



TECHNICAL SPECIFICATION

Project Name: South Coast Corridor – Station Improvement Programme

Cluster 2: Amanzimtoti Protection Services, Amanzimtoti, Warner Beach and Winkelspruit Stations

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Annexures

PRASA BLUE PRINT

Amendment History

<i>Issue</i>	<i>Date</i>	<i>Author</i>	<i>Reason</i>

SECTION 1 – INTRODUCTION

The specifications are contained in this document, on the design drawings and on the PRASA standard document 'Blueprint 2022'. Where the Contractor is of the opinion that there is a contradiction in any specification, it shall immediately bring this to the attention of the engineer, where after the engineer shall provide the necessary clarification.

SECTION 2 – ARCHITECTURAL SPECIFICATION

The reference code in the table below refers to the PRASA specifications document titled 'Blueprint 2022' which has been included as an Annexure to this document.

Table 1: Architectural Specifications

Specification
Floors
600 x 600mm min R9 preferably R10 slip rated Full Bodied Porcelain tiles, mineralised with 3mm grouting lines.
300 x 300 x 2,0mm thick semi-flexible vinyl floor tiles or similar approved.
600 x 600 x 20mm– Lava Stone - with 5mm grouting, sealed with manufacturer recommended sealant or similar approved.
200x100x80mm min thickness Premium Interlocking concrete paving blocks or similar approved.
Skirting
300mm high natural porcelain tile, bedded to wall with cement adhesive or similar approved.
Existing timber skirtings to be sanded down & varnished with Clear Woodcare Varnish or Woodgard Interior Double Life polyurethane varnish as per heritage requirements. New skirting profiles to be installed where necessary, to match existing. Eggshell finish or similar approved.
300 x 600mm & 600x600mm Full Bodied polished Porcelain tiles with 3mm grouting lines. Wall edge / corners to be finished with Stainless Steel Square Edge Trims.
Walls
600 x 600mm & 300 x 600mm Full Bodied Porcelain tiles with 3mm grouting lines. Complete with stainless steel square edge trim. Matt finish or similar approved.
300 x 600mm & 600x600mm Full Bodied polished Porcelain tiles with 3mm grouting lines. Wall edge / corners to be finished with Stainless Steel Square Edge Trims.
12mm one coat smooth plaster and painted with two coats acrylic paint or similar approved.
12mm one coat smooth plaster and painted with two coats or similar approved.
Flush jointed facebrick
222 x 106 x 73mm SABS approved facebrick or similar approved.
Aluminium curtain wall partition with safety glass infills or similar approved.
Doors
New shop primed mild steel door frames to be sanded down, treated, and painted Gloss Enamel or similar approved.

All new aluminium door frames to be natural anodised aluminium or similar approved.
Existing external timber door frames to be sanded down & varnished or repainted with two coats of quality varnish as per heritage requirements or similar approved.
Paint all internal door leafs to be painted with new to match existing or similar approved.
Paint all external door leafs to be painted with new to match existing or similar approved or similar approved.
Manual Push-up Roller Shutters, for openings not exceeding 2,0m x 3,0m high or similar approved.
Solid steel doors for security and durability inclusive of supporting ironmongery or similar approved.
Solid flush panel door with hardboard both sides & 2 concealed edges to suite opening or similar approved.
Semi-solid flush panel door with hardboard both sides & 2 concealed edges to suite opening or similar approved.
Purpose made aluminium door frame to suite opening, safety glass infill or similar approved.
Windows
All new aluminium windows to be natural anodised aluminium or similar approved.
Existing Timber window frames to be sanded down & varnished or repainted with two coats of quality varnish as per heritage requirements or similar approved.
Existing steel window frames to be sanded down, treated and painted with new to match existing or similar approved.
General powder coating colour.
Bullet Resistant Pay / Transaction Windows including sales windows & information desk or similar approved.
Roller Blind installed into the Ticket Sales window, lowered down indicates Ticket counter not in use currently or similar approved.
Ceilings
600 x 600mm perforated lay-in powder coated aluminium ceiling tiles with acoustic backing laid on prepainted tees and adjustable hanger system.
1200 x 600 x 15mm thick acoustic ceiling tiles laid on prepainted tees and adjustable hanger system or similar approved.
1200 x 600 x 12,5mm vinyl faced ceiling panels laid on tees and adjustable hanger system or similar approved.
Flush plaster gypsum or Magna Board ceiling fixed to concealed suspended tee system skimmed and prepared to receive 2 coats quality PVA paint or similar approved.
Concrete soffits to be painted, rippel paint texture or similar approved.
15mm smooth plaster to underside of soffit & painted or similar approved.
Flush plaster fiber cement or Magna board ceiling fixed to concealed suspended tee system prepared to receive 2 coats external prepared quality PVA paint or similar approved.
Isoboard or similar approved extruded polystyrene over-purlin ceiling boards or similar approved.
Steel and other metal items
One coat of waterprime, one coat of universal undercoat, two coats of gloss Enamel as supplied or similar approved.
Roof
700mm cover Klip-Tite™ profile roll-formed in continuous lengths from 0.53mm thickUltima
PVC gutters and down pipes.
Fiber Cement or Magna Board Fascia/barge.
Miscellaneous

Granite Tops or similar approved.
Office Worktops to client choice and approval.
Precast concrete-timber composite benches.
Street pre-cast concrete bins.
Sinks
Double stainless steel Kitchen Sinks or similar approved.
Small Kitchens / Kitchenette stainless Sinks or similar approved.
Stainless Steel Slop hopper / Mop Drip Sink or similar approved.
Ablutions fittings
Sloped Granite Slab basin to details document or similar approved.
Waterborne Wash Hand Basin with wall mounted push on demand tap – Vandal resistant or similar approved.
Drop-in vanity basin with push on demand tap - Vandal resistant or similar approved.
Wash hand basin with one taphole & pedestal or similar approved.
Wall mounted top inlet Urinal or similar approved.
Wall mounted top inlet Urinal or similar approved. (at least one urinal to be installed at lowered height for kids).
Vandal resistant WC pan or similar approved.
Paraplegic wall hung WC with back inlet flush valvet or similar approved.
Close coupled suite or similar approved.
Shower Head Round 200mm Chrome or similar approved.
Single lever shower mixer for concealed installation or similar approved.
Disabled Ablution Facility
Bathroom Butler Paraplegic Rails dog leg grab rail with 3 supports or similar approved with brushed stainless-steel finish, plugged and screwed to wall with stainless steel screws.
Bathroom Butler Paraplegic Rails flush valve grab rail with brushed stainless-steel finish, plugged and screwed to wall with stainless steel screws.
General
Refer to PRASA station design blue print annexure for furniture, painting, accessories, supporting ironmongery and detailed signages.

SECTION 3 – STRUCTURAL SPECIFICATION

1. CONCRETE, FORMWORK AND REINFORCEMENT

This section covers the construction of all new reinforced concrete and associated concrete works requirements for the proposed construction of the security wall, as directed by the Engineer.

1.1. PARTICULAR SPECIFICATIONS

The following specifications shall apply:

NB: All in situ concrete work (mass and reinforced) shall comply with SANS Specification 1200G ("8 Measurement and Payment" is not applicable) supplemented by the clauses in this section. Where SANS Specification 1200G and the clauses in this section are in conflict the clauses in this section shall take precedence.

In addition the "Model Preambles for Trades" as recommended and published by the Association of South African Quantity Surveyors, 1999 Edition, shall be read in conjunction with and shall apply to all items in the Bill of Quantities not covered by the 'SANS Standardised Specifications' SANS 1200 Series.

Where the term "plain concrete" appears in SANS Specification 1200G it shall be read as "mass concrete".

- SANS 1200 G Concrete
- SANS 2001: CC1 Construction Works: Concrete Works (Structural)
- SANS 1083: 2006 Aggregates from natural sources
- SANS 10100-2:2000 The Structural use of concrete – Part 2: Materials and execution of work.
- SANS 50197-1:2000 Cement – composition, specifications and conformity criteria. Part 1: Common cements
- SANS 1491-1:2005 Portland cement extenders – Part 1 Ground granulated blast furnace slag.
- SANS 1491-2:2005 Portland cement extenders – Part 2 Fly ash.
- SANS 1491-3:2006 Portland cement extenders – Part 3 Condensed Silica Fume

1.2. CEMENT

Common cements, complying with SANS 50197-1 shall be used for all concrete work. On no account shall masonry cements be used for concrete work, even if the strength designations are the same as for common cements.

The Supervisor for test purposes may require samples of cement from any one, or from every consignment. Cement in any consignment from which a sample may have been taken for testing shall not be used until it has been approved. Allowance must be made for possible delay in that tests may take 10 days to carry out.

Bags of cement shall be stacked in a waterproof, solidly constructed shed with a central door and a floor rendered damp-proof with a tarpaulin. The bags of cement shall be closely stacked (but not against walls) in order to reduce air circulation in such a manner that the cement is used in the order in which it was received, i.e. first in first out.

1.3. CRACKS

The crack must be sealed with a low viscosity sealant to prevent further corrosion to the reinforcing in the concrete or/and the brickwork following exposing the affected areas to identify the severity on each fracture.

Crack filling sealants/bonding agents or similar approved may be used to the manufacturer specification.

All paint or/and plaster cracks will require re-plastering and repainting to match existing finish

1.4. ALKALI REACTIVE CONCRETE

Alkali Reactive Aggregates shall not be used in this project. The equivalent Na₂O content of the concrete shall not exceed 2, 0 kg/m³ where % Na₂O equivalent = % Na₂O + (0,658 x %K₂O)

1.5. AGGREGATES

Fine and coarse aggregate shall comply with the relevant clauses of SANS 1083. No aggregate shall be delivered for use in the works until approval is given.

1.5.1. Sand (fine aggregate)

The fine aggregates shall comply with the requirements of SANS Specification 1083. Other aggregates may be approved if they have a satisfactory history and / or test results.

No aggregate may be used until it has been approved. Samples having a mass of 25kg (16.5 litres) of the proposed aggregate to be used may be required by the Supervisor for test purposes. Samples having a mass of 25kg shall be forwarded every 3 months during concreting work and also if the source of supply is changed. Allowance must be made for possible delay in that the tests may take 14 days to carry out.

1.6. ADMIXTURES

Admixtures containing chlorides will not be permitted in reinforced concrete.

1.7. COVER BLOCKS

Cover blocks used to ensure the cover to reinforcement shall be made of cement mortar.

Cover blocks shall be dense and have a minimum 28-day crushing strength of 30 MPa and shall be cured in water for at least 14 days before being used.
Cover/spacer blocks made of plastic will not be permitted.

1.8. CONCRETE QUALITY

Prior to the start of any concrete work on site, the Contractor shall submit a quality assurance plan which will ensure compliance with specification and provide acceptable documentary evidence that all specified operations have been carried out satisfactorily.

Where the minimum dimension to be placed during a single pour is larger than 600mm, and the cement content of the reinforced concrete exceeds the following:

- Cement Types I and II/ * S : 400 kg/m³
- Cement Types II/B-V and II/B-W : 450 kg/m³

The Project Manager may require that measures be instituted to reduce heat development in the concrete.

1.9. UNREINFORCED CONCRETE

Class A Concrete: Filling to cavity of hollow walls.

Unreinforced concrete cast against excavated surfaces: 15 MPa/19mm Concrete, Surface blinding under footings and bases.

1.10. REINFORCED CONCRETE

30 MPa/19mm Concrete:

- Foundation bases,
- Columns,
- Precast panels.

1.11. BATCHING

All cementitious binders shall be batched by full sack or by mass batching with approved precision weighing equipment.

All aggregates shall be precisely measured by mass using approved precision weigh-batching equipment, unless otherwise permitted by the Project Manager.

Should any variation in the composition of the aggregate become apparent, the Project Manager shall be notified and a further sample of aggregate submitted immediately for his approval.

1.12. CONCRETE PLACING

The size, shape and depth of any excavation shall be approved by the Project Manager before concrete is placed.

Unless otherwise permitted by the Project Manager, no concrete shall be placed until the fixed reinforcement has been accepted by him and confirmed in writing by way of a release certificate.

1.13. GROUTING

25 MPa non-shrink cementitious grout: Bedding approximately 25mm thick under base plate including chamfered edges all round.

1.14. CURING COMPOUND

Unless otherwise directed by the Project Manager, the curing compound shall be:

- An approved trafficable, resin-based, white pigmented, membrane forming for slopes flatter than 1:1.
- An approved clear, aesthetically acceptable, membrane forming for all other concrete surfaces, including beam and slab soffits.

