ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED DEVELOPMENT OF AN LPG (LIQUID PETROLEUM GAS) IMPORT FACILITY, PIPELINE AND HANDLING FACILITY IN THE PORT OF SALDANHA

DEA REF NR: 14/12/16/3/3/2/1069

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	Title: **PROPOSED DEVELOPMENT OF AN LPG (LIQUID PETROLEUM GAS) IMPORT FACILITY, PIPELINE AND HANDLING FACILITY IN THE PORT OF SALDANHA** **2nd DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME**
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Verification	Capacity	Name	Signature	Date
By Author(s):	EAP	Lauren Abrahams		18 June 2019

COMMITMENT AND DECLARATION OF UNDERSTANDING BY CONTRACTOR AND DEVELOPER FOR THE PROPOSED DEVELOPMENT OF AN LPG (LIQUID PETROLEUM GAS) IMPORT FACILITY, PIPELINE AND HANDLING FACILITY IN THE PORT OF SALDANHA

I, the undersigned ……., as duly authorized by the Contractor, have studied and understand the contents of this document. On behalf of the Contractor, I confirm that the Contractor undertakes to adhere to the conditions as set out herein, unless specifically otherwise agreed to in writing.

Signed at ……. on this …….. Day of ……20……

…….
For Contractor

I, the undersigned ……, as duly authorized by the Developer have studied and approve the contents of this document on behalf of the Developer, for implementation by all Contractors involved at the site.

Signed at ……. on this …….. day of ……20…….

…….
Developer's Representative

DEFINITIONS

Auditing:	A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis based to a (e.g. ISO 19011:2003) standard.
Biodiversity:	The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.
Contractor:	An employer, as defined in section 1 of the Occupational Health and Safety Act 85 of 1993, who performs construction work and includes principal contractors
Environment:	A place where living, non-living and man-made features interact, and where life and diversity is sustained over time.
Evaporation:	The change by which any substance (e.g. water) is converted from a liquid state into and carried off as vapour.
Developer:	One who builds on land or alters the use of an existing building for some new purpose
Independent:	Is independent and has no interest in any business related to the development site, nor will receive any payment or benefit other than fair remuneration for the task undertaken
Groundwater:	Subsurface water in the zone in which permeable rocks, and often the overlaying soil, are saturated under pressure equal to or greater than atmospheric.
Landowner:	Holder of the estate in land with considerable rights of ownership or, simply put, an owner of land
Monitoring:	A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.
Natural vegetation:	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on a site.
Pollution:	The result of the release into air, water or soil from any process or of any substance, which is capable of causing harm to man or other living organisms supported by the environment.
Protected Plants:	Plant species officially listed under the Threatened or Protected Species regulations as well as on the Protected Plants List (each province has such a list), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Red Data Species:	Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.
Rehabilitation:	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat. Rehabilitation does not necessarily re-establish the pre-disturbance condition, but does involve establishing geological and hydro logically stable landscapes that support the natural ecosystem mosaic.

Site:	Property or area where the proposed development will take place

ACRONYMS

CEF:	Central Energy Fund
DEA&DP:	Department of Environmental Affairs and Development Planning
DEA:	Department of Environmental Affairs
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EM:	Environmental Manager
EMP:	Environmental Management Programme
EO:	Environmental Officer
ER:	Engineer's Representative
I&AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
LPG:	Liquid Petroleum Gas
PM:	Project Manager
SANS:	South African National Standards
SFF:	Strategic Fuel Fund
TNPA:	Transnet National Port Authority

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DEVELOPER'S COMMITMENT

The Strategic Fuel Fund ("SFF") has committed itself to a set of values that include the maintenance of good relations and transparent communications with all stakeholders, and the dynamic engagement of the larger community.

SFF undertakes to implement suitable management systems for all the areas and aspects of this operation. This will ensure that development itself and management of the project will comply with legal, technical, environmental and transformation policies and standards. SFF, in drafting this EMP for implementation, intends to enable continuous improvement in legal compliance and the sustainable operation of the site.

The EMP intends to change the way in which the owners, the construction process they have commissioned and the contractor plan for and manage resources to achieve sustainability. The satisfactory implementation of the EMP on site will require both the full support and commitment of all personnel.

CHAPTER 1

1.1. Executive Summary

This EMP has been prepared principally in compliance with the requirements of section 24N and Section 34 of the National Environmental Management Act 107 of 1998. This document, together with the conditions in the Environmental Authorisation, must be adhered to. The EMP must be included as part of all contract documentation for all contractors in the construction phase of the development.

The Author(s) and Eco Impact Legal Consulting (Pty) Ltd ("Eco Impact")

Lauren Abrahams has completed her professional registration in terms of section 20(3) (b) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003) as a Candidate Natural Scientist in the field of practice Biological Science (Registration number 100126/12). She obtained her B Tech in Oceanography at the Cape Peninsula University of Technology in 2010.

Lauren has trained as an Environmental Assessment Practitioner since July 2015 and has been involved in the compilation, coordination and management of Basic Assessment Reports, Environmental Impact Assessments, Environmental Management Programmes, Waste Licence Applications, Water Use Licence Applications and Baseline Biodiversity Surveys for numerous clients.

The Curriculum Vitae for the EAP has been included in Appendix H of the EIR.

The Strategic Fuel Fund has appointed Eco Impact to prepare an Environmental Management Programme that meets the technical standards as required by DEA.

1.2. Project Description

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

Background:

SFF, a subsidiary of CEF is responsible for the storage of strategic fuels. SFF owns and manages the Saldanha Bay crude oil storage facility and jetty in the Saldanha harbour. In addressing South Africa's energy systems challenges (universal access, energy security and environmental impact), SFF requested a Section 79 Directive to be issued to TNPA, thereby initiating a partnership with TNPA to commission the development of a LPG Import facility in the port of Saldanha. This facility aims to support efforts to realize the objectives of the National Development Plan, Integrated Resource Plan (IRP 2010), Industrial Policy Action Plan and the transition to low carbon economy (Green Economy).

The current SFF's terminal operator agreement (TOA) with TNPA will be amended to include the handling of LPG.

The Department of Energy (DoE) is mandated to develop appropriate policy for South Africa's energy requirements. The DoE has identified LPG as a key product to enable access to cheaper and cleaner energy to previously disadvantaged communities.

The SFF currently operate a 45 million bbl. crude oil storage facility, which receives and discharges product at the port of Saldanha. The LPG project is to receive product from the existing crude oil jetty.

Property Description and location:
The proposed pipeline route will run in the existing servitude from the SFF Saldanha site (Erf 1038) to the Saldanha Jetty (Erf 1185). The LPG bullets are proposed to be installed on the south eastern corner of the existing tank farm property on Erf 1038.

Property Details: Erf 1038 [C04600000000103800000]
Registered Servitude between erven 1038 and 1185
Erf 1185 [C04600000000118500000]

Co-ordinates for the proposed pipeline:

Location	S	E
Start	33°00'25.11"	18°02'17.78"
Middle	33°00'03.97"	18°00'55.01"
End	33°02'02.52"	17°58'59.79"

Co-ordinates for the proposed LPG handling facility:

Location	S	E
A	33°00'25.11"	18°02'17.78"
B	33°00'17.10"	18°01'19.10"
C	33°01'19.47"	17°59'19.69"
D	33°01'01.64"	18°03'09.81"
Centre	33°00'54.51"	18°03'07.19"

Technical proposal:
SFF proposes to construct and manage an LPG handling facility and pipeline with total capacity of 8000 MT, for strategic stocks, within the Port of Saldanha.

The conceptual design that forms the basis of the application is depicted by figure 1 below:

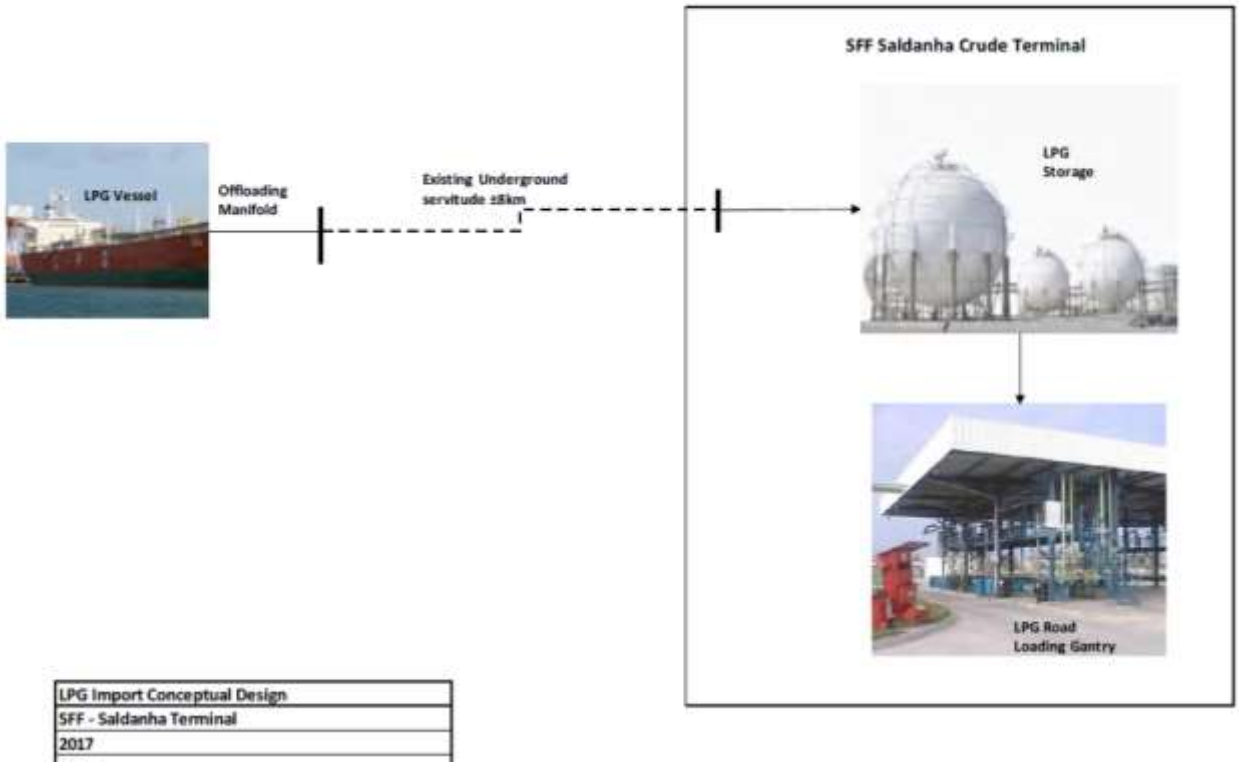


Figure 1

Development Components:

The LPG handling facility, pipeline and associated infrastructure would comprise of the following: -

- LPG pipeline (approx. 8.3km)
- LPG Handling Facility (approx. 3 ha): -
    - Four 4241 ton spherical mounded LPG tanks
    - Stores and ablutions
    - Internal concrete Road
    - Mini-substation
    - Four 60 ton weigh bridges
    - New gravel internal road
    - New asphalt access road
    - Re-alignment and surfacing of existing access road
    - Gate house and driver waiting area
    - Fire water pipeline (to connect to existing infrastructure)
    - Water supply pipeline (to connect to existing infrastructure)
    - Sewer pipeline (to connect to existing infrastructure)
    - 2.2m high security fence
- Modification of the existing jetty
    - Installation of mooring hooks on caissons 19 – 23
    - Installation of a flexible hose/arm on caissons 18 – 19
    - Installations of fenders 3.3 x 6.5m on caissons 18 - 21
    - Installation of a deck on beams above water to span between caissons 19 and 20.

NOTE: Each Development component (1 – 3) is detailed further below:

It must be noted that the proposed development application is a phased application which will be broken up into the following phases:
The initial phase of the proposed development includes: -

- Construction of the LPG pipeline;
- Modification of Jetty;
- Vegetation Clearing for LPG pipeline and handling facility;
- Construction of mini-substation;
- Construction of new access road and internal; road network of the LPG handling facility;
- Fence around LPG handling facility;
- Construction and installation of two 4241 ton LPG mounded spherical tanks;
- Construction of stores, ablutions, driver waiting area, gate house, loading gantry and weighbridges.

The expansion phase of the proposed development includes: -

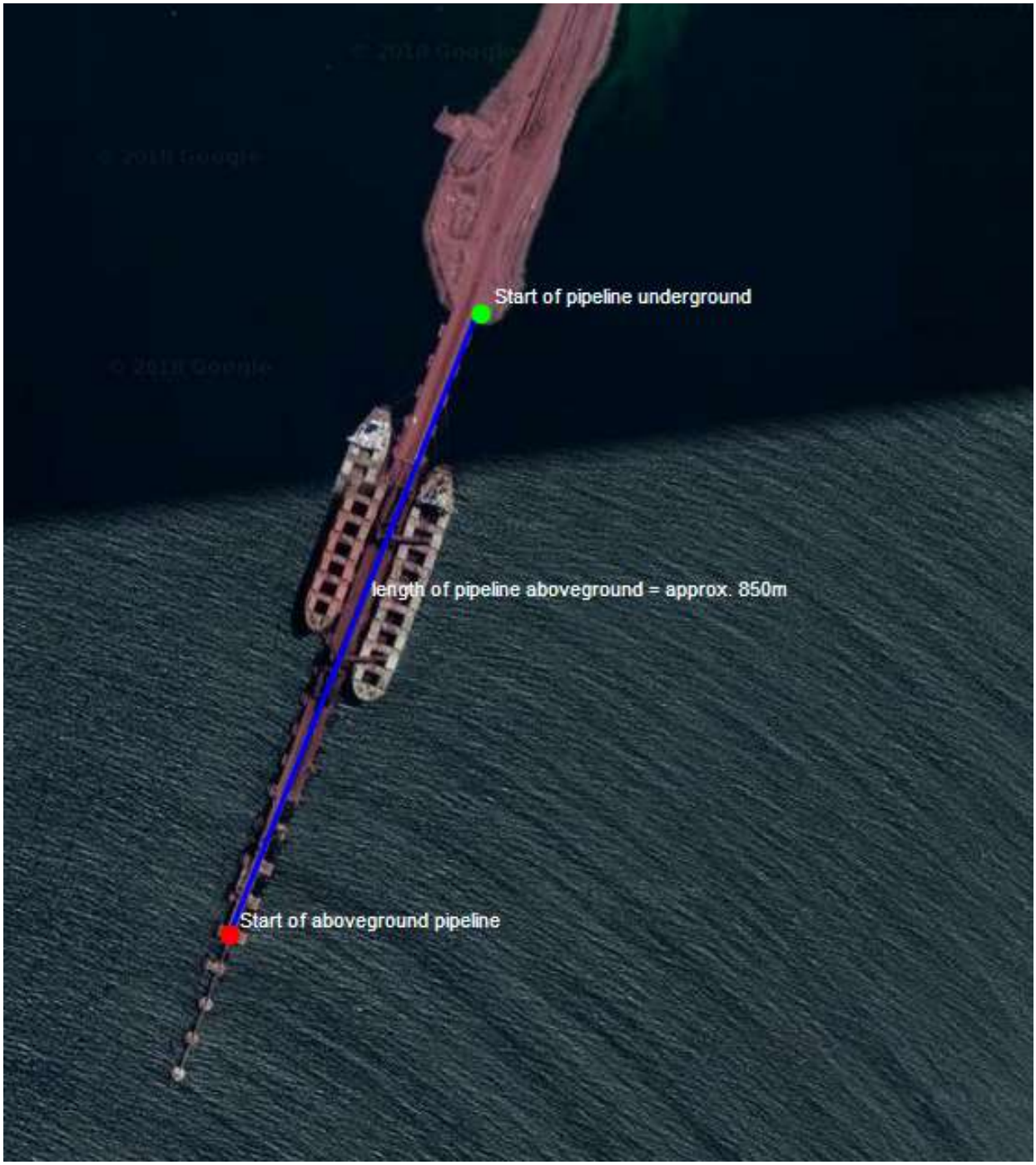
- Construction and installation of two 4241 Ton LPG mounded spherical tanks;
- Additional weighbridges.

The various development components are detailed below:

1. LPG Pipeline (approx. 8.3km)

The approx. 8.3km 12" (30 cm) diameter pipeline is proposed to run within the existing crude oil pipeline servitude (indicated by the blue line) as per the diagram below:

The pipeline will be aboveground from the jetty till the SFF pump house (still located within the port) as per the diagram below:


Start of pipeline underground
length of pipeline aboveground = approx. 850m
Start of aboveground pipeline

The rest of the pipeline will be underground within the existing servitude in which the existing crude oil pipeline is located. The development may result in the clearing of vegetation classified as Endangered in terms of NEMBA for the development of the LPG pipeline. Although only about 53% of the route (3100m) passes through Low or Medium sensitivity habitat where this will have only a Low – Medium negative impact, but the remainder passes through an existing disturbed servitude within High (0.6km) and Medium – High (0.1km) sensitivity habitat, where at least five plant Species of Conservation concern may be present in varying abundance, and where species diversity is fairly high.

