



VOLUME 1

CONTRACT

SCOPE OF WORKS

C3: SCOPE OF WORK

Item N°

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C3.1 DESCRIPTION OF THE WORK

STATUS

In the event of any discrepancy between the Scope of Works and a part or parts of the SABS 1200 Standardized Specifications, the Bill of Quantities or the Drawings, the Project Specifications shall take precedence and prevail in the Contract. The discrepancy must be brought to the Employer's Agent urgently as any claims pertaining to the identified discrepancies won't be entertained.

C3.1.1 EMPLOYER'S OBJECTIVES

The Employer's objectives are to deliver public infrastructure using labour-optimised methods where possible. The intention is to provide electricity to the community of Monyakeng Area in the Nala Local Municipality.

Under this Tender N° **NLM/TS/004/2023-24 Nala Local Municipality is inviting tenders for the ELECTRIFICATION OF 250 STANDS IN MONYAKENG EXT 12 & 13.**

C3.1.2 OVERVIEW & EXTENT OF WORKS

The contract consists of erecting new MV (11kV) Overhead lines, Supplying transformers and the installation of an LV (415/230V) Overhead networks.

C3.1.4 LOCATION OF THE WORKS

The works are located in the Monyakeng, Wesselsbron, Free State.

C3.1.5 TEMPORARY WORKS

The Contractor is to allow for all temporary works required for this Contract. The Contractor shall be required to obtain the use of suitable land and to establish maintain and secure his site office, workshop, storage facilities for pipes, plant, equipment, fittings, fuel, lubricants and all other materials required in the performance of this contract, all in terms of the requirements of the contract as described in C3 of this document and in the Environmental Management Plan enclosed in this document.

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

C3.2 ENGINEERING

C3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

Description	Responsible Party
Works designed by, per design stage:	Employer
Concept, feasibility and overall process	Employer
Basic engineering and detail layouts to tender stage	Employer
Final design to approved for construction stage	Employer
Temporary works	Contractor
Preparation of as-built drawings	Contractor

a) The Employer is responsible for the design of the permanent Works as reflected in the Contract Documents unless otherwise stated.

b) The Contractor is responsible for the design of the temporary Works and their compatibility with the permanent Works.

c) The Contractor shall supply all details necessary to assist the Employer's Agent in the compilation of the as-built drawings.

C3.2.2 EMPLOYER'S DESIGN

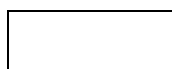
The Employer's design comprises of the following principal elements:

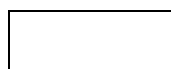
- a) Construction of MV (11kV) Overhead lines, Supplying transformers and the installation of an LV (415/230V) Overhead networks.

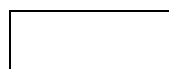
The Employer will issue construction drawings. Drawings issued to Tenderers as part of the tender documents must be regarded as provisional and preliminary for the Tenderer's benefit to generally assess the Scope of Work. The tender drawings are issued separately to this document.

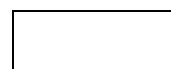
At commencement of the Contract, the Employer's Agent will deliver to the Contractor, copies of the construction drawings and any instructions required for the commencement of the Works. From time to time thereafter during the progress of the Works, the Employer's Agent may issue further drawings or revisions for construction purposes as may be necessary for adequate construction, completion and defects correction of the Works. The work shall be carried out in accordance with the latest available revision of the drawings approved for construction.

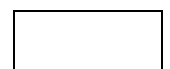

Contractor


Witness 1


Witness 2


Employer


Witness 1


Witness 2

C3.2.3 DRAWINGS

The drawings issued to Bids as part of the Bid documents must be regarded as provisional and preliminary for the Bidder's benefit to generally assess the scope of work.

The work shall be carried out in accordance with the latest available revision of the drawings approved for construction.

At commencement of the contract, the Engineer will issue copies of the construction drawings and any instructions required for the commencement of the works to the Contractor. From time to time thereafter during the progress of the works, the Engineer may issue further drawings or revisions for construction purposes as necessary for adequate construction, completion and defects correction of the works.

DRAWING TITLE	DRAWING NO.
Layouts	
MV & LAV LAYOUT	-

C3.2.4 CONTRACTOR'S DESIGN

The Contractor's responsibilities for design and documentation includes, but are not necessarily limited to, the descriptions below:

C3.2.4.1 Design of Alternatives

Should the Contractor, at tendering stage or following appointment, propose any alternative to the Employer's design, such proposal shall only be deemed valid if it is accompanied by adequate and suitable sketches or drawings detailing the extent of the alternative and the component, sufficient to establish the means of execution of the work, applicable fabrication drawings, etc. and provided that such submission is also accompanied by Method Statements, and specifications where appropriate, detailing how the Contractor proposes to go about the work from the ordering of materials, organizing of plant, steps in executing the alternative proposal, together with proposed lists of personnel involved, tools, health and safety measures and measures for environmental compliance.

Such alternative shall be provided adequately in advance of the proposed work to allow for sufficient consideration and consultation and shall be subject to the Employer's Agent's approval

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

C3.2.4.2 Design of Temporary Works

The Contractor shall be responsible for the layout of his/her site camp, construction areas, design of the pipe yard and all temporary works, including construction access, culverts and drainage. The Contractor is also referred to the Employer's Environmental Specification.

C3.2.4.3 Other Documentation Required from Contractor

Operation and Maintenance Manual

The Contractor shall be responsible to produce the Operations & Maintenance Manual for the Works. Two draft copies of the O & M Manual shall be issued to the Employer's Agent prior to commissioning of the Works. Before the Certificate of Practical Completion is issued (after the successful completion of the Trial Operational Period) four final copies of the final approved version of the O & M Manual shall be issued to the Employer's Agent.

Binders with hard plastic covers and four-ring spring clip holders shall be used. Binders shall not be over-filled to allow use without damage to the contents. A spare binder shall be provided for every three used, marked with the contract information. At least one set shall contain original copies.

The manual shall be of a standard acceptable to the Employer's Agent. Title labels which include contract number, title, location, Contractor's name as well as the equipment or fittings used together with volume number and contents shall be fixed on the front as well as the spine of the binders.

Manuals shall be in English only, with sections of equipment arranged by labelled dividing separator sheets. Where standard literature is obtained from suppliers or manufacturers, this shall be neatly photocopied in A4 size, with the applicable sections clearly marked, omitting duplicate sections in languages other than English.

Comprehensive indexes shall be included, with separate sections (with their own index) where required, as follows:

- Record (as-built) drawings referenced to the drawings list in C3.2.3.
- Name and contact details of all suppliers
- A comprehensive schedule of routine maintenance for the works.
- The index is not exhaustive and may be amended by the Employer's Agent during the construction stage.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

C3.3 PROCUREMENT

C3.3.1 PREFERENTIAL PROCUREMENT PROCEDURES

C3.3.1.1 Requirements

The conditions associated with the granting of preferences, if any, and the sanctions relating to a breach of preferencing conditions are contained below.

C3.3.1.2 Resource standard pertaining to targeted procurement

Preferential procurement will be applied as per Nala LM preference policy.

C3.3.1.3 Contracts of Employment

All employees of the Contractor shall be issued with a written contract of employment which shall be signed by the Contractor and the employee. The contracts shall be in Sesotho and in English.

Contracts of employment shall incorporate, inter alia, the following:

- personal particulars;
- job title and job description;
- employment period, including any probation period, which probation period shall not exceed 13 weeks;
- hours of work, statutory holidays, vacation, sick leave;
- remuneration, including wage rates for overtime, and any monetary allowances and deductions applicable to any probationary period and the time after its satisfactory completion;
- method of payment;
- medical and any other social benefits;
- conditions precedent to termination of employment;

and shall be accompanied by a written statement of company procedures covering such matters as training, promotion and redundancy policies, procedures for dealing with grievances, disciplinary procedures, protective clothing and occupational safety, and the like.

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

C3.3.1.4 Induction Programme

Before starting training or regular working, all employees shall attend an induction programme at which, inter alia, methods of working, site safety procedures, environmental policies, and the employees' role in relation to them shall be addressed. The employees shall be given an introduction to the Contractor's general industrial relations policy and procedures, covering aspects such as selection for promotion and redundancy, any bonus schemes, procedures for dealing with grievances, disciplinary procedures, and the like.

C3.3.1.5 In-task Training

In-task training of the workforce is a general responsibility of the Contractor to ensure that his/her workforce is sufficiently skilled, Health and Safety aware and Environmentally compliant as per the Employer's Environmental Specification, PTC: Construction Environmental Management Plan. The Contractor shall provide in-task training of local labour during the construction of the works and at his/her own cost. In-task training shall consist of training and guidance of Construction Supervisors, Construction Supervisors Assistants and labourers in those construction activities where the labour is engaged. The in-task training shall cover all training and guidance required to ensure that the leaders and labour are able to carry out the project tasks in accordance with the requirements of the project specification. The in-task training shall be carried out by the Contractor's on key and skilled personnel.

C3.3.2 LABOUR INTENSIVE CONSTRUCTION METHODS

It is the intention of the Employer to enhance local employment as far as possible. Certain tasks have been identified for the mandatory use of Labour-Intensive Construction Methods. Apart from the identified tasks the Contractor shall plan his/her works in general to make maximum use of labour-intensive methods in preference to the use of plant where appropriate.

The tasks identified for mandatory use of Labour-Intensive Construction Methods are:

- Pipeline trench excavation in soft material for trench depths not exceeding 1,5m depth;
- Placement of bedding cradle and bedding blanket;
- Backfilling of pipe trenches

Classification of materials for hand excavation shall be as per Annex B of SANS 1921 Part 5 (Tables B.1 & B.2). For excavation by hand, daily task rates shall be as per Table B.3 (Annex B) of SANS 1921 Part 5 ('Typical production per 6-hour task'), where the task rate varies according to classification of soft material (Soft Class 1, Soft Class 2 & Soft Class

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

3) and depth of excavation (Refer also PSDB 5.4.1.). Cases of disagreement in classification of excavation shall be referred to the Employer's Agent, whose decision is final. A task for placing bedding and backfilling by hand (excluding compaction) may be agreed at 7,0m³/day.

The adherence to the application of Labour-Intensive Construction will be monitored by the Community Liaison Officer (CLO) and will be reported on via the monthly income generation reports. Machine excavation shall be used where the classification of excavation is 'intermediate' or 'hard' and for excavation of pipe trenches beyond 1,5m in depth. Machine excavation may also be used where the community reports that the work is too hard for manual labour. The CLO will be the liaison person in this respect.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

C3.4 CONSTRUCTION

C3.4.1 WORKS SPECIFICATIONS

1. DESIGN PARAMETERS

The following design parameters are set as the bench mark:

a) Medium Voltage (Final Design)

ADMD:	1.2kVA/stand.
Spare capacity on feeder :	2.8kVA/stand
Supply voltage:	11kV 3-phase
Supply regulation (bulk):	90%

The projected load for the final phase (at 1.2kVA per stand) is 1.37MVA. Annexure E provides details of MV load forecast. The transformer installed capacity is suitable for and can deliver an ADMD of 1.2kVA per stand.

b) Low Voltage (Final Design)

ADMD	1.2kVA/stand
Supply voltage	415/240 Volt
Lowest permissible voltage	218V
Service connection (max)	20Amp

2. MV DESIGN

The existing and proposed medium-voltage network is best described in terms of both geographic layout (**Annexure D**) and electrical connection layout (**Annexure C**). The performance of the network (both existing and proposed) is quantified by MV load flow studies , based on the loads described in the load forecast Studies shall be conducted for year 15 (final design).

Transformer Schedule:

Trfr Zone	Number of Connections	Trfr Selection (kVA)	Loading (kVA)
Zone 7	60	100	72
Zone 8	65	100	78
Zone 9	61	100	73,2
Zone 10	64	100	76,8
Total	250	400	300

Medium Voltage supply consists of three phase Fox conductor. The conductor shall be mounted on 11m wood poles and shall run street-front. The selected transformers shall all be 22kV/420V SABS 780 pole mounted transformers. Approximately 0.8km route length of 3ph Fox conductor will be required to supply the transformers. See **Annexure C** for final ADMD MV single line diagrams.

Refer to specification on Protection philosophy: Rural Distribution Feeders

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Reference number: SCSAGAAE8.

N.B: The transformer must not be loaded more than 105%.

All MV structures shall be constructed in accordance with Eskom Medium Voltage Distribution Standard and specifications.

All services shall be in accordance with Eskom Distribution Services Standard and specifications.

3. LV Design

The low voltage feeders shall be three phase 4 core aerial bundle conductor with bare neutral and shall be 70mm² and 35mm² as well as dual phase 3 core aerial bundle conductor of 35mm² where applicable. The LV network is to be constructed in mid block layout on 7m wood poles. The feeders shall be fused at the transformer pole. All internal road crossings shall be done using 9m poles

Refer to Eskom Distribution Standard Part 3: Section 1, 4.10 and section 3.

All LV structures shall be constructed in accordance with Eskom Low Voltage Distribution Standard and specifications.

4. Service Connections

The majority of customers are expected to purchase a 20 Amp supply. Service connections are to be made with a mm² concentric cables from 4-way distribution pole top boxes. The service connection shall be a concentric cable in accordance with SCSSCAAC7. The concentric cable used on all new services shall be installed without joints from the pole-top distribution box into the standard passive unit base, which is mounted in the customer's premises.

Where the concentric cable enters the dwelling, suitable protection shall be applied around the cable to prevent damage to the insulation. The concentric cable shall form a "drip loop" before the attachment or entry point on the customer's wall as illustrated in drawings D-DT-0360 and D-DT-0361. The concentric cable entry point into the SPU shall be watertight.

The SPU consists of a standard dispenser socket (ED base) attached to a standard 110 mm x 110 mm socket outlet box as illustrated in D-DT-0347. The SPU shall be installed in every customer's home regardless of the type of supply required. For customers with a 60A supply the standard 110mm X 110mm socket outlet box shall be removed from the SPU. The SPU shall comply with SCSSCAAJ1.

The SPU integrates the incoming service cable with the metering, protection and household distribution. It provides the separation of the earth and neutral for the customer's installation. The wiring between the standard dispenser terminals and the socket outlet box is part of the customer's installation. The wiring shall be done with a separate earth and neutral wire.

The SPU shall be mounted at a position that is suitable for the customer and away from sources of heat and moisture. Refer to 7.9 in SABS 0142 for the positioning of distribution boards. On brick walls, a 6mm diameter "easy-drive" with screw (D-DT-3149) shall be used to mount the SPU. In all other cases, a threaded rod with washers shall be used. A non-metallic cable gland (D-DT-3070) shall be provided at the service cable entry point to the standard passive unit.

All services shall be in accordance with Eskom Distribution Services Standard and specifications.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

5. Metering and Vending

The metering policy for a specific town, village or area will be determined in accordance with the requirements of the energy balancing and statistical metering policies. The details of these requirements will be implemented according to the specific site requirements.

Two basic packages will be available, viz. Bulk Metering, where measurements are taken on the MV system and Low Voltage Metering where measurements are taken at the transformer installations. Eskom approved meters are to be used for this purpose and overall accuracy of the installation shall be 2 % or better.

For individual customers, prepayment meters are preferred. These must be Eskom approved and should be one of the meters on the Eskom National Contract. Should an alternative be tendered, then proof of Eskom approval as well as compliance to the specifications is required.

Vending must make use of an Eskom approved common vending system. The system must be compatible to a common vending master station. A telephone connection and a power connection point must be provided at the vendor. The general principles that will influence metering choices are as follows:

MV Bulk meter installations can be installed where:

- The connections are able to be ring fenced within a specified project area that will have a group project code for the villages included in the project area; the code is issued for vending purposes.
- Have a customer / meter ratio of at least 2000 minimum.
- No series bulk metering installations will occur.

Low Voltage metering will meet all the above requirements due to the inherent flexibility. The high level estimated cost breakover between MV / LV metering installations are 15: 1.

6. MATERIAL & EQUIPMENT SPECIFICATIONS**6.1 GENERAL**

The Developer shall erect the MV and LV overhead line reticulation systems in accordance with Eskom's Electrification Standards (Wood Structures). The internal MV distribution systems shall comprise of Fox aluminium conductor steel reinforced configuration on 11m wooden poles and shall be built to 22kV specifications.

The LV distribution systems shall comprise an aerial bundled conductor (ABC) system, of the supporting core type mounted overhead on either 7 or 9 metre wooden poles. LV distributor spurs shall extend within a radius of approximately 500m from transformer positions depending on individual voltage drop requirements. LV distributor spurs shall share pole structures with the MV system where these follow parallel routes provided that LV conductor clearance can be achieved.

Transformers shall be of the pole mounted type suitably rated to serve anticipated individual LV distributor loads and shall be of the SABS 780 type. All materials supplied by the Developer shall conform with Eskom's Buyer's Guide (Part 9 of DT Standard).

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

6.2 MV OVERHEAD LINE

The MV overhead feeder system shall comply with the requirements of Eskom's Distribution Technology, Electrification Standards and Guidelines as and where applicable for an urban concrete pole reticulation system.

a) Conductor

Type	:	Aluminum conductor steel reinforced.
Code Name	:	Fox-see Bill of Quantities/drawings
Mass	:	85kg/km / 149kg/km
Ultimate tensile strength	:	7 900 / 13 200 Newtons
Max working tension	:	@ -5°C + wind 5 240 / 8760 Newtons.
Mounting	:	See structure codes on drawings.

The maximum working tension may be exceeded only during the construction stages when the conductors are to be "over-tensioned" to 1.05 x MWT for a period of not less than 8 hours nor longer than 24 hours after which the tension is to be reduced to a figure not to exceed the stated maximum working tension of the conductor concerned.

b) Poles

Pole type	-	Wood
Pole lengths	-	7m for LV distributor 9m for LV road crossing, 11m for MV line
Planting depth	-	1.5, 1.8 and 2m respectively
Pole marker	-	painted - black on yellow background.

c) Stays

Type	-	Fiber glass for MV
Rods	-	M20 - 2000 long
Base plate	-	380 x 380 x 6 galvanized
Stay wire	-	7/4mm, 1100 MPA - galvanized
Planting depth	-	2m

Stays are indicated on the drawings by means of the structure codes.

d) Flying Stays

Flying stays shall be installed in the positions indicated on the drawings by the structure codes. Anchor poles shall be as specified for the line structures and of sufficient length to ensure the required ground clearance. Overhead stay wire shall be 7/4.00mm as specified for stays.

e) Struts

Struts shall be installed in the positions indicated on the drawings by the structure codes. Strut poles shall be as specified for the line structures. Line structure poles shall be fitted with suitable ground anchors at all strut positions. Struts shall be fitted with barbed wire anti climbing devices.

f) Insulators, Line Clamps and Other Line Components, Pole Dressing Hardware etc.

All in accordance with Eskom's Distribution Reticulation Technology, Electrification Standards and Guidelines with particular reference to the detailed material take off sheets provided for the various line structures.

g) Sags and Tensions

The Developer shall provide suitable dynamometer sighting rods or other approved apparatus necessary for proper checking of the work. Dynamometers shall be calibrated in kg or kN.

h) Surge Arrestors

Surge arrestors shall be of the metal oxide outdoor hermetically sealed, vertical base mounted type, rated at 22kV, 10kA impulse current.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

i) Sectionalisers

Dropout fuses shall be provided for each transformer zone.

6.3 LV ABC Overhead Lines

LV ABC overhead lines shall comply with the requirements of Eskom's Distribution Reticulation Technology, Electrification Standards and Guidelines as and where applicable. The LV ABC system may share pole structures with the MV system wherever these follow parallel routes.

a) LV Aerial Bundled Conductor

System Detail - 415/231 volt, 3 phase, 4 wire, 50 Hz

Type ABC - Bare Neutral ABC in accordance with SABS 1418

The following ABC sizes are to be utilized (aluminium conductors).

Ultimate strength

(54.6 BN supporting core) - 16 600 N 1690 kgf

Max working tension

(54.6 BN supporting core) - 6640 N 676 kgf

The ABC shall be installed in strict accordance with the manufacturer's recommendations and so as to ensure that the statutory clearances as specified in the Eskom Distribution Standard are maintained at all times. The Contractor shall submit details of terminations to be used to the Engineer for his approval before installation of the bundle.

b) Poles

Pole type: Wood

Pole lengths: 7m/9m

Planting depth: 1.3m/1.5m respectively

Pole marker: Black painted letters on yellow background.

c) Stays

LV stays for wooden poles in the Eskom Distribution Standard. Stays are indicated on the drawings by means of the structure codes.

d) Flying Stays

LV flying stays for wood poles in the Eskom Distribution Standard and indicated on the drawings by means of the structure codes.

e) Struts

Strut are as detailed for the MV system described in Clause 3.5

f) Line Clamps, Connections, Pole Dressing and Mounting Hardware

These shall be in accordance with Eskom Distribution Construction Standards:

i) Connectors

Connectors shall be of the insulation piercing type for main and tap conductors, except for the bare neutral when a double PG clamp will be utilized.

The connector housing shall be made entirely of weather resistant plastic materials. No metallic parts outside the housing will be accepted (except for the tightening bolt).

The tightening bolt shall incorporate an over torque shearing head which will allow a clamping torque in conformity with the manufacturer's re-commendations, without the use of any special tools.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

No energized parts shall be exposed or accessible by the operators during installation.

ii) Mounting brackets

All mounting hardware shall comply with the Eskom Distribution Standard for bare neutral ABC.

Suspensions bracket max. Vertical load	-	700daN
Strain clamps max. Horizontal load	-	1500daN

Brackets are to be manufactured from corrosion resistant materials. Galvanized steel brackets are not acceptable.

g) Sags and Tensions

Sags and tensions are as detailed for the MV system described in Clause 3.2.3(g)

h) Surge Arrestors

No surge arrestors are required on the LV system. A 6kV, 10kA impulse surge arrestor will be provided on the LV neutral of the transformer.

6.4 Civil Infrastructure

The Contractor shall provide the following excavations.

a) Pole holes as required for both MV and LV overhead line systems.

Pole excavations	:	5m	-	1200 long 1000 wide 1000 deep
		4m	-	1200 long 1000 wide 1000 deep
		7m	-	1200 long 1000 wide 1300 deep
		9m	-	1200 long 1000 wide 1500 deep
		10m	-	1200 long 1000 wide 1800 deep
		11m	-	1200 long 1000 wide 1800 deep

b) Strut and stay holes as required for both MV and LV overhead line systems. Strut and stay excavations: 2000 long 1000 wide 1700 deep

c) Trenching for structure and operator earthing systems.

Trench excavation : 300 wide, 600 deep.

6.5 CLEARANCES

Eskom Standards as well as Occupational Health and Safety Act shall be adhered to. The overhead line routes require a number of MV crossings over roads. Correct clearance heights as specified in the Eskom Distribution Standard shall be adhered to. Annexure R details clearance requirements.

Contractor

Witness 1

Witness 2

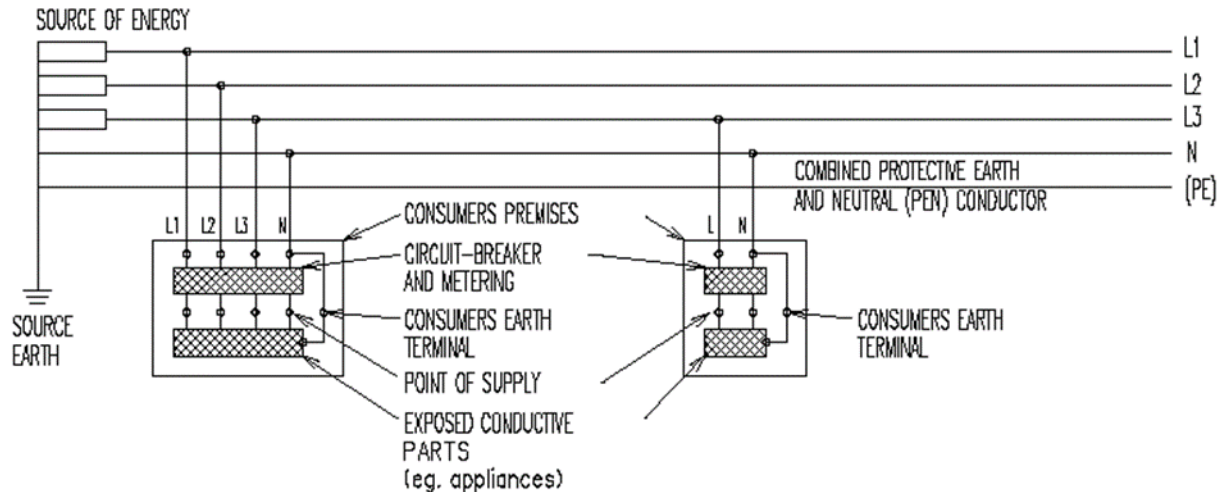
Employer

Witness 1

Witness 2

6.6 EARTHING

In accordance with Eskom Distribution Standard Part 2, with particular reference to:
 Earthing system philosophy TN -C – S



Results of soil resistance survey at 2 points.
 Min Cu area : 16mm² stranded
 12mm² solid

Medium Voltage
 11kV system : 30 Ohms
 22kV system : 30 Ohms

NB.: The extent of earthing must be indicated on the Design, Construction and "As Built" drawings.

Allowance shall be made for the supply and installation of the various earthing requirements as listed hereunder.

- a) Bonding all pole top and/or crossarm hardware
- b) Basic pole earthing - MV systems. (All structures not listed below).

6.7 BUDGET ENERGY CONTROLLERS

20A ECU's will be supplied in accordance with Eskom's Specification.

6.8 POLE TOP BOXES

A pole-top distribution box shall be used to connect all customers from poles along the LV distributor. The pole-top distribution box shall be in accordance with SCSSCAAH3. The 120A MCB inside the pole-top box can be used to connect four customers with 20 A supplies. Where a customer with a 60 A supply is to be connected from a pole-top box an additional 63A MCB shall be mounted in parallel with the existing MCB and the customer shall be fed separately.

The pole top distribution boxes are to comply with the requirements of Eskom's Distribution Reticulation Technology, Electrification Standard as and where applicable.

- b) Two way distribution boxes are to be equipped with 1 x 50A circuit breaker.
- c) Four way distribution boxes are to be equipped with 1 x 50A circuit breaker.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

- d) Eight way distribution boxes are to be equipped with 2 x 50A circuit breakers.

The 10mm² core of the service cable shall be used to supply the 63 A MCB from the 50 A MCB as indicated in drawing D-DT-0363. Where a project consists of only 60 A connections a pole-top box with a 120 A MCB shall be used. The 120 A MCB can be used to connect four customers with 60 A supplies. The pole-top box shall be secured to the pole stainless steel strapping D-DT-3131.

6.9 INTERNAL HOUSE INSTALLATION

Only installations with COC's will be connected. ECU's with 4-way outlet boxes will be installed if no electrical installation exists in dwellings.

7. PROJECT DESIGN

7.1 RETICULATION DIAGRAMS

Annexure E shows the entire electrical reticulation map of the township whereas Annexure D shows a details MV transformer zone. The following drawing form part of the Electrical Design Report:

Monyakeng: Electrical Reticulation Final Design

Rev. 0

7.2 VOLTAGE DROP STUDIES

LV Nodes shall be numbered by best practice as applied in the municipality. The voltage profiles are attached as Annexure F for the Final Design (ADMD = 1.2kVA) +/- 10 % measured at the furthest customer premises. + 10 % would be for the first connected customer from the transformer and - 10 % will be for the last / furthest connected customer from the transformer.

7.3 PROTECTION SCHEDULE

See Annexure G for the protection schedule. Earth fault protection will be by means of providing Morsdorfer fuses in accordance with the LV protection schedule. The application of MV protection (line and transformers), LV protection (transformers, feeders and distribution boxes), and bulk metering. Detail shall be given of all proposed MV and LV switchgear to be used, and of the requirement for bulk metering.

7.4 PROJECT COST ESTIMATE

The estimated project cost for the Developer is attached as Annexure H.

7.5 PROJECT PROGRAM

Annexure I shows the project schedule of various milestones for the project such as the expected approval of the detail design, completion of construction as well as hand over of project.

7.6 Design Standard

Annexure J and K details all Eskom design standards and philosophies used with respect to MV conductor, LV conductor, Single-, dual-, and three-phase technology; and Transformer loading.

7.7 Additional information required

Annexure L contains any additional information to the project. Most of this information is the one required for detailed design submission. This involves

- a) Design changes or deviations
- b) Completed design indicators
- c) Single line diagram
- d) Schedule of :
 - 1) "As-built" drawings
 - 2) Auxiliary installations
 - 3) Voltage drop files
 - 4) Earthing installation values
 - 5) Percussion stay details

Contractor

Witness 1

Witness 2

Employer

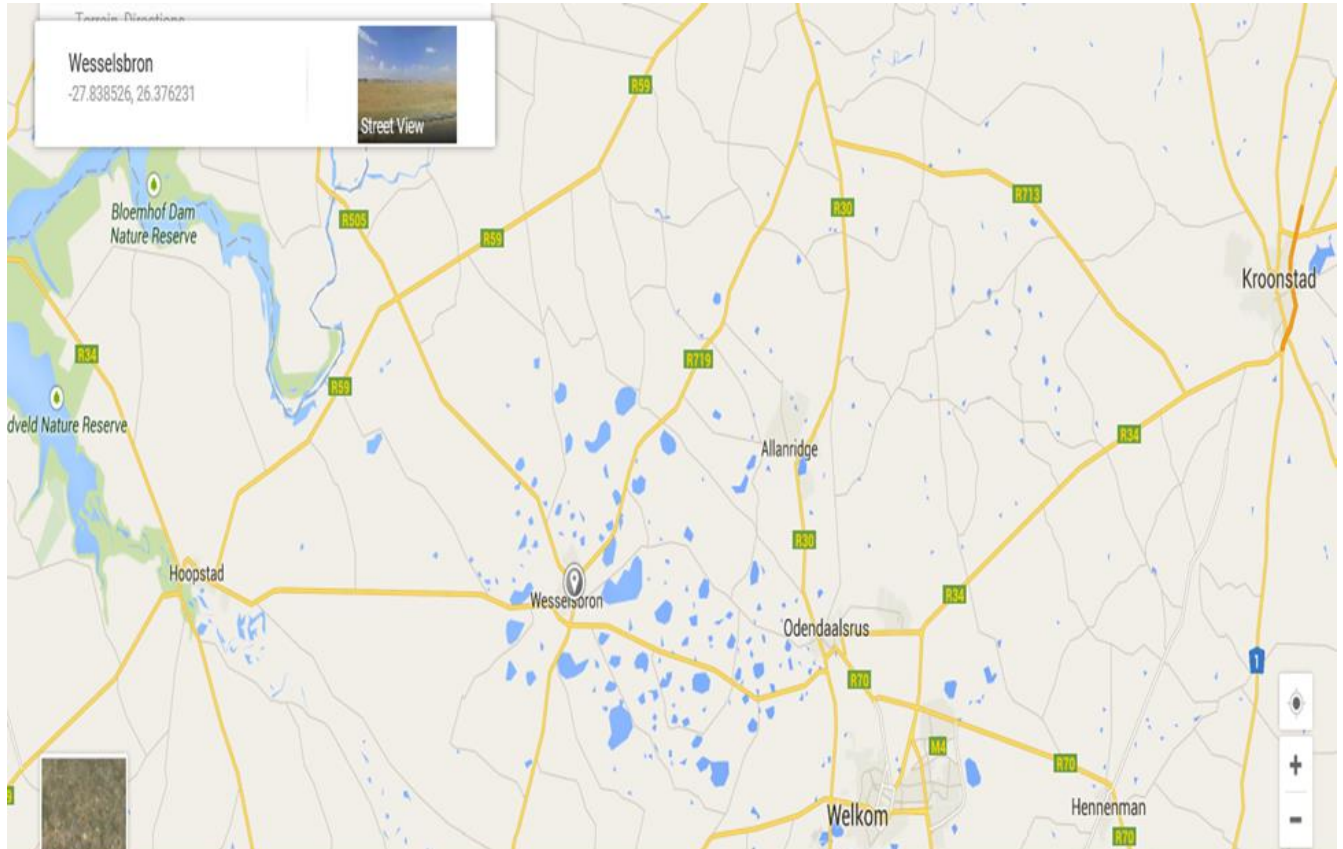
Witness 1

Witness 2

ANNEXURE A

A1. Locality Diagram

A locality diagram for the proposed link line town, indicating the location of the town of interest with reference to some well-known point of reference.



Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE B

TRANSFORMER LOADING SCHEDULE

Trfr Zone	Number of Connections	Trfr Selection (kVA)	Loading (kVA)	Loading incl. Losses (kVA)	Utilization
Zone 1	60	100	72	73,45	73%
Zone 2	65	100	78	79,21	79%
Zone 3	61	100	73,2	75,62	76%
Zone 4	64	100	76,8	78,1	78%
	250				

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Annexure C

MV TRANSFORMER MAP



THE C.A.D. REFERENCE NUMBER IS: CONSTRUCTION OF MONYAKENG 252 HOUSE CONNECTIONS - MV AND LV LAYOUT .DGN

Contractor Witness 1 Witness 2 Employer Witness 1 Witness 2

ANNEXURE D

ELECTRIFICATION RETICULATION LAYOUT DRAWING



Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE E

PROTECTION SCHEDULE

Zone 7	
MV Network	- 20A Fused Link Isolator at the 100kVA transformer structure
LV Network	<ul style="list-style-type: none"> - 3x 100A HRC Fuse at transformer LV (1x For White Phase, 1x for Blue Phase and 1x for Red Phase) - 2x 160A Mosdorpher Fuse - 1x 20A double Pole MCCB and Earth leakage at Ready Board

Zone 8	
MV Network	- 20A Fused Link Isolator at the 100kVA transformer structure
LV Network	<ul style="list-style-type: none"> - 3x 100A HRC Fuse at transformer LV (1x For White Phase, 1x for Blue Phase and 1x for Red Phase) - 2x 160A Mosdorpher Fuse - 1x 20A double Pole MCCB and Earth leakage at Ready Board

Zone 9	
MV Network	- 20A Fused Link Isolator at the 100kVA transformer structure
LV Network	<ul style="list-style-type: none"> - 6x 100A HRC Fuse at transformer LV (1x For White Phase, 1x for Blue Phase and 1x for Red Phase) - 2x 160A Mosdorpher Fuse - 1x 20A double Pole MCCB and Earth leakage at Ready Board

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Zone 10	
MV Network	<ul style="list-style-type: none"> - 20A Fused Link Isolator at the 100kVA transformer structure
LV Network	<ul style="list-style-type: none"> - 6x 100A HRC Fuse at transformer LV (1x For White Phase, 1x for Blue Phase and 1x for Red Phase) - 2x 160A Mosdorpher Fuse - 1x 20A double Pole MCCB and Earth leakage at Ready Board

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE F

BILL OF QUANTITIES

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE G

PROJECT PROGRAMME

The Project Programme will follow shortly before the start of construction.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE H**DESIGN STANDARDS AND SPECIFICATION**1 Relevant Eskom Distribution Standards

The following Eskom standards and bulletins apply to this document.

Part 0: Definitions, Abbreviations and Exemptions

Doc.Ref. No.	Rev.No.	Description
SCSASAAM0		Standard: Structures, definitions, abbreviations and exemptions

Part 1: Planning

Doc.Ref. No.	Rev. No.	Description	Rev. Date
SCSAMAAF0	0	Planning and design. Section 1: Planning and design processes and standards overview	January 2003
SCSASABJ5	0	Planning and design. Section 2: Electrification planning - rural	January 2003
SCSASABJ6	0	Planning and design. Section 12: Electrification design – rural	January 2003
SCSASAB06	0	Planning guidelines Section 20: Book - Quality of supply standards the Electricity Act	January 2003
SCSASAB07	0	Planning guidelines Section 21: Book - Electrification technology options	February 2003
SCSASAB09	0	Planning guidelines Section 23: Book - electrification load forecasting	February 2003
SCSASABP1	0	Planning guidelines Section 25: Book - electrification technology section	February 2003
SCSASABP3	0	Planning guidelines Section 27: Book - Voltage drop apportionment	February 2003
SCSASABP6	0	Planning guidelines Section 30: Book - Voltage unbalance	February 2003
SCSASABP9	0	Planning guidelines Section 33: Electrification Indicators	February 2003
SCSASABQ2	0	Planning guidelines Section 40: Tool - Domestic load forecasting tools	February 2003
SCSASABO4	0	Planning guidelines Section 42: Tool - Electrification technology selection	February 2003
SCSASABQ6	0	Planning guidelines Section 44: Tool - Reticmaster	February 2003
SCSASABQ7	0	Planning guidelines Section 45: Analysis tool - CART	February 2003

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

SCSASABQ8	0	Planning guidelines Section 46: Tool electrification network modelling.	February 2004
SCSASABR0	0	Planning guidelines Section 48: Sag and tension calculations	February 2003
SCSASABR1	0	Planning guidelines Section 49: Tool - Financial evaluation calculations	February 2003
SCSAGAAI3	0	Project indicators to be used in electrification projects.	June 2000
SCSAGAAS3	0	Eskom (Distribution) insulator manual Part1 - Overview, selection and procurement of high-voltage, outdoor insulators.	January 2003
DT04/98	0	Effect of MV voltage on cost per connection	
99TB-020	2	Rural electrification design philosophies and parameters Replaces DT38/98 Electrification design & planning parameters	

Part 2: Earthing

Doc. Ref. No.	Rev. No.	Description
SCSASAAL9	2	Standard: MV Reticulation earthing
DT005/96	0	Earthing at Auxiliary Equipment
DT018/97	2	Auto-recloser earthing
DT02/98	0	Earthing - Crow's foot

Part 4 Medium Voltage

Doc. Ref. No.	Rev. No.	Description
SCSASABE7	1	General information and requirements for overhead lines up to 33kV with conductors up to Hare/Oak.
SCSASAAP2	0	22kV overhead reticulation up to Hare/Oak conductor (particular requirements)
SCSASABE5	0	Distribution Standard Part 4: medium voltage reticulation Section 4: 33kV overhead reticulation for conductors up to Hare/Oak (particular requirements).
SCSASABB6	1	MV reticulation/ 19kV Single Wire Earth Return (SWER) overhead reticulation
SCSAGAAQ0	0	Distribution Standard Part 4: Medium Voltage Reticulation Section 8: Rural Reticulation Protection: Network Philosophy.
SCSAGAAP9	0	Distribution Standard Part 4: Medium Voltage Reticulation Section 8: Rural Reticulation Protection: Settings Philosophy.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Technical Bulletins Part 8 Services

Doc. Ref. No.	Rev. No.	Description
DT06/97	0	Concentric cable
DT13/97	0	Energy control units and earth leakage protection
DT12/97	0	Polarity tests for newly electrified house
DT16/97	0	50A pole top box MCB
DT19/97	0	Electrification - single phase supply options
DT20/97	0	50A pole top breaker - electrification
DT21/97	0	Installation certificate for energy control unit
DT09/98	0	2-way pole top box
DT07/98	0	Service connections - concentric cable
DT17/98	0	Ordering and implementation of 2.5A prepayment meters
DT03/99	0	Interface with TELKOM for joint use
99TI-03	0	Luminaires with ECU & ED supplies

2 NRS / SABS / IEC / British

Any relevant bulletins, specifications of material and standards required for successful completion of the project are also applicable:

- SABS 0142:1993, The wiring of premises.
- SABS 780:1979, Distribution transformers.
- SABS 1524-1:1994, Electricity dispensing systems — Part 1: Single-phase electricity dispensers.
- SABS 1619:1995, Small power distribution units (ready boards) for single-phase 230 V service connections.
- NRS 016:1995, Electricity distribution — Code of practice for the earthing of low-voltage distribution systems.
- NRS 032:1993, Electricity distribution — Service distribution boxes — Pole-mounted types for overhead single-phase a.c. service connections at 230 V.
- NRS 041:1995, Electricity transmission and distribution — Code of practice for overhead power lines for conditions prevailing in South Africa.
- NRS 043:1997, Code of practice for the joint use of a pole route for power and telecommunication lines.
- NRS 038-1:1997, Electricity Distribution ? Concrete poles ? Part 1: Concrete poles MV overhead distribution systems.

3 OHS ACT

All legal requirements as stated in the OHS-act must be adhered to apart from the exemptions as in part 0 of the Distribution Standard.

 Contractor

 Witness 1

 Witness 2

 Employer

 Witness 1

 Witness 2

4 Code of Practice (Eskom / Telkom)

The code of practice or the agreement with Telkom states that Telkom has to grant Eskom permission to erect plant in the midblock position. The Act also states that all proposed lines must be submitted to the Postmaster general for approval prior to erection. This is mainly to avoid dangerous conditions arising as well as to ensure mutual co-operation on designs.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

ANNEXURE I**CLEARANCE REQUIREMENTS****1 CLEARANCE BETWEEN MV CONDUCTORS**

The line profile for the 11kV line will satisfy the clearances given in the Occupational Health and Safety Act, Act No. 85 of 1983 (OHSA) detailed in the following table. Refer to the Construction Handbook for the minimum vertical clearances of power lines at maximum sag and swing.

Section 15 of the Electrical Machinery Regulations of the OHS Act specifies the minimum clearances between bare conductors and other conductors and objects. This is the minimum distance that must be maintained in all conditions up to a conductor temperature of 50 degrees centigrade and wind pressure of 500Pa. It is assumed that the lower conductor is at ambient temperature during design to establish this clearance.

TABLE 1. MINIMUM CLEARANCES FOR BARE OH MV LINES

Maximum phase-to-phase voltage (kVrms)	Clearance to ground A- Outside town B- Inside town	Above roads and railway lines	Clearance to communication lines and other power lines	Clearance to buildings and structures not forming part of power lines
1,1 or less	A - 4,9m B - 5,5m	6,1m	0,6m	3,0m
7,2	A - 5,0m B - 5,5m	6,2m	0,7m	3,0m
12	A - 5,1m B - 5,5m	6,3m	0,8m	3,0m
24	A - 5,2m B - 5,5m	6,4m	0,9m	3,0m

MV line crossing line

In the case of a MV line crossing a LV line then the spacing of column 6 of the table should be complied with under the conditions specified. For a 22kV line over a LV line the clearance is thus 900mm minimum. Should however a structure supporting the LV line be beneath the MV lines then the clearance between the **MV conductors** and the **LV structure** should be as per column 7 i.e., 3m. This is to provide a safety distance that will allow work to be carried out on LV equipment on the structure in addition to the minimum safety clearance.

Normal work to be carried out on the power line (e.g., planting/replacing the pole, stringing, tensioning or replacing conductor) will require the isolation and earthing of the MV line in accordance with OPR 6204 (ORHVS) regulation 5.03.

Shared structures

In the case of a set of structures being used to support both MV and LV lines then the clearances in column 6 are used to comply with the Act. For LV conductor running under 22kV conductors on the same structures the minimum clearance to satisfy the Act will be 900mm. The Distribution Standard specifies a minimum spacing between the MV and LV conductors of 1100mm at the attachment point to ensure that the requirement in the Act is met.

Contractor

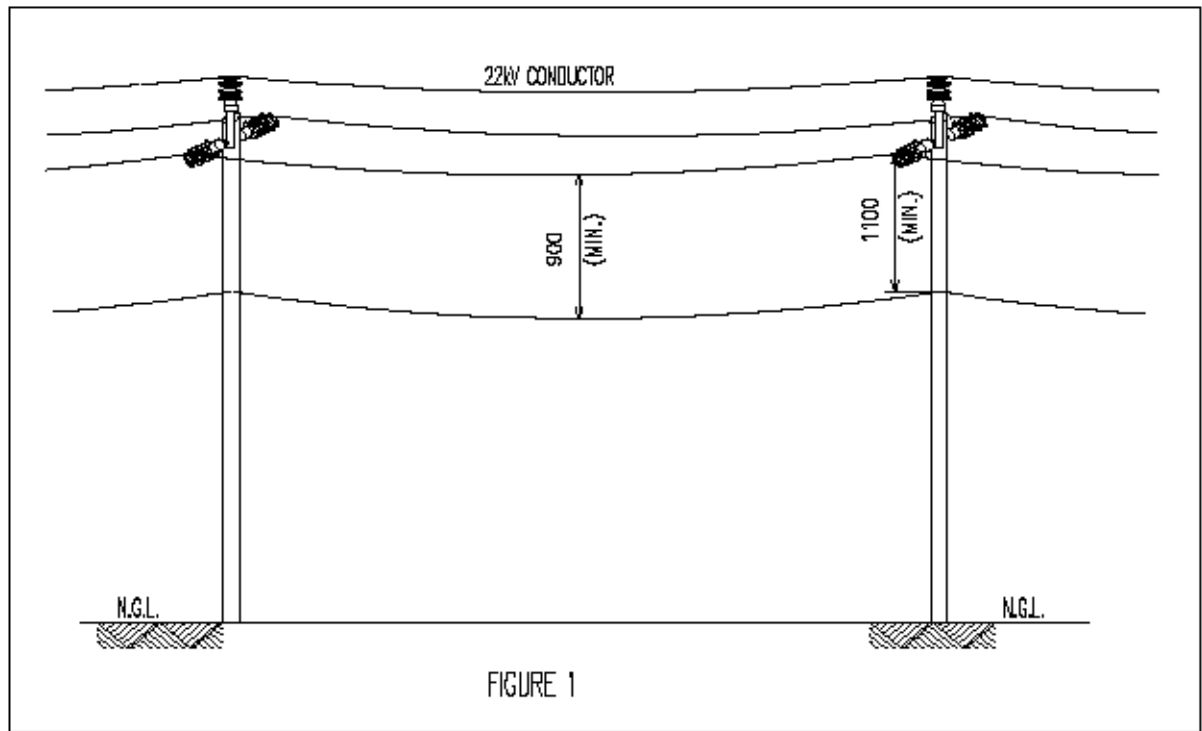
Witness 1

Witness 2

Employer

Witness 1

Witness 2



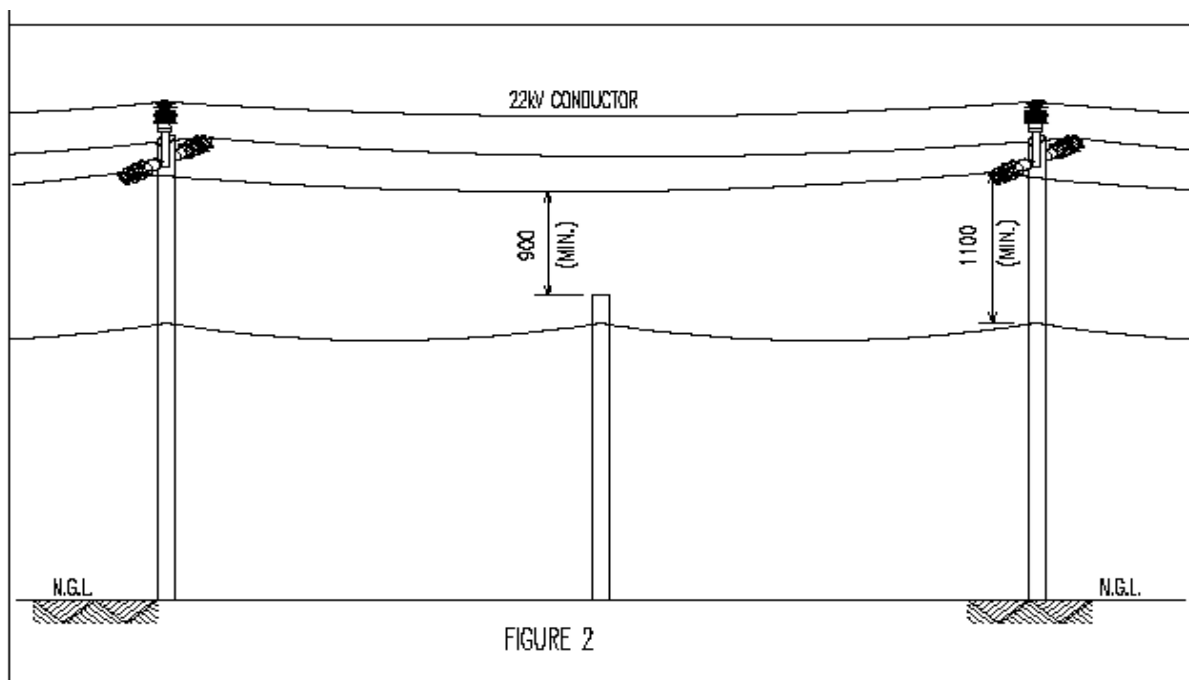
Work is able to be carried out on LV equipment on this structure and still maintain the minimum working clearance, e.g., disconnecting, connecting, inspecting or installing a customer service connection, pole top box or streetlight. This is illustrated in figure 1. Normal work to be carried out on the power line (e.g., planting/replacing the pole, stringing, tensioning or replacing conductor) will require the isolation and earthing of the MV line in accordance with OPR 6204 (ORHVS) regulation 5.03.

Semi shared structures

For the case of a LV line running beneath a MV line where the line structures do not all support the MV line then it has been agreed with the Inspector that the spacing as in column 6 will apply. This clearance will apply to the conductors at the common support structures and within the span. At structures only supporting the LV conductors and LV equipment, then the clearance will apply between the MV conductor and the top of the LV structure. Again, this clearance is to be the minimum clearance under the case of the MV conductor at 50 degrees centigrade. This is shown in figure 2.

It is further stipulated by the Inspector that, should work be carried on these LV power lines e.g., planting/replacing the pole, stringing, tensioning or replacing conductor, the MV line above the structure should be isolated accordance with OPR 6204 (ORHVS) regulation 5.03. Disconnecting, connecting, inspecting or installing a customer service connection, pole top box or streetlight on this pole will be carried out in the same way as would be done on a shared structure.

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2



It must be noted that this DHO does not intend to restrict work in terms of the standard practices provided for in OPR 6204 (ORHVS) Regulation 5.03.6.3 – Work in close proximity or, OPR 6204 (ORHVS) Section 7 – Live Work. This implies that certain work on the power line (LV or HV) can commence with both systems alive utilizing prescribed live work techniques.

2. CLEARANCES FOR EQUIPMENT MOUNTED ON POWER LINE STRUCTURES

Section 15 is concerned with the safety of people by placing live conductors out of reach. It is not concerned with equipment or performance of the system. It is concerned with the clearances between a live conductor and another circuit's conductor or other places that a person may occupy. It does not apply to conductors of the same power line. It does not cover all possible configurations. It does not apply for clearances to insulated systems such as LV ABC, insulated services or MV cables.

Table 1, column 2 gives a minimum safety clearance for each system voltage. This is the minimum distance to an energized conductor that a person may approach with reasonable safety. There is a reasonable safety margin built into these distances to ensure that there will be a low probability of breakdown of the air between the conductor and a person at this distance.

The determination of clearances for specific cases is based on the determination of an "object" space, which is added to the electrical clearance. As an example, the clearances given in column 3, minimum clearance to a power line above ground outside townships, is based on an object space of 4.9m. The object in this case is the largest vehicle that will normally pass under the power line. This 4.9m object clearance is added to the electrical clearance of 0.3m at 22kV to give the 5.2m clearance for a 22kV power line.

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

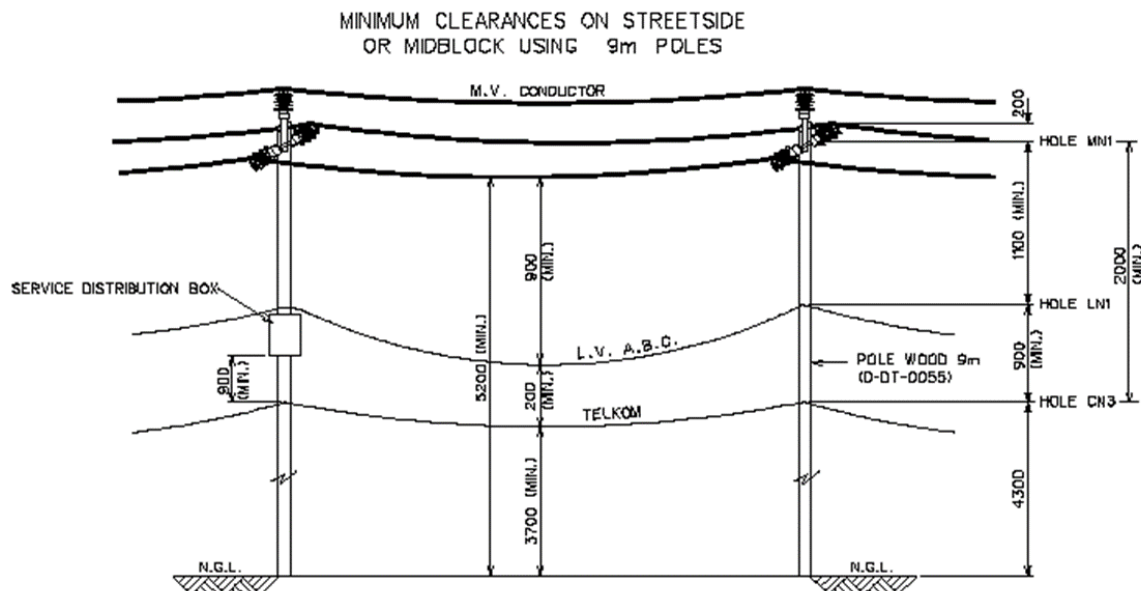
Equipment on power line structures

TABLE 2: MINIMUM CLEARANCE FOR LIVE TERMINALS OF EQUIPMENT MOUNTED ON LINE STRUCTURES

MAXIMUM RATED PHASE TO PHASE VOLTAGE	MINIMUM CLEARANCE IN METERS
1.1 or less	-
7.2	0.15
12	0.20
24	0.32
36	0.43

While the height of the power line is specified in the regulations the case of electrical equipment mounted on power line structures is not. The object space for this type of situation and the subsequent overall ground clearance was agreed to with the Inspector. The clearances are given in table 2. This is as per the Department of Manpower reference 34/2/4/1/2 of 5 May 1992.

The clearances given in table 2 are the clearance between the live terminals of the structure-mounted equipment and ground level. Since the equipment that Eskom install on poles does not have bushings at a consistent height from the base of the equipment the Distribution Standard mounting heights have been developed by ensuring that the equipment base is at a height of 4m from ground level.



3. LOW VOLTAGE

- | ABC (Without Telkom) | | ABC (With Telkom) |
|------------------------------|--------|-------------------|
| a) Main roads | : 5,1m | : 5,3m |
| b) Across roads in townships | : 4,7m | : 4,9m |
| c) Along roads | : 3,7m | : 3,7m |
| d) Across plots | : 3,3m | : 3,5m |

Note that Eskom and Telkom have agreed that a minimum clearance of 1,8m will be provided between bare Eskom power lines above 1,1 kV, and communication lines at crossing points. For exemptions see part 0 of the Distribution Standard.

Contractor

Contractor

Witness 1

Witness 1

Witness 2

Witness 2

Employer

Employer

Witness 1

Witness 1

Witness 2

Witness 2

- Midspan clearance (Shared services)

a) Not less than 0,2m between insulated LV power cables and telecommunication cables.

b) Not less than 1,5m between bare MV power conductors and telecommunication cables at the worst condition of sagging.

c) Telkom ground clearances - over roads : 6,1m

- along roads in town : 3,6m

- along roads outside town : 3,0m

- Clearances at attachment points on a structure

a) Telkom to ground : 4,3m

b) Telkom to low voltage conductor : 0,9m

c) Telkom to medium voltage conductor : 1,5m

4 Service cables

a) Main roads : 5,2m

b) Across roads in townships : 4,7m

c) Along roads : 3,0m (align with Telkom)

d) Over private property : 2,5m

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

C.6 PART F: HEALTH AND SAFETY

This part of the Project Specifications contains comprehensive additional specifications for health and safety matters not covered by nor carried out in terms of the SANS Standard Specifications.

The number of each clause and each payment item in this part of the Project Specification is prefixed with a F to differentiate these clauses and items as additional requirements.

The following additional requirements are covered under this part of the Project Specifications:

SECTION F1000: HEALTH AND SAFETY REQUIREMENTS

CONTENTS

F1001	SCOPE
F1002	GENERAL
F1003	DESCRIPTION OF THE CONSTRUCTION WORK
F1004	EXISTING CONDITIONS
F1005	DESIGN INFORMATION
F1006	CONSTRUCTION MATERIALS
F1007	SITE WIDE ELEMENTS
F1008	USE OF SITE BY THE EMPLOYER
F1009	SITE RULES
F1010	HEALTH AND SAFETY PLAN
F1011	AUDITS BY THE EMPLOYER
F1012	VARIATIONS
F1013	MEASUREMENT AND PAYMENT

F1001 SCOPE

This section covers health and safety matters applicable during construction.

F1002 GENERAL

The Contractor shall comply with the Occupational Health and Safety Act (Act No. 85 of 1993) (OHS Act) and in particular with its Construction Regulations, 2003.

All the work included in this Contract shall, for the purpose of complying with the OHS Act and the Construction Regulations, be deemed to be "construction work".

The Contractor is also referred to Clauses 4.5, 31, 34 and 35.8 of the General Conditions of Contract in this regard.

It should be noted that, with a few exceptions, the Standard Specifications and the Project Specifications are "end product specifications" and not "method specifications". As the methods of construction to be used are generally determined by the Contractor detailed safety requirements applicable to all the operations to be carried out on Site are not provided in the project documentation. The Contractor shall apply all the relevant safety regulations and requirements to the work methods and materials used.

F1003 DESCRIPTION OF THE CONSTRUCTION WORK

The temporary and permanent Works required under this Contract are described in the following:

- The Project Specification;
- The Standard Specifications;

<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

- The Drawings;
- The Schedule of Quantities;
- The other Volumes of the Specification.

The Contractor, in complying with the OHS Act and the Construction Regulations, shall consider all aspects of the Works described and take into account the construction methods and materials to be used.

F1004 EXISTING CONDITIONS

The Contractor shall take into account, inter alia, the following existing conditions when complying with the OHS Act:

- Existing utility services;
- Existing ground and foundation conditions;
- Traffic accommodation requirements;
- Surrounding land use;
- Anticipated weather conditions.

The existing conditions on this Contract are described in the following:

- The Project Specifications;
- The Drawings;
- The other Volumes of the Specification.

F1005 DESIGN INFORMATION

Design information provided for safety planning purposes, such as design loads for structures, foundation conditions etc, is provided on the Drawings, in the Project Specifications or in other Volumes of the specification.

F1006 CONSTRUCTION MATERIALS

The following commonly used construction materials and substances potentially pose health and safety hazards:

- All materials contained in pressurized containers;
- Bitumen products;
- Cement;
- Epoxies;
- Lime and other stabilizing agents;
- Paints;
- Tar products;
- Timber preservatives.

The materials to be used to construct the Works are described in the following:

- The Scope of Work;
- The Project Specifications;
- The Standard Specifications;
- The Drawings;
- The Bills / Schedule of Quantities;
- The other Volumes of the Specification.

The Contractor shall take appropriate measures to manage the risks associated with the use of all the materials required to complete the Works, i.e., not only those listed above, and shall, inter alia, implement all the precautionary measures provided by manufacturers and suppliers for the storage, use and application of materials used.

ContractorWitness 1Witness 2EmployerWitness 1Witness 2

F1007 SITE WIDE ELEMENTS

(a) Site access, egress, deliveries and vehicular and pedestrian routes

The requirements regarding the control of access to and egress from the Site and vehicular and pedestrian routes are indicated in the Project and Standard Specifications and in particular in Section 1500.

(b) Environment

Environmental conditions and requirements particular to this Contract are indicated in the Project Specification.

F1008 USE OF SITE BY THE EMPLOYER

Any continued use of the Site required by the Employer to maintain traffic flows or to allow work to be done by other Contractors or authorities is indicated in the Project Specification.

F1009 SITE RULES

Obtaining the required wayleaves remains the responsibility of the Contractor, however, the Engineer will assist as far as possible by applying for the necessary wayleaves on his behalf during the Bid period in order to shorten the time required to obtain the wayleaves.

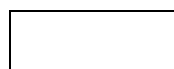
F1010 HEALTH AND SAFETY PLAN

In compliance with the Construction Regulations the Contractor shall, after performing a risk assessment, prepare a health and safety plan for approval by the Employer.

The health and safety plan shall include, but not be limited to, the following:

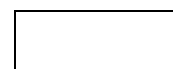
- The safety management structure including the names of all designated persons such as the construction supervisor and any other competent persons;
- Safety method statements and procedures to be adopted to ensure compliance with the OHS Act. Aspects to be dealt with shall include:
 - Public vehicular and pedestrian traffic accommodation measures;
 - Control of the movement of construction vehicles;
 - The storage and use of materials;
 - The use of tools, vehicles and plant;
 - Temporary support structures;
 - Dealing with working at height;
 - The use of batch plants;
 - Excavation work;
 - Demolition work;
 - Security, access control and the exclusion of unauthorised persons.
- The provision and use of temporary services;
- Compliance with wayleaves, permissions and permits;
- Safety equipment, devices and clothing to be employed;
- Emergency procedures;
- Provision of welfare facilities;
- Induction and training;
- Provision and maintenance of the health and safety file and other documentation;
- Arrangements for monitoring and control to ensure compliance with the safety plan.

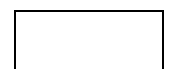

Contractor


Witness 1


Witness 2


Employer


Witness 1


Witness 2

F1011 AUDITS BY THE EMPLOYER

The Contractor shall permit the Employer to regularly audit, at an agreed interval, the implementation and maintenance of the approved health and safety plan and shall co-operate and provide all the required documentation, as may be required, in this regard.

F1012 VARIATIONS

Should any variations be ordered or design amendments issued the Engineer shall inform the Contractor of all the associated potential hazards to ensure that the health and safety aspects of the work ordered are taken into account.

F1013 MEASUREMENT AND PAYMENT

Item	Unit
F10.01 Contractor's obligations in respect of Health and Safety	lump sum

Payment of the lump sum Bided shall include full compensation for all costs resulting from complying with Occupational Health and Safety Act and its Construction Regulations and requirements in terms of health and safety requirements in respect of the contract as specified.

The lump sum Bided will be payable monthly in instalments in relation to the month under consideration and the total time of the completion of the Works.

<div></div> <div>Contractor</div>	<div></div> <div>Witness 1</div>	<div></div> <div>Witness 2</div>	<div></div> <div>Employer</div>	<div></div> <div>Witness 1</div>	<div></div> <div>Witness 2</div>
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3.7 PART B: PROJECT SPECIFICATIONS REFERRING TO THE STANDARD SPECIFICATIONS

Amendments to the standard specifications are included in this Part B: Project Specifications.

- (i) The project specifications form an integral part of the contract documents and supplement the standard specifications.
- (ii) In the event of any discrepancy between the project specifications and a part of the standard specifications, the schedule of quantities, or the drawings, the project specifications shall take precedence.
- (iii) The standard specifications, which form part of this contract, have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

In certain clauses the standard specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains some additional specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix B followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or a payment item which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by B followed by a new number. The new numbers follow on the last clause or item number used in the relevant section of the standard specifications.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

C3.8 SECTION A: GENERAL

The relevant definitions of the General Conditions of Contract for Construction Works (Second Edition) 2015 shall apply to the contract:

General Conditions of Contract 2015: Sub-clause

B 2.7 INFORMATION FURNISHED BY THE EMPLOYER

Drawings and quantities regarding the distribution and extent of repair work items were compiled and calculated to the best of the Engineer's knowledge and available information at the time of the design and could be subject to significant variations at the construction stage. Such variations shall, however, not form grounds for a claim by the Contractor in terms of Clause 36: Variations of the General Conditions of Contract.

B 5.4 SERVICES

a) There are no known services.

The Contractor shall take due cognizance of the restrictions as well as requirements the service authorities have, regarding any construction work to be carried out close to their services.

Way leaves shall be applied for on behalf of the Contractor in advance of the award of the contract.

The Contractor shall mark the position of all known services with suitable permanent markers to the satisfaction of the Engineer. These markers shall remain visible and in place until the completion of the works in that area after which they must be removed by the Contractor."

EXISTING SERVICES

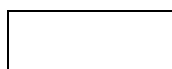
Prior to commencing work, the Contractor shall confer with all Authorities and Departments concerned and obtain the necessary wayleaves for both overhead and underground services affected by the Works and shall satisfy himself that he has obtained all the relevant information required to complete the Contract. The Contractor shall carry out the works with the minimum interference to existing services. He shall co-operate with all Authorities and Departments concerned and he shall be solely responsible for carrying out the following operations and checks:

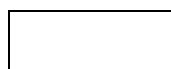
- (1) He shall inform all Authorities and Departments in good time before the correct stage of the construction is reached for the laying and/or relaying of any particular services.
- (2) He shall set out the lines and levels of kerbs, pipes, culverts and any other necessary features of the Contract in order that Authorities and Departments are able to lay and/or relay services correctly.

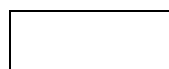
It shall be clearly understood that obtaining the necessary wayleaves and any extra work, such as the removal of any portion of the Works already executed either by the Contractor or other Authority or Department and its subsequent reexecution, which is caused by the Contractor's failure to observe and carry out his responsibilities as specified, will be at his own cost.

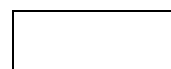
Obtaining the required wayleaves remains the responsibility of the Contractor, however, the Engineer will assist as far as possible by applying for the necessary wayleaves on his behalf during the Bid period in order to shorten the time required to obtain the wayleaves.

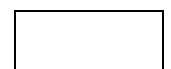

Contractor


Witness 1


Witness 2


Employer


Witness 1


Witness 2

If the Contractor considers that the progress of the works is being retarded by the failure of any Authority or Department to lay, remove or divert pipes, ducts, services, cables or poles within a reasonable time, he shall immediately notify the Engineer in writing, stating clearly the number of days of delay claimed. The Engineer will then decide whether such a claim is justifiable, and in the event of the claim being accepted he will hand to the Contractor a certificate stating clearly the number of days of delay sanctioned.

The cost of repairing any damage to services, due to miscalculations or negligence on the part of the Contractor or his failure to carry out the duties set out in this Clause, shall be borne by the Contractor.

(a) Protection of Overhead and Underground Services

Where no underground services are shown on the drawings or scheduled, but the possibility of their presence can be reasonably inferred, the Contractor shall in collaboration with the Engineer, search for such services to establish their positions well in advance of the work. A full report shall then be submitted in good time to the Engineer, to enable the necessary arrangements for the protection, removal or diversion of the services before work is commenced in their vicinity.

In the event of damage to existing services, the Contractor shall take such immediate action as is necessary to prevent further damage or danger to life or property and shall immediately notify the Engineer who will issue instructions as to the necessary repairs or protective measures to be taken. The cost thereof shall be borne by the Contractor irrespective of whether the repairs or protective measures were carried out by him or by or on behalf of the service authority or department concerned.

As soon as an underground service not shown on the drawings is discovered, it shall be deemed to be a known service and the Contractor will be held responsible for any subsequent damage to it. If such service is damaged during the course of its discovery, the Contractor will be reimbursed for the cost of making good such damage, unless it is established by the Engineer that the Contractor did not exercise reasonable diligence and care and that the damage was avoidable.

(b) Existing Services

Without derogating from the ordinary and general meaning of the words "existing service", the words shall be deemed to include any service which has either been suspended or taken out of service to allow for the execution of the works or which has been so suspended or taken out of service as a result of any event which has given rise to or has necessitated the execution of the works.

(c) Condition of Existing Services

The Contractor acknowledges that he has inspected and examined all known existing services and all existing services subsequently discovered, as contemplated in (a) above and is satisfied that all such services were in an acceptable and serviceable state at the commencement of the works, alternatively, upon discovery thereof as contemplated in (a) above.

In the event of a dispute as to the acceptability and/or serviceability of an existing service at the commencement of the works or upon the discovery of such service, the Contractor shall bear the onus of proving that the service in question was not in an acceptable and/or serviceable state at the commencement of the works.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

(d) Maintenance, Protection and Relocation of Existing Services

During the course of the works, all existing services including traffic signals, watermains, sewers and stormwater reticulation, electricity transmission and telephone lines, cables, poles and conduits whether in service or not shall be protected, supported and maintained to the satisfaction of the service authority or department concerned and the Engineer. The Contractor shall bear all costs in this regard.

Where a bank of underground ducts, cables, etc are crossed over a distance of less than 1.0m they shall be regarded as a single crossing. Hydrants under pressure, watermain valve covers and manholes shall be kept unobstructed and accessible at all times.

Where the existing stormwater system is affected by the roadworks, drainage pipes and structures will have to be upgraded, adapted or demolished and new drainage pipes and structures constructed.

The covers and frames of service manholes and catchpits will have to be adjusted where they are affected by the roadworks.

(e) Work in Close Proximity to Existing Services

The Contractor shall note that no mechanical excavators or vibratory type compactors may be used within three (3) metres of any telecommunications or electrical services. No pegs or stakes shall be driven into the ground in the vicinity of underground services unless their exact positions have been determined.

The Contractor's attention is drawn to the following with regard to work done in the proximity of ESKOM and other electrical services:

MACHINERY AND OCCUPATIONAL SAFETY ACT (Act No 6 of 1983) WITH REGULATIONS**D16 (7) Excavations**

"The builder or excavator shall ascertain as far as practicable the location and nature of underground services likely to be affected by the excavation and take such steps as may be necessary to prevent danger to persons."

THE ELECTRICITY ACT (Act No 40 of 1958)**Section 51(3): Offences and Penalties**

"Any person who without legal right (the proof of which shall be upon him) cuts or damages or interferes with any apparatus for generating, transmitting or distributing electricity, shall be guilty of an offence and liable on conviction to a fine not exceeding R1 000,00 or to imprisonment for a period not exceeding twelve months."

The Contractor shall take the above into account in the drawing up of his construction programme and in the calculation of his Bided rates, and shall note that no additional payment or compensation will be allowed for any additional costs or delays incurred as a result of compliance with these regulations, except as measured and paid under the Items listed in the Schedule of Quantities.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

The Contractor shall allow all reasonable access to the representatives of any Authority or Department for the purpose of maintaining, laying and/or relaying any services, cables or mains during the period of the Contract.

Permanent alterations to existing services ordered in writing by the Engineer, and for which no separate provision has been made in the Bill of Quantities, will be paid for under dayworks if required.

B 5.7 SAFETY

Replace Clause 5.7 with the following:

The Contractor shall at all times observe adequate safety precautions on Site to ensure the safety of his own staff as well as that of the public and other persons engaged in or about the Works. In this respect he shall comply with the provisions of the Health and Safety specifications (Part G of the Works Specifications) and observe all laws, ordinances and regulations pertaining to his work.

In terms of Clause 4.5 of the General Conditions of Contract, the Contractor shall enter into an agreement (refer to C1.4 of Volume 3) to complete the work required for the construction of the works in accordance with the provisions of all pertinent legislation and in particular with the provisions of the Occupational Health and Safety Act, (Act 85 of 1993) and the regulations promulgated thereunder.

Where adequate safety precautions are not being observed, the Engineer may order the Contractor to comply with minimum safety requirements at the latter's expense. Compliance with such an order will not absolve the Contractor from any of his responsibilities and obligations under the Contract.

B 8.2 PAYMENT

B 8.2.5

B 8.2.5.1 Rates to be inclusive

No value added tax shall be included in the Contractor's Bided rates or amounts. Payment of value added tax (VAT) shall be made under a separate item in the Summary of Schedule(s) in C2.2 Bill of Quantities in C2 Pricing Data.

B 8.2.5.2 The meanings of certain phrases in payment clauses

- (i) Procuring and furnishing (material)

Add the following:

Payment for procuring and furnishing material from commercial sources shall include for all transport costs, irrespective of distance hauled.

Add the following new subclauses:

B 8.2.5.3 Work in confined areas

Except where provided for in the Specification **and** the Bill of Quantities in the Pricing Data no extra payment shall be made nor shall any claim for additional payment be considered for construction in confined areas. The omission of standard pay items from the Bill of Quantities

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

shall be taken to be deliberate and any additional costs incurred shall be included in the bulk rate.

B 8.2.5.4 Trade names

Where materials are specified under trade names, Bids must be based on these materials. Equivalent materials may be submitted as alternative Bid offers in the Bid and the Engineer may, after receipt of Bids, approve the use of equivalent materials.

B 8.2.5.5 Payment Certificates

With reference to Clause 49.1 of the General Conditions of Contract, the Contractor shall, at his own expense, submit to the Engineer three sets of A4-sized paper copies of the monthly statement for payment.

SECTION AB: ENGINEERS OFFICE**B 3.2 Office Buildings**

In addition to the furnishings listed under sub-items (a) to (c), the following shall be provided and properly maintained: This Specification covers the requirements for office facilities for the use of the Engineer on the site.

(a) If power is to be used by the Contractor on site electrical installation is to include a light and two 15A plug points plus an adequately sized air conditioning unit * (for heating and cooling) or, alternatively, one 2000 W electric heater and one 375 mm diameter electric fan.

Or

(b) If power is unlikely to be available on site:

One gas operated light and one gas operated heater plus an adequate supply of gas.

(c) One AO sized drawing board and matching tee-square

PSAB 2 PLANT (Subclause 4)**B 4.1 Telephone****PSAB 2.1 Cellular Telephone (Subclause 4.1)**

Delete the Sub-Clause and substitute the following:

The Contractor shall, subject to availability from communication service provider, arrange for the purchasing of a cellphone telephone in the Engineer's office, for the sole use of the Engineer or his representative.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

SECTION C: SITE CLEARANCE

The specifications of SANS 1200 Section C will apply.

SECTION D: EARTHWORKS

The specifications of SANS 1200 Section D will apply.

B 3 MATERIALS

PART C: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

1.1 Introduction

This Environmental Management Plan (EMP) addresses the management of environmental impacts related to the proposed construction of the Warden Link Line project. The document provides a basis for managing, mitigating and monitoring the environmental impacts associated with all phases of the proposed project.

1.2 Objectives of the EMP

This document provides appropriate mitigation measures designed to minimise or eliminate the significant adverse impacts that may be caused as a result of the proposed project. Mitigation can be achieved in two ways, namely:

By applying preventative measures during the construction phase, and

By rehabilitating the disturbed area during construction phase of the project.

The primary objectives of the EMP are to:

Describe actions for achieving the mitigation measures.

Define organisational and administrative arrangements for environmental management and monitoring of the work, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures.

Ensure that communication is adopted by the site supervision staff regarding pro-active environmental management, such that potential problems can be identified and mitigation measures can be implemented prior to rehabilitation work being carried out.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

1.3 Environmental aspects and impacts

Environmental aspects could be defined as “those components of the proposed activity that are likely to interact with the environment”. An environmental impact could be defined as “any change to the environment resulting from an environmental aspect”.

The contractor shall plan activities in such a way that impacts are prevented. In the event that prevention is not practicable, or is not achieved because of misapplication, the contractor shall apply approved measures that will limit and contain the magnitude, duration and intensity of the impact as soon as practical. The contractor shall demonstrate that it is capable of repairing and reinstating the damaged environment. General good construction practice will play an important role in avoiding the occurrence of an imp

2.0 Environmental Impacts Associated with the project.

Component of the receiving Environment	Pollutant	Environmental impact
Physical		
Water quality	<ul style="list-style-type: none"> Fuel leakages Chemical spillages Erosion Waste generated (chemical containers) 	Water quality decrease/ water pollution
Air quality	<ul style="list-style-type: none"> Dust emissions Chemicals Vehicle fumes Vapour discharge from tanks Fuel nozzles Waste odours 	
Soil	<ul style="list-style-type: none"> Erosion Chemical spillages Fuel leakages Waste generation salinization 	Soil pollution
Geology	<ul style="list-style-type: none"> Excavation Earthing 	Soil pollution
Ground and soil stability	<ul style="list-style-type: none"> Cracking of the tank or piping Leakages of hazardous substances Unstable foundations 	Water pollution Soil pollution

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Social		
Sound environment	<ul style="list-style-type: none"> Noise 	Noise pollution
Architecture /archaeology and cultural heritage		
Aesthetics	Construction of the bulk water scheme	Visual impact Light pollution
Human beings (safety and security) Human beings (Traffic)	<ul style="list-style-type: none"> Security risk from vagrants Safety risk to workers Fires and explosions resulting from negligent Criminal activities Increased traffic on surrounding roads networks 	Health impact

3.0 GENERAL REQUIREMENTS

3.1. EMP ADMINISTRATION

Copies of this EMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

3.2. ROLES AND RESPONSIBILITIES

The implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase.

3.2.1. Department of Environmental Affairs (DEA)

The National Department of Environmental Affairs (DEA) is the designated authority responsible for authorising the EIA and this EMP. DEA has overall responsibility for ensuring that the applicant (NLM) complies with the conditions of its ROD as well as this EMP. DEA shall be invited to join the Environmental Management Committee (EMC) (see below) and attend the monthly EMC meetings.

3.2.2. Employer: NALA LOCAL MUNICIPALITY (NLM)

Under South African environmental legislation, the Applicant / Employer is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. NLM as the Applicant / Employer therefore has overall environmental responsibility to ensure that the implementation of this EMP complies with the relevant legislation and the conditions of the ROD.

The Employer has appointed the Contractor to undertake the contract on a design and construct basis.

NLM shall join the EMC and attend the monthly EMC meetings.

3.2.3. Employer's Representative (ER)

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

THEWO as the Employer's Representative (ER) would act as the Employer's on-site implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ROD.

In addition to general project management, the ER has the responsibility to appoint the Environmental Control Officer (ECO) (see below).

Any on-site decisions regarding environmental management are ultimately the responsibility of the ER.

The on-site ER shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- Ensuring that the necessary environmental authorisations and permits have been obtained.
- Reviewing and approving the Contractor's method statements with input from the ECO (see 3.2.4 below) where necessary.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO and EMC (see 3.2.6 below) where necessary.
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMP.
- Providing input into the ECO's ongoing internal review of the EMP, which is submitted as a report to the Employer.
- Attending the monthly EMC meetings as a member of the EMC.

3.2.4. Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be an independent environmental consultant appointed by the ER to act as the Employer's representative to monitor and review the on-site environmental management and implementation of this EMP by the Contractor.

The ECO shall be on site daily for the first six months of the construction contract and thereafter on a needs basis, but at least once a week.

The ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorisations and permits have been obtained.
- Maintaining open and direct lines of communication between the ER, Employer, Contractor and EMC with regard to environmental matters.
- Convening the EMC and facilitating EMC meetings. Appointing specialists (botanists, freshwater ecologists, etc.) as required to advise the EMC. Reporting on environmental issues at construction site meetings and at monthly EMC meetings.
- Convening and facilitating public meetings.
- Reviewing and approving the Contractor's construction method statements together with the ER.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

- Regular site inspections of all construction areas with regard to compliance with the EMP.
- Monitoring and verifying adherence to the EMP, the ROD and approved method statements at all times, monitoring and verifying that environmental impacts are kept to a minimum. Taking appropriate action if the specifications are not followed.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP (via the ER).
- Auditing the implementation of the EMP and compliance with the ROD on a monthly basis.
- Undertaking a continual review of the EMP and recommending additions and/or changes to the document to the EMC for discussion.
- Compiling a final audit report regarding the EMP and its implementation during the construction period after completion of the contract and submitting this report to the Employer and the DEA.

3.2.5. Contractor's Designated Environmental Officer (DEO)

The Contractor refers to the team appointed by the Employer to undertake the detailed design and the construction activities for the project.

The appointed Contractor will be required to appoint a competent individual as the Contractor's on-site Designated Environmental Officer (DEO). The DEO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management to all personnel involved in the contract.

The DEO will be responsible for overseeing the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.

The DEO will be responsible for keeping detailed records of all site activities that may pertain to the environment. This includes:

- Daily site inspections.
- Supervision of work where environmental management is a key aspect (e.g. in sensitive areas, with high environmental risk, etc.).
- Informing the ECO.
- Reporting to the EMC regarding implementation of the EMP.
- Completing start-up, weekly, monthly and site-closure checklists

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

- Keeping a photographic record of progress on site from an environmental perspective.
- Keeping a register of complaints in the site office and recording and dealing with any community comments or issues.
- Keeping a record of on-site incidents and accidents and how these were dealt with.

3.2.6. Environmental Management Committee (EMC)

The EMC shall be a multidisciplinary team tasked with monitoring the progress of the EMP and resolving any environmental problems that may arise during the course of the project. The EMC shall be accountable for ensuring that environmentally sound principles guide the project during the construction phase. The TOR shall be finalised once the EMC has been convened.

The EMC shall consist of all the relevant stakeholders in the construction phase, as well as representatives of interested and affected parties, for example:

- The affected landowners and/or communities;
- The local municipalities;
- Local environmental NGOs;
- Local tourism and agriculture organisations; and
- NALA LOCAL MUNICIPALITY Biodiversity Initiative.

If particular specialists (e.g. a vegetation specialist or freshwater ecologist) are required to advise the EMC on particular issues, these shall be brought in on a needs basis.

The EMC shall normally meet monthly. If the EMC is required to meet more or less frequently, this shall occur on a needs basis.

3.3. ENVIRONMENTAL AWARENESS TRAINING

The Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMP.

The presentation shall be conducted, as far as is possible, in the employees' language of choice. As a minimum, training should include:

- Explanation of the importance of complying with the EMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

- Explanation of the specifics of this EMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the EMP.

The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

3.4. METHOD STATEMENTS

Method statements are written submissions by the Contractor to the ER in response to the requirements of this EMP or to a request by the ER. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.

The Contractor shall not commence the activity for which a method statement is required until the ER has approved the relevant method statement.

Method statements must be submitted at least five (5) days prior to the date on which approval is required (start of the activity).

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.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost.

The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Compliance / non-compliance with the EMP Specification and motivation if non-compliant.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Method statements required:

Based on the specifications in this EMP, the following method statements are required as a minimum:

MS1: Site clearing (4.1)

MS2: Site layout and establishment (4.2.1)

MS3: Hazardous substances (4.3.4)

MS4: Cement and concrete batching (for each operation) (4.3.6)

MS5: Traffic accommodation (4.4)

MS6: Solid waste control system (4.5.1)

MS7: Wastewater control system (4.5.3)

MS8: Erosion remediation and stabilisation (for both operations) (4.8.2).

MS9: Bridge demolition and construction (for each operation) (4.9.1)

MS10: Fire control and emergency procedures (4.12)

MS11: Alien vegetation clearing programme (5)

MS12: Vegetation rehabilitation plan (6)

3.5. PUBLIC PARTICIPATION

An ongoing process of public participation shall be maintained to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way.

Public meetings to discuss progress and any construction issues that may arise shall be held at least every six months and more regularly if deemed necessary by the ER.

These meetings shall be arranged by the ECO but shall be facilitated by the ER. The

Contractor shall present a progress report at each public meeting.

All the I&APs that participated in or were informed during the EIA shall be invited to each of the public meetings.

4. CONTROL OF CONSTRUCTION ACTIVITIES**4.1. SITE CLEARING**

MS1: The Contractor shall submit a site clearing method for all areas where the Contractor is required to, or intends to, clear vegetation, either within the road reserve or at the other designated construction areas outside the road reserve. The method statement shall clearly indicate chainage or land references and shall detail any search and rescue and/or seed collection to take place, what is to be cleared and how this will be done, where and how cleared material would be stored or disposed of, etc.

4.1.1. Vegetation clearing

No vegetation clearing shall take place without written approval of the method statement by the ER.

No vegetation clearing shall take place until a search and rescue of conservation-worthy plants has been undertaken.

No vegetation clearing shall take place until seed collection has been undertaken in the area, unless the area is not deemed suitable for seed collection.

Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared.

Vegetation clearing shall take place in a phase manner in order to retain vegetation cover for as long as possible.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Vegetation clearing in watercourses and wetland areas shall be conducted by hand. No heavy machinery shall be permitted in watercourses to clear vegetation. Vegetation cleared from watercourses shall be removed from the watercourse immediately to prevent flooding.

All indigenous plant material removed from cleared areas shall be stockpiled for mulching. All remaining vegetation shall be removed and disposed of at an approved landfill site.

4.1.2. Topsoil

The Contractor shall remove topsoil from all areas where topsoil will be impacted on by construction activities, including temporary activities such as storage and stockpiling, etc.

Stripped topsoil shall be stockpiled in areas agreed with the ER for later use in revegetation and shall be adequately protected. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth of topsoil stripped may vary.

Topsoil stockpiles shall be convex and no more than 2 m high. Stockpiles shall be shaped so that no surface water ponding can take place.

Topsoil stockpiles shall be protected from erosion by wind and rain by providing suitable stormwater and cut off drains and/or by establishing suitable temporary vegetation. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank.

Topsoil stockpiles shall not be subject to compaction greater than 1500 kg/m² and shall not be pushed by a bulldozer for more than 50m.

Topsoil stockpiles shall be monitored regularly to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank.

Before topsoil is to be re-used the stockpiles shall be analysed by a suitably qualified landscape contractor / horticulturist and, if necessary, upgraded before use.

Any topsoil contaminated by hazardous substances shall not be used but shall be disposed of at a DWA approved landfill site.

The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the approved method statements and the requirements of this EMP.

4.2. MANAGEMENT OF SITE FACILITIES

The construction, layout and extent of the construction site and its components shall be planned, designed and managed in such a manner that environmental impacts are minimised.

Temporary structures and facilities shall be decommissioned to the satisfaction of the EMC and clean-up after construction shall be effectively undertaken.

4.2.1. Site layout and establishment

The Contractor shall establish construction camps, offices, workshops, testing facilities, stockpiling areas, staff accommodation etc. in a manner that does not adversely affect the environment.

The construction area shall be kept to a minimum.

Site establishment shall not take place on steep slopes, within 30 m of wetland areas and watercourses or at sites declared as no-go areas (see 4.2.2 below).

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

The site layout shall take cognisance of access for deliveries and services. Likely disturbance to neighbours as well as security implications shall be considered.

MS2: Before construction can begin, the Contractor shall submit to the ER for approval a method statement detailing:

A layout plan and the method of establishment of the construction camp, i.e. all offices, accommodation facilities, testing facilities / laboratories, batching areas, storage & stockpiling areas, workshops, vehicle washing areas and all other areas/facilities required for the undertaking of activities required for completion of the project.

The plan shall include the location and layout of waste storage and treatment facilities, ablution facilities, stockpiling and spoil areas and hazardous material storage areas. The demolition and removal of these facilities on completion of construction works shall also be detailed.

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. The Contractor shall ensure that the approved construction area will be adequate to cover the project without further space adjustments being required at a later date.

4.2.2. No-go areas

Areas where construction activities (including traffic accommodation) are prohibited are referred to as no-go areas. Entry into these areas by any person, vehicle or equipment without the ER's written permission will result in a penalty.

All declared no-go areas will be demarcated by temporary fencing (4.2.3) the position of which shall be agreed to by the ER and ECO, and appropriate signage.

All private property outside of the construction areas (including any bypass routes) as set out in the site layout plan shall be considered no-go areas.

The following areas within the road reserve shall be declared no-go areas:

Demarcation materials (fencing, signage, etc.) shall not be moved or removed at any stage of the project without the written consent of the ER.

4.2.3. Temporary fencing

The Contractor shall erect temporary fencing along the perimeter of designated no-go areas. Temporary fencing shall, as a minimum, consist of wooden or metal posts at 3m intervals, with two plain wire strands tensioned horizontally at heights of 300 mm and 900 mm above the ground, threaded with commercial type danger tape.

The Contractor shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.2.4. Ablution facilities

The Contractor is responsible for the erection and maintenance of adequate ablution facilities and for enforcing the use of these facilities.

The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the ER.

Ablution facilities (chemical toilets, etc.) must be provided at all construction camp areas where there will be a concentration of labour. Toilet paper must be provided.

4.2.5. Eating areas

If none is available, the Contractor shall provide adequate temporary shade within the construction areas to ensure that site personnel do not move off site to eat.

The Contractor shall provide adequate refuse bins at all eating areas to the satisfaction of the ER.

If deemed necessary by the ER, the Contractor shall demarcate designated eating areas.
No feeding of wild animals shall be allowed.

4.2.6. Workshop, equipment maintenance and storage

All vehicles and equipment shall be kept in good working order to maximise efficiency and minimise pollution.

All maintenance, including washing and refuelling of plant on site shall take place at designated locations at the workshop area.

The Contractor shall ensure that no contamination of soil or vegetation occurs around workshops and plant maintenance facilities.

All machinery servicing areas shall be bunded.

Drip trays shall be used to collect used oil, lubricants, etc. during maintenance. Drip trays shall be provided for all stationary plant.

Washing of equipment shall be restricted to urgent maintenance requirements only. Adequate wastewater collection facilities shall be provided (4.5.3).

4.2.7. General aesthetics

The Contractor shall ensure that the type and colour of roofing and cladding materials of any new buildings and structures constructed as part of the project are selected to reduce reflection and blend with the natural environment.

The Contractor shall not deface, paint, damage or mark any natural feature (e.g. rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand with the ER. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ER.

All construction areas must be kept neat and tidy at all times. Different materials and equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.

Lighting shall be of the downward facing spill off type.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.3. MATERIALS HANDLING, USE AND STORAGE

The potential environmental impact of the handling, use, storage and disposal of materials used during construction shall be minimised.

4.3.1. General

Environmental considerations shall be taken into account in the siting of any material storage areas.

4.3.2. Transportation

The Contractor shall ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of this EMP.

Material shall be appropriately secured to ensure safe passage between destinations during transportation. Loads shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

4.3.3. Stockpiling

The Contractor shall plan his activities so that materials excavated from borrowpits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used.

Should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the ER for his approval (MS1), together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

Stockpiles shall be positioned and sloped to create the least visual impact.

No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be reinstated to the satisfaction of the ER and ECO.

4.3.4. Hazardous substances

All hazardous material / substances (e.g. petrochemicals, oils, etc.) shall be stored on site only under controlled conditions. All hazardous material / substances shall be stored in a secured, appointed area that is fenced and has restricted entry. All storage shall take place using suitable containers to the approval of the ER. Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure.

Fuel shall be stored in a steel tank supplied and maintained by the fuel suppliers. The tank shall be located in a secure, demarcated area and an adequate bund wall (110% of volume) shall be provided. The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled / leaked fuel into the soil.

MS3: The Contractor shall provide a method statement detailing the hazardous substances / material that are to be used during construction, as well as the storage, handling, and disposal procedures for each substance / material and emergency procedures in the event of misuse or spillage that might negatively affect people or the environment.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.4. TRAFFIC ACCOMMODATION

The Contractor shall be required to ensure that traffic along the road is accommodated within the road reserve as far as is possible.

Any traffic accommodation outside the road reserve, excluding the temporary bypasses at the bridge demolition and construction sites (4.9.1), shall utilise existing farm and public roads as much as possible.

No new bypass or traffic accommodation routes shall be cleared or established without the approval of the ER.

MS5: The Contractor shall submit a method statement for approval detailing how traffic is to be accommodated along the road during construction. Cognisance must be taken of no-go areas within the road reserve, utilisation of existing public and farm roads, etc. Details should include stop-go locations, estimated delays, start date and duration, etc.

4.5. WASTE MANAGEMENT

Waste management on site shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed.

The Contractor shall ensure that all site personnel are instructed in the proper disposal of all waste.

4.5.1. Solid waste

The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the Contractor shall provide litter bins, containers and refuse collection facilities for later disposal.

Solid waste may be temporarily stored on site in a designated area approved by the ER prior to collection and disposal. Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter.

No burning, on-site burying or dumping of waste shall occur.

All solid waste shall be disposed of off site at an approved landfill site. The Contractor shall supply the ER with certificates of disposal.

MS6: The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) to the ER for approval.

4.5.1.1. Domestic waste

The Contractor shall provide metal refuse bins to BS 792 or equivalent plastic refuse bins, all with lids, for all buildings. Refuse shall be collected and removed from all facilities at least twice per week. Domestic waste shall be transported to the approved refuse disposal site in covered containers or trucks.

4.5.1.2. Construction rubble/waste

Inert construction rubble and waste materials shall be disposed of by burying in the borrowpits or at a site approved by the ER.

4.5.1.3. Scrap metal

Scrap metal shall be disposed of offsite.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.5.2. Hazardous waste

All hazardous waste (including bitumen, etc.) shall be disposed of at a DWA approved hazardous landfill site. The Contractor shall provide disposal certificates to the ER.

Used oil and grease shall be removed from site and sold to an approved used oil recycling company.

Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, in borrow pits or any burying, be allowed.

Unused or rejected tar or bituminous products shall be returned to the supplier's production plant.

Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at a DWA approved hazardous waste site.

4.5.3. Waste water

The ER's approval shall be required prior to the discharge of contaminated water into sewer systems.

Water from kitchens, showers, laboratories, sinks etc. shall be discharged into a conservancy tank for removal from the site.

Run off from fuel depots / workshops / machinery washing areas and concrete batching areas shall be collected into a conservancy tank and disposed off at a site approved by the ER.

MS7: The Contractor shall submit a method statement to the ER detailing how waste water would be collected from all waste water generating areas, as well as storage and disposal methods. If the Contractor intends to carry out any on-site waste water treatment, this should also be included.

4.6. NOISE CONTROL

The Contractor shall endeavour to keep noise generating activities to a minimum.

The Contractor shall restrict all operations that result in undue noise disturbance to local communities and/or dwellings (e.g. blasting, crushing, etc.) to daylight hours on weekdays or as otherwise agreed with the ER.

The Contractor shall warn any local communities and/or residents that could be disturbed by noise generating activities such as blasting well in advance and shall keep such activities to a minimum.

The Contractor shall be responsible for compliance with the relevant legislation with respect to noise.

4.7. DUST CONTROL

The Contractor shall ensure that the generation of dust is minimised and shall implement a dust control programme to maintain a safe working environment, minimise nuisance for surrounding residential areas / dwellings and protect damage to natural vegetation, crops, etc.

Construction vehicles shall comply with speed limits and haul distances shall be minimised.

Material loads shall be suitably covered and secured during transportation.

Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors.

The Contractor shall implement dust suppression measures (e.g. water spray vehicles, covering of material stockpiles, etc.) if and when required.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.8. SOIL EROSION AND SEDIMENTATION CONTROL

4.8.1. During construction

The Contractor shall, as an ongoing exercise, implement erosion and sedimentation control measures to the satisfaction of the ER.

During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

Any runnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ER.

Consideration and provision shall be made for the following methods (or combination thereof): brushcut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ER.

In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and revegetation should commence as soon as possible.

4.8.2. Remediation of existing eroded areas

The Contractor shall be required to undertake actions to correct and stabilise and existing areas of erosion along the area of activity, within or outside the area of activity.

MS8: The Contractor shall submit a method statement to the ER for approval detailing the method of erosion remediation and stabilisation in each of these areas.

4.9. WORK IN WATERCOURSES AND WETLAND AREAS

The Contractor shall not work within river floodlines, watercourses and wetlands without written approval from the ER as required for the execution of the work. An experienced freshwater ecologist shall be consulted for all issues related to wetlands.

As far as is reasonably possible, work in watercourses and wetland areas shall take place outside of the expected rainy season and allow sufficient time for rehabilitation processes to be effected before the rains commence, i.e. between the months of October and April. This includes any work requiring the diversion of rivers or sections of rivers, the stabilisation of eroded drainage lines and any construction activities involving the crossing of watercourses and wetland areas.

All watercourses and wetland areas shall be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, refuse, sewage, cement, oils, fuels, chemicals, waste water, bituminous products, etc.

In the event of a spill, the Contractor shall take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor shall be liable to arrange for professional service providers to clear affected areas, if required.

Any work requiring the fording of watercourses by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (no leaks, etc.) and along a single track.

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks

4.9.1. Protection of surface water quality

The Contractor shall ensure uninterrupted flow of clean surface water past the construction works to the satisfaction of the ER and ECO. This shall be done by diverting surface water flow (coffer dams, etc.), piping the surface flow past the works, etc. No watercourse may be diverted, dammed or modified without the approval of the method statement (3.8.1) by the ER.

Should this occur, the necessary approval must be obtained from DEA and DWA in terms of the National Water Act (36 of 1998).

Contaminated water (silt-laden, cement-contaminated, etc.) pumped from the works area shall be pumped into settlement ponds and not straight back into the watercourse or wetland areas.

Water shall not be pumped from the settlement ponds into the river without the approval of the ER.

Washing of clothes and equipment, bathing and swimming in rivers, streams and dams are strictly forbidden.

4.10. PROTECTION OF NATURAL VEGETATION

The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities.

Clearing of natural vegetation shall be kept to a minimum. The removal, damage and disturbance of natural vegetation without the written approval of the ER are prohibited.

Before vegetation clearing takes place in any construction area, search and rescue and seed collection shall be undertaken.

The use of herbicides is prohibited unless approved by the ER.

The trees located within the activity are protected by legislation and may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold except under licence granted by DWA (or a delegated authority).

4.11. PROTECTION OF FAUNA

The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place.

The feeding of any wild animals is prohibited.

The use of pesticides is prohibited unless approved by the ER.

No domestic pets or livestock are permitted on site.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

4.12. FIRE CONTROL

The Contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site.

The Contractor shall ensure that basic fire-fighting equipment is available at all construction areas and facilities.

The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.

MS10: The Contractor shall submit a fire control and fire emergency method statement to the ER for approval. The method statement shall detail the procedures to be followed in the event of a fire and the name of the appointed fire officer.

Any work that requires the use of fire may only take place at a designated area approved by the ER and must be supervised at all times. Fire-fighting equipment shall be available.

4.13. BLASTING

The Contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of flyrock. Environmental damage caused by blasting / drilling shall be repaired at the Contractor's expense to the satisfaction of the ER.

The Contractor shall notify any occupants / owners of surrounding land at least one week prior to blasting and shall address any concerns that they may have to the satisfaction of the ER.

4.15. WATER PROVISION

The Contractor shall make available safe drinking water fit for human consumption at the site offices and all other working areas.

All drinking water must be from a legal source and comply with recognised standards for potable use. The Contractor shall comply with the provisions of the National Water Act and its Regulations for taking water from rivers or streams and the use thereof.

If water is stored on site, drinking water and multi-purposed water storage facilities shall be clearly distinguished and demarcated.

4.16. PROTECTION OF HERITAGE AND CULTURAL FEATURES

If any archaeological or palaeontological artefacts or remains are uncovered during earthmoving activities, work in the vicinity of the find shall cease immediately. Contractor shall immediately notify the ER, who shall contact the South African Heritage Resources Agency (SAHRA).

The Contractor will be required to abide by the specifications as set out by SAHRA or the heritage specialist appointed to investigate the find.

The Contractor may not, without a permit issued by the relevant heritage resources authority, destroy, damage, excavate, alter, deface or otherwise disturb archaeological material.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

5. ALIEN VEGETATION CLEARING PROGRAMME**5.1. GENERAL REQUIREMENTS**

MS11: The Contractor shall liaise with DWA's Working for Water programme (or another experienced organisation approved by the ER) in compiling and implementing an alien vegetation clearing programme (AVCP), which shall indicate eradication areas, vegetation types, method of eradication and an order of priority for all the actions to be undertaken. The AVCP shall be submitted to the ER for approval.

The Contractor shall ensure that unskilled labour for vegetation eradication is sourced from the local labour database.

The AVCP shall comprise specifications on the biological, mechanical, and chemical control methods as required for the management of alien species.

The AVCP shall provide for short, medium and long-term eradication and maintenance programs for this project. The program shall include the following three phases:

1. Initial control (reduction of existing population).
2. Follow-up control (control of seedlings, etc. after initial eradication).
3. Maintenance control (longer term monitoring and eradication of alien vegetation in areas that have been cleared) for the duration of the contract period.

The Contractor shall co-ordinate the plan with the local authority as well as the NALA LOCAL MUNICIPALITY Biodiversity Initiative group and provide for the correct and effective handing over of the AVCP to the relevant organisation after completion of road construction.

The Contractor shall ensure that cognisance is taken of the possibility of fire hazard, spread of alien vegetation seeds released when mature vegetation is chopped down.

The AVCP should also include the safe, effective disposal of removed vegetation. This is particularly important in terms of stormwater management.

Consideration should be given to the establishment of a local community-based firewood selling initiative using the removed alien vegetation.

5.2. GENERAL ERADICATION GUIDELINES

All alien vegetation within the project area shall be cleared. If any alien vegetation clearing is required within no-go areas, this shall not take place without the written approval of the ER and shall be undertaken under supervision of the ECO. Special care shall be taken to protect indigenous vegetation in no-go areas from trampling, herbicide drift, etc.

All alien vegetation within a 50 m wide strip on either side of the road reserve shall be cleared.

Alien vegetation clearance on private land shall exclude homestead gardens and shall be negotiated with the relevant landowners. The principle is that all alien vegetation shall be removed, unless a specific request is received from the relevant landowner.

The use of herbicides is encouraged in preference to vehicle-driven brush cutting and grading.

Cutting without the use of herbicide treatment would stimulate re-growth.

All trees and saplings need to be cut down at ankle height where possible and herbicides applied immediately after cutting.

Eradication must start in the least infected areas and from highest lying areas.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Herbicides shall not be applied when conditions are windy, so as to avoid spray drift. No herbicides should be applied when rain is forecast within two days.

Protective clothing and masks must be worn at all times during application of herbicides.

Colour dyes must be used with the herbicides to clearly mark areas that have been treated.

Herbicide drift unto other plants must be avoided and care must be taken not to trample indigenous vegetation or stack alien vegetation on top of it.

Always read and follow the instructions on the labels of the herbicides.
Unused herbicides and empty herbicide containers shall not be disposed of on site.

6. VEGETATION REHABILITATION

6.1. VEGETATION REHABILITATION PLAN

MS12: The Contractor shall appoint a suitably experienced landscaping contractor / horticulturist to compile a vegetation rehabilitation plan that shall detail search and rescue, seed collection, seed mixing, seeding methods, planting and vegetation establishment in all construction areas.

The Contractor shall submit the vegetation rehabilitation plan to the ER for approval.

The landscaping contractor / horticulturist shall be familiar with NALA LOCAL MUNICIPALITY Plain vegetation and his/her appointment must be approved by the ER.

The vegetation rehabilitation plan shall include the following:

- Seed requirements, harvesting methods and locations, seed storage methods;
- Search and rescue;
- Handling of plant material rescued (translocation areas, propagation, etc.);
- Establishment and maintenance of a project-specific nursery, if required;
- Topsoil, mulch, fertiliser and soil stabiliser requirements and application;
- Landscaping and revegetation methods for each area, i.e. hydroseeding / hydromulching, planting, including locations and timing;
- Procurement requirements and a list of species of plants to be procured, if any;
- Vegetation establishment and maintenance requirements (irrigation, etc.) for all revegetated areas; and
- The use of any herbicides, pesticides and other poisonous substances, if required.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

6.2. GENERAL

All areas disturbed by construction activities, including borrowpits, temporary bypasses, storage and stockpiling areas, etc. shall be rehabilitated to the satisfaction of the ER.

Hydroseeding / hydromulching are expected to be the most suitable methods of revegetation for most areas.

Certain areas may be identified where specific plants / trees could be planted (e.g. viewing sites). All plants / trees used in revegetation shall be locally indigenous species only.

Avoidance is preferred over translocation and search and rescue should be undertaken only for plants/trees for which translocation is likely to be successful.

Revegetation of construction areas shall take place as soon as possible after completion of construction works. The timing of revegetation shall take cognisance of maintenance requirements and provision shall be made for any irrigation requirements.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been revegetated.

6.3. SEED COLLECTION AND STORAGE

Indigenous seed shall be harvested from areas that are free of alien vegetation, either within construction areas prior to site clearing or from suitable neighbouring areas with the consent of the relevant landowners.

Seed can be gathered by vacuum harvester or other approved mass collection method.

Harvested seed shall be free of excessive quantities of organic and/or substrate material.

If it is required to collect seed from selected species by hand, this seed shall be treated and stored separately.

Following harvesting, seed shall be dried under cool airy conditions. Seed shall be insect free and shall be stored in suitable containers under cool conditions that are free of rodents or insects. No wet, mouldy or otherwise damaged seed is acceptable.

The Contractor shall provide adequate facilities for the storage of collected seed in rodent- and insect-free, cool, dry conditions to the satisfaction of the ER.

Seed collection shall be an ongoing exercise throughout the construction period (at least twice a year) in order to ensure that sufficient seed is collected for use in revegetation.

Only if the harvested seed quantities are not sufficient may additional seed be bought. Any procurement of seed for use in revegetation shall be from reputable sources only. The seed mix quantities and purity levels shall be as specified in the approved method statement.

6.4. SEARCH AND RESCUE

Search and rescue of all rare or localised plant species within construction areas shall be undertaken before any site clearing takes place. Search and rescue shall include the collection of plants, cuttings and, where applicable, seed.

Search and rescue of seed and cuttings for propagation purposes may be undertaken within no-go areas under the supervision of the ECO.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Rescued plant material shall either be planted nearby within suitable habitats in areas that will not be disturbed in the foreseeable future.

The Contractor shall provide nursery facilities for the holding of any rescued plant material that is deemed suitable for later use in revegetation to the satisfaction of the Engineer.

6.5. NURSERY

The establishment of an on-site nursery to propagate and supply indigenous plants for use in revegetation is preferred to the procurement of plants / trees from commercial sources.

Nursery plants shall be grown from locally obtained seed, cuttings and plants.

The use of plants / trees bought from commercial sources in revegetation of specific areas (e.g. viewing sites) or for use in propagation at the nursery may be allowed if approved by the ER.

All plant material shall be obtained from reputable nurseries and shall be locally indigenous species only.

6.6. MULCH

Mulch shall be used in all areas where revegetation has to take place. Mulch shall be obtained from all areas where vegetation is cleared, after removal of alien vegetation and search and rescue of conservation-worthy species.

Mulch shall be free of alien species.

Plant material shall be reduced by either mechanical mean (chipper) or by hand-axing to pieces no longer than 100mm.

No harvesting of mulch vegetation outside of construction areas shall be allowed.

Every effort shall be taken to ensure the retention of as much seed as possible in mulch made from indigenous vegetation and mulches shall be collected in such a manner that the loss of seed is restricted.

Bush-cut mulch shall be stored for as short a time-period as possible, and seed released from stockpiles shall be collected for use in revegetation.

Compost from a local source may be used as mulch during revegetation, but must be approved by the ER. Compost shall be well decayed, friable and free from weed seeds.

Seed free, half-composted material, such as mulled-bark, may be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances.

Wood chips (including bark), which are half composted and have not been treated with preservatives can also be used as mulch during revegetation. Wood chips shall only be obtained from indigenous species removed during site clearing of construction areas. Chips shall be no longer than 50 mm in length or breadth and the ER shall approve the source of the chips.

6.7. FERTILISER

The use, storage and handling of fertiliser shall be strictly controlled

Fertilisers shall be suitably stored in sealed containers in areas approved by the ER.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

Care shall be taken when using fertilisers near no-go areas, watercourses and wetland areas and other sensitive natural areas.

Soil shall be well watered and moist before any fertiliser is applied.

6.8. LANDSCAPING AND GROUND SURFACE PREPARATION

Cut and fill slopes shall be shaped and trimmed to approximate the natural condition and contours as closely as possible. Cut and fill slopes shall be left as rough as possible and shall be shaped to contain ridge that would facilitate the accumulation of topsoil

Prior to revegetation, the Contractor shall ensure that the area is clear of any building materials and other foreign debris.

All visible weeds shall be removed from the area before replacing topsoil

Compacted soil shall be ripped along the contour and hand-trimmed. Topsoil shall then be spread evenly over the surface.

The final prepared ground surface shall be furrowed to follow the natural contours of the land and not smooth.

6.9. HYDROSEEDING / HYDROMULCHING

The hydroseeder shall be capable of pumping the specified seed mix, fertiliser, soil stabiliser, etc. at the specified rates over the areas to be seeded, according to the approved method statement.

The hydroseeder shall have an agitation system, which shall be sufficient to agitate, suspend and homogeneously mix the specified slurry.

The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with hydraulic spray nozzles suitable for the even distribution of the slurry on the various slopes to be seeded.

6.10. PLANTS / TREES

The handling, maintenance and planting of plants / trees shall be undertaken under supervision of the appointed landscape architect / horticulturist.

The Contractor shall ensure that each plant / tree is handled and packed in the approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on site in a proper condition for successful growth.

Plants shall be protected from wind during transportation.

No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase.

The Contractor shall ensure that the plants are in a good condition and free from plant diseases and pests. The Contractor shall immediately remove plants containing any diseases and/ or pests from site.

All plants supplied by the Contractor shall be healthy, well formed, and well rooted. Roots shall not show any evidence of having been restricted or deformed at any time. The potting materials used shall be weed free.

There shall be sufficient topsoil around each plant to prevent desiccation of the root system.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

6.11. TIMING

Revegetation of disturbed construction areas shall take place as soon as possible after construction work is completed.

As much as is possible, revegetation shall take place at the start of the winter rains to maximise water availability and minimise the need for watering.

If revegetation takes place during the dry season, irrigation of planted areas may be necessary.

6.12. ESTABLISHMENT OF VEGETATION

6.12.1. Irrigation

The Contractor shall be responsible for maintaining the desired level of irrigation necessary to maintain vigorous and healthy growth, as advised by the appointed landscaping contractor / horticulturist.

Water used for the irrigation of revegetated areas shall be free of chlorine and other pollutants that will have a detrimental effect on the plants.

Where hydroseeding was undertaken, the commencement of watering may be postponed until seeds have germinated and growth begins.

Where an irrigation system is required, the Contractor shall be responsible for its installation prior to seeding or planting. The Contractor shall supply all required water as well as all equipment as required by the approved method statement.

Every effort shall be made to avoid irrigation overspray into no-go areas and other areas with natural vegetation.

6.12.2. Weed, disease and pest control

The Contractor shall be responsible for ensuring that all revegetated areas remains free of all alien and indigenous weed species during the contract and establishment period.

Weeding, removal methods and storage of this material shall be undertaken in such a manner that prevents the re-infestation of the cleaned areas.

All dead plant material shall be removed immediately as it may become a fire hazard.

The Contractor shall ensure that all plants are disease and pest free. Any methods used to control any diseases and/or pests, including the use of herbicides and pesticides, must be approved by the ER.

6.12.3. Tree establishment

Any trees planted as part of the revegetation shall be watered three times weekly in summer, once weekly in winter, or otherwise as specified by the appointed landscaping contractor / horticulturist.

Trees that die or become diseased so that they appear to be in a badly impaired condition shall be promptly removed and replaced as soon as possible.

Trees shall be kept free from dead wood, broken branches, etc.

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

6.13. SPECIFIC REQUIREMENTS

There are no specific requirements recorded so far, but if any specific requirements discover during construction ER/ECO will compile a method statement for that specific requirements.

7. NON-COMPLIANCE**7.1. PROCEDURES**

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ER to impose a penalty.

In the event of on-compliance the following recommended process shall be followed:

The ER shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.

The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.

The Contractor shall provide the ER with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.

In the case of the Contractor failing to remedy the situation within the predetermined time frame, the ER shall impose a monetary penalty based on the conditions of contract.

In the case of non-compliance giving rise to physical environmental damage or destruction, the ER shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.

In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination.

The ER shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

7.2. OFFENCES AND PENALTIES

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty.

Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas;
- Unauthorised damage to natural vegetation;
- Unauthorised camp establishment (including stockpiling, storage, etc.);

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2

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- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
 - Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
 - Late method statements or failure to submit method statements;
 - Insufficient solid waste management (including clean-up of litter, unauthorised dumping etc.);
 - Erosion due to negligence / non-performance;
 - Excessive cement / concrete spillage / contamination'
 - Insufficient fire control and unauthorised fires;
 - Preventable damage to water courses or pollution of waterbodies; and
 - Non-induction of staff.

A list of indicative penalty fines is provided

Contractor

Witness 1

Witness 2

Employer

Witness 1

Witness 2