  - Call the fire brigade or ambulance if necessary.
  - Ensure all visitors are escorted out of the building.
  - No employee should discuss the incident with any news reporter or members of the public.

- All employees should follow instructions given to them by senior management, security personnel or the fire brigade and ambulance staff.

- In the event of a bomb threat:
  - Remain calm.
  - Call the South African Police services.
  - All staff to obey instructions of senior management, security staff or the South African Police Services. Do not touch anything.
  - Only evacuate the building if instructed by the manager or South African Police to do so.
  - In the case of evacuation, ensure that all patrons/visitors are safely evacuated from the site.
  - Open all windows and doors where possible.

COMPLAINTS MANAGEMENT PLAN

Management Statement and objective: To ensure complaints receive due attention and prevent similar complaints in the future.
Impact Management Outcomes: No unresolved complaints.

- A complaints register must be opened and managed by the Applicant/ Owners' Association.
- All complaints received must be logged.
- Valid complaints must be analysed by means of a root cause analysis to understand the underlying causes.
- A preventative action plan must be developed.
- The complainant must receive feedback on how the complaint was dealt with and resolved.
- The contact details of the POA should be prominently displayed at the entrance to the site.

NOISE AND ODOUR MANAGEMENT

Management Statement and objective: The Light Industrial Park does not disturb surrounding land users.
Impact Management Outcomes: Low noise and odour levels are maintained, and minimal complaints received.

- Should the Applicant/ POA or a tenant consider the installation and operation of a generator, the noise abatement plans should make provisions with regard to the operation of a generator.

EMISSIONS (where applicable)

Management Statement and objective: The businesses/activities within the light industrial park do not disturb surrounding land users and does not conduct business/operations in the absence of required permits.
Impact Management Outcomes: All permits are to be in place where appropriate.

- The POA is to check each new tenant's business activities against the requirements of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) and the associated activities which would require permits.
- Should a particular tenant and their associated business activity require a permit/ Air Emission License (AEL), the necessary processes should be carried out to ensure approval.
- It must be noted that, for all industries requiring AELs, annual reporting on the National Atmospheric Emissions Inventory System (NAEIS) is required. The City of Cape Town City Health: Air Quality Department can be contact for more information in this regard.

RESOURCE USE MANAGEMENT PLAN - WATER

Management Statement and objective: To facilitate the efficient use of water resources on the site.

Impact Management Outcomes: No water wastage.

The POA must develop a water savings plan to reduce the demand on this resource. The plan should be communicated to all tenants and appropriate signage should be put up as a reminder. The plan must be simple and easy to understand. It should include the following:

1. The water cycle within the development (i.e. where water is sourced, what it is used for and where it is recycled, reused or disposed of);
2. The procedure for the review and update of the water savings plan (i.e. how often it is reviewed and who would do so- note that when the water savings plan is reviewed, the targets are to be compared with the water use data collected each month and new opportunities for water saving should be considered and researched);
3. The maintenance and management schedule for all water facilities (note that if individual tenants would be responsible for their own buildings, they would have to provide this information to the POA who would assimilate it into the water savings plan);
4. The procedures to be followed should leaks be detected;
5. Procedures for monthly monitoring and recording of water use (note that if individual tenants would be responsible for their own buildings, they would have to provide this information to the POA who would assimilate it into the water savings plan);
6. Printable signage templates on water saving awareness as well as instructions on where to place the signage for all tenants to print and make use of;
7. Instructions for tenants and building owners on water-saving measures to be implemented;
8. Annual water use targets for tenants as well as incentives for tenants to save water;
9. Procedures for penalties for those tenants/ owners who transgress on the requirements of the water savings plan.