The design specifications of the pipeline are as follows:

Component	Description
Material	Pipes larger than 2" (50NB) - ASTM A106 Grade B - SCH40 < 2" (50NB) and below – ASTM A106 Grade B – SCH80
Bends	45 and 90deg LR ASTM A234 WPB SCH40 (Buttweld fitting)
Fittings	Tees and reducers to ASTM A234 WPB SCH 40 (Buttweld fittings)
	Pipe branches to be design in accordance with ASME B31.3 and will be reinforced with pipe collars where required
Ends	Flanged ANSI class 300 slip on raised face
	Max length of spool 150NB and below – 6m
	Max length of spool 200NB and above – 9m
	Pipe spool to have max of 1 bend
Gaskets	Self-centering or confined type gaskets, resistant to LPG. Gaskets shall be selected to withstand rated pressure.
Bolts	SANS 135 Grade 8.8 (High tensile)
Pressure rating	30 Bar

2. <u>LPG Handling Facility (approx. 3 ha)</u>

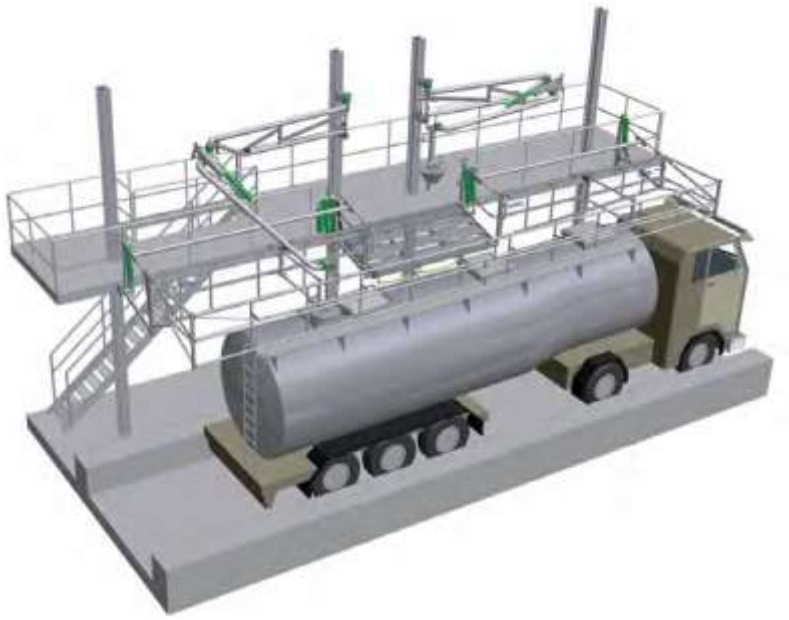
The area identified for the handling facility (approx. 3ha) would involve the clearing of indigenous vegetation for the development and establishment of the LPG Handling facility.

The development of the LPG handling facility is made up of a number of components which has been indicated by the SDP's located in Appendix B:

- Four 4241 ton spherical mounded LPG tanks
- Stores and ablutions
- Internal concrete Road
- Mini-substation
- Four 60 ton weigh bridges
- The proposed access to the site will be from the existing gravel road, which intersects with the Road MR559. It is proposed that the gravel road be upgraded to a 7.4 m wide bituminous surfaced road up to the access to the new facility and that the road be re-aligned to provide a safer intersection with Road MR559. The new access road to the facility is also proposed to be a 7.4 m wide bituminous surfaced road.
    - New gravel internal road
    - New asphalt access road
    - Re-alignment and surfacing of existing access road
- Gate house and driver waiting area
- Fire water pipeline (to connect to existing infrastructure)
- Water supply pipeline (to connect to existing infrastructure)
- Sewer pipeline (to connect to existing infrastructure)
- 2.2m high security fence
- Loading gantry
    - The road tanker gantry initially with 2 loading bays will be located just west of the spheres. The positioning of the gantry is such that it allows the road tankers to travel into the gantry and exit without any reversing or manoeuvring. The road tanker gantry will be underneath a steel canopy fitted with an automatic deluge system for fire-fighting purposes. The design includes vapour lines and bottom loading arms on stand post structures with quick release couplings, flow meters and emergency shutdown valves. Fusible loop switches will be fitted, which when fused will activate

an automatic shutdown process and the deluge system and fire water pumps will be activated. Metering will be by way of a weighbridge.

- Conceptual design:



3. Mooring Configuration:

Flexible option to cover small to large range of vessels (112.5 m to 225 m):

- 112.5 m vessel drawing – This minimum vessel can only be moored amidships halfway between Caissons 19 and 20. A deck will be required as indicated.
- The 172 m and 225 m vessels can still moor alongside Caisson 19.
- Two loading points will need to be provided here, as the small and large vessels will moor at slightly different positions.

Please refer to mooring configurations for each vessel size in Appendix B3 – 5.

Principals assessed in providing the berthing option:

- Guidelines specify that the fender spacing generally needs to be between 25% and 40% of the vessel length. This range is very restrictive when the existing caisson spacing is considered.
- To put the guideline into perspective, the shortest crude tanker at the existing facility has a maximum fender spacing of 50% of the vessel length (Caisson 18 to 21). This is outside the 40% guideline.
- The selection of the smallest vessel we used the standard 40% guideline to define the smallest vessel. The only downside to the smallest vessel is that the small vessel will have to use the ships gangway to access the jetty.
- Ships between 172 m and 215 will be pushing the 40% spacing guideline as mentioned above.

Modification to the Jetty:

- Installation of mooring hooks on caissons 19 – 23 (see diagram 1 below)
- Installation of a flexible hose/arm on caissons 18 – 19
- Installations of fenders 3.3 x 6.5m on caissons 18 - 21 (see diagram 2 below)
- Installation of a deck on beams above water to span between caissons 19 and 20.

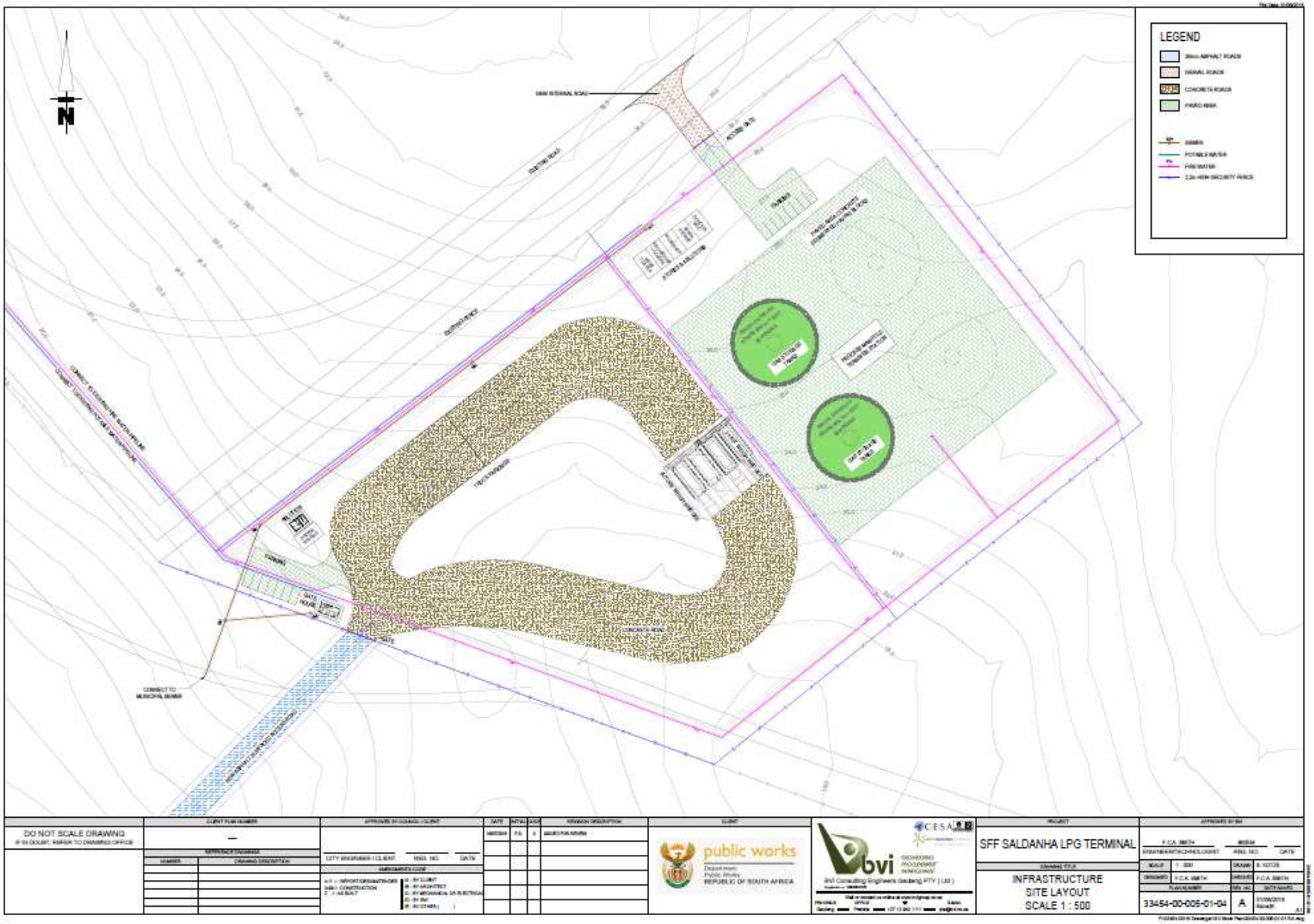
NOTE: *No construction or development will occur in the marine environment. The existing footprint of the jetty will remain the same regardless of the installations made to the existing infrastructure. All modifications will consist of infrastructure added to the existing jetty.*

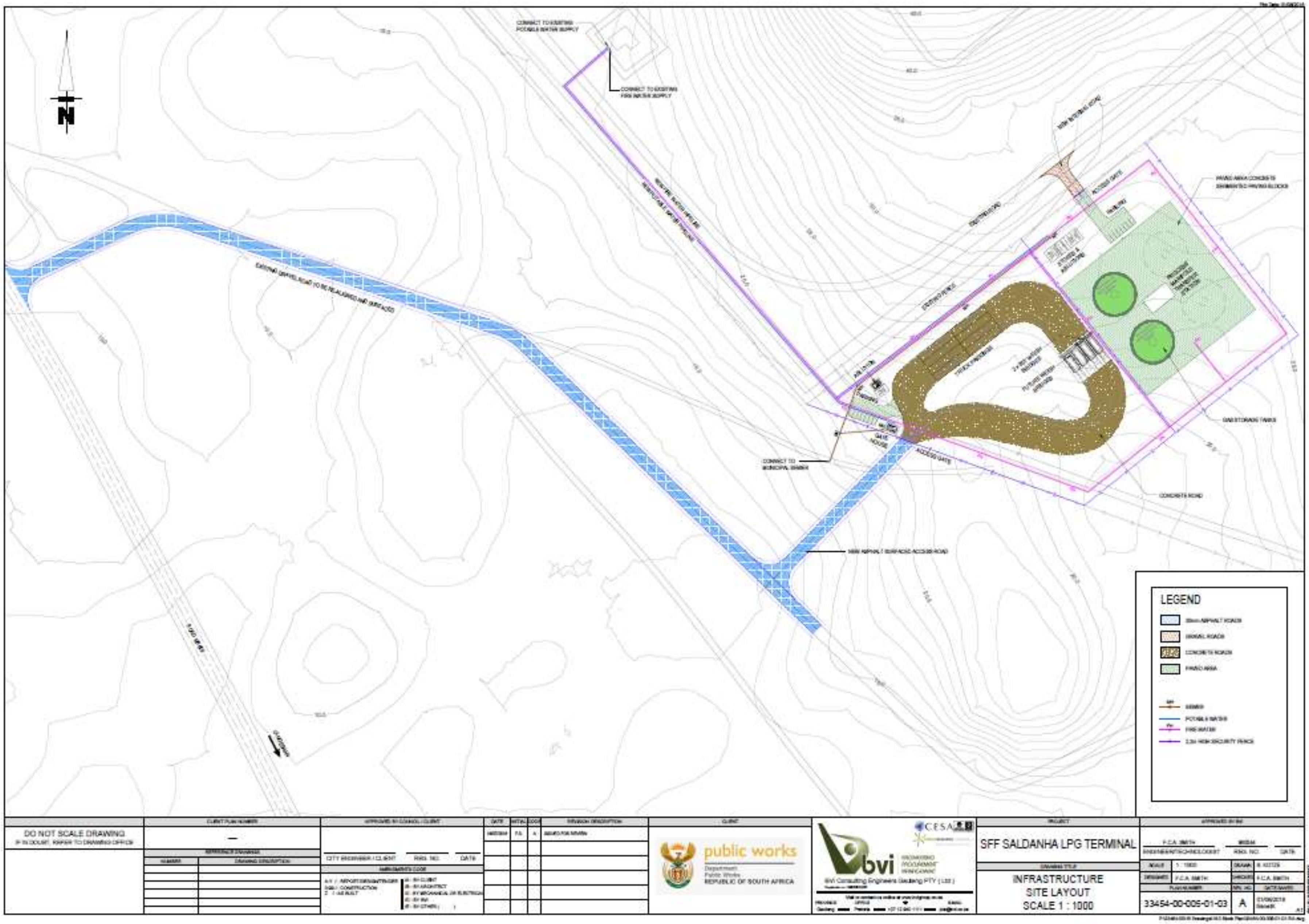
Diagrams:

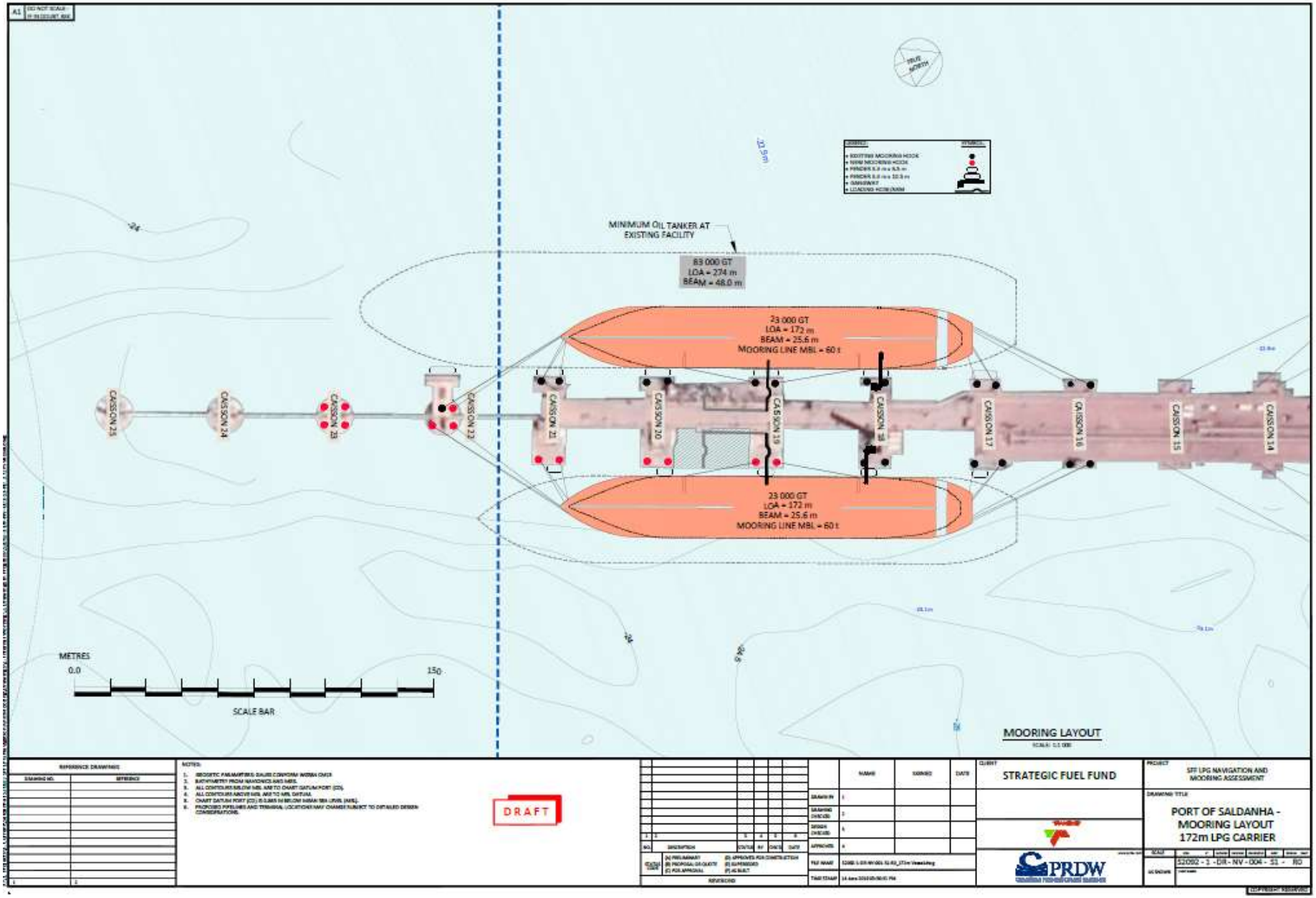
Diagram 1: Example of a mooring hook.

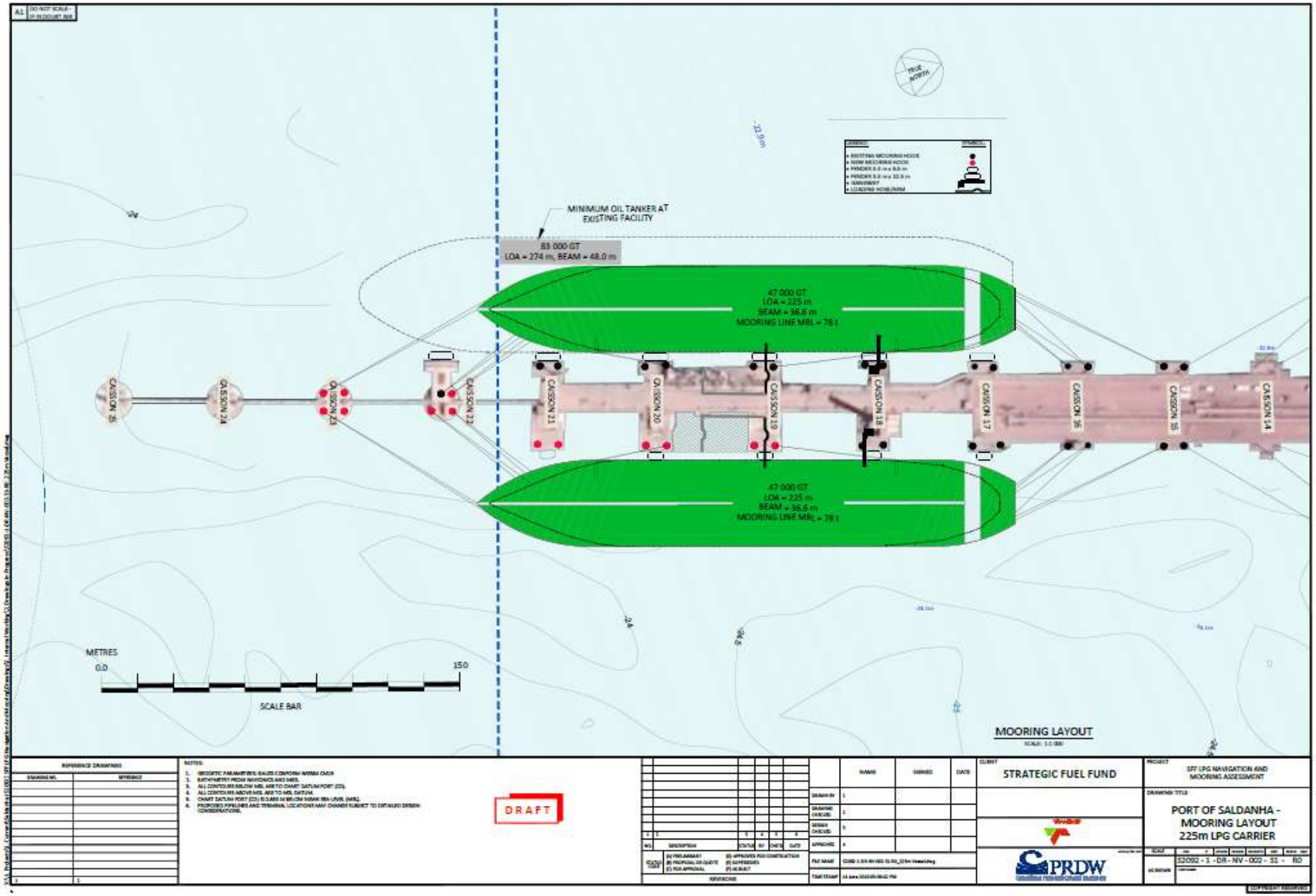
Diagram 2: Example of a fender installation.

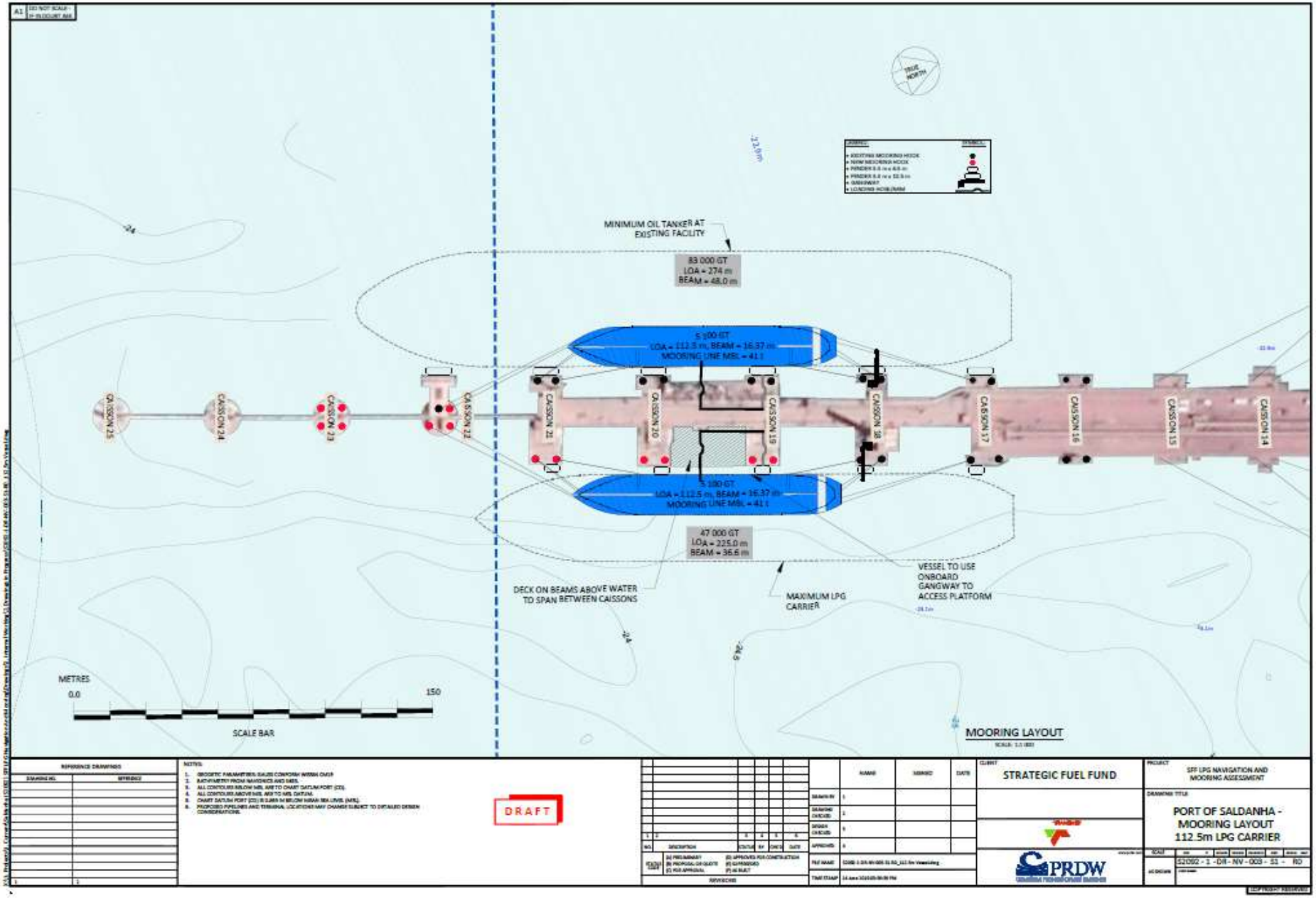
See proposed SDPs below:




N
LEGEND
GRAVEL ROADS
CONCRETE ROADS
PAVED AREA
SEWER
POTABLE WATER
FIRE WATER
DO NOT SCALE DRAWING
public works
Department:
Public Works
REPUBLIC OF SOUTH AFRICA
CESA
bvi
SFF SALDANHA LPG TERMINAL
INFRASTRUCTURE
SITE LAYOUT
SCALE 1 : 1000
33454-00-005-01-03
A


MINIMUM OIL TANKER AT EXISTING FACILITY
83 000 GT
LOA = 274 m
BEAM = 48.0 m
23 000 GT
LOA = 172 m
BEAM = 25.6 m
MOORING LINE MBL = 60 t
23 000 GT
LOA = 172 m
BEAM = 25.6 m
MOORING LINE MBL = 60 t
CAISSON 25
CAISSON 24
CAISSON 23
CAISSON 22
CAISSON 21
CAISSON 20
CAISSON 19
CAISSON 18
CAISSON 17
CAISSON 16
CAISSON 15
CAISSON 14
METRES
0.0
150
SCALE BAR
MOORING LAYOUT
DRAFT
STRATEGIC FUEL FUND
SPF LPG NAVIGATION AND MOORING ASSESSMENT
PORT OF SALDANHA - MOORING LAYOUT 172m LPG CARRIER
PRDW


MINIMUM OIL TANKER AT EXISTING FACILITY
83 000 GT
LOA = 274 m, BEAM = 48.0 m
47 000 GT
LOA = 225 m
BEAM = 36.6 m
MOORING LINE MBL = 78 t
47 000 GT
LOA = 225 m
BEAM = 36.6 m
MOORING LINE MBL = 78 t
CAISSON 25
CAISSON 24
CAISSON 23
CAISSON 22
CAISSON 21
CAISSON 20
CAISSON 19
CAISSON 18
CAISSON 17
CAISSON 16
CAISSON 15
CAISSON 14
METRES
0.0
150
SCALE BAR
MOORING LAYOUT
DRAFT
STRATEGIC FUEL FUND
SFF LPG NAVIGATION AND MOORING ASSESSMENT
PORT OF SALDANHA - MOORING LAYOUT 225m LPG CARRIER
PRDW


MINIMUM OIL TANKER AT EXISTING FACILITY
83 000 GT
LOA = 274 m
BEAM = 48.0 m
5 100 GT
LOA = 112.5 m, BEAM = 16.37 m
MOORING LINE MBL = 41 t
CAISSON 25
CAISSON 24
CAISSON 23
CAISSON 22
CAISSON 21
CAISSON 20
CAISSON 19
CAISSON 18
CAISSON 17
CAISSON 16
CAISSON 15
CAISSON 14
5 100 GT
LOA = 112.5 m, BEAM = 16.37 m
MOORING LINE MBL = 41 t
47 000 GT
LOA = 225.0 m
BEAM = 36.6 m
DECK ON BEAMS ABOVE WATER TO SPAN BETWEEN CAISSONS
MAXIMUM LPG CARRIER
VESSEL TO USE ONBOARD GANGWAY TO ACCESS PLATFORM
METRES
0.0
150
SCALE BAR
MOORING LAYOUT
DRAFT
STRATEGIC FUEL FUND
PRDW
SFF LPG NAVIGATION AND MOORING ASSESSMENT
PORT OF SALDANHA - MOORING LAYOUT 112.5m LPG CARRIER
52092 - 1 - DR - NV - 003 - 11 - R0


LPG Proposed Location Area - approximately 11 hectares
LPG Proposed Site - approximately 3 hectares
LPG Proposed Pipeline route


N
Appendix E1 -
Biodiversity Map
Legend
BSP ESA: Restore
ESA2: Restore from plantation or high density IAP
ESA2: Restore from other land use
ESA2: Restore where appropriate (CT)
BSP ESA
ESA: Aquatic
ESA: Terrestrial
BSP CBA: Degraded
CBA2: Aquatic
CBA2: Terrestrial
BSP CBA
CBA: Terrestrial
CBA: Terrestrial (CT)
CBA: Forest
CBA: River
CBA: Estuary
CBA: Wetland
CBA: Aquatic (CT)
Other Natural Area
MPA
BSP Protected Areas
LPG Proposed Location Area
LPG Proposed Site Layout
Current SFF Crude Oil Pipeline route
LPG Proposed Pipeline route
LPG Alternative 1 Pipeline route
LPG Alternative 2 Pipeline route
Scale: 1:50 000
Date created: October 24, 2018
Western Cape Government
Agriculture

CHAPTER 2

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act 107 of 1998.

It deals with issues relating to the implementation of the EMP.

2.1 Organizational Structure

The organizational structure identifies and defines the responsibilities and authority of the various persons and organizations involved in the project. All instructions and official communications regarding environmental matters must follow the organizational structure.

The Environmental Official (EO), to whom the Engineer's Representative (ER) and/or Environmental Control Officer (ECO) must report and interact, must be the responsible client representative.

The EMP must be an agenda item at the monthly site and operations meetings and the responsible client representative(s) may attend these meetings in order to provide input with respect to compliance with the EMP.

2.2 Responsibilities and Functions of the Environmental Control Officer

The ECO will be responsible for monitoring, reviewing and verifying compliance with the EMP and/or EA by all contractors and site management during site visits.

The ECO duties in this regard will include the following:

With the assistance, where necessary of the ER, to ensure all necessary environmental authorizations and permits have been obtained and are available and visible on site at the ER offices.

- monitor and verify that the EMP and/or EA is adhered to at all times and by taking action if the specifications are not followed;
- monitor and verify that environmental impacts are kept to a minimum;
- review and approve construction method statements, with input as appropriate from the ER;
- assist the contractor in finding environmentally responsible solutions to problems;
- report on the environmental issues at the site meetings and other meetings that may be called regarding environmental matters, if requested by ER;
- inspect the site and surrounding areas regularly with regard to compliance with the EMP and/or EA;
- monitor the environmental awareness training for all personnel coming onto site;
- advise management on the removal of person(s) and/or equipment not complying with the specifications, after collaboration with the ER. Recommendations must be recorded by the ER in a Site Instruction Book;
- ensure that activities on site comply with known legislation of relevance to the environment;
- recommend the issuing of penalties via the developer for contraventions of the EMP and/or EA;
- keep a photographic record of progress on site from an environmental perspective; and
- undertake a continual internal review of the EMP and/or EA and submit a report to the developer and the responsible DEA Environmental Official according to EA conditions.

2.3 Agreed Work Plan and Site Visit Schedule of ECO

After initial construction start-up site visit it is recommended that an ECO site visit be conducted once a month during construction.

Information recording activity on site, and any guidelines or instructions emanating from there will be routinely made available electronically to the developer and applicable contractors and a copy of the report must be available at the site office.

Clearly matters of urgency or immediate action may be channelled appropriately on an urgent basis.

2.4 Site Manager

The site manager will have the following environmental control responsibilities:

- In conjunction with the ECO will present the environmental education programs to all persons employed on site.
- Consult with the ECO, landowner, developer and any contractor to resolve all environmental issues.
- Issue any instructions from the ECO to the management team via a formal site instruction book or appropriate management tool used for the purpose.
- Take responsibility for the penalty system. The ECO and developer recommendations must be considered when deciding whether or not to impose a penalty.
- The engineer will, via the ECO actions, be accountable for the overall implementation of the Environmental Management Programme.
- Keep a site diary and complaints register.

2.5 Contractors

As part of any tender, the tendering contractor must submit a first draft of a contractor's programme, to the developer which must include the environmental considerations to be followed prior to appointment.

The appointed Contractor's representative will have the following responsibilities:

- Ensure that all staff is familiar with the Environmental Management Programme, which explains the environmental policy for the project.
- Allow for sufficient time between surveying the exact locations where services will be intended and actual construction, for the ECO to facilitate and instruct for the removal of plants, seeds and cuttings if necessary.
- The contractor must keep his personnel fully aware of environmental issues and ensure they show adequate consideration to all environmental aspects.
- Establish environmental signs to be erected on the construction site at locations identified by the ECO and approved by the engineer.
- Be responsible for the cost of the restoration of any damage caused, in environmentally sensitive areas, as a result of contractor responsibility regarding negligence. This must be done in accordance with the engineer / ECO's specifications.
- Take responsibility and active steps to avoid any increase in the fire hazard.
- The contractor must take responsibility for implementing all the relevant provisions of the EMP, or if he encounters difficulties with the specifications, he must discuss alternative approaches with the ECO and engineer prior to proceeding.

Failure to comply with the EMP may result in the application of fines as set out, and any reported non-compliance may result in the suspension of work or termination of a contract.

2.6 Record keeping of activities, inclusive of recording of non-compliances and corrective actions

The site must keep a record of all activities relating to environmental matters on site, including:

- meetings attended;
- method statements received and approved;
- issues arising on site;
- cases of non-compliance with the EMP;
- corrective actions taken and penalties issued.

This information will be recorded in an appropriate manner in a site diary, registers, issues/warning book, etc.

2.7 Compliance with other legislation

It is important that all on site staff are aware of other relevant legislation that may relate to the activities taking place on site, especially local authority required compliances.

CHAPTER 3

Applicable Legislation, Policy and Environmental Principles

3.1 Applicable Legislation Identified

1. ADVERTISING ON ROADS AND RIBBON DEVELOPMENT ACT, 21 OF 1940
2. BASIC CONDITIONS OF EMPLOYMENT ACT, 75 OF 1997
3. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 130 OF 1993
4. CONSERVATION OF AGRICULTURAL RESOURCES ACT, 43 OF 1983
5. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996
6. EMPLOYMENT EQUITY ACT, 55 OF 1998
7. ENGINEERING PROFESSION ACT, 2000 (ACT NO. 46 OF 2000)
8. ENVIRONMENT CONSERVATION ACT, 73 OF 1989
9. ENVIRONMENT CONSERVATION ACT, 73 OF 1989, WESTERN CAPE NOISE CONTROL REGULATIONS
10. ENVIRONMENTAL CONSERVATION ACT, ACT 73 OF 1989
11. FENCING ACT, 31 OF 1963
12. FIRE BRIGADE ACT, ACT 99 OF 1987
13. GOVERNMENT GAZETTE NO. 34995, NOTICE NUMBER 79, REGULATION NUMBER 9672 PRESSURE EQUIPMENT REGULATION
14. GOVERNMENT NOTICE NO. 37305 OF 07 FEBRUARY 2014 CONSTRUCTION REGULATIONS
15. GOVERNMENT NOTICE NO. 37305 OF 07 FEBRUARY 2014 CONSTRUCTION REGULATIONS
16. GOVERNMENT NOTICE NO. R. 1593 OF 12 AUGUST 1988 FACILITIES REGULATION
17. GOVERNMENT NOTICE NO. R. 1593 OF 12 AUGUST 1988 FACILITIES REGULATION
18. HAZARDOUS SUBSTANCE ACT, ACT, ACT 15 OF 1973REGULATIONS FOR HAZARDOUS CHEMICALS SUBSTANCES, R1179 AUG1995
19. HAZARDOUS SUBSTANCES ACT, 15 OF 1973
20. LABOUR RELATIONS ACT, 66 OF 1995
21. NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 103 OF 1977
22. NATIONAL DISASTER MANAGEMENT ACT, ACT 57 OF 2002
23. NATIONAL ENVIRONMENTAL MANAGEMENT ACT, ACT 107 OF 1998
24. NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 39 OF 2004
25. NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 10 OF 2004
26. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 59 OF 2008
27. NATIONAL FORESTS ACT, 84 OF 1998
28. NATIONAL HEALTH ACT 61 OF 2003
29. NATIONAL HERITAGE RESOURCES ACT, 25 OF 1999
30. NATIONAL PORTS ACT, ACT 12 OF 2005
31. NATIONAL RAILWAYS REGULATOR ACT, ACT 16 OF 2002
32. NATIONAL VELD AND FOREST FIRE ACT, 101 OF 1998
33. NATIONAL WATER ACT, 36 OF 1998
34. OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993
35. REGULATIONS FOR HAZARDOUS CHEMICALS SUBSTANCES, R1179 AUG 1995ENVIRONMENTAL CONSERVATION ACT, ACT 73 OF1989
36. SALDANHA BAY MUNICIPALITY: AIR QUALITY BY-LAW
37. SALDANHA BAY MUNICIPALITY: BY-LAW ON MUNICIPAL LAND USE PLANNING
38. SALDANHA BAY MUNICIPALITY: BY-LAW RELATING TO BOUNDARY WALLS AND FENCES
39. SALDANHA BAY MUNICIPALITY: BY-LAW RELATING TO PUBLIC NUISANCES
40. SALDANHA BAY MUNICIPALITY: BY-LAW RELATING TO ROADS AND STREETS
41. SALDANHA BAY MUNICIPALITY: BY-LAW RELATING TO WATER SUPPLY, SANITATION SERVICES AND INDUSTRIAL EFFLUENT
42. SALDANHA BAY MUNICIPALITY: CEMETERIES AND CREMATORIA BY-LAW

43. SALDANHA BAY MUNICIPALITY: FIRE SAFETY BY-LAW
44. SALDANHA BAY MUNICIPALITY: INTEGRATED WASTE MANAGEMENT BY-LAW
45. SALDANHA BAY MUNICIPALITY: OUTDOOR ADVERTISING AND SIGNAGE BY-LAW
46. SALDANHA BAY MUNICIPALITY: PARKING MANAGEMENT BY-LAW
47. SALDANHA BAY MUNICIPALITY: PUBLIC AMENITIES BY-LAW
48. SALDANHA BAY MUNICIPALITY: STORMWATER MANAGEMET BY-LAWS
49. TOBACCO PRODUCTS CONTROL ACT, 83 OF 1993
50. TRADE METROLOGY ACT, ACT NO. 77 OF 1973
51. WATER SERVICES ACT, 108 OF 1997
52. WEST COAST DISTRICT MUNICIPALITY: AIR QUALITY MANAGEMENT BY-LAW
53. WEST COAST DISTRICT MUNICIPALITY: BY-LAW RELATING TO FIRE SAFETY
54. WEST COAST DISTRICT MUNICIPALITY: MUNICIPALITY HEALTH BY-LAWS

CHAPTER 4

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

Compliance

4.1 Monitoring and Auditing

4.1.1 Introduction

In keeping with current environmental and associated legislation, all environmental management procedures and actions must be reviewed and refined on an ongoing basis.

This is in accordance with the dynamic nature of environmental management and allows for the timeous identification and mitigation of issues as they come to light.

The process of review and refinement, built into the requirements of the EMP, is known as monitoring and auditing.

4.1.2. Roles and responsibilities

Efficient implementation of the performance specifications, effective monitoring and auditing, as well as clear responsibility and accountability allocation requires that various role-players be defined for the construction implementation project.

Depending on the nature and scale of a project, implementing teams could be composed of any number of role-players, each with their own specified responsibilities.

Therefore, for the purpose of this document, the following role-players are defined, based purely on responsibility and accountability allocation. The actual designation of role-players may vary, but the responsibilities will largely remain as stated.

4.1.2.1. Developer/landowner or custodian of the land

The developer/landowner or custodian of the land is the person or organization with decision making capacity for the land in question, and thus ultimately accountable for what takes place on that land.

4.1.2.2. Contractor

Contractors are appointed to undertake the works as specified in the contract. It is the responsibility of the contractor to do whatever is necessary from their side to ensure that he or an appointed advisor is well versed in environmental studies, so that they may accurately and efficiently carry out the requirements of the environmental specification.

The contractor is liable for any and all remedial work required in terms of the environmental specification, resulting from his environmental negligence, mismanagement and / or non-compliance.

4.1.2.3. Environmental Control Officer

An environmental control officer will manage and undertake monthly environmental inspections for the duration of the construction phase of the project as required.

The contractors or line management are answerable to the ECO for non-compliance. Issues of non-compliance raised by the ECO/EO must be taken up by the project manager, and resolved as per the conditions of his contract.

Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation and not allowed for in the performance specification) must be endorsed by the project manager.

4.2 The Monitoring Procedure

Environmental monitoring is the continuous evaluation of the status and condition of environmental elements. Its purpose is to detect change that takes place in the environment over time and involves the measuring and recording of physical, social and economic variables associated with development impacts.

Many techniques for environmental monitoring have been proposed, each detailing a specific protocol. Regardless of which technique is used, the ultimate aim is that each environmental management specification be checked by means of a system in which a score may be allocated for:

- Full compliance;
- Satisfactory performance;
- Unsatisfactory performance; and
- No action taken.

Completed monitoring reports will be submitted to the project engineer, developer/landowner and the contractor, who will attend to issues. These reports must be kept on file and be made available upon request by any environmental authority requesting such.

All persons employed, the contractor or his sub-contractors, must abide by the requirements of these performance specifications as they apply to the works. Any employees, the contractor or his sub-contractors found to be in breach of any of the environmental specifications, may be ordered to vacate the site forthwith and/or be subject to a disciplinary process.

The order may be given orally or in writing by the ECO. Confirmation of an oral order will be given as soon as practicable, but lack of confirmation in writing must not be a cause for the offender to remain on site, or not be subject to a disciplinary process. Supervisory staff, the contractor or his sub-contractor may not direct any person to undertake any activities which would place such person in contravention of the EMP, legislation and specifications.

The contractor and staff are deemed not to have complied with the performance specifications if:

- There is evidence of wilful or accidental contravention of any specification included in the specification;
- There is evidence of the contractor carrying out activities not permitted in terms of the EMP, contract and / or the specification;
- There is evidence of environmental negligence and / or mismanagement resulting in negative impacts on the environment;
- Has failed to meet with the requirements of the approved schedule.

The contractor and developer/landowner will be informed via ECO monthly reports, as well as by means of direct instruction (if necessary) as to what corrective actions are required in terms of environmental compliance.

Disregard for an instruction, and failure to respond adequately to complaints from the public will be construed as non-compliance. Non-compliance may lead to parties being penalised.

In more serious cases, the ECO may give notice, and halt operations until such a time that the corrective action is taken and the site complies with the performance specifications.

In cases of persistent non-compliance, the contractor or staff may be evicted from site after disciplinary process is followed. Only the developer/landowner may issue such instruction, retaining

any costs required to remedy situations perpetuated by environmental negligence, mismanagement and / or non-compliance.

4.3 The Auditing Procedure

Environmental auditing is the process of comparing the impacts predicted with those which have actually occurred during implementation.

An environmental performance audit examines and assesses practices and procedures which, in the event of failure, would cause an environmental impact or result in an environmental risk. During each of the lifecycle phases, various issues will be monitored. The performance audit will ensure that the monitoring was correctly undertaken and that compliance was best achieved.

To these ends the project will be audited versus this EMP for effectiveness. ISO/SANS 19011:2011 auditing standards will be applied.

Audits will be undertaken at completion of the construction phases. Audit reports will be submitted to management, who will attend to all noted issues.

These reports must be kept on record and be made available upon request by the developer/landowner/custodian of the land and any environmental authority or I&AP requesting such.

4.4 Retentions and Penalties

It is recommended that a penalty retention system be combined with the penalty system to both motivate and compel the contractor to adhere to the EMP for the duration of the contract.

In this way incentives may be created to perform (i.e. in the form of the retention amounts that will only be paid to the contractor at the end of the contract), without creating the misunderstanding that adherence to the EMP is optional.

Persistent non-compliance will not only result in the contractor forfeiting any retention amount, but he will also be fined.

Of importance is that the contract specifies exactly how the penalty and retention system will operate, as well as how any funds resultant from retentions and penalties will be utilised.

All such funds must be used to improve environmental conditions on the site in general..

4.4.1. The Retention System

For this system, a percentage value for each of the sections priced for in the environmental bill of quantities is retained until the full completion of the contract works.

If the monitoring process reveals persistent and/or wilful non-compliance with any aspect of the environmental performance specifications, then the full retention associated with that particular item will be withheld.

The project may then apply these retained funds to rectify the problem on site possibly making use of other or alternate resources at his disposal.

At the end of the contract or action, all remaining environmental retention amounts will be paid out to the contractor or staff pending approval by the ECO, after having confirmed full compliance with the relevant performance and rehabilitation specifications.

4.4.2. Penalty System

A system of penalties will be introduced to reinforce environmentally sensitive and prudent behaviour. The maximum penalties that will be fined per incident that may be enforced are listed below. The penalty amount will be determined (inter alia) by the severity of the offence.

Non-compliance	R 5 000.00 (ex VAT) per non-compliant act, per day until compliance is achieved
Casual Litter on site resulting from operation	R250 / offence / day
Disposal of any litter or construction material in non-specified area or by non-compliant means	R5000 / m^3 / per day
Dumping of cement, concrete, fuel or oil in an area or other than that authorised and suitable	R10 000 per offence / day
Failure to use portable / toilets	R100 / observed incident or evidence of human excrement on site

In addition to the above, all costs incurred by the client / developer to remedy any damage will be the responsibility of the offender.

Should the monitoring process reveal acts of persistent and / or wilful non-compliance with the environmental performance specifications, then the contractor or staff member will be fined according to the specified value of that item.

4.5 Method Statements

Contractors must provide written statements for discussion with the ECO on environmentally sensitive aspects of the contract. Environmentally sensitive aspects include by example excavations, work close to sensitive areas, collection and storage of top soil and vegetation, erosion control, wash water control, waste control, etc.

CHAPTER 5

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act 107 of 1998.

5.1. Good Housekeeping

The developer/landowner will ensure the maintenance of “good housekeeping” practices during operations.

This will help avoid several disputes regarding responsibility and will allow for the smooth running of the operation as a whole.

Good housekeeping extends beyond the environmentally sensitive construction methods to include the care for and preservation of the surrounding environment.

5.2 Record Keeping

The developer/landowner will ensure that a filing system, identifying all documentation related to the EMP, is established.

A list of reports likely to be generated during the project is set out below.

All applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Approved EMP, authorizations, licenses or permits;
- Final design documents and diagrams issued;
- All communications detailing changes of design/scope that may have environmental implications;
- Daily, weekly and monthly site monitoring reports;
- Complaints register;
- Environmental training manual;
- Environmental training attendance registers;
- Incident and accident reports;
- Emergency preparedness and response plans;

- Copies of all relevant environmental legislation;
- Permits and legal documents as part of emergency preparedness teams e.g. fire teams, etc.;
- Material data sheets of all chemicals utilised on site;
- Crisis communication manual;
- Disciplinary procedures;
- Monthly site meeting minutes during construction;
- All relevant permits;
- All method statements for all phases of the project.

All registers and records should be kept on site and must be made available to the department on request.

5.3 Document Control

The developer/landowner will be responsible for establishing a procedure for document control.

The document control procedure must comply with the following requirements:

Documents must be identifiable by organisation, division, function, activity and contact person;
Every document must identify the person and their positions, responsible for drafting and compiling the document, for reviewing and recommending approval, and final approval of the document for distribution;

All documents must be dated, provided with a version number and reference number, filed systematically, and retained for a specified period.

The owner will ensure that documents are periodically reviewed and revised where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMP are performed. All documents will be made available to the external auditor.

5.4 Reporting Requirements

All advice and recommendations made by the ECO must with the project engineer/engineers compliance be recorded on site in the site instruction book/ suitable register for his attention.

All spills will need to be documented and reported to DWS and other relevant authorities.

CHAPTER 6

6.1. Public Communication Protocols

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

The developer/landowner must be responsible for regulating public access to information and compliance reporting.

The developer/landowner must respond to third party or public queries and complaints.

The developer/landowner must also be responsible for maintaining the compliance register to record complaints received and action taken. All complaints receive by the facility must be documented.

CHAPTER 7

This section of the report is included in compliance with Section 24 N 2 (d - g) and 3 (a - b) of the National Environmental Management Act, 107 of 1998.

Goal for Planning and Design (PD)

Overall Goal for Planning and Design: Undertake the planning and design phase of the Residential development in a way that:

- Ensures that the design of the residential development responds to the identified environmental constraints and opportunities.

- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of any landowner concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the project.
- Enables the residential development construction activities to be undertaken without significant disruption to other land uses in the area.
- In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE PD1: PRE-CONDITIONS

The following pre-conditions must be fully met before any construction activities commence.

A site meeting between the contractors and the representatives of the developer must take place at least 5 days prior to commencement of construction work to:

- Demarcate micro construction sites, services routes, access routes, working boundaries and no-go areas;
    - An adequate buffer should be established and maintained to protect the botanically sensitive area from impacts relating to the construction of this development.
- Discuss methods of stockpiling (vegetation, topsoil, sub-soil, shell-grit, etc);
- Check required toilets and fire-fighting facilities to be in place;
- Discuss and agree restricted access to construction site;
- Sign the Declaration of Understanding (Contractors);
- Discuss and agree communication channels including contact details;
- Discuss and agree areas of responsibility;
- Discuss and agree the demarcation and control of construction and building sites.

Minutes of this site meeting must be kept, and are to be distributed to all parties.

The following equipment must be on every micro or sub site before any construction work is due to start:

- Sufficient and suitable chemical toilet facilities.
- Sufficient refuse bins, which are weather and wind proof, with proper lids.
- 1 x type ABC (all purpose) 12.5 kg fire extinguisher

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD2: LAYOUT PLAN CONTROLS

The contractor must ensure that a copy of the signed approved layout plan is available at the office on site at all times for inspection by the developer or his representative(s). Any variation to the approved layout plan must be submitted to the developer for signed approval and may only be implemented once the approved variation is available to the contractor and available on site at the office. The variation of changes to the layout must be approved by the competent authority as per the EA conditions.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD3: ADVERTISING

The contractors may place no advertising material on the property unless prior formal written permission has been obtained from the landowner.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD4: METHOD STATEMENTS

To ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMPr.

The environmental specifications are required to be underpinned by a series of Method Statements, within which the contractors and service providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the contractor will be required to describe how specified requirements will be achieved through the submission of written method statements to the site manager.

A method statement is defined as "a written submission by the contractor in response to the environmental specification or a request by the site manager, setting out the plant, materials, labour and method the contractor proposes using to conduct an activity, in such detail that the site manager is able 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 must cover applicable details with regard to:

- Details of the responsible person/s
- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/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 site manager

Method statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities.

Specific areas to be addressed in the method statement pre, during and post construction include:

General Administration:

- Designation of access road and protocol to be followed whilst the road is in use;
- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these). Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).

Soil Management:

- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.

Water Management:

- Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
- Stipulate the storm water management procedures recommended in the storm water management method statement.
- Ablution facilities (placement, maintenance, management and servicing)

Solid Waste Management:

- Description of the waste storage facilities (on site and accumulative).
- Placement of waste stored (on site and accumulative).
- Management and collection of waste process.
- Recycle, re-use and removal process and procedure.

Liquid Waste Management:

- The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
- Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into wetlands or natural watercourses.

Dust and Noise Pollution

- Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
- Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.

Hazardous Substance Storage:

- Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials (South African National Standards apply.
- Lists of all potentially hazardous substances to be used. Appropriate handling, storage and disposal procedures.
- Prevention protocol of accidental contamination of soil at storage and handling areas. All storage areas, (i.e.: for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).

Fire Prevention and Management:

- Fire management protocols and procedures to be put in place in accordance with relevant legislature.

Environmental Reporting:

- Incident and accident reporting protocol and procedures to be put in place on site in accordance with relevant legislature.

The contractor may not commence the activity covered by the method statement until it has been approved by the site manager, except in the case of emergency activities and then only with the consent of the site manager. Approval of the method statement will not absolve the contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD5: ENSURE THE DESIGN OF THE DEVELOPMENT RESPONDS TO THE IDENTIFIED ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES

Project Component/s	Storm water structures; Access roads; Laydown areas and construction camp area.
Potential Impact	Design fails to respond optimally to the environmental consideration.
Activities/Risk Sources	Poor planning and design of storm water and drainage structures. Poor consideration of the natural landscape features.
Mitigation: Target/Objective	Ensure that the design of the residential development responds to the identified environmental constraints and opportunities.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Plan and conduct pre-construction activities in an	Developer	Pre-construction

environmentally acceptable manner.		
Access roads to be carefully planned to minimise the impacted area and prevent unnecessary over compaction of soil.	Developer	Design phase
As far as possible, existing roads must be used.	Developer	Design phase
Develop a site specific waste management plan for the construction phase.	Developer	Pre-construction
The holder of an environmental authorisation has the responsibility to notify the competent authority of any alienation, transfer and, change of ownership rights in the property on which the activity is to take place.	Developer	Pre-construction
Fourteen (14) days written notice must be given to the Department that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number.	Developer	Pre-construction
ECO to be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to the DEA.	Developer	Pre-construction

Performance indicator	Design meets objectives and does not degrade the environment. Design responds to the mitigation measures and recommendations in the EIR. Minimal impact on the surrounding agricultural land and residential development.
Monitoring	Ensure that the design implemented meets the objectives and mitigation measures in the EIR through review of the design by the Project Manager, Developer and the Contract or prior to the commencement of construction.

OBJECTIVE PD6: ENSURE EFFECTIVE COMMUNICATION MECHANISMS WITH THE VARIOUS STAKEHOLDERS

On-going communication with affected and surrounding landowners and key departments is important to maintain during the construction and operational phases of the development. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project Component/s	Development area/site; Access roads; Adjacent landowners / occupiers of land adjacent to the development.
Potential Impact	Impacts on affected and surrounding landowners/occupiers and land uses.
Activities/Risk Sources	Activities associated with facility construction; Activities associated with facility operation.
Mitigation: Target/Objective	Effective communication with affected and surrounding landowners; Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/Control		**Responsibility**	**Timeframe**
Compile and implement a grievance mechanism procedure for the public to be implemented during both the construction and operational phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.		Developer	Pre-construction, construction and operational phase
Performance indicator	Effective communication procedures in place.		
Monitoring	An incident must be reported in the site book and monitored by the ECO.		

CONSTRUCTION AND REHABILITATION PHASE
CIVIL CONTRACTOR

Goal for Construction Phase

Overall Goal for Construction (C):
Undertake the construction of the residential development infrastructure in a way that:

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts;
- Enables construction activities to be undertaken without significant disruption to other land uses in the area, in particular concerning noise impacts, dust, traffic and road use, and effects on local residents;
- Minimises the impact on the surrounding area;
- Minimises impacts on avifauna and other fauna using the site; and
- Minimises the impact on the heritage and historical value of the site
- Minimise possible health impacts.

Objectives
In order to meet this goal, the following objectives have been identified, together with the necessary actions and monitoring requirements.

OBJECTIVE C1: WORKING HOURS

Civil & Construction Sites	
Mondays to Fridays	06h00 – 19h00
Saturdays & Public Holidays	06h00 – 17h00

Project Component/s	Development site; Access roads.
Potential Impact	Surrounding landowners/occupiers and residents are exposed to noise generated from the development site.
Activities/Risk Sources	Activities associated with facility construction that creates disturbing noises.
Mitigation: Target/Objective	Effective communication with affected and surrounding landowners/occupiers; Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Contractors may only be present on the site during the public time hours.	Developer and contractor.	Construction phase.

Performance indicator	Effective communication and procedures in place.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C2: SAFETY

Project Component/s	Development site; Access roads; Adjacent land owners / land users.
Potential Impact	Impacts on affected and surrounding landowners/occupiers and land uses such as crime, violence, accidents and incidents.
Activities/Risk Sources	The proposed development may result in an increase in crime levels in the surrounding community.
Mitigation: Target/Objective	To protect all involved from incidents and injury.

Mitigation: Action/Control	Responsibility	Timeframe
Telephone numbers of emergency services, including the local fire-fighting services, must be posted conspicuously in the contractor's office and near the telephone. No firearms are permitted on the construction site, other than those authorised by the developer for the property security service provider if needed. Notices should be displayed at all public entrances to the property, warning visitors that they are entering a construction site.	Contractor	Construction phase

Performance indicator	Effective communication and procedures in place.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C3: SPEED LIMIT

Project Component/s	Development site; Access roads.
Potential Impact	Speeding motorists and construction vehicles could injure personnel, members of the public or cause damage to property/infrastructure.
Activities/Risk Sources	Activities associated with facility construction such as transport of construction material, rubble and contractors.
Mitigation: Target/Objective	To protect all involved from incidents and injury.

Mitigation: Action/Control	Responsibility	Timeframe
For security and safety reasons the speed limit on the property for all contractors' vehicles is 30 km per hour. The contractor is responsible for ensuring that all his employees, sub-contractors and delivery vehicles adhere to this rule.	Contractor	Construction phase

Performance indicator	Effective communication and procedures in place.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C4: CONTRACTOR'S CAMP

Project Component/s	Development site; Access roads.
Potential Impact	Degradation of the natural environment inside/outside of the development area.
Activities/Risk Sources	Setting up and operation of the contractor's camp.
Mitigation: Target/Objective	Construction camp must be neatly fenced and construction site must be neat and tidy.

Mitigation: Action/Control	Responsibility	Timeframe
The contractor's camp will be indicated by and to landowner management and the ECO on the site. The final location of the contractor's camp will be authorized by the ECO and landowner.	Developer / Contractor	Construction phase

Performance indicator	ECO in conjunction with the landowner will approve construction camp area.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C5: DELIVERIES TO CONTRACTORS

Project Component/s	Access roads.
Potential Impact	Increased traffic, congestion and noise for surrounding landowners / residents and other road users. Impact on the natural environment.
Activities/Risk Sources	Vehicles on site transporting material to contractors.
Mitigation: Target/Objective	To protect and mitigate impacts on the environment, surrounding land uses, landowners, and personnel working on site.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Contractors will at all times be responsible for compliance by their delivery service providers as engaged. Delivery times will be limited to working times as defined in this document. Contractors have the responsibility of advising the property security staff of deliveries expected and to be executed. Contractors shall further ensure that drivers of service providers are informed of all procedures and restrictions e.g. which access road to use, speed limits, no-go areas, demarcated construction areas, and maximum allowed vehicle mass etc., as applicable before their first visit to site. Washing of service provider delivery vehicles and equipment will not be allowed on the property and must be carried out elsewhere.	Contractor	Construction phase

Performance indicator	Site is secure and there is no unauthorised entry. No members of the public/ landowners injured.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C6: ALIEN/INVASIVE PLANTS

Project Component/s	Development site.
Potential Impact	Alien/invasive plant species are allowed to spread into natural/indigenous vegetation areas.
Activities/Risk Sources	Activities associated with facility construction.
Mitigation: Target/Objective	To protect and mitigate impacts on the environment.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
A contractor appointed by the developer and engineer shall be tasked to ensure that all weeds and alien/invasive species are removed as instructed and approved by the ECO. No on-site burying, dumping or stockpiling of any weeds and aliens or invasive species shall occur. Such should be removed from the site to a suitable dumping site from which seed cannot escape.	Contractor	Construction phase

Performance indicator	All possible introduction and spreading of alien invasive plant species are controlled.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C7: STORM WATER MANAGEMENT

Project Component/s	Storm water infrastructure.
Potential Impact	Erosion due to poor storm water infrastructure. Pooling and ponding of water / flooding in portions of the development site due to poor storm water infrastructure design and engineering. Polluted runoff contaminating groundwater resources / streams due poor storm water infrastructure design and implementation.
Activities/Risk Sources	Activities associated with facility construction, poor storm water infrastructure.
Mitigation: Target/Objective	To manage storm water effectively and prevent erosion and the pollution of surface and ground water resources.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Areas disturbed during construction must be re-vegetated as soon as possible. All roads need to be maintained and monitored and visible signs of possible erosion immediately rehabilitated. Construction of storm water infrastructure to ensure that rain/storm water does not pool or accumulate. Undertake storm water management measures as required. Rehabilitate or stabilise eroded areas immediately to prevent any increase in erosion.	Contractor	Construction phase

Performance indicator	All possible erosion impacts are controlled. No signs of storm water pollution or accumulation that will result in a nuisance. No surface, ground or storm water may be polluted as a result of any activities on the site.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C8: ARCHAEOLOGY AND PALAEONTOLOGY MANAGEMENT

Project Component/s	Development site; Access roads.
Potential Impact	The loss of cultural or heritage resources.
Activities/Risk Sources	Activities associated with facility construction such as excavation.
Mitigation: Target/Objective	To protect and mitigate the potential loss of cultural and heritage resources.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Should any heritage or fossil remains be exposed during any excavation or related activities, these must immediately be reported to the provincial heritage resource authority of the Western Cape, Heritage Western Cape (in terms of the National Heritage Resources Act, 1999 (Act No.25 of 1999) via the ECO. Heritage remains uncovered or disturbed during earthworks must not be disturbed until inspection and verified by the professional.	Contractor	Construction phase

Performance indicator	Protection of heritage resources.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C9: SERVICES

Project Component/s	Development site; Associated services infrastructure; Access roads.
Potential Impact	Damage/loss of services infrastructure or supply.
Activities/Risk Sources	Activities associated with facility construction.
Mitigation: Target/Objective	To protect and mitigate impacts on the surrounding land uses; landowners and residents/occupiers.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Care and due cognisance must be taken of existing services, service routes and services restrictions. The developer and landowners shall not be liable for damages, expenses or costs incurred for any interruption in supply, variation, frequency, or failure of any utility provider to supply service.	Contractor	Construction phase

Performance indicator	Protection of existing services and infrastructure.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C10: ROADS

Project Component/s	Access roads.
Potential Impact	Increased traffic/congestion. Construction vehicles pose a potential risk to other road uses and the natural environment if they do not use designated routes.
Activities/Risk Sources	Activities associated with facility construction, receiving of goods by road.
Mitigation: Target/Objective	Designation of specific routes for construction vehicles to reduce impact on the environment and other road users.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Only existing access routes to the property will be used during construction work, so as to control the movement of construction vehicles. The contractor shall ensure that access to construction sites and associated infrastructure and equipment is designated off-limits to the public at all times during construction. Traffic safety measures shall be considered in determining entry or exit points to public roads.	Contractor	Construction phase

Performance indicator	To minimise the impacts on road users and the environment.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C11: ANTI-EROSION MEASURES

Project Component/s	Development site; Infrastructure; Access roads.
Potential Impact	Wind/water erosion as a result of construction/operation activities.
Activities/Risk Sources	Activities associated with facility construction such as excavation, removal of vegetation, etc.
Mitigation: Target/Objective	Reduce the impact of erosion by implementing anti-erosion measures.

Mitigation: Action/Control	Responsibility	Timeframe
The contractor shall take all appropriate and active measures to prevent erosion, especially wind and water erosion, resulting from operations and activities, specifically of storm water control measures to the satisfaction of the ECO/ER. During construction the contractor shall protect areas susceptible to wind and water erosion, by installing all the necessary temporary and permanent works. Measures can include brush packing, anchovy net stabilisation, etc. Where required erosion protection measures must be installed. Aspects normally covered in construction contracts in terms of protection of works are standard and are not to be confused with those under environmental legislation.	Contractor	Construction and operational phase

Performance indicator	All possible erosion impacts are controlled and rehabilitated.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C12: CONSTRUCTION MATERIAL

Project Component/s	Development site; Infrastructure; Access roads.
Potential Impact	Aesthetically displeasing/ visual impacts and causing a nuisance to surrounding landowners/residents.
Activities/Risk Sources	Activities associated with facility construction such as the storage of construction material.
Mitigation: Target/Objective	Reduce the visual impact or nuisance to the surrounding landowners/residents.

Mitigation: Action/Control	Responsibility	Timeframe
Construction material will be stored at the contractor's camp, as well as on the construction site within the demarcated working areas at each construction point. Special permission may be obtained from the ECO/ER to store material on suitable substitute or ancillary locations should the need arise, and as communicated by the project engineer.	Contractor	Construction phase

Performance indicator	To minimise the impact on the surrounding land users.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C13: FIRES

Project Component/s	Development site; Infrastructure; Construction camps.
Potential Impact	Uncontrolled fire on/off site, resulting in damage to the environment, property, injuries/death to personnel on site, or injuries/death to the public.
Activities/Risk Sources	Activities associated with facility construction.
Mitigation: Target/Objective	To protect and mitigate the safety of people, property, and the environment on and off site by preventing uncontrolled fires.

Mitigation: Action/Control	Responsibility	Timeframe
No open fires will be allowed on site and adequate fire-fighting equipment should be available on site in good working order at all times as prescribed by the fire management protocols.	Contractor	Construction phase

Performance indicator	No fire occurred to damage the surrounding environment and land uses and management actions are in place should a fire occur.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C14: AN EFFECTIVE MONITORING SYSTEM TO DETECT ANY LEAKAGE OR SPILLAGE OF ALL HAZARDOUS SUBSTANCES DURING THEIR TRANSPORT, HANDLING USAGE AND STORAGE. THIS MUST INCLUDE PRECAUTIONARY MEASURES TO LIMIT THE POSSIBILITY OF OIL AND OTHER TOXIC LIQUIDS FROM ENTERING THE SOIL OR STORM WATER SYSTEMS.

Project Component/s	Development site; Access roads.
Potential Impact	Contamination of soil, storm water and ground water resources by hazardous substances.
Activities/Risk Sources	The handling, storage and use of hazardous substances.
Mitigation: Target/Objective	Prevention and mitigation of the environment contaminated as a result of exposure to hazardous substances.

Mitigation: Action/Control	Responsibility	Timeframe
The EA holder, Land Owner, Site Environmental Officer and Environmental Control officer will do daily, weekly and monthly inspections and report and monitor compliance with the management actions included in the EMPr and EA conditions. These monitoring and reporting requirements are recorded in several sections of the EMPr. Monitoring will focus on signs of spillages and procedures during handling and storage of dangerous goods as described in the EMPr. The section on storage and handling of dangerous goods in the EMPr will be enforced.	Contractor	Construction phase

Performance indicator	Impacts on sensitive environmental features minimized and mitigated. Handling, storage and use of hazardous substances in accordance with relevant legislation.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C15: DIESEL FUEL AND LUBRICANT HANDLING PROGRAMME

Project Component/s	Development site; Access roads.
Potential Impact	Contamination of soil, storm and ground water resources as a result of an oil/diesel/lubricant spill/leak.
Activities/Risk Sources	Diesel fuel/lubricant use, handling, transportation and storage on site.
Mitigation: Target/Objective	To protect and mitigate impacts of contaminants on the environment and hydrological features.

Mitigation: Action/Control	Responsibility	Timeframe
Servicing of construction vehicles and machinery to take place of site. All vehicles must be in a good condition with no leakages leading to possible contamination of soil or	Contractor	Construction phase

water supplies. The following conditions related to the temporary fuel tanks must be implemented: The fuel tanks must be designed and installed in accordance with relevant Oil Industry standards and SANS codes where applicable for the aboveground storage tanks. The tanks must be located within a bund (110 % of the tanks capacity) in order to contain potential spills. During fuel tanker delivery, the tanker driver must be present at all times during product offloading. Should an incident occur the supply vehicle emergency cut-off switch must be activated to immediately stop fuel delivery. Flexible hoses with dry-break couplings and emergency isolation must be used. All spillage incidences and actions taken consequent thereto must be reported to the ECO and recorded in the site register. All fuel and flammable liquids should be stored under secure and fenced conditions and in a bunded site with the volume of the bunding capable of holding 110% of the liquid. The applicant must ensure that effective stock inventory monitoring and regular auditing take place for the early identification of possible leaks. The requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), must be adhered to. Within three months of the tanks ceasing to be used the tanks must be removed at the expense of the applicant, and the site, including all associated infrastructure must be rehabilitated to the satisfaction of the relevant authority. **Refuelling:** Refuelling of equipment must be conducted from the bunded fuel tank and pump at the contractor's camp. Fuel tanks must be bunded and supplied with a concrete apron. The concreted refuelling apron will be constructed with a drain along its extremities to collect any diesel contaminated run-off and channel it to the oil trap where separated oil will be collected and disposed of in the oil recycling container and process. Any spills on the concrete apron of floor below the tank are to be treated with OT8 or Spillsolve or equivalent as per the product instructions. A 500 litre drawn trailer to convey diesel to the equipment for re-fuelling may also be used. Such trailer will be drawn by a specified vehicle and driver, with alternate nominated as approved by the Project Engineer. Such tow vehicle may travel at 20kms per hour maximum at any time, be clearly identifiable as such, and may only tow the diesel cart should the pre requisite drip trays and emergency equipment be on the vehicle at the time. In situ refuelling activity may only take place during a standard specified daily time slot as displayed in the construction office, unless specific per day permission has been given to refuel at any other time by the ECO. This must be pre-		

recorded in the site record book. Staff will require instruction in the identification of diesel and oil leaks and the use of Spillsolve (or equivalent) products. **On-Site emergency repairs:** Only small mobile plant and emergency repairs are to take place on site. These will require the provision of drip trays and funnels to ensure that no oil or fuel leakages occur onto the ground. Should such spill take place, then the oil saturated soil is to be placed in suitable containers and disposed of at a hazardous waste disposal site. Any contamination of soil is to be treated with Spillsolve or similar product. Contaminated water as a result of an oil or fuel spillage on the area should similarly be treated in appropriate way, and the polluted water should not be specifically removed and not allowed to merge with run-off water collected in the trap collecting all run offs from the slab. **Collection of contaminated spares and waste oils:** Contaminated spares, oil filters, gaskets, water, etc. will be collected in separate holders at the designated storage facility for disposal at a licensed H:h site. Staff will require instruction in: • Deleterious effects of oil / fuel on the environment • Identification of oil leaks • Handling of oil / fuel leaks into soil • Location and method in storage of contaminated spares • Fire prevention and emergency drills in case of an accident		

Performance indicator	Ensure that no spillages occur and if it does occur that it is handled and cleaned up accordingly. Ensure that the storage, use, handling and transportation of diesel fuel and lubricants is in accordance with relevant legislation.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C16: APPROPRIATE HANDLING AND STORAGE OF CHEMICALS, HAZARDOUS SUBSTANCES AND WASTE (WASTE MANAGEMENT PLAN)

The construction phase will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents. The main wastes expected to be generated by the construction of the facility will include general solid waste and liquid waste, and may include hazardous waste.

Project Component/s	Access roads; Construction camp; Storage areas.
Potential Impact	• Release of contaminated water from contact with spilled chemicals. • Generation of contaminated wastes from used chemical containers. • Inefficient use of resources resulting in excessive waste generation. • Litter or contamination of the site or water through poor waste management practices. • Pollution of surface, groundwater and soil resources.
Activities/Risk Sources	• Vehicles associated with site preparation and earthworks. • Packaging and other construction wastes. • Hydrocarbon use and storage.

	• Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	• To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. • To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons. • To comply with waste management guidelines. • To minimise production of waste. • To ensure appropriate waste storage and disposal. • To avoid environmental harm from waste disposal.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
• Implement a site specific waste management plan during the construction phase. • Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. • Corrective action must be undertaken immediately if a complaint is received, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures. • Implement an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems. • Leakage of fuels must be avoided at all times and if spillage occurs, it must be remediated immediately. • In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents. • Spilled cement, fly ash and concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. • Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility. • All stored fuels to be maintained within a sealed bund and on a sealed surface. The bund must be at least 110% of the volume of the total containers. • Adjacent fuelling areas situated around fuel tanks must be provided with an impervious layer or drip trays must be used during refuelling. • Areas around fuel tanks must be appropriately bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1. • Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function. • Oily water from bunds at the substations must be removed from site by licensed contractors. • The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with MSDS files. • Any storage and disposal permits/approvals which	Contractor	Construction phase

may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with and copies kept on site in the environmental file. • Transport of all hazardous substances must be in accordance with the relevant legislation and regulations. • Construction sub-contractors must provide specific detailed waste management plans to deal with all waste streams. • Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control. • Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.). • Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and disposal at appropriately licensed waste disposal sites. • Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area. • Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal and copies of the safe disposal slips must be kept in the environment file on site. • Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time. • An incident/complaints register must be established and maintained on-site. • The sediment control and water quality structures used on-site must be monitored and maintained in a fully operational state at all times. • An integrated waste management approach that is based on waste minimisation must be used and must incorporate reduction, recycling, re-use and disposal where appropriate • Upon the completion of construction, the area must be cleared of potentially polluting materials. • Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site. • Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management. • The storage of waste must comply with the National Environmental Management: Waste Act, (Act No. 59		

of 2008) National Norms and Standards for Storage of Waste, 2013.		

Performance indicator	• Limited chemical spills outside of designated storage areas; • No water or soil contamination by spills; • No complaints received regarding waste on site or indiscriminate dumping; • Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately; • Provision of all appropriate waste manifests for all waste streams.
Monitoring	• Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase; • A complaints register must be maintained, in which any complaints from the community will be logged; • Observation and supervision of waste management practices throughout construction phase; • Waste collection will be monitored on a regular basis; • Waste documentation completed; • A complaints register will be maintained, in which any complaints from the community will be logged; • Complaints will be investigated and, if appropriate, acted upon; • An incident reporting system will be used to record non-conformances to the EMPr; This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE C17: EFFECTIVE MANAGEMENT OF CONCRETE BATCHING AREA

Project Component/s	Concrete batching area.
Potential Impact	• Dust emissions. • Release of contaminated water, pollution of ground water resources. • Ground, soil pollution. • Generation of contaminated wastes from used chemical containers. • Inefficient use of resources resulting in excessive waste generation.
Activities/Risk Sources	• Operation of the batching area. • Packaging and other construction wastes. • Hydrocarbon use and storage. • Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	To ensure that the operation of the batching area does not cause pollution to the environment or harm to persons.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
• Concrete batching areas to be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised; • Access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment; • The concrete batching area should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up;	Contractor	Construction phase

• The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind; • Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage; • The site should be designed and constructed such that clean storm water, including roof runoff, is diverted away from contaminated areas and directed to the storm water discharge system; • Any liquids stored on site, including admixtures, fuels and lubricants, should be stored in accordance with applicable legislation; • Contaminated storm water and process wastewater should be captured and recycled where possible. A wastewater collection and recycling system should be designed to collect and filter contaminated water; • Process waste water and contaminated storm water collected from the entire site should be diverted to a settling pond, or series of ponds, such that the water can be reused in the concrete batching process. The settling pond or series of ponds should be lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect; • Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control; • Ensure that all practicable steps are taken to minimise the adverse effect that noise emissions. This responsibility includes not only the noise emitted from the plant and equipment but also associated noise sources, such as radios, loudspeakers and alarms; • Where possible, waste concrete should be used for construction purposes at the batching area or project site; • The batching area to be monitored by the ECO to ensure that the plant is operating according to its environmental objectives and within legislative requirements. • Dust generated must comply with the National Dust Control Regulations (Government Notice No. R. 827 of 1 November 2013), promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (“NEM:AQA”). These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, may have a detrimental effect on the environment, including health.		

Performance indicator	• No complaints regarding dust or contamination; • No water or soil contamination by chemical spills; • No complaints received regarding waste on site or indiscriminate dumping.
Monitoring	Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.

	A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. An incident reporting system will be used to record non-conformances to the EMPr. Developer or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE C18: NOISE

Project Component/s	Modification of the jetty.
Potential Impact	Noise pollution.
Activities/Risk Sources	Construction activities relating to the modification of the jetty.
Mitigation: Target/Objective	To ensure that the construction activities do not cause unnecessary noise pollution.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
• Construction activities to be limited to construction working times. • Noise generated during the construction and operational phases must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013. • Contractors must implement noise control/reduction measures.	Contractor	Construction phase

Performance indicator	No complaints regarding noise.
Monitoring	A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. An incident reporting system will be used to record non-conformances to the EMPr.

OPERATIONAL PHASE

This following section defines the management programme for each of the identified goals during the operational phase. The programme is presented in the form of a table, which includes the components described. This programme consists of the following components:

Goals
Over-arching environmental goals for the management phase.

Objectives
The objectives are in place in order to meet these goals. These take into account the findings from existing studies and monitoring programmes.

Management Actions
The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.

Monitoring
*K*ey actions to verify that objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

Criteria/ Targets
The criteria or targets indicate the efficacy of the management programme. The targets should be readily measurable, understandable to the layperson, cost-effective to monitor, and meet legal requirements.

Remedial Actions
Specifies actions needed to be taken if the targets are not met; or if there is an unforeseen event.

Goals
The following 10 are specified goals:
Goal 1: Waste Management
Goal 2: Pollution Control - Jetty
Goal 3: Pollution Control - LPG Pipeline and Handling Facility
Goal 4: Water Quality and Storm Water Management
Goal 5: Soil erosion
Goal 6: Fire Management
Goal 7: Safety, Security and Emergency Procedures
Goal 8: On-going Monitoring of social environmental impacts
Goal 9: Avian Monitoring
Goal 10: Fire / Explosion

Goal 1: Waste Management

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Integrated Waste Management (E.g. staff, equipment).	Pollution, odours, and nuisances.	1. No solid waste may be incinerated on the property. 2. All vehicles transporting waste must be closed to avoid possible pollution of waste on transport routes. 3. Waste needs to be sorted and recycled were necessary. 4. All waste types to be handled, stored, transported and disposed of according to relevant legislature. 5. Domestic waste not suitable for compost or bio electricity generation needs to be stored in skips for transport to the Local Authorities registered Landfill site. 6. Squatting and rubble dumping adjacent to the new development must be controlled and regular inspections conducted to ensure control. 7. An integrated waste management approach must be implemented on site, based on waste minimisation, reduction, recycling, re-use and disposal where possible. 8. The National Information System Regulations must be adhered to in terms of registering and reporting hazardous waste generated on site via the Integrated Pollutant Waste Information System (IPWIS).	Audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. Ongoing employment of in house maintenance staff.	• If pollution on site is detected immediate action must be taken to contain the pollution. • Within 24hours of detection the ECO must be informed of the incident, where after the ECO will conduct a site visit and recommend further rehabilitation methods to be implemented. • Depending on the type and extent of pollution that occurred specialists may be contacted to provide specific recommendations. • An incident report is to be compiled and sent to the municipal and relevant governmental authorities.

Waste Management

Waste is defined as any matter, for which the current user has no further purpose, or any matter, gaseous, liquid, or solid or any combination thereof originating from any residential, commercial or industrial use, which has been discarded, accumulated, or stored.

It further is worth noting that on average 80% of waste management costs accrue to transport.

Principally three types of waste occur-

- Gaseous	Open fires
- High moisture (effluent)	sewerage/waste water/ petroleum products
- Low moisture (solid/semi solid)	glass/plastic/cardboard/paper/domestic/chemical

Some potential consequences-

- Salination of ground/surface/ river water.
- Eutrophication (nutrient enrichment) of natural areas.
- Microbiological contamination of natural areas.
- Sediment and silt migration inflows.
- Harmful inorganic/organic compounds introduction into soil.

Chemical residues and empty containers are required as per purchase contract to be removed ex site by the original supplier. The supplier is asked to further declare that such waste is disposed of within accepted Waste Management Programs standards.

Identified Waste Streams:

Components-
Sewerage (black water)
Sewerage (grey water)
Wet refuse
Dry refuse
Bottles and glass
Tins or cans
Plastic or polypropylene
Garden refuse
Building Rubble
General other waste

Integrated Waste Management Strategy:

Waste Avoidance-
Objective is to promote the concept of minimisation in the generation of any waste in all activities and sites.

Waste Reduction-
To promote the reduction of all waste by ensuring that nothing that can be decomposed is disposed of to waste as opposed to recycling.

Waste Recycling-
Re-using waste or selling waste to recycling companies as far as and if possible to prevent re-usable waste from going to municipal landfill site.

Waste Disposal-
To store, dispose or treat all waste that cannot be avoided, recycled, or composted at licensed facilities within regular operational and environmental monitoring and always in accordance with regulatory requirements.

Storm Water Pollution Management-
It is assumed that all stormwater can be classified as clean stormwater which can be discharged into the environment. All drainage will be surfaced drainage via the roads and surface bed areas. The unpaved areas will be landscaped to accommodate any stormwater run-off created.

Goal 2: Pollution Control – Jetty

Pollution control will be managed by the SFF Saldanha Oil Pollution Control (OPC) unit that is based at the Jetty. One of the methods used to mitigate instances of pollution during the offloading of vessels is through the deployment of pollution prevention booms. This is a procedure that is mandatory prior to the offloading of any vessels.

Import Operations:
During import operations, the vessel lined up to receive product will be isolated from all the liquid and vapour connections. The 12" liquid import line will then be opened to enable the receipt of product. During operations, the 12" liquid import line will be filled with product and liquid will be pumped via the cargo carrier pumps to the storage vessel.

After the receiving vessel has been filled to a certain level, the cargo carrier pumps will be stopped. The liquid line will be emptied by means of a vapour push. The cargo carrier will utilise on board compressors to achieve the vapour push. The current SFF facility is located roughly 10km from the jetty and the 12" liquid import /export line will contain an approximate volume of 820 cubic meters of product. Considering that each storage vessel
will have a volume of 8181 cubic meters, the tank filling during liquid pumping will be limited to ensure that sufficient storage space is available for the receipt of the liquid in the import line.

The line will then be emptied by means of the vapour push. Once the vapour push is complete, and a custody transfer surveyor has confirmed quantity and quality of product, the cargo carrier may disconnect.

Export Operations
During export operations, both vessel pumps can be utilised to increase transfer rates. A maximum of 400m3/hr can be achieved with the use of both pumps (P2A/P2B). The vessel under export mode will be lined up such that the liquid export connection is opened to the suction header. The liquid export pumps will draw product off the suction header and discharge product into the export line via the 12" import/export line.

During export operations, the facility can simultaneously dispense product to road tankers by closing of the tanker segregation valves on the 10" suction header line.

Liquid export pumps will be stopped once the vessel under export mode has been emptied. Thereafter the import/export line would require a vapour push to ensure no liquid product remains in the line. For the SFF terminal pre-feasibility study, vapour push from the LNG terminal to the cargo carrier has not been considered as the facility is not anticipated to perform export operations, however the integration of a vapour push compressor can be incorporated in future and the facility layout and piping systems will provide for this potential future requirement. The vapour push required to remove liquid from the import/export line will therefore be performed by cargo carrier vapour compressors and the liquid remaining in the import/export line will be transferred back to storage.

The implication of the above will result in export capacity being limited to approximately 95% of terminal storage capacity.

Inter-tank Transfer
To allow for product flexibility, inventory management and maintenance/inspections requirements, the terminal supports inter-tank transfer operations. Inter-tank transfer is achieved as follows:

- The vessel that is to be evacuated shall be lined with its liquid export connection opened to the 10" suction header.
- The vessel vapour connections (6" vent header) will be opened to allow for pressure equalisation between the tanks.
- The receiving vessel will be lined up to allow for product receipt via the minimum flow liquid line.

- Once the tank pressures have been equalised and the required vessel line ups confirmed, the discharging vessel pump will be started to commence liquid product transfer.
- Upon completion of the liquid discharge, the vessel to be evacuated will be connected to the drain tanker compressor to draw down the tank pressure and recover vapour product.

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Integrated Waste and pollution control Management (E.g. staff, equipment, budget).	Pollution, odours and health.	1. Waste to be stored in appropriate containers or facilities as provided by the municipality. 2. All vehicles transporting waste must be closed to avoid pollution of transport routes. 3. Special measures such as surface drainage works to prevent water from running onto this area must be constructed. 4. All spillages should be reported immediately.	Audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF/OPC	Adequate annual Budgets. On-going employment of in house maintenance staff.	• If pollution on site is detected immediate action must be taken to contain the pollution. • Within 24hours of detection the ECO must be informed of the incident, where after ECO will conduct a site visit and recommend further rehabilitation methods to be implemented. • Depending on the type and extent of pollution that occurred specialists may be contacted to provide specific recommendations. • An incident report to be compiled and sent to the municipal and relevant governmental authorities.

Goal 3: Pollution Control – LPG Pipeline and Handling Facility

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Integrated Waste and pollution control Management (E.g. staff, equipment, budget).	Pollution, odours and health.	5. Waste to be stored in appropriate containers or facilities as provided by the municipality. 6. All vehicles transporting waste must be closed to avoid pollution of transport routes. 7. Special measures such as surface drainage works to prevent water from running onto this area must be constructed. 8. All spillages should be reported immediately.	Audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of in house maintenance staff.	• If pollution on site is detected immediate action must be taken to contain the pollution. • Within 24hours of detection the ECO must be informed of the incident, where after ECO will conduct a site visit and recommend further rehabilitation methods to be implemented. • Depending on the type and extent of pollution that occurred specialists may be contacted to provide specific recommendations. • An incident report to be compiled and sent to the municipal and relevant governmental authorities.

Goal 4: Water Quality and Storm Water Management Measures

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Water Quality and Storm Water Management (E.g. staff, equipment, budget).	Pollution, odours, erosion and illegal quality of waste water discharge.	1. Ensure no pollution of any water resources, including surface water, storm water and ground water takes place as a result of any activities on the site. 2. Ensure that no water other than storm water be discharged in the storm water system.	Audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of in house maintenance staff.	• If pollution or erosion is detected immediate action must be taken to contain the pollution or erosion. • Within 24hours of detection the ECO must be informed of the incident, where after the ECO will conduct a site visit and recommend further rehabilitation methods to be implemented. • Depending on the type and extent of pollution or erosion that occurred specialists may be contacted to provide specific recommendations. • An incident report to be compiled and sent to the municipal and relevant governmental authorities.

Goal 5: Erosion Control

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources) for on-going erosion control management (E.g. staff, equipment, budget)	Erosion, sink-holes and or blocking of storm water systems. Damage to Infrastructure.	1. Ongoing control and management of roads, roadways and areas susceptible to erosion. 2. Ensure suitable vegetation cover or surface on non-hardened surfaces. 3. Control runoff of storm water to prevent soil erosion. 4. Avoid the formation of sink-holes on sensitive soils. 5. Management and control of erosion.	Audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of in house maintenance staff.	• If erosion is detected immediate actions must be taken to contain the erosion. • Within 24hours of detection the ECO must be informed of the incident, where after the ECO will conduct a site visit and recommend further rehabilitation methods to be implemented. • Depending on the type and extent of erosion that occurred specialists may be contacted to provide specific recommendations. • An incident report to be compiled and sent to the municipal and relevant governmental authorities.

Erosion Control

Erosion control and maintenance will be an on-going process, especially erosion developing on or as a result of roads. SFF must implement erosion control measures to ensure that no erosion occurs on site. The area must also be regularly monitored and erosion maintenance measures implemented to prevent erosion.

Goal 6: Fire Management

Fire water supply

It is proposed that the supply for water for the fire protection is from the existing system at the strategic fuel storage facility, as indicated in Figure 23 (in the Pre-feasibility Report Appendix G2). A ring network with fire hydrants and hose reels will be provided around the facility. Any additional equipment, such as deluge systems can be connected to the ring network.

Objectives	**Risks**	**Actions**	**Monitoring**	**Criteria/Targets**	**Remedial Actions**
Ensure allocations of sufficient resources (E.g. staff, equipment, Budget) for on-going fire management	Pollution, fire, damage to property and health risks.	1. Sufficient fire- fighting equipment to be on site. 2. Yearly pre-fire season clearing and maintenance of fire breaks. 3. Yearly pre-season testing and servicing of fire-fighting equipment.	Six monthly at start and then yearly audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of staff.	To be determined when required

Fire Management

Such legislation applies to the open countryside beyond urban limits and puts in place a range of legal requirements.

The responsibilities of people who own or control land.

The landowner on whose land a fire may start, or from whose land it may spread across boundaries, must have in place:

- Prepared firebreaks on your boundary, if there is a reasonable risk of fire.
- Have available such equipment, protective clothing and trained personnel required to extinguishing such fire as may occur.
- Take all reasonable steps to notify the fire chief of the local authority should a fire break out.
- Do everything in their reasonable power to stop the spread of the fire.

The Act also requires that should the owner be absent, a known and identified other person responsible needs to be present on or near this land to:

- Extinguish a fire if one breaks out, or assist or instruct others to do so
- Take all reasonable steps to alert the neighbours and Fire Chief.
- The owner may appoint an agent to act on his or her behalf to perform these duties.

Goal 7: Safety and Security Measures and Emergency Procedures

Please refer to Appendix G3, G4 and G5 for specific Disaster Risk Management Procedures - Please note that as the facility is a National Key Point - Procedures are confidential under the National Key Points Act.

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going safety, security and emergency procedures (E.g. staff, equipment, and budget).	Pollution, fire, security and health risks.	1. Any emergency incident, originating at the development site, which falls within the definition of section 30(1)a of the National Environmental Management Act (NEMA), Act 107 of 1998, must be dealt with by the facility in accordance with Section 30 of NEMA. 2. In the event of any incident the facility must ensure containment by the responsible person. 3. On-site emergency plans should be reviewed regularly.	Six monthly at start and then yearly audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of staff.	To be determined when required.

EARTHING AND LIGHTNING PROTECTION

The Feasibility Design for this project will include a complete risk analysis as input to the earthing system design as required in SANS 62305-1:2011.

For purposes of this study, an allowance is made for the earthing and lightning protection system using the following principles.

A site-wide earthing system consisting of underground copper conductors and earth electrodes are installed between all buildings and structures.

The site wide earthing conductor consists of a 70mm2 BCEW buried 600mm deep in trenches which follow the electrical cable servitudes. The earth electrodes used for this system is 16mm copper coated mild steel rods, 3 meters in length in accordance with SANS 1063. All metallic equipment and service lines including cable racks, pipe racks, conveyor systems piping, tanks etc. are bonded to the site-wide earth conductor. This equipment is connected to the site-wide earthing system by means of bonding conductors with a minimum size of 35mm2.

An Individual earth mat will be installed at the LPG Minisub.

The electrical earthing system employed at the plant is TN-S in line with IEC 60364-1 and/or SANS 10142:1.

Electrical Earthing is accomplished by the installation of separate bare copper earth wires with all feeder cables between main and sub-distribution boards. The earth wires sizes are selected as per the requirements of SANS 10142 which recommends the maximum lengths allowed for any particular feeder breaker size.

Earthing terminals and/or earthing bars in Distribution Boards are solidly bonded to the main earthing system. Main earthing conductors subject to damage or abuse are encased in 20mm minimum diameter tubing.

The following ohmic values are set for the design:
- 1 Ohm for the MV substations
- Overall resistance of 10 Ohm for remainder of systems

The power, data, communications and instrumentation installations shall also be referred the same main earthing system directly.

Jetty
A Control Station is provided on the Jetty to provide the following functions:
- Operate electrical isolating flanges;
- Operate Fire Safe, Fail Safe, Nitrogen (or Instrument Air) Operated, Flow Control Valves;
- Monitor Coriolis Flow Meter providing flow, temperature, and density monitoring;
- Monitor Pressure Transmitter;

The Control Station will contain a segregated Emergency Shutdown System in a separate cubicle to take care of the following functions:
- Monitor Fire detection / CCTV combination monitoring at berth.
- Shut off the LGP flow in the event of fire (Flame detector);
- Shut off the LPG flow on detection of LPG at the Gas Detector;
- Shut off the LPG flow when the manual ESD button located at the operations is activated;
- Shut off the LGP flow on command from the PCMS;
- Any shut-down is reported to the PCMS.

LPG Terminal
A Main Control Room is provided at the LPG Terminal. The control system incorporates the following functions:
- SCADA system as MMI (Man-Machine-Interface) to monitor and control LPG Terminal and Jetty operations;
- PCMS to monitor and control the following systems:
    - Ethyl Mercaptan injection;
    - Tank Farm Operations including Loading Gantries;
    - LPG Chiller Plant;
    - Storage Spheres;
    - Transfer Pumps;
    - Pipeline Evacuation System;

- Vehicle Booking System.

The Control Station will contain a segregated Emergency Shutdown System in a separate cubicle to take care of the following functions:
- Monitor Fire detection / CCTV combinations located throughout the LPG Terminal.
- Shut off the LGP flow in the event of fire (Flame detector);
- Shut off the LPG flow on detection of LPG at the Gas Detector;
- Shut off the LPG flow when the manual ESD button located at the operations is activated;
- Shut off the LGP flow on command from the PCMS;
- Any shut-down is reported to the PCMS.

Nitrogen

A Nitrogen system is provided as follows:
- Maintenance use for purging and small pipe low pressure testing.
- Fail Safe Valve Operation;
- Mercaptan Priming;
- Purity ≥ 95%;
- Pressure 1000Kpa;
- Storage TBA;

Instrument Air

An Instrument Air System is provided as follows:
- Fail Safe Valve Operation;
- Pressure 600Kpa;
- Dry Air -5°C dew point;
- Oil Free;
- Storage TBA.

Deluge Fire Fighting Systems

Protection shall be provided by deluge systems at road tanker operations in combination with strategically placed fixed monitors and hydrants.
- Deluge systems for road tanker and rail wagon gantries.
- Strategically placed monitors and hydrants with lay flat hoses and cabinets. Sufficient water run off provision shall be provided to accommodate maximum deluge or hydrant discharge plus recorded rain fall volumes.
- A separate and dedicated fire control panel mounted in security access or exit gate to monitor the
- ESD System, monitoring and activation of deluge systems, and monitoring of firewater pump.
- Modbus integration with a SIL 2 rated PCMS, SCADA monitoring with segregated Emergency Shutdown Systems.

The benefit of both the mounded and passive protected storage is an immediate reduction in firewater provision where no firewater is required for the storage. The existing firewater system shall be integrated providing for the following;

Design Reference	Detail
Deluge Road Tanker Volume	10L/m^2 (surface area)/min = 67,200Litres/hr/Road Tanker
Monitors / Hydrants	1600L/min 30m Reach @ 10 bar

Additional Fire Fighting Systems

- 9kg and 50kg Dry Powder Fire extinguishers.
- Infra-Red Fire detection / CCTV combination units strategically placed to monitor, berth operations, road tanker operations, transfer pump station, and top of storage valve stations.
- Gas detector units strategically placed to monitor road tanker gantries, berth operations, pump transfer stations, and top of storage valve station.
- Modbus integration with a SIL 2 rated PCMS, SCADA monitoring with segregated Emergency Shutdown Systems.

Passive Fire Protection Coating

A high-density spray applied fire resistive material for the protection of the pressure vessel offers substantial physical advantages of outstanding thermal performance and long term durability that meets and exceeds industry expectations.

The protective coating exceeds international hydrocarbon-related Specifications & Approvals including, but not limited to API, NFPA, and Lloyd's Register.

Compliance to UL 1709, Jet Fire, Three-Bar Blast Overpressure with Subsequent Jet Fire, Three-Bar Blast Overpressure with Subsequent Torch Fire and Hose Stream.

Suction Line

The pump suction line will be insulated with 50mm PIC insulation with vapour barrier and aluminium cover. The insulation will prevent solar heat ingress and the formation of two-phased liquid / vapour flow, which is exacerbated by extended suction lines with consequent pump cavitation. The suction line will comprise of the following:

Design Reference	Detail
Design Pressure	17 bar
Operating Pressure	2 – 5 bar
Design Temperature	-20°C to +65°C
Operating Temperature	+5°C to +30°C
Flange Rating	CL300#

- ASTM A106 GrB Sch40 Seamless Carbon Steel Pipe
- Block and bleed suction section with manual and auto isolation valve assy. complete with non-return valve
- Fail Safe Spring Return Fire Safe air operated Flow Control Valves
- Fire Safe manual operated Isolation Valves
- Inline Strainer per transfer pump
- Local pressure indicators complete with block and bleed assembly
- Thermal Relief Valve piped away to vent header
- Modbus integration with a SIL 2 rated PCMS, SCADA monitoring with segregated Emergency Shutdown System

Loading Gantries

Road Tanker Loading

Road tanker loading shall be completed by an automated loading system. Loading takes place directly on a Multideck (multi-axle weighing) Weighbridge, which is provided per loading gantry. New road tankers are increasingly built to a maximum of 27t payload whereas many older road tankers are as small as 22t. All road takers are bottom loading, liquid and vapour connections are centrally located on the passenger side of the barrel. The connections for liquid and vapour are 2" male Evertite cam lock fittings. The weighbridge shall be an aboveground installation with ramp on and ramp off access. The aboveground installation provides for ease of maintenance without the problems associated with water and drainage from pit mounted weighbridges. Weighbridge loading removes the issue of temperature compensation and provides legal loading with vapour return. Loading will be against the maximum Gross Vehicle Mass (GVM) of the combined trailer and horse or 85% (+2% margin) volume of the trailer whichever is level is reached first.

Loading Operation

An online vehicle booking system could be provided allowing customers to book loading slots, controlling paperwork issues that slow down throughputs. Each weighbridge provides loading of up to 15 road tankers per day taking into account positioning, administration, weigh in and weigh out procedures. The design shall allow for the future installation of extra weighbridges to meet additional future demand.

- The system will comprise of the following:
- ASTM A106 GrB Sch40 Seamless Carbon Steel Pipe
- Fail Safe Spring Return Fire Safe air operated Flow Control Valves.
- Fire Safe manual operated isolation valves
- Thermal Relief Valve/s piped away to vent header
- Earth Bonding Link integrated to ESD System.
- Fail Safe Spring Return Fire Safe air operated Flow Control Valves.
- Local pressure indicators complete with block and bleed assy.
- Local temperature indicators complete with thermowell.
- Break-Away couplings
- Local Stop/Start Station for pumping systems.
- Local lock and turn ESD control is locally provided.
- 60t 5 5kg x 22m Hot Dipped Multideck Galvanised Custody Transfer Weigh Bridge
- Weighbridge Room
- Local operator controller
- Individual firewater deluge system per loading gantry.
- Modbus integration with a SIL 2 rated PCMS, SCADA monitoring with segregated Emergency Shutdown Systems.

Goal 8: On-going Monitoring of Social Environmental Impacts

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going monitoring of environmental impacts (E.g. staff, equipment, budget).	Pollution, nuisances and health risks.	1. Internal formal management inspections. 2. SFF will do weekly inspections and maintain critical issued observed and do management actions when required.	Six monthly at start and then yearly audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of staff.	To be determined when required.

SPECIALIST RECOMMENDATIONS:

The following mitigation is considered reasonable, feasible and essential, and is factored into the assessment, and it assumes that only the applicant's preferred pipeline route will be authorised and that the 2ha Handling Facility (as indicated) will be authorised:

- The pipeline construction corridor in the area within and between the High, Medium and Medium – High sensitivity areas (as per Figure 4) should be minimised and kept as narrow as possible, and should ideally be less than 6m wide in this area. The approved development corridor in this area must be surveyed and clearly demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.
- The ECO must ensure that no disturbance occurs outside the approved development footprint of the pipeline route during construction.
- Topsoil removed from the pipeline trench must be kept separate from other fill during the construction process, and must be replaced last, on the soil surface.
- Alien invasive annual species (such as ryegrass or oats), or straw containing any such species, should not be used for temporary soil stabilisation of the pipeline corridor, as these will then rapidly dominate these areas, to the exclusion of indigenous species.
- Plant Search and Rescue must be undertaken from the entire pipeline development corridor, with the exception of Low sensitivity areas (as per Figure 4), prior to any development. All translocatable plant species, but notably the succulents and geophytes, must be bagged up and stored in a nursery for later use, once construction of the pipeline has been completed and rehabilitation is required in this area south of the road. Replanting of these rescued specimens should be undertaken in the first autumn – winter (May – June) after construction has been completed, giving the plants maximum time to establish before the next summer dry period.

- Additional rehabilitation of the High and Medium – High sensitivity sections of the pipeline servitude (as per Figure 4) should be undertaken using locally indigenous Strandveld species that are additional to those used in the Search and Rescue process. This work should be undertaken by an experienced horticultural contractor who has access to suitable locally grown species. Key elements suggested include shrubs such as *Othonna cylindrica, Limonium peregrinum, Calobota sericea, Thamnochortus spicigerus, Searsia laevigata, Searsia glauca, Lycium ferocissimum, Euclea racemosa* and *Putterlickia pyracantha*.
- Pipeline trenching should be undertaken in sections to minimise time that topsoil is exposed, and to minimise the chance of small animals such as tortoises becoming trapped in the trenches.
- The ECO or contractor must remove any trapped animals from the trenches every morning, and must not harm them.
- Ongoing alien invasive plant management must be undertaken on an annual or biannual basis within the full pipeline servitude, ideally in the month of October. No spraying of herbicide should be undertaken in these areas as this kills numerous non-target species, and no further soil disturbance should be allowed. The focus should be on removing (using CapeNature approved methodology) all alien invasive shrubs and large herbs (such as *Echium* species), although in some cases it may be possible and necessary to also remove invasive alien grasses such as kikuyu (*Pennisetum clandestinum*) or ryegrass (*Lolium* species).
- The approved handling facility development area must be fenced off and clearly demarcated throughout the construction period, so that no adjacent High sensitivity areas are damaged.
- The High sensitivity portion of the greater handling facility study area (6.6ha) must be managed as a conservation area, with no disturbance of this area allowed.

Goal 9: Avian Monitoring

Objectives	**Risks**	**Actions**	**Monitoring**	**Criteria/Targets**	**Remedial Actions**
Ensure allocation of sufficient resources for on-going monitoring of environmental impacts (E.g. staff, equipment, budget).	Disturbance of coastal birds, fouling of coastal birds, coastal bird mortalities.	1. The Jetty to be monitored on a regular basis to ensure that coastal seabirds are not nesting on the jetty. 2. Implementation of constructive methods to dissuade coastal birds from nesting on the jetty, especially prior to breeding season.	1. Internal formal management inspections. 2. SFF will do weekly inspections and maintain critical issued observed and do management actions when required. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of staff.	To be determined when required.

Goal 10: Fire/Explosion

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going monitoring of environmental impacts (E.g. staff, equipment, budget).	**Jetty at the Port of Saldanha** • The total individual risk involving the current crude oil jetty loading/offloading operations in the port is acceptable, with the 1.0e-6 (one-in-a-million) contour extending 12m beyond the Saldanha side of the jetty edge. The 3.0e-7 (one-in-thirtymillion) contour extends 21m beyond the Saldanha side of the jetty edge and does not reach any sensitive areas or MHIs. • The total individual risk involving the proposed LPG jetty loading/offloading operations in the port is acceptable, with the 1.0e-6 (one-in-a-million) contour extending 34m beyond the Langebaan side of the jetty edge. The 3.0e-7 (one-inthirty- million) contour extends 81m beyond the Langebaan side of the jetty edge and does not reach any sensitive areas or MHIs. • The total individual risk involving the current crude oil and the proposed LPG jetty loading/offloading operations in the port is acceptable, with the 1.0e-6 (one-in-amillion) contour extending 35m beyond the jetty edge. The 3.0e-7 (one-in-thirtymillion) contour extends 85m beyond the jetty edge and does not reach any sensitive areas or MHIs.	1. Good housekeeping always needs to be observed on site; 2. The Emergency Plan must be updated to include the scenarios described in this report; 3. The Emergency Plan must comply with SANS 1514; 4. Once the designs for the LPG Import Terminal has been finalised a final MHI must be conducted and the updated MHI report must be distributed to Local, Provincial and National Government as per MHI Regulations; 5. Only suitably qualified people must be used for all work on the proposed installations; 6. Check alarms and emergency procedures regularly; 7. Do a full pressure test to ensure that there are no leaks prior to commissioning the installations; 8. Hazard Area Classification must be done as per SANS 10108.	1. Internal formal management inspections. 2. SFF will do weekly inspections and maintain critical issued observed and do management actions when required. **Responsibility:** SFF	Adequate annual Budgets. On-going employment of staff.	To be determined when required.

	Pipeline to the SFF Import Terminal Facility • The total individual risks involving the current crude oil pipelines are acceptable, with the 1.0e-6 (one-in-a-million) contour extending 25m beyond pipelines. The 3.0e-7 (one-in-thirty-million) contour extends 45m beyond the pipelines and does not reach any sensitive areas or MHIs. • The total individual risks involving the proposed LPG pipeline are acceptable, with the 1.0e-6 (one-in-a-million) contour extending 25m beyond the. The 3.0e-7 (one-in-thirty-million) contour extends 60m beyond the pipeline and does not reach any sensitive areas or MHIs. • The total individual risks involving the proposed crude oil and LPG pipelines are acceptable, with the 1.0e-6 (one-in-a-million) contour extending 46m beyond the. • The 3.0e-7 (one-in-thirty-million) contour extends 98m beyond the pipelines and does not reach any sensitive areas or MHIs. **SFF Import Terminal Facility** • The total individual risks involving the current crude oil installations are acceptable, with the 1.0e-5 (one-in-a-hundred thousand) reaching the edge of the bulk tanks but not reaching the property boundaries. The 1.0e-6 (one-in-a-million) contour extends beyond the				

	property boundaries and just reaches the Moggs boundary to the east and across the main Saldanha/Langebaan road to the west. The 3.0e-7 (one-inthirty-million) contour extends 570m beyond the boundaries, just reaching the Moggs tanks and does not reach any sensitive areas. • The total individual risks involving the proposed LPG installations are acceptable, with the 1.0e-6 (one-in-a-million) contour extends 136m beyond the property boundaries but does not reach the Moggs boundary to the east and does not reach the main Saldanha/Langebaan road to the west. The 3.0e-7 (one-in-thirty-million) contour extends 706m beyond the boundaries, just reaching the Moggs tanks and does not reach any sensitive areas. • The total individual risks involving the crude oil and LPG installations are acceptable, with the 1.0e-5 (one-in-a-hundred thousand) reaching the edge of the bulk tanks but not reaching the property boundaries. The 1.0e-6 (one-in-a-million) contour extends beyond the property boundaries and just reaches the Moggs boundary to the east and across the main Saldanha/Langebaan road to the west. The 3.0e-7 (one-inthirty-million) contour extends 706m beyond the boundaries, just reaching the Moggs tanks and does not reach any sensitive areas.				

CHAPTER 8

ENVIRONMENTAL REPORTING

In order to ensure that the necessary environmental issues are adequately addressed and recorded, the following environmental reporting shall be undertaken:

- Incident reporting; and
- Compliance reporting

See below for a template of an Incident Report to serve as a guideline for the recording and addressing of emergency incidents as and when they occur.

ENVIRONMENTAL INCIDENT REPORT

DATE:	**File Ref:**
NAME:	**Copy to:**
EXACT LOCATION OF INCIDENT:	

SECTION 1 : DESCRIPTION OF INCIDENT

SECTION 2 : REMEDIAL ACTION REQUIRED

Remedial Action Due Date:
Confirmation of implementation: Name: **Date:**

SECTION 3 : RELEVANT DOCUMENTATION

SECTION 4 : SIGNATURES

Municipal Engineer:

.....

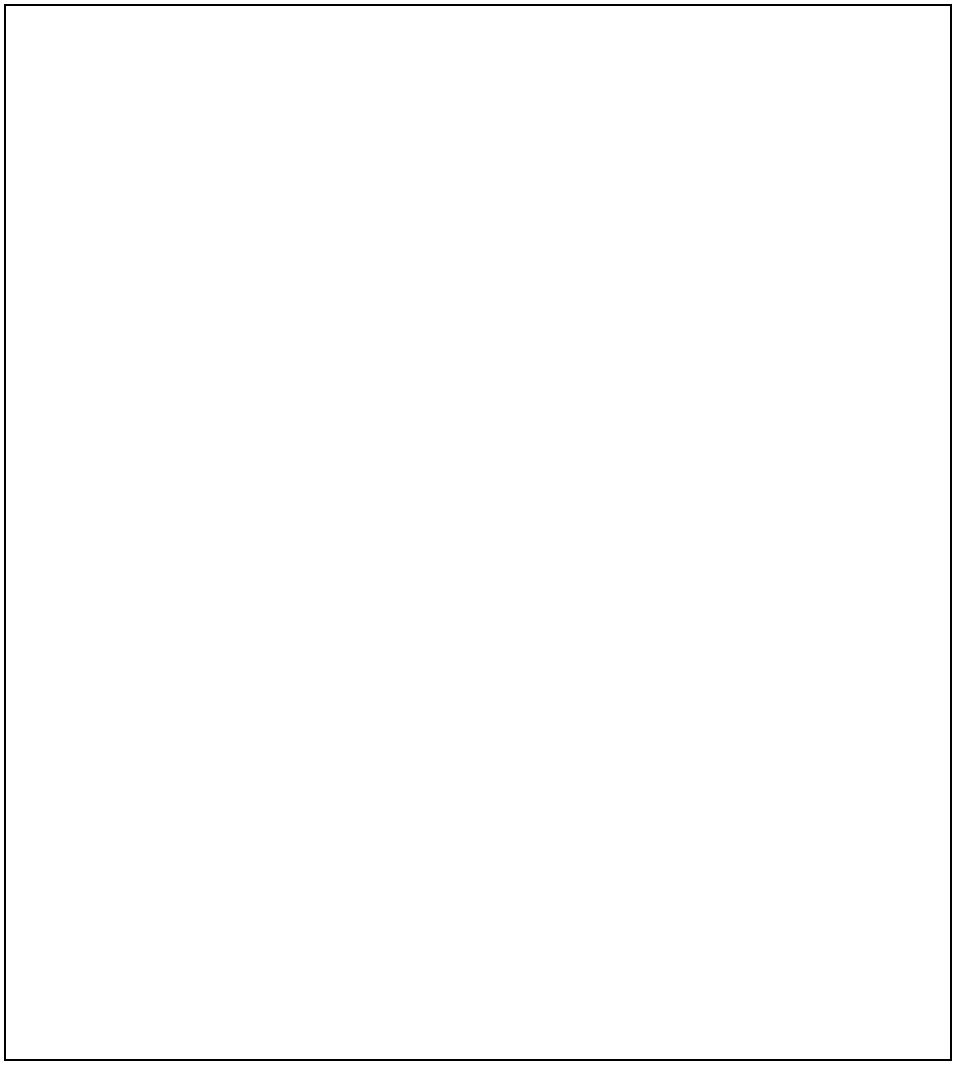
Name:
Date:

ECO:

.....

Name:
Date:

SECTION 5: DRAWING/SKETCH



CHAPTER 9

DECOMMISSIONING PHASE

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased.

The decommissioning phase EMP provides specific guidance with respect to the management of the environmental risks associated with the decommissioning stage of a project.

Closure and decommissioning impacts are likely to be similar to the construction phase impacts. The management actions and control under the construction phase EMP need to be implemented to mitigate the negative impacts on the environment and to restore the property to its natural state.

A decommissioning phase is where a structure is removed or otherwise modified to make it incapable for re-use for the original design purpose.

The results of environmental monitoring during the decommissioning phase will be used to assess the impact of the decommissioning on the surrounding environment and demonstrate compliance with regulatory requirements.

The actual scope of the decommissioning environmental monitoring will be established following consultation with the regulatory authorities. The format of decommission management strategy will probably be similar to that of earlier development phases and consist of the following:

- Management Principles
    - Develop monitoring procedures in accordance with standard protocols and the requirements of the environmental legislation.
    - Undertake environmental monitoring during the decommissioning phase as shown below.

Environmental monitoring during the decommission phase will include terrestrial flora rehabilitation monitoring.

CHAPTER 10

REHABILITATION SPECIFICATIONS AND SITE CLEAN-UP

The contractors must ensure that all temporary structures, equipment, materials and facilities used or created on site for, or during construction activities, are removed once the project has been completed. The construction sites must be cleared, and cleaned to the satisfaction of the developer.

Stabilisation and rehabilitation must take place immediately after construction operations have been completed. No vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.

The areas impacted during construction must be stabilised and shaped according to the natural surrounding contours. If topsoil was removed during construction the topsoil must be used to stabilise the impacted areas.

If erosion occurred the ECO must be informed immediately who will then recommend erosion mitigation measures to be implemented.

Alien vegetation monitoring of the rehabilitated areas and surrounds must be conducted on an annual basis and if alien vegetation is detected the ECO must be informed immediately who will then recommend eradication methods. Complete rehabilitation of all disturbed areas has been included in the rehabilitation plan included as part of the EMPr which has been informed by the specialist recommendations.

SPECIALIST RECOMMENDATIONS:

The following mitigation is considered reasonable, feasible and essential, and is factored into the assessment, and it assumes that only the applicant's preferred pipeline route will be authorised and that the applicant's preferred red site 3ha Handling Facility (as indicated) will be authorised:

- The pipeline construction corridor in the area within and between the High, Medium and Medium – High sensitivity areas (as per Figure 4) should be minimised and kept as narrow as possible, and should ideally be less than 6m wide in this area. The approved development corridor in this area must be surveyed and clearly demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.
- The ECO must ensure that no disturbance occurs outside the approved development footprint of the pipeline route during construction.
- Topsoil removed from the pipeline trench must be kept separate from other fill during the construction process, and must be replaced last, on the soil surface.
- Alien invasive annual species (such as ryegrass or oats), or straw containing any such species, should not be used for temporary soil stabilisation of the pipeline corridor, as these will then rapidly dominate these areas, to the exclusion of indigenous species.
- Plant Search and Rescue must be undertaken from the entire pipeline development corridor, by an experienced and reputable horticultural contractor, with the exception of Low sensitivity areas (as per Figure 4), prior to any development. All translocatable plant species, but notably the succulents and geophytes, must be bagged up and stored in a nursery for later use, once construction of the pipeline has been completed and rehabilitation is required in this area south of the road. Replanting of these rescued specimens should be undertaken in the first autumn – winter (May – June, after second good rainfall) after construction has been completed, giving the plants maximum time to establish before the next summer dry period.
- Additional rehabilitation of the High and Medium – High sensitivity sections of the pipeline servitude (as per Figure 4) should be undertaken using locally indigenous Strandveld species that are additional to those used in the Search and Rescue process. This work should be undertaken by an experienced horticultural contractor who has access to suitable locally grown species. Key elements suggested include shrubs such as *Othonna cylindrica, Othonna coronopifolia, Limonium peregrinum, Calobota sericea, Thamnochortus spicigerus, Aloe mitriformis (distans), Searsia laevigata, Searsia glauca, Lycium ferocissimum, Euclea racemosa* and *Putterlickia pyracantha*.
- Pipeline trenching should be undertaken in sections to minimise time that topsoil is exposed, and to minimise the chance of small animals such as tortoises becoming trapped in the

trenches.

- The ECO or contractor must remove any trapped animals from the trenches every morning, and must not harm them and must release them at least 100m away, west of the main road.
- Ongoing alien invasive plant management must be undertaken on an annual or biannual basis within the full pipeline servitude, ideally in the month of October. No spraying of herbicide should be undertaken in these areas as this kills numerous non-target species, and no further soil disturbance should be allowed. The focus should be on removing (using CapeNature approved methodology) all alien invasive shrubs and large herbs (such as *Echium* species), although in some cases it may be possible and necessary to also remove invasive alien grasses such as kikuyu (*Pennisetum clandestinum*) or ryegrass (*Lolium* species).
- The approved handling facility development area must be fenced off and clearly demarcated throughout the construction period, so that no adjacent High sensitivity areas are damaged. No fill may be dumped outside the approved development area.
- Plant Search and Rescue should be undertaken for the approved handling facility area prior to any earthworks, by an experienced contractor. Some of the material can be used to rehabilitate the pipeline areas, and the remainder may be kept for use elsewhere on this site, or on other sites.
- A qualified botanist should review the rehabilitation interventions a year after primary rehabilitation completion and report to the applicant and the authorities on what has been successful and what has not been successful, with recommendations on what still need to be done, if anything. Adequate budget will need to be made available by the applicant for this.
- The High sensitivity portion of the greater handling facility study area (red site; about 11ha; as per Figure 4) must be managed as a conservation area, with no disturbance of this area allowed.

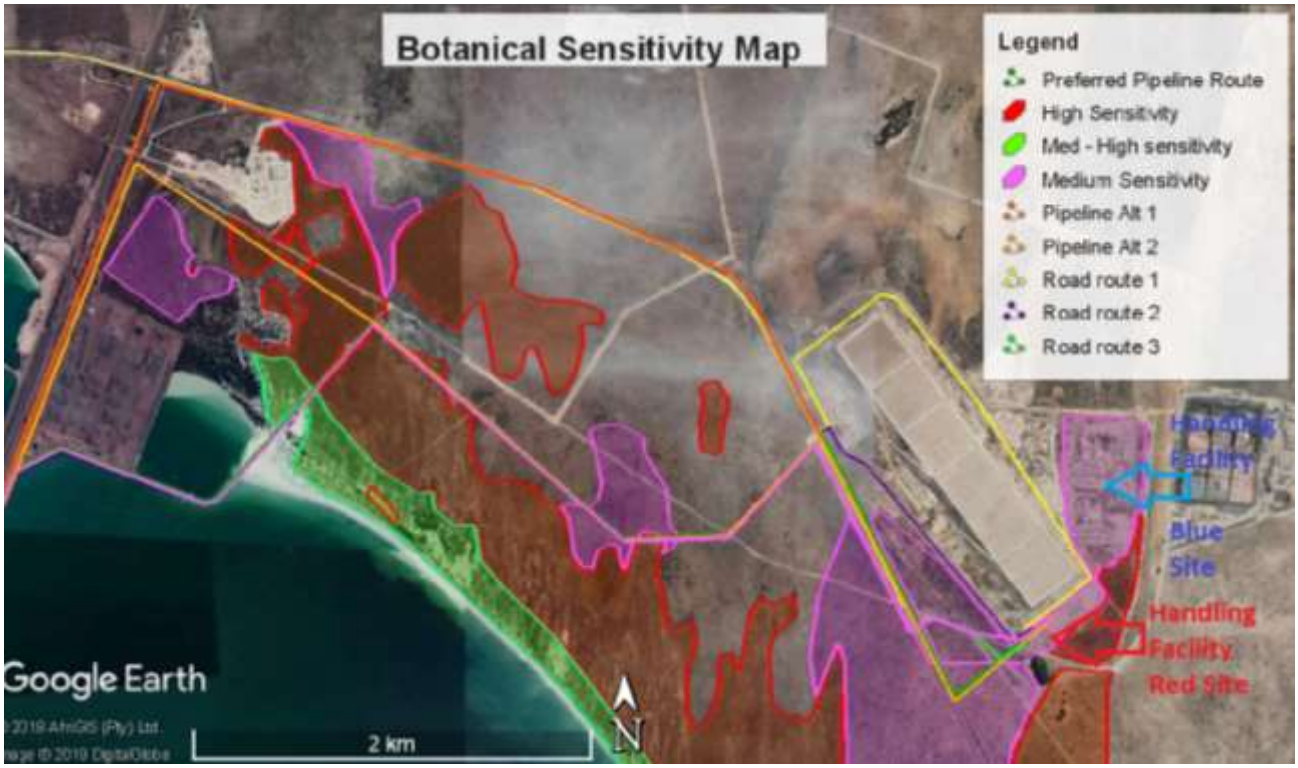


Figure 4: Map of the botanical sensitivity in the study area. Note that unshaded areas within the project area (generally within 50m of any infrastructure here assessed) are of Low sensitivity.

CHAPTER 11

ENVIRONMENTAL AWARENESS INDUCTION COURSE MATERIAL

This section of the report is included in compliance with Section 24N (3) (c) of the National Environmental Management Act 107 of 1998.

WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe

WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A Policy and System will be signed

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP

WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times

RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream

ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site

TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission

PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed

DUST

Try to avoid producing dust

NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles

TOILETS

- Use the toilets provided
- Report full or leaking toilets

EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins

RUBBISH

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly

TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers – check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill

EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance:
- Fire:
- Police: 10111

FINES AND PENALTIES

- Spot fines of between R20 and R2000
- Your company may be fined
- Removal from site
- Construction may be stopped

PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

ATTENDANCE REGISTER FOR ……	
PLACE ……..	TRAINER……
NAME & SURNAME	SIGNED
SIGNED ……	DATE & TIME ……

CHAPTER 12

COMPLIANCE WITH THE ENVIRONMENTAL AUTHORISATION

All conditions of the Environmental Authorisation must be adhered to onsite during the construction-, operational-, decommissioning- and rehabilitation phases of the proposed project. A copy of the Environmental Authorisation must be available on site together with the EMP and all contractors on site must sign the Declaration of Understanding as proof of awareness and understanding of all the conditions to be adhered to on site in terms of the EA and EMP.

CHAPTER 13

UPDATING/ADAPTING THE EMP

Although care has been taken to address all known relevant environmental issues for the development, it will become necessary to add or amend certain procedures or instructions to improve the efficiency of the EMP. Only those additions to, or amendments of, this EMP that will either improve environmental protection or can be proven not to have any negative effects would be considered to be included, and any amendments to the EMP must first be approved by the ECO and competent authority/ies i.e. DEA.

REFERENCES

City of Cape Town (2002) Environmental Management Programme (Version 5) for Civil Engineering Construction Activities.

DEA&DP: Environmental Management Programme. Version 5 (04/2002). Guideline Document for the ECO / ESO and the ER

Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.