PART C3: SCOPE OF WORK

C3.1 DESCRIPTION OF WORKS.....

C3.2 ENGINEERING.....

C3.3 PROCUREMENT.....

C3.4 CONSTRUCTION.....

C3.5 MANAGEMENT OF THE WORKS.....

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C3.1 DESCRIPTION OF WORKS

C3.1.1 Employer's Objectives

The employer's objectives are to provide maintenance of all water related activities for a period of three years on when and as required basis within Ephraim Mogale Local Municipality, while making optimum use of local labour, and to stimulate the economy of the area by providing professional and high standard service and creating jobs for locals throughout the project cycle as well as creating business opportunities for local contractors and SMME's. The project implementation will be designed to maximise EPWP sector quotas and opportunities

C3.1.2 Overview and Location of Works

The works is within the Ephraim Mogale Local municipality and stretches in all **16 wards.**

C3.1.3 Extent of Works

The description of the project contained in this section is merely an outline of The contract works and shall not limit the work to be carried out by the Contractor under this contract. Approximate quantities of each type of work to be carried out in accordance with the contract documents will be listed in the Bill of Quantities to be provided as and when there is an allocation.

The nature of work to be carried out under this contract includes but not limited to the following

- Excavation of pipe trenches
- Installation of suitable pipe bedding (insitu / imported)
- Repairing of old infrastructure i.e pipes and fittings
- Laying and testing of pipes
- Backfilling of pipe
- Water reticulation
- Installation pressure pump and testing
- Confirmation of water quality and quantity as and when requitred
- Installation of scour, isolation, check, air valves etc
- Construction of valve chambers
- Drilling of boreholes and equipping
- E.t.c

C3.1.4 Location of the Works

Ephraim Mogale Local Municipality area

C3.1.5 Temporary Works

C3.1.6 General Information

C3.1.6.2 Power, Water Supply and Other Services

The contractor shall make his own arrangements concerning the supply of electrical power and all other services. No direct payment will be made for the provision of electrical and other services. The cost of providing these services will be deemed to be included in the rates and amounts Tendered for the various items

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of work for which these services are required.

C3.1.6.3 Contractor's Camp Site and Security

The contractor shall make his own arrangements regarding the establishment of a camp site and housing for his construction personnel and all regulations stipulated by the local authority shall be adhered to.

It is anticipated that the contractor's choice of a camp site will be influenced by the availability of telephone and electrical connections as well as the supply of potable water.

Provision is made in these specifications for the erection of a security fence around the site offices. The contractor shall be responsible for the security of his personnel and constructional plant on and around the site of the works and for the security of his camp, and the employer will consider no claims in this regard.

C3.1.6.4 Additional Requirements for Construction Activities

C3.1.6.4.1 The contractor may not commence constructional activities before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

C3.1.6.4.2 The contractor shall submit proposals in connection with directional signs to the engineer for approval.

C3.1.6.5 Programme Requirements for Construction Activities

The contractor shall programme his activities to be suitable in terms of his resources to complete the contract inside the stipulated time period.

C3.1.6.6 Construction in Confined Areas

It may be necessary for the contractor to work in confined areas. In certain areas the width of the fill material and pavement layers may reduce to zero and the working space may be confined. The method of construction in these confined areas depends on the contractor's construction plant. However, the contractor must note that measurement and payment will be in accordance with the specified cross-sections and dimensions, irrespective of the method used to achieve these cross-sections and dimensions, and that the rates and amounts Tendered will be deemed to include full compensation for any special equipment or construction methods or for any difficulty encountered in working in confined areas and narrow widths, and at or around obstructions, and that no extra payment will be made nor will any claim for payment be considered on account of these difficulties.

C3.1.7 Labour Regulations

C3.1.7.1 **Payment for the labour-intensive component of the works**

Payment for works identified in clause 2.3 "the Extent of the Project" in the Project Specifications as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the scope of work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in contract or in delict.

C3.1.7.2 **Applicable labour laws**

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C3.2 ENGINEERING

C3.2.1 Design

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

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

The **Contractor** shall supply all details necessary to assist the engineer in the compilation of the as-built drawings.

C3.2.2 Employer's Design

Detail description of Works
General Works

C3.2.3 Contractor's Design

Where contractor is to supply the design of designated parts of the permanent Works or temporary Works, he shall supply full working drawings supported by a professional engineer's design certificate.

C3.2.4 Design procedures

All designs and modifications thereto shall be communicated in writing and the contractor and engineer shall maintain master lists to record and track all transactions.

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C3.3 PROCUREMENT

C3.3.1 Preferential Procurement Procedures

C3.3.1.1 The Contractor's attention is drawn to the following returnable schedules contained in Part T2:

a) Empowerment and Preferential Procurement and

b) Enterprise Declaration Affidavit

C3.3.1.2 These schedules contain all requirements about preferential procurement.

C3.3.2 Subcontracting

The Contractor is obliged to utilize any subcontractors specifically nominated by the contractor, where in the opinion of the employer the contractor cannot provide a subcontractor that is deemed to be sufficiently experienced and can perform the task at a reasonable market related price.

The Contractor may be required to utilise local subcontractors for the completion of unskilled labour-based sections of the works and for the reinstatement of asphalt surfacing within the road reserve.

The Contractor is responsible for work executed by subcontractors on his behalf.

The Engineer will not negotiate directly with subcontractors and all problem relating to payments, programming, workmanship, etc., are matters between the Contractor and his subcontractors.

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C3.3: PROJECT SPECIFICATIONS

AMENDMENTS TO THE STANDARD AND PARTICULAR SPECIFICATIONS

In certain clauses in the standard, standardized and particular specifications, allowance is made for 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 alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains the necessary 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 PS followed by a number corresponding to the relevant clause or payment item in the standard specification.

The number of a new clause or 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 PS, but followed by a new number which follows on the last clause or item number used in the relevant section of the standard specifications.

PART A: GENERAL

A1 SERVICES

Provision is made in the bill of quantities for payment for searching and exposing of known or unknown services.

PS2 PROGRAMME OF WORK

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(a) General requirements

The bar-chart programme to be provided by the contractor shall show the various activities in such detail as may be required by the Employer's Agent. Progress in terms of the programme shall be updated monthly by the contractor in accordance with the progress made by the contractor.

In compiling the programme of work, the contractor shall indicate and make due allowance for the following:

a. Civil works as per the tender drawings, Bill of Quantities and Scope of Works;
b. Mechanical & Electrical (M&E) Contract. For the M&E contractor, a provision of 22 months from appointment to successful completion of the 28-day Trial Operational Period must be provided. Thereafter the civil contractor and the M&E contractor will be involved with the 2-months operation and training period.

PS3 WORKMANSHIP AND QUALITY CONTROL

The Employer's Agent shall, however, undertake acceptance control tests for the judgement of workmanship and quality, without accepting any obligations vested with the contractor in terms of the contract with specific reference to quality of materials and workmanship. Such acceptance control test done by the Employer's Agent shall not relieve the contractor of his obligations to maintaining his own quality control system.

The Employer's Agent shall, for the purpose of acceptance control on products and workmanship, assess test results and measurements.

Where small quantities of work are involved, a lot shall mean a full day's production for a specific item of work subject to acceptance control testing.

PS4 .... PAYMENT

(b) Rates to be inclusive

VAT shall be excluded from the rates and provided for as a lump sum in the Summary of Bill of Quantities.

Section 2.01	(e)	Materials on the site

In addition, the Employer's Agent may at his sole discretion also allow payments under "Materials on Site" in respect of any construction materials if stored off-site providing that:

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(a) The site selected for this purpose is approved by the Employer's Agent;
(b) Such land is physically separated from any production plant or operation;
(c) Only materials for use under this contract is stockpiled on such land;
(d) The contractor has provided proof of an agreement with the owner of such land that the owner has no claim whatsoever on any materials stockpiled on such land;
(e) Materials obtained by the contractor for or on behalf of emerging subcontractors (SMME's) shall remain the responsibility of the contractor after payment has been made in respect of materials on site;
(f) A cession form for the material has been provided to the approval of the Employer.

Section 2.02	**(f)**	**Payments Certificates**

With reference to Sub-Clause 6 of the General Conditions of Contract, the Employer's Agent's certificate will be issued only after receipt by him of a draft certificate prepared by the Contractor in the form prescribed by the Employer's Agent.

The cost of duplicating and delivering copies of the Employer's Agent's Certificate to the Contractor, the
Employer's Agent and the Employer shall be borne by the Contractor. A total of three copies of the certificate (A-4 size) will be required by the Employer's Agent and the Employer.

PS4 .... EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Extension of time will not be considered for normal rainfall but only for abnormal rainfall or saturated conditions and will be calculated in accordance with the following method:

a) The Contractor shall, in his programme, allow for the anticipated number of working days on which work could be delayed - as given in the Schedule below.

b) Extension of time will be calculated for each calendar month or part thereof over the full period for the completion of the Work, plus any approved extension thereof, as follows:

i) A delay caused by abnormal rainfall will only be accepted for extension of time if, in the opinion of the Employer's Agent, it delays an item or items which lie on the critical path determined by the Contractor's programme. Only delays on working days will be considered.

ii) Abnormal rainfall will be days, as approved, on which rain delayed operations, less the anticipated number of days given in the Schedule below;

iii) The net extension of time determined for each month, which may be negative, shall accumulate algebraically to determine the net number days for extension of time due to abnormal rainfall, but a negative total at the end of the construction period will not be considered.

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iv) Where a portion of a month is involved, a pro rata number of days shall be calculated.

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PART B PROJECT SPECIFICATION

PSA GENERAL (SABS 1200 A)

PSA 1 STANDARDISATION MARK (CLAUSE 3.1)

Add the following to the Clause:

All material delivered to the site shall bear the Official Standardization Mark.

PSA 2 CONTRACTOR'S CAMP (CLAUSE 4.2)

PSA 2.1 Restrictions on employee accommodation (Sub-clause 4.2)

No housing is available for the Contractor's employees. The Contractor shall make his own arrangements to house his employees.

The Employer shall place an area at the disposal of the Contractor to enable him to erect his site offices, workshops and stores. Any temporary housing and facilities shall comply with the requirements of the local authority. The Contractor shall provide his own fencing and site security.

PSA 3 DEALING WITH WATER (SUBCLAUSE 5.5)

In addition to the items as set out in Subclause 5.5 the contractor shall also provide pumping equipment, pipes and other equipment as may be necessary.

PSA 4 MEASUREMENT AND PAYMENT

PSA 4.1 Fixed charge and Value Related Items (Sub-clause 8.2.1)

Replace the sub-clause with the following:

Payment shall be a lump sum to provide for the Contractor's expenses in connection with:

(a) setting up and maintaining his organisation, camps and plant on the site;
(b) effecting the insurances and indemnities required in terms of the General Conditions of Contract
(c) meeting all other general obligations and liabilities which are not specifically measured for payment in these contract documents.

The lump sum total of items (a), (b) and (c) as measured and Fixed Charge Items and time Related Items shall not exceed 15% of the nett total Tender Amount. If the Tenderer should tender a higher amount for this item it shall be reduced to the amount allowed above and all other tendered prices increased in the proportion required to retain the same Nett Total Tender Amount.

The tendered lump sum shall not be subject to any variation if the actual value of work done under the Contract exceeds, or falls short of, the Tender Amount, or as a result of an extension of time for completion in terms of Clause 5.12 of the General Conditions of Contract.

Any payment made under this item shall not be taken into account when determining whether the value of a certificate complies with the "minimum amount of monthly certificate" laid down in the Appendix.

Before any payment is made under this item the Contractor shall satisfy the Engineer that he has provided on site an establishment and plant of good quality and in value exceeding that of the first installment. The Contractor may be asked to furnish documented proof that he owns the offices and plant on site, the value of which should exceed the amount claimed in the first certificate. In the event that the Contractor cannot satisfy the Engineer as to the value or ownership, the Engineer shall have the right to withhold part of any payments to be made under this item, until the

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Works have been completed.

Payment of the lump sum shall be made in three separate installments as follows:

(a) The first installment, 50% of the lump sum, will be paid in the first payment certificate after the Contractor has met all his obligations under this sub-clause and has made a substantial start on construction in accordance with the approved programme.

(b) The second installment, 35% of the lump sum, will be paid when the value of the work done reaches one half of the Nett Total Tender Amount.

(c) The third and final installment, 15% of the lump sum, will be paid when the works have been completed and the Contractor has fulfilled all requirements of this sub-clause. No payment for the scheduled Fixed Charge Items for this contract will not be made until the requirements regarding and the erection of name boards have been met.

Section 3.01	**PSA 4.2**	**Time-Related Items (Sub clause 8.2.2)**

Replace this sub clause with the following:

Subject to the provisions of 8.2.3 and 8.2.4, payment of item 8.4.1 (time-related item) will take place in equal monthly amounts, calculated on the tendered amount for the item, divided by the contract period in months, with the understanding that the total of the monthly payments which was paid for this specific item does not exceed the proportion that the progress of the works to date bears in relation to the works as a whole.

Should the Engineer grant an extension of time, the Contractor is entitled to an increase in the amount tendered for time related items, and this increase must be kept in the same proportion to the original tender amount as the extension of time is to the original time of the completion of the works.

Payment for such increased amounts will be considered as full compensation for all time related, provisional and general costs which arise as a result of the extension of time.

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PSA 4.3 <u>Facilities for Engineer</u> (Sub clause 8.3.2.1)

Change the item descriptions of the following items as follow:

PSA 4.3.1 Item:

a) Engineer's office Unit: sum

The specifications for the items listed below should be provided in accordance with the "Facilities provided by the Contractor" in C3.1 Scope of Works:

The tendered sum shall provide for the following:

Provide the following units:
- 2 x Airconditioned Offices (minimum 10 m²)
- 1 x Airconditioned Boardroom (minimum 20 m²)
- 1 x Kitchen (7 m²)
- 2 x WC units (male and female)
- 6 x carports with crushed stone floor

Note that the areas surrounding the units in the Engineer's camp must be covers with gravel as specified in Section C3.1 Scope of Works

The Boardroom shall each be furnished with the following:
- Air conditioner
- 1 x conference table to seat 20 people
- 20 x new chairs
- White board mounted to wall (Minimum 1.2 x 2m) □ 1 x 10 kg Fire Extinguisher

The office shall be furnished with:
- Air conditioner
- 2 x office desks and 2 x chairs
- 1 x drawing table
- 2 x steel cabinets
- 1 x A1 drawing rack
- 1 A4/A3 Colour laser printer/Scanner/Copier
- 1 x 10 kg Fire extinguisher

The kitchen shall be furnished with:
- 2 Min 300 l fridge/freezer combination fridge
- Microwave of min 36 l and 1 000 W
- Cordless kettle
- 2 x 1.8 m steel folding table
- A set of 12 x each of knifes, forks, spoons and teaspoons
- A set of 12 x each of white ceramic crockery including dinner plates, side plates, bowls, coffee mugs, tea cups and saucers
- A set of 24 x beer glasses
- 1 x large wooden cutting board
- 1 x kitchen knife set in knife block which includes at least a large carving knife, bread knife, medium knife, pairing knife and kitchen scissors
- 2 x braai tongs

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- 1 x meat casserole with lid
- 1 x 10 kg Fire extinguisher

The contractor must supply the following equipment:

- New Dumpy Level and Staff
- New Dynamic Cone Pentrometer (DCP)
- Measuring wheel with electronic display
- Rain gauge
- 2 x 1m spirit level
- 2 x First Aid Kit

The contractor will provide the following additional services

 Uncapped WIFI coverage for the offices and boardroom (min 6 mbs speed)

PSA 4.3.2 Item:

c) Name board Unit: sum

The tendered sum shall provide for two contract nameboards as specified by the detail drawings.

PSA 4.4 <u>Exposing of existing services</u>

Add the following new pay item:

PSA 4.4.1 Item:

Excavation by hand in all materials to expose existing services Unit: cubic meter (m^3)

The tendered sum must include full compensation for all hand excavation as per the dimension approved by the Engineer for the locating, exposing and moving of existing services. Excavation outside of approved dimensions will not be paid. The rate must also include for backfill and compaction to 90% of mod AASHTO density and, if applicable, the removal of excess material not used for backfill, the securing of excavations, for handling surface and subsurface water, for protection of existing services and for any other activity necessary to complete the work. Free haul of 1,0 km will be applicable on the transport of excess material.

No distinction will be made between classes of material or types of services.

<u>Note:</u> The Contractor must provide sufficient supervision over labourers when services are exposed."

PSA 4.5 <u>Occupational Health and Safety</u>

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Add the following new pay items:

Provision for the cost related to the Occupational Health and Safety Act, 85 of 1993, and the relevant Regulations:

a) Preparation of a Health & Safety Plan. Unit: Sum

b) Compilation of a Risk Assessment prior to Construction. Unit: Sum

c) Health & Safety induction Training of employees. Unit: Sum

d) Compilation and keeping up to date the Health & Safety file which shall include all documentation required in terms of the act. Unit: Sum

e) Implementation of the Health and Safety Plan over the entire construction period. Unit: Sum

The tendered sum shall include full compensation for providing the above services as required from the Occupational Health & Safety Act. The rate shall include all related costs incurred by the Act, remuneration of personnel, trainers, etc. and equipment required for the execution of the required services as depicted by the Act. The tendered amount for items a, b, c, d and e shall only be paid on the successful completion of the task as approved by the client. The tendered amount for item shall be paid on a monthly basis.

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PSA 4.6 SUMS STATED PROVISIONALLY BY THE ENGINEER

Add the following new pay items:

PSA 4.6.1 Item:

Project Liaison Officer — Unit: Prov Sum

The total cost is for the duration of the project.

PSA 4.6.2 Item:

Project Liaison Committee — Unit: Prov Sum

The total cost is for the duration of the project.

PSA 4.6.3 Item:

Additional laboratory testing — Unit: Prov Sum

PSA 4.6.4 Item:

AS BUILT Survey — Unit: Prov Sum

The rate shall cover the cost for a surveyor to conduct an AS BUILT survey of the works as required by the Clients Agent

PSC SITE CLEARING (SABS 1200 C)

PSC 1 GENERAL

The areas where work is to be carried out must be kept clean for the duration of the contract. All rubbish must be removed without delay and the site must be left clean and tidy on completion of the service.

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PSC 2 DUMPING SITE

No dumping is allowed on site other than at the designated and approved fill areas. Dumping will only be allowed for filling sinkholes and dolines and may not be detrimental to the natural storm water drainage of the area. Only soil, rock, clean masonry and concrete rubble may be dumped in the designated dump areas.

PSC 3 REMOVAL OF TREES

No trees may be removed without written permission from the Engineer.

PSC 4 MEASUREMENT AND PAYMENT

PSC 4.1 Item:

Clear & Grub (Clause 8.2.1) Unit: ha or m or km

Add the underlined text to the second sentence of the item description to read as follow:

"The rate shall cover the cost of clearing the surface, removing boulders of size up to 0,15 m³, grubbing of trees and tree stumps (except large trees (**with girth over 1m**) and stumps as specified in 8.2.2 below), cutting of trunks and branches exceeding 0,5m **up to 1,0m** in girth into transportable lengths....."

Add the following to the pay item description:

"The rate shall include for transport and disposal of material and debris to unspecified site and disposal thereof."

"The area (in ha) shall comprise the entire site to be cleared and grubbed within the limits to be indicated by the engineer on site in writing.

The area of clear and grub measured in linear meter (or km) shall be the sections outside the initial cleared area (measured in hectares), specifically applicable to pipeline routes outside the original cleared site area. The width and length shall be indicated by the engineer on site in writing."

PSD SABS 1200 D: EARTHWORKS

PSD 1 MATERIALS (CLAUSE 3)

PSD 1.1 Classification (Clause 3.1)

Notwithstanding the provisions of Sub-clause 3.1 of SANS 1200 D, the unit rate for excavation shall cover excavation in all materials other than hard rock.

PSD 2 CONSTRUCTION (CLAUSE 5)

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PSD 2.1 Excavations (Subgrade Preparation) (Sub-clause 5.2.2)

The Contractor shall allow 6 weeks in his programme for when bulk excavation has been completed for the Engineer to review the founding conditions and to instruct the Contractor to commence with soil improvement and implement these soil improvements, if required, before commencing with construction activities.

Bulk and restricted excavations shall be taken down to the underside of the concrete blinding layers for the various structures. After the earthworks operations have been carried out, the surface shall be watered so that the top 300mm is at optimum moisture content, and this layer shall then be compacted to 100% Mod AASHTO density. The subgrade shall then be carefully levelled and prepared to receive the concrete blinding. Surplus excavated materials shall be removed and spoiled as indicated by the Engineer. Payment for preparation of subgrade and compaction shall be included in the rate for excavations.

PSD 2.2 Excavation for working space (Sub-clause 5.2.2.1 b) and c))

Add the following to the clause:

Other than for the sides of strip or pad footings or where specifically authorized by the Engineer, no concrete shall be placed against the sides of excavations.

For external concrete faces below ground level, (other than concrete placed against the sides of excavations as above) the Contractor shall over-excavate to provide sufficient working space for the erection of formwork.

Tenderers shall allow in their rates for excavation for any over-excavation required for working space.
Excavation volumes for structures will be calculated as the nett volume of the structure below ground level after general site excavations have been completed. No additional payment shall be made for working space.

All water retaining structures shall be shuttered externally on vertical and on other faces inclined within 45º from the vertical.

PSD 2.3 Inspection (Sub-clause 5.2.2.1 d))

Add the following to the clause:

Excavation to final level soil improvement, ready to achieve a binding layer or concrete footing, shall be completed less than 24 hours before such layer or footing is cast.

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The Contractor shall arrange for the inspection by the Engineer or his Representative of all surfaces immediately before casting concrete.

PSD 2.4 Over-excavation to sides of excavation (Sub-clause 5.2.2.1 e))

Add the following to the clause:

Where the sides of excavations are over-excavated to establish safe slopes, provide access to excavations, or for other purposes not specifically required by the Engineer, such over-excavation shall be backfilled with material as required by the Engineer and compacted to a minimum density of 95% Mod AASHTO.

No separate payment will be made for this work.

PSD 2.5 Over-excavation (Sub-clause 5.2.2.1 e))

Add the following to the clause:

If the material in the bottom of an excavation is loosened, or if there is any over-excavation, any loose or disturbed soil shall be removed, and the over-excavation shall be replaced by mass concrete mix 15 MPa.

No separate payment will be made for replace over-excavation with concrete. No separate payment will be made for over excavation as defined in PSD 2.4 and PSD 2.5.

PSD 2.6 Trimming of surface of bulk earthworks (add the following sub-clause 5.2.2.1 f))

Where blinding, mass or structural concrete is to be cast or where precast elements are to be placed on surfaces established by bulk earthworks, the Contractor shall:

a) Arrange his bulk excavation operation so that over-excavation is avoided, taking into account the requirements in PSD 2.4.
b) Over-fill embankments while placing fills as necessary to allow for trimming and arrange his compaction operations to ensure that the specified density is achieved throughout the finally trimmed embankment; and
c) Shortly before casting concrete or placing precast elements, carefully remove the final layer and trim such surfaces to the design levels and profiles within Grade II degree of accuracy.

PSD 2.7 Disposal of surplus material (Sub-clause 5.2.2.3)

Add the following to the clause:

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All surplus material from bulk excavation for concrete units and for pipework shall be dumped, leveled and spread on site at the areas as indicated by the Engineer. No dumping shall be undertaken prior to obtaining detailed instructions from the engineer.

PSD 2.8 <u>Freehaul</u> (Sub-clause 5.2.5.1)

Replace the sub-clause with the following:

All haul within the site of works or within a distance of 1.0 km outside the extremities of the boundaries of the contract as indicated on the drawings shall be regarded as freehaul.

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PSD 3 MEASUREMENT AND PAYMENT (CLAUSE 8)

PSD 3.1 Restricted excavation (add the following to sub-clause 8.3.3)

Add the following to this item:

The volume of restricted excavation will be calculated from the net plan dimensions and the difference between the original ground profiles (or terraces), and the blinding layer (or no-fines) levels shown on the drawings. On the sides, the volume will only be calculated to the outside dimensions of the concrete structures. No additional payment will be made for the provision of working space, although it will be provided.

PDS 3.2 Additional Lateral Support / Shoring (Sub-clause 8.3.7)

The contractor must at all times ensure that excavations are safe to work in. Should the excavations exceed 2 meters and appear unstable shoring must be installed. Allowance in the Bill of Quantities has been made for shoring. No claims for extension of time, additional costs or damages for doing shoring will be entertained.

The unit in the Bill of Quantities is m2.d. the Contractor shall submit his shoring design proposal to the Engineer for approval. The unit rate shall cover the product of the surface area of the shoring and the number of days it is required.

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PSDB SABS1200DB: EARTHWORKS - PIPE TRENCHES

PSDB 1 CONSTRUCTION

Section 4.01	PSDB 1.1	Freehaul Distance

All haul within the site of works or within a distance of 1.0 km outside the extremities of the boundaries of the contract as indicated on the drawings shall be regarded as freehaul.

PSDB 2 MEASUREMENT AND PAYMENT

Section 5.01 clause 8.1.1)	PSDB 2.1 Dewatering (Sub

Add the following to this item:

The scheduled rates for excavation shall include dewatering of trenches.

Section 5.02 clause 8.3.2b)	PSDB 2.2 Excavations (Sub

Replace the clause with the following:

Extra-over item:

Only two types of excavations are defined and paid for under this contract. These items are soft excavation and hard rock excavation. No intermediate excavations will be paid for. Hard rock excavations qualifies when blasting or mechanical breaking are applied to break the rock.

Section 5.03	PSDB 2.3	Shoring (Sub-clause 8.3.4(a))

The contractor must at all times ensure that excavations are safe to work in. Should the excavations exceed 2 meters and appear unstable shoring must be installed. Allowance in the Bill of Quantities has been made for shoring. No claims for extension of time, additional costs or damages for laying pipes in shored trenches will be entertained.

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PSG SABS 1200 G: CONCRETE (STRUCTURAL)

PSG 1 SCOPE OF WORKS

This specification covers the construction of all structural concrete elements.

PSG 2 MATERIALS (CLAUSE 3)

PSG 2.1 Concrete

PSG 2.1.1 Cement (Sub-clause 3.2.1)

Add the following to the sub-clause:

The type of cement to be used for concrete structures shall be approved by the Engineer.

PSG 2.1.2 Storage of cement (Sub-clause 3.2.3)

Add the following to the sub-clause:

Cement shall not be kept in storage for longer than eight weeks without the Engineer's permission.
Cement which has been damaged in any way or which has been stored on site for a period exceeding three months shall be condemned and removed from site.

PSG 2.1.3 Aggregates (Sub-clause 3.4)

Add the following to the sub-clause:

Concrete with reactive aggregates:

The Contractor shall supply a test certificate for the aggregate confirming that it is not reactive.
With each delivery of materials under this clause the Contractor shall supply acceptable written evidence that this clause is being complied with.

PSG 2.1.5 Use of plumbs (Sub-clause 3.4.2)

Add the following to the sub-clause:

The use of plumbs shall not be permitted.

PSG 2.1.6 Admixtures (Sub-clause 3.5)

Replace this sub-clause with the following

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Admixtures may only be used with the prior approval of the Engineer. No air-retaining properties will be tolerated.

PSG 2.2 Joint materials (add the following new sub-clause 3.9)

All primers, fillers, sealers, admixtures and breakers shall be suitable for use on potable water.

PSG 2.2.1 Primer

An approved primer, fully compatible with and/or manufactured for the specified jointing and sealing materials shall be applied to the joint surfaces.

PSG 2.2.2 Filler

Fillers shall be closed-cell expanded polyethylene.

Fillers shall be pre-cut to suit the application with a tear-out strip for forming the specified recess for the bondbreaker and sealant.

PSG 2.2.3 Sealer and breaker

The elastomeric sealant shall be a two-pack polyurethane type (gun grade for vertical joints) generally conforming with the physical properties specified in SABS 110, and used with primers as specified above.

The bondbreaker placed immediately prior to application of the sealant shall be a self-adhesive vinyl type (or similar approved material) with a width the same as the joint recess into which it is to be applied.

PSG 3 CONSTRUCTION (CLAUSE 5)

PSG 3.1 Classification of finishes (Sub-clause 5.2.1)

Add the following to the sub-clause:

Concrete surfaces which will be in contact with the natural ground or which will otherwise be covered on completion of the works, shall have a rough finish as specified in sub clause 5.2.1 (a).
Horizontal surfaces and surfaces with a slope not exceeding one vertical to two horizontal shall be finished to a woodfloat finish. For this finish the surface must be given a finish as specified in subclause 5.5.10.1 and after the concrete has hardened sufficiently, it shall be floated to a uniform surface free of trowel marks.

The finished concrete surfaces shall be accurate to degree 1 as defined in sub-clause 6.2.

E-TENDER

The visible vertical or near vertical surfaces of valve chambers, and culvert head walls or parapets shall be finished to a smooth surface, repaired and rubbed to remove projections.

The bagging of concrete surfaces to repair defects will not be permitted.

All concrete edges shall be provided with 25 mm x 25 mm chamfers.

PSG 3.2 Cover (Sub-clause 5.1.3 and 5.5.1.5)

Add the following to the sub-clauses:

The exposure conditions for all structures in the works shall be deemed to be “severe”. The minimum cover to reinforcement shall be 50 mm for water retaining concrete and 50 mm for all other concrete, unless otherwise specified on the Engineers drawings and bending schedules.

PSG 3.2.1 Spacers for reinforcement (sub-clause 5.1.3)

Add the following to the sub-clause:

Spacers of approved design include purpose made precast mortar blocks. No plastic spacer blocks will be allowed.

Where mortar blocks are used, they shall be properly shaped so as not to slip out of position and shall be made of the same mix as the mortar of the concrete in which they are to be placed.
The mortar shall be well compacted by approved means into the moulds to result in blocks with a density of at least 2 300 kg/m; and which are free from honeycombing. They shall be cured in water for at least seven days. Mortar blocks which have not been manufactured and cured strictly in accordance with these requirements or which are in any other way considered unsatisfactory by the Engineer, will be rejected and shall be removed from the Site.

PSG 3.3 Holes, Chases and Fixing Blocks (Concrete Boxouts) (Sub-clause 5.3)

Where pipes are to be cast into concrete, the Contractor shall provide a box-out in the wall and grout the unit in at a later stage. When constructing such a box-outs, reinforcement shall not be cut, but shall run through the opening. Reinforcement shall be cut and/or bent out at a later stage to suit the item being cast in. After installation of the item the remaining reinforcement shall be bent back in position.

Where box-outs for pipes/specials have been provided in the walls, the Contractor shall be responsible for the grouting in of such pipes/specials regardless of whether or not these have been supplied by himself.

An approved non-shrink grout shall be used for the grouting in of pipes and specials after they have been positioned. The details and method statement are to be submitted to the Engineer for approval prior to the commencement of any grouting. The approval by the Engineer shall not relieve the Contractor from his obligation to provide a watertight joint between the concrete and grout used.

E.TENDER

PSG 3.4 Strength concrete (Sub-clause 5.5.1.7)

Add the following sub-clause:

The grade of strength concrete for each portion of the works will be indicated on the drawings and/or specified in the Schedule of Quantities. The grade of concrete will be designated as "Class S/A", where "S" is the characteristic strength in Mpa and "A" is the maximum nominal size of coarse aggregate in mm.

With the exception of mixes weaker than 15 Mpa, all concrete for the Works shall be considered to be strength concrete in terms of Sub-clause 5.5.1.7.

No concrete shall be cast until the mix designs have been approved by the Engineer. The Engineer may call for revised mix designs at any stage during the contract.

Contractor to supply and test 6 No. cube test results for approval prior to commencement of the works.

Unless otherwise specified on the drawings or in the Schedule all structural concrete shall have a strength of 35/19 Mpa.

The concrete to be used on this contract shall be as follows:

(a) For all water retaining structures (including reservoir roofs), 35/19 MPa. The slump limits shall be 75 mm. The water/cement ratio shall not be greater than 0,5. A waterproofing agent
(Crystalline Admix) shall be added as per supplier's specification to a minimum of 1% by weight of cement.
(b) For all other structures not in contact with water 25/19 MPa concrete.
(c) For anchor blocks, benching and mass concrete, 20/19 MPa concrete.
(d) For no-fines concrete 15/19 Mpa concrete
(e) All sizes of aggregate used shall be 19 mm granite.

These mixes shall be designed for vibration. All data reports prepared by the Institute shall be submitted to the Engineer for information and approval.

DESIGN OF CONCRETE MIX:

The concrete mix design shall be prepared by an approved independent laboratory and submitted to the Engineer for approval. Historical data shall be provided for a similar mix design to the same strength.

The successful Tenderer will be required to submit samples of the fine and coarse aggregate which he proposes using, to an approved laboratory for tests regarding the suitability of such aggregates. The laboratory shall prepare trial mixes of the two stronger grades of concrete required for the contract to establish acceptable design mixes.

PSG 3.5 Formwork and finishes (Sub-clause 5.2)

Add the following to the sub-clause: E.210

E-TENDER

.....FORMWORK TIES

The use of sleeves through the concrete for formwork ties will not be permitted. Ties, when cast in, shall have some form of positive shear key to prevent any rotation when loosening formwork.

The formwork ties and bolt holes shall be placed with regularity and precision.

The finish of exposed concrete surfaces of concrete structures shall be "smooth" as detailed in (b) of sub-clause 5.2.1.

FILLETS AND CHAMFERS

All internal and external angles in concrete works shall have 25 mm x 25 mm fillets and chamfers unless shown otherwise on the drawings.
The units rate tendered for formwork shall cover the cost of forming these chamfers and fillets.

PSG 3.6 Joints (Clause 5.5.7)

Add the following to the sub-clauses:

PSG 3.6.1 General

Notwithstanding Sub-clause 2.4.3 "designated joints" shall only be joints shown on the drawings and in the Schedule. Further joints required by the Contractor because of construction limitations or any other reason, shall be deemed to be "undesignated joints".

The position and pattern of all joints (designated or undesignated) shall be to the Engineer's approval.
All joints (designated or undesignated) except expansion and contraction joints shall be treated in accordance with Sub-clause 5.5.7.3.

Joints between tank bottoms, floors or wall bases and the walls and columns standing on them, shall not be made flush with the supporting surface, but shall be made in the wall or the column a distance of 140 mm above the base. The 140 mm high "riser" shall be cast as an integral part of the bottom, floor or base, i.e. the concrete in the riser shall be deposited at the same time as the concrete in the bottom, floor or base adjacent to it.

In cases where there is a fillet at the bottom of the wall or column, the construction joint shall be made 140 mm above the fillet.

The Contractor should note that the details of the undesignated joints shall be identical to the designated joints shown on the drawings where the joint is in a similar situation and performs the same duty.

The Contractor shall further note that the position and the type (where no identical designated joints exist) of undesignated joints shall be subject to the Engineer's approval.

PSG 3.6.2 Construction joints (Sub-clause 5.2.4.3 and 5.5.7)

E-TENDER

All joints other than expansion, contraction or other movement joints, shall be treated as follows:
As soon as practical, but not before 15 hours after placing, the joint surface shall be prepared to receive fresh concrete.

This preparation, as specified in Sub-clause 5.5.7.3 (a) to (d) shall be such as to remove all laitance or inert and strengthless material which may have formed and the specified chipping and sand blasting shall be such as to produce a roughened surface all over.

Concrete surfaces, where concreting is interrupted, shall be protected from the sun as specified in Sub-clause 5.5.8 (d).

Floor slab concrete shall be cast in one continuous pour. Should the Contractor wish to deviate from this requirement for the larger pours, a water bar shall be placed in the centre of the joint. This deviation should first be discussed with the Engineer before construction commences.
A kicker joint shall be formed at all external floor/wall intersections. The kicker shall be formed with the floor pour and shall include a 200mm PVC water bar, of the dumbbell kind. The water bar shall be provided with eyelets so that the water bar can be held in its correct position. A rate item for construction joints is provided in the Bill of Quantities.