The curing compound shall comply with specification ASTM C309, except that the maximum permissible water loss in the test shall be 0, 40 kg/m².

Alternatively, the curing compound shall be acceptable if the treated concrete retains 90% or more of its mixing water when subject to the test set out in BS 8110 Part 1 – Chapter 6.6.

1.15. CURING COMPOUND APPLICATION

The total application rate of the curing compound shall be the greater of the supplier's specification or 0.90 l/m². On textured concrete surfaces, the total application rate shall be 0.90 l/m².

In cases of concrete surfaces with run-off problems, it may be necessary to apply more than one coat of membrane forming curing compound to obtain the specified total or cumulative application rate.

Curing in accordance with SANS 1200 G shall commence on all concrete surfaces as soon as it is practical in the opinion of the Technical Officer.

On unformed surfaces the curing compound shall be applied after finishing and as soon as the free water on the surface has disappeared and no water sheen is visible, but no so late that the liquid curing compound will be absorbed into the concrete.

On formed surfaces, the exposed concrete shall be wet with water immediately after the forms are removed and kept moist until the curing compound is applied.

Application of the curing compound shall begin once the concrete has reached a uniformly damp appearance with no free water on the surface.

Application of the compound may be done by hand or power spray.

The compound shall be applied at a uniform rate with two applications at right angles to each other to ensure complete coverage.

Pigmented compounds, without a thixotropic agent, shall be adequately stirred to assure even distribution of the pigment during application.

Unless otherwise directed by the Project Manager, the initial 24 hour curing of concrete surfaces not covered by formwork shall be carried out by ponding, covering with constantly wetted sand or mats, or continuous spraying in accordance with SANS 1200 G when the following climatic conditions occur:

1. Wind velocity greater than 5 m/s
- and/or
2. Ambient temperature is above 25 °C
- and/or
3. The relative humidity is below 60 %

If plastic shrinkage occurs, the concrete, while still plastic, shall be re-vibrated, floated and re-coated with curing compound as if no curing has previously taken place.

1.16. CURING PERIOD

The curing period for concrete containing only CEM 1 shall be 7 days.

The curing period for concrete containing CEM 1 plus cement extenders (MGBS, FA) shall be 10 days.

The curing period will start on completion of the concrete pour and for formed surfaces shall be included the time for which forms are still in place after the pour.

1.17. CONCRETE RECORDS

The Contractor shall maintain the following daily records for every part of the concrete structure and shall make these available at all times during the progress of the work for inspection by the Project Manager:

- The date and time during which concrete was placed
- Identification of the part of the structure in which the concrete was placed
- The mixed proportions and specified strength
- The type and brand of cement
- The slump of the concrete
- The identifying marks of test cubes made
- Curing procedure applied to concrete placed
- The times when shuttering was stripped and props removed
- The date of despatch of the cubes to the testing laboratory
- The test results

The records shall be delivered to the Project Manager each week except in the case of sub-standard concrete, when the Project Manager shall be informed immediately.

1.18. TOLERANCES

Deviations shall be within the limits listed in SANS 1200 G for degree of accuracy II unless otherwise specified.

1.19. TESTING AND MONITORING

Frequency of sampling and testing shall be as specified in SANS 1200 G

1.20. COST OF TEST

The costs of making, storing and testing of concrete test cubes as required under clause 7 'Tests' of SANS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Project Manager. The testing shall be undertaken by an independent firm or institution nominated by the Contractor to the approval of the Project Manager (Test cubes are measured separately)

If the quantity of concrete from which samples were taken exceeds 40 m³, it shall be subject to the testing of a minimum of 3 sets of samples per day from each grade of concrete placed in each independent structure.

If the quantity of concrete from which samples were taken is less than 40 m³, it shall be subject to the testing of a minimum of 2 sets of samples per day from each grade of concrete placed in each independent structure.

If the Contractor disputes the results of the tests on concrete cubes, the concrete represented by the cubes will be considered acceptable if the Contractor, at his own cost, proves to the satisfaction of the Project Manager that the estimated actual strength of cores taken from the structure, determined in accordance with SANS Standard Method SM 856, is not less than the specified strength.

If the strength of the concrete fails to meet the acceptance criteria stipulated, the Project Manager may in his sole discretion and in addition to the options listed in SANS 1200 G:

- i. Accept the concrete subject to approved remedial measures being undertaken by the *Contractor*; or
- ii. Permit the concrete to remain subject to the payment of a penalty

The penalty referred to will be determined as follows:

$$\text{Penalty} = V \times R \times F$$

Where,

V = Volume (in the opinion of the Project Manager) of concrete of unsatisfactory strength represented by the test result.

R = Relevant scheduled rate

$$F = 1 - \sqrt{\frac{\text{Average strength of unsatisfactory concrete}}{\text{Specified strength} + 6 \text{ MPa}}}$$

Where the relevant scheduled rate (R) includes the cost of formwork or

$$F = 1 - \frac{\text{Average strength of unsatisfactory concrete}}{\text{Specified strength} + 6 \text{ MPa}}$$

Where the relevant scheduled rate (R) excludes the cost of formwork or where no formwork was involved.

1.21. FORMWORK

Rough formwork (degree of accuracy ii)

Rough Formwork to Sides:

- Strip footings.
- Bases.
- Rectangular columns in foundations.

1.22. REINFORCEMENT

High tensile steel reinforcement to structural concrete work:

- In various diameters and lengths
- Mild steel reinforcement to structural concrete work
- In various diameters and lengths
- High tensile steel reinforcement to structural concrete work
- Fabric reinforcement:
- Fabric reinforcement type as specified on structural drawings.

1.23. “NO FINES” CONCRETE

“No-fines” concrete, for grading flat concrete roofs and the like to falls, shall be in the proportion of 12 parts 19 iron cubical stone to 1 part cement mixed with 20 litres water per bag of cement and be laid to falls of not less than 15mm per linear metre for mastic asphalt and not less than 20mm per linear metre for sheet roof covering. For heavy load applications special mix designs may be required

1.24. STEEL WORK

Governing Codes and Standards

- ANSI/AWS D1.1 : Structural Welding Code - Steel
- BS-EN 287 Part 1 : Approval testing of welders/fusion welding
- BS-EN 288 Part 3 : Specification and approval of welding procedures for metallic materials
- BS 5135 : Metal arc welding of carbon and carbon manganese steels
- BS 4360/SANS 50025: Weldable structural steel

- BS 2573 Part 1 : Classification, stress calculations and design of structures
- BS 3923 : Methods for ultrasonic examination of welds
- BS 2600 : Radiographic examination of fusion welded butt joints in steel
- DIN 1026 : Metric channels
- ISO R657 : Angles
- SANS 10094 : The use of high strength friction grip bolts and nuts
- SANS 135 : ISO metric bolts, screws and nuts (hexagon and square)
- (coarse thread free fit series)
- SANS 136 : ISO metric precision hexagon-head bolts and screws, and
- hexagon nuts (coarse thread medium fit series)
- SANS 435 : Mild steel rivet

1.25. STRUCTURAL STEELWORK

The design of all structural steelwork shall be such as to provide a robust and rigid structure requiring the minimum of maintenance and providing a long service life. In the design of steel structures, due cognisance shall be taken of environmental and wind load conditions as specified in the main specification.

Due to the highly corrosive conditions experienced in South African coastal regions, the permissible stresses shall not exceed those set out in British Standard No. 2573.

All steel sections shall be manufactured in accordance with the following standards:-

i.	BS 4360/SANS 50025	:	Weldable structural steel
ii.	BS 4 Part 1	:	I and H sections
iii.	DIN 1026	:	Metric channels
iv.	BS 4 Part 1	:	Structural steel, hot rolled sections
v.	ISO - R657	:	Angles
vi.	BS 4848 Part 2	:	Hot finished hollow sections
vii.	BS 6363	:	Cold formed sections
viii.	BS 29	:	Forgings

ix.	BS 3100	:	Steel castings
x.	BS 1452	:	Cast iron

All steel plates and rolled steel sections used in the construction of the structures shall be of steel made by the open hearth process (acid or basic) and shall comply in every respect with BS 4360, "A" quality Structural Steel for Bridges and General Building Construction, Grade 43A or Grade 50B or SANS 50025 grade S355JR, where sections sizes allow. That is, the percentage of phosphorous and sulphur shall not exceed 0.06%.

The above is laid down as a standard, but tenders will also be considered for rolled steel not conforming strictly to the above standard. Full particulars of the guaranteed properties of the steel tendered for should in this case be furnished, i.e. chemical composition, tensile strength, yield point, reduction in area, bend tests, etc.

Forgings and drop forgings shall be free from flaws and surface defects of any kind and be accurately finished to the prescribed dimensions.

Steel castings shall be sound, clean and free from all defects and distortion of any kind and should, except where otherwise specified, conform with the conditions and tests specified in B.S. No. 3100/Latest Edition, for grades A, B and C according to requirements. They shall be thoroughly annealed and all working parts and bearing surfaces shall be machined and turned accurately with correct finish.

The dimensional and out-of-square tolerance as specified in the above Standards shall also apply to built-up components. Edge preparations, welding techniques, straight beds and material fit-up shall be considered when welded joints are designed.

The shape of all members and connections must allow easy accessibility for maintenance painting of all surfaces. No members shall comprise a double member which cannot be painted and maintained.

Structural details must be so designed as to eliminate or seal off any cavities or pockets where water or condensation could collect and promote corrosion. Horizontal members with upstanding flanges require special drainage.

All hollow sections shall be completely closed and airtight, and all welding is to be of such size and quality as to ensure complete airtightness. No tapping or drilling of holes into sealed sections will be permitted.

1.26. WELDING

All the provisions of BS 5135 shall be complied with as far as applicable.

Design of weld joints shall be such that crevices, overlaps, pockets, arc strikes and dead ends do not exist.

All joints shall be completely seal welded in accordance with BS 5135. Special care must be taken to prevent the ingress of moisture into the tubular members by ensuring that each such tubular member is airtight. "Stitch" welding will not be permitted. Only continuous welding will be accepted.

Weld cracks, undercut, or pock marks will not be accepted.

All welds on the load bearing frame structure, containers, piping, pipe line flanges, etc., shall be continuous and shall be visually inspected for cracks and other discontinuities.

Welds on the main chords must be tested ultrasonically in accordance with BS 3923 or X-rayed in accordance with BS 2600 and those on minor joints by the dye-penetrant method. The equipment required for these tests must be supplied by the Contractor and the testing done at his cost.

Steel, except in minor details, which has been partially heated, shall be properly annealed. (Electrically welded structural members accepted.)

All brackets, clamps, lugs, straps, suspenders, etc. required for attaching mechanical and electrical equipment must be welded on prior to erection and special precautions must be taken not to damage welds or puncture tubes during erection.

The welding of all rails shall be done by an approved method.

Welding shall only be carried out by a coded welder according to SANS 10044, BS-EN 287 Part 1 and BS-EN 288 Part 3 or ANSI/AWS D1.1.

All parts to be welded shall be thoroughly cleaned and dried before welding. The welding will only be done in dry surroundings and all steps taken to prevent hydrogen embrittlement.

Where materials of different compositions are joined by welding, especially carbon steel to chrome steel, the filler welding method and post welding treatment shall be such that embrittlement and other degradation of both steel and filler is prevented.

It must be ensured that welded joints are ductile.

1.27. FASTENERS

All bolts, nuts and rivets shall be manufactured in accordance with the following standards:-

- SANS 135 : Commercial bolts and nuts Grade 4.6
- SANS 136 : Precision bolts and nuts Grade 8.8
- SANS 10094 : Friction Grip Bolts and nuts Grade General
- SANS 435 : Rivets

All friction grip fasteners shall be hot dip galvanised, including high tensile bolts (and their nuts and washers), structural rivets and Huck bolts.

All holding down bolts and nuts and brackets, as well as all fixing bolts, studs, nuts and washers shall be of stainless steel. Fixing rivets shall be of either stainless steel or brass.

Bolts and set screws shall be locked in an approved manner and shall not be stressed in tightening to beyond the recommended loads.

The quality of friction grip bolts, nuts and washers, bolt lengths, sizes of holes, tightening standards, surface condition of clamped components, shop and site assembling and acceptance inspection of friction grip joints shall comply with the latest edition of SANS 10094. Certificates shall be supplied for all bolts of grade 8.8 and 10.9.

All bolt and rivet holes must be accurate to size and location, the centres of holes shall not be placed nearer the edge of a plate than 1.5 diameters with an extra allowance of 3mm for sheared edges. All holes in the structural work shall be drilled or otherwise punched to a diameter not exceeding 1,5mm less than the diameter of the finished hole on the die side, and afterward reamed out to the exact size.