The following water-saving measures should be included in the water savings plan (note that the list is not exhaustive and the POA should provide additional measures in the water savings plan):

- Use of low-flow water outlets.
- Monthly monitoring and recording of water use.
- Setting water use targets for tenants (noting that different tenants may have different water needs, which means blanket targeting may not be the best approach).
- Regular maintenance of water pipes and outlets.
- Water-wise awareness campaigns/signage.
- Watering of gardens only when permitted in terms of City By-laws.
- Dry clean-up measures (use of brooms, vacuums, etc.) must be standard practice and should be undertaken before resorting to water–based cleaning. If required, ensure that the minimum amount of water is used in cleaning tasks.
- Compile a checklist of equipment / fittings / sanitary ware that uses water and conduct monthly leak detection inspections.
- Repair dripping faucets and any water leaks immediately upon detection.
- Employees and land users must be encouraged to report leaks and be trained on the importance of water efficiency.
- Water restrictions as imposed from time to time by the local authority By-Laws must be strictly adhered to and the POA shall ensure that all land users are aware of the requirements of the water restrictions.
- A water awareness programme should, where possible, be implemented within the

development (e.g. notifications in rest rooms to use water sparingly) by the POA.

- Sub-metering water devices are to be installed in order to achieve an understanding of the volume of water used by specific tenants.
- The facilities management for each building should conduct regular checks of the facilities and clearly display signs for who to contact (as well as the relevant contact details) should leaks be detected.
- In times of drought (such as that of 2017) and water restrictions as imposed by the City of Cape Town, water use should be monitored daily in order to detect leaks quickly.
- Monthly water consumption data for each building should be supplied to the POA. The POA should monitor the use of each building and, where necessary and in terms of water restrictions in place at the time, take action against tenants who use excessive amounts of water. These measures could include written warnings, followed by fines for continuous offenders.
- Annual water audits are to be carried out by the POA and the monthly data collected as per the above would inform the audit.
- All tenants are to be educated on water savings policies. Water-saving signage should be placed throughout the developed in strategic locations.
- All taps in the bathrooms should be fitted with sensors and they should be fitted with timers to allow for the water flow to occur for a few seconds only.
- No toilet cistern may exceed 9,5 ℓ in capacity.
- Toilets should be fitted with a dual-flush setting and appropriate signage should be clearly displayed above each toilet indicating a preference for half-flush and that a full-flush should only be used when absolutely necessary. During times of extreme drought (such as the 2017drought in the Western Cape) and water restrictions as imposed by the City of Cape Town it is strongly recommended that signage be clearly displayed in all restroom which discourages the flushing of toilets unless absolutely necessary (i.e. "if its yellow let it mellow, if it's brown, flush it down").
- Ideally, waterless urinals should be installed in all male restrooms.
- The water savings plan should be revised annually to identify any further opportunities for water saving activities.
- No hosing down of paved surfaces with municipal drinking water should be permitted until such times as water restrictions are lifted. Once they are lifted, the use of municipal drinking water for such activities should still be avoided as far as possible and the rain- and grey-water collected and stored on site should be used instead.
- No irrigation or watering with municipal drinking water should be permitted until such times as water restrictions are lifted. Once they are lifted, the use of municipal drinking water for such activities should still be avoided as far as possible and the rain- and grey-water collected and stored on site should be used instead.
- Water features may not use municipal drinking water until such times as water restrictions are lifted. Once they are lifted, the use of municipal drinking water for such activities should still be avoided as far as possible and the rain- and grey-water collected and stored on site should be used instead.

RESOURCE USE MANAGEMENT PLAN – ELECTRICITY (ENERGY CONSERVATION PLAN)
Management Statement and objective: To facilitate the efficient use of electricity on the site, specifically in relation to housekeeping activities. Impact Management Outcomes: No wastage of electricity/energy
It is recommended that the POA develop an energy savings plan to reduce the demand on this resource. The plan should be communicated to all tenants and appropriate signage should be put up as a reminder. The plan should include the following measures, amongst others: • Targets for energy consumption. • Monitoring of energy use. • Regular maintenance of equipment. • Turning the thermostat back 10° to 15° in the evenings when no workers are in the buildings, where possible. • Encouraging tenants to turn off unnecessary equipment when not in use. • All energy using equipment must be fitted with invertor based motors, where possible. • All electrical equipment must be maintained in a good working condition. • All light fittings must be energy efficient (e.g. low voltage, or compact fluorescent lights). • The developments on site must keep up with new technologies / industry standards that exist for energy efficiency in terms of pumping of fuel.

LANDSCAPE MAINTENANCE
Management Statement and objective: To prevent degradation and death of landscaping on the site over time. Impact Management Outcomes: No reduction in aesthetic appearance over time, landscaping to always look healthy.
• Ensure regular maintenance of structures and landscaped areas. • The following aspects are to be noted when implementing the Landscape Plan: o **Plants**: Only indigenous vegetation is allowed in all landscaped areas and the landscaping of road reserves to increase the amount of green space. Locally indigenous wetland species must be used in the vicinity of the wetland. The Bracken Nature Reserve plant specialist should be consulted for examples of plants to be used in landscaping. No declared invasive alien species may be used. Only locally occurring indigenous vegetation that blend in with the surrounding environment is allowed to be utilised. The use of alien invasive species is prohibited. The Bracken Nature Reserve plant species list should be consulted for examples of plants to be used in landscaping. Plants must be of acceptable health and vigour as directed by the Landscape Architect and must be free of pests, diseases and weed seed. o **Chemical fertilizers and pesticides:** Only approved pesticides shall be used for this development. Chemical fertilisers should be avoided in favour of the use of organic fertilizers. All chemicals and pesticides shall be strictly handled as per the manufacturers' instructions. o **Topsoil:** Topsoil shall not be compacted in any way, especially not by vehicles driving over it.

23 NON-COMPLIANCE AND PENALTIES

Allegations of non-compliance by members of the public, stakeholders, authorities, residents, Contract Workers (e.g. plumbers, electricians, etc.), businesses on site and visitors to the site, must be reported to the head of the Owners' Association for investigation.

All such allegations should be recorded in written format, together with the findings of the investigation. These records must be stored for consideration and made available to authority's upon request and also included in any operational audits, as required by the authorities.

All acts of non-compliance must be reported to the head of the Owners' Association. The action to remediate acts of non-compliance must be identified in consultation with a suitable specialist and/or environmental consultant and a cost attached to this (where relevant).

The individual responsible for the act of non-compliance can be held financially responsible for the remediation of any damage to the environment. The instruction to remediate must come from the head of the Owners' Association, in consultation with an environmental consultant or specialist.

The following penalties (not an exclusive list) shall be issued in addition to any remedial costs incurred as a result of non-compliance with the operational aspects of the EMPr.

Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment:

a.	An individual entering a "no-go" area (without head of Owners' Association/ ECO's permission)	R1000
b.	An individual failing to adhere to the internal speed limit	R1000
c.	An individual littering on site	R100- R250
d.	An individual making an illegal fire on site	R1000 – R10000
e.	An individual causing unnecessary damage to other flora	R1000 – R2000
f.	An individual causing intentional injury to fauna	R5000
g.	An individual or business causing contamination of stormwater pond on site	R2000

For each subsequent similar offence committed by the same individual, the penalty shall be doubled in value to a maximum value of R10 000.

The following penalties are suggested for transgressions where damage has been done to the environment:

a.	Damage to sensitive environments	The cost of restoration plus 20%.
b.	Pollution to soil, groundwater or stormwater	The cost of restoration plus 20%.

Records of penalties and their payments are to be kept.
All on-going requirements of the operational aspects of the EMPr must be funded by the Owners' Association or an Environmental Management Fund and all penalties are to be paid to the company and used for environmental projects/ purposes.

APPENDIX A
METHOD STATEMENT TEMPLATE

METHOD STATEMENT

CONTRACT: ..... **DATE**: .....

PROPOSED ACTIVITY (give title of Method Statement and reference number from the EMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):

* Note: please give too much information rather than too little. Please ensure that issues such as emergency procedures, hydrocarbon management, wastewater management, access, individual responsibilities, materials, plant used, maintenance of plant, protection of natural features etc are covered where relevant

DECLARATIONS

1) RESPONSIBLE OFFICER (EO/ ESO/ECO)

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____

(signed) (print name)

Dated:._____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the EO/ ESO/ECO will audit my compliance with the contents of this Method Statement. I understand that this Method Statement does not absolve me from any of my obligations or responsibilities in terms of the Contract.

_____ _____

(signed) (print name)

Dated: _____

3) EMPLOYER (*i.e.* ASSOCIATION/ Owner/Project Manager)

The works described in this Method Statement are approved.

_____ _____ _____

(signed) (print name) (designation)

Dated: _____