PSG 3.6.3 <u>Construction joints</u> (Sub-clause 5.5.7.3)

No vertical construction joints other than those shown on the Drawings may be formed without prior approval. Horizontal construction joints may be formed if the method of construction does not allow for one continuous pour. However, these construction joint will be indicated to and approved by the Engineer. It must be noted that should the Contractor wish to form a construction joint in water retaining concrete, the watertightness of this joint will remain the responsibility of the Contractor. In addition to the precautions to be taken as prescribed under clause 5.5.7.3, the Contractor may ensure watertightness by providing additional means (such as a bandage on the joints or wet to dry epoxy) to the approval of the Engineer. No additional payment will be made to the Contractor for ensuring that construction joints are watertight and the Contractor will have to include such costs in the rate for the concrete.

PSG 3.6.4 <u>Expansion and construction joints</u>

Expansion and contraction joints shall be made in the position and to the details shown on the drawings.

The specified filler strips shall be attached to the complete side of the straight or grooved concrete joint by means of an approved adhesive.

PSG 3.7 <u>Items to be casted in or grouted into concrete</u> (sub-clause 5.4)

Add the following to the sub-clauses:

E-TENDER

PSG 3.7.1 Fixing for equipment and pipe specials supplied under this Contract

a) The Contractor will be responsible for the forming of pockets and grouting in of pipe items and/or holding down bolts for equipment supplied under the contract.

b) Upon completion of the positioning and alignment of equipment, the Contractor shall, grout up pipe items, pockets and base plates (subject to (c) below) necessary for the permanent installation of the equipment.

c) Only after the Engineer is satisfied with the alignment and the level of each item of plant shall the Contractor grout up the base plates/pipe specials with an approved non-shrink grout.

PSG 3.7.2 Fixing for equipment supplied under this contract

Holding down bolts or other fixings required for the installation of handstops, crane beams, ladders, handrails and other items supplied under the Contract, shall be provided by the Contractor. These fixings shall be cast in or grouted into pockets or installed by other means as approved by the Engineer.

Where anchor bolts are used which are installed into holes drilled into concrete or masonry, these shall be a type approved by the Engineer.

All anchor bolts shall be stainless steel grade 316.

PSG 3.7.3 Pipes and conduits embedded in concrete

Except with the written approval of the Engineer, no pipes other than those shown on the drawings shall be embedded in concrete and the approval of the Engineer for the position of all services to be embedded shall be obtained before concreting commences.

The clear space between pipes of any kind embedded in reinforcement concrete and the clear space between such pipes and reinforcement shall not at any point be less than:

(a) 40 mm, or

(b) 5 mm plus the maximum size of coarse aggregate, whichever is the greater.

PSG 3.8 Curing and protection (Sub-clause 5.5.8)

Add the following to the sub-clauses:

Level or gently sloping surfaces shall be cured by one of the methods described in Sub-clause 5.5.8 (a) or (b) and vertical surfaces by the methods described in Sub-clause 5.5.8 (e) for a period of five days after casting for an ambient temperature of 5ºC or above and for eight days for an ambient temperature of below 5ºC.

PSG 3.9 Concrete surfaces (Sub-clause 5.5.10)

E-TENDER

Add the following to the sub-clauses:

PSG 3.9.1 Screed finish

After placing and compacting, the concrete on a top (unformed) surface shall be struck off with a template to the designated grades and tamped with a tamping board to compact the surface thoroughly and to bring mortar to the surface, leaving the surface slightly ridged but generally at the required elevation. No mortar shall be added, and noticeable surface irregularities caused by the displacement of coarse aggregate shall be made good by re-screeding after the interfering aggregate has been removed or tamped.

PSG 3.9.2 Wood float finish

Where wood floating is ordered or scheduled, the surface shall first be given a finish as specified in PSG 3.6. and, after the concrete has hardened sufficiently, it shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screed marks.

PSG 3.9.3 Steel float finish

The surface of tank bottoms, floors and roof slabs, etc. shall be given a steel float finish in accordance with Sub-clause 5.5.10. To Degree 1 accuracy.

PSG 3.9.4 Power floated finish

Where power floating is required the surface shall be treated as specified in PSG 3.11.2 to a degree necessary.

PSG 3.10 Screeds (add the following sub-clause 5.5.16)

GRANOLITHIC SCREED

Granolithic screed shall consist of: Cement - 1 part; Sand - 1.25 part; Coarse aggregate - 2 parts.
The coarse aggregate shall consist of granite or other approved chips which shall pass a 10 mm sieve and be retained on a 5mm sieve.

The cement/water ration of the mix shall be at least 2,0 mass.

PSG 3.11 Repairs and defects (add the following sub-clause 5.5.14)

All defects to the concrete shall be attended to, in full, as soon as possible after the formwork is removed. Further concreting of the element concerned may be prohibited by the engineer until he is satisfied that this remedial work has been satisfactorily attended to.

PSG 3.12 Porous Concrete

Porous concrete shall be laid under foundations and floor slabs, and behind walls, etc., where shown on the drawings and where directed by the Engineer.

E-TENDER

Porous concrete shall be placed behind shuttering to form a vertical layer against the external face of foundations, etc. where shown on drawings and where directed by the Engineer.
The thickness of the horizontal, sloping and vertical layers shall not be less than that shown on the drawings.

The exposed faces, both horizontal and vertical, of the porous concrete shall be finished with a cement mortar seal, as specified in Clause PSG2.11.3, where reinforced concrete is to be cast against it.
The schedule rates for porous concrete shall include the cost of the mortar seal and steel float finish.
Porous concrete shall comprise water, cement, coarse aggregate and not more than 5 % by mass of fine sand. Every size of aggregate shall be a single size aggregate, graded in accordance with SABS 1083.

The voids ratio of porous concrete shall not be less than 27,5 %.

No-fines concrete shall be classified by the prefix NF and the size of the aggregate to be used. Class NF19 means a no-fines concrete with a 19 mm nominal size. The volume of aggregate per 50 kg of cement is to be as follows:

Class	Aggregate Size	Aggregate per 50kg cement	Minimum Average Strength of a set of three test cubes after 28 days (MPa)
NF38	38	0.33 m^3	5.5
NF19	19	0.30 m^3	5.5
NF13	13	0.27 m^3	5.5

Section 6.01 and Mixing **PSG 3.12.1 Batching**

The quantity of water to be added shall be just sufficient to form a smooth grout which will adhere to and coat completely each and every particle of aggregate, and which is just wet enough to ensure that at points of contact of aggregate the grout will run together to form a small fillet to bond the aggregate together. The mix shall contain no more than 20 liters of water per 50 kg of cement.

Mixing shall be carried out in an approved batch type mechanical mixer. The whole batch of aggregate together with half of the water shall be placed into the mixer and mixed together for at least half a minute. The cement, followed by the balance of water, shall subsequently be added and the mixing shall continue for at least 1,5 minutes or as much longer as is necessary to ensure that all aggregates are uniformly coated with cement grout.

Testing of porous concrete shall be carried out in accordance with test method 3 of BS 1881 Part 3 : 1970.

PSG 3.12.2 Placing E.210

The Engineer shall be timeously advised to enable him to inspect the excavations or form work before no-fines concrete is placed.

After the placing of the concrete has commenced, it shall be continued uninterrupted and may only be halted at the construction joints approved by the Engineer. Control shall be exercised to ensure that no placed green concrete lies for longer than 30 minutes before being covered with fresh concrete and that the concrete is placed in its final position within 20 minutes after the cement has been loaded into the mixer.

The concrete shall be worked sufficiently to ensure that it completely fills the space to be concreted and that adjacent aggregate particles are in contact with one another. Excessive tamping or ramming shall be avoided and under no circumstances shall the concrete be vibrated.

Section 6.02 PSG 3.12.3 Mortar seal over porous concrete

Where concrete is to be cast against previously cast porous concrete, the surface of the porous concrete shall be sealed with a 5 mm thick layer of mortar composed of one part normal Portland cement to two parts of fine aggregate by mass, trowelled on before screed to provide a dense, smooth, uniform plane surface without filling any of the internal voids of the porous concrete. The surface of the seal shall have a steel float finish.

PSG 3.12.4 Protection

All no-fines concrete shall be protected from the elements, particularly from strong wind, flowing water, damage to the surface and loss of moisture. Protection against loss of moisture shall be accomplished by one or more of the following methods :-

(a) Keeping form work in place.

(b) Covering exposed surfaces with sacking or other approved material that is kept continuously wet.

(c) Covering exposed surfaces with plastic sheeting.

Section 6.03 PSG 3.12.5 Sealing of surface of no-fines concrete

Where indicated on the drawings or instructed by the Engineer, the surface of the no-fines concrete shall be sealed with a layer of 1:8 cement mortar to prevent loss of moisture from the structural concrete.

This seal shall be placed after the no-fines concrete has hardened and must be leveled off to the same level as the top of the no-fines concrete.

PSG 3.13 Water tightness testing and cleaning (add the following sub-clause 5.5.11)

On completion of concreting and when the concrete has attained its required strength, all structures shall be tested for water tightness. As a result, structures shall not be backfilled until the water test has been successfully completed. No water is available on site and the contractor must make his own arrangements for water for water tight testing of all the structures.

E-TENDER

Each structure shall be filled with water and shall be allowed to stand for 48 hours. Thereafter the water level in the structure shall be monitored over a period of 10 days. The effects of evaporation shall be taken into account during this period. The structure will be deemed to have passed the test if it loses no more than 5mm of water after the drop due to evaporation is deducted.

Where there are visible signs of sweating, seepage or leakage, the affected areas shall be brought to standard. Where it is obvious that there is harmful leakage, the test shall be discontinued and the tank emptied without delay. The Contractor shall then, at his own expense, rectify the leak and re-test that tank. After the said tank has successfully passed the water tightness testing the tank shall be emptied again.

In order to conserve water, it shall be sequentially pumped from structure to structure as successful testing is completed. The rate tendered for testing shall include for the cost of testing as described above and the supply and operation of any pumping equipment required.

After the watertight test the water retaining structures shall be disinfected by applying water containing 20mg/liter free chlorine residual for a period of 24 hrs. The water retaining structures will not be accepted and cleaning of the water retaining structures have been passed by Engineer.

PSG 4 TOLERANCES (CLAUSE 6)

PSG 4.1 Permissible deviations (Sub-clause 6.2)

Add the following to the sub-clause:

The degrees of accuracy of construction shall be as follows:

(a) All structures (including water retaining structures) – Degree I accuracy.

(b) All weirs (concrete) and weir plates shall have a tolerance of +1/-1 mm

PSG 5 TESTING (CLAUSE 7)

PSG 5.1 Grouting (add the following new sub-clause 7.4)

The Contractor shall, where so ordered, carry out a site test for each grouting procedure and each grouting gang to be used. The tests shall be carried out on a dummy bedplate similar in configuration to that which is to be grouted, but not exceeding 1 m^2 in area unless otherwise ordered.
When the dummy bedplate is dismantled, the underside shall show a minimum grout contact area of 80 % with reasonably even distribution of the grout over the surface grouted except that, in the case of expanding grout, the minimum grout contact area shall be 95 %.
The test shall show evidence of good workmanship and materials and the results shall be to the satisfaction of the Engineer.
The Contractor shall, when so ordered, make standard test cubes from various grout mixtures and also subject them to compression tests to determine whether the specified strength has been achieved. E.210

E-TENDER

Test procedures shall comply with the relevant requirements of Sub-clause 7.2.1 to 7.2.3.

PSG 6 MEASUREMENT AND PAYMENT (CLAUSE 8)

PSG 6.1 Grouting / casting in of pipe specials (add the following sub-clause 8.10)

Add the following pay item:

Item:

Grouting / casting in of pipe pieces in the following diameter Unit: No

The rate shall include all labour, plant and material for the grouting/casting in of pipes of the above items as per PSG 2.6.4. The actual pipe/item to be cast in is measured elsewhere.

PSG 6.2 Step irons (add the following sub-clause 8.16)

Add the following pay items:

Item:

Step irons (Calcamite or similar approved) Unit : No

The rate shall cover all costs to supply and install the step iron. The rate shall include for the drilling into the concrete, supplying and installing chemical anchors as well as the setting out of the step irons in the correct position.

E-TENDER

PSHA SABS 1200 HA: STRUCTURAL STEELWORK (Sundry Items)

PSHA 1 MATERIALS (CLAUSE 3)

PSHA 1.1 Structural Steel (Clause 3.1)

Add the following to this clause:

All structural steelwork, including pipe supports and ladders will be to SANS 1421 Grade 300 W. The Contractor must allow in his rates to provide for shop details. Corrosion protection to be hot dipped galvanising to the requirements of EN 10240:1997 and SANS ISO 1461:1999 unless indicated differently.

All handrails and flooring, including supports and fasteners shall be manufactured from hot dipped galvanised mild steel to the requirements of EN 10240:1997 and SANS ISO 1461:1999 unless indicated differently.

PSHA 1.2 Bolts, Nuts and Washers (Clause 3.3)

Add the following:

All bolts, nuts and washers shall be AISI 316 stainless steel.

All sleeve anchors shall be AISI 316 stainless steel.

All fixings shall be AISI 316 stainless steel and this will also apply to any bought out item. An approved molybdenum disulphide anti seize compound shall be applied on all bolts and nuts.

PSHA 2 CONSTRUCTION (Clause 5)

Add the following:

All surfaces shall be abrasive blast cleaned to Swedish standard SIS 05 59 00 of 1967 to SA 2½ finish. The blast profile shall be between 40 and 70 microns.

PSHA 2.1 Holes for Fasteners (Clause 5.2.3)

Add the following to this clause:

Holes for holding-down bolts shall not be flame-cut.

PSHA 2.2 Welding (Sub-clause 5.2.4) (site welding)

Add the following to this clause:

E-TENDER

Manual flame-cutting is allowed only where authorised. Edges shall be grinded to be free of unevenness, defects and distortions.

Welding shall comply with SABS 044 Part III, SABS 044 Part iv and SABS 0162.

Welding shall be minimum grade B welding.

The qualification of welders shall be in accordance with the relevant clauses of the above standards, and specifically SABS 044 Part III and shall be Grade 1 welders. Grade 2 welders will be permitted only with the Engineers written approval.

The Contractor shall provide evidence, acceptable to the Engineer, that welding procedures and welders have been tested in accordance with the requirements of AWS D1.1-81.

No welding shall be permitted on site without the express approval of the Engineer, with the exception of those details shown on the drawings as Site Welded.

PSHA 2.3 Handrails (Clause 5.2.6)

Handrails shall be of the two rail type, ball and stanchion, top mounted, type Mentis MT 90 or similar approved.

Add the following:

Handrails and stanchions shall be hot dipped galvanised and painted to the following specification:

(a) Hot dip galvanise in accordance with Table 2 of SANS 763.

(b) Clean with Galvkleen or similar approved to achieve a water break free surface and allow to dry.

STEP	PREPARATION/COATING METHOD	Minimum dft (µm)
1	After hot-dip galvanizing, do not passivate.	
2	Coat epoxy primer (two part for HDG surfaces)	75
3	Coat polyurethane enamel (two part)	50
		Total = 125 µm

Where handrails are specified as stainless steel, the handrails shall be AISI 316 stainless steel.

Section 6.04 PSHA 2.4 Prefabricated open and chequer plate floors (clause 5.2.8 & 5.2.9)

Open grid steel covers and floor panels shall be pressure locked and welded as "Maclock" type

"Eggcrate" or similar approved. All span bars shall have a depth of 40mm and be of such a width and at such a spacing that the maximum deflection of any bar under a 10 kN/m^2 uniformly distributed load shall not exceed 1/360 of the clear span. Under no circumstances will cutting and welding be permitted on site.

Framing to open grid "Maclock" or "Eggcrate" covers or panels shall be assembled and welded to the detail as shown on the drawings.

E-TENDER

Chequer-plate flooring shall be of 6mm minimum thickness “treadplate” flooring or similar approved with raise 5-bar pattern and lifting key holes at each end of each plate.

Frames shall be angle and bar welded together and as detailed on the drawings.

Section 6.05 plate flooring (clause 8.3.4)	**PSHA 4.3**	**Open grid/chequer**

Replace sub-clause 8.3.4 with the following:

Item:

Open grid flooring

Supply and install HDG floor grating, bearer bar=40mm Unit: m^2

Supply and install cast-in HDG 45 x 45 x 5 mm angle support complete with fishtail lugs Unit: m

Add the following to the clause:

The open grid or chequer plate flooring covers or panels will be measured by area, and the unit rates will be held to include for all cutting, welding, galvanising, etc. The cast-in angle support will be measured separately per linear meter. This rate will include for installation, galvanising, fixing complete with cement mortar and/or bolts/fishtail lugs which may be required to secure the frame. The rate shall include for supply and installation.

E-TENDER

Section 6.06 PSLSABS 1200 L:
MEDIUM PRESSURE PIPELINE

PSL 1 SCOPE

All water pipelines in this contract shall be deemed to be medium pressure pipelines.

PSL 2 MATERIALS (CLAUSE 3)

PSL 2.1 General (Sub-clause 3.1)

Add the following to the sub-clause:

Pipes

All pipes shall be of class as indicated on the drawings. The corrosion protection to the flanged steel pipe material shall be either Epoxy Coated or Hot dipped galvanized to SABS specifications

PSL 2.2 Steel Pipes, Fittings and Specials (Sub-clause 3.4)

Add the following to 3.4:

a) Steel pipes with normal bore up to 150mm diameter shall be manufactured to conform to all the requirements of SANS 62 whereas steel piping of larger diameter shall be manufactured to conform to all the requirements of SANS 719.

b) BUTT WELD FITTINGS: Steel butt welding pipe fittings shall be to ANSI B 16.9, BS 1965 or BS 1640 of the same schedule as the piping or heavier. Butt weld fittings in stainless steel shall be to ASA B 36.19 for schedule 5S and 10S and ASA B 16.9 for schedule 40S and 80S. Alternatively, fittings may be to BS 1640

PSL 2.3 Other types of pipes (Sub-clause 3.7)

Add the following to 2.3:

a) PLASTIC PIPING: uPVC piping shall comply with the requirements of SANS 966 mark for pressure pipes and shall be fitted with spigot and socket joints with rubber sealing rings.

b) GRP PIPING: GRP piping shall comply with the requirements of SANS 1748 mark for pressure pipes and shall be fitted with suitable couplings where the GRP piping connects to non-GRP piping or equipment. Joints between GRP pipes shall be GRP couplings (Flowtite double bell coupling or equal approved). Above ground GRP pipes shall be coated with 300 microns of UV resistant polyurethane or equal supplier-recommended coating. GRP pipes cast into concrete shall comply with manufacturer guidelines on floatation. The GRP piping installation of GRP pipes larger than dia. 800 mm shall be done by (or under the supervision of) a specialist field technician endorsed or provided by the GRP pipe manufacturer. The GRP pipe manufacturer shall be ISO 9001:2015 certified.

E TENDER

E-TENDER

PSL 2.4 Isolating valves (Sub-clause 3.10)

Add the following to the sub-clause:

Except where otherwise specified, isolating valves shall be of the resilient seal gate type, with a nonrising spindle and shall be arranged for clockwise closing. All valves shall be standard coated and shall receive a final coat of light blue enamel paint after installation. All valves shall be flanged and drilled to the specification.

Materials shall comply to the following specifications:

Materials of Construction (minimum specifications)

Component	*Specification*
Body	Cast Iron to BS 1452 Gr 14
Bonnet	Cast Iron to BS 1452 Gr 14
Spindle seal housing	Cast Iron to BS 1452 Gr 14
Hand wheel	Cast Iron to BS 1452 Gr 14
Cap top	Cast Iron to BS 1452 Gr 14
Gate	Spheroidal Graphite Iron to BS 2789 Gr 17 covered with nit rile rubber
Spindle	EN57 Stainless Steel
Spindle seal “O” rings	Nit rile rubber
Seal housing “O” rings	Nit rile rubber
Seal bush “O” rings	Nit rile rubber
Wiper ring	Nit rile rubber
Seal housing	Nylon
Spindle nut	Bronze to SABS 200 Code 30

A copy of the relevant valve specification of the proposed valves shall be attached to this tender document.

PSL 2.4.1 Marking of valves

The design pressure in Megapascal (MPa) shall be engraved on the side of the valve where it is legible. Valves shall be marked with the item number of the schedules when delivered to site.

PSL 2.4.2 Handwheels and closure

Where handwheels are specified, edges shall be machined to a smooth surface. Wording "OPEN" and "CLOSE" will be casted into handwheels. Valves will close clockwise except where it is otherwise specified. Spindles will be of the non-rising type.

PSL 2.4.4 Protection of valves

Valves shall be painted externally with a zinc chromate primer according to SABS 679 Type 1. (Dry film thickness of 50 mnc) After installation damaged primer shall be made good with compatible primer in accordance with valve suppliers specifications.

Subsequently to making good of the primer the valve shall be painted with two layers of alkide based enamel according to SABS 630 Grade 1 (dry film thickness of 250 micro meter per layer) to match the colour of adjoining pipe work.

PSL 2.4.5 Handling, delivery and installation

All valves and related items shall be handled with the necessary care throughout all processes of manufacture, testing, delivery and installation. Valves furnished with lifting eyes shall be handled only by those eyes and other valves shall be handled solely with slings that will cause no damage.
In particular the inlet and escape orifices of air valves and special valves shall be effectively sealed after manufacture until completion of installation and this sealing shall be examined regularly to ensure that it is still effective.

Valves shall be effectively supported, packed or fastened down for transporting and care taken to avoid valves knocking together during transport.

Valves shall be stored in a safe place above ground and shall be protected against the ingress of foreign matter.

PSL 2.5 Fittings (Sub-clause 3.12)

Add the following sub-clause:

Generally all special fittings are to be manufactured in mild steel as applicable. No aluminum fitting shall be permitted. Fittings shall be compatible in respect of working and test pressure to those of the pipelines.

PSL 3 CONSTRUCTION

E-TENDER

PSL 3.1 Laying Depths and Cover (Sub-clause 5.1.4)

Add the following to sub-clause 5.1.4.1:

Water mains shall be laid to follow the grades of the existing adjoining roads, except where otherwise instructed by the Engineer. The depth from finished sidewalk level to the top of the pipe barrel shall be as follows, except where otherwise directed:

a) on sidewalks = 900 mm

b) below carriageways = 1 000 mm

c) outside road reserves = 900 mm

PSL 3.2 Jointing Methods (Sub-clause 5.2)

Notwithstanding the provisions of sub-clause 5.2 of SANS 1200L, jointing of pipes and specials of all diameters shall be as follows:-

i. uPVC pipes - by rubber ring spigot and socket.

ii. Steel pipes - by welding except where pipes are connected to flanged fittings or elsewhere as shown on the drawings or as instructed by the Engineer.

iii. GRP pipes – by coupling (Flowtite double bell coupling or equal approved) except where stainless steel and GRP pipes are connected using flanges or elsewhere as shown on the drawings or as instructed by the Engineer. Anchors for above ground pipe shall be designed as cradles with high friction cradle liners and a pretensioned steel clamp pressing the pipe against the cradle. The pretension of the clamp shall be sufficient to prevent the pipe from moving in the cradle. The clamp shall allow for thermal expansion of the GRP pipe.

iv. Steel pipes shall connect to uPVC and GRP pipes using a steel flange adaptor or couplings. All pipes and fittings shall be suitable for a test pressure of 1200kPa.

PSL 3.3 Anchor / thrust blocks and pedestals (Sub-clause 5.5)

Add the following to the sub-clause:

Dimensions of all anchor / thrust blocks shall be supplied by the Engineer as and when required. The Contractor shall request such information not less than 14 seven calendar days in advance.

PSL 3.4 Crossing existing services (Sub-clause 5.1.4.3)

There will be existing services that will be crossed. Generally these areas can be identified and careful hand excavation will be required to expose these services.

E-TENDER

PSL 3.5 Pipe laying personnel (Sub-clause 5.1.1)

The laying of pipes and ancillary fittings shall be performed only by a qualified person who is registered as an artisan in the pipe fitting or drain laying trades, or is qualified by reason of having attended and passed the course on pipe laying of the Civil Engineering Industry Training Board.

PSL 3.6 Steel pipes, specials and fittings scope

This specification covers the manufacture, corrosion protection, delivery, erection, installation, making good of corrosion protection as well as over-coating as may be required, site-testing and commissioning of steel pipes, specials and fittings mostly for the conveyance of water, but also for air, at normal ambient temperatures between 5ºC and +70ºC.

PSL 3.6.1 Manufacture of steel pipes

Steel pipes with normal bore up to 150mm diameter shall be manufactured to conform to all the requirements of SABS 62 whereas steel piping of larger diameter shall be manufactured to conform to all the requirements of SABS 719, all as may be amplified or amended below.
The requirements regarding pipe sizes and grades, wall thicknesses, pipe lengths and pipe and requirements are specified in the Pipe Schedule and / or stated in the Schedule of Quantities.

The following minimum wall thicknesses shall apply:

External Diameter (mm)	Minimum wall thickness (mm)
168 – 406	4,5mm
419 – 508	5,9mm
570 – 864	6,0mm

With regard to Sub-clause 4.2.2.1 in SABS 719 the Contractor shall, before commencing with pipe manufacture, satisfy the Engineer that the welding methods to be used in the pipe manufacture are adequate by:

a. The preparation of a weld sample employing precisely the same welding process, equipment and artisans by which the pipe shall be manufactured.

b. The preparation and destructive testing of the sample in (a) above, as laid down in Clause 7.2 of SABS 719.

The results of the tests on the test pieces shall comply with the requirements of Clause 7.2 of SABS 719 in all aspects.

Such destructive testing shall be carried out for each grade of steel and for each thickness of steel in that grade.

With regard to sub-clause 4.2.2.2 and 4.2.2.3 in SABS 719 the height of the inner weld reinforcement shall not exceed 1mm.

E-TENDER

specials

Only pipe conforming to the requirements of Clause PSL 3.5.1 above, may be used for the manufacture of pipe specials.

For pipes of nominal bore, up to 150mm diameter T-pieces shall be heavy class pipe only, with the same wall thickness for both main and branch pipes. The manufacturing process and quality requirements are as specified in the relevant section of BS 806 (Section 3).

Dimensions and joint types for pipes specials are specified in the Pipe Schedule and / or stated in the Schedule of Quantities.

Welding shall be done by a welder holding a valid competence certificate (Grade 1) in terms of SABS 044 – Part V. Butt-welded joints shall conform to the requirements for welding for pipes, and the Contractor shall prove all butt and fillet welded joints to be crack-free by carrying out dye penetrant tests, following the procedure laid down in BS 4416.

If at all practicable, pipe specials shall be subjected to hydraulic pressure tests as specified. Where this is not feasible, butt-welds must be subjected to radiographic inspection over their full length, with inspection procedure and acceptability limits for defects as specified in API 1104, keeping a record of all weld inspection and repair.

Where working pressures allow the use of malleable cast iron fittings for nominal bore up to 150mm diameter, these shall conform to the requirements of SABS 509.

Section 6.08 jointing **PSL 3.6.3** **Pipe flanges, bolts and**

PSL 3.6.3.1 Material and dimensions for flanges

The requirements for the materials and dimensions for flanges are in all respects as specified in SABS 1123.

A raised joint face shall be provided on all flanges of pressure rating higher than 2,5 MPa unless otherwise agreed to by the Engineer or as stated in the Schedule of Quantities, and the backs of cast of forged flanges shall be machined.

The machined surfaces of flanges shall be covered immediately after machining by a temporary rust preventative film of a suitable type as specified in BS 1133 (Section 6).

All flanges shall be drilled to SABS 1123 (Table 1600/3) or otherwise to the class as stated in the Schedule of Quantities or on drawings.

PSL 3.6.3.2 Welding on of flanges

The procedure for the welding-on of flanges, shall comply with the requirements of BS 806 (Section 3).
The proficiency of the welder and the quality requirements for the weld are the same as those specified in Clause PSL 3.6.3 above.

As a rule, the bolt holes in flanges for pipe specials shall not be on the vertical centre line.

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TENDER

When so specified in the Schedule of Quantities, flanged pipes shall be hydraulically tested after the welding-on of the flanges to a test pressure of 1,5 times the pressure rating of the respective flange.

PSL 3.6.4 Bolts

Materials and dimensional requirements of bolts and nuts are specified in SABS 135 or 136. These requirements shall correspondingly be prescribed by the Contractor when ordering.

The threaded length shall be adequate to allow two full threads to protrude beyond the nut after the latter is fully tightened.

Each bolt shall be fitted with a nut and steel washer and bolts, nuts and washers shall be cadmium plated in accordance with and to a thickness specified for Class A in BS 1706.

Unless otherwise indicated in the Pipe Schedule, the number of bolts to be supplied shall be determined on the basis that each flange is to be supplied with half the number of bolts required for that flange.

PSL 3.6.5 Jointing

Gaskets for flanges shall be recommended by the Contractor's supplier and shall be submitted to the Employer's Agent for approval.

PSL 3.6.6 Pipe joints and coupling other than flanges

Pipe ends shall be prepared for the type of jointing and coupling as specified in the pipe schedule and / or stated in the Schedule of Quantities with the requirements for and preparations as specified in SABS 62 and 719 as applicable.

Standard couplings and flange adapters shall be of the Viking Johnson type or equivalent and all loose bolts with nuts and washers shall be cadmium plated in accordance with and to a thickness specified for Class A in BS 1706 and shall be lined and coated as specified in Clause PSL 3.6.8 below.

PSL 3.6.7 Lining and coating of steel pipes, specials and fittings

All pipes, specials and fittings, including couplings and flange adapters, shall be fully lined and coated by fusion bonded epoxy on the outside and liquid epoxy on the inside with a minimum of three coats to a minimum total dry film thickness of 400 micrometres on a steel surface that has been prepared by sandblasting to Grade SA 2.5 as specified in SIS 055900, with a delay of not more than four hours between sandblasting and the application of the first paint coat.
Successive paint coats shall be of different colours, and the colour of the final coat shall be approved by the Engineer prior to painting. Over-coating time between the applications of successive coats shall not exceed 24 hours.

E-TENDER

The epoxy product and process shall be presented to the engineer prior to the ordering of any pipe fittings applicable.

The coating and lining applied shall be as per the Standard Specification DWS 9900 Section C1 unless specified otherwise in the text above. The Specification is attached under C5 Annexures.

Tape wrapping

All underground steel pipes joints (flanged, flexible coupling, etc.) shall be tape wrapped in accordance with this specification. No additional payment shall be made as the rate for the coupling shall include for the tape wrapping.

External steel pipe coating and wrapping specification:

A Denso Corroklad 750 tape or equivalent should be applied to the external surface of the steel pipeline.

The tape consists essentially of a specially formulated polyethylene film laminated to a pressure sensitive, non-hardening thermoplastic adhesive. The adhesive layer is generally one and a half times thicker than the polyethylene film.

The composite wrapping system provides a durable impact and cut resistant rockshiled for normal and rugged service conditions.

Technical Data

The following information pertains to the Corroklad 750 tape:

- The base layer is made of polyethylene and is 0,3mm thick.
- The adhesive layer consists of rubber modified bitumen and is 0,45mm thick.
- The product thickness is 0,75mm.
- The tape has a minimum tensile strength of 15 MPa.
- The minimum elongation at failure is 300%.
- The adhesive and peel strength of the tape at 25°C is 2,2N/mm and 1,65N/mm respectively.
- The minimum dielectric strength of the tape is 25 KV.
- Cathodic disbondment by ASTM G8 Method B is 425mm². The service temperature of the tape is –10°C to 65°C.

Application Procedure

Corroklad tape can be successfully wrapped by hand (maximum tape width 100mm) and by machine. The general application is detailed below.

Surface Preparation	E.210

- All dirt, loose ruste/mill scale and grease must be removed from the pipe surface.

E-TENDER

- The minimum surface preparation acceptable for tape wrapping with Corroklad is ST2 (Swedish Standard SIS 055900-1967, Mechanical wire brushing).

Priming the Pipe Surface

- The primer to be used is Denso Primer D or equivalent Polymer Bitumen Solution, and is to be applied by means of a medium pressure cop gun.
- The primer may be thinned for application with white spirits or toluene.
- The primer should nominally cover 9m² liter.
- The minimum drying period at 20°C is 20 minutes.
- The flash point occurs above 23°C.
- If the pipes are prepared and primed off site, it may be necessary to apply a second coat of primer on site in order to rejuvenate the first application. This is only required if the pipe is being wrapped on site.
- The primer should be dust free prior to the application of the tape wrap system. Should the primer be contaminated, the surface must be reprimed.
- The primer should be allowed to dry for approximately 30 minutes at 20°C to 25°C prior to the application of the tape system.

Tape Application

- The Corroklad tape or equivalent should be spirally wrapped onto the primed pipe, utilising a 55% overlap.
  55% Overlap will ensure a minimum of two layers of tape at any point.
- Ensure that a constant web tension of 10 to 15kg/100mm is maintained during wrapping.
- At no time is the shrinkage of the total width of tape to exceed 2%.

Pipe Handling

 Non-metallic slings are to be utilised when handling the wrapped pipe sections or pipe, in order to ensure that no mechanical damage occurs to the tape.

Section 6.09 PSL 3.6.8 Making good and over-coating of steel pipes, specials and fittings

PSL 3.6.8.1 Steel pipes, specials and fittings

After erection, all damage to the Epoxy coatings or Linings, shall be made good strictly in accordance with The DWS 9900 Specification which is attached under C5 Annexures.

PSL 3.6.8.2 Handling, delivery and installation

All pipes, pipe specials and fittings shall be handled throughout the processes of manufacturing, corrosion protection, delivery and installation with all care necessary to prevent any damage.

After the corrosion protection of the outside of pipes and specials has been carried out, these items must be handled only by means of straps that will in no way damage the protection.

After completion of corrosion protection at the place of manufacture, all pipe ends shall be effectively closed off by at least a sheet of plastic held fast to the pipe and by binding wire.

E-TENDER

This seal shall be checked specifically during delivery and after off-loading on site to confirm that it is still fully effective and shall immediately be repaired or replaced if damaged. Should there be the slightest danger of the ingress of foreign matter into the pipework during installation, the ends shall be kept sealed off all the time.

Pipes shall be supported during travelling on shaped and padded cradles while pipe specials shall be adequately supported and separated from each other to prevent any damage.
Steel pipes will only be offloaded with the aid od a spreader boom of 6m length to spread the point load and minimize the deflection in the pipe.

At the delivery points on site, pipes, pipe specials and fittings shall be supported by plastic sandbags of sufficient strength, such that the under sides of the pipes and pipe specials are at least 200mm off the ground. The number and positioning of supports under the pipes, shall be such as to prevent any undue pipe deflection.

Bolts, nuts, washers and jointing, shall be packed in strong metal or wooden containers with effective lids, with each different sizes of bolts grouped separately in hessian bags all clearly labelled as to their contents.

Pipe work shall be securely clamped in its final position by means of galvanised fittings.

PSL 3.7 Flexible couplings at structures

Flexible couplings shall be provided at the point where pipelines enter all structures.

PSL 3.8 Valves (Sub-clause 3.10)

PSL 3.8.1 Scope

This specification covers the requirements for material, manufacture, delivery, installation, overcoating as may be required, site-testing and commissioning for gate valves for use in pipe work, mainly for the delivery of raw and purified water, but also for air supply, at ambient temperatures up to 70°C.

PSL 3.9 Testing of pipelines (Sub-clause 7.3)

PSL 3.9.1 Test pressure (Sub-clause 7.3.1(a))

Replace the Sub-clause 7.3.1 with the following:
All pipes shall be tested at 1.25 the working pressure at the specific point where the pressure test be executed. The Contractor shall identify the points on the pipeline where the hydrostatic pressure test be executed and shall notify the Engineer in advance in order for the Engineer to be able to furnish the Contractor with the required test pressure at the specific test point.

PSL 3.9.2 Method of testing (Sub-clause 7.3.1(b))

Add the following new clauses: E.210

a) The Contractor shall provide an approved test pump, an accurate water meter, sealed pressure gauge, tested and certified by an independent testing organisation, and all other equipment, materials and labour required for the test.

b) The section of pipeline to be tested shall be clean and closed off at the ends by isolating valves, end caps or approved end-closure pieces

c) During the initial filling stage, the pipe section joints and all specials, fittings and valves shall be visually inspected for visible leaks and same rectified before proceeding with the test.

d) The pressure shall be maintained for one hour and if a pressure drop occurs, more water shall be added to reinstate the test pressure and the valve closed again. The quantity of water added shall be measured by recording the readings before and after pumping. This procedure shall be repeated for a period of 24 hours, with water added at hourly intervals where necessary to reinstate pressure and water meter reading recorded. At the end of the 24 hour period, the aggregate quantity of water required to reinstate pressure over 24 hours shall be determined.

e) The Contractor shall give the Engineer 48 hours written notice of his intention to commence pressure testing and the Engineer may attend and supervise all or any part of tests. All records and recording charts shall be handed to the Engineer as soon as tests over any section have been completed.

f) All valves, specials, fittings and exposed joints, shall be inspected visually during the 24 hours pipeline test and all visible signs of leaks, sweating and distress shall be reported and attended to without delay.

g) Immediately after completion of the prescribed 24 hours hydrostatic test, all air valves shall be tested in turn before test pressure in the pipeline is released. Each air valve shall be isolated and the drain plug removed. The air valve shall work freely without restraint. The isolating valve shall be checked for leakage before replacing the plug. Finally, the automatic resealing of the air valves shall be checked by re-opening the isolating valve.

h) After completion of tests on air valves, the section of pipeline under test shall be completely refilled with water, if necessary, and pressured to the static head shown on the drawings or indicated by the Engineer. Each scour valve shall be checked by opening isolating valves where applicable for a duration sufficient to check the complete opening and closing cycles. If necessary, the pipeline shall be refilled after each individual test and re-pressurised to the prescribed static pipeline head in order to test all scours within the section under test.

PSL 3.9.3 Remedial measures (Sub-clause 7.3.1 (c))

Add the following new clauses:

a) Should the maximum leakage limits as specified be exceeded, the Contractor shall determine the position and cause of the leaks and shall take remedial measures at his own expense and to the satisfaction of the Engineer to stop such leaks and ensure the specified degree of water tightness.

TENDER

b) If during the contract period of maintenance, the number of leaks and other defects is considered by the Engineer to be more than could reasonably be expected from a well laid pipeline operating under normal conditions, he may order the Contractor to re-test parts or the whole of the pipeline at the Contractor's own expense and no claims for escalation in costs or for whatever other reasons the Contractor might consider to submit claims shall be considered, except where such re-tests are the result from damages caused to the pipeline by the Employer."

PSL 3.10 Concrete work (Sub-clause 5.13)

Add sub-clause 5.13 as follows:

Section 6.10 pipe work	**PSL 3.10.1 Encased**

a) Where pipes and / or specials are permanently encased in concrete, e.g. in thrust blocks, walls of concrete valve chambers, stream crossings, etc., the coating over the portion to be so encased shall be to the same standard as the rest of the pipeline, except where indicated to the contrary in the Schedule of Quantities or on the drawings.

b) Whenever it is necessary to encase pipes in concrete, the flexible joints shall not be encased and the concrete shall terminate 300 mm from the flexible joint.

c) All specials encased in concrete shall be painted with one coat of bitumen primer and two coats of bit mastic paint to a dry film thickness of 180 micrometers.

PSL 3.10.2 Brickwork (Sub-clause 5.14)

Add sub-clause 5.14 as follows:

a) Brickwork is to be built to the dimensions, thicknesses and heights as shown on the drawings.

b) All exposed brickwork shall be plastered and shall have joints raked out to a depth of 12 mm to ensure good plaster fond.

c) Mortar shall consist of one part cement to four parts approved sand by volume and shall be used within one hour of mixing.

d) Brickwork shall be built in stretcher bond and all common bricks shall be well wetted before being laid.

PSL 4 MEASUREMENT AND PAYMENT

PSL 4.1 Steel specials and fittings (sub-clause 8.2.1)

Add the following clause to the payment item:

E-TENDER

The rate shall also cover the cost of the coating and lining as specified in this contract as well as repairing or making good damaged coatings and linings on site.

PSL 4.2 Steel specials and fittings (sub-clause 8.2.2)

Add the following payment item:

Item:

Fabrication, supply, transport and install and test the following pipe fittings. All items to be approved by Engineer prior to ordering. Unit: number (no)

The unit of measurement for payment for the manufacture, corrosion protection and final over-coating as may be required, delivery, installation of pipes, site-testing and commissioning of pipes, pipe specials and fittings conforming with this Specification shall be measured by number for each type, class and size as stated in the Schedule of Quantities.
The rates tendered and paid for valves and fittings must include the cost of the provision of an approved coating and the cost of any additional couplings other than those listed in the Schedule of Quantities to connect to the water mains.

All adapters and distance pieces required for the extension to the specified level and length as shown on the drawings for air and scour valves must be included in the rates for the units. All underground pipe fittings shall be wrapped in an approved isolating material as specified in PSL 3.5.7
The cost of providing couplings, cutting pieces, etc. shall be allowed for in the rate tendered for pipe work.

PSL 4.3 Reinstate Road Surface

Add the following payment item:

Item:

Reinstate road surface as per detail drawings:

a) Cut and remove existing gravel layer in windrow and stockpile Unit: m^3

b) Reinstate existing gravel layers to original state (98% MAMDD) Unit: m^3

The above item covers the complete repair of the road surface where the pipeline trench exaction is required over an existing gravel or surfaced road. The rate shall cover all materials, plant, watering, stabilizing, labour and tests to repair the road surface and related layer works back to its original state.

PSLB SABS 1200 LB: BEDDING (PIPES)

E.210

E-TENDER

PSLB 1 MATERIALS

PSLB 1.1 Selected granular material (Sub clause 3.1)

Add the following to this sub-clause:

Granular materials shall be selected from trench excavations. If the contractor elects not to apply selection of material from excavations, he shall provide suitable material from any other approved source at his own expense.

Bedding material shall be either of the following type:

a) Type A : Finally graded, composed of material with the following properties:

i) Percentage by mass passing:

4,75 mm screen - 100 %
0,425 mm screen - 80 to 100 %
0,002 mm screen - 0 to 45 %

ii) Liquid limit (LL) as determined in accordance with SABS Method 852 shall not be more
than 15, when performed on all the material passing the 0,425 mm sieve.

iii) Plasticity index (PI) as determined in accordance with SABS Method 852 shall not be more than 15, when performed on all the material passing the 0,425 mm sieve.

iv) Linear shrinkage (LS) as determined in accordance with SABS Method 853 shall not exceed 5 %, when performed on all the material passing the 0,425 mm sieve.

dium graded, composed of material with the following properties:

Percentage by mass passing:

4,75 mm screen - 80 to 100 %
0,425 mm screen - 60 to 80 %
0,002 mm screen - 0 to 40 %

LL) as determined in accordance with SABS Method 852 shall not be more than 35 %, ned on all the material passing the 0,425 mm sieve.

ex (PI) as determined in accordance with SABS Method 852 shall not be more than rformed on all the material passing the 0,425 mm sieve.

:age (LS) as determined in accordance with SABS Method 853 shall not exceed 7 %, ned on all the material passing the 0,425 mm sieve.

E-TENDER

c) Type C : Granular, composed of material with the following properties:

i) Percentage by mass passing:

9,5 mm screen - 100 %
4,75 mm screen - 70 to 100 %
0,425 mm screen - 30 to 60 %
0,002 mm screen - 0 to 45 %

ii) Liquid limit (LL) as determined in accordance with SABS Method 852 shall not be more than 40 %, when performed on all the material passing the 0,425 mm sieve. iii) Plasticity index (PI) as determined in accordance with SABS Method 852 shall not be more than 20, when performed on all the material passing the 0,425 mm sieve.

iv) Linear shrinkage (LS) as determined in accordance with SABS Method 853 shall not exceed 10 %, when performed on all the material passing the 0,425 mm sieve.

Items a), b) and c) are conveniently summarised in the following table:

Material	PERCENTAGE BY MASS PASSING SCREENS				ATTERBERG LIMITS SHALL NOT EXCEED		
	9,5 mm	4,75 mm	0,425 mm	0,002 mm	Liquid Limit (LL) %	Plasticity Index (PI)	Linear Shrinkage (LS) %
Finely graded / A	100	100	80 - 100	0 - 45	30	15	5
Medium graded / B	100	80 - 100	60 - 80	0 - 40	35	18	7,5
Granular / C	100	70 - 100	30 - 60	0 - 35	40	20	10

SLB 1.<u>Bedding</u> (Sub-clause 3.3)

Add the following to this sub-clause:

All steel pipes in the works shall be classed as “rigid” with flanged joints and shall be bedded on Class C bedding as described in sub-clause 5.2 of SABS 1200 LB, unless otherwise specified or instructed by the Engineer.

PSLB<u>Backfilling of pipe trenches</u> (Sub-clause3.5)
1.3

Add sub-clause 3.5 as follows:

E-TENDER

No backfilling of pipe trenches on top of the selected fill layer may commence without the written consent of the Engineer or his Representative.

PSLBCONSTRUCTION 2

PSLB2.1 Waterlogged trench bottoms (Sub-clause 5.5)

Add sub-clause 5.5 as follows:

a) Where trench bottoms are too soft and waterlogged to permit placement and compaction of bedding material in the normal manner, such trench bottoms shall be excavated to a depth of at least 300 mm below the underside of pipes and specials for the full width and length of the trench affected.

b) The full width and length of the trench bottom and at least 500 mm height of both sides of trench walls shall be covered by an unwoven approved geotextile, similar to Kaymat U24.

The full width and length of the trench shall thereupon be covered by a 300 mm thick layer of coarse gravel, coarse sand or 19 mm nominal size crushed stone, fully compacted within the confines of the geotextile to take the mass of the pipe filled with water and all loads on the pipe without settlement.

The free drainage layer shall be covered over the full width of the trench by a single layer of geotextile with the cloth on trench walls folded over and overlapping to completely seal off the free drainage layer against ingress of sand or fine soil particle.

Pipes shall be laid directly on the bed prepared as above and pipe bedding and selected backfill completed as specified.
contract".

B1231 COMMUNITY LIAISON OFFICER (CLO)

The contractor or his appointed agent will appoint a Community Liaison Officer (CLO) after consultation with the local communities, the engineer and the employer. The contractor shall direct all his liaison efforts with the local communities through the appointed officer. The contractor shall, however, accept the appointed as part of his management personnel.

Duties of the Community Liaison Officer

The Community Liaison Officer's duties will be:

To be available on site daily between the hours of 07h00 and 17h00 and at other times as the need arises.

To determine, in consultation with the contractor, the needs of the temporary labour for relevant skills training. He will be responsible for the identification of suitable trainees and will attend one of each of the training sessions.

E1210

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To communicate daily with the contractor and the engineer to determine the labour requirements with regard to numbers and skill, to facilitate in labour disputes and to assist in their resolution.

To assist in and facilitate in the recruitment of suitable temporary labour and the establishment of a “labour desk”.

To attend all meetings in which the community and/or labour are present or are required to be represented.

To assist in the identification, and screening of labourers from the community in accordance with the contractor’s requirements.

To inform temporary labour of their conditions of temporary employment and to inform temporary labourers as early as possible when their period of employment will be terminated.

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To attend disciplinary proceedings to ensure that hearings are fair and reasonable.

To keep a daily written record of his interviews and community liaison.

To attend monthly site meetings to report on labour and RDP matters.

All such other duties as agreed upon between all parties concerned.

To submit monthly returns regarding community liaison as illustrated in Part C5.1 of this document (form RDP 12(E)).

Payment for the community liaison officer

A special pay item is incorporated in section 1200 of the bill of quantities relating to payment of the liaison officer on a prime cost sum basis. This payment shall only be made for the period for which the duties of the liaison officer are required and not necessarily for the full duration of the contract. The remuneration of the CLO shall be determined Employer with a minimum salary of R 3,000.00 per month.

Period of employment of the community liaison officer

The period of employment of the community liaison officer shall be as decided upon jointly by the contractor, engineer and employer at a maximum period of a six months basis, but with the option of renewal.

B1232 SUBCONTRACTORS

Over and above the stipulations of clause 8 of the General Conditions of Contract 1998, regarding subletting of part of the works, it is a condition of the contract that an approved subcontractor shall not sublet part of his work, covered in his appointment by the main contractor, to another subcontractor without the consent and approval of the engineer. Subletting shall in all cases be critically considered by the engineer.

In addition to the provisions of clause 8 of the general conditions of contract regarding subcontracting of the works, it is a requirement of this contract that an approved subcontractor shall not further subcontract work subcontracted to him by the main contractor, to another subcontractor without the consent and approval of the engineer. Subcontracting shall in all cases be critically considered by the engineer. The engineer reserves the right to limit the extent or the volume of work subcontracted by the contractor, should he deem it necessary in terms of progress or quality of workmanship.

B1233 WORKMEN'S COMPENSATION ACT

All labour employed on the site shall be covered by the Compensation for Occupational Injuries and Deceases Act (COIDA). The contractor shall pay in full, including the payment of the necessary levies, such amounts, as are due in terms of the Act. The contractor at the commencement of the contract shall resolve the manner in which Workmen's Compensation will be handled.

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Amounts paid by the contractor shall not be included in the wage rates but shall be covered by the Contractor to be deemed as included in his General Obligations rates in Section 1300 of the Bill of Quantities.

Add the following clause:

B1234 MINE HEALTH AND SAFETY ACT 1996, ACT 29 OF 1996

Introduction

The main objective of this Act is to protect the health and safety of persons at mines. This specification is therefore aimed at promoting health and safety specifically at borrow pits. Borrow pits are classified as mines.

General Provisions

The contractor shall be responsible for controlling his operations at every borrow pit where material is being excavated to ensure compliance with all the requirements of the Mine Health and Safety Act, 1996. The contractor shall also ensure that the works, shaping and finishing off of the borrow pit are done in accordance with the provisions as specified in section 3100 of the COLTO Standard Specifications and this Act. The contractor shall also comply to the requirements as set out in C3.4.3.2 Environmental Management Plan.

The minimum requirements for operations at borrow pits are:

Borrow pits are worked in such a way that the health and safety of employees and the public will not be endangered.

A monthly report shall be submitted to the engineer on health and safety aspects at the borrow pits.

The contractor shall appoint a manager to manage the borrow pits in accordance with the Mine Health and Safety Act.

The contractor shall take the necessary steps to ensure that the work area of the borrow pits are safe at all times. This shall include items such as the provision of fencing and security guards.

Duties of the Manager

The minimum duties of the manager supervising the activities at borrow pits shall be:

Maintain a healthy and safe borrow pit environment.
Identify hazards and related risks to which persons and employees are exposed.

Establish a health and safety policy that

Describes the organization of work.

Contains aspects concerning the protection of the employees and other persons' health and safety.

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Contains a risk analysis.
Supply and erect the necessary safety and warning signs.

Add the following pay items and change the clause number.

B12.35 MEASUREMENT AND PAYMENT

Add the following items:

"ITEM			**UNIT**
B12.01	**Excavation**		
	Excavating material within the following depth ranges below ground level for the exposing of/or searching for services		
	(a)	0m to 2m	
		(i) soft material	cubic metre (m^3)
		(ii) hard material	cubic metre (m^3)
	(b)	Extra over item B12.01(a) for excavation by means of hand tools such as picks, crowbars and pneumatic tools or mechanical breakers in close vicinity of services where no machine excavation is permitted	
		(i) soft material	cubic metre (m^3)
		(ii) hard material	cubic metre (m^3)

Measurement and payment shall be as specified for item 22.01 in the standard specifications.

ITEM			**UNIT**
B12.02	**Backfilling**		
	(a)	Using the excavated material	cubic metre (m^3)
	(b)	Using imported selected material	cubic metre (m^3)

Measurement and payment shall be as specified for item 22.02 in the standard specifications.

ITEM			**UNIT**
B12.03	(a)	Allow a provisional sum for existing services to be relocated and/or protected as ordered by the engineer	provisional sum
	(b)	Handling costs and profit in respect of sub item B12.03(a) above	percentage (%)

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Measurement and payment shall be in accordance with the general conditions of contract."

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ITEM	UNIT

B12.04 Provision for a Community Liaison Officer

Provisional sum for the payment of the Community

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Liaison Officer Provisional Sum
Handling costs and profit in respect of sub-item
B12.04(a) Percentage (%)

Expenditure of the above item shall be made in accordance with the general conditions of contract.

The tendered percentage is a percentage of the amount actually spent under the sub-item B12.04 (a), which shall include full compensation for the handling costs of the contractor, and the profit in connection with providing the community liaison officer."

ITEM			**UNIT**
B12.05	(a)	Mine Health and Safety obligations	Month
	(b)	Special information signs	Prime Cost Sum (PC Sum)
	(c)	Provision of security guards	Prime Cost Sum (PC Sum)
	(d)	Handling cost and profit in respect of sub-item B12.05(b) and (c)	Percentage (%)

Payment of the rate per month for sub-item B12.05(a) shall include full compensation for all the contractors obligations relevant to the Mine Health and Safety Act.

The prime cost sums shall be paid in accordance with the provisions of the General Conditions of Contract. The tendered percentage is a percentage of the amount actually spent under the prime cost items, which shall include full compensation for the profit in connection with providing the specified service.

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SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

B1302 GENERAL REQUIREMENTS

Camps, constructional plant and testing facilities

"The contractor shall, at each area where work is being undertaken, provide on a daily basis at least one (1) portable chemical latrine unit per thirty (30) workers for use by construction workers employed on the project. The latrine units shall be serviced daily and kept in a hygienic and orderly state to the satisfaction of the engineer. No separate payment shall be made for this requirement and shall be deemed to be included in the rates tendered for the contractor's time-related obligations."

B1303 PAYMENT

ITEM		UNIT
B13.01	**The contractor's general obligations**	(As specified)

"The combined total tendered for sub-items (a), (b) and (c) shall not exceed 15% of the tender sum, excluding VAT.

Should the contractor be of the opinion that 15% is inadequate to cover his costs in terms of section 1300, he shall indicate separately with his tender where such costs have been allowed for in his tender. If no such indication is given, the contractor shall not at any stage during the contract for any reason whatsoever claim additional compensation under this item."

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SECTION 1400: HOUSING, OFFICES AND LABORATORIES FOR THE ENGINEER'S SITE PERSONNEL

B1402 OFFICES AND LABORATORIES

General

Add the following:

"The facilities to be provided for the engineer in terms of these specifications shall be fenced off by a two metre high veranda type security fence with diamond mesh on the vertical portion and barbed wire on the overhang. A security gate shall be provided in the fence which shall be guarded at all times by an acceptable watchman provided by the contractor.

The engineer's establishment may be incorporated within the contractor's establishment provided that the preceding requirements are met to the satisfaction of the engineer.

Separate payment shall be made for the provision and erecting of the security fence and gate as indicated on the drawings, but the cost in respect of the provision of a watchman at all times by the contractor shall be deemed to be included in the contractor's tendered rate for item B13.01(c)."

Offices

Add the following new sub-sub-clause:

"(xviii) The engineer's site supervisory staff shall be provided with cellular telephones by the contractor for site communication purposes. Provision is made in the bill of quantities for separate payment of the supply and operating costs of such cellular phones."

B1403 HOUSING

Rented accommodation Add the

following:

"The engineer may arrange for the obtaining of rented accommodation for his supervisory personnel on site. Payment of such rent shall be made under the provisional sum in sub-item 14.07(a) and shall be expended on a monthly basis by the contractor as ordered by the engineer."

B1406 MEASUREMENT AND PAYMENT

Add the following sub-item:

ITEM		UNIT
B1403 (b) (ix)	1. Provision of cellular telephones	Number (No)
	2. Provisional sum for the costs of cellular calls	

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and other charges Provisional sum

3. Handling cost and profit in respect of

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sub-item B14.03(b)(ix) 2 Percentage (%)

The unit of measurement for sub-sub-item B14.03 (b) (ix)1 shall be the number of cellular telephones supplied to the engineer's site supervisory staff. The tendered rate shall include full compensation for the purchasing of the cellular phones inclusive of any fixed contract costs with the service provider."

Measurement and payment in respect of the provisional sum item shall be made in accordance with the provisions of the general conditions of contract.

The tendered percentage is a percentage of the amount actually spent under sub-item B.14.03 (b)(ix) 2, which shall include full compensation for the handling costs of the contractor, and the profit in connection with the payment of the cost of calls and other charges relating to the use by the engineers site staff of the supplied cellular telephones."

ITEM **UNIT**

B14.11 Provision and erection of security fencing (Including gate) metre (m)

The unit of measurement shall be the metre of security fence supplied and erected as indicated on the drawings and/or ordered by the engineer. The tendered rate shall include full compensation for procuring and furnishing of all material, including one vehicle gate, labour and equipment required to erect the specified security fence and maintain it for the duration of the contract."

General: Method of payment

The tendered rates under this section of the bill of quantities shall also include full compensation for the dismantling and removal from site of all offices, laboratories and other facilities provided for the engineer's supervisory staff at the completion of the contract.

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SECTION 1500: ACCOMMODATION OF TRAFFIC

B1502 GENERAL REQUIREMENTS

Access to properties

"Where the alignment of the new road coincides with the alignment of the existing road, a number of accesses to private properties will have to be operational and maintained during the constructional period. No separate payment will be made for providing acceptable and safe access across the new road at all times during construction of the road."

Traffic safety officer

"(ix) be responsible for contacting all the relevant authorities in the event of an accident on the site of the Works

arrange for the removal of broken-down vehicles that obstruct the normal traffic flow

The Contractor shall provide the traffic safety officer with all the necessary resources to carry out his duties as specified, inter alia, light delivery van (LDV), personnel, warning signs and revolving amber flashing lights. A warning sign with the words "CONTRACTOR TRAFFIC CONTROL" and/or "AANNEMER VERKEERSBEHEER" in clearly legible letters shall be mounted on the vehicle at least 1,5m above ground level to be clearly visible. The vehicle shall be equipped with two revolving amber-coloured flashing lights with a minimum intensity of 55W. The flashing lights shall be switched on and the warning sign be displayed at all times when the vehicle is used on the site.

No separate payment will be made for the traffic safety officer, his vehicle, personnel and equipment and the cost thereof shall be included in the Contractor's cost for his establishment and general obligations (Section 1300)."

"(j) Handing over the site

The total extent of the site between the limits of construction as described in this document and indicated on the drawings will be handed over to the contractor at the commencement of the contract period. The engineer however reserves the right to adjust this arrangement should progress or safe passage of traffic warrant such a change.

Use of explosives in close proximity of temporary deviations

The contractor shall arrange all necessary traffic control and other requirements to safeguard the traffic on temporary deviations during blasting operations.

Land taken up for deviations

Negotiations with landowners to obtain the land taken up by temporary deviations will be undertaken by the employer. A prime cost sum is allowed in the bill of quantities for payment of compensation to affected landowners. All other

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negotiations regarding temporary access to properties, land-use, fencing

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requirements etc. shall be dealt with by the contractor in conjunction with the engineer and be confirmed in writing and be kept on record by the contractor.

"(m) Maximum lengths of construction areas

A temporary deviation, where the proposed road follows the existing route shall be constructed along the length of existing road. Traffic shall generally be accommodated as follows:

On a two-way two lane gravel deviation (Class 1) constructed partially outside or adjacent to the existing road reserve boundaries of road.

On one-way single lane gravel deviation (Class 2) constructed inside the existing road reserve boundaries and on either side of road. In this instance special cognisance shall be taken to accommodate traffic to private properties.

A maximum length of one section of approximately 5,0km or two sections of 3,0km each of deviation (Class 1 or 2) shall be operational at a time and no relieve of this limitation shall be considered by the engineer except where the programme necessitates such at the construction of bridges."

B1503 TEMPORARY TRAFFIC CONTROL FACILITIES

All temporary road signs, devices, sequences, layouts and spacing shall comply with the requirements of the Road Traffic Act, 1996 (Act 93 of 1996), the National Road Traffic Regulations, 2000, the South African Road Traffic Signs Manual, the requirements of the relevant road authority and the drawings. All temporary traffic control facilities shall comply with the guidelines set in SA Road Traffic Signs Manual, Volume 2, Chapter 13: Roadworks Signing, (SARTSM, June 1999, obtainable from the Government Pinter, Pretoria)."

Road signs and barricades

All the temporary road signs are to be mounted on posts as specified in section 5600 of the specifications. Provision shall be made for the supply and erection of the signs and the maintenance of the signs during the construction period. Provisions shall also be made for the removal of the temporary road signs on completion of the construction work when such signs are no longer required.

Temporary road signs and channelization devices shall be manufactured in accordance with the latest edition of the South African Road Traffic Signs Manual (June 1999) and placed as shown on the drawings and in Road Signs Note 13. Delineators shall be manufactured from a non-metal material and shall be mounted on a base section also manufactured of non-metal material. Single as well as back-to-back mounted delineators are required.

The obligation to arrange safe passage of traffic shall always be vested with the contractor regardless what is indicated on the drawings of the engineer."

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Channelization devices and barricades

TENDER

Drums shall not be used as channelization devices.
TW 401 and TW 402 delineators shall comply with the following requirements:

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It shall be manufactured from a flexible material and shall comply with SABS 1555. The blade portion of the delineator shall be positively affixed to a base unit which in turn shall be stable on its own or be stabilized by means of sandbags when used on the road.

The blade shall be retro-reflectorised, with class 1 yellow sheeting on the side facing oncoming traffic..

It shall nominally be 1000mm high x 250mm wide and the bottom edge of the delineator shall not be more than 200mm above the road surface.

It shall be subject to the approval of the Engineer.

The maximum spacing between centres of delineators shall be as shown on the drawings or as directed by the Engineer."

Warning devices

"It is a requirement of this contract that all construction vehicles and plant used on the works will be equipped with rotating amber flashing lights and warning boards as specified in the standard specifications. Construction vehicles travelling outside the limits of construction areas shall however, not operate the warning lights.

The warning lights shall have a base diameter of at least 170mm and the amber bulb cover a height of a least 150mm high. It shall be a requirement that the contractor also provides the engineer's site personnel with warning lights for their vehicles (a maximum of two lights are required) without any payment applicable.

B1514 TEMPORARY FENCING AND GATES

Where temporary fencing is ordered by the engineer, it shall be paid for under item 55.06 of the standard specifications. The temporary fencing shall be new fencing material, which shall subsequently be dismantled and removed and erected at an alternative position as directed by the engineer. When ordered by the engineer, temporary fences and gates shall be moved to new locations or either left in place or when no longer required be dismantled and removed from site if so directed. Allowance is made in the bill of quantities for moving existing fences and gates."

Add the following clause:

B1517 RETRO-REFLECTIVE MATERIAL

Retro-reflective material for temporary signs shall comply with the requirements of SABS 1519-1 for weathered material. Tests shall be carried out with a field retro-reflectometer and the testing procedure and classification are described in Clause B 8118. The value of the coefficient of Retro-Reflection shall be at least 60% of the values indicated in Table B 8181."

TENDER

B1518 MEASUREMENT AND PAYMENT

Renumber item 15.01 as B15.01 and add the following:E.220

The tendered rate shall also include for all measures necessary to safeguard traffic on temporary deviations during blasting operations."

Renumber item 15.03 as B15.03

Add the following sub-item:

"ITEM		UNIT
B15.03	**Temporary traffic control facilities**	
(n)	Provision of high visibility safety jackets and safety hats	number (No)

The unit of measurement shall be the number of safety jackets supplied to the supervisory staff.

The tendered rate shall include full compensation for providing and maintaining hats and the jackets equipped with high visibility retro-reflective and/or fluorescent panels in red, yellow and white for the duration of the contract".

"ITEM		UNIT
B15.14	**Allow provisional sum for:**	
	repair of damaged temporary road signs and delineators	provisional sum
	replacement of damaged temporary road signs and delineators	provisional sum

The provisional sums allowed under sub-items (a) and (b) shall be expended on a daywork basis in terms of the provisions of the general conditions of contract.

Payment shall only be made in respect of repair work or replacement of such temporary traffic-control facilities arising from damage or loss occasioned by the travelling public and which did not arise from negligence or non-compliance with the requirements of the specifications on the part of the contractor.

ITEM		UNIT
B15.15	**Prime cost sum for:**	
	Compensation to landowners for land taken up by deviations	prime cost (PC) sum
	Handling cost and profit in respect of sub-item B15.15(a) above	percentage (%)

The prime cost sum shall be expended in accordance with the provisions of the general conditions of contract. Payment to the landowner shall be made within fourteen (14) days after such order has been given by the engineer. The contractor shall provide detailed proof of

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payment before payment shall be certified to the contractor.

The tendered percentage in item B15.15(b) is an extra over percentage on the amount actually spent under sub-item B15.15(a) which shall include full compensation for the handling costs and profit of the contractor."

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C.E.221

SECTION 1700: CLEARING AND GRUBBING

B1702 DESCRIPTION OF WORK

Clearing

Clearing shall include the removal of material to a thickness of up to 150mm in-situ material as ordered by the engineer. No payment shall be made for temporary stockpiling of topsoil material in the case where this material is applied as topsoil after completion of road side slopes.

Should the required depth exceed 150mm, the total volume of material removed shall either be classified as “temporary stockpiling of topsoil” or “unsuitable roadbed material” or “cut to spoil” whichever is applicable as allowed for in the standard specifications. In these cases no payment shall be made for clearing and grubbing.

Clearing as described shall in all cases be undertaken in such a manner that the topsoil is preserved and not contaminated with other debris or rubbish. Cross-sections for the determination of earthworks quantities shall be taken after clearing (topsoil or unsuitable roadbed material) and roadbed preparation if applicable.

Payment for gabion boxes and mattresses which have to be removed and the material sorted and stacked shall be made under section 5200”

B1703 EXECUTION OF WORK

Areas to be cleared and grubbed

Apart from normal clearing and grubbing, the fill embankments of the existing roads are also to be cleared and grubbed over the areas where the new horizontal alignment coincides with the alignment of the existing road, or where repairs are required to the fill embankments of the approaches of bridges. Provision is made for separate payment for clearing and grubbing of the existing fill embankments where conventional machinery might be suitable to undertake the work due to the steep side slopes of the embankments. An additional pay-item is allowed for in the bill of quantities for this type of clearing and grubbing which may have to be undertaken by hand or similar manner.”

B1704 MEASUREMENT AND PAYMENT

Change item 17.01 to read as follows:

ITEM		UNIT
B17.01	**Clearing and grubbing of:**	
	Normal areas:	
	i) Within the road reserve	hectare (ha)

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	ii)	In borrow pits	hectare (ha)
b)		Existing fill embankments with Slopes steeper that 1:4	hectare (ha)

Measurement and payment for sub-items (a) and (b) shall be as specified for item 17.01 of the standard specifications. Where distinction is made for clearing and grubbing existing fill embankments with slopes steeper than 1:4 (vertical : horizontal), payment shall be made under item B17.01.

SECTION 1800: DAYWORK SCHEDULE

Note: This is a new section added to the Standard Specifications. **B1801 SCOPE**

This section covers the listing of daywork items for use in determining payment for work which cannot be quantified in specific pay item “units” in the bill of quantities or work ordered by the engineer during the construction period which was not foreseen at tender stage for which no applicable rate exists in the schedule or for work of a special or different character warranting special payment as decided by the engineer.

B1802 ORDERING OF DAYWORK

No daywork shall be undertaken unless specific written authorization is obtained from the engineer.

B1803 MEASUREMENT AND PAYMENT

The engineer may order the following daywork items:

ITEM	DESCRIPTION	UNIT
B18.01	Labourers:	
	(i) Unskilled	Hour (h)
	(ii) Semi-skilled	Hour (h)
	(iii) Skilled	Hour (h)
B18.02	Foreman	Hour (h)
B18.03	Tipper trucks:	
	(i) 3 – 5 ton	Hour (h)
	(ii) 5,1 – 10 ton	Hour (h)
B18.04	Loader (0,5m^3)	Hour (h)
B18.05	Grader (CAT 140G or similar)	Hour (h)
B18.06	LDV	Hour (h)
B18.07	Compaction Rollers:	
	(i) Vibrator roller	Hour(h)
	(ii) Tamping roller	Hour (h)
	(iii) Grid roller	Hour(h)

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B18.08	Hand Controlled Compactors	

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	(i) Pedestrian roller (Bomag BW90)	Hour(h)
	(ii) Vibratory plate	Hour(h)
	(iii) Rammers	Hour(h)
B18.09	Water truck (min 10000 l)	Hour(h)
B18.10	Dozer (D7 or similar)	Hour(h)

The unit of measurement shall be the actual number of hours worked by labourers or foremen or an item of plant.

The tendered rates shall include full compensation for all cost items including overheads, head-office expenses and profits as described in subclause 40(3) of the general conditions of contract and shall be subject to contract price adjustment as provided for in the contract.

The mark-ups on daywork items in accordance with the Appendix to the Tender shall not be applicable on daywork items listed in the bill of quantities in terms of the above specifications. In the event of new daywork rates being requested for items not appearing in the bill of quantities, then the provisions of the general conditions of contract and the Appendix to the Tender shall apply.

Prior to the commencement of any work by the labourers described under item B18.01, the contractor must obtain written consent from the engineer regarding the classification and composition of all labourers in terms of “unskilled” and “skilled” labourers required for the work as ordered by the engineer.”

SECTION 2200: PREFABRICATED CULVERTS

B2201 SCOPE

All rectangular culverts with spans from 0,9m up to and including 2,4m shall be constructed with precast units.

The attention of the contractor is drawn to the fact that information given on the plans, longitudinal sections or drainage schedules may have to be altered to suit actual site conditions and, therefore, the contractor shall only construct these culverts after the engineer has verified the information on the drawings from detail surveys taken on site by the contractor as directed by the engineer.

Precast units shall be ordered by the contractor from actual measurements of length acquired on the site and not from lengths stated in the drainage schedule or from the bill of quantities.

No precast units shall be ordered until the engineer has satisfied himself that the proposed units have been manufactured to the required tolerances and loading standards. The engineer must be given the opportunity to load test units if he considers this necessary.

E.210

B2203 MATERIALS

E-TENDER

Skewed End

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Delete the second and third paragraphs and substitute with the following:
"Precast portal and rectangular culverts placed on a skew shall be supplied with cast in situ skewed ends as shown on the drawings. In situ skew ends are to be constructed simultaneously with the wingwalls and headwalls".

B2204 CONSTRUCTION METHODS

In all cases where soft founding materials is classified as suitable for culvert bedding construction, the in-situ material shall be ripped, moistened and compacted to 90% or 93% modified AASHTO density. The depth of preparation and compaction of founding material shall be as indicated on the drawings or as specified by the engineer. Allowance for measurement and payment for this work is made in the bill of quantities under this section.

Excavation by hand

Where circumstances prevent the use of mechanical excavators and material can be removed only by hand tools, the engineer shall authorise the supplementary payment to the contractor for such work at the tendered rates for excavation by hand should he be satisfied that the contractor had been unable to prevent the necessity for excavation by hand by proper planning and precautionary measures. The supplementary rate for excavation by hand shall not apply to minor finishing or clearing jobs in excavations which are otherwise being done by mass excavation plant.

Payment for hand excavation shall be an "extra over" payment to normal excavation as allowed for in item 22.01."

B2205 EXCAVATION FOR CONSTRUCTION BY TRENCH METHOD

"(c) Excavation by hand

Where circumstances prevent the use of mechanical excavators and material can be removed only by hand tools, the engineer shall authorise the supplementary payment to the contractor for such work at the tendered rates for excavation by hand should he be satisfied that the contractor had been unable to prevent the necessity for excavation by hand by proper planning and precautionary measures. The supplementary rate for excavation by hand shall not apply to minor finishing or clearing jobs in excavations which are otherwise being done by mass excavation plant.

Payment for hand excavation shall be an "extra over" payment to normal excavation as allowed for in item 22.01.

Drainage of excavations

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The contractor shall apply suitable, effective drainage and dewatering methods for preventing the ingress of water into the excavation and to keep them dry.

TENDER

Drainage measures, with the exception of pumping, shall be maintained until the backfilling has been completed. Between various construction stages, pumping may be interrupted in consultation with the engineer.

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C.E.225

Any draining or pumping of water shall be done in a manner as will preclude the concrete or materials or any part thereof from being carried away.

Allowance for measurement and payment for dewatering and keeping dry of culvert excavations is made in the schedule in this section.

B2210 LAYING AND BEDDING OF PREFABRICATED CULVERTS

B2210(b)(i)Cast in situ invert slabs

In accordance with the drawings, transverse construction joints are required in cast in situ concrete invert slabs for portal culverts. In addition, longitudinal construction joints as shown on the drawings between the invert slabs of each of the barrels of multiple culverts are required. Allowance for measurement and payment for a Class F1 surface finish and soft board in these joints is made in the bill of quantities. No payment shall be made for formwork on the outside edges of invert slabs (closest to excavated face).

All culverts (precast as well as in situ) shall be constructed with an in situ reinforced concrete floor laid on a 75mm concrete screed".

Delete subclause B.2210(b)(ii) : “Prefabricated floor slabs.”

B2211 BACKFILLING OF PREFABRICATED CULVERTS

Change the last sentence in the fourth paragraph to read "90% or 93% as shown on the drawings or as directed by the engineer."

B2212 INLET AND OUTLET STRUCTURES, CATCHPITS AND MANHOLES

Concrete work

The type of surface finish for in situ concrete in the culverts shall be as indicated on the drawings. Generally all exposed faces shall be of Class F2 formwork and faces covered by backfill shall be Class F1. The top of parapet walls and wingwalls shall be finished to a Class U2 surface finish.”

Prefabricated inlet and outlet structures

The use of precast concrete inlets and outlets as described in clause 2212(h), shall not be allowed under any circumstances. Cast in situ concrete wingwall type inlets and outlets shall be constructed as indicated on the drawings and shall be in accordance with section 6000 of the Standard Specifications. Allowance for measurement and payment for wingwall type inlets and outlets is made in the schedule in this section.”

B2218 MEASUREMENTS AND PAYMENT

“ITEM			**UNIT**
B22.01	(c)	Extra over sub item B22.01(a) for excavation by hand using hand tool E.210	cubic metre (m³)

TENDER

Measurement shall be as specified for pay item 22.01 of the standard specifications

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The tendered rate shall include full compensation for carrying out the excavations by hand where circumstances prevent the use of mechanical excavator

ITEM **UNIT**

B22.07 (f) Formwork for joints in cast in situ concrete invert slabs

(i) Transverse construction joints (type indicated) square metre (m²)

(ii) Longitudinal joints (as per drawing) metre (m)

Measurement and payment shall be as specified in item 22.07 of the standard specifications with the exception that formwork for construction joints in cast in situ invert slabs in trench conditions as indicated on the drawings, shall be measured and paid for in accordance with section 6200 of the standard specifications. No payment shall be made for formwork to the outside edges of invert slabs (closest to excavated face)."

Add the following to pay item 22.08:

"In addition to the requirements for measuring concrete backfill to rectangular culverts as specified for item 22.08, the following shall apply:

Concrete backfill shall be measured to the actual dimensions of the precast units, i.e. actual volumes between ribs and haunches shall be taken into account. For the purpose of calculating concrete backfill quantities, the horizontal dimensions of the concrete backfill on the outside of the culvert(s) (closest to excavated face), shall be taken as 100mm maximum irrespective of what type or make of precast portal is used or the actual width of the excavation.

The width of the concrete backfill between portals in the case of multiple culverts, shall be taken as 80mm for precast units with a leg height of 1500mm and 100mm for precast units with a leg height exceeding 1500mm. The vertical dimensions, in both cases, shall be equal to the height of the portal".

"ITEM **UNIT**

B22.29 Tie bars for joining in situ concrete invert slabs to inlet and outlet structures, as indicated on the drawings (Type, diameter and length indicated) Number (No.)

The unit of measurement shall be the number of tie bars installed as specified and indicated on the drawings.

The tendered rate shall include full compensation for supply and installation of the tie bars.

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ITEM **UNIT**

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B22.30	a)	Preparation and compaction of in-situ bedding material to 90% of Mod. AASHTO density (depth indicated)	cubic metre (m^3)
	b)	Extra over sub-item B22:30(a) for compaction	

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to 93% of Mod. AASHTO density (depth indicate) cubic metre (m³)

The unit of measurement shall be the cubic metre of material ripped and compacted as specified.

The tendered rate shall include full compensation for the ripping of the in-situ material to the specified width and depth, wetting of the material to such an extent that the specified density can be achieved.

ITEM **UNIT**

B22.31 Dewatering and keeping dry of culvert excavations

The unit of measurement shall be the number of culverts constructed. The tendered rate shall be full compensation for dewatering and keeping dry of the culvert excavations until the backfill is completed.

Payment shall be as follows:

80% of the payment shall be made after the barrel of the culvert has been constructed and backfilled.

Remaining 20% of the payment shall be made after the wingwalls have been constructed and backfilled.

ITEM **UNIT**

B22.32 Cutting of concrete pipes

a) Diameter indicated Number (No.)

The unit of measurement shall be the number of pipes that have been cut. The tendered rate shall be full compensation for the cutting, by means of mechanical saw (angle grinder) and finishing off of the pipes for the specific angle of skew at which the pipes must be laid.

Cutting of pipes shall only be paid for if the headwall of the wingwalls are at such a skew angle in respect to the centre line of the pipes that cutting is required and where non-standard lengths are required. The maximum skew angle at which pipes are allowed to be cut shall be 30 degrees and the minimum length of pipe, measured along the shortest side, shall be 1,5m.”

Classification of soft/hard materials as well as all quantities shall be agreed upon and finalised as the work progresses.

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SECTION 2300: CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES AND CONCRETE LININGS FOR OPEN DRAINS

B2301 SCOPE

"The position and length of the following types of concrete kerbs and channels are indicated on the geometric layout plans, typical drawings and on the drainage plans.

Type A	:	In situ concrete channel, 0,8m wide on fills
Type B	:	Precast concrete kerbing, semi-mountable (SABS 927-1969)
Type C	:	In situ concrete kerbing at intersections
Edge beam	:	In situ concrete kerbing at farm access and bus stops
Type E, F1 & F2	:	In situ concrete "V"-shaped channels in side drains and open drains."

B2302 MATERIAL

Metal pipes

"Metal pipes down side slopes shall comply with the requirements of clause 2203 of the standard specifications."

B2304 CONSTRUCTION

Slip form kerbing Add

the following:

"Slip-form kerbing shall under no circumstances be allowed."

Cast in situ kerbs and channels

"Forming and templates used to form joints between alternate sections shall be of steel plate of which the thickness shall not be less than 5mm."

Add the following new subclauses:

Construction sequence

Replace paragraphs (i), (ii) and (iii) with the following:

"In all cases where kerbing and/or channelling adjoin the bituminous surface of the road, the kerbing and/or channelling may only be constructed after the bituminous surface has been completed.

Before commencing with the kerbing and/or channelling, the surfacing and the base, shall be accurately cut to line with a mechanical saw to a minimum depth of 75mm. After excavation the concrete shall then be cast against the cut surface without formwork. All material outside the cut line must be carefully removed to the required thickness of concrete without damaging the edge before commencing

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with the casting of the concrete. No payment shall be made for repair work as instructed by the engineer to damage caused by the cutting/excavating process of surfacing and base layers. Any concrete spilt onto

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the surfacing shall immediately be removed and cleaned. Where so required by the engineer, the contractor shall, without any additional compensation, paint emulsion over the stained surface.

Add the following subclause:

Formwork and finish

"Formwork and finish of concrete kerbs shall comply with the requirements of section 6200. All visible edges on the sides or at joints of cast in situ concrete kerbs or channels shall be rounded with a rounding tool."

SECTION 3100: BORROW MATERIALS

B3102 NEGOTIATIONS WITH OWNERS AND AUTHORITIES

"Arrangements regarding to access to borrow pits and the alignment of haul roads shall be made between the contractor and the owners of the land on which borrow pits are situated. The engineer's representative on site shall be present at all such negotiations, which shall be confirmed in writing by the contractor. All costs involved with such negotiations as well as the requirements contained in clause 3102 and clause 1225 of the specifications shall be borne entirely by the contractor."

B3103 OBTAINING BORROW MATERIALS

General

The expropriation and compensation for land from which borrow materials is obtained shall be negotiated and paid for by the contractor.

Use of borrow materials

Compensation to owners and arrangements with owners for taking material from alternative borrow pits proposed by the contractor shall be the contractor's responsibility and entirely at his own expenses."

B3104 OPENING AND WORKING BORROW PITS AND HAUL ROADS

Excess overburden

All excess overburden removed at borrow pits shall be replaced over the entire area of the borrow pit after initial shaping has been undertaken in an even layer. Payment for this requirement shall be deemed to be included in pay item 31.01

Protecting borrow pits

It is a requirement of the contract that each borrow pit or pits shall be provided with fencing around the perimeters, including an access gate, of the borrow areas, including the supply of danger warning signage fixed to the fencing, visible at all sides approaching the borrow pit area. The fencing shall be erected prior to entering the land for borrowing purposes and shall on final finishing of the borrow

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areas as specified by the employer, be dismantled and removed or left in-place as instructed by the employer. Payment for fencing around borrow pits shall be

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made in accordance with the stipulations of section 5500 in these specifications."

In addition to fencing, Security Guards shall be supply on a 24 hour, 7 days a week basis, with full time communication to the Site Manager or site camp for the duration of the contract and activities at the borrow pits."

"(h) Haul roads

Haul roads to designated borrow pits along the road shall be constructed along alignments as instructed by the engineer and shall be maintained at the contractor's own cost to the satisfaction of the engineer.

B3105 FINISHING-OFF BORROW AREAS AND HAUL ROADS

Should the employer, engineer or any other authority approved by the engineer, require a higher standard of shaping and finishing off of borrow pits than specified in the standard specifications, measurement and payment for such extra work shall be made using day work items as scheduled under this section.

B3108 MEASUREMENT AND PAYMENT

"ITEM		**UNIT**
B31.01	**Excess overburden :**	
	(a) Depth up to and including 0,5m	cubic meter (m^3)
	(b) Depth exceeding 0,5m and up to 1,0m	cubic meter (m^3)

Measurement and payment shall be as specified for item 31.01 of the standard specifications with the abovementioned depth ranges applicable."

"ITEM		**UNIT**
B31.04	**Compensation to landowners:**	
	(a) Prime cost sum for compensation to landowners	prime cost (PC) sum
	(b) Handling cost and profit in respect of sub-item B31.04(a) above	percentage (%)

Measurement and payment shall be in accordance with the provisions of clause 48(2) of the general conditions of contract. Payment to the landowner shall be made within fourteen (14) days after such order has been given by the engineer. The contractor shall provide detailed proof of payment before payment shall be certified to the contractor.

The tendered percentage is an extra over percentage on the amount actually spent under sub-item B31.04(a) which shall include full compensation for the handling

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costs and profit of the contractor."

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SECTION 3200: SELECTION, STOCKPILING AND BREAKING-DOWN THE MATERIAL FROM BORROW PITS, CUTTINGS AND EXISTING PAVEMENT LAYERS, AND PLACING AND COMPACTING THE GRAVEL LAYERS

B3204 BREAKING-DOWN THE MATERIAL

Initial breaking-down of the material in cuttings, borrow pits and existing pavement layers

"Pioneer layers - 500mm maximum dimension

Not more than 20% of pioneer layer material shall pass through the 2,0mm sieve."

Further breaking-down of pavement material

"Material used for the construction of selected, and wearing course layers shall be broken down by means of normal grid-rolling or additional normal grid-rolling to such an extent that the compacted pavement layer shall contain material of which 95% of the aggregate size shall not exceed 65mm. All oversize material, after breaking-down, shall be removed".

B3209 PLACING AND COMPACTING THE MATERIALS IN LAYER THICKNESSES IN EXCESS OF 200mm AFTER COMPACTION

:

Pioneer layer

"The maximum size rock used in pioneer layers shall be 500mm and the layer thickness before compaction shall not be more than one-and-a-half times the maximum actual size of the rock. Not more than 20% of pioneer layer material shall pass through the 2,0mm sieve. Pioneer layer processing and compaction shall be as specified in subclause 3307(c) of the standard specifications".

SECTION 3300: MASS EARTHWORKS

B3305 TREATING THE ROADBED

Removing unsuitable material

"For the purpose of this contract, excavation and removal of in-situ clayey material over areas where the road is in a fill condition, shall be classified as removal of unsuitable material, irrespective of the stability or moisture condition of the in-situ material".

Preparing and compacting the roadbed

Delete the last sentence of the first paragraph “If necessary, roadbed…….depth of compaction” and replace as follows:

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“Where demarcated by the engineer, prior to the roadbed being scarified,

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excess in situ material forming part of the present roadway, and within the limits of the roadbed, and in close proximity of the layer works, but falling within the limits of the layerworks, shall be bladed to controlled level in order to achieve the required level and necessary depth of compaction."

B3307 FILLS

Constructing a pioneer layer

"For the purpose of this contract, pioneer layers shall be completed by means of eight-pass roller compaction using vibratory rollers as specified in subclause 3304(b) of the standard specifications."

Benching

"Benching of fill and pavement layer material is required to be undertaken into the existing fill embankments and pavement layers. No additional payment shall be made over and above the normal pay items applicable to earthworks and pavement layers where benching is required for widening of the existing road formation. Benching shall be undertaken as shown on the drawings.

It is a requirement that benching shall always be started at the bottom of the existing fill progressing to the top of the formation. The dimensions and details of benching are shown on the drawings."

B3308 FINISHING THE SLOPES

General

"Where existing cut and fill slopes are excessively eroded or where slippages occurred in slopes, the slopes are to be reinstated by means of backfilling with suitable gravel material. All loose material and vegetation shall first be removed from the eroded cut and fill slopes before backfilling may commence from the bottom of the cut or fill. The backfill material shall be benched into the existing slopes and compacted to 90% of modified AASHTO density, using suitable small compaction equipment e.g. Bomag walk-behind rollers or hand-held compaction tools. Benching shall be executed to the dimensions shown on the drawings. Upon completion of the backfilling operation the cut and fill slopes shall be neatly finished as specified."

B3312 MEASUREMENT AND PAYMENT

"ITEM			**UNIT**
B33.10	(e)	Extra over sub-items 33.10(a), (b) and (d) for blading to controlled levels (existing road)	cubic metre (m^3)

The unit of measurement in respect of the material bladed as specified in subclauses 33.05 (c) shall be the cubic metre of material bladed, measured in the original position before blading, in accordance with the method of average

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end areas.

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The tendered rate shall include full compensation for blading of such material to level.

Only material bladed on the instruction of the engineer for exposing the underlying roadbed material for treatment will be measured and paid for as described above."

SECTION 3400: PAVEMENT LAYERS OF GRAVEL MATERIAL

B3402 MATERIALS

General

"Material requirements for gravel pavement layers are in accordance with TRH4 and shall be indicated on the drawings."

B3405 CONSTRUCTION TOLERANCES

Cross-section

Delete the second paragraph and replace with the following:

"The normal crossfall of the road wearing course where the road is in a straight horizontal alignment, is specified as 3% as shown on the drawings.

At any cross-section the measured crossfall between any two points shall at least be 2,8% and not more than 3,5%. At any cross-section the actual level at any point shall not be higher than 10mm above the computed level from the cross-section as specified and the actual level, if lower than the computed level, shall not be lower by more than that derived from the specifications for longitudinal grade and crossfall deviations."

Surface regularity

"Where transverse construction joints in base layers are made between newly and previously constructed sections, the contractor shall exercise level control at such joints by installing level poles at 5m intervals on either side of the joint of the layer covering at least a 30m length into the newly constructed section."

B3406 QUALITY OF MATERIALS AND WORKMANSHIP

"Test results and measurements shall be assessed by the engineer according to the provisions of Section 8300 of the standard specifications".

SECTION 5200 : GABIONS

B5201 SCOPE

Add the following paragraph
"This section also covers the removal, dismantling and stacking of existing gabion work, and the reuse of these materials where authorised by the engineer.

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B5203 CONSTRUCTION OF GABION CAGES

General

Add the following new sub-clause:

"(iii) Reno mattresses or similar may be used as alternative to gabion boxes. These Reno mattresses are to be manufactured of 80mm x 100mm mesh (2,5mm diameter wires, diaphragm spacing 0,6m).

B5204 CONSTRUCTING GABIONS

Assembly

Delete and substitute with:

Assembly, erection and stretching

Assembly

"Prior to assembly, the gabion material shall be opened out flat on the ground and stretched to remove any kinks and bends. The gabion boxes shall then be assembled individually by raising the sides, ends and diaphragms ensuring that all creases are in the correct position and that the tops of all four sides are even. The four corners of the gabion boxes shall be laced first followed by the edges of internal diaphragms to the sides. In all cases lacing shall commence at the top of the box by twisting the end of the lacing wire around the selvages. It shall then be passed round two edges being joined, through each mesh in turn and securely tied off at the bottom. The ends of all lacing wire shall be turned to the inside of the box on completion of each lacing operation.

Erection

Only assembled boxes, or groups of boxes, shall be positioned in the structure. The side, or end, from which work is to proceed, shall be secured to either completed work or by rods or stakes driven into the ground at the corners. These must be secured and reach at least to the top of the gabion box. Further gabions shall then be positioned in the structure as required, each being securely laced to the preceding one at all corners and diaphragm points.

Stretching

On completion of erection of a suitable length of gabion, the gabion boxes shall be stretched using a wire strainer or winch of at least one ton capacity firmly secured to the free end of the assembled gabion boxes.

Whilst under tension the gabion boxes shall be securely laced along edges (top, bottom and sides) and at diaphragm points, to all adjacent boxes and shall thereafter be filled."

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Rock filling

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Add the following new sub-sub-clause:

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General

"Filling shall be carried out only whilst gabion boxes are under tension. Filling material shall consist of rock of size not less than 120mm and not greater than 250mm so placed to produce a neat face and line with a minimum of voids.
Internal horizontal bracing wire shall be provided at 500mm vertical centres or such spacing to ensure a ratio of four to every 1m³ of filling. These bracing wires shall be wrapped around two mesh wires and extended from front to back so positioned to ensure a neat face and line free of excessive bulges and depressions. Gabion boxes shall be filled in stages and horizontal bracing wires inserted as filling is brought up.

Similar bracing wires used vertically shall be provided in 0,5mm deep gabions at 330mm horizontal centres where water falls directly onto gabions or where a neat face is required.

Tension on the gabion boxes shall be released only when sufficiently full to prevent the mesh from slackening.

Gabion boxes shall be overfilled by 20 to 50mm above their tops to allow subsequent settlement of the filling."

Add the following new sub-clauses:

Final wiring

"Closing and wiring down of lids shall proceed as soon as possible after filling operations and certainly in the likelihood of storms or floods during construction. The wiring down shall consist of wrapping around wire at such intervals as required or specified.

Lids shall be stretched tight over the filling with bars and wired down securely through each mesh along all edges, ends and diaphragms. The ends of all tying and bracing wires shall be turned into the gabion box on completion of all lacing operations.

Tightness of mesh, well packed filling and secure lacing is essential in all structures."

Removal, dismantling and stacking of gabions

"Existing gabions, either damaged or not, that require to be removed or moved to a new location shall be dismantled. Material not required for re-assembly or unsuitable for re-use shall be neatly stacked at approved locations in accordance with the engineer's instructions. Payment will be made only for gabions removed in accordance with the written instruction of the engineer.

Where gabions require moving, or as declared suitable by the engineer are re-usable, the contractor shall re-use all the material, plus supply such new materials as may be required to re-assemble the gabion again to the standard

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Specification for new gabions.

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B5205 MEASUREMENT AND PAYMENT

Add the following new items:

"ITEM **UNIT**

B52.05 Removal and dismantling of existing damaged gabions Cubic metre (m³)

The unit of measurement for the removal and dismantling of existing damaged gabions shall be the cubic metre of each type of gabion removed and dismantled on the instruction of the engineer.

The tendered rate shall include full compensation for removing and dismantling gabions, and stacking all the materials. The tendered rate shall further include for the disposal of unsuitable material.

ITEM **UNIT**

B52.06 Gabions constructed from re-usable materials

a) Galvanised gabion boxes:

(i) 4m x 1m x 1m Cubic metre (m³)

(ii) 3m x 1m x 1m Cubic metre (m³)

(iii) 2m x 1m x 1m Cubic metre (m³)

b) Galvanised gabion mattresses

(i) 0.3m Deep Cubic metre (m³)

The unit of measurement for re-assembling gabions from re-usable materials shall be the cubic metre of rock filled cages for each type of gabion that is re-usable and approved by the engineer, as specified in the standard specification.

The tendered rate shall include full compensation for using the existing wire cages and rock fill, and for supplying new binding and connecting wires, the assembling and filling of the cages, and any other work for the re-construction of the gabions to conform to the specifications."

SECTION 5600 : ROAD SIGNS

B5601 SCOPE

"This section also covers the supply and erection of permanent danger plates at culverts and bridges at the locations indicated on the drawings or as directed by the engineer."

B5603 MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS

Road signboards E.210

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Add the following:

"The contractor shall make every effort to ensure that signboards are correct in all respect and before dispatching the boards from the manufacturer's factory shall provide the Engineer with a 100mm x 150mm colour photograph of each sign face for approval of the correctness of the legend. Such approval will not imply final acceptance of the board. If the Contractor is in any doubt as to the correctness of the sign detail, the sign designer shall be contacted for verification."

(a) (ii) Steel profile road signboards

Where the letter or legends cross the horizontal joints of the sign panels, the letter shall be cut on the joint and both ends folded around the radius.

Retro-reflective material to adjoining Chromadek panels on a sign shall be practical visual match of the specified colour.

B5604 ROAD SIGN FACES AND PAINTING

"(e) Application of retro-reflective material

All sign faces shall be faced with diamond grade retro-reflective material. Painted front sign faces shall not be used.

Where applied to Chromadek sections, retro-reflective material shall be applied as specified for aluminium section in Clause 5603(d) of the Standard Specification, and of Clause B5603 (a)(ii) of this project Specification.

B5605 STORAGE AND HANDLING

The following shall not be allowed on the sign face:

Drilling of holes, except for the fastening of overlays
Application of any form of adhesive
Cleaning with any chemicals that are not specifically approved by the manufacturer of the retro-reflective material
Covering the sign face with an impermeable material that does not allow free circulation of air."

B5606 ERECTING ROAD SIGNS

Erection

Add the following:

"After erection the signboard shall be thoroughly cleaned with a cleaning agent approved by the retro-reflective material's manufacturer.

All vegetation obstructing the new or replaced sign board shall be removed and disposed of as instructed by the Engineer."

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B5608 DISMANTLING, STORING AND RE-ERECTINGEXISTING ROAD SIGNS

Add the following:

"Existing overhead and ground mounted road signs that are being replaced by new signs shall be dismantled and disposed of by the Contractor. Where possible the dismantling of the signs shall not be before the replacement sign is erected and displayed. Where dismantling of the sign is required before erection of the replacement sign, the dismantling shall not take place until immediately before work is to commence on the replacement, and the replacement shall be completed and the new sign displayed as soon as possible thereafter (within 72 hours).

Dismantling shall include sign panels and ground mounted sign supports.

Ground mounted sign supports shall be cut off just below ground level. Material excavated for removal of buried poles shall be replaced, and any depression made good using excess material from excavation for new signs.

Pay items are provided in the Bill of Quantities. Payment will differentiate between different types of sign panels."

B5609 MEASUREMENT AND PAYMENT

ITEM **UNIT**

B56.01 Road sign boards with painted or coloured semi-matt background. Symbols, lettering, and borders in diamond grade retro-reflective material, where the sign board is constructed from:

Amend the last two lines of the second paragraph to read:

"completion, delivery, installation of the road sign board complete as specified, and the removal and disposal of all vegetation obstructing the motorists' view of the new or replaced sign board."

Add the following pay items:

"ITEM **UNIT**

B56.10 Danger plates at culverts/structures

(a) Type A at stormwater culverts (size indicated) number (No.)

(b) Type B at bridges (size indicated) number (No.)

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The unit of measurement shall be the number of danger plates provided and

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erected in accordance with the drawings.

The tendered rate shall include full compensation for all labour and material, painting, posts, excavation, backfilling with soil etc., as may be necessary for completing the work in accordance with the details shown on the drawings."

"ITEM		UNIT
B56.11	**Replace marker boards on existing kilometre posts**	number (No)

The unit of measurement shall be the number of reference marker boards provided and attached to existing kilometer posts in accordance with the

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drawings.

The tendered rate shall include full compensation for the manufacturing and supplying of the completed marker boards, for attaching the marker board to existing posts along the route and for all materials equipment, labour, nuts and bolts necessary for attaching the marker board as specified."

The tendered rate shall include full compensation for all the labour and material, painting, retro-reflective material, posts, excavation, backfilling, etc. as may be necessary for completing the work in accordance with the details shown on the drawings."

SECTION 5700: ROAD MARKINGS

B5706 SETTING OUT THE ROAD MARKINGS

Add the following:

"Where road markings are to be replaced after milling/overlay seal, it is essential that all existing barrier lines and other road marking lines be accurately referenced before commencement of milling or other operations which will obliterate the existing road markings. The position of barrier lines shall be re-assessed on site by the Engineer before the Contractor commences with the road marking."

B5707 APPLYING THE PAINT

Add the following:

"The Contractor's establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be onsite or is required to move within the site."

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SECTION 5900: FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

B5902 FINISHING THE ROAD AND ROAD RESERVE

Add the following to the first paragraph:

"The contractor shall pay special attention to the collection and removal of all waste materials originating from the construction activities. All materials trimmed or excavated from the road shall be collected and removed from the road reserve to the satisfaction of the engineer.

This requirement shall be deemed to be incorporated in the tendered rates for item 59.01 of the bill of quantities or such other items as the contractor may decide upon.

The engineer may order additional finishing of the road reserve which will entail the collection and disposal of loose rocks etc. Payment for this work will be made under daywork items included in section 5900 of the bill of quantities as described in section 1800 of these project specifications."

C3.3 PARTICULAR SPECIFICATIONS

In addition to the Standardized and Project Specifications the following Particular Specifications shall apply to this contract and are bound in hereafter.

SECTION EMP ENVIRONMENTAL MANAGEMENT SPECIFICATION
SECTION DWK DAY WORKS
SECTION OHS OHSA 1993 SAFETY SPECIFICATION

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PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

SECTION EMP: ENVIRONMENTAL MANAGEMENT SPECIFICATION

EMP.1 General

In order to ensure that the construction works is carried out in an environmentally sensitive matter, strict compliance to the Environmental Management Plan (EMP) guidelines is required. The EMP is bounded to this document under Part C4: ***Site Information***. The purpose of the EMP is to:

- Encourage good management practices through planning and commitment to environmental issues,
- Provide rational and practical environmental guidelines to:
  i. Minimize disturbance of the natural environment,
  ii. Prevent pollution of land, air and water,
  iii. Prevent soil erosion and facilitate re-vegetation.
- Adopt the best practicable means available to prevent or minimize adverse environmental impact,
- Develop waste management practices based on prevention, minimization, recycling, treatment or disposal of wastes,
- Train employees and contractors with regard to environmental obligations.

EMP.2 Training and Induction of Employees

- The Contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.). The EMP shall be part of the terms of reference for all contractors, sub-contractors and suppliers.

EMP.3 Complaints Register and Environmental Incident Book

Any complaints received by the project team from the public will be recorded. The complaint should be brought to the attention of the site manager, who will respond.

The following information must be recorded:
- Time, date and nature of the complaint,
- Type of communication (telephone, letter etc),
- Name, contact address and telephone number of the complainant,
- Response and investigation undertaken and
- Actions taken and by whom.

All complaints received will be investigated and a response given to the complainant within 14 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:
- Time, date, location and nature of the incident,
- Actions taken and by whom.

EMP.4 Site Cleanliness and Neatness

- Location of a construction camp is to be approved by the Engineer and is to be restored to its previous condition after completion of construction.
- The construction camp should preferably be fenced with a 1.8m bonnox fence or similar approved.
- All materials, equipment, plant and vehicles must be stored within the construction camp.
- A dedicated area must be made available for construction staff to change and store their

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personal belongings.

EMP.5 Access

- Access to existing roads, schools, buildings, shops and residential properties must not be impeded during construction.
- Access roads utilised by the Contractor must be maintained in good condition.

EMP.6 Borrow Pits

- Mining authorizations (permits) for borrow pits must be obtained from the Department of Minerals and Energy (DME) in consultation with the Department of Water Affairs and Forestry (DWAF).
- Spoil dumps resulting from borrow pits must not interfere with any natural surface drainage.
- Borrow pits must be rehabilitated after use in accordance with the requirements of DME and DWAF.
- Borrow pits will be fenced and the necessary warning signs will be erected.

EMP.7 Dust Control / Air Quality

- Dust suppression measures must be implemented during construction by ensuring that all surfaces prone to dust generation are kept damp (e.g. use of water tanker).
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
-
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
- Special care must be taken in areas where the route passes close to schools and residential areas.
- The speed of construction vehicles must be reduced.

EMP.8 Fauna

- Contractor staff may not chase, catch or kill animals encountered during construction.

EMP.9 Fire Prevention and Control

- Smoking is prohibited in the vicinity of flammable substances.
- The contractor must ensure that fire-fighting equipment is available on site, particularly where flammable substances are being stored or used, and that construction staff are aware of where it is kept and how it is operated.
- Fires started for comfort (warmth) are prohibited, due to the risk of veld fires and risk to adjacent property owner's lands.

EMP.10 Grave Sites

- Gravesites in close proximity to the road must not be disturbed during construction.

EMP.11 Materials Handling and Spills Management

- Any hazardous materials to be used during construction (e.g. lime, fuel, paint, etc) are to be stored in a designated area at the campsite.
- The storage containers/facilities (including any diesel/petrol tanks) must be placed on an impermeable surface and surrounded by a bund wall, in order to ensure that accidental spillage

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does not pollute the environment.
- Workers must at all times be made aware of the health and safety risks associated with any hazardous substances used (e.g. smoking near fuel tanks), and must be provided with appropriate protective clothing/equipment in case of spillages or accidents.
- Ensure all staff and contractors undergo relevant training in the maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants and other chemicals.
- Any spill of potentially hazardous materials must be cleaned up immediately (Potentially hazardous materials on site include paint, oil, grease, fuel, turpentine, etc).
- The area of contaminated soil or spill must be deposited into the hazardous waste container(s).
- The contractor should keep Peat, Sorb or a similar absorbent on site to clean up any spills. The absorbent must be stored in a designated area and be available for inspection.
- All spills are to be recorded in the environmental incident book.

EMP.12 Noise

- Noise generating activities must be restricted to between 07:00 and 17:00 Monday to Friday, unless otherwise approved by the appropriate competent person in consultation with adjacent landowners/affected persons.
- All equipment, vehicles and machinery must be in good working condition and be equipped with sound mufflers if necessary.
- Construction staff must be trained and made aware of not creating unnecessary noise such as hooting and shouting.

EMP.13 Pollution Control

- Soil and water pollution through usage of fuel, oil, paint, bitumen or other hazardous substances must be avoided.
- All construction vehicles are to be maintained in good working order so as to prevent soil or water pollution from oil, fuel or other leaks, and to reduce noise pollution.

EMP.14 Rivers and Streams

- During construction of bridge structures, there must be no obstruction of the water flow of rivers and streams.
- Excavated material must not be stockpiled on or near riverbanks, in order to prevent sedimentation occurring.
- Erosion control measures must be employed both during and after construction.
- No impediments to natural surface water flow, other than approved erosion control measures, must occur.

EMP.15 Safety

- Safety measures, such as detour signs, must be implemented during construction to ensure the safety of workers, pedestrians and drivers/passengers in vehicles in the vicinity of construction work.
- Special care must be taken in the vicinity of schools to ensure the safety of children wishing to cross the road under construction.
- The relevant signage (e.g. speed control signs) must be erected alongside the road during the operation phase in order to control traffic.
- Accommodation must be made for pedestrian pathways alongside the road during the construction and operation phases.

EMP.16 Soil Management

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- Stormwater drainage pipes must be installed alongside the road in all areas susceptible to soil erosion.
- Erosion should be minimized by the construction of meadow drains and the planting of indigenous vegetation on the side slopes and drains to reduce flow velocity of stormwater.
- Spoil from cuts may be used in existing erosion galleys.
- Stone pitching and gabions should be constructed at pipe culvert outlets.
- Accidental spills of contaminants onto the ground e.g. oil, concrete, fuel and chemicals should be removed together with the contaminated soil.
- If necessary an absorbent such as Peat Sorb should be used the aid in cleaning up the spill. The contaminated soil should be disposed of in an appropriate container, depending on its classification.
- Servicing and re-fuelling of vehicles must only be carried out at construction camp.

EMP.17 Worker Conduct

Code of Conduct for Construction Personnel:

- Do not leave the construction site untidy and strewn with rubbish which will attract animal pests.
- Do not set fires.
- Do not cause any unnecessary, disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
- Do not drive a construction-related vehicle under the influence of alcohol.
- Do not exceed the national speed limits on public roads or exceed the recommended speed limits on the site.
- Do not drive a vehicle which is generating excessive noise or gaseous pollution (noisy vehicles must be reported and repaired as soon as possible).
- Do not litter along the roadsides, including both the public and private roads.
- Do not pollute any water bodies (whether flowing or not).
- No member of the construction team is allowed to enter the areas outside the construction site.

EMP.18 Traffic Disturbances and Diversions

- Any traffic diversions must be undertaken with the approval of all relevant authorities and in accordance with all relevant legislation.
- Wherever possible, traffic diversion must only take place on existing disturbed areas and remain within the existing road reserve.
- Traffic diversion routes must be rehabilitated after use.

EMP.19 Vegetation

- Only vegetation falling directly on the route must be removed where necessary.
- Alien vegetation within the road reserve must be eradicated, and management measures must be implemented for future control of these species.
- Vegetation that has been removed from large areas (e.g. on traffic diversion routes) during construction must be replaced with indigenous vegetation after construction has been completed.

EMP.20 Waste Management

- All general, non-hazardous waste must be placed in a skip container and disposed of at a registered waste disposal site.
- The contractor is to ensure that the portable toilet facilities at the campsite are properly maintained and in working order.
- No disposal, or leakage, of sewage must occur on or near the site.
- All hazardous waste (e.g. oil, paint, empty lime bags, contaminated wash water, etc) must be stored in leak proof containers and disposed of at a registered hazardous waste disposal site.

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- The contents of waste storage containers must, under no circumstances, be emptied to the surrounding area. In general, littering, discarding or burying of any materials is not allowed on site or along the route.
- Adequate waste receptacles must be available at strategic points around the construction camp and site for all domestic refuse and to minimize the occurrence of littering.
- Concrete rubble must be collected and disposed of as directed by the Project Manager.
- Each working area must be cleared of litter and building waste (e.g. rubble, wood, concrete packets etc) on completion of the day's work.
- Any spill around the container(s) should be treated as per Section EMP11 and EMP16.

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SECTION DWK: DAY WORKS

This part of the Project Specifications deals with the provision for Day works in the Schedule of Quantities. Rates for Day works shall be entered in Section 1800 of the Schedule of Quantities in accordance with the following specifications.

DWK. 1 SCOPE

According to clause 37.2 of the General Conditions of Contract for construction works (GCC) 2010 edition, certain work may be carried out using rates tendered in the day work schedule. A schedule of personnel, plant and equipment which may be necessary to perform work on a day work basis is included in the schedule of quantities. The quantities used in the schedule are for tender evaluation purposes only and the use or not of these items shall not constitute a variation in terms of Clause 37 of the General Conditions of Contract 2010 edition.

No work will be paid for as Day works without the written instruction or approval of the Engineer.

DWK. 2 TYPE OF WORK

The Engineer may order day work in certain cases where it is necessary to vary or to extend the works due to new or unforeseen circumstances to such an extent that the tendered rates for specific items of work are no longer applicable, or where no suitable combination of tendered rates can be used to pay for such work.

As a general rule, applicable rates for additional work items will be agreed between the Contractor and the Engineer. Day works will only be used in exceptional circumstances.

DWK. 3 MATERIALS

Materials for use in works carried out under Day work shall be purchased by the Contractor who shall also arrange for delivery to site, and shall be responsible for any other requirements associated with specific materials. A Provisional Sum has been allowed in Section 1800 for Day work materials. The Contractor shall enter a tendered percentage in the schedule to cover his handling costs and profit, as per other provisional and prime cost sums in this Contract.

Materials shall be paid for using the method described in the Pricing Data. No contract price adjustment will be applicable to materials.

The Contractor shall submit proof of ownership for any materials used in Day works with his day works claim to the Engineer. Further, if specific materials are required for Day works, quotations will be called for as per Clause 37.2.4 of the General Conditions of Contract 2010 edition.

DWK. 4 CONSTRUCTION PLANT HIRE

Where daywork is ordered, the tendered rates for plant hire in Section 1800 shall be used in calculating the payment due for any plant required to execute the daywork. If no rate is included in the schedule for a particular piece of equipment, and where no other rate or combination of rates would provide suitable compensation, then the daywork method of payment described in Clause 37.2.3 of the General Conditions of Contract 2010 edition will be used.

The tendered rates for each item of constructional plant shall include for all operating costs associated with the said item of plant. Such costs are deemed to include fuel, re-fuelling costs, lubrication and routine servicing / maintenance, breakdowns and spares, all overhead costs, site management costs and administration costs. The tendered rates shall also include the plant

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operator and the general supervision of the plant while it is engaged in the day works.

DWK. 5 SALARIES AND WAGES OF WORKMEN

The salaries and wages of workmen executing daywork shall be paid for using the tendered rates in Section 1800. The tendered rates shall include for all costs associated with the employment of personnel, including salaries, wages, allowances, workmen's compensation, medical aid and pension contributions, government levies and taxes, training costs and any costs associated with living on the site. The tendered rates shall also include for the transportation of the workmen to the site of the day works.

All overhead costs, administration costs, site management costs and the Contractor's profit are deemed to be covered by the DAY WORKS rates and no additions or mark ups will be made to the tendered rates.

The tendered rates shall also include any hand tools normally associated with the workmen's job description e.g. picks, shovels, hammers, saws, spirit levels, etc. The tendered rate for labourers shall also include for the casual supervision by a gang boss or foreman. Only when specifically called for by the Engineer, will payment be made for the use of a gang boss or foreman supervising on a continuous basis.

DWK. 6 MEASUREMENT AND PAYMENT

The following principles shall also apply to the measurement and payment of day works.

The unit of measurement for plant shall be the number of vibroclock hours worked and each item of plant shall be fitted with a vibroclock, the cost of which shall be included in the rates. Excessive non-productive time when the engine is idling will not be paid for. Where there is ambiguity between the flywheel horsepower and mass of the machine, the flywheel horsepower shall govern the measurement category. Where width and mass are specified, mass shall govern the measurement category.

The Contractor's attention is drawn to the requirements of Sub-clauses 37.2.5 and 37.2.6 of the General Condition of Contract 2010 edition with regard to the submission of day works claims.

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PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

PART C5ANNEXURES

(For Information Purposes Only)

SECTION CONTENTS

C5.1 Annex I - Environmental Management Plan

C5.2 Annex II - Abstracts of the Mine Health and Safety Act No. 29 of 1996 and Amendment Act No. 72 of 1997

C5.3 Annex III - Borrow Pit Guarantee

C5.4 Annex IV - Health and Safety Specification

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C5.1 PART G: Annex I ENVIRONMENTAL MANAGEMENT PLAN

CONTENTS

G 01 SCOPE

This environmental management programme (EMP) sets out the methods by which proper environmental controls are to be implemented by the Contractor. The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects liability period.

The provisions of this EMP are binding on the Contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract. In the event that any conflict occurs between the terms of the EMP and the project specifications or Record of Decision, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the Employer in writing for approval.

The EMP identifies the following:

Construction activities that will impact on the environment. Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts. Actions that shall be taken in the event of non-compliance.

G 02 DEFINITIONS

Alien Vegetation: alien vegetation is defined as undesirable plant growth which shall include, but not be limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Activity: a construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process as defined in the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7, 1998)

Environment: environment means the surroundings within which humans exist and that could be made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Aspect: an environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

Environmental Impact: an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

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Record of Decision: a record of decision is a written statement from the National Department of Environmental Affairs and Tourism, (NDEAT), that records its approval of a planned undertaking to improve, upgrade or rehabilitate a section of road and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.
Road Reserve: the road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Road Width: for the purposes of the EMP, the road width is defined as the area within the road reserve i.e. fence line to fence line, but also includes all areas beyond the road reserve that are affected by the continuous presence of the road, e.g. a reach of a water course.

Listed in the table below are some of the references in the COLTO Standard Specifications to environmental related issues.

Description	Reference
Establishment of site offices	1302(a), 1402(e).
Vegetation	5801(b), 5802(b), (c), (d), and (e), 5804, 5805, 5806 and 5807.
Rehabilitation	1302(a)and Sections 5800 and 5900.of the Standard and Project Specifications
Sewage treatment	1402(g) and 1404(a) and Part B of the Project Specifications, clause B1302(a).
Litter	1302(b).
Removal of solid waste	1404(a).
Soil management	3104(a), 5802(a), (g), 5804(a), (b), and (c).
Borrow/Quarry material	3100. (The cost of complying with the requirements shall be deemed to be included in existing rates in the Bill of Quantities.)
Discovery of archaeological sites, artefacts or graves	Clause 4.7 of the GCC 2015 General Conditions of Contract.
Graves	
Stockpiled material	3202 and 4306.
Pollution prevention	Sub clause 8.1.2 of the GCC 2015 General Conditions of Contract.

G 03 IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

The Contractor shall identify likely aspects before commencing with any construction activity. Examples of environment aspects include:

- waste generation
- stormwater discharge
- emission of pollutants into the atmosphere
- chemical use operations
- energy use operations

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- water use operations
- use of natural resources
- noise generation

Thereafter the Contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening. If prevention is not practicable, or in the event of mishap or misapplication, the Contractor shall provide plans and measures for the Engineer's approval, which will limit and contain the magnitude, duration and intensity of the impact. The Contractor shall demonstrate that he/she is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce an approved construction programme according to sub clause 5.6 of the general conditions of contract and clause B1204 of these project specifications.

Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction activities:

- Pollution of atmosphere, soil or water
- Destruction or removal of fauna and flora and effect on biological diversity
- Deformation of the landscapes oil erosion
- Destruction of historical/heritage sites
- Effect on the built environment
- Effect on agricultural land and wetlands

General good construction practice will play an important role in avoiding the occurrence of an Impact. The Contractor's attention is drawn, in this regard, to G 08. Environmental Management of Construction Activities.

G 04 LEGAL REQUIREMENTS

G04.01 General

Construction will be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the Contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

G04.02 Statutory and other applicable legislation

The Contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

G 05 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

G 05.01 Appointment of a Designated Environmental Officer (DEO)

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For the purposes of implementing the conditions contained herein, the Contractor shall submit to the Engineer for approval the appointment of a nominated representative of the Contractor as the DEO for the contract. The request shall be given, in writing, at least fourteen days before the start of any work clearly setting out reasons for the nomination, and with sufficient detail to enable the Engineer to make a decision. The Engineer will, within seven days of receiving the request, approve, reject or call for more information on the nomination. Once a nominated representative of the Contractor has been approved he/she shall be the DEO and shall be the responsible person for ensuring that the provisions of the EMP are complied with during the life of the contract. The Engineer will be responsible for issuing instructions to the Contractor where environmental considerations call for action to be taken. The DEO shall submit regular written reports to the Engineer, but not less frequently than once a month.

The Engineer shall have the authority to instruct the Contractor to replace the DEO if, in the Engineer's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required. There shall be an approved DEO on the site at all times.

G 05.02 **Administration**

Before the Contractor begins each construction activity the DEO shall give to the Engineer a written statement setting out the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of the environmental aspects and impacts that might result from the activity.
- Methodology for impact prevention for each activity or aspect.
- Methodology for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.
- The Contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the Engineer whenever there is a change or variation to the original.

The Engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the Contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

G 05.03 **Good Housekeeping**

The Contractor shall undertake "good housekeeping" practices during construction as stated in clause 1217 of the COLTO Standard Specifications for Roads and Bridges. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

G 06 TRAINING

The designated environmental officer (DEO) must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the

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presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies
- The environmental impacts, actual or potential, of their work activities
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.
- In the case of permanent staff, the Contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the Contractor shall inform the Engineer when and how he/she intends concluding his environmental training obligations.

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G 07 ACTIVITIES/ASPECTS CAUSING IMPACTS

A list of possible causes of environmental impacts that occur during construction activities is given in Table 1: Aspects or Activities that Cause Environmental Impacts during Construction Activities, which is to be found at the end of this part. This list is not exhaustive, and shall be used for guideline purposes only.

G 08 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

G 08.01 **Site Establishment**

G 08.01.01 Site Plan

The Contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the Contractor shall submit to the Engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible. Regardless of the chosen site, the Contractor's intended mitigation measures shall be indicated on the plan. The site plan shall be submitted not later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the Engineer for consultation during rehabilitation of the site. Read with COLTO Specification 1302(a), 1402(e).

G 08.01.02 Vegetation

The Contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the Engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring, shall be re-established.

The project specification for the rehabilitation of the grass cover shall be strictly adhered to. Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding. (Read in conjunction with COLTO Specification 5801(b), 5802(b), (c), (d) and (e), 5804, 5805, 5806 and 5807). Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

G 08.01.03 Rehabilitation

The area where the site offices were erected will require rehabilitation at the end of the

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contract. All construction material, including concrete slabs and braai areas shall be removed from the site on completion of the contract.

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G 08.01.04 Water for human consumption

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp/office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams etc.). Only domestic type wastewater shall be allowed to enter this drain.

G 08.01.05 Heating and Cooking fuel

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

G 08.02 **Sewage treatment (impose penalties on solid waste non-conformance)**

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-away, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a subcontractor. The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the Engineer. Read with COLTO Specifications 1402(g) and 1404(a).

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed. Monthly proof of safe disposal must be filed on site by the contractor.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Engineer.

G 08.03 **Waste Management**

The Contractor’s intended methods for waste management and waste minimisation shall be implemented at the outset of the contract. All personnel shall be instructed to dispose of all waste in the proper manner.

Monthly proof of safe disposal for all waste must be filed on site.
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- Suitable covered receptacles shall be available at all times and conveniently placed for the disposal of waste.
- All used oils, grease or hydraulic fluids shall be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.
- All spills should be cleaned up immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.

G 08.03.01 Solid Waste

Solid waste shall be stored in an appointed area in covered, tip proof metal drums for collection and disposal. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the Engineer. Disposal of solid waste shall be at a DWS licensed landfill site or at a site approved by DWS in the event that an existing operating landfill site is not within reasonable distance from the site offices and staff accommodation. No waste shall be burned or buried at or near the site offices, nor anywhere else on the site, including the approved solid waste disposal site. Read with COLTO Specification 1404(a).

G 08.03.02 Litter

No littering by construction workers shall be allowed. During the construction period, the facilities shall be 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 collection facilities for later safe disposal at approved sites. (Read with COLTO Specification 1302(b)).

G 08.03.03 Hazardous waste

Hazardous waste such as bitumen, tar, oils etc. shall be disposed of in a DWS approved landfill site. Special care shall be taken to avoid spillage of tar or bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

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. Any spillage of tar or bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the Engineer.

G 08.04 **Control at the workshop**

The Contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop)

G 08.04.01 Safety

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by, the staff whose duty it is to manage and maintain the Contractor's and his subcontractor's and supplier's plant, machinery and equipment.

G 08.04.02 Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under

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controlled conditions. All hazardous materials e.g. tar or bitumen binders shall be stored in a secured, appointed area that is fenced and has restricted entry. Storage of tar or bituminous products shall only take place using suitable containers to the approval of the Engineer.

The Contractor shall provide proof to the Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the Contractor shall furnish the Engineer with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

G 08.04.03 Fuel and Gas Storage

Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. An adequate bund walls, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

G 08.04.04 Oil and Lubricant Waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

G 08.05 **Clearing the Site**

In all areas where the Contractor intends to, or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Engineer for his approval. Contractor to communicate with an appointed ECO before clearing any area on site.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the Engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The Contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the road reserve, or at designated or instructed areas outside the road reserve. This responsibility shall extend until expiry of the

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defects liability period.

G 08.06 **Soil Management**

G 08.06.01 Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include the storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved Department of Water and Sanitation waste disposal site. (Read with COLTO Specifications 3104(a), 5802(a), (g), 5804(a), (b) and (c)). The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, upgraded before replacement. Stockpiles shall be protected against infestation by weeds.

The Contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. 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 progress plan approved by the Engineer. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

G 08.06.02 Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the Engineer, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

G 08.07 **Drainage**

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous or tar products.

The Contractor shall submit to the Engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or

barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.

G 08.08 **Earthworks and Layer works**

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the Contractor shall have complied with the requirements of sections G 08.05 and G 08.07. In addition, the Contractor shall take cognisance of the requirements set out below.

G 08.08.01 Quarries and borrow pits

The Contractor's attention is drawn to the requirement of the Department of Minerals and Energy, that before entry into any quarry or borrow pit, an EMP for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department. It is the responsibility of the Contractor to ensure that he is in possession of the approved EMP or a copy thereof, prior to entry into the quarry or borrow pit. The conditions imposed by the relevant EMP are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific EMP and these specifications the former shall apply. The cost of complying with the requirements shall be deemed to be included in existing rates in the Bill of Quantities. (Read with COLTO Specification 3100 and 3200). An approval from DMR with all the conditions which need to be adhered to by the contractor will be given to the appointed contractor.

Demarcating the Borrow pit/Quarrying Area

- The mining/Quarrying area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons as indicated on the layout plan or as prescribed must be firmly erected and maintained in their correct position throughout the life of the operation.
- Mining/ Quarrying and resultant operations shall only take place within this demarcated area.

RESTRICTIONS ON MINING/Quarrying Area

- On assessment of the application, the Regional Manager may prohibit the conducting of mining or Quarrying operations in vegetated areas or over portions of these areas
- In the case of areas that are excluded from mining, no operations shall be conducted within 5 m of these areas.

RESPONSIBILITY

- The environment affected by the mining operations shall be rehabilitated by the holder, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
- It is the responsibility of the holder of the mining permit to ensure that the manager on the site and the employees are capable of complying with all the statutory requirements which must be met in order to mine, which includes the implementation of this EMP.

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Maintenance of access roads

- In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit/ prospecting right.
- Newly constructed access roads shall be adequately maintained so as to minimise dust, erosion or undue surface damage.

Dust control on the access and haul roads

- The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions; excessive dust or excessive deterioration of the road being used.

1) Rehabilitation of access roads

- **Whenever a mining permit is suspended, cancelled or abandoned or if it lapses and the holder does not wish to renew the permit or right, any access road or portions thereof, constructed by the holder and which will no longer be required by the landowner/tenant, shall be removed and/or rehabilitated to the satisfaction of the Regional Manager.**
- Any gate or fence erected by the holder which is not required by the landowner/tenant, shall be removed and the situation restored to the pre-mining/ prospecting situation.
- Roads shall be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation must be removed and disposed of in an approved manner prior to rehabilitation.

Toilet facilities, waste water and refuse disposal

- As a minimum requirement, the holder of a mining permit shall, at least, provide pit latrines for employees and proper hygiene measures shall be established.
- Chemical toilet facilities or other approved toilet facilities such as a septic drain shall preferably be used and sited on the camp site in such a way that they do not cause water or other pollution.
- The use of existing facilities must take place in consultation with the landowner/tenant.
- In cases where facilities are linked to existing sewerage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to.

LIMITATIONS ON BORROW PITS AND QUARRYING AREA

- The mining of shall take place only within the approved demarcated mining or prospecting area.
- Mining may be limited to the areas indicated on assessment.
- The holder of the mining permit/ shall ensure that operations take place only in the demarcated areas.

G 08.08.02 Excavation, hauling and placement

The Contractor shall provide the Engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the

impact that such activities will have on the adjacent built environment. The Contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity. (Read with COLTO Standard Specification clauses 1217 and 3309)

G 08.08.03 Spoil sites

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects liability period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the Engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the Engineer. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The same shall apply for the disposal of solid waste generated from the various camp establishments. The Engineer will assist the Contractor in obtaining the necessary approval if requested by the Contractor.

Spoil sites will be shaped to fit the natural topography. These sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Slopes shall not exceed a vertical: horizontal ratio of 1:3. Only under exceptional circumstances will approval be given to exceed this ratio. Appropriate grassing measures to minimise soil erosion shall be undertaken by the Contractor. This will include both strip and full sodding. The Contractor may motivate to the Engineer for other acceptable stabilising methods. The Engineer may only approve a completed spoil site at the end of the defects liability period upon receipt from the Contractor of a landowner's clearance notice and an engineer's certificate certifying slope stability (Read with COLTO standard Specifications clause 1214). The Contractor's costs incurred in obtaining the necessary certification for opening and closing of spoil sites shall be deemed to be included in the tendered rates for spoiling.

G 08.08.04 Stockpiles

The Contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, 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 Engineer for his approval, together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the Engineer and the relevant Authority is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in-situ milling or any detritus of material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract drawing or under instruction from the Engineer
In all cases, the Engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated. (Read with COLTO Specification 3203 and 4306).

G 08.08.05 Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the Contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the Contractor shall, prior to any drilling of holes in preparation for blasting, supply the Engineer with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc. The Contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the Contractor from his responsibilities in this regard. The Contractor shall also indicate to the Engineer the manner in which he intends to advertise to the adjacent communities and/or road users the times and delays to be expected for each individual blast.

G 08.09 **Batching sites**

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the Contractor shall be responsible to obtain the necessary permit from the Department of Environmental Affairs and Tourism, regardless of where they are sited.

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the Department of Minerals and Energy legislation as well as the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section G 08.08.03, with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the Contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The Engineer will assist the Contractor in his submissions to the relevant authority.

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Effluent from concrete batch plants and crusher plants shall be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the Engineer for approval.

The Contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter, not exceeding 12 months apart

G 08.10 **Spillages**

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and tar or bituminous products. In the event of a spillage, the Contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill treatment lies with the Contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her DEO or to the Engineer. The Designated Environmental Officer will assess the situation in consultation with the Engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the Contractor in consultation with the DEO and the Engineer. Areas cleared of hazardous waste shall be re-vegetated according to the Engineer's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Engineer. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input.

G 08.11 **Areas of Specific Importance**

Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the approved EMP. The Contractor may offer alternative solutions to the Engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require ad hoc treatment.

G 08.11.01 Archaeological Sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery. The National Monuments Council is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist. (Read with Sub clause 4.7.1 of the General Conditions of Contract).

G 08.11.02 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the Engineer informed of the discovery. The National Monuments Council should be contacted

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and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred. (Read with Sub clause 4.7.1 of the General Conditions of Contract).

G 08.12 **Noise Control**

The Contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during daylight hours. Compliance with the appropriate legislation with respect to noise, shall be mandatory.

Should noise generating activities have to occur at night the people in the vicinity of the drilling shall be warned about the noise well in advance and the activities kept to a minimum.

G 08.13 **Dust Control**

Dust caused by strong winds shall be controlled by means of water spray vehicles. Dust omission from batching plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant office of the Department of Minerals and Energy.

G 08.14 **Alien Vegetation**

The Contractor shall be held responsible for the removal of alien vegetation within the road reserve disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily or otherwise within the road reserve. This responsibility shall extend for the duration of the defects liability period.

G 09 RECORD KEEPING

The Engineer and the DEO will continuously monitor the Contractor's adherence to the approved impact prevention procedures and the Engineer shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The DEO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the Engineer in the monthly report.

Copies of any record of decision or EMP's for specific borrow pits or quarries used on the project shall be kept on site and made available for inspection by visiting officials from the Employer or relevant environmental departments.

G 10 COMPLIANCE AND PENALTIES

The Contractor shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.

Any avoidable non-compliance with the above-mentioned measures shall be considered sufficient ground for the imposition of a penalty

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The following penalties shall apply for environmental violations:

G10.01 Unnecessary removal or damage to trees:

- 2600mm girth or less: R5 000 per tree
- Greater than 2600mm, but less than 6180mm girth: R10 000 per tree
- Greater than 6180mm girth: R30 000 per tree

G 10.02 Serious violations:

- Hazardous chemical/oil spill and/or dumping in non-approved sites: R10 000 per incident
- General damage to sensitive environments: R5 000 per incident
- Damage to cultural and historical sites: R5 000 per incident
- Uncontrolled/unmanaged erosion(plus rehabilitation at the Contractor's cost): R1 000 to R5 000 per incident
- Unauthorised blasting activities: R5 000 per incident
- Pollution of water sources: R10 000 per incident

The Engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final.

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G 10.03Less serious violations:

- Littering on site: R1 000 per incident
- Lighting of illegal fires on site: R1 000 per incident
- Persistent or un-repaired fuel and oil leaks: R1 000 per incident
- Excess dust or excess noise emanating from site: R1 000 per incident
- Dumping of milled material in side drains or on grassed areas: R1 000 per incident
- Possession or use of intoxicating substances on site: R500 per incident
- Any vehicles being driven in excess of designated speed limits: R500 per incident
- Removal and/or damage to flora or cultural or heritage objects on site, and/or killing of wildlife: R2 000 per incident
- Illegal hunting: R2 000 per incident
- Urination and defecation anywhere except in designated areas: R500 per incident

The Engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

G 11 MEASUREMENT AND PAYMENT

Item **Unit**

G 11.01 Penalty for unnecessary removal or damage to trees for the following diameter sizes:

(a) 2600mm girth or less ..... number (No)
(b) Greater than 2600mm, but less than 6180mm girth ..... number (No)
(c) Greater than 6180mm girth ..... number (No)

The unit of measurement shall be the number of trees by diameter size removed unnecessary or damaged. The penalty rates applied shall be those stated in clause G 10.01.

Item **Unit**

G 11.02 Penalty for serious violations:

(a) Hazardous chemical/oil spill and/or dumping in non-approved sites ..... number (No)
(b) General damage to sensitive environments ..... number (No)
(c) Damage to cultural and historical sites ..... number (No)
(d) Pollution of water sources ..... number (No)
(e) Unauthorised blasting activities ..... number (No)
(f) Uncontrolled/unmanaged erosion per incident, depending on environment impacts, plus rehabilitation at the Contractor's cost) ..... number (No)

The unit of measurement for G 11.02(a) to (f) shall be the number of serious violation incidents. The

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penalty rates to be applied shall be those stated in clause G 10.02.

The relevant sections of Mineral and Petroleum Resources Development Act and its supporting Regulations are *summarised below* for the information of applicants. The onus is on the applicant to familiarise him/herself with the provisions of the full version of the Mineral and Petroleum Resources Development Act and its Regulations.

Section of Act	Legislated Activity/ Instruction/ Responsibility or failure to comply	Penalty in terms of Section 99
5(4)	No person may prospect, mine, or undertake reconnaissance operations or any other activity without an approved EMP, right, permit or permission or without notifying land owner	R100 000 or two years imprisonment or both
19	Holder of a Prospecting right must: lodge right with Mining Titles Office within 30 days; commence with prospecting within 120 days, comply with terms and conditions of prospecting right, continuously and actively conduct prospecting operations; comply with requirements of approved EMP, pay prospecting fees and royalties	R100 000 or two years imprisonment or both
20(2)	Holder of prospecting right must obtain Minister's permission to remove any mineral or bulk samples	R100 000 or two years imprisonment or both
26(3)	A person who intends to beneficiate any mineral mined in SA outside the borders of SA may only do so after notifying the Minister in writing and after consultation with the Minister.	R500 000 for each day of contravention
28	Holder of a mining right or permit must keep records of operations and financial records AND must submit to the DG: monthly returns, annual financial report and a report detailing compliance with social & labour plan and charter	R100 000 or two years imprisonment or both
29	Minister may direct owner of land or holder/applicant of permit/right to submit data or information	R10 000
38(1)(c)	Holder of permission/permit/right MUST manage environmental impacts according to EMP and as ongoing part of the operations	R500 000 or ten years imprisonment or both.
42(1)	Residue stockpiles must be managed in prescribed manner on a site demarcated in the EMP	A fine or imprisonment of up to six months or both
42(2)	No person may temporarily or permanently deposit residue on any other site than that demarcated and indicated in the EMP	A fine or imprisonment of up to six months or both
44	When any permit/right/permission lapses, the holder may not remove or demolish buildings, which may not be demolished in terms of any other law, which has been identified by the Minister or which is to be retained by agreement with the landowner.	Penalty that may be imposed by Magistrate's Court for similar offence
92	Authorised persons may enter mining sites and require holder of permit to produce documents/ reports/ or any material deemed necessary for inspection	Penalty as may be imposed for perjury
94	No person may obstruct or hinder an authorised person in the performance of their duties or powers under the Act.	Penalty as may be imposed for perjury
95	Holder of a permit/right may not subject employees to occupational detriment on account of employee disclosing evidence or information to authorised person (official)	Penalty as may be imposed for perjury

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All sections	Inaccurate, incorrect or misleading information	A fine or imprisonment of up to six months or both
All sections	Failure to comply with any directive, notice, suspension, order, instruction, or condition issued	A fine or imprisonment of up to six months or both

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Item **Unit**

G 11.03 Penalty for less serious violations:

(a) Littering on site ..... number (No)
(b) Lighting of illegal fires on site ..... number (No)
(c) Persistent or un-repaired fuel and oil leaks ..... number (No)
(d) Excess dust or excess noise emanating from site ..... number (No)
(e) Dumping of milled material in side drains or on grassed areas ..... number (No)
(f) Possession or use of intoxicating substances on site ..... number (No)
(g) Any vehicles being driven in excess of designated speed limits ..... number (No)
(h) Removal and/or damage to flora or cultural or heritage objects on site, and/or killing of wildlife ..... number (No)
(i) Illegal hunting ..... number (No)
(j) Urination and defecation anywhere except in designated areas ..... number (No)

The unit of measurement shall be the number of less serious violation incidents. The penalty rates applied shall be those stated in clause G 10.03.

The Engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

Item **Unit**

G 11.04 Contractor's time related obligations in respect of

Environmental management plans and specifications ..... monthly

The tendered monthly amount shall represent full compensation for that part of the Contractor's general obligations in terms of the environmental management plans and specifications which are mainly a function of time. This includes inter alia payment of all costs of the approved designated environmental office (DEO) and other staff contemplated in the administration of the environmental obligations, including the transport of employees on site. Payment will be monthly. The following obligations will be directed by the Audit reports to be compiled by the Environmental control officer and that report will give a clue on the basis of contractor's compliance on the below obligations:

Below is the list of time related obligations in respect of EMP specifications but not limited to:

- Servicing of Toilets on site & Submission of proof of safe of disposal
- Dust Suppression
- Cleaning of spillages on site
- Methods statement for all the activities
- Waste disposal and proof of safe disposal (Registered landfill site)
- Designated Environmental officer (Full time on site)
- Administration for all the required documents for Environmental Compliance
- Maintenance of site camp standard
- Provision of all the Covid-19 requirements

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Contractor's initial obligations in respect to Environmental Management Plans Specifications……Lump Sum

- Site Establishment
- Fencing of Borrow pits & Quarrying Area
- Provision of Toilets on site, Quarrying and Borrow pit
- Provision of Waste Bins on sites for waste separations
- Legal Requirements in terms of NEMA
- Mining Requirements as per the Mine regulations and Bylaws.
- Methods statement for all the activities
- Waste management plan
- All necessary Signage's to be posted on site
- Provision of PPE

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Table 1: Mechanisms that Cause Environmental Impacts during Construction Activities

CONTENTS	ENVIRONMENTAL IMPACTS				
	POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS
Camp Establishment	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	High Sensitivity
Housing, Offices and laboratories	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Moderate Sensitivity
Accommodation of Traffic	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Moderate
Overhaul	Spillage Storage Noise/lights Dust control Exhaust fumes Washing waste	Turning circles Parking areas	Restrict access to sensitive areas	Protection of indigenous vegetation Preserve topsoil	Moderate

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CONTENTS	ENVIRONMENTAL IMPACTS				
	POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS
Clearing and grubbing	Waste treatment Hazardous waste Water supply Noise /lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Protection of indigenous vegetation Preserve topsoil	Moderate
Drainage	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Moderate
Borrow pits/Quarrying	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	High Sensitivity
Stockpiling	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Moderate/Low
Mass Earthworks	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Low-Moderate

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CONTENTS	ENVIRONMENTAL IMPACTS				
	POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS
Pavement layers	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Low
Asphalt works / sealing operations	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights Dust control Smoke control Storage of materials	Selection of site Preserve indigenous vegetation Preserve topsoil Turning circles Parking areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil	High Sensitivity
Ancillary roadworks	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Low-Moderate
Structures	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Low-Moderate

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CONTENTS	ENVIRONMENTAL IMPACTS				
	POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION	ALIEN VEGETATION	SENSITIVE AREAS
Concrete/Cement	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	Moderate to High

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Section 6.11 Guarantee	C5.3Annex III - Borrow Pit

BANK OR GUARANTOR'S LETTER HEAD)

(Reference number …….)

(Guarantee number …….)

The Regional Manager
The Department of Mineral and Energy
POLOKWANE

Dear Sir/ Madam

FINANCIAL GUARANTEE FOR THE REHABILITATION OF LAND DISTURBED BY MINING (EXECUTION OF ENVIRONMENTAL MANAGEMENT PROGRAMME)

1 Concerning the responsibility in terms of the Mineral and Petroleum Resources Development Act 28 of 2002, which is incumbent on

(hereinafter referred to as "the mine owner") to execute the environmental management programme approved in terms of the provisions of the said Act for the mine known as

situated in the magisterial district of ..... Province

, I/We.. , in my/our

Capacity/capacities of .

and as duly authorized representative ..

(Hereinafter referred to as "the guarantor") confirm that the amount of R

R () is
available to you for the purpose of executing the said environmental management programme.

2 The guarantor, who hereby waives the advantages of the exceptions non numerate pecuniae non causa debitiexecutionis et divisionis the meaning and the consequences of which is known to the guarantor undertakes to pay to you the said

sum of R..... (.....) upon
receipt of a written claim from you to do so and the claim may be submitted by you, if (in your opinion and discretion) the mine owner fails or remains in default to execute the said environmental management programme, or if he ceases mining/prospecting operations, or if his estate is sequestrated, or if he should hand over his estate in terms of the Insolvency act which are applicable in the Republic of South Africa, or if the guarantor gives written notice to you in terms of clause 5 of this agreement. The said claim may be instituted by you at any stage commencing from the date of

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signature of this guarantee.

3 The said amount of R.....may be held by you on the condition that you, after having complied with all the provisions of the said environmental management programme, will give account to the guarantor of how the amount was appropriated and repay any inappropriate amount to the guarantor.

4 This undertaking is neither negotiable nor transferable, and –

(a) must be returned to the guarantor when giving account to the guarantor in terms of clause 3 above,

(b) shall lapse on the granting of a closure certificate in terms of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and

(c) shall not be construed as placing any other responsibility on the guarantor other than the paying of the guaranteed amount.

5 The guarantor reserves the right to withdraw from this guarantee after having given you at least <u>three months</u> written notice in advance of his intention to do so.

Yours faithfully

……..…….. ……..……..

ADDRESS: ……

……

……

……

DATE: ……

PLEASE NOTE: (1) No amendments and/or additions to the wording of this Guarantee will be accepted.
(2) The address of the guarantee must be stated clearly.
(3) This guarantee must be returned to:

……..……..……

……..……..……

……..……..……

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PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

……..

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SECTION OHS : OHSA 1993 HEALTH AND SAFETY SPECIFICATION

OHS.1 SCOPE

This specification covers the health and safety requirements to be met by the Contractor to ensure a continued safe and healthy environment for all workers, employees and subcontractors under his control and for all other persons entering the site of works.

This specification shall be read with the Occupational Health and Safety Act (Act No 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2014, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHSA Agreement in Section C1.2.4 of the Contract document, the status of the Contractor as mandatory to the Employer (client) is that of an employer in his own right, responsible to comply with all provisions of OHSA 1993 and the Construction Regulations 2014.

This safety specification and the Contractor's own Safety Plan as well as the Construction Regulations 2014, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following are possible risks associated with this project:

- Working high above the ground on top and below the bridge, most of the time in a restricted environment with limited landings (working platforms)
- Working above a continuously flowing river and in an flood plain environment subject to flooding
- Lifting and lowering of materials and equipment from the ground to the bridge and vice versa, exposed to cross winds
- Steep and restricted access to the lower flood plain below the bridge
- Potentially dangerous existing services, i.e. gas lines, water and sewerage mains, electrical high voltage cables, on the bridge, buried and overhead
- Deep excavations in soils requiring shoring or reducing of slopes
- Blasting of hard rock or demolition of concrete
- High pressure during testing of the relocated pipe lines, which could result in potentially dangerous situations in the event of the pipeline of fittings failing
- Potentially harmful gasses when tying into the existing sewer mains
- Movement of construction vehicles on site, taking into consideration steep slopes, other traffic and existing services
- Exposure to possible injuries due to mishandling or failure of power and hand tools
- Falling debris, tools and materials from bridge
- Non-conformance to specifications with regards to fasteners and materials
- Risks related to general safety and security on site

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessary covered in the above.

OHS.2 DEFINITIONS

For the purpose of this contract the following shall apply:

(a) **Employer**" where used in the contract documents and in this specification, means the Employer

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as defined in the General Conditions of Contract and it shall have the exact same meaning as "**client**" as defined in the Construction Regulations 2014. "**Employer**" and "**client**" is therefore interchangeable and shall be read in the context of the relevant document.

(b) "**Contractor**" wherever used in the contract documents and in this specification, shall have the same meaning as "**Contractor**" as defined in the General Conditions of Contract.

In this specification the terms "**principal contractor**" and "**contractor**" are replaced with "**Contractor**" and "**subcontractor**" respectively.

For the purpose of this contract the **Contractor** will, in terms of OHSA 1993, be the mandatory, without derogating from his status as an employer in his own right.

(c) "**Engineer**" where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent on behalf of the Employer (the client as defined in the Construction Regulations).

OHS.3 TENDERS

The Contractor shall submit the following with his tender:

(a) a documented Health and Safety Plan as stipulated in Regulation 7 of the Construction Regulations. The Safety Plan must be based on the Construction Regulations 2014 and will be subject to approval by the Employer;

(b) a declaration to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Construction Regulations 2014;

(c) a declaration to the effect that he made provision in his tender for the cost of the health and safety measures envisaged in the Construction Regulations.

(d) Failure to submit the foregoing with his tender, will lead to the conclusion that the Contractor will not be able to carry out the work under the contract safely in accordance with the Construction Regulations.

OHS.4 NOTIFICATION OF COMMENCEMENT OF CONSTRUCTION WORK

After award of the contract, but before commencement of construction work, the Contractor shall, in terms of Regulation 4, notify the Provincial Director of the Department of Labour in writing if the following work is involved:

(a) the demolition of structures and dismantling of fixed plant of height of 3,0m or more;
(b) the use of explosives;
(c) construction work that will exceed 30 days or 300 person-days;
(e) excavation work deeper than 1,0m; or
(f) working at a height greater than 3,0m above ground or landings.

The notification must be done in the form of the pro forma included under Section 9 (Forms to be Completed by Successful Tenderer) of the tender document.

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A copy of the notification form must be kept on site, available for inspection by inspectors, Employer, Engineer, employees and persons on site.

OHS.5 RISK ASSESSMENT

Before commencement of any construction work during the construction period, the Contractor shall have a risk assessment performed and recorded in writing by a competent person. (Refer Regulation 9 of the Construction Regulations 2014).

The risk assessment shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The risk assessment shall be available on site for inspection by inspectors, Employer, Engineer, subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

OHS.6 APPOINTMENT OF EMPLOYEES AND SUBCONTRACTORS

6.1 Health and Safety plan

The Contractor shall appoint his employees and any subcontractors to be employed on the contract, in writing, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

6.2 Health and safety induction training

The Contractor shall ensure that all employees under his control, including subcontractors and their employees, undergo a health and safety induction training course by a competent person before commencement of construction work. No visitor or other person shall be allowed or permitted to enter the site of the works unless such person has undergone health and safety training pertaining to hazards prevalent on site.

The Contractor shall ensure that every employee on site shall at all times be in possession of proof of the health and safety induction training issued by a competent person prior to commencement of construction work.

OHS.7 APPOINTMENT OF SAFETY PERSONNEL

7.1 Construction Supervisor

The Contractor shall appoint a full-time **Construction Supervisor** with the duty of supervising the performance of the construction work.

He may also have to appoint one or more competent employees to assist the construction supervisor where justified by the scope and complexity of the works.

7.2 Construction safety officer

Taking into consideration the size of the project and the hazards or dangers that can be expected, the Contractor shall appoint in writing a full-time or part-time **Construction Safety Officer** if so

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decided by the Inspector of the Department of Labour. The Safety Officer shall have the necessary competence and resources to perform his duties diligently.

Provision shall be made by the Contractor in his rates, to cover the cost of this dedicated construction safety officer appointed after award of the contract.

7.3 Health and safety representatives

In terms of **Section 17 and 18 of the Act (OHSA 1993)** the Contractor, being the employer in terms of the Act for the execution of the contract, shall appoint a **health and safety representative** whenever he has more than 20 employees in his employment on the site of the works. The health and safety representative must be selected from employees who are employed in a full-time capacity at a specific workplace.

The number of health and safety representatives for a workplace shall be at least one for every 100 employees.

The function of health and safety representative(s) will be to review the effectiveness of health and safety measures, to identify potential hazards and major incidents, to examine causes of incidents (in collaboration with his employer, the Contractor), to investigate complaints by employees relating to health and safety at work, to make representations to the employer (Contractor) or inspector on general matters affecting the health and safety of employees, to inspect the workplace, plant, machinery etc. on a regular base, to participate in consultations with inspectors and to attend meetings of the health and safety committee.

7.4 Health and safety committee

In terms of Sections **17 and 18 of the Act (OHSA 1993)** the Contractor (as employer), shall establish one or more **health and safety committee(s)** where there are two or more health and safety representatives at a workplace. The persons selected by the Contractor to serve on the committee shall be designated in writing.
The function of the health and safety committee shall be to hold meetings at regular intervals, but at least once every three months, to review the health and safety measures on the contract, to discuss incidents related to health and safety with the Contractor and the inspector, and to make recommendations regarding health and safety to the Contractor and to keep record of recommendations and reports made by the committee.

7.5 Competent persons

In accordance with the Construction Regulations the Contractor has to appoint in writing **competent persons** responsible for supervising construction work on each of the following work situations that may be expected on the site of the works.

(a) Risk assessment and induction training as described in Regulation 9 of the Construction Regulations;
(b) Fall protection as described in Regulation 10;
(c) Excavation work as described in Regulation 13;
(d) Demolition work as described in Regulation 14;
(e) Scaffolding work as described in Regulation 16;
(f) Suspended platform operations as described in Regulation 17;
(g) Material hoists as described in Regulation 19;
(h) Bulk Mixing plant operations as described in Regulation 20;
(i) Explosive actuated fastening device as described in Regulation 21;

(j) Cranes as described in Regulation 22;
(k) Construction vehicle and mobile plant inspections on a daily basis by a competent person as described in Regulation 23(1);
(l) Control of all temporary electrical installation on the construction site as described in Regulation 24;
(m) Stacking and storage on construction sites as described in Regulation 28; and
(n) Fire precautions on construction sites as described in Regulation 29.

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to supervise at the same time the construction work on all the work situations for which he has been appointed.

The appointment of competent persons to supervise parts of the construction work does not relieve the Contractor from any of his responsibilities to comply with **all** requirements of the Construction Regulations.

OHS.8 RECORDS AND REGISTERS

In accordance with the Construction Regulations the Contractor is bound to keep records and registers related to health and safety on site for periodic inspection by inspectors, the Engineer, the Employer, trade union officials and subcontractors and employees. The following records and registers must be kept on site and shall be available for inspection at all times.

(a) A copy of the OHSA 1993 Construction Regulations 2014;
(b) A copy of this Health and Safety Specification;
(c) A copy of the Contractor's Health and Safety Plan (Regulation 7);
(d) A copy of the Notification of Construction Work (Regulation 4);
(e) A health and safety file in terms of Regulation 7(1b) with inputs by the Construction Safety Officer (Regulation 8(5));
(f) A copy of the risk assessment described in Regulation 9;
(g) A full protection plan and the corresponding records of evaluation and training of employees working from elevated positions as described in Regulation 10;
(h) Drawings pertaining to the design of structures (Regulation 11(1c)) and temporary works (Regulation 10) must be kept on site;
(i) Pronouncement of the safety of excavations must be recorded in a register to be kept on site (Regulation 13(2)(h));
(j) A copy of the certificate of the system design for suspended platforms (Regulation 17(3));
(k) A notice must be affixed around the base towers of material hoists to indicate the maximum mass load, which may be carried at any one time by material hoists (Regulation 11(2));
(l) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site (Regulation 19(8));
(m) A record of any repairs to or maintenance of a batch plant must be kept on site (Regulations 19(8));
(n) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used (Regulation 21(2));
(o) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant (Regulation 23(1) (k)).

OHS.9 CONTRACTORS RESPONSIBILITIES

For this contract the Contractor will be the mandatory of the Employer (Client), as defined in the Act (OHSA 1993), which means that the Contractor has the status of employer in his own right in respect of the contract. The Contractor is therefore responsible for all the duties and obligations of an

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employer as set out in the Act (OHSA 1993) and the Construction Regulations 2014.

Before commencement of work under the contract, the Contractor shall enter into an agreement with the Employer (Client) to confirm his status as mandatory (employer) for the contract under consideration.

The Contractor's duties and responsibilities are clearly set out in the Construction Regulations 2014, and are not repeated in detail but some important aspects are highlighted hereafter, without relieving the Contractor of any of his duties and responsibilities in terms of the Construction Regulations.

(a) Contractor's position in relation to the Employer (Client) (Regulation 5)

In accordance with Section 4 of the Regulations, the Contractor shall liaise closely with the Employer or the Engineer on behalf of the Employer, to ensure that all requirements of the Act and the Regulations are met and complied with.

(b) The Principal Contractor and Contractor (Regulation 7)

The Contractor is in terms of the definition in Regulation 2(b) the equivalent of Principle Contractor as defined in the Construction Regulations, and he shall comply with all the provisions of Regulation 7.

Any subcontractors employed by the Contractor must be appointed in writing, setting out the terms of the appointment in respect of health and safety. An independent subcontractor shall however provide and demonstrate to the Contractor a suitable, acceptable and sufficiently documented health and safety plan before commencement of the subcontract. In the absence of such a health and safety plan the subcontractor shall undertake in writing that he will comply with the Contractor's safety plan, the health and safety specifications of the Employer and the Construction Regulations 2014.

(c) Management Supervision of construction work (Regulation 8)

The Contractor shall appoint the safety and other personnel and employees as required in terms of Regulation 8 and as set out in paragraph 7 above. Appointment of those personnel and employees does not relieve the Contractor from any of the obligations under Regulation 8.

(d) Risk assessment for construction works (Regulation 9)

The Contractor shall have the risk assessment made as set out in paragraph 3 above before commencement of the work and it must be available on site for inspection at all times. The Contractor shall consult with the health and safety committee or health and safety representative(s) etc. on a regular basis to ensure that all employees, including subcontractors under his control, are informed and trained by a competent person regarding health hazards and related work procedures.

No subcontractor, employee or visitor shall be allowed to enter the site of works without prior health and safety induction training, all as specified in Regulation 9.

(e) Fall protection (Regulation 10)

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Fall protection, if applicable to this contract shall comply in all respects with Regulation 10 of the Construction Regulations.

(f) Structures (Regulation 11)

The Contractor will be liable for all claims arising from collapse or failure of structures if he failed to comply with all the specifications, project specifications and drawings related to the structures, unless it can be proved that such collapse or failure can be attributed to faulty design or insufficient design standards on which the specifications and the drawings are based.
In addition the Contractor shall comply with all aspects of Regulation 11 of the Construction Regulations.

(g) Temporary works (Regulation 12)

The Contractor will be responsible for the adequate design of all formwork and support structures by a competent person.

All drawings pertaining to formwork shall be kept on site and all equipment and materials used in formwork, shall be carefully examined and checked for suitability by a competent person.

The provisions of Regulation 12 of the Construction Regulations shall be followed in every detail.

(h) Excavation (Regulation 13)

It is essential that the Contractor shall follow the instructions and precautions in the Standard Specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The Contractor shall therefore ensure that all excavation work is carried out under the supervision of a competent person, that inspections are carried out by a Professional Engineer or Technologist, and that all work is done in such a manner that no hazards are created by unsafe excavations and working conditions.

Supervision by a competent person will not relieve the Contractor from any of his duties and responsibilities under Regulation 13 of the Construction Regulations.

(i) Demolition work (Regulation 14)

Whenever demolition work is included in a contract, the Contractor shall comply with all the requirements of Regulation 14 of the Construction Regulations. The fact that a competent person has to be appointed by the Contractor does not relieve the Contractor from any of his responsibilities in respect of safety of demolition work.

(j) Tunneling (Regulation 15)

The Contractor shall comply with Regulation 15 wherever tunneling of any kind is involved.

(k) Scaffolding (Regulation 16)

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The Contractor shall ensure that all the provisions of Regulation 16 of the Construction Regulations are complied with. [Note: Reference in the Regulations to "Section 44 of the Act" should read "Section 43 of the Act"].

(l) Suspended platforms (Regulation 17)

Wherever suspended platforms will be necessary on any contract, the Contractor shall ensure that copies of the system design issued by a Professional Engineer are submitted to the Engineer for inspection and approval. The Contractor shall appoint competent persons as supervisors and competent scaffold erectors, operators and inspectors and ensure that all work related to suspended platforms are done in accordance with Regulation 17 of the Construction Regulations.

(m) Rope Access (Regulation 18)

Where rope access are required on the construction site, the Contractor shall comply with Regulation 18.

(n) Material Hoists (Regulation 19)

Wherever applicable, the Contractor shall comply with the provisions of Regulation 19 to the letter.

(o) Bulk Mixing plants (Regulation 20)

Wherever applicable, the Contractor shall ensure that all lifting machines, lifting tackle, conveyors, etc. used in the operation of a batch plant shall comply with, and that all operators, supervisors and employees are strictly held to the provisions of Regulation 20. The Contractor shall ensure that the General Safety Regulations (Government Notice R1031 of 30 May 1986), the Driven Machinery Regulations (Government Notice R295 of 26/2/1988) and the Electrical Installation Regulations (Government Notice R2271 of 11/10/1995) are adhered to by all involved.

In terms of the Regulations, records of repairs and maintenance shall be kept on site.

(p) Explosive actuated fastening devices (Regulation 21)

The Contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 21 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

(q) Cranes (Regulation 22)

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 22 shall be complied with.

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(r) Construction vehicles And mobile plant (Regulation 23)

The Contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers or operators who have received appropriate training, all in accordance with all the requirements of Regulation 23.

All vehicles and plant must be inspected on a daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

(s) Electrical installation and machinery on construction sites (Regulation 24)

The Contractor shall comply with the Electrical Installation Regulations (Government Notice R2920 of 23 October 1992) and the Electrical Machinery Regulations (Government Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over or on the site.

All temporary electrical installations on the site shall be under the control of a competent person, without relieving the Contractor of his responsibility for the health and safety of all workers and persons on site in terms of Regulation 24.

(t) Use of temporary storage of flammable liquids on construction sites (Regulation 25)

The Contractor shall comply with the provisions of the General Safety Regulations (Government Notice R1031 of 30 May 1986) and all the provisions of Regulation 25 of the Construction Regulations to ensure a safe and hazard-free environment to all workers and other persons on site.

(u) Water environments (Regulation 26)

Where construction work is done over or in close proximity to water, the provisions of Regulation 26 shall apply.

(v) Housekeeping and general safeguarding on construction sites (Regulation 27)

Housekeeping on all construction sites shall be in accordance with the provisions of the environment Regulations for workplaces (Government Notice R2281 of 16 October 1987) and all the provisions of Regulation 27 of the Construction Regulations.

(w) Stacking and storage on construction sites (Regulation 28)

The provisions for the stacking of articles contained in the General Safety Regulations (Government Notice R1031 of 30 May 1986) as well as all the provisions Regulation 28 of the Construction Regulations shall apply.

(x) Fire precautions on construction sites (Regulation 29)

The provisions of the Environmental Regulations for Workplaces (Government Notice R2281 of 16 October 1987) shall apply.

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In addition the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 29 of the Construction Regulations.

(y) Construction welfare facilities (Regulation 30)

The Contractor shall comply with the construction site provisions as in the Facilities Regulations (Government Notice R1593 of 12 August 1988) and the provisions of Regulation 30 of the Construction Regulations.

(z) Non-compliance with the Construction Regulations 2014

The foregoing is a summary of parts of the Construction Regulations applicable to all construction projects.

The Contractor, as employer for the execution of the contract, shall ensure that all provisions of the Construction Regulations applicable to the contract under consideration are complied with to the letter.

Should the Contractor fail to comply with the provisions of the Regulations 4 to 30 as listed in Regulation 33, he will be guilty of an offence and will be liable, upon conviction, to the fines or imprisonment as set out in Regulation 33.

The Contractor is advised in his own interest to make a careful study of the Act and the Construction Regulations as ignorance of the Act and the Regulations will not be accepted in any proceedings related to non-conformance to the Act and the Regulations.

OHS.10 MEASUREMENT AND PAYMENT

10.1 Principles

It is a condition of this contract that Contractors, who submit tenders for this contract, shall make provision in their tenders for the cost of all health and safety measures during the construction process. All associated activities and expenditure are deemed to be included in the Contractor's tendered rates and prices.

(a) Safety personnel

The Construction Supervisor, the Construction Safety Officer, Health and Safety Representatives, Health and Safety Committee and Competent Persons referred to in clauses 9.1 to 9.5 shall be members of the Contractor's personnel, and no additional payment will be made for the appointment of such safety personnel.

(b) Records and Registers

The keeping of health and safety-related records and registers as described in 8 is regarded as a normal duty of the Contractor for which no additional payment will be considered, and which is deemed to be included in the Contractor's tendered rates and prices.

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C5.4 Part H Annex IV - Health and Safety Specification

Project		CONSTRUCTIKON OF MARBLE HALL EXTENSION 6 STORMWATER (PHASE 5)	
Client		Ephraim Mogale Local Municipality	
Prepared By		Complied By	Approved By

		DOCUMENT CHANGE RECORD	
Rev	Date	Section(s) change(d)	Description of Revision

H 1. Introduction

Construction regulation 7(1) states that a principal contractor shall provide and demonstrate to the client a suitable and sufficiently documented health and safety plan based on the client's documented health and safety specifications which shall be applied from the date of commencement of and for the duration of the construction work

This document therefore describes the health and safety specifications required by the client for any principal contractor who is making a bid for or who has been appointed to perform construction work on behalf of the client. [Ref. CR 5(1)(b)]. The specification is based on relevant legislation as a minimum requirement and any best practices the client subscribes to that will contribute to an improved health and safety performance

Principal contractors are requested to compile their Health and Safety Plans including risk assessments,

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based on the specifications detailed and referred to, in this document. In other words, the Health and Safety Plan must specify how the principal contractor will control and manage all health and safety aspects on the construction site. The importance of the plan cannot be emphasized enough, as it is the direct response to these specifications which is the minimum health and safety standard required by the contractor on site.

The Health and Safety Plan and all required documentation that are part of the health and safety file on site must be reviewed and approved by the client's agent prior to the principal contractor commencing work on site.

H 2. Reference Documents

The following Acts and Regulations are referred to in this document followed by their abbreviations in brackets. Note that this is not an exhaustive list and other documents may be referred to if necessary, in order to compile a Health and Safety Plan:

2.1. Occupational Health and Safety Act, (Act No. 85 of 1993) and Mining Health and Safety Act - [OHSA] and Regulations as follows:

- Construction Regulations [CR]
- General Admin Regulations [GAR]
- General Safety Regulations [GSR]
- Environmental Regulations for Workplaces [ERW]
- Hazardous Chemical Substances Regulations [HCSR]
- Lead Regulations [LR]
- Noise Induced Hearing Loss Regulations [NIHLR]
- General Machinery Regulations [GMR]
- Electrical Installation Regulations [EIR]
- Electrical Machinery Regulations [EMR]
- Pressure Equipment Regulations [PER]
- Basic Conditions of Employment Act (Act 75 of 1197)
- National Environmental Management Act no 107 of 1998

2.2. Compensation for Occupational Injury and Diseases Act – [COIDA]

2.3. The Gauteng Noise Control regulation (GN 5479 of 1999)

2.4. Standards applicable such as:

- SANS10103 the Measurement and Rating of Environmental Noise with Respect to annoyance and to Speech Communication.

H 3. Definitions

The following definitions apply. (Abbreviations and legal references in brackets where applicable):

Construction Work [CR 1]:
Means any work in connection with –

a) The erection, maintenance, alteration, renovation, repair, demolition or dismantling of or an addition to a building or any similar structure;

b) The installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling;

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c) The construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or

d) The moving of earth, clearing of land or making of an excavation or work on any similar type of work.

Hazard Identification, Risk Assessment and Risk Control (HIRA)

Means a documented plan, which identifies hazards, assesses the risks and detailing the control measures and safe working procedures, which are to be used to mitigate and control the occurrence of hazards and risks during construction or operation phases.

Site

Means the area in the possession of the Contractor for the construction of the works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the client.

Hazard

Means a source of or exposure to danger (source which may cause injury or damage to persons or property)

Risk

Means the probability or likelihood that a hazard can result in injury or damage.

Construction Manager [CR 8(1)

Means a full time, competent employee appointed in writing by the Contractor to supervise construction work. The appointment, as required by the OHSA, shall stipulate health and safety responsibilities, area of responsibility and the proposed duration of the project.

Hazardous Chemical Substance (HCS)

Means any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture or substances for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health.

Construction Plant

Encompasses all types of plant including but not limited to, cranes, piling frames, boring machines, excavators, dewatering equipment and road vehicles with or without lifting equipment.

Contractor [CR 1]

Means an employer [OHSA 1] who performs construction work and includes principal contractors and sub-contractors

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Health and Safety Plan (HSP) [CR 1]

Means a documented plan, which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.
The plan shall be applied from the date of commencement of and for the duration of construction work [CR 7(1)]

Health and Safety File (HSF) [CR 1]

The file holding all documentation and records on health and safety for the project, which shall be available at all times for evaluation, and a copy of which will be forwarded to the client upon completion of the project.

Disabling Injury Frequency Rate (DIFR)

The number of disabling injuries (DI's) multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Disabling Injury Severity Rate (DISR)

The number of days lost due to DI's multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Confined Space

An enclosed, restricted or limited space in which, because of its construction, location or contents, or any work carried on therein, a hazardous substance may accumulate, or an oxygen deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, machinery or object in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present.

H 4. Responsibilities of Contractors for Construction Work

H 4.1. Notification of Intention to Commence Construction Work [CR 4]

The principal contractor shall within 7 days notify the Provincial Director of the Department of Labour before any work commences, in accordance with the following requirements:

- The demolition of a structure exceeding a height of 3 meters; or
  The use of explosives to perform construction work; or
- The dismantling of fixed plant at a height greater than 3 meters;
  or
- The work exceeds 30 days or will involve more than 300 person days of construction work; and
- Includes excavation work deeper than 1 meter; or
- Includes working at a height greater than 3 meters above ground or a landing.

The notification must be done on a form similar to that shown in **Annexure** and a copy of the completed form kept in the HSF for inspection by an inspector, the client or an employee.

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H 4.2. Principal Contractor's Responsibilities [CR 7]

a) Compile a HSP [CR 7(1)
b) Ensure co-operation between all contractors to comply to the Act
c) Provide and demonstrate to the client a suitable, sufficiently documented and coherent site specific health and safety plan, based on this client's health and safety specifications of which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the principal contractor as work progresses.
d) Ensure compliance to the Act in terms of
    a) Provide relevant sections of these specifications to contractors as required
    b) Appoint each contractor in (a) above in writing. Only contractors who have the necessary competencies and resources may be appointed
    c) Ensure each contractor's HSP is implemented and maintained on site
    d) Stop any contractor from work which is not in accordance with HSP's or which pose a threat to health and safety of persons
    e) Sufficient information is provided to contractors where there are changes to design and construction
    f) Ensure every contractor is registered and in good standing with the Compensation Commissioner
    g) Ensure potential contractors have made provision for the cost of health and safety measures
e) Negotiate and approve the HSP of each contractor
f) All HSP's including the principal contractor's to be available on site
g) All HSF's including the principal contractor's to be available on site
h) A consolidated HSF to be handed over to the client on completion of construction including records of drawings, designs etc
i) HSF to include updated list of all contractors, the agreements and their type of work

H 4.3. Contractor's Responsibilities (including sub-contractors)

a) Provide their HSP to the principal contractor
b) Where a contractor appoints another contractor (sub-contractor) it is the responsibility of that contractor to apply a) above as if he were the principal contractor.
c) No contractor to appoint another contractor (sub-contractor) unless the latter has the necessary competency and resources to perform the required work.
d) To provide any information which affects the health and safety of any persons at work to the principal contractor.

H 4.4. Supervision of Construction Work [CR 8]

The appointments embodied in this regulation are as follows:

a) Construction Manager [CR 8(1)]
b) Assistant construction manager [CR 8(2)]
c) Safety officer [CR 8(5)], in terms of the nature of project such Safety Officer must be full-time on site and must avail him/herself whenever there is work at the Quarry. Registered with SACPCMP council.
d) Construction Supervisor [CR 8(7)]

The detailed requirements of these appointments can be found under the relevant regulation. In terms

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of competence of these appointees, they are to be approved by the client's agent before being appointed for the project.

H 4.5. Legal Appointments

The principal contractor shall ensure copies of the appointment letters of all responsible persons appointed on site will be kept in the HSF. All legal appointments shall be conducted in accordance with the requirements set out in the OHSA and as per this specification. The appointment protocols for the CR and the OHSA are set out in the tables below. It should be noted that these represent complete lists and not all these appointments may be required:

H 4.5.1. Construction Regulations

Reg.	Appointment	Appointee	Appointed by	Represented by
CR 7(1 c)	Principal Contractor	16(2) for the company	Client	Project Manager
CR7 (3)	Contractor	Competent person	Principal Contractor	16(2)
CR 8 (1)	Construction Manager	Competent person	Principal Contractor	16(2)
CR 8 (2)	Assistant Construction Manager	Competent person	Principal Contractor	16(2)
CR 8 (5)	Safety Officer (SACPCMP registered)	Competent person	Principal Contractor	16(2)
CR 9 (1)	Risk Assessor	Competent person	Principal Contractor	16(2)
CR 10 (1a)	Fall Protection Planner	Competent person	Principal Contractor	16(2)
CR 11(2 a)	Structure Inspector	Competent person	Principal Contractor	16(2)
CR 12 (a)	Formwork & Support work Inspector	Competent person	Principal Contractor	16(2)
CR 13 (1)	Excavation Work Inspector	Competent person	Principal Contractor	16(2)
CR 14 (1)	Demolition Work Supervisor	Competent person	Principal Contractor	16(2)
CR 17	Suspended Platform Supervisor	Competent person	Principal Contractor	16(2)
CR 20	Batch Plant Supervisor	Competent person	Principal Contractor	16(2)
CR 21	Explosive power tool Controller	Competent person	Principal Contractor	16(2)
CR 22	Mobile Crane Operator	Competent person	Principal Contractor	16(2)

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CR 23	Construction Vehicle Inspector	Competent person	Principal Contractor	16(2)
CR 24	Temporary Electrical Installation Inspector	Competent person	Principal Contractor	16(2)
CR 28	Stacking and Storage Supervisor	Competent person	Principal Contractor	16(2)
CR 29	Fire Equipment Inspector	Competent person	Principal Contractor	16(2)
CR 29	Fire Team Members	Competent person	Principal Contractor	16(2)

OHS Act

Reg.	Appointment	Appointee	Appointed by	Represented by
OHSA 16 (1)	16 (1)	CEO	Board members	
OHSA 16 (2)	16 (2)	Contract Manager	16(1)	CEO
OHSA 17 (1)	Health & Safety Rep	Nominated employee	16(1)	CEO
OHSA 8	Hand Tools Inspector	Competent person	Principal Contractor	16(2)
GAR 9 (2)	Incident Investigator	Competent person	Principal Contractor	16(2)
GSR 3 (4)	First Aider	Competent person	Principal Contractor	16(2)
GSR 13	Ladder Inspector	Competent person	Principal Contractor	16(2)
FR 9	Welfare Facilities Inspector	Competent person	Principal Contractor	16(2)
HCSR 3	Hazardous Chemical Substances Co-ordinator	Competent person	Principal Contractor	16(2)
DMR 18 (11)	Lifting Equipment Operator	Competent person	Principal Contractor	16(2)
DMR 18 (5)	Lifting Equipment Inspector	Competent person	Principal Contractor	16(2)
PER 10	Portable Gas Bottle Inspector	Competent person	Principal Contractor	16(2)

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The responsibilities of each appointment are detailed in the relevant written appointment form, which are signed by both the authorised person and the appointee and kept in the Health and Safety file.

H 5. Documentation and Procedures

All required documentation for the construction work, shall be kept in the HSF, which shall be available on site. The Construction Supervisor shall be responsible for the file on site and ensure that documentation is valid and up to date. The procedures to be used for the project are to be in accordance with contractor policy and as per the outcome of the HRA exercise. It is required that the documentation is filed in an orderly fashion for easy access. The following sections are suggested:

- Policies, permits etc
- Health & Safety plans, specifications
- Appointments
- Incident management
- Inspection checklists
- Risk assessments
- Training and Competency
- Procedures
- Hazardous Chemical Substances
- Environmental Risk Assessments and protocols

H 6. Application of COIDA and OHSA to Construction Work

H 6.1Compensation of Occupational Injuries and Diseases Act, Act No. 130 of 1993 (COIDA)

Every contractor shall provide proof of registration and updated letter of good standing with the Compensation Commissioner.

H 6.2Occupational Health and Safety Policy [OHSA 7] and copy of the Act [GAR 4]

Every contractor's OHS Policy statement should be available for scrutiny and as evidence of their commitment their employees' occupational health and safety. If the contractor has 5 or more employees on site, a copy of the OHS Act and regulations must be available on the site and ensure that such copies are displayed at visible areas such site offices, boardrooms and notice boards.

H 6.3Health and Safety Training and Competency

Training of personnel is a necessity and a legal requirement when required. A record of all training shall be kept and provided on request.

H 6.3.1 Induction Training

The principal contractor shall be responsible for the induction of all personnel entering the site including visitors, inspectors etc. An identification card confirming induction training must be carried by all contract personnel and site security informed so that only contractors carrying a card may be admitted to the site. Contractors doing specific construction work shall be responsible for the induction of their employees with respect to that specific work.

H 6.3.2 Awareness Training

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In addition, the client would favour awareness training to be carried out such as Toolbox Talks on relevant topics e.g. manual lifting, wearing PPE, safe use of portable electric tools etc.

H 6.3.3 Competency and CV's

Where applicable, valid copies of certificates of competency of appointed personnel to be provided and kept in the HSF. Other training requirements such as those identified through the HIRA process, to be completed and proof of that training also kept in the HSF. Where competency is achieved through experience, a brief CV will be required.

H 6.3.4 Specific OHS training

Valid certificates of training from registered service providers preferably accredited by the appropriate SETA are required for First Aiders, H&S reps, Fire Marshals etc.

H 6.3.5 Medical Fitness

All employees will have entry and exit valid medical fitness certificate, certified by a HPCSA registered occupational medical practitioner to be fit for work. See the annexure 3A template

H 6.4Hazards and Potentially Hazardous Situations [OHSA 13]

The principal contractor is responsible to ensure that all contractors and any visitors are warned of any hazardous or potentially hazardous situations, which may affect them on site and shall put any additional measures in place to assist in mitigating the risk of these hazards.

H 6.5Health and Safety Reps [OHSA 17 and 18]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required and to ensure similar compliance of all contractors. All contractors are required to have at least one OHS rep even if the minimum requirement of 20 employees is not met.

H 6.6Health and Safety Committee [OHSA 19 and 20]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required. A health and safety committee must be formed that will be chaired by the principal contractor's 16(2) and which will consist of all OHS reps from both the principal contractor and all contractors. They will meet at least once a month and a record kept of all meetings.

H 6.7General Record Keeping

The principal contractor shall ensure that all Health and Safety records, required by OHSA and Regulations are kept for reference purposes and auditing.

H 6.7.1 Inspections

The principal contractor shall keep all records of inspections undertaken during the contract. The total list of

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inspections can be found under **Annexure 1 (at the bottom) .** An assessment will need to be made of what inspections are required and their frequency. The principal contractor is also responsible to ensure compliance to this requirement by all contractors.

H 6.7.2 Audits

The client's agent shall carry out regular audits on the principal contractor at least once per month. Similarly, principal contractors shall be responsible for carrying out regular audits on their contractors at least once per month. The results shall be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate. Records of such meetings must be kept in the file, made available upon request by inspector, client or client's agent.

H 6.8 Incident management and emergency plans

The principal contractor shall create an Emergency Plan for the construction site. The plan shall be clearly laid out for all types of emergencies including responsibilities, evacuation routes, siren, emergency no.'s etc. The plan shall be fully explained to all personnel during the induction training. All contractors will become completely familiar with the requirements of the plan and will participate in any evacuation drills that may take place.

H 6.8.1 First Aid [GSR 3]

The principal contractor shall be responsible to ensure compliance to this regulation as required. In particular, a first aid box with the minimum stock as specified in the regulation will be located at the site office and there will be signage to indicate the location of the box. Attention is drawn to GSR 3(4) for the requirement of trained first aiders. It is also suggested that a trained first aider be made responsible for the box in terms of the following:

a) Security – the box should not be left open but it must be accessible in case of emergency (spare key availability)
b) Injuries - a record of first aid box injuries treated and the stock issued (Dressing Register)
c) Stock – a regular inspection to maintain stock levels and check expiry dates

In addition, the first aid requirements should be noted for high risk substances or hazardous chemical substances and if these are to be used, then it should be addressed in the HRA and the need for eye wash facilities assessed.

H 6.8.2 Incidents and Injuries

a) Incidents

The principal contractor shall provide evidence by means of a procedure or chart that he is fully aware of the "hierarchy" of incidents that can occur e.g. unsafe situations, near misses, first aid box injuries, medical cases, disabling injuries etc. He shall keep an incident register of all such incidents, investigate and apply corrective action where required. The client also reserves the right to request incident statistics from the principal contractor such as DI's, DIFR and DISR and it is advised that these are maintained.

b) Injuries

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First aid box injuries have been addressed under 6.8.1 above. More serious injuries requiring transport of the injured person to the nearest hospital or doctor or the calling of an ambulance and paramedic personnel will be the responsibility of the principal contractor's appointed personnel such as the Construction Supervisor, First Aider and Safety Officer. It is advised that all required emergency numbers be on hand and prominently displayed.
As all contractors are registered and in good standing with the Compensation Commissioner, it will be the responsibility of the contractor whose employee has been injured, to make the necessary report and claims to the Commissioner.

H 6.8.3 Accident and Incident Reporting and Investigation [OHSA 24, GAR 8, 9 (1) & (2)]

Should an incident or accident investigation need to be conducted, a competent person shall be appointed to conduct the said investigation. The procedure to be followed will be in accordance with Annexure 1 of GAR 9 – "Recording and Investigation of incidents". A copy of this annexure can be found under **Annexure 2 (at the bottom)** in this document
Particular attention is also drawn to OHSA 24, the reporting of certain incidents to an inspector of the Department of Labour
The principal contractor shall ensure that the investigations are kept for record purposes and he shall ensure that the outcome of the investigation is communicated to all affected parties as required i.e. the client and contractors
The client reserves the right to participate in all investigations into accidents or incidents and to conduct their own investigation if required.

H 6.8.4 Fire Precautions on Construction Site.

A contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, ensure that:

- All appropriate measures are taken to avoid the risk of fire.
- A sufficient and well-functioning mobile fire alarm must be in place.
- Sufficient and suitable storage is provided for flammable liquids, solids and gases.
- Smoking is prohibited and notices in this regard are prominently displayed in all places containing readily combustible or flammable materials.
- Combustible materials do not accumulate on the construction site; (welding, flame cutting and other hot work are done only after appropriate precautions have been taken to reduce the risk of fire.
- Suitable and sufficient fire-extinguishing equipment is placed at strategic locations or as may be recommended by the Fire Chief or local authority concerned, and that such equipment is maintained in a good working order.
- The fire equipment contemplated in paragraph (g) is inspected by a competent person, who has been appointed in writing for that purpose, in the manner indicated by the manufacturer thereof:

(i) A sufficient number of workers are trained in the use of fire- extinguishing equipment;) where appropriate, suitable visual signs are provided to clearly indicate the escape routes in the case of a fire.

- The means of escape is kept clear at all times; there is an effective evacuation plan providing for all:
  - (i) Persons to be evacuated speedily without panic.
  - (ii) Persons to be accounted for at the Assembly point.

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H 6.9 Contractors and suppliers [OHSA 37(2)]

The client shall enter into an "Agreement with Mandatory" in terms of Section 37(2) of the Occupational Health and Safety Act, 85 of 1993, with all appointed principal contractors, a copy of which can be found under **Annexure 3 (at the bottom)**. Likewise, all principal contractors shall enter into a similar agreement with all contractors, sub-contracted to them for the duration of their contract. Please note that if contractors hire any construction vehicles including operator, the companies from which the equipment is hired are subject to the requirements as "contractors" detailed in this document

The principal contractor shall ensure that all contractors are issued with this safety specification where reasonably practicable including any contractor pack for the project, should they not be contained in the safety specification.
The principal contractor shall assist and ensure that contractors engaged comply with all of these requirements and adhere to the requirements set out in the OHSA. Contractors will be stopped from working in the event of unsafe conditions and activities being observed.
All contractors shall be subject to the requirements specified in the HSP and will be issued with a copy of the plan. If the contractor is not able to comply with the requirements set out in the plan, he shall not be appointed as contractor.

H 6.10 Personal Protective Equipment, Intoxication, Signage and Access Control [GSR 2]

H 6.10.1 Personal Protective Equipment (PPE) [GSR 2]

The principal contractor shall through the Risk Assessment process identify the specific PPE needs per activity. Contractors, as employers, will be responsible for the issue of the required PPE. Should PPE be lost or stolen, then the employee will be issued with new PPE. Should PPE be worn out or damaged, the user shall return the worn or damaged PPE and will be issued with a replacement. Contractor is required to issue PPE every after 6 months, whether worn out or damaged. Training in the use of this shall be provided. Visitors shall be informed of PPE requirements prior to their visit so that they may enter the site.

H 6.10.2 Intoxication [GSR 2A]

The principal contractor shall be responsible to ensure that no persons may enter or remain at the construction site if under or apparently under the influence of intoxicating liquor or drugs. Random breathalyser testing shall be carried out using the marked ping pong ball method. If anyone Is found intoxicated such person must not allowed entry.

H 6.10.3 Display of signs [GSR 2B]

The principal contractor should make use of signage to assist in enforcing compliance to any requirement specified in this document or as required by law. Standard symbolic signs are acceptable for conveying these requirements where applicable.

H 6.10.4 Access control [GSR 2C]

The principal contractor shall be responsible to ensure control of all persons entering the construction site by means of the biometric access control system and access registrar controlled by the security guard. The reasons for this are as follows:

a) The principal contractor is the 'employer' on the site and for all intents and purposes is responsible for section 8 of OHSA for employees and contractors and section 9 for any other person on site such as visitors and inspectors

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b) All persons entering the site must undergo induction training to inform them of the hazards present on the site. This includes contractors, visitors, inspectors etc
c) The construction supervisor will be aware of who is on site and their function
d) The construction supervisor will be able to control tasks that may impact on other work being carried out on the site by a permit to work system
e) The number of people and their purpose on the site must be known in case of emergency and evacuation
f) Security reasons.

The principal contractor shall post conspicuous notices at the site informing all those entering the site of these requirements.

H 6.11 Ladders [GSR 13A]

The following requirements shall be complied with regarding Ladders and Ladder work:

a) A competent person shall be identified and appointed as the ladder inspector.
b) Where aluminium ladders cannot be used, then wooden ladders shall be straight grained, unpainted to allow for proper inspection of the grain for cracking.
c) Ladders shall be secured at the top and chocked at the base to prevent slipping.
d) Where chocking of the base is not possible, then the user shall ensure that the ladder is held in position by another employee when ascending the ladder.
e) Ladders shall be inspected a minimum once per month by the person appointed as the ladder inspector.
f) Proper storage shall be provided for all ladders when not in use.

H 6.12 Ramps [GSR 13B]

The following requirements shall be complied with regarding Ramps:

a) Is constructed in accordance with accepted standards
b) Has a safety factor of at least 2 with respect to the load it is expected to carry
c) Has an inclination to the horizontal of not more than 34^{o}
d) Every ramp steeper than 14^{o} is provided with stepping laths at suitable intervals which may be interrupted to allow for wheel barrows
e) All ramps higher than 2m must be provided on both sides with substantial handrails at least 900 mm and not more than 1000 mm in height and toe boards at least 150mm in height.

H 6.13 Pressure Equipment Regulations (Gas Bottles) [PER]

If gas bottle sets (Oxy-Acetylene for heating, cutting, welding) are used, these regulations, as required, shall be adhered to. Regular inspection of the sets shall be carried out. In particular:

- Only trained personnel shall operate such equipment.
- The Construction Supervisor shall ensure operation of the equipment is in accordance with the HIRA requirements and Safe Working Procedure (SWP) or method statement.
- All users shall undergo regular awareness training (toolbox talk) to ensure compliance.
- The Construction Supervisor shall ensure the required PPE is used.

H 6.14 Portable Electrical Tools [EMR 9]

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This regulation shall be complied with as a minimum requirement. Regular inspections of all Portable Electrical Tools such as drills, angle grinders etc, and shall be carried out. In particular:

- Only trained personnel shall operate such equipment.
- The Construction Supervisor shall ensure operation of the equipment is in accordance with the HIRA requirements and Safe Working Procedure (SWP).
- All users shall undergo regular awareness training (toolbox talk) to ensure compliance.
- The Construction Supervisor shall ensure the required PPE is used.

H 6.15 Permit to work (including hot work)

The principal contractor shall be responsible to ensure that:

- All work being carried out on the site has been approved through the necessary project control system
- Permits required from third parties such as town councils for utility and sewage services are in place
- If required, a permit system is operational so that work consisting of many tasks related to the construction on site, can be carried out without endangering the health and safety of personnel on site, neighbours and the public surrounding the site and/or causing damage to property.
- In particular, attention is drawn to GSR 9, which details the requirements for welding, flame cutting, soldering and similar operations (hot work).

H 6.16 Work in confined spaces [GSR 5]

The principal contractor shall be responsible to ensure that no work is carried out in a confined space unless it is safe to do so. All the requirements of this regulation shall be met. Attention is drawn to the fact that further precautions are required if hot work is to be carried out in a confined space as per GSR 5(5) and GSR 9(2).

In addition, CR 11(3)(j) specifies that excavations are regarded as confined spaces and these precautions need to be applied.

H 6.17 Noise within the construction site [NIHL]

The principal contractor shall be responsible to ensure compliance with this regulation where applicable within the construction site.

H 6.18 Noise impacting the surrounding neighbourhood

The principal contractor shall be responsible to ensure compliance as follows:

H 6.18.1 The Noise Control regulation (GN 5479 of 1999) provides:

- A uniform minimum standard for noise regulation in the Province
- Accommodates the specific circumstances of different neighbourhoods and areas, and
- Creates new mechanisms for effective enforcement in neighbourhoods.

Section 9(m) prohibits the use any power tool or power equipment used for **construction work, drilling work or demolition work**, or allow it to be used, in or near a residential area if it may cause a noise nuisance. Noise nuisance is defined as any sound, which disturbs or impairs, or may disturb or impair the convenience or peace of any reasonable person considering time of day and environment.

The regulations define a “disturbing noise” as meaning, “...a noise level that causes the ambient

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noise level to rise above the designated zone level, or if no zone level has been designated, the typical rating levels for ambient noise in districts which can be obtained from the following code of practice below.

H 6.18.2 The South African National Standard SANS 10103:2008 - The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication provides guidance in defining noise impact criteria limits and standards and is also used by local authorities in the control of environmental noise

The code of practice should be referred to obtain typical noise rating levels for various land use types and expected community response that may be elicited should these levels be exceeded.

H 6.19Hazardous Chemical Substances [HCSR]

The principal contractor shall be responsible to ensure compliance with this regulation where applicable within the construction site. A hazardous chemical substance is any toxic, harmful, corrosive irritant or asphyxiant substance or mixture of such substances for which an occupational exposure limit is prescribed or which creates a hazard to health. For example cement is a hazardous chemical substance.

The principal contractor shall ensure that all hazardous chemicals brought to site have a Material Safety Data Sheet (MSDS) and the users are made aware of the important sections of the MSDS such as:

- Hazards
- First aid measures
- Fire-fighting measures Accidental release measures
- Handling and storage Exposure control especially PPE
- Disposal

First Aiders shall be made aware of the MSDS and how to treat HCS incidents appropriately. Copies of MSDS's will be available on site and in the HSF.

H 6.20 Traffic control

The principal contractor shall appoint a competent person to design and maintain a site specific traffic control management plan and have this plan approved and accepted by the local authorities and have a copy available in the file.

The Principal Contractor shall ensure that a fulltime traffic safety officer be appointed in writing, upon the commencement of construction activities.
The traffic safety officer shall be tasked with regular inspections and movement of road traffic signs as per the approved traffic accommodation plans and will report to the safety officer.
This document must indicate the potential risk to the public or environment posed by all vehicles travelling to and from the areas of construction for the purpose of the construction work, and proposes methods to eradicate or minimize these risks. Such a plan must include the following aspects:

- Design of Traffic Management Plan
- Site specific base line risk assessment
- Protection of employees

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- Protection of pedestrians
- Specific signage and distances applicable
- Applicable training
- Appointments of road safety officers
- Management after hours/weekend/adverse weather conditions
- Setup and clearing of signage

The Principal Contractor will also put in place flagmen to control the entry and exit of vehicles to and from the site onto the public roads

The Principal Contractor must bear in mind that there are two villages within the proposed road. Therefore, traffic safety should be strengthened and timeously monitored.

H 6.21. Public Health and Safety

The contractor shall ensure that each person working on or visiting a site, and the surrounding community shall be made aware of the dangers likely to arise from onsite activities and the precautions to be observed to avoid or minimize those dangers. Appropriate health and safety signage shall be posted at all times.

H 6.22. Borrow Pit usage

There are two identified borrow pits authorised to borrow materials from. Contractor shall safely fence both borrow pits with access lockable gates installed.

Each borrow pit must have all the warning signs and emergency contact board attached to it.

Chemical toilets with toilet papers and hand-washing water shall be provided.

Contractor must ensure that each borrow as long as it is in use, it is stationed with a security guard and such security guard is provided with a guard-house at the gate.

Contractor must ensure that a safe excavation when borrowing material, it is adhered to and trucks are able to move around safely.

Ensure that excessive dust is controlled.

Material from the mine

The contractor will be required to collect material from the mine to be stockpiled in a designated area to be identified outside the mine.

All the loading plant will not be allowed to stay overnight at the mine and therefore the contractor will be required to make that arrangement on a daily basis to remove all the plant from the mine

Induction for all the personnel to enter the mine will be conducted timeously

Valid Medical fitness certificate will be required from a qualified Occupational Doctor

These requirements are in terms of the Mine Health and Safety Act, Act 29 of 1996.

- Every Borrow Pit must have a valid Mining Permit issued by the Department of Minerals and

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Energy.

- Adequately safeguard Borrow Pits to prevent unauthorized entry.
- Appropriate, conspicuous safety signs must be placed around the excavations.
- No undercutting or under mining may be allowed to take place in the Borrow Pit.
- All undesired material must be used to backfill the excavations made.
- Excavations to be sloped to a safe angel.
- All excavations must be design such that they will drain any water accumulated. Where this is impractical, means of protection must be provided.
- All operators must be appointed to work in Borrow Pits.
- All operators must be authorized to work with machinery in Borrow Pits.
- All vehicles working in Borrow Pits shall have reverse hooters, at least 3 mirrors for reversing and shall be fitted with a rotating light.
- All machinery working in the Borrow Pit shall have a certificate of compliance by a competent person.
- A monthly labour compliment report must be submitted of employees worked in a Borrow Pit.
- The contractor shall submit a Code of Practice on Trackless Mobile Machines to the Department of Minerals and Energy for approval.
- A Risk Assessment for each Borrow Pit must be submitted.

Note: Principal Contractor must note that road material will be collected from a mining area and such must be considered and ensure that the Mine health and safety act will be adhere to at all times.

H 7. Application of the Construction Regulations [CR]

H 7.1 Hazard Identification, Risk Assessment and Risk Control (HIRA) [CR 9]

The contractor shall prior to the commencement of any construction work perform a HIRA exercise, known as a Baseline Risk Assessment which will form part of the HSP for the project. An Issue Based Risk Assessment will be carried out during construction for any changes or variations to procedures or methods and Continuous Risk Assessments may be done during construction as a result of audit findings, inspections, hazard awareness etc.
A copy of the HIRA shall be made available for viewing to the client's agent and shall be kept in the HSF the contractor shall ensure that the outcome of all HIRA exercises will be conveyed to all relevant employees with respect to the hazards and the related control measures before any work commences.

Below is a list of activities, which may be considered for the risk assessment. The list is not exhaustive but covers the main activities applicable on site:

- Contractual appointments, agreements and notifications
- Traffic – restrictions, existing systems, site traffic
- Site security and access
- Existing services, overhead and underground
- Ground conditions / ground water
- Employees and visitors (all persons outside the construction site) safety and liaison

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- Demolitions, excavations using explosives
- Tree felling
- Activities that affect adjacent sites and roads during construction
- Excavations in particular those adjacent to roads or sidewalks Construction Vehicles and mobile plant use
- Stacking, storage and good housekeeping
- Use and storage of flammable and hazardous chemicals such as petrol, diesel, etc Use of hand tools
- Use of portable electrical equipment (power tools)
- Use of flammable and hazardous chemical substances
- Waste management such as removal of excavation waste and debris
- Environmental restraints such as excessive dust
- General hazards to site personnel such as cleaning, noise and dust and correct issuing of PPE
- Welfare facilities such as toilets, change rooms and eating areas
- Emergency evacuation
- Temporary site accommodation
- Construction activities

H 7.2 Excavations [CR13]

Section 1 of this regulation states that this work must be carried out under the supervision of a competent person, who has been appointed in writing. All the requirements of CR 13 shall be met. For inspection of excavations, attention is drawn to section 3(h), the records of which must be available on site.

Contractor shall consider the safety and health of the surrounding livestock and ensure that excavations that can be closed immediately are closed and that those that cannot be closed are solidly barricaded with warning signs.

H 7.3 Demolition [CR14]

Section 1 of this regulation states that this work must be carried out under the supervision of a competent person.

Contractor must in terms of section 4 (d), where the stability of an adjoining building road is likely to be affected by the removal of the guardrails (demolition), take steps to ensure the stability of such road and safety of persons.

Contractor must also ensure that no material is dropped to any point, which falls outside the exterior walls of the structure, unless it is effectively protected.

H 7.4 Batch Plants [CR 20]

Contractor will be collecting stone materials from a quarry at a mining area, to an established batch plant, where the contractor will need to comply to such mines health and safety requirements.

In terms of section 1 Contractor must appoint a competent person, for supervising such batch plant in writing

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and such person must be aware of the dangers involved within the operation and ensure precautionary measures are taken in the interest of health and safety.

All requirements of CR 20 shall be met if applicable.

H 7.5 Explosive powered tools [CR 21

Section 2(b) of this regulation states that these tools must be cleaned and inspected daily before use by an appointed, competent person and a trained person (3b) can only operate them.

Contractor must bear in mind that there might be any live explosives buried under at the quarry and ensure that an effective risk assessment is taken into consideration prior any mining.

All the requirements of CR 21 shall be met.

H 7.6 Cranes [CR 22] including lifting machines and lifting tackle [GMR 18]

If applicable, the requirements of CR 22 shall be met. If a mobile crane or other mobile plant is hired, only approved hire companies shall be contracted to provide such equipment. The Construction Supervisor shall ensure compliance of the provider to these regulations. In particular attention is drawn to the competence and fitness of the operator [section 1(d)] and the inspection of the equipment [section 1(j)].As far as GMR 18 is concerned, compliance to these requirements will be the responsibility of contractors using any lifting equipment and lifting tackle. Especially in lifting items such as mobile offices brought during site establishment.

H 7.7 Construction vehicles and mobile plant [CR 23]

It will be the responsibility of each contractor on site to ensure compliance of their construction vehicles and mobile plant to these regulations.

Each contractor will have to take into consideration the busyness of provincials roads and the public road users within, and make it a priority that such vehicles and plants are in perfect working conditions and road worthy in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996.

Contractor must ensure that all the tipper trucks that will be loading rocks from the quarry are well guarded, to prevent loaded rocks from falling.

This includes vehicles to be used for transporting personnel to and from site, which will be subject to relevant requirements such as licensing and roadworthiness checks. In addition, the following will apply:

- Safe transport for personnel working on the project to and from the workplace, which shall include proper seating, side restraints and cover.
- Road safety principles shall be adhered to on and off site.

If a mobile crane or other mobile plant is hired, only approved hire companies shall be contracted to provide such equipment. The Construction Supervisor shall ensure compliance of the provider to these regulations. In particular attention is drawn to the competence and fitness of the operator [section 1(d)] and the inspection of the equipment [section 1(j)].

H 7.8 Electrical Installations [CR 24], including [EIR] and [EMR]

The requirements of these regulations shall be met as required, by the appointed electrical contractor. A competent person will be appointed for inspection and control of all temporary electrical installations as per CR 24(d) and (e) respectively.

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H 7.9Use and storage of flammable liquids [CR 25], and [GSR 4]

All the requirements of CR 25 shall be met and attention is drawn to the storage requirements of flammable liquids as specified in GSR 4.

H 7.10 Water Environments [CR 26]

All requirements of CR 26 shall be met if applicable.

H 7.11 Housekeeping [CR 27] including [ERW(6)]

All contractors shall ensure that housekeeping standards as per these regulations shall be maintained at all times. The principal contractor is responsible to ensure that building waste and debris is removed at regular intervals and not allowed to build up to any degree. The building's domestic and compactable waste removal systems may not be used for this purpose under any circumstances.

H 7.12Stacking of Materials [CR 28] including [GSR(8)]

All contractors shall ensure that materials are only stored in defined and allocated storage areas and that materials being stored are stacked in accordance with sound stacking principles as per these regulations.

H 7.13 Fire precautions [CR 29]

All contractors on site will comply fully with the requirements of this regulation. In particular, the principal contractor will be responsible for the evacuation plan (section (l)) the details of which will be imparted to contractors, visitors etc. through the site induction.

H 7.14 Construction welfare facilities [CR 30] including [FR 2- 9]

The principal contractor shall be responsible for implementing this regulation and shall ensure that adequate facilities are provided for the personnel on site in terms of the following:

- At least one shower for every 15 workers
- At least one sanitary facility for every 30 workers
- Changing facilities for each sex
- Sheltered eating areas
- Potable water.

On-site chemical toilets must be serviced daily.
No food preparation shall be conducted on site. Eating and drinking will only be permitted in the designated eating areas, which must be provided with adequate seating. Waste bins shall be strategically placed and cleared regularly.

B12.12 Contractor's initial obligations in respect of the Occupational Health And Safety act (OHS), General Safety Regulations 1986, Covid-19 Regulations and Construction regulations 2014 Lump Sum

The full amount will be paid in one instalment only once: -

(a) The contractor has notified the Provincial Director of the Department of Labour in writing of the project and to obtain construction permit.

(b) The contractor has made the required initial appointments of employees and sub-contractors and their entry medical fitness certificates are in place.

(a) The client has approved the contractor's Health and Safety Plan.

(b) Compliance with the Covid-19 Regulations

(c) The contractor has set up his Health and Safety File.

(d) All employees are provided with PPE

(e) Compliance with General Safety Regulations is met

(f) All general site posters and signage in terms of GSR is met

The tendered sum shall include full compensation to the Contractor for compliance with all the requirements of the OHS Act and Regulations (including the Construction Regulations, 2014) at all times for the full duration of the Contract, as described in clause B1228 of the project specifications. The successful Tenderer shall provide the Engineer with a complete breakdown of this tendered sum.

This sum will be paid to the Contractor in equal monthly amounts subject to proper and/or substantial compliance.

B12.13 Submission of the Health and Safety File.....Lump Sum

The tendered sum shall include full compensation to the Contractor for compliance with all the requirements with regard to the Health and Safety File and Approval.

B4 SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

B1301 GENERAL REQUIREMENTS

(c) Legal and contractual requirements and responsibility to the public

ADD THE FOLLOWING PARAGRAPH:

"The Contractor shall comply with all statutory and contractual requirements of the Environmental Management Programme, as included in the Project Document.

Separate items will be scheduled under payment item B13.01 (The contractor's general obligations) to cover the following components of the Contractor's preliminary and general costs, Contractor's General items (Clause 1.1.1.21 of the Conditions of Contract):

(i) fixed,
(ii) value-related and
(iii) time-related in respect of the

1. Mobilisation Period:

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Shall be the number of days as specified in Clause 1.1.1.35 in the Contract Data.

The Contractor shall note that on this Contract all costs associated with this period shall be deemed to be included in other rates.

2. Construction Period:

Shall be the number of days within which the Contractor has to complete the construction of the Works as specified in Clause 1.1.1.36 in the Contract Data, and as adjusted by such extensions of time or acceleration as may be allowed in terms of the Contract."

ADD THE FOLLOWING NEW SUBCLAUSE:

"(d) Contractor's ablution facilities

The Contractor shall, at each construction section, provide sufficient portable chemical latrine units. Furthermore, the Contractor shall also provide a portable chemical latrine unit at each temporary traffic control facility. The latrine units shall be serviced daily and kept in a hygienic and orderly state to the approval of the Engineer. No separate payment shall be made for this requirement and the costs thereof shall be deemed to be included in the rates tendered for the Contractor's time-related obligations."

B1301 PAYMENT

Item

B13.01 The Contractor's general obligations:

DELETE SUBITEM(c) *AND REPLACE WITH THE FOLLOWING:*

"(c) Time related obligations:

(i) Mobilisation Period	days
(ii) Construction Period	month"

INSERT THE FOLLOWING PARAGRAPH AFTER THE FOURTH PARAGRAPH:

"Should the combined total tendered for subitems (a), (b), and (c) exceed 15% of the Tender Sum (excluding CPA, contingencies and VAT), the tenderer shall state his reasons in writing for tendering in this manner. The tenderer's attention is drawn to Form B1: Contractor's establishment on Site (bound in this Volume) to be completed by the tenderer."

After the paragraph starting with "Should the combined …." Insert the following:

"In the 11th paragraph, the following amendments apply:

Delete "from the date on which the contractor has received the letter of acceptance in terms of clause 12 of the general conditions of contract" *and replace with* "for subitem 13.01(c)(i) Mobilisation Period from the Commencement Date in terms of Clause 1.1.1.5 of the General Conditions of Contract, until the end of the Mobilisation Period and for subitem 13.01(c)(ii) Construction Period from the end of the Mobilisation Period.

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Payment for the Mobilisation Period shall only be made if such item B13.01(c)(i) is included in the Bill of Quantities".

DELETE THE SEVENTEENTH PARAGRAPH COMMENCING WITH" The tendered rate per month for subitem B13.01(c) …"*AND REPLACE WITH:*

"The tendered rate per month for sub item B13.01(c) represents full compensation for that part of the Contractor's general obligations which is mainly a function of construction time. The tendered sum will be paid monthly, pro rata for parts of a month, from the Commencement Date until the end of the period for completion of the Works, plus any extension thereof as provided in Clause 5.12 of the General Conditions of Contract, provided that –

(a) Should the works be certified as having been completed before the Due Completion Date, the Contractor will then be entitled to payments in regard to the unexpired period up to the approved Due Completion Date."

ADD THE FOLLOWING AT THE END OF THIS PAY ITEM:

"The amount payable to the Contractor for time-related costs arising from extensions of time granted by the Employer, where the Contractor is fairly entitled to such compensation in terms of Clause 5.12.3 of the General Conditions of Contract, shall be calculated by taking account of only payment items for which the unit of measurement is 'month'. All pay items for which the unit of measurement is 'month' shall be deemed to be based upon an average of 30 days per month."

B13.01 Contractor's time related obligation in respect of the month Occupational Health and Safety Act and Construction Regulations.

Payment of the rate per month shall include full compensation for all the contractor's obligation relevant to the Occupational Health and Safety Act No. 85 and Amendment Act No.181 of 1993, General Safety Regulations 1986 and OHSA 1993 Construction Regulations 20014 issued on August 2014 by the Department of Labour.

The rate must also include a full-time Traffic Safety Officer who will be full-time on site for the duration of the contract.

B6 SECTION 1500: ACCOMMODATION OF TRAFFIC

B1501 SCOPE

ADD THE FOLLOWING:

"This section also covers the provision of additional information signs for motorists and the release of any notices to the media and public."

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B1502 GENERAL REQUIREMENTS

(a) Safety

ADD THE FOLLOWING:

"Should the Contractor park any of his vehicles within the road reserve at night, it shall be done in such a way that the vehicle is more than 6 m away from the shoulder of the road and it shall be properly illuminated and signposted to ensure safe passing by motorists."

(b) Providing temporary deviations

ADD THE FOLLOWING PARAGRAPH:

"The Contractor shall keep the provincial traffic police and the Engineer fully informed of changes in the normal traffic flow and obtain their approval for these changes."

(f) Approval of temporary deviations

ADD THE FOLLOWING:

"If, after any temporary deviation has been constructed, any changes are considered necessary or desirable, the proposal shall be submitted to the Engineer for his approval." Contractor must ensure that such temporary deviation is safe and drivable for motorist and must be maintained timeously.

(i) Traffic Safety Officer

ADD THE FOLLOWING AFTER THE SECOND PARAGRAPH:

"The Contractor shall submit a Curriculum Vitae of the candidate to the Engineer for approval before the Traffic Safety Officer is appointed. The Traffic Safety Officer shall make himself available to discuss road safety and traffic accommodation matters whenever required by the Engineer."

REPLACE SUBSUBCLAUSES (ii) AND (iii) WITH THE FOLLOWING:

"(ii) Record on neat and dimensioned sketches and submit to the Engineer the position and sign reference number where applicable of each sign, barricade, delineator, cone, amber flicker light, guardrail and permanent or temporary painted road marking feature. The position of each shall be adequately referenced to identifiable permanent features located along the site of the Works.

These records shall also show the date and time at which the recorded traffic accommodation features are certified correct by the Traffic Safety Officer and shall be signed by the Traffic Safety Officer before being submitted to the Engineer.

The records shall be amended whenever changes are made in the field and the revised detailed sketches shall be submitted to the Engineer. This shall include the

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recording of the position of flagmen and stop/go control men and their associated traffic accommodation equipment wherever they are used.

(iii) Personally inspect the position and condition of each traffic accommodation feature on the whole site of the Works twice each day, 9:30 and 16:30, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the Engineer such record sheets by 10:00 and by 17:00 each day. The Traffic Safety Officer shall keep a duplicate book for this specific purpose.

The Traffic Safety Officer shall also submit to the Engineer by 10:00 each morning, a record of all matters pertinent to site safety and traffic accommodation throughout the site of the Works the previous day. He shall also record the daily labour returns of flagmen, stop/go and traffic signal control men employed.

The Traffic Safety Officer shall be equipped with a cellular telephone and shall have a vehicle and three labourers at his disposal 24 hours a day and he shall be directly answerable to the Contractor's Site Agent. The traffic safety vehicle shall be a truck with a capacity of 5 tons and shall be equipped with a high visibility rear panel in accordance with the requirements of Part 13 of Volume 2 of the South African Road Traffic Signs Manual. The Traffic Safety Officer shall have a direct line of communication at all times with the police and traffic officers responsible for the area within the limits of the Contract. The provision of the road safety vehicle, driver, three labourers and the cost of the cellular telephone shall be deemed to be included in the rates tendered for the Contractor's establishment on Site."

ADD THE FOLLOWING SUBSUBCLAUSES:

"(ix) Ensure that all obstructions related to the Contractor's activities be removed before nightfall where applicable and instructed by the Engineer and that the roads are safe for night traffic.

(x) The Traffic Safety Officer shall also be responsible for arranging the removal of broken down vehicles off the roadway and implementing actions requested by the traffic authorities with regard to the work to be carried out and for the erection and maintenance of all traffic signs necessary for the accommodation of traffic."

ADD THE FOLLOWING SUBCLAUSES:

"(j) Failure to comply with provisions

Failure or refusal on the part of the Contractor to take the necessary steps to ensure the safety and convenience of the public traffic, accommodation of traffic, plant and personnel in accordance with these specifications or as required by statutory authorities or ordered by the Engineer, shall be sufficient cause for the Engineer to deduct penalties as follows:

- A fixed penalty of **R5 000,00** per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements of Section 1500 of the Standard Specifications and/or the Project Specifications.

- In addition, a time-related penalty of **R500,00** per hour over and above the fixed penalty shall be deducted for non-compliance to rectify any defects in the accommodation of traffic within the allowable time after an instruction to this effect has been given by the Engineer. The Engineer's

instruction shall state the allowable time, which shall be the time in hours for reinstatement of the defects. Should the Contractor fail to adhere to this instruction, the time-related penalty shall be applied from the time the instruction was given.

(k) Public traffic

The travelling public shall have right of way on public roads. The Contractor shall arrange his activities so as to bring about the least possible disruption to the traffic on the roads on which he works.The closure of one lane of the road shall only be done:

- on written instruction of the Engineer,
- after approval of a specific accommodation of traffic detail,
- subject to all the road signs and markings being implemented and
- subject to such other conditions as the Engineer would reasonably require to ensure the safety of the travelling public.

The closure of more than one lane of traffic will only be considered in exceptional cases. The Engineer shall determine the maximum period for which such a closure may be allowed. It is also an express provision that such an eventuality will be controlled by the traffic authority concerned. Should the traffic authority not be available for such control, the Contractor shall control such an event, provided that he has proven that he has exercised his best endeavours and taken all actions timeously to involve the traffic authority to control the traffic. No additional payment will be made for such control by the Contractor and the rates tendered for Section 1500 will be deemed to include full compensation for all costs pertaining to such control.

Failure or refusal on the part of the Contractor to take the necessary steps to ensure the safety and convenience of the public in accordance with these specifications or as required by the Engineer or the traffic authorities shall be sufficient cause for the closing down of all work under this Contract until all provisions prescribed have been complied with to the satisfaction of the Engineer.

(l) Handing over the Site

The road reserves of all the roads to be constructed under this Contract will be handed over to the Contractor at commencement of the Contract. The Contractor will be permitted to work on any structure or service provided that a free and safe flow of traffic is maintained at all times and that the requirements of the Specifications are complied with.

The Contractor's programme for the accommodation of traffic and any proposed deviation from the approved programme shall be subject to the Engineer's approval."

B1503 TEMPORARY TRAFFIC-CONTROL FACILITIES

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH:

"All temporary road signs, devices, sequences, layouts and spacings shall comply with the requirements set out in the National Road Traffic Act, 1996 (Act No 93 of 1996), the National Road Traffic Regulations, 2000 of the relevant authorities and on the Drawings or as instructed by the Engineer.

The Contractor shall indemnify the Employer against all proceedings, claims, actions, damages and costs which may arise from or be related to the absence or improper functioning or

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placement of road traffic signs, barricades, traffic-control facilities, channelization devices and warning devices.

REPLACE THE THIRD PARAGRAPH WITH THE FOLLOWING:

"The type of construction, spacing and placement of traffic-control devices shall be in accordance with Volume 2 of The South African Road Traffic Signs Manual (in particular Part 13), these special provisions and the Drawings. The recommended arrangements of the traffic-control devices illustrated in Part 13 of the above Manual and/or Drawings shall not be departed from without prior approval of the Engineer. The arrangements expected to be most commonly used on the Contract are given on the tender drawings.

The details shown for spacing and placement of traffic-control facilities may, however, be revised at the discretion of the Engineer where deemed necessary to accommodate local site geometry and traffic conditions."

(a) Traffic-control devices

REPLACE THE SECOND SENTENCE OF THE SECOND PARAGRAPH WITH THE FOLLOWING:

"Two-way communication systems in good working condition shall be available at both ends of those sections of the works where the road is barricaded and only one-way traffic is accommodated. A standby communication system set in good working order shall also be made available."

ADD THE FOLLOWING AFTER THE LAST PARAGRAPH:

"The Contractor shall provide portable shelters to protect his personnel who regulate the STOP and GO-RY signs against the elements. The personnel regulating the traffic shall at all times wear reflective safety jackets."

(b) Road signs and barricades

ADD THE FOLLOWING AFTER THE LAST PARAGRAPH:

"The Contractor shall be responsible for the protection and maintenance of all signs, and shall at his own cost replace any that have been damaged, or lost, or stolen.

All temporary road signs shall be mounted on portable supports for the easy moving of signs to temporary positions. The only permitted ballasting of the sign supports shall be by using durable sandbags filled with sand of adequate mass to prevent signs from being blown over by wind. The cost of the sandbags shall be included for in the tendered rates for the various types of temporary road signs.

The traffic-control devices, temporary signs and devices required in the Contract are those designated in Part 13 of Volume 2 of the South African Road Traffic Signs Manual.

No work may proceed on any section where accommodation of traffic is required until such time as the relevant requirements with regards to signposting are met and written approval of the Engineer is obtained. The Contractor shall keep sufficient surplus signs, delineators and barricades on the site to allow for the immediate replacement of

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damaged or missing items, in any case, within three hours of instructions having been given by the Engineer. Delineators shall be of the flexible plastic reversible variety and not of the rigid metal variety.

Should the Contractor fail to respond to an instruction to re-erect a road sign within three hours or fail to comply to the requirements, the work on that section will be suspended without any compensation to the Contractor."

(c) Channelization devices and barricades

ADD THE FOLLOWING PARAGRAPHS:

"Drums shall not be used as channelization devices.

TW 401 and TW 402 delineators shall comply with the following requirements:

(i) They shall be manufactured from a flexible material and shall comply with SANS 1555:2011. The blade portion of the delineator shall be positively affixed to a base unit which in turn shall be stable on its own or be stabilized by means of sandbags when used on the road.

(ii) The blade shall be retro-reflectorised, with Class I yellow sheeting on the side facing oncoming traffic.

(iii) It shall be nominally 1 000 mm high x 250 mm wide and the bottom edge of the delineator shall not be more than 200 mm above the road surface.

(iv) The delineators shall be subject to the approval of the Engineer.

(v) The maximum spacing between centres of delineators shall be as shown on the Drawings or as directed by the Engineer.

(d) Barriers

ADD THE FOLLOWING:

"Guardrails mounted on steel drums shall not be used as barriers."

(e) Warning devices

ADD THE FOLLOWING TO THE FIRST PARAGRAPH:

"The flashing lights shall have a minimum intensity of 55 W."

ADD THE FOLLOWING AFTER THE FIRST SENTENCE OF THE SECOND PARAGRAPH:

"The warning boards shall be at least 1,5 m above ground level."

ADD THE FOLLOWING AFTER THE LAST PARAGRAPH:

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"All construction vehicles and Plant used on the works shall be equipped with rotating amber flashing lights and warning boards as specified. Clearance permits for all vehicles and Plant shall be obtained from the Engineer before being allowed onto the Site.

Rotating lights shall have an amber lens with a minimum height of 200 mm and shall be mounted in order to be clearly visible from all directions. The lights on construction vehicles shall not be switched on while vehicles are being operated on unrestricted sections of a public road, but shall be switched on while construction vehicles are operating within the accommodation of traffic area, as the vehicles decelerate to enter a construction area, and as the vehicles accelerate to the general speed when entering the road from a construction area. Lights on Plant shall operate continuously while the Plant is working alongside sections of road open to public traffic.

All LDVs and cars operating on Site shall also be equipped with rotating amber flashing lights which shall be placed so as to be clearly visible and operated continuously while the vehicles are manoeuvring in or out of traffic or are travelling on or parked alongside roads open to public traffic.

The Contractor shall provide the Engineer with four (4) rotating amber-coloured flashing lights. These lights shall be at least 200 mm high, shall have magnetic bases and must be equipped with fittings to draw power from a cigarette lighter point in a vehicle. No separate payment will be made for the supply and maintenance of these flashing lights and full compensation therefor shall be included in the rates tendered for in Section 1500.

Rotating lights and the 'Construction Vehicle' signs on the Contractor's vehicles and Plant shall not be paid for separately but shall be included in the rates covering the use of the vehicles.

The Contractor shall supply and maintain lights together with temporary mounting brackets, to the approval of the Engineer. Vehicles and plant that do not comply with these requirements, shall be removed from the Site."

ADD THE FOLLOWING SUBCLAUSES:

"**(g) Safety jackets**

The Contractor shall ensure that all his personnel, excluding those who are permanently office bound, are equipped with reflective safety jackets and that these are worn at all times when working on or near to the travelled way. Any person found not wearing a reflective jacket under these circumstances shall be removed from the Site until such time as he is in possession of and wearing a reflective jacket. Reflective safety jackets shall be kept in good condition and any jackets that are, in the opinion of the Engineer, ineffective shall be replaced immediately by the Contractor.

The Engineer, his personnel and visitors shall wear safety jackets at all times when they move about the Site. The Contractor shall provide the Engineer with safety jackets. The safety jackets shall be orange in colour and shall be submitted for the Engineer's approval before they are purchased. Payment for the safety jackets will be made under item B15.14(b).

(h) Other signs or facilities

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The Engineer may instruct the Contractor to provide any other road sign, reflective tape, etc not measured in standard pay items. The road signs shall conform to the requirements of Part 13 of Volume 2 of the South African Road Traffic Signs Manual, or specification provided by the Engineer.

The Contractor shall inform the general public of the intended road works, construction period and accommodation of traffic proposal through press releases in local and provincial newspapers."

B1222 USE OF EXPLOSIVES

REPLACE PARAGRAPH (g) *WITH THE FOLLOWING:*

"(g) The Contractor shall, seven (7) days before each blasting operation is carried out, advice the Engineer thereof in writing. Any such blasting operation shall be confirmed with the Engineer twenty-four (24) hours prior to execution. The Contractor shall make all the necessary arrangements to keep the public and the provincial traffic authorities fully informed with regard to the closures of the road for blasting purposes."

ADD THE FOLLOWING PARAGRAPH:

"(h) Where blasting needs to be carried out within the road reserve of the existing road, it shall only be allowed between 10:00 and 14:00**.** The road may not be closed for a period longer than thirty (30) minutes during which time all blasting shall be carried out, debris removed from the road surface and the road made safe and passable for traffic."

Annexure 1

No.	Inspection	By who	Frequency	Record
1	Structures	Appointed person	As required for design compliance	Checklist
2	Formwork & Support work	Appointed person	Before, during, after loading, then daily	Checklist
3	Excavations	Appointed person	Daily before shift, plus other	Checklist
4	Traffic Accommodation	Appointed person	Daily	Inventory / checklist
5	Suspended Platforms	Appointed person	Manufacturer's spec, not more than 3 mo.	Inventory / checklist
6	Material Hoists	Appointed person	Daily	Checklist
7	Construction Vehicles	Appointed person	Daily	Inventory / checklist
8	Electrical Installations	Appointed person	Weekly	Inventory / checklist

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9	Explosive Powered Tools	Appointed person	Daily	Inventory / checklist
10	Fire Equipment	Appointed person	Manufacturer's spec	Inventory / checklist
11	First Aid Box Contents	First Aider	Monthly	Inventory
12	Ladders	Competent person	Monthly	Inventory / checklist
13	Lifting Tackle	Appointed person	3-monthly	Inventory / checklist
14	Hand Tools	Appointed person	Monthly	Inventory / checklist
15	Portable Electrical Equipment	Appointed person	Monthly	Inventory / checklist
16	Gas Bottle Sets (OxyAcetylene)	Appointed person	Monthly	Inventory / checklist
17	Safety Harnesses	H&S Rep / Safety Officer	Monthly	Inventory / checklist
18	Health & Safety Rep	H&S Rep / Safety Officer	Monthly	Checklist
19	Good Housekeeping	H&S Rep / Safety Officer	Monthly	Report
20	Stacking and Storage	Appointed person	Monthly	Report
21	Change rooms and toilets	H&S Rep / Safety Officer	Monthly	Inventory / checklist

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Annexure 2

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993

(ACT NO 85 OF 1993)

REGULATION 9 OF THE GENERAL ADMINISTRATIVE REGULATIONS

RECORDING AND INVESTIGATION OF INCIDENTS

A. RECORDING OF INCIDENT

1 Name of employer.

2 Name of affected person

3 Identity number of affected person

4 Date of incident

5. Time of incident.

6 Part of the body affected.*

Head or Neck	Eye	Trunk	Finger	Head	
Arm	Foot	Leg	Internal	Multiple	
Sprains or strains	Contusions or wounds	Fractures	Burns	Amputation	
Electric shock	Asphyxiation	Unconsciousness	Poisoning	Occupational diseases	
0-13 days	2-4 weeks	>4-16 weeks	>16-52 weeks	>52 weeks or permanent disablement	Killed

7 Effect on the person.*

8 Expected period of disablement.*

9

10 Description of Occupatic disease**

ed/type of work performed/exposure*

11

Was the incident reported to the Compensation Commissioner and Provincial Director? Make a cross in the appropriate square	Yes	No
12 Was incident reported to the police?*	Yes	No

13 SAPS office and eference to be completed in case of a fatal incident.

* in case of a hazardous chemical substance, indicate substance

** exposed to

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PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

B. INVESTIGATION OF THE ABOVE INCIDENT BY A PERSON DESIGNATED THERETO

1 Name of investigator _____ 2. Date of investigation _____

3 Designation of investigator _____

_____

4 Short description of incident _____

_____

_____

5 Suspected cause of incident _____

_____

_____

6 Recommended steps to prevent a recurrence _____

_____

_____

_____

Signature of investigator Date

C. ACTION TAKEN BY THE EMPLOYER TO PREVENT THE RECURRENCE OF A SIMILAR INCIDENT

_____

_____

_____

_____

Signature of employer Date

D. REMARKS BY HEALTH AND SAFETY COMMITTEE

Remarks _____

_____

_____

_____

Signature of chairman of health and safety committee Date

E-TENDER

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Annexure 3

Definition of Mandatary

Includes an agent, a contractor or sub-contractor for work, but without derogating from his status in his own right as an employer or user.

Occupational Health and Safety Act (No. 85 of 1993)

You are requested to, as far as you reasonably can, comply with the requirements of the OHS ACT and Regulations.

1. Your attention is drawn to **"General Duties of Employers to their Employees"** as required by Sect 8 of the Act.
2. You are required to:

3.1 Sign a written **"Agreement with Mandatory"** as required by Sect 37(1)(2) of the Act with us before you commence any work on my / our premises / site.

3.2 Provide the **client / principal contractor** with a documented health and safety plan.

3.3 Provide the **client / principal contractor** with written appointment of the person who is going to supervise the construction work as per Construction Regulation 6(1).

Note: Electrician to provide copy of certificate of registration as per Elect. Install Reg. 9(3).

3.4 Provide the **client / principal contractor** with written designation of your nominated Health and Safety Representative as per Sect 17(1).

2.5 If you employ more than five (5) persons, you are required to provide your own First Aid Box. (General Safety Regulation 3 (2).)

2.6 If you employ more than ten (10) persons, you are required to provide your own qualified First Aider as per General Safety Regulation 3(4).

2.7 When working with hazardous chemical substances, comply with Hazardous Chemical Substances Regulation 3. *Note: Asbestos and Lead regulations are separate.*

2.8 When using a Materials Hoist , comply with Construction Regulation 17.

2.9 When using Lifting Machines and Lifting Tackle, comply with Driven Machinery Regulation 18.

2.10 When using Explosive Powered Tools, comply with Construction Regulation19.

2.11 When using Scaffolding, Formwork and support work, comply with Construction Regulation 10 and 14.

2.12 When Excavating or Demolishing, comply with Construction Regulation 11 and 12.

2.13 When Welding, Flame Cutting, Soldering, comply with General Safety Regulation 9.

2.14 When working in confined spaces, comply with General Safety Regulation 5.

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3. You are responsible for providing your own **legal safety documents and registers** to comply with the Act's requirements. *A copy of the OHS Act of 1993 should be available in the main contractor's office.*

4. You are required to comply with General Safety Regulation 2(1) to (7) and provide employees with: personal protective equipment which will allow them to carry out their work in a safe manner, e.g. hard hats, safety belts, gloves, safe footwear, eye protection, ear protection, waterproof clothing etc.

5. Reporting of Incidents and Occupational Diseases shall be done as per General Admin. Regulation 6. (Also see Sect 24 of the Act.)

Compensation for Occupational Injuries and Diseases Act (No 130 of 1993)

You are required to provide the **client** proof of registration with the Compensation Commissioner/Federated Employer's Mutual within seven (7) days after signing this agreement. Failure to do so would result in the **client** notifying the agent of the Commissioner to investigate and make an assessment of your wage return and the applicable levy you have to pay, which will be liable for a deduction from your monthly progress payments and paid over to the Commissioner. (Copies of proof of payment will be provided to the contractor) ***See Section 89(1) of the COID Act.***

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Annexure 3A

OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993 CONSTRUCTION REGULATIONS, 2014

Medical Certificate of Fitness

Name of Employee_____ ID Number_____ Co Number_____

*** Occupation** e.g General worker, Welder, Bricklayer, Steel fixer, Mobile crane operator, etc	*** Possible Exposure** e.g Noise, Heat, Fall risk, Confined spaces, etc	*** Job Specific Requirements** e.g Operating mobile crane, Digging trenches, Erecting formwork and support work etc	*** Protective Clothing** e.g Dust respirator, Welding gloves, etc

* The Employer to complete the information in the spaces marked with an * before sending the Employee for a medical examination Declaration by the Medical Examiner: I certify that I have, by examination and testing, using the above criteria specified by the employer, satisfied myself that the abovementioned employee is fit to perform the duties as described by the employer in the matrix above.

Occupational Medicine Practitioner / Occupational Health Nursing Practitioner: _____

Signature_____ Practice Number_____ Date_____

Address_____

_____

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PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

AGREEMENT WITH MANDATARY In terms of Section 37 (1) and (2)

Section 37 (1)

Whenever an employee does or omits to do any act which it would be an offence in terms of this Act for the employer of such employee or a user to do or omit to do, then unless it is proved that -

(a) in doing or omitting to do that act the employee was acting without the connivance or permission of the employer or any such user;

(b) it was not under any condition or in any circumstance within the scope of the authority of the employee to do or omit to do an act, whether lawful or unlawful, of the character of the act or omission charged; and

(c) all reasonable steps were taken by the employer or any such user to prevent any act or omission of the kind in question,

the employer or any such user himself shall be presumed to have done or omitted to do that act, and shall be liable to be convicted and sentenced in respect thereof; and the fact that he issued instructions forbidding any act or omission of the kind in question shall not, in itself, be accepted as sufficient proof that he took all reasonable steps to prevent the act or omission.

Section 37 (2) The provisions of subsection (1) shall *"mutatis mutandis"* apply in the case of a mandatory of any employer or user, except if the parties have agreed in writing to the arrangements and procedures between them to ensure compliance by the mandatory with the provisions of the Act.

I, (Responsible person) for, (Company) appoint , (Contractor) at the following premises / site:

Period:

AUTHORISED SIGNATORY FOR THE COMPANY (CLIENT)

Signature **Designation** **Date**

ACCEPTANCE SIGNATORY FOR THE CONTRACTOR

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Tenderer	*Witness 1*	*Witness 2*	*Employer*	*Witness 1*	*Witness 2*

I, hereby acknowledge receipt of and accept and understand the requirements of this agreement and shall ensure compliance with the OHS Act 85, of 1993.

Signature **Designation** **Date**

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Tenderer	*Witness 1*	*Witness 2*	*Employer*	*Witness 1*	*Witness 2*

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BASELINE RISK ASSESSMENT

RISK AND ASSURANCE STANDARD RISK MATRIX		Hazard Effect / Consequence				
Loss Type		**1 Insignificant**	**2 Minor**	**3 Moderate**	**4 Major**	**5 Catastrophic**
Timeline		No impact on overall project timeline	May result in overall project timeline overrun of less than 5%	May result in overall project timeline overrun of between 5% and less than 20%	May result in overall project timeline overrun of between 20% and less than 50%	May result in overall project timeline overrun of 50% or more
Budget		No impact on the budget of the project	May result in overall project budget overrun of less than 5%	May result in overall project budget overrun of between 5% and less than 20%	May result in overall project budget overrun of between 20% and less than 50%	May result in overall project budget overrun of 50% or more
Investment Return – NPV loss		Less than R25 000	R25 000 to less than R100 000	R100 000 to less than R1 000 0000	R1 000 000 to R10 000 000	R10 000 000 or more
Quality		No impact on quality	Minimal quality issues that can be addressed in a short timeframe with minimal interactions	Some quality issues that requires immediate management action	Significant quality issues that requires senior project management interaction	Significant quality issues that requires sponsorship intervention with significant resource and cost implications for rework
Safety / Health		First aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Single fatality or loss of quality of life / Irreversible impact on health	Multiple fatalities / Impact on health ultimately fatal
Environment		Minimal environmental harm – L1 incident	Material environmental harm – L2 incident remediable short term	Serious environmental harm – L2 incident remediable within LOM	Major environmental harm – L2 incident remediable post LOM	Extreme environmental harm – L3 incident irreversible
Legal & Regulatory		No legal impact	Minor legal concerns with minor impact	Some legal concerns with manageable level of impact	Serious legal concerns and significant impact on operations	Legal noncompliance with risk of shutdown of operations with significant cost impacts
Likelihood		**Risk Rating**				
5 Almost Certain	The unwanted event has occurred frequently; has a 90% and higher probability of reoccurring	**Medium (11)**	**Significant (16)**	**Significant (20)**	**High (23)**	**High (25)**
4 Likely	The unwanted event has a probability of between 60% and less than 90% of occurring	**Medium (7)**	**Medium (12)**	**Significant (17)**	**High (21)**	**High (24)**
3 Possible	The unwanted event has a probability of between 30% and less than 60% of occurring	**Low (4)**	**Medium (8)**	**Significant (13)**	**Significant (18)**	**High (22)**
2 Unlikely	The unwanted event has a probability of between 1% and less than 30% of occurring	**Low (2)**	**Low (5)**	**Medium (9)**	**Significant (14)**	**Significant (19)**
1 Rare	The unwanted event has never occurred, has a probability of less than 1% of occurring	**Low (1)**	**Low (3)**	**Medium (6)**	**Medium (10)**	**Significant (15)**

TENDER

PROJECT NAME: APPOINTMENT OF A PANEL OF CONTRACTORS FOR WATER RELATED PROJECTS FOR A PERIOD OF 36 MONTHS ON AN AS AND WHEN REQUIRED BASIS

PLANNING, DESIGN AND CONSTRUCTION SUPERVISION OF MARBLE HALL EXTENSION 6 STORMWATER (PHASE 5)

Activity Description:	**BASELINE RISK ASSESSMENT**	**Project No:**	**PWRT99/13**
Assessment Team:	**Assessment Date:**	**Review Date:**	

Task #	Task Description	Hazards / Aspects / Failures	Potential Risks / Impacts	SHEQ Category	Likelihood	Consequence	Raw Risk Rating	Mitigation / Control Measures	SHEQ Category	Likelihood	Consequence	Residual Risk Rating	Resp Person
1	Induction and training	• Injuries due to employees not aware of dangers in work area • Long hours of induction. • Use of unfamiliar language. • Imcompetent trainer/facilitator. • Issueing Incorrect PPE afterwards. • Employment of underaged employees.	Injury Disability Property damage	S&H BI/AD L&R	4	4	21(H)	• Inductions- Employees to be informed to all hazards in the work area as well as the recommended precautionary measures • Site specific induction to be conducted to all employees, sub-contractors and visitor's • Employees to be trained on all tools and equipment. • Ensuring that all the employees understood the training including questionaires raised. • Ensure all employees get the correct PPE. • The contractor to hire people that are legal to work in terms of age.	S&H BI/AD L&R	2	3	9(M)	Safety Officer Site Agent General Foreman
2	Site establishment	• Fence erection. • Exposure to hazardous materials. • Exposure to moving	Injury, disease, Property damage,	S&H BI/AD L&R	4	2	12 (H)	• Management to ensure site layout be approved by relevant engineer to consider site traffic, plant movement and other interfacing contractor site layouts.	S&H BI/AD L&R	1	3	8 (M)	Site Agent General Foreman

		machinery and vehicles. • Exposure to exhisting services. • Office building building and istallation of ventillations. • Installation of electrical connections. • Clearing of site						• Ensure that proper PPE is provided. • Ensure that Plants used for clearing are inspected and well serviced. • Contractor to ensure that competent persons are hired for isntallations.					
3	Environmental control	Environmental risks	Environmental	EN	1	3	6(M)	• Ensure all waste areas controlling hazardous waste is kept clear • Ensure area housing hazardous waste is bunded to prevent run-off and absorption into the ground water systems • Ensure the area is well demarcated and screened off • Ensure that waste is disposed legally with an appointment letter from legal appointee. • Ensure all spills are reported immediately • Ensure drip trays are used when the risk to spillage is high • Ensure the waste storage area has sufficient capacity • Ensure that all loose materials are covered and tied down to prevent wind picking the loose items out of the storage area or facility	EN	1	2	3(L)	Environmental officer

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								• Ensure storage areas and facilities are kept neat and tidy at all times • Ensure these areas are cleared regularly of waste material • Ensure all hazardous waste is removed to an approved dumping site/facility • Ensure correct colour coded waste bin for the discarding of waste					
4	Access/egress to site & correct placing of units	Restricted/unsafe access & parking of vehicles and plant	Injury Property damage	S&H BI/AD L&R	5	2	16(S)	• Management to ensure site layout approved by client to consider site traffic, plant movement and other interfacing contractor site layouts	S&H BI/AD L&R	1	4	10 (M)	Site Agent General Foreman
5	Create access through berm using TLB	Substandard plant	Injury Propety damage Production loss	S&H BI L&R	3	4	14 M)	• Only certified and approved operator to be used. • Plant pre-inspection checklist to be completed • Tool box talk and risk assessment training before work commences • Work area to be barricaded and flag man to control people and plant movement	S&H BI L&R	1	4	4(L)	Site Agent General Foreman
6	Truck onto site and lay down area	• Reckless driving • Uncertified driver • Substandard truck Conditions	Injury Fatality Property damage	S&H BI/AD L&R	3	5	15 (H)	• Ensure drivers are qualified and competent. • Ensure drivers are informed of route and site traffic requirements • Vehicle to be approved and licensed to enter site	S&H BI/AD L&R	2	4	10 (M)	Site Agent General Foreman

								• Ensure that the plant is serviced on intervals and by competent and certified personnel.					
7	Pedestrian access to site Construction plant access to site.	• Unsafe pedestrian access (Walkway) • Plants that are not road worthy • Incompetent drivers or operators.	Injury Property damage Production loss	S&H BI L&R	4	4	16(H)	• Safe demarcated walkway to be conducted • Walkway to be barricaded with snow netting • Pedestrian crossings to be conducted and utilised. • Pedestrain and plants access must be separated. • Vehicle and plant signages must be made available. • Monitoring of site. • Appointment of qualified security service provider.	S&H BI L&R	1	4	4(L)	Site Agent General Foreman

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8	Offloading and positioning of containers/offices (mobile crane)	• Equipment failure • Load falling • Rigger (falling) • Load striking employees • Load striking other containers • Load swinging	Injury Property damage Production loss Fatality	S&H BI L&R	4	5	20 (H)	• Management (supervisor) to ensure that only certified and approved operator, crane and lifting tackle to be used. • All lifting equipment to be inspected and registered • Plant pre-inspection checklist to be completed • Operator and rigger to attend tool box talk and risk assessment training before work commences • Supervisor and rigger to ensure correct lifting tackle and attaching method/procedures applied • Qualified and competent rigger allocated to specific crane (one on one communication) • Rigger to wear safety harness and tie-off at all times. • Step ladder must be used for access to top of container • If working on top of load the rigger must then be hooked on the crane or on a life line • Area to be barricaded off during lifting activities to prevent unauthorised entry • Two guide ropes to be used on load to ensure stable movement	S&H BI L&R	1	4	4 (L)	Site Agent General Foreman

								• No lifting during high winds or inclement weather • Heavy equipment must be identified and a rigging study to be in place • Swing radius must be identified to ensure that the load can be of loaded in a safe manner • Stay out of the swing radius of the crane • Ensure there are barrier guards showing swing radius • A boom angle indicator must be on the crane				

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9	Erecting safety and security fencing	Employees Fencing material (Wire and poles) Tools (Tensioners and pliers) Theft (Unauthorised entry) Hi-hub Crane truck Unfenced borrow pits	Injury Disability, Production loss, Property damage, animal loss	S&H BI/AD L&R	2	4	8(M)	• Ensure outriggers are in full extended position and on firm and stable ground using spreader boards • Crane may not travel with outriggers in extended position • Trained and competent workers to be used under supervision for fence erecting • No borrow pit will be excavated prior fencing together with an access gate. • Only approved and correct hand tools for the job may be used • No homemade or modified tools allowed on site • Tools to be inspected before commencing of work • Security guard will be appointed to provide security and access controll. • Labelled tools or plants.	S&H BI/AD L&R	1	2	2(L)	Site Agent General Foreman
10	Installation of safety signs and notice boards	Un-informed employees Inadequate signage Incorrect signage	Injury Property damage	S&H BI/AD L&R	2	2	4 (L)	• Legal required signage must be displayed to be clearly visible at all times. • All required signage to be available • Informative, prohibitive, mandatory and emergency signs • Signage change and applicability should be maintained	S&H BI/AD L&R	1	1	2(L)	Site Agent General Foreman

11	Emergency preparedness	Fire fighting equipment Insufficient no's	Injury Property damage Production loss	S&H BI/AD L&R	2	3	6(M)	• Fire fighting equipment must be placed in accordance to survey conducted during site establishment • Identification and signage must be clear and visible • All relevant equipment to be inspected and on register	S&H BI/AD L&R	1	4	4 (L)	Site Agent General Foreman Safety Officer
12	First aid	Inadequate medical assistance Untreated injuries	Dieases, disability	S&H BI L&R	2	4	8 (M)	• First aid boxes to be available at each work area clearly identified, signage installed and qualified first aider identified • First aid boxes to comply with minimum requirements inspected and registered	S&H BI L&R	1	3	3(L)	Safety Officer First Aider
13	Facilities	Hygiene Insufficient no Waste Eating area Drinking water	Hygiene Environmental Poor hygiene Illnesses and ailments Water contaminated	S&H BI L&R	2	2	4(L)	• Separate toilets for both genders must be available and clearly identified • Ration 1 to 20 and to be cleaned 3 times a week • Separate waste bins for different wast categories to be available and identified • Waste disposal plan and schedule must be maintained • Skips must have lids • Adequate, clean and shaded eating area to be ensured • Facilities to be ensured from start of site establishment • Clean drinking water must be available	S&H BI L&R	1	2	2(L)	Safety Officer Site Agent

								• Signage to be installed to all drinking and non drinking water					
14	Power supply and electricity to office area	Generator	Injury	S&H	4	4	16 (H)	• DB board must stand on firm level base and should be locked at all times • DB board to be inspected and approved by qualified electrician	S&H	2	4	8 (M)	Site Agent General Foreman
		Electrical cables	Injury Electrocution	S&H BI L&R	3	4	12 (H)	• All cables to be routed underground • Only qualified electrician to do installation and termination	S&H BI L&R	2	4	8 (M)	Site Agent General Foreman
15	Refuelling Tank	Environmental spillage	Soil contamination Fire risk	S&H EN	3	3	12 (H)	• Bunding or drip tray to be untilsed • Spill kit to be available at all times • MSDS abailable at generator • Fire extinguisher and relevant required signage to be installed • (no smoking, no open flames and hearing protection) • Boundry wall to be available.	S&H EN	1	3	3 (L)	Site Agent General Foreman Environmental officer

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16	Lay down area Stacking and storage	Inadequate space	Injury	S&H BI L&R	3	3	12 (H)	• Lay down area must be well planned to ensure adequate space	S&H BI L&R	1	3	3 (L)	Site Agent General Foreman
		Poor stack/storage practices	Property damage	S&H BI L&R	2	5	10(H)	• Safe stacking and storaging practices/procedures must be maintained • Access and off-loading space must be a priority • Area to be barricaded • Flammable material not to be stacked together.	S&H BI L&R	1	3	3 (L)	Site Agent General Foreman
		Dunnage	Injury Property damage	S&H BI L&R	3	3	9 (M)	• Timber poles (Dunnage) to be used for stacking material	S&H BI L&R	1	3	3 (L)	Site Agent General Foreman
17	Loading and off-loading of truck with mobile crane	Unfit personnell on site Incorrect PPE Incompetent personnel Under the influences of alcohol and substances	Injury Fatality	S&H BI/AD L&R	4	4	16 (H)	• Insure all personnel are fit by means of medical clearance certificate • All personnel shall undergo all relative inductions, site inductions and risk assessment training • Daily DSTI plus toolbox talks to be conducted • Correct PPE to be worn for the right job or site requirements • Safety harnesses to be worn when working at heights and safety life lines to be erected when required • Safety harnesses will be issued per person and will be inspected and booked out accordingly • Supervisor to ensure personnel is competent for the task at hand with competency/qualifications certificates	S&H BI/AD L&R	1	4	4 (L)	Site Agent General Foreman Banksman

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								• All competency certificates to be kept in the safety officer office • All appointments to be up to date • Crane operator must be licence by an authorised training institution • Only competent rigger to do lifting operations • No employee to work when under the influence of drugs or alcohol • Random alcohol test will be conducted					
18	Approval of mobile crane	Non compliance No crane certification	Injury Fatality	S&H BI/AD L&R	3	4	12 (H)	• All cranes to be checked and tested by an testing station • All cranes shall be finally inspected and passed by project vehicle inspector • The crans shall have an up to date and valid load test certificate, rope test certificate, LMI calibration certificate and crane hook certificate • Full maintenance record of crane • Operator competence certificate	S&H BI/AD L&R	1	4	4 (L)	Site Agent General Foreman Safety Officer

								• Crane pre-use checklist available and checklist completed daily • Crane specification and load chart available in crane cab, understood and used by operator					
20	Establishing crane on site	• No set-up/traffic plan • Poor or unstable ground condition • Obstructions • Excavations • Power lines (arc flash/electrocution)	Injury Fatality	S&H BI/AD L&R	4	4	14(H)	• Site traffic plan/area establishment plan shall be available and be approved by site manager and Project construction manager • Training and awarness to be conducted • Crane to be escorted to set-up area • Barricade crane and work area • Supervisor and crane operator to do a pre-inspection of ground conditions • Check and verify that there is no unkown services • Supervisor/rigger to ensure area is free of any obstructions • Crane not to be established closer than 3 menter to any excavation to prevent possible side wall collapse	S&H BI/AD L&R	2	4	8(M)	Site Agent General Foreman

								• Do not work within 15 meters of any power line • Site manager to ensure a pre-plan meeting and site inspection • Site specific traffic plan in place and approved by Projects construction manager • Permit to work near power lines.					
21	Select correct lifting equipment	Pinch points Lifting equipment failure	Injury Property damage	S&H BI/AD L&R	3	4	12 (H)	• Pre task assessment for correct lifting equipment above 5 ton – Rigging study • Wear correct PPE • Client representative can inspect tools and equipment and request tools to be replaced or repaired • Competent person/s shall be appointed for the responsibility of looking after equipment and tools must be inspected as required Hazard awareness briefings • Rigging study to be approved by construction manager and master rigger	S&H BI/AD L&R	2	3	6 (L)	Site Agent General Foreman
22	Hook up lifting equipment , crane and material to be lifted. Hoist up crane slowly to get equipment slack out	Pinch points	Injury	S&H BI/AD L&R	4	4	16 (H)	• Connect lifting equipment to correct procedures • All lifting equipment must have a load certificate inspection and must be updated and lock down in register • Keep hands clear once hooked up	S&H BI/AD L&R	2	4	8 (M)	Site Agent General Foreman

								• Rigger to ensure all personnel are clear when hoisting, to get slack out					
23	Raise load slowly to check load stability and centre of gravity	Equipment failure	Injury Fatality Disability Property damage	S&H BI L&R	3	5	15 (H)	• Use correct and certified equipment • Work within crane and lifting equipment specification • Rigger only personnel to communicate with crane operator by means of hand signals, radio communications and or whistles • Rigger to remove glove when giving hand signals • Do not exceed wind speed for elevated lifts • Rigger to ensure no person to be under a suspended load. • No personnel within the swing radius of the crane	S&H BI L&R	2	4	8 (M)	Site Agent General Foreman
24	Raise load to desired height and slew to designated installation area Remove lifting equipment	Incorrect lifting practices Lifting equipment failure Crane toppling over	Injury Fatality Property damage Production loss	S&H BI L&R	3	4	12 (H)	• Work to lifting procedures/task analysis • Rigger to communicate with operator • Ensure sufficient guide ropes attached • Work to equipment specifications • Work within crane load chart specification • Work within wind regulations – 6m/s or analyse situation • Rigger to ensure he/she constant eye contact with crane operator or radio contact	S&H BI L&R	2	3	6 (M)	Site Agent General Foreman

								• Rigger to ensure no person to be under a suspended load					
25	Weather conditions	Lightning/wind Storms and thunder storms	Injury Fatality	S&H BI/AD L&R	2	4	14 (H)	• Work within wind regulation – 6m/or analyse situation • Stop task and call manager or rigger for assistance if in doubt ask crane operator • Do not work in thunderstorms and lightning • No work to be conducted on elevated positions when raining • If possible when load is suspended lower the load to ground level • Do not work with any steel/lifting of any steel when raining	S&H BI/AD L&R	1	4	4 (L)	Site Agent General Foreman

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26	Truck arrived at site	Un informed operator Restricted access to loading area	Injury Propery damage	S&H BI L&R	2	4	8 (M)	• Supervisor to inspect driver's public licence and condition of truck by means of an checklist. • Truck maintenance/service record to be with driver of truck • Driver to be send back if condition are not complied with • Supervisor to escort trucks to lie-down area • Communication with truck and crane operator • Area to be identified and barricaded • If delivery truck from a supplier come to site they need to complete the proforma checklist at the warehouse and manager to sign off.	S&H BI L&R	1	4	4 (L)	Site Agent General Foreman
		Truck operator under influence of alcohol and substances	Injury Property damage	S&H BI L&R	3	4	12 (H)	• Randomly drug and alcohol test to be conducted • All truck drivers compulsary to do alcohol test prior of enter site area	S&H BI L&R	2	3	6(M)	Site Agent General Foreman

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		Load not secure	Property damage	S&H BI L&R	3	3	9(M)	• Suppliers must be notified before hand that supplier is not allowed on site. • If delivery truck from an supplier come to site and complete proforma checklist at warehouse and their manager must sign • Signed form accompany with truck to site • Delivery truck to be inspected for secure load before entry on site.	S&H BI L&R	1	2	2(L)	Site Agent General Foreman
		Not in position of stop blocks and PPE	Injury	S&H BI L&R	2	2	4(L)	• Spare stop blocks to be provided or operator remain in truck. • Engine to be stopped engage park brakes and stay seated to take action if track comes in motion • Operator not allowed exiting truck without correct PPE	S&H BI L&R	1	1	1 (L)	Site Agent General Foreman
		Incorrect parking on site	Injury Property damage	S&H BI L&R	3	3	9 (M)	• Supervisor to plan off load area before trucks arrived • Supervisor to eliminate that roads been close for other users • Barricade area off	S&H BI L&R	1	2	2(M)	Site Agent General Foreman
27	Climbing on to truck to connect lifting equipment	Falling from truck	Injury	S&H BI L&R	3	4	12 (H)	• Personnel must take tripping hazard in consideration and not walk on the edge of truck load bed • Ensure 3 point contact when climbing on and off the truck	S&H BI L&R	2	3	6 (M)	Site Agent General Foreman Banksman/Slinger

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								• Ladder to be used when ascending or descending truck • Workers to wear safety harness attached to life line if working height exceeds 18m; lineyard on harness not exceeds 1 meter					
		Caught between	Injury	S&H BI L&R	2	3	6{M}	• Ensure loads are stable when offloading • Workers to ensure proper footing and keep their feet out from line of fire	S&H BI L&R	1	2	2{L}	Site Agent General Foreman
		Cuts and brazes	Injury	S&H BI L&R	1	2	2{L}	• Ensure all material is free from sharp edges and protruding objects • Gloves and safety boots to be worn	S&H BI L&R	1	1	1 (L)	Site Agent General Foreman
28	Traffic Accomodation	Failure to inform members of the public about project thru PSC and CLO Non/incorrect placing of signage signage	Injury Fatality Disability Property damage due to traffic accidents	S&H BI L&R	3	4	12{H}	• Discuss Traffic Plan with PSC and CLO and inform members of the public including employees • Placement of correct signage • Pre use inspection prior of use • No damage equipment to be used • Informing members of the public of construction activities thru CLO •	S&H BI L&R	1	5	5 (M)	Site Agent General Foreman
29	Identifying and Exposing of existing services Hand excavations Setting out points (Survey	Unsafe conditions unstable ground, incorrect identification Hand tools Incorrect setting out points (Demarcation)	Danage to services and disruption to existing services Production loss Loss of production Injury to employees	S&H BI L&R	2	2	5 44(L)	Pre-checks on hand tools Discuss DSTI with employees Identify and expose services Pre-checks on hand tools Warn others in close	S&H BI L&R S&H BI L&R	1	2	3 (L)	Site Agent General Foreman

								proximity when excavating using hand tools Barricade all excavations Management, surveyor and supervisor must ensure that SOP's are in accordance with approved and accepted drawings and survey results					
30	Barricading of work area	Uncontrolled movement	Injury Disability Fatality Property damage Production loss	S&H BI L&R	2	2	5 (L)	• All excavation areas will be barricaded with solid barricading from before excavations start until after backfilling is completed • Excavation to be numbered and put on register • Daily pre-work check list to be completed and permit obtained by appointed supervisor • Signage for barricading to be installed at access to excavation	S&H BI L&R	1	2	3(L)	Site Agent General Foreman
31	Excavation with Excavator Handling and storage of excess spoil	Man and machine interface Failure of equipment Property damage Excess spoil (Rocks, stone boulders etc.) Plant lock out	Injury Fatal Property damage	HS	3	5	15H	• Discuss traffic management plan • Pre-use inspection of plant daily before use • Operator and supervisor to inspect site before actual works • Excess spoil will be removed from excavation work area with tipper • Spoil remain in work site area for backfilling purposes will be stock piled in safe area • All spoil will be stored further than 2m way	S&H BI L&R	1	4	4(M)	Site Agent General Foreman

								from excavation edges and outside barricading • Stock pile will not cause restriction to access/egress of work area					
32	Placing spoil	Excess material/spoil (Excavation sides collapsing)	Injury Fatality Property damage	S&H BI L&R	2	2	4(L)	• No excess spoil will be placed within 2m from excavation • All spoil material to be removed offiste to n identified land fill • • All excavation sides will be shored to prevent collapsing of materials • Spoil at edges will not exceed height of 2m and will be shored 1-2 at all times	S&H BI L&R	1	2	3(L)	Site Agent General Foreman
33	Access/egress to excavation	Poor or no access/egress at excavation	Injury	S&H BI L&R	2	2	5(L)	• All excavation will be supplied with sufficient access/egress ladders for entry and exit, placed no further than 6m away from nearest workers and no further than 6m apart.	S&H BI L&R	1	2	3(L)	Site Agent General Foreman
34	Using of drilling machine Pre-use inspection Changing of drill bits	• Inspection not done and on register • Drilling machine not made safe • Incorrect tools used • Incorrect bit fitted	Injury Equipment damage	S&H BI L&R	3	3	9(M)	• Inspection to be done by competent person • User of drilling machine to be trained and found competent • Checklist to be signed off by competent appointed supervisor • Permanent lock switch not allowed	S&H BI L&R	1	3	3 (L)	Site Agent General Foreman

		• Bit fitted wrong way • Damaged bit fitted						• Only trained and found competent employees to change drill bits on a drilling machine • To ensure drilling machine is unplugged • Equipment needs to be inspected prior entering site • Proper tool (Chuck key) to be use • Supervisor to ensure correct bit is provided and fitted • Bit to be inspected pior of fitment by competent and trained employee					
35	Use of drilling machine (drilling thru hard rock)	• Drilling machine used by incompetent employee • Noise • Dust • Bit coming off while working with drilling machine • Employee injured as a result of an electric shock	Injury Disability Fatality	S&H BI L&R	3	3	9(M)	• Only trained employees allowed to work with drilling machine • Ensure drilling machine not to be left unsupervised • Ear plugs to be worn when drilling • No loose clothing to be worn • Dust mask to be used • Correct PPE to be worn at all times • Employee to ensure drill bit is attached properly and secured with suck key • Drilling machine not to be used while standing in water • Drilling machine to be inspected before use • Faulty equipment to be removed from site • No drilling operations to be done during rain	S&H BI L&R	1	3	3 (L)	Site Agent General Foreman

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36	Use of mobile compressor	• Unauthorised persons using equipment • Operator not knowing where emergency stop button is • No inspection done prior of commencement of work • Leakage of diesel/petrol • Oil decomposition • Rotating parts • Cleaning of clothes and skin with compressed air	Fire risk Injury Fatality Property damage Injury	S&H BI L&R	3	4	12(H)	• Only authorised trained employees to use equipment • Supervisor to be present at all times • Supervisor to give employee on the job training as to the hazards and risk associated with the mobile Compressor and emergency preparedness • Only trained employees to use mobile Compressor • Inspection to be done daily by supervisor prior commencement of entering site. • Material safety data sheets must be on site and communicated to all employees by supervisor • Drip trays to be utilised • No smoking or open flames near Mobile Compressors that are in operation • Contaminated soil will be properly disposed in line with construction EMP • Disposal certificate will be kept on record • Only certified companies used to dispose of hazardous waste • Regular cleaning of cylinders and valves • Supervisor to ensure employees comply	S&H BI L&R	2	3	6 (M)	Site Agent General Foreman

								• All rotating parts must be guarded. • Supervisor to ensure that items are covered in pre start inspection • Supervisor to ensure no employees uses compressed air to dust off clothes or skin as irritation can occur • Communicate to employees in Toolbox Talk • Warning signs to be displayed					
37	Hazardouse chemical storage	• Employees not familiar with MSDS • Liquid splashing • Employees inhaling fumes • Liquid spilling from container • No information of hazardous substance signage • No fire extinguisher	Injury Disability Fatality	S&H BI L&R	3	4	12(H)	• Obtain formal approval of flammable store from the relevant local authority and display the certificate at the entrance to the store • Flammable liquid store to conform all legal requirements • Assessment to be carried out to determine the quantity of flammable liquid kept on site • No open flames and no smoking symbolic signs to be displayed in the vicinity of flammable liquid store • All material safety data sheets (MSDS) to be available at all times • Liquid bulk storage tanks to be bunded. • Each bund to be capable of containing the maximum volume of the tank +10%	S&H BI L&R	2 2	3	6{M}	Site Agent General Foreman

								• Fire extinguisher to be in 10 meter radius.					
38	Borrowing of materials at the Quarry	• Working without conducting a risk assessment. • Without the supervsion. • Defective and faulty construction plant and equipments. • No induction conducted. • No PPE worn • Live burried explosives under-ground qaurry. • Uncontrolled access	Medical treatment cases Injuries/Fatality Damage to property Incidents/accidents lead by high speeding/no traffic compliance. Falling of rocks from tippers at the public road could lead to incidents/accident		4	4	16(H)	• Conducting site specific risk assessment • Appointment of Site Safety officer and supervisors. • Contruction plant daily checklists • Conducting induction training awareness prior accessing the quarry • All employees shall be provided with task specific PPE • Ensure the risk assessment also tackles the possibility of live buried explosives. • Control access and register every one accessing.		1	5	5(M)	Site Agent Safety officer Traffic ooficer

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