Where possible the adjoining parts forming a connection shall be drilled or reamed together, with holes not exceeding 1.5 mm diameter the rivet or bolt for which it is made. No rough or broken edge shall be left around any of the holes.

For turned and fitted bolts, the holes shall be accurately drilled or reamed; the diameter of the hole shall not exceed the finished diameter of the bolt by more than 0,25mm.

The holes, after assembly of the parts, shall be true throughout the thickness of all the parts and perpendicular to the axis of the member.

Rivets shall be cup-headed or countersunk as required, unless otherwise specified. No rivet head shall contain less metal than does a length of the rivet equal to 1,25 times its diameter. All loose and defective rivets shall be cut and replaced by sound ones; also others when required for the purpose of examining the work. Rivets shall be driven with pressure tools whenever possible and pneumatic hammers shall be used in preference to hand driving.

All field rivets must be supplied with shanks of suitable length for pneumatic riveting.

Bolts shall be of such a length as to accommodate a full nut when tightening up, and project at least two thread pitches beyond the nut. Excessive projection of threads beyond the nuts should be avoided.

All bolts having countersunk heads shall have strong feathers forged on the neck and head to prevent turning and the bolt holes shall be cut to receive same. All nuts and bolts (excluding countersunk bolts) shall be furnished with circular washers of sufficient thickness, the outside diameter being at least twice the nominal diameter of the bolt, and washers fitted correctly.

Where bolt heads or nuts are seated on bevelled surfaces of beams or channel flanges, bevelled washers must be inserted.

1.28. JOINTS AND MATING SURFACES OF MEMBERS

Mating surfaces of members to be joined by high tensile steel bolts in friction grip shall be cleaned and primed as specified for the rest of the steelwork. Mating surfaces shall lay flat against each other to eliminate gaps which may allow ingress of water. After joining, the edges shall be sealed with an approved brand of Butyl/ Rubber sealing compound by means of a suitable caulking gun, or shall be seal welded.

Other joints shall be formed by one of the following methods:

- i. The mating surfaces of members shall be blast cleaned, primed and protected prior to sub-assembly by the liberal application of caulking compound. While the compound is still wet, the members shall be bolted together and caulking compound which is squeezed out shall be completely removed.
- ii. The mating surfaces shall be protected with the full corrosion protection system as specified, the surfaces joined together and the joint so formed shall be sealed with butyl rubber sealer.
- iii. After being cleaned and primed the surface shall be joined together and the joint so formed shall be seal welded.
- iv. The primer coating on mating surfaces must be applied not more than 4 hours after cleaning and the edges must be sealed within 3 weeks of assembly of the part.

1.29. FABRICATED PARTS

All fabricated parts shall be properly fitted during assembly to result in properly aligned equipment having a neat appearance. Fabrications of load bearing members shall have no abrupt changes in cross section and regions of severe stress concentration. All sharp corners accessible by personnel during erection or operation shall be ground, rounded, or removed by other methods. Burrs, welding spatter and stubs of welding wire shall be removed.

1.30. CORROSION PROTECTION

Scope

PRASA requires that the Contractor supply, install and guarantee a robust, climatically suited, grade corrosion protection system for use on all steelwork. The Contractor may select either a 3-Coat or 1-Coat system. The corrosion protection system selected for use shall be from an internationally recognised and reputable supplier. The selected corrosion protection system shall carry a minimum 5year guarantee, defined as a maximum of 1% of the total area of corrosion protection breakdown per year. The Contractor shall be required to repair yearly, any corrosion protection breakdown exceeding 1% of the total surface area. The paint supplier

shall carry the guarantee for the first 5years. A guarantee certificate, from the paint supplier, is required prior to the construction Works.

The final paint selection by the Contractor shall be approved by the Engineer before its application.

Typical Accepted Sequence of Corrosion Protection Application – 3 coat system

- High pressure wash, clean and remove oils and contaminants,
- Descale,
- Grit blast to SA 2 ½,
- Remove all slag and waste,
- Stripe coat using 1st coat primer: angles, stiffeners, edges, corners, welding seams and all areas inaccessible by spray painting,
- Spray 1st primer coat to all surfaces,
- Allow sufficient drying time,
- High pressure wash to remove dust before next coat application,
- Stripe coat using 2nd coat primer: angles, stiffeners, edges, corners, welding seams and all areas inaccessible by spray painting,
- Spray 2nd primer/intermediate coat to all surfaces,
- Allow sufficient drying time,
- High pressure wash to remove dust before final coat application,
- Stripe coat using final coat: angles, stiffeners, edges, corners, welding seams and all areas inaccessible by spray painting,
- Spray final coat to all surfaces

Paint specification – 3 coat system

- 1st Coat Primer to be 150 microns DFT,
- 2nd Coat Primer to be 150 microns DFT,
- Coat to be 160 microns DFT.

Paint Application

The application instruction covers surface preparation, application equipment and application details for corrosion protection to steelwork according to the requirements of IMO Resolution MSC.215 (82): Performance Standards for Protective Coatings on Steelwork.

- The steel surfaces shall be prepared so that the coatings achieve an even distribution at the specified nominal dry film thickness. Adequate adhesion ensured by removing weld spatter and any other surface contamination,
- All welding seams shall be partially dressed to remove irregular profiles,
- Surface pores, pits and craters shall be sufficiently open to allow penetration of the paint,
- Sharp edges shall be treated to a round radius of minimum 2mm,
- Before blasting any deposits of grease or oil must be removed from steel using a suitable detergent followed by fresh water hosing,
- Minor spots of oil grease may be cleaned with thinner and clean rags,
- Steel must be abrasive blast cleaned to SA 2 ½,
- Welds as well as shop primed areas with damage, burn marks and rust must be blasted to SA 2 ½,
- Surfaces with deposits of black iron oxides from gas cutting markings shall be cleaned by light abrasive sweep blast,
- Welds coated with temporary primer after welding must be cleaned by hard abrasive sweeping, preferably abrasive blast,
- Spot checks for possible salt contamination of the surfaces must be executed,
- Overlap zones must be treated with great care,
- Relative humidity shall be 85% or below, the steel temperature shall be 3-5 degC above the dew point,
- The paint layer must be applied homogeneously and as close to the specification as possible,
- The finished coatings must appear as a homogeneous film with a smooth surface. Any defects of bubbles, voids, visible abrasive residue shall be marked and appropriate repair affected.

SECTION 4 – ELECTRICAL ENGINEERING

1. GENERAL

The Contractor will be responsible for the stripping existing electrical installations, supply, delivery, installation, testing, commissioning and handing over in proper working condition of the complete upgrading of the new electrical installation, as specified in detail in these documents. Also included in the scope is the supply of as-built drawings, operating and maintenance manuals and on-site training of the Employer's staff.

The Scope of Work shall include the supply of all necessary required Equipment and Contractor's Personnel to properly perform the Contractor's obligations under the Contract, including:

- a) Construction Site surveys (dimensional, layout, checking etc.);
- b) ensuring that the completed Works shall comply with the Codes and Standards and any applicable statutory requirements;
- c) selection of suitable Plant and Materials (where not already specified herein);
- d) offloading of Plant and Materials at Site;
- e) safety equipment (guards, notices, etc.;
- f) construction, erection and the supervision of the Works;
- g) specialist installation and installation supervision;
- h) removal and disposal, as approved by the Employer, of all scrap and rubble generated by the Contractor within the Site to a demarcated area on the Site;

The Contractor must return all returnable documents on the attached specification of this document with the tender's returnable document.

2. LOW VOLTAGE SCOPE

The electrical work includes, but is not restricted to the following:

- Strip existing electrical installation and redundant cables and hand them to PRASA and certain rubble is for disposal at Contractors cost
- Refurbishment and or Retrofit existing electrical installation as indicated on the drawing
- Isolation, disconnect and make safe,
- The supply, delivery, installation, connections and testing of any material and equipment associated with the electrical supply connections to the buildings equipment's

- Supply, delivery, installation, connection and testing of busbars complete with housing
- The supply, testing and inspection at the manufacturer's premises, installation, connection, testing and commissioning of new distribution boards and switchgears
- Supply, delivery, installation and connection of all power and lighting, distribution, cabling, conductors i.e. socket outlets, light switches, isolators, etc.
- Supply, installation and connection of all circuit wire ways, cable trays, cable ladders, conduit, draw and outlet boxes and sleeves as per the drawings
- Supply, delivery and installation of earthing and bonding including clean earth for instrumentation system
- This includes the installation of a lightning protection system as per the drawings. A suitably certified Contractor shall install the lightning protection system and all earthing points shall be tested and the results recorded. All test results shall be submitted to the Project Manager in the form of a test report/certificate. Payment for this portion of the project cannot be made until the Project Manager has accepted the results of the tests
- Supply, delivery, installation and connection of all circuit wiring, cables and conductors;
- Provide labelling on distribution boards and equipment and cover plates as per specification
- Supply, delivery, installation and connection of all luminaries as per specification
- Connection of electrical power to all mechanical equipment / motors and systems
- Supply, installation, connection and testing of an earthing system entire installation including LV distribution boards providing clean earth for instrumentation
- Supply, delivery, installation, test and commissioning of backup generator set complete with AMF panel and all other required accessories for complete operation
- Service, maintenance of existing generator sets
- Excavations for all cable trenches, compaction, backfill and making good of existing surfaces
- Co-ordination with PRASA (where applicable) and Municipality / supply authority representatives when required etc.
- Testing of all new installations in accordance with the latest requirements of SANS 10142, the Electrical Contracting Board of South Africa and the issue of a certificate of compliance test report for the electrical installation in the buildings
- Any other work deemed necessary by the Project Manager for the completion of the project.

3. MAIN DISTRIBUTION BOARDS / MAIN ELECTRICAL PANELS

3.1. GENERAL

The electrical panels shall be suitable for the coastal environment and prevailing climatic conditions on site and equipment shall be designed and manufactured in accordance with SANS 1973/60439. The equipment shall conform to SANS 60947 Parts 1 -7, and shall be suitable for operation on supply voltages of 230/400 Volt at 50 Hz, AC. Reference must be made to the schematic/line diagrams, as well as to the following specific requirements.

The main distribution boards in the substations shall be of the free standing, floor mounted, multi-tiered, with individual main MCCB/Isolator for each motor starter, with front and back access, suitable for top busbars entries and bottom and top exit cable. The schematic drawings show the specific requirements applicable to each assembly.

The assembly shall be constructed of and manufactured from stainless steel grade 316 or as per single line diagram.

The minimum thickness of 2mm thick electrical panel.

The metal enclosures, internal panels and all equipment support frames shall be manufactured from the same type of plate stated above.

The degree of protection shall not be less than IP54 in accordance with SANS 1222 and capable of withstanding the temperature, humidity and coastal conditions. The assembly shall be fully vermin proofed.

A hot dipped galvanised steel base frame with predrilled holes for fixing the electrical panels to the floor shall be provided and removable lifting eyes with blanking off plugs shall be provided for lifting heavy assemblies. The panel shall be suitably braced to ensure rigidity. The method of preparing plate-work, priming and painting shall be in accordance with the standard painting specification.

The electrical panels are to be fully assembled in the manufacturer's factory for final acceptance tests. Where broken down for transportation to site, the electrical panels will be provided with all items required for re-assembly. Provision must be made for future extension at either side of the panels. All holes provided for such extension to be suitably plugged or covered.

The overall outside dimensions of the assembly shall be suitable for easy handling of the switchgear as indicated on the drawings.

All hinged front panels shall be fitted with stainless steel or heavy duty rustproof hinges of an approved manufacture with a 180° movement and shall be secured in the closed position by means of locking devices of approved quality. Hinged front panels in excess of 450mm height shall be secured at both the top and bottom. Lockable catches are required on all hinged front panels. All hinged front panels are to be fitted with earth straps.

Covers, other than the hinged type, shall be provided with chromium plated handles to facilitate removal. Removable covers shall be secured in position by means of patent screw locking devices approved by Engineer. All removable covers and hinged front covers shall have a neoprene or rubber gasket to ensure that the required IP rating of the panel is achieved.

All the equipment shall be mounted behind the hinged front panels and neat machine punched openings shall be provided for the purpose of operating handles etc. The drawings will detail the instruments required which will be flush mounted. The positions of instruments shall be such that the glass cannot be broken by other equipment when the hinged front panels are in the fully open position.

Cut outs which are provided for future equipment and instruments shall be neatly blanked off by means of removable dummy frames. Back plates shall be provided in all spare cubicles for the specified future starters.

To avoid damage to paintwork, screws, bolts, door lock, etc. must not be in direct contact with painted surfaces.

The Engineer shall approve the manufacturer's detailed working / shop drawings of the assembly before any fabrication commences. Any other construction or type of assembly proposed as an alternative to that specified must have the approval of Engineer in writing. The drawings will detail all dimensions of busbars, connections, electrical component make, type and rating. Positions and layout of busbars, earth bars and gland plates will be shown in front and side elevation drawings.

3.2. PAINT SPECIFICATION

All metal used for the fabrication of the board shall be painted, i.e. internally and externally. Baked enamel, electro statically applied powder coating or similar proven methods, other than standard enamel paint applied by brush, shall be used.

In general, the following standard colours shall be used, but the final colours are to be confirmed with PRASA and the Engineer.

- Non-essential sections Electric orange
- Essential sections Signal red
- Uninterrupted power (UPS) Purple.
- Instrumentation and control Blue.

3.3. EDGES

Care shall be taken to ensure that all edges and corners are properly covered, after all burrs and sharp edges have been removed.

3.4. SURFACE PREPARATION

Surface preparation shall comply with SANS 10064. Prior to painting, all metal parts shall be thoroughly cleaned of rust, mill scale, grease and foreign matter to a continuous metallic finish. Sand or shot blasting or acid pickling and washing shall be employed for this purpose.

The corrosion inhibiting process shall be suitable for the environmental conditions to be encountered on site and full details shall be provided at the time of tendering. Details of the chemical process employed and the method of application shall also be provided at the time of tendering.

3.5. FINISH ON STAINLESS STEEL

One (1) coat of suitable etch primer (15 microns). Apply epoxy polyester powder coat (60 microns final thickness). Steel shall be correctly pickled and passivated prior to being painted. Pickling and passivation shall be undertaken after basic manufacture of the Enclosure is complete.

3.6. BUSBARS

All busbars shall be manufactured from solid high conductivity copper and shall comply with the requirements laid down in SANS 1195. The completed busbar system shall be a standard modular system and shall have been tested to SANS approval and a certificate shall be made available confirming the full busbar technical description, current rating and fault rating together with full details of the test results. Busbars shall be designed to withstand a test voltage of 2.5kV AC for one minute.

The busbar assembly shall be rated in accordance with the specified ultimate projected fault level, which will be not less than the short-circuit stresses limited by the protective device(s) on the supply side of the busbars, as well as the specified continuous full load current, with a current density not exceeding 1,60 Amps per mm². The busbars shall withstand a fault current under test conditions of the specified fault level for 1 second. If a fault level is not specified, the busbars shall be tested at 20 times rated current for 1 second.

The fault current during tests shall be:

- between all three-phases
- any two phases
- neutral and the adjacent phase, and
- earth conductor and the nearest phase conductor.

The busbars shall be continuously rated for the specified current with a maximum temperature rise of 40°C relative to a peak ambient temperature of 40°C giving a maximum peak busbar temperature of 80°C.

Busbars shall be mounted in the top section of the assembly and shall be rigidly supported by means of approved insulated busbar clamps (at intervals not exceeding 500mm) to prevent damage resulting from the specified short circuit conditions.

The busbars shall run along the entire length of the assembly up to 76mm from either end. The phase busbars shall be identified in the phase colours red, white and blue.

The busbars shall be arranged horizontally with the longer side of the cross-sections in the vertical plane and one behind the other in the horizontal plane. The minimum clearance between live conductors and live conductors and earth shall be 40mm.

3.7. EARTH BUSBAR

A solid copper earth bar shall be provided inside each assembly at the back and along the entire length, at a height of approximately 500mm above floor level, or 200 mm above the gland plates. A bar is to be provided at the top of the assembly where top entries exist and this shall be solidly connected to the bottom earth bar.

The bar will be supported on robust spacers and will have a minimum clearance of 40mm to the sheet steel panel.

The earth bar shall have same size as the phase busbars and shall be drilled with the requisite number of holes for the individual connection of all cable ECC and other earth conductors.

The earth bar, busbar joints and cable terminations must not be insulated.

Stainless steel bolts and lock washers shall be provided through the earth bar at each earthing position and at least 5 additional holes will be provided for future connections, each being fitted with nuts and bolts as above.

The earthing positions shall be evenly spaced along the length of the earth bar and the bar must be clearly identified as the earth.

3.8. NEUTRAL BUSBARS

Neutral busbars in 3 phase, 4 wire supplies shall have a cross-section of the same area and size as of the phase busbars. Where single-phase circuits (e.g. lighting and general power circuits) are protected by single-phase circuit breakers or fuses, all neutral conductors shall be connected to a separate neutral busbar mounted in a suitable position. The cross-section of the busbar shall be at same as phase busbars and the busbar shall be long enough for the lug of each conductor to be bolted separately to the busbar. Only one neutral conductor is allowed per nut and bolt combination.

A separate neutral bar shall be provided for each earth leakage unit provided on the switchboard.

3.9. BUSBAR DROPPERS

All busbar droppers must be suitably supported (maximum spacing @ 500mm centres) and braced to suit the specified and/or projected short circuit conditions. They should be fully insulated and screened against accidental contact.

The droppers to the supply side of a single functional unit, as well as the components included in this unit, may be rated on the basis of the reduced short-circuit stresses occurring on the load side of the short-circuit protective device in this unit provided that these conductors are arranged such that under normal operating conditions an internal short-circuit between phases and/or between phases and earth is only a remote possibility, for example by being provided with adequate insulation or shrouding.

Particular attention shall be paid to the provision of adequate facilities for making off the main power supply cables. Attention must be paid to the vermin proofing of single core cabling.

Bunched cable connections will not be accepted between busbars and outgoing power circuit breakers, fuses or isolators.

3.10. BUSBAR CONNECTIONS

All connections and extensions to busbars shall be effected by means of stainless steel nuts, bolts and washers or cadmium plated, high tensile steel bolts and nuts which shall also be provided for future extensions. The minimum diameter of any hole will be 10 mm.

In exceptional cases a relaxation of SANS 1973 may be permitted to allow the drilling of holes, in which case the cross-sectional area as measured is to be reduced by the area of the holes.

3.11. EQUIPMENT

Unless otherwise stated on the drawings the latest version of the following minimum specifications shall be assumed for equipment to be installed in the switchboards:

SANS 60947 relates specifically to equipment for use at voltages up to 1000V AC.

All contactors and/or starters shall be protected with suitable back-up current limiting circuit breakers to protect the equipment against abnormally high currents or short circuits developing in the system.

The manufacturer will be required to ensure the correct co-ordination between circuit breakers, contactors and overload relays to comply fully with SANS 60947 Part 4, in order to achieve 'Type 2' co-ordination.

Unless otherwise stated, contactors and/or starters shall be rated for 10 million operations for making and breaking no-load currents to category AC3 as laid down in SANS 60158. Note that SANS 60947 requires equipment and wiring to be suitable for 7.2 x full load current for Direct-On-Line starters.

Each switchboard shall be provided with a means to isolate the incoming supply. This may be achieved by the use of an isolator, circuit breaker (fixed or draw-out), rated to make against the full system fault at the point and break the full load current. The incoming supply section containing switchgear, protection equipment, controls and instrumentation shall form a clearly labelled, self-contained unit behind one or more hinged panels. The operating handle of the isolator, circuit-breaker or fuse switch controlling the incoming supply shall protrude through the panel and shall be interlocked to ensure that the panel can only be opened when the supply is off.

Equipment that cannot be flush mounted on the panel, shall be mounted on a suitable metal chassis and shall protrude through a close fitting cutout in the panel. All protection relays contained in enclosed units with glass fronts shall be flush mounted on the hinged panels, contactors, thermal overload relays, etc. shall be mounted on a chassis behind the panel.

Access to the various starters shall be possible without isolation of the entire MCC, but the hinged front panels corresponding to each compartment shall be inter-locked with a local isolator in order that any compartment must be isolated before access to the equipment can be obtained. A mechanical device shall be incorporated in each isolation in the off position to provide a locking out facility during maintenance periods.

All over current reset buttons (22mm diameter) shall be mounted on the front panel enabling operators to reset the unit without having to open the panel.

Timers and relays controlling a starter shall be mounted in the compartment with the starter. All timers and relays must be clearly labelled with the identity given on the schematic diagrams.

Equipment to be supplied under this contract must be identical in all respects and it shall be possible to interchange such equipment should it become necessary.

All material and equipment must be suitable for 400/230V-supply voltage, 50 Hz supply frequency and must be approved by the Engineer. In addition all equipment shall be designed, manufactured and tested in accordance with the relevant IEC Standard Specification.

3.12. DERATING OF EQUIPMENT

Full cognisance must be taken of manufacturers derating tables for equipment located in enclosures and the rating of that equipment must be increased accordingly. In all such cases labels must be provided on the front of the associated cubicle stating the maximum permitted circuit loading.

3.13. CABLE TERMINATIONS

Due to the continuing miniaturisation of equipment, difficulties can be experienced in terminating power cables onto equipment terminals, particularly where more than one cable has to be terminated. The manufacturer shall ensure that suitably designed and rigidly braced

copper stubs are extended from such terminals to facilitate the termination of all cables. Flash barriers must be used between the phase terminals of circuit breaker equipment.

3.14. INSTRUMENTATION

All instruments shall be of a matching flush pattern. The single line diagram will indicate the ratio of CTs where required. The instruments shall be suitable for the environment in which they are installed. All instruments shall withstand a test voltage of 2kV for 1 minute and the terminals of all instruments mounted on hinged panels shall be shrouded.

Electrical panel shall be provided with digital meter to measure voltages, amperes, kWh, Hetz, etc. the meter shall be able to measure each motor power consumption.

3.15. PROTECTIVE DEVICES AND PROTECTION SETTINGS

The switchgear shall be provided with the specified protection and auxiliary relays, which must be of a modular pattern, readily accessible, replaceable and extensible.

The thermal overload releases and instantaneous magnetic short circuit trips are to be adjustable over the trip ranges as specified by Engineer.

The Contractor must allow to grade, set and test the protection devices for the main switch, bus section switches and each motor circuit.

3.16. PUSH BUTTONS AND INDICATING LIGHTS

These shall be 22mm diameter unless otherwise specified and shall be suitable for the environment conditions. Emergency Stop push-buttons shall be 40mm diameter "Twist to Release"

Indicator lamps may only be of the Cluster LED types. Where LED's are specified as indicators on main supply voltages, a suitable current limiting capacitor and reverse voltage protection diode must be used. For low AC or D.C. voltages ($\pm 24V$) a current limiting resistor will suffice.

3.17. SITE TESTS

After completion of erection, cabling and field wiring, the Contractor shall set all overloads, protection devices etc. and shall again carry out a full functional test to prove the correct operation of the entire electrical panel, including the simulation of all remote devices. A signed compliance certificate by the Contractor's accredited person for the electrical panel and its installation shall be handed over to Engineer on Completion.

The tests shall be witnessed by the Engineer.

3.18. WORKMANSHIP GUARANTEE

A 12-month guarantee shall cover the sheet metal enclosures and all the equipment installed therein against faulty workmanship and materials. The guarantee period shall begin from the date the electrical panels are completely installed and accepted by Engineer.

3.19. SUB-DISTRIBUTION BOARDS

3.19.1. General

Sub-Distribution board shall comply with the requirements of the standard specifications of these documents or shown on the drawings. All sub-distribution boards must be dustproof with an IP54 rating and 1,6mm stainless steel and/or as per drawings specification. Floor standing distribution boards shall be have sheet of 2,0mm (minimum) stainless steel. They must have a proxy finish.

Distribution boards are to be manufactured by an approved switchboard manufacture and to have a SABS approved manufacturer circuit breakers and/or isolators (as per drawing) and lightning/surge arrestor. All DB's to have surge arrestors as per drawings. A thirty percent (30%) space must be included on all DB's.

Drawings of all distribution by the manufacturer shall be submitted by the Contractor to the Engineer for approval before commencement of manufacture of distribution boards. After construction all DB must be inspected by the Engineer before installation.

3.19.2. Installation of Distribution Boards

Distribution boards shall be installed in the positions as shown on the respective drawings. The Contractor shall ensure that the distribution boards with the necessary conduits, sleeves, and channels as required are placed in position and mounted when required, and he shall ensure that all equipment is installed in the correct positions. It must be emphasised that no chasing will be allowed in walls built with face-bricks on the side in which distribution boards and ancillary equipment are installed. In all such cases the Contractor shall place his equipment in its proper place for the building contractor to build.

The costs of any additional work caused by late, incorrect or defective positioning of equipment and/or material by the Contractor, shall be recovered from him.

The Contractor shall, while material and/or equipment forming part of the electrical installation are/is being built in, and have a competent representative present to ensure that no unnecessary stress is placed on the material that will influence subsequent installation of equipment. Care shall be taken that all equipment of the board fit properly in their respective position without distortion which can lead to a poor installation and appearance. All bolts, clamps and fasteners shall be examined and properly tightened.

The Contractor shall ensure that all circuit breakers and other equipment can be changed and replaced if and when required.

All support props and struts, packing pieces and material used by the board manufacturer to prevent damage during transit, shall be removed by the Contractor. The Contractor shall examine all boards and ensure that all equipment shown on the appropriate relevant drawings has been supplied and fitted.

Any conspicuous damage like scratches or chafe marks to paint work, shall be touched up with the same colour paint as supplied by the board supplier.

The mounting height of all distributions measured to the top of the edge of the board shall be 2 000 mm above finished floor level, unless otherwise specified or the position and circumstances dictate differently. The Contractor shall ensure that cables sleeves and provision for the entry of cables to distribution boards as shown on drawings are done properly and neatly.

All DB must have surge arrestors as specified on the drawing.

Exposed cables above or below the surface distribution board must be covered with a metal cover of the same colour as the DB.

All distribution boards shall have mechanical barrier which will separate supply from normal supply /generator supply from the solar system supply.

3.20. EARTHING

Earthing shall be done in accordance with the requirements of the standard specifications and those of the Supply Authority.

Earth system neutral and all non-current carrying metal parts of electrical equipment, conduit, cable racks, etc.

Earth metal parts of distribution boards, switch boxes, conduit, wash-hand basins, working surfaces, cable armouring and electrical equipment.

A separate isolated earth-bar shall be fitted in each distribution board for the dedicated computer socket outlets. These earth-bars shall be earthed with an insulated earth conductor to a separate earth spike from the main earth. The computer earth spike shall be inter-linked outside the building to an earth conductor, to the main earth spike of the building.

Additional Equipment

Install three phase lightning arrestor in the Distribution boards as per drawing.

3.21. LABELS

All distribution boards shall be marked as follows:

- Name and number of distribution board and Fault level rating of distribution board, example “DB - G, 5kA”;
- Origin of supply, and size of all cables, example “Supply from main DB - 25 mm² x 4c
- All circuit breakers shall have its current rating clearly indicated on the handle, or on the panel adjacent to the switchgear;
- All circuit breakers shall be properly labelled as to its service, as indicated on the drawings.

3.22. COLOUR CODING AND LABELLING OF THE DISTRIBUTION BOARD

The distribution board must be white in colour, with the following specification:

- Non-essential DB colour to be white with white colour face plate. The label will have black engraved letters on white ivorene label. Ivorene label super-glue or pop riveted to face plate or frame. Distribution board number as per drawing, e.g. DB-G. Content of internal label on face plate – DB number indication of a feeder source, size of a feeder cable, fault level rating of a distribution board and phase rotation direction. The label of a DB will be 6 mm label on face plate to be 3 mm. labelling of cables – all incoming and outgoing cables shall be labelled with ivorene labels indicating the size of the cable.
- Essential DB colour to be white with red colour face plate for sub-distribution boards.
- Essential DB colour to be electric orange with red colour face plate for main-distribution board.
- The label will have black engraved letters on red ivorene label. Ivorene label super-glue or pop riveted to face plate or frame. Distribution board number as per drawing, e.g. DB-E/G. Content of internal label on face plate – DB number indication of a feeder source, size of a feeder cable, fault level rating of a distribution board and phase rotation direction. The label of a DB will be 6 mm label on face plate to be 3 mm. labelling of cables – all incoming and outgoing cables shall be labelled with ivorene labels indicating the size of the cable.
- Uninterrupted Power Supply / Solar system boards - DB colour to be white with blue colour face plate. The label will have black engraved letters on white ivorene label. Ivorene label super-glue or pop riveted to face plate or frame. Distribution board number as per drawing, e.g. DB-U/G. Content of internal label on face plate – DB number indication of a feeder source, size of a feeder cable, fault level rating of a distribution board and phase rotation direction. The label of a DB will be 6 mm label on face plate to be 3 mm. labelling of cables – all incoming and outgoing cables shall be labelled with ivorene labels indicating the size of the cable.
- All distribution boards shall have mechanical barrier separating non-essential and essential sections of the electrical panel.

All Essential and UPS distribution boards, kiosks and low-tension switchboards shall be equipped with LED indicators connected to the incoming supply and labelled alternative supply.

POWER SOURCE	NORMAL	ESSENTIAL	UPS
Colour of Electrical Panel	Distribution Boards in buildings White or Beige Outdoor Kiosks, and Low Tension Switchboards Electric Orange	Distribution Boards in buildings White or Beige Outdoor Kiosks, and Low Tension Switchboards/ main LV room Electric Orange	Distribution Boards in buildings White or Beige Outdoor Kiosks, and Low Tension Switchboards/ main LV room Electric Orange
Colour of Plate	Distribution Boards in buildings White or Beige Outdoor Kiosks, and Low Tension Switchboards Electric Orange	Distribution Boards in buildings Red Outdoor Kiosks, and Low Tension Switchboards Red	Distribution Boards in buildings Blue Outdoor Kiosks, and Low Tension Switchboards Blue
Label of plate	Black engraved letters on white Ivorene label. Ivorene label super-glued or pop riveted to face plate or frame.	White engraved letters on red Ivorene label. Ivorene label super-glued or pop riveted to face plate or frame.	White engraved letters on blue Ivorene label. Ivorene label super-glued or pop riveted to face plate or frame
Contents on external Label	Distribution Board Number as per example DB A	Distribution Board Number as per example DB/E-A / DB/E – 1	Distribution Board Number as per example DBAU / DB/U – 1
Contents of internal label of face plate	Distribution Board Number, Indication of Feeder Source, Size of Feeder Cable, Fault Level Rating of Distribution board, Phase rotation direction	Distribution Board Number, Indication of Feeder Source, Size of Feeder Cable, Fault Level Rating of Distribution board, Phase rotation direction	Distribution Board Number, Indication of Feeder Source, Size of Feeder Cable, Fault Level Rating of Distribution board, Phase rotation direction
Letter size	Label of Distribution Board : 6 mm Label on Face	Label of Distribution Board : 6 mm Label on Face	Label of Distribution Board : 6 mm Label on Face

POWER SOURCE	NORMAL	ESSENTIAL	UPS
	Plate: 3 mm	Plate: 3 mm	Plate: 3 mm
Labelling of cables	All incoming and outgoing cables shall be labelled with Ivorene labels indicating the size of the cable.	All incoming and outgoing cables shall be labelled with Ivorene labels indicating the size of the cable.	All incoming and outgoing cables shall be labelled with Ivorene labels indicating the size of the cable.

3.22.1. Balancing Of Load and Phases

In multiphase distribution boards, all single phase circuits shall be equally distributed over all three phases so as to balance the electrical load as far as possible.

Each type of sub-circuit shall separately be balanced over all three phases as far as possible.

3.22.2. Provision for Future Equipment

Where space is required for future switchgear, the panel shall be correctly punched for such future switchgear.

Approved blank-covers must be provided.

3.23. EARTHING

Earthing shall be done in accordance with the requirements of these documents and those of the Supply Authority.

Earth system neutral and all non-current carrying metal parts of electrical equipment, conduit, cable racks, etc.

Earth metal parts of distribution boards, switch covers, conduit, wash-hand basins, working surfaces, cable armouring and electrical equipment.

The current carrying capacity of earth conductors shall in general be not less than 50 % of that of the largest conductor which is protected, except that earth conductors smaller than 2,5 mm squared may not be used.

All luminaires shall be earthed to an earth conductor.

A specialist and approved lightning & earthing protection contractor will be appointed by the Contractor. A provisional amount for this work has been allowed for in the tender summary. The lightning protection system shall comply with the latest relevant requirements of the specification: SANS 10313: Protection of structures against lightning.

3.24. Kiosks

Kiosk shall comply with the requirements of the standard specifications of these documents or shown on the drawings. 2,0mm 3RC12 All kiosks must be dustproof with an IP65 rating and floor standing shall have sheet of 2,0mm (minimum) 3CR12 and/or as per drawings specification. They must have an epoxy finish..

Kiosk are to be manufactured by an approved switchboard manufacture and to have a SABS approved manufacturer circuit breakers and/or isolators (as per drawing) and lightning/surge arrestor. All kiosks to have surge arrestors as per drawings. A thirty percent (30%) space must be included on all DB's.

Shop drawings of all kiosks by the manufacturer shall be submitted by the Contractor to the Engineer for approval before commencement of manufacture of kiosks. After construction all kiosk must be inspected by the Engineer before installation.

Installation Of kiosks

Kiosk shall be installed in the positions as shown on the respective drawings. The Contractor shall ensure that the Kiosk with the necessary sleeves, and channels as required are placed in position and he/she shall ensure that all equipment is installed in the correct positions. In all such cases the Contractor shall place his equipment in its proper place for the civil Contractor to build. Contractor must include materials and concrete for each kiosk raised 100mm above ground.

The costs of any additional work caused by late, incorrect or defective positioning of equipment and/or material by the Contractor, shall be recovered from him.

The Contractor shall, while material and/or equipment forming part of the electrical installation are/is being built in, and have a competent representative present to ensure that no unnecessary stress is placed on the material that will influence subsequent installation of equipment. Care shall be taken that all equipment of the board fit properly in their respective position without distortion which can lead to a poor installation and appearance. All bolts, clamps and fasteners shall be examined and properly tightened.

The Contractor shall ensure that all circuit breakers and other equipment can be changed and replaced if and when required.

All support props and struts, packing pieces and material used by the board manufacturer to prevent damage during transit, shall be removed by the Contractor. The Contractor shall examine all kiosks and ensure that all equipment shown on the appropriate relevant drawings has been supplied and fitted.

Any conspicuous damage like scratches or chafe marks to paint work, shall be touched up with the same colour paint as supplied by the board supplier.

The Contractor shall ensure that cables sleeves and provision for the entry of cables to kiosk as shown on drawings are done properly and neatly.

Surge arrestors shall be provided as specified on the drawing.

Earthing – as per Distribution board above.

Additional equipment – as per Distribution board above.

Labels – refer narrative of the distribution board above, refer to the drawings for reference.

Balance of load – as per distribution board narrative above

3.24.1. The Kiosk must be white in colour, with the following specification.

- Non-essential Kiosk colour to be white with white colour face plate. The label will have black engraved letters on white ivorene label. Ivorene label super-glue or pop riveted to face plate or frame. Kiosk number as per drawing, e.g. Kiosk-A. Content of internal label on face plate – Kiosk number indication of a feeder source, size of a feeder cable, fault level rating of a distribution board and phase rotation direction. The label of a Kiosk will be 6 mm label on face plate to be 3 mm. labelling of cables – all incoming and outgoing cables shall be labelled with ivorene labels indicating the size of the cable.
- Essential kiosk colour to be electric orange with red colour face.

The label will have black engraved letters on red ivorene label. Ivorene label super-glue or pop riveted to face plate or frame. Distribution board number as per drawing, e.g. Kiosk-E/G. Content of internal label on face plate – Kiosk number indication of a feeder source, size of a feeder cable, fault level rating of a Kiosk and phase rotation direction. The label of a Kiosk will be 6 mm label on face plate to be 3 mm. labelling of cables – all incoming and outgoing cables shall be labelled with ivorene labels indicating the size of the cable.

Where space is required for future switchgear, the panel shall be correctly punched for such future switchgear.

Approved blank-covers must be provided.

Provision of Control Devices on Kiosk

The switchboard manufacturer shall install the following control devices as indicated on the drawings.

- Switched socket outlets – 16A, 250VAC 3 round pin, 2-pin/Euro pin surface mounted inside the kiosk.

- A photo-electric cell mounted, as per specification of this document, on top of the kiosk as indicated on the drawing
- A industrial light switch for floodlights installed inside the kiosk where applicable or as indicated on the drawing

Where space is required for future switchgear, the panel shall be correctly punched for such future switchgear.

Approved blank-covers must be provided.

NB: Contractor to ensure that the control devices comply with the colour coding source. If the supply comes from backup generator, the control devices must reflect correct colour coding as indicated below

3.25. CONDUIT AND FITTINGS

3.25.1. Flush In Walls, Floors and Concealed In Roof Spaces

Conduit fittings and their installation shall comply with these documents. All conduits shall be concealed by laying in concrete, chasing in walls or running in ceiling/roof spaces. All chase work and making good thereof shall form part of this contract.

Contractor is to install PVC conduits in all electrical installation. Conduits jointing to be done with couplings or approved jointing accessories for conduit jointing and contractor is to use glue to make sure that the jointing or connection of conduits is permanently fixed.

All conduit shall be painted and match the wall after installation where applicable.

3.25.2. PVC Power skirting

The Contractor shall be responsible for supply and installation of all power skirting complete with corner pieces, splices, end pieces, junction pieces, supply conduits, cover plates and power outlets as specified and indicated on the drawing.

The power skirting must comply with SANS 1197. The Contractor must ensure that the power skirting is installed to the satisfaction of the Engineer before commencing with the wiring of the power skirting.

Two compartments with two cover power skirting shall be supplied and installed as indicated in the drawings. The compartments shall be switched socket outlet (normal and dedicated), and data.

Power skirting and trunking shall be polyvinyl chloride (PVC) and white in colour.

3.26. COVERPLATES

Switched socket outlets and switches are mounted in hot deep galvanised wall outlet boxes and for blank cover plates they shall be white.

All cover plates shall be PVC and white in colour with 3mm engraved lettering indicating distribution board and circuit number.

Colour coding is to be done as per SANS standard, namely:-

- Normal /Non-essential Supply: white,
- Emergency/Essential Supply: signal red
- UPS supply: blue

3.27. CABLE SLEEVES

All cable sleeves inside the building and on the site across roads and under hardened surfaces shall be supplied and installed by the Contractor and shall form part of his contract.

Cable sleeves shall be made from PVC and shall be at least Class 34, unless otherwise specified and shall be installed at all entrances to building, road and street crossings and such other entrances to building, road and street crossings and such other places as may be specified elsewhere in these documents or shown on the drawings. Sleeves used at entrances to building shall be sealed at both ends after the cable has been installed. During installation and until final sealing is done, the sleeves shall be kept clean of debris and blockage by temporary plugs. Final sealing shall be done with a weak cement mixture. Sleeves for future use shall be likewise sealed.

The sizes and number of cable sleeves are indicated on the drawings.

Where the diameter of cable sleeves are such that it cannot be hidden behind a plastered slot in the wall, an acceptable and suitable cover shall be provided and screwed over the cable slot.

The Contractor shall ensure that the correct sizes, number and length of sleeves are supplied and installed so that the cables can be pulled-through and installed.

3.28. ARRANGEMENT OF CIRCUITS

The arrangements of the various circuits are indicated on the drawings, together with the required protection (switchgear), control and the type and number of wiring (conductor or cable) of each circuit.

All protection shall be done with moulded case circuit breakers (MCCB's) from a SABS approved manufacturer.

No mixing of different types, ratings and manufacture of switchgear shall be allowed.

The Contractor shall check and make sure that the conductors as given for the various circuits, comply with the requirements of the standard specifications of these documents, as well as those of the SANS Code of Practice, SANS 10142-1 as amended.

The Contractor shall ensure that all circuits are connected such that the load is equally balanced over all three phases.

3.28.1. Isolators, Circuit Breakers, Earth Leakage Relays and Surge Arrestor

Isolating switches, circuit breakers and earth leakage units shall comply with the relevant requirements and shall be of the SABS approved manufacture (commercial/industrial circuit breakers and switch disconnectors), or as may be specified elsewhere in these documents or shown on the drawings. The circuit breakers must be hydraulic magnet type.

3.29. SWITCHED SOCKET OUTLETS

Switched socket outlets (S.S.O) shall be 250V 16A 3 round pin, 3-pin and 2pin and dedicated switched socket outlet shall be 250V 16A 2 round pin and chamfered and shall be of approved manufacture and shall bear a SABS mark. The position of the sockets out will be 300 mm above floor finishing level (AFFL) or/and as per drawing. Sockets outlets with waterproof housing must be provided and must be installed as shown on the drawings be the same height of 300mm AFFL, or as specified on the drawing.

Labelling on the cover plate is to be engraved or with pop riveted to cover plate with black letters. Content on label shall be the distribution board number and circuit number feeding socket outlet, e.g. DBA/PD1/1. Each socket outlet on a circuit shall be labelled.

All s.s.o shall be wired with 4,0mm² conductors that is red, white or blue for live circuits, black conductors for neutral and green for earth.

Dedicated switched socket outlet shall not be linked with earth leakage.

Cover plates for s.s.o shall be white plate with white or red toggle or blue plate as indicated on the drawing.

Cover plate for dedicated s.s.o shall be white with red toggle and chamfered earth or blue plate as indicated on the drawing.

POWER SOURCE	NORMAL	ESSENTIAL	UPS	DEDICATED This socket outlet shall be used for computer equipment only and shall not be on earth leakage units.
Cover Plate Colour	White	White	White	Red
Switch / toggle Colour	White	Red	Blue	Red
Label Type	Black letters on white Ivorene label or Black engraved letters on cover plate. Ivorene label glued with super glue or pop riveted to cover plate.	White letters on red Ivorene label or Red engraved letters on cover plate. Ivorene label glued with super glue or pop riveted to cover plate.	White letters on blue Ivorene label or Blue engraved letters on cover plate. Ivorene label glued with super glue or pop riveted to cover plate.	Black letters on white Ivorene label or Black engraved letters on cover plate. Ivorene label glued with super glue or pop riveted to cover plate.
Contents On Label	Distribution Board Number and Circuit number feeding the socket outlet as per example DBA/ P1/1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the socket outlet as per example DB/E-A/ P1/1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the socket outlet as per example DB/U – A / P1/1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the socket outlet as per example DB-A/ PD1/1 Each socket outlet on a circuit shall be labelled.
Letter Size	3 mm	3 mm	3 mm	3 mm

POWER SOURCE	NORMAL	ESSENTIAL	UPS	DEDICATED This socket outlet shall be used for computer equipment only and shall not be on earth leakage units.
Earth Pin	Round	Round	Round	Chamfered
Female Socket	White	White	White	Red

3.30. LIGHT SWITCHES

Switches shall comply with the requirements of these documents, shall have a rating of not less than 16A 240V and shall be suitable to break the load which is typical of LED luminaries. Light switches shall be of approved manufacture and shall bear a SABS mark. The position of the light switch must be 1 200 mm above floor finishing level (AFFL) or/and as per drawing. Light switches with waterproof housing must be provided and must be installed as shown on the drawings.

Light switch cover plates are to be provided with an engraved label or pop riveted to cover plate with black letters. Content on label shall be the distribution board number and circuit number feeding light switch, e.g. DBA/L1/1. Each light switch on a circuit shall be labelled. All switch covers must be metal steel.

All lighting circuit shall be wired with 2,5mm² conductors that is red, white or blue for live circuits, black conductors for neutral and green for earth.

Where applicable, lighting circuit shall be wired or connected with 2,5mm²-2core PVC/SWA/PVC Ecc copper cable. This shall be shown on the drawing.

POWER SOURCE	NORMAL	ESSENTIAL (Gen set)	UPS
Cover Plate Colour	White	White	White
Switch / toggle Colour	White	Red	Blue
Label Type	Black letters on white Ivorene label or Black engraved letters on cover plate.	White letters on red Ivorene label or Red engraved letters on cover plate.	White letters on blue Ivorene label or Blue engraved letters on cover plate.

POWER SOURCE	NORMAL	ESSENTIAL (Gen set)	UPS
	Ivorene label glued with super glue or pop riveted to cover plate.	Ivorene label glued with super glue or pop riveted to cover plate.	Ivorene label glued with super glue or pop riveted to cover plate.
Contents On Label	Distribution Board Number and Circuit number feeding the socket outlet as per example DBA/ P1/1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the switch as per example DB/E-A / L1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the switch as per example DB/U – A / L1 Each socket outlet on a circuit shall be labelled.
Letter Size	3 mm	3 mm	3 mm

3.31. ISOLATORS

All welding/industrial isolators shall be 5 pin, 400V, 3-phase, neutral, earth and shall be weatherproof to IP65 standards. Other isolator (surface and or recessed) are 3-pole / 400V (32A, 60A, 100A); 1-pole (20A, 32A), etc. Colour to be as per the table below.

Isolators shall be connected with 16mm²-4core PVC/SWA/PVC ECC copper Cable or as per single line diagram.

All final connections shall comply with the requirements of SANS 10142-1.

Isolators shall IP65 weatherproof surface mounted isolators wall-mounted at ± 1 300 m AFFL or as indicated on the drawing.

POWER SOURCE	NORMAL	ESSENTIAL (Gen set)	UPS
Cover Plate Colour	White	White	White
Switch / toggle Colour	White	Red	Blue
Label Type	Black letters on white Ivorene label or Black engraved letters on cover plate.	White letters on red Ivorene label or Red engraved letters on cover plate.	White letters on blue Ivorene label or Blue engraved letters on cover plate.

POWER SOURCE	NORMAL	ESSENTIAL (Gen set)	UPS
	Ivorene label glued with super glue or pop riveted to cover plate.	Ivorene label glued with super glue or pop riveted to cover plate.	Ivorene label glued with super glue or pop riveted to cover plate.
Contents On Label	Distribution Board Number and Circuit number feeding the socket outlet as per example DBA/ P1/1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the switch as per example DB/E-G/ S1 Each socket outlet on a circuit shall be labelled.	Distribution Board Number and Circuit number feeding the switch as per example DB/U – G / S1 Each socket outlet on a circuit shall be labelled.
Letter Size	3 mm	3 mm	3 mm
Comments	n/a	Where red switches are not obtainable the illuminated type red switch may be used or a white switch may be used but the switch shall be tagged with a non-removable red sticker.	Where blue switches are not obtainable the illuminated type blue switch may be used or a white switch may be used but the switch shall be tagged with a non-removable blue sticker.

3.32. DESIGN DRAWINGS

The design drawings generally show the scope and extent of the proposed work and shall not be held as showing every minute detail of the work to be executed.

The position of power points, switches and light points that may be influenced by built-in furniture must be established on site, prior to these items being built in.

3.33. LOW VOLTAGE CABLE

The sizes and routes of low voltage cables are indicated on the drawings and in these documents.

Low voltage cables shall be PVC/SWA/PVC ECC type with copper conductors which shall comply with the requirements of SANS 1507 in those of the standard specifications, in all respects.

Cables shall bear the SABS mark. The supply, installation, termination and jointing of cables shall comply with SANS 10198 and with the requirements of these documents. No jointing will be allowed in cables unless authorised by the Engineer.

3.33.1. Earth Conductors

Earthing shall comply with the requirements of the Supply Authority and SANS 10142-1 as amended.

3.34. CABLE GLANDS

All cable glands shall be of the SABS approved IP 65 rated and shall conform to SANS.

3.35. MARKING

The Contractor shall mark & label of all substation equipment. Supply and install laminated single line schematic diagram of the LV reticulation and state the feeder. Labelling with ID codes of all LV & control cable ends at substation. Supply and install new OHS Act signage & fire & resuscitation notices on MV and metering/LV rooms of substation.

Cables shall be labelled at all terminations with suitable and approved labels (stainless steel Ivone white ivorene label written in black) indicating:

- i) Origin and Destination; (e.g. from Meter room to DB - C)
- ii) Cable size and no. of cores; (e.g. 16 mm²-4-core)
- iii) Conductor type. (e.g. PVC/SWA/PVC Copper ECC cable)

3.36. CABLE ROUTES

The final cable routes shall be determined on site before installation commences. Concrete cable markers shall be installed along the cable routes where applicable.

3.37. CABLE TRAYS AND RACKS

All cable wireways, channels, trucking, ladders and trays shall be SABS manufacture and shall be hot deep galvanised steel finish.

All cable wireways, trunking, channels, trays, etc. shall be neatly and properly fixed, suspended, clamped or supported with hot deep galvanised steel finish mechanical support accessories specially engineered and manufactured as per detail specifications of the manufacturer.

All cable trays/racks/ladders exposed to view shall be provided with galvanised steel finish galvanised steel in-fill plates to prevent cables being visible from the bottom.

The Contractor shall note the minimum mounting height requirements of all ducting and wire ways.

Allowance must be made for the installation of a new heavy hot deep galvanised cable ladder that will support the cables as specified. This shall include all fixing materials, risers, bends and splice kits.

Description

Duty	:	Heavy
Material	:	hot deep galvanised
Span	:	6m with loading of 144 kg/m
Side rail	:	100mm high
Cross rung	:	150mm, 300mm,
Cable ladder width	:	As required + 20% spare capacity

3.38. LUMINAIRES

3.38.1. General

Luminaires which comply with the requirements of the standard and detail specifications of these documents shall be supplied and installed in accordance with these documents and/or drawings. The tender rates shall be for the type specified and if alternatives are offered it shall be under a covering letter submitted with the tender documents. The onus will be on the Contractor to prove that the alternatives are in all respects equal or better to the types specified by means of a supplying SABS approved photometric data.

Luminaire positions indicated on drawings are diagrammatic, and all positions, spacing, etc. must be determined in accordance with drawing.

3.38.2. Fixing Of Luminaires

Luminaires shall be installed in the position(s) indicated on the drawings. Final positions shall be determined by the engineer when in doubt.

3.38.3. Supply and Installation of Luminaires

The contractor shall allow for ordering, receiving, packing out, storing, mounting/fixing and final connections, of all the luminaires indicated on the drawings, in his tender sum.

No luminaires shall be ordered prior to the Engineer's official written approval.

3.38.4. Damage to Luminaires

All luminaires damaged by the contractor or his staff before first delivery shall be replaced with new luminaires at his own cost.

3.38.5. SANS Specification

Luminaires shall comply with the relevant SANS specification where such specification exists and shall carry the SANS mark of approval.

Where a SANS specification does not exist for complete luminaires, the accessories and control gear shall be SANS approved and carry the SANS mark of approval.

3.38.6. Photo-Electric Daylight Sensitive Switch

Exterior lighting shall be controlled by a photo-electric cell mounted against the exterior of the building with the unit positioned so that the extraneous light shall not affect its operation.

The unit shall comprise a photocell, thermal actuator and change-over switch, rated at not less than ten ampere (20A). The cover of the unit shall be manufactured from a tough, destruction resistant material for protection against tampering. The cover shall have good weather proofing properties, be ultra violet resistant and shall not deteriorate when exposed to sunlight for prolonged periods. Switch contacts shall be silver plated and shall be capable of breaking the load associated with fluorescent lamp luminaires. Contact rating shall be not less than 10 A.

The operational level shall be factory preset for "ON" at a light level of approximately 54 LUX and "OFF" at approximately 108 LUX. Voltage variations shall not materially affect the operational levels.

A time delay of not less than 30 seconds shall be provided to prevent the unit from functioning due to lightning or other short period changes in illumination.

The unit shall be effectively safeguarded against surges by means of a suitable surge protector which shall preferably form an integral part of the unit.

Bypass switches shall be provided for exterior lights controlled via photocells so that testing and maintenance can be done at any time.

External lighting shall be controlled via a photo-cell mounted on a wall.

3.38.7. Schedule and Specification of Luminaires

TYPE	DESCRIPTION	TYPE
A1	Surface mounted 53W / +/-5300-lumen (4000K) LED light fitting 1200mm x 600mm. The luminaire must produce approximately +/-5850lumen (+/- 10% tolerance of 5300-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. The luminaire shall consist of a polycarbonate body and an opal diffuser. A standard (1-10v) dimmable driver shall be supplied with the luminaire. Must be 1200mm x 600mm on size. A surface mounted, hot deep galvanised steel and powder coated enclosure. The luminaire shall bear the SANS 60598-2-1 safety mark and shall have an ingress protection of IP20 in compliance with SANS 60598-2-1, certified by a SABS test report. Use of high efficiency LED's >120 lumens per watt and CRI >80. The standard LED's colour temperature provided shall be neutral white (4000K). The surface mounted LED fitting shall operate LED light sources of 50W/ +/-5300lm in ambient temperatures without reducing the LED lifetime of 50 000 hours, at a lumen depreciation of not more than 30% (L70). Must have a 5-years warrantee.	
A2	Same as type A1 above but shall have a back-up battery to operate for 1 hour. A self-contained emergency/standby integrated back-up power with a 4w max output power. The driver shall operate at a power factor of >0,94 and the total harmonic distortion levels are < 20% and do not cause interference on the electrical network.	
A3	Surface mounted 30W / +/-3200lumen (4000K) LED light fitting 600mm x 600mm. The luminaire must produce approximately 3900lumen (+/- 10% tolerance of 3900-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. The luminaire shall consist of a polycarbonate body and an opal diffuser. A standard (1-10v) dimmable driver shall be supplied with the luminaire. Must be 600mm x 600mm on size. A surface mounted, hot deep galvanised steel and powder coated enclosure. The luminaire shall bear the SANS 60598-2-1 safety mark and shall have	

TYPE	DESCRIPTION	TYPE
	an ingress protection of IP20 in compliance with SANS 60598-2-1, certified by an SABS test report. Use of high efficiency LED's >120 lumens per watt and CRI >80. The standard LED's colour temperature provided shall be neutral white (4000K). The surface mounted LED fitting shall operate LED light sources of 30W/ +/-3900lm in ambient temperatures without reducing the LED lifetime of 50 000hrs, at a lumen depreciation of not more than 30% (L70). The fitting shall be tested and comply with the requirements of SANS IEC 60598:1. Must have a 5-years warrantee.	
A4	Same as type A3 above, but shall have a back-up battery to operate for 1 hour	
A5	Surface mounted IP65 die-cast aluminium body luminaire 30W or +/-4440lm LED. Correlated colour temperature (CCT): Neutral white light (4000K) – 40W/ +/-4440lm. (+/- 10% tolerance of 4440-lumen may be acceptable upon Engineers approval), Operating hours 60 000 minimum. Must have a 10kA/10kV surge protection minimum. Impact resistance and Diffuser protection – IK08 minimum. The luminaire must consist of a high-impact polycarbonate with a robust clear polycarbonate diffuser and is designed to operate LEDs of 43W. The luminaire must bear the standard code SANS 60598-2-1 safety mark. The body and diffuser must be designed in such a way to prevent collection of dust and moisture on the accessible surface of the body, thus also preventing any grip of the luminaire. The luminaire must be designed to allow entry of surface conduits via 20mm conduit or and 2,5mm 3 core cable threaded entries at both ends, as well as a 25mm hole in the centre of the back of the body. A silicone sponge gasket ensures	

TYPE	DESCRIPTION	TYPE
	reliable IP 65 rating. The one-piece, injection-moulded polycarbonate diffuser must be vandal resistant. It must be secured to the body by six stainless steel Allen head screws. The removable gear tray must be manufactured from stainless steel, powder coated white to optimise luminaire efficiency. All control gear components are mounted on the gear tray. The gear tray can be removed by loosening four Allen head screws in keyhole slots, which allow the gear tray to be relieved into a suspended position, ensuring ease of maintenance. All control gear components are removable and bear the relevant SABS mark. All screws, bolts and metal parts must be stainless steel or non-corrosive material. Mains connections are by means of a suitable screw terminal block with a wire clamping contact. The luminaire must have an electronic temperature monitoring prevents overheating of LEDs and power supply. Power factor $\geq 0,95$. Uniform luminance with low glare due to prismatic diffuser design. Long service life: over 60 000 hours (L70B10). No ingress of dust and moisture into the LED and controller compartment - IP 65 The fitting shall be tested and comply with the requirements of SANS IEC 60598:1 Must have a 5-years warrantee.	
A6	Same as type A5 above but shall have a back-up battery to operate for 1 hour.	
A13	Surface mounted IP66 die-cast aluminium body rough-guard luminaire 30W or +/-4440lm (+/- 10% tolerance of 4440-lumen may be acceptable upon Engineers approval), LED. Correlated colour temperature (CCT): Neutral white light (4000K) – 40W/ +/-4440lm, wattage may differ from supplier to supplier. (acceptable tolerance is +/-10% on 4440 lumen). Operating hours 60 000 minimum. Must have a 10kA/10kV surge protection minimum. Impact resistance and Diffuser protection – IK10 minimum. Contractor to allow for PRASA selective colour – Blue / grey colour – to be confirm on luminaire approval.	

TYPE	DESCRIPTION	TYPE
	The luminaire must consist of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser and shall be designed to operate LEDs of up 30W. The luminaire shall bear the SANS 60598-2-1 safety mark. The body and diffuser shall be designed in such a way to prevent collection of dust on the accessible surface of the body and preventing any grip of the luminaire. The luminaire shall be designed to allow entry of surface conduits via 20mm conduit threaded entries at both ends, as well as a 25mm hole in the centre of the back of the body. A silicone sponge gasket ensures reliable IP 66 rating. The one-piece, injection-moulded polycarbonate diffuser shall be vandal resistant. It shall be secured to the body by six stainless steel Allen head screws and must have tamper-proof screws with centre-pin. The luminaire shall have a removable gear tray is manufactured from mild steel; powder coated white to optimise luminaire efficiency. All control gear components shall be mounted on the gear tray. The gear tray shall be removed by loosening four Allen head screws in keyhole slots, which allow the gear tray to be relieved into a suspended position, ensuring ease of maintenance. All control gear components shall be removable and bear the relevant SABS mark. All screws, bolts and metal parts are stainless steel or non-corrosive material. Mains connections are by means of a suitable screw terminal block with a wire clamping contact. Electronic temperature monitoring prevents overheating of LEDs and power supply. Must have a 5-years warrantee.	
A14	Same as A15 type above, but shall have a back-up battery to operate for 1 hour.	

TYPE	DESCRIPTION	TYPE
B1	Bulkhead LED 20W / +/-2300lumen (4000K) with electronic gear, rated IP65. The luminaire must produce approximately 2300lumen (+/- 10% tolerance of 2300-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. Must have Surge protection. Surface mounted bulkhead luminaires complete with high-pressure die cast aluminium, high-impact acrylic diffuser and high-pressure base, with trim ring casting mounted onto the base casting by stainless steel M5 Allen head screw, located outside lamp. With silicon sponge gasket. IP65 protection. Effective high-power LEDs, 4000K at a colour rendering index>80. Minimum 50 000 hours useful lifetime, L70B10. SANS approved control gear bearing the SANS 60598-2-1 safety mark. With black base, opal diffuser. Must have a 5-years warrantee.	
B2	Same as B1 type above but shall have a back-up battery to operate for 1 hour.	
B3	Industrial bulkhead LED 32W / +/- 4430 lumen (+/- 10% tolerance of 4430-lumen may be acceptable upon Engineers approval), (4000K), rated IP66. wattage may differ from supplier to supplier. The luminaire shall be designed to operate LED light sources of 32W without reducing the useful lifetime of up to 50 000 hours, at a lumen depreciation of not more than 30% (L70). To maximize the reliability of the LEDs, the photometric engine and control gear compartment are completely sealed to IP 66. This shall ensure that the photometric performance is maintained over time. The body shall be manufactured from marine grade high-pressure die-cast aluminium (EN 1706 AC-44300). The luminaire shall be supplied with three mounting holes, or be supplied with no holes in the body, using mounting lugs instead, depending on site requirements. Electrical cable entry shall be via a compression type gland at the rear of the luminaire. The luminaire shall have a high-pressure die-cast aluminium decorative skirt assembly. The body shall be surface mounted. The fitting shall be supplied with wire guard.	

TYPE	DESCRIPTION	TYPE
	The diffuser shall be manufactured from non-discolouring injection moulded high impact acrylic. The prisms are restricted to the inside of the diffuser and are designed to provide a spacing to mounting height ratio of up to 8:1, whilst controlling excessive glare. The frame assembly shall be held to the body by four stainless steel M6 Allen head captive screws located outside the sealed lamp compartment. The control gear shall be mounted directly onto the body to provide optimum heat dissipation. All external screws, bolts and metal parts shall be stainless steel or non-corrosive material. The bulkhead to include guard wire and all other mounting accessories. Must have a 5-years warrantee.	
B4	same as type B3 above, but with battery backup to last 1-hour as per specification.	
C4	LED lowbay 144W / +/- 21000 lumen (+/- 10% tolerance of 21 000-lumen may be acceptable upon Engineers approval, (4000K) complete with aluminium body, IP66. Housing shall be marine grade high-pressure die-cast aluminium and protection glass. wattage may differ from supplier to supplier. Must have a 10kA/10kV surge protection minimum. Impact resistance and Diffuser protection high-impact polycarbonate – IK10 minimum. Contractor to allow for PRASA selective colour – Blue / grey colour – to be confirm on luminaire approval. Integrated with movement & Daylight Sensor - Fitting must be supplied with dimming sensor (up to 50% dimming when no activity occurs during a certain period) that shall be set to PRASA's operations times. Designed to operate LED light sources of 144W / in an ambient temperature (Ta) environment of up to 40°C. The luminaire must have a lifetime of 100 000 hours, at a lumen depreciation of not more than 30% (L70) at an ambient temperature (Tq) of 25°C.	

TYPE	DESCRIPTION	TYPE
	Luminaire shall have an easily accessible power supply/driver. SANS approved control gear bearing the SANS 60598-2-1 safety mark. Compartment. Glare-reduced light distribution, Flicker-free lighting. Must have a 5-years warrantee.	
C5	same as type C4 above, but with battery backup to last 1-hour as per specification.	
C6	LED streetlight 80W / +/- 9389 lumen (+/- 10% tolerance of 9300-lumen may be acceptable upon Engineers approval), (4000K) with aluminium body, IP66. +/- 9389 lumen, Wattage may differ from supplier to supplier. Must have a 10kA/10kV surge protection minimum. High-impact polycarbonate and Diffuser protection – IK10 minimum. Contractor to allow for PRASA selective colour – Blue / grey colour – to be confirm on luminaire approval. The luminaire shall consist of an LED engine, power supply and spigot compartment. This should allow the easy installation of the LED engine by means of a hinging action onto a spigot base casting, with incorporated levelling device. It shall be secured by stainless steel latches and an access screw. The LED engine, consisting of the LED light source and the power supply, to be easily replaced or upgraded. Both compartments shall be rated IP 65. Electronic temperature monitoring prevents overheating of LEDs and power supply, positioned directly next to LEDs (ThermiX®). The power supply shall be automatically disengaged when opening the luminaire. The luminaire housing must be manufactured of marine grade aluminium.	

TYPE	DESCRIPTION	TYPE
	These shall be installed on a hot dipped galvanised steel pole. Contractor to make allowance for pole mounting. The LED lifetime of 100 000hrs (LED lifetime and Driver), (L90B10). Must have a 5-years warrantee.	
	Same as D1 type above but shall have a back-up battery to operate for 1 hour.	
D1	20W / +/-2000 lumens LED down lighter recessed on ceiling. +/- 2000 lumen (+/- 10% tolerance of 2000-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. The luminaire consists of an LED engine and power supply. Shall have a design to operate LED light sources of 20W/ +/-2000lumen in an ambient temperature environment of up to 35°C, without reducing the LED lifetime of 50 000hrs, at a lumen depreciation of not more than 30%. The power supply shall be located outside of the luminaire housing. The luminaire shall be secured into the ceiling by means of two springs located on either side of the luminaire. Housing – Aluminium, Diffuser – frost Glass. Neutral White (4000K), IP20. Electrical Safety Class (IEC), Class II. Must have a 5-years warrantee.	
D2	Same as D1 type above but shall have a back-up battery to operate for 1 hour.	
D3	10W / +/-1200 lumens LED down lighter recessed on ceiling. +/- 1200 lumen (+/- 10% tolerance of 1200-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. The luminaire consists of an LED engine and power supply. Shall have a design to operate LED light sources of 10W/ +/-1200lumen in an ambient temperature environment of up to 35°C, without reducing the LED lifetime of 50 000hrs, at a lumen depreciation of not more than 30%. The power supply shall be located outside of the luminaire housing. The luminaire shall be secured	

TYPE	DESCRIPTION	TYPE
	into the ceiling by means of two springs located on either side of the luminaire. Housing – Aluminium, Diffuser – frost Glass. Neutral White (4000K), IP20. Electrical Safety Class (IEC), Class II. Must have a 5-years warrantee.	
D4	Same as D3 type above but shall have a back-up battery to operate for 1 hour.	
FL1	LED streetlight 180W / +/- 27000 lumen (+/- 10% tolerance of 27 000-lumen may be acceptable upon Engineers approval), (4000K) with aluminium body, IP66. Wattage may differ from supplier to supplier. Power factor > 95% at full load. Must have a 10kA/10kV surge protection minimum. High-impact polycarbonate and Diffuser protection – IK10 minimum. Contractor to allow for PRASA selective colour – Blue / grey colour – to be confirm on luminaire approval. Luminaire to be integrated with movement & night light Sensor - Fitting must be supplied with dimming sensor (up to 50% dimming when no activity occurs during a certain period) that shall be set to PRASA's operations times. The luminaire shall have of an LED engine, power supply and spigot compartment. Must have easy installation of the LED engine by means of a hinging action onto a spigot base casting and with incorporated levelling device. It must be secured by stainless steel latches and an access screw. The luminaire must have pole mounted version. The LED engine, consisting of the LED light source and the power supply, shall be easily replaced, or upgraded for future additions. Both compartments shall be rated IP 66. Electronic temperature monitoring prevents overheating of LEDs and power supply, positioned directly next to LEDs (ThermiX®). The power supply shall be automatically disengaged when opening the luminaire. The luminaire housing must be manufactured of marine grade aluminium. The	

TYPE	DESCRIPTION	TYPE
	LED lifetime of 100 000hrs (LED lifetime and Driver), (L90B10). To comply with the testing standard - SANS 62262, SANS 475, SANS 60598. Contractor to make allowance for pole mounting accessories and included on the rates. Must have a 5-years warrantee.	
FL2	A LED 54W / +/- 7600 lumen (+/- 10% tolerance of 7600-lumen may be acceptable upon Engineers approval), (4000K) traditional post top luminaire range for general area lighting. The luminaire must consist of a spigot base, optical compartment with integral control gear and top cover and shall be designed to operate LEDs of 54W. The cable entry grommet shall accommodate a connection of 10mm²-4core cable. +/-7600 lumen (+/- 10% tolerance of 7600-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. Must have a 10kA/10kV surge protection minimum. The luminaire shall bear the SANS 475 performance mark and the SANS 60598-2-3 safety mark. Luminaire spigot entries comply with SANS 1088 - Table 1 for Type 2: ø76mm x 75mm. The luminaire shall have a degree of protection that complies with SANS 60598-2-3: - IP 65 The top cover shall be a robustly constructed, weatherproof, hail proof, corrosion proof and vandal resistant. The luminaire must be manufactured from glass-filled nylon and firmly secured with a single injection moulded dome nut and must be coated white on the inside to improve the efficiency of the luminaire. A silicon sponge gasket fixed into a groove to seal the top cover against the diffuser to IP 65. The spigot base manufactured from high-pressure die-cast aluminium; powder coated for added protection in the colour black. The luminaire secured to the 6-meter pole (or as specified on the drawing) by three M8 stainless steel grub screws.	

TYPE	DESCRIPTION	TYPE
	The high-impact non-discolouring acrylic diffuser bowl hexagonal in shape and smooth on the outside but has internal prisms to reduce the direct glare component. A drip ridge provided at the bottom edge avoids direct rainwater contact with the gasket. The control gear incorporated inside the luminaire shall be mounted on a removable gear tray. The nominal voltage must be rated at 230V (plus and minus 10%) 50Hz single phase. All control gear components must be removable and bear the relevant SABS mark. All internal wiring is Teflon® coated with protective sleeving to prevent damage by possible abrasion. All screws, bolts and metal parts must be stainless steel or non-corrosive material. Mains connections by means of a suitable screw terminal block with a wire clamping contact. The luminaire power factor corrected to a minimum of 0,9. The IP65 LED housing compartment optimizes the thermal operating environment around the LEDs must enabling the long useful lifetime (100 000hrs, L70). Must have a 5-years warrantee.	
FL 3	LED streetlight 75W / +/- 9250 lumen (+/- 10% tolerance of 9250-lumen may be acceptable upon Engineers approval), preferable 2700K (alternatively a 3000K will be acceptable if 2700k is not available) with aluminium body, IP66. Wattage may differ from supplier to supplier. Must have a 10kA/10kV surge protection minimum. High-impact polycarbonate and Diffuser protection – IK10 minimum. Contractor to allow for PRASA selective colour – Blue / grey colour – to be confirm on luminaire approval. The luminaire shall have of an LED engine, power supply and spigot compartment. Must have easy installation of the LED engine by means of a hinging action onto a spigot base casting and with	

TYPE	DESCRIPTION	TYPE
	incorporated levelling device. It must be secured by stainless steel latches and an access screw. The luminaire must have pole mounted version. The LED engine, consisting of the LED light source and the power supply, shall be easily replaced, or upgraded for future additions. Both compartments shall be rated IP 66. Electronic temperature monitoring prevents overheating of LEDs and power supply, positioned directly next to LEDs (ThermiX®). The power supply shall be automatically disengaged when opening the luminaire. The luminaire housing must be manufactured of marine grade aluminium. The LED lifetime of 100 000hrs (LED lifetime and Driver), (L90B10). To comply with the testing standard - SANS 62262, SANS 475, SANS 60598. Contractor to make allowance for pole mounting. Must have a 5-years warrantee.	
R1	Recessed mounted 53W / +/-5850lumen (+/- 10% tolerance of 5300-lumen may be acceptable upon Engineers approval), (4000K) LED light fitting 1200mm x 600mm. The luminaire must produce approximately 5300lumen, wattage may differ from supplier to supplier. The luminaire shall consist of a polycarbonate body and an opal diffuser. A standard (1-10v) dimmable driver shall be supplied with the luminaire. Must be 1200mm x 600mm on size. A surface mounted, hot deep galvanised steel and powder coated enclosure. The luminaire shall bear the SANS 60598-2-1 safety mark and shall have an ingress protection of IP20 in compliance with SANS 60598-2-1, certified by a SABS test report. Use of high efficiency LED's >120 lumens per watt and CRI >80. The standard LED's colour temperature provided shall be neutral white (4000K). The recessed mounted LED fitting shall operate LED light sources of 50W/ +/-5850lm in ambient temperatures without reducing the LED lifetime of 50 000 hours, at a lumen depreciation of not more than 30% (L70).	

TYPE	DESCRIPTION	TYPE
	Must have a 5-years warrantee.	
R2	Same as type R11 above but shall have a back-up battery to operate for 1 hour. A self-contained emergency/standby integrated back-up power with a 4w max output power. The driver shall operate at a power factor of >0,94 and the total harmonic distortion levels are < 20% and do not cause interference on the electrical network.	
R3	Recessed mounted 30W / +/-3240lumen (4000K) LED light fitting 600mm x 600mm. The luminaire must produce approximately 3900lumen (+/- 10% tolerance of 3900-lumen may be acceptable upon Engineers approval), wattage may differ from supplier to supplier. The luminaire shall consist of a polycarbonate body and an opal diffuser. A standard (1-10v) dimmable driver shall be supplied with the luminaire. Must be 600mm x 600mm on size. A surface mounted, hot deep galvanised steel and powder coated enclosure. The luminaire shall bear the SANS 60598-2-1 safety mark and shall have an ingress protection of IP20 in compliance with SANS 60598-2-1, certified by an SABS test report. Use of high efficiency LED's >120 lumens per watt and CRI >80. The standard LED's colour temperature provided shall be neutral white (4000K). The surface mounted LED fitting shall operate LED light sources of 30W/ +/-3240lm in ambient temperatures without reducing the LED lifetime of 50 000hrs, at a lumen depreciation of not more than 30% (L70). The fitting shall be tested and comply with the requirements of SANS IEC 60598:1. - Must have a 5-years warrantee.	

TYPE	DESCRIPTION	TYPE
R4	Same as type R3 above but shall have a back-up battery to operate for 1 hour.	
OC	Occupancy sensor High performance relay for connecting all types of lights, e.g. including LED luminaires etc. Flexible and wide mounting methods: Flush mount with spring clip. High sensitivity to be provided with "no dead spot" zones in its 360 high intensity of detection. Must have a built-in red LED is used as an indicator for easy test operation and different operation modes clear identification. Manually switch on the loads by wire connected to an external N.C. type push button switch when the ambient light level exceeds the pre-set Lux value. Time delays: Smart Set (automatic), 30 minutes), walk-through, test-mode. To cover area of 25m². To operate on a 230V. Built-in light level sensor;	

NB: All luminaires must have a 1,5mm² cabtyre cable / conductor which is 1,5m long and must have 3-pin socket. The contractor shall install an unplugged socket for each internal luminaire on the trunking. All light luminaires / fittings must bear SANS / SABS approval for testing purpose. The pictures shown illustrate the required fitting to match the existing fitting and to match fitting for all PRASA stations, Contractor to ensure they match the fittings on the picture. The approval process shall be strict to these fittings. This is to assist the client to have minimum and common / same product on their system without going to too many different suppliers.

3.39. Lighting Poles

The pole shall be manufactured from hot dip galvanised steel including the base plate. The filament winding shall be continuously applied with uniform tension onto a rotation mandrel, resulting in a minimum mass glass to resin ratio of 70:30, for optimum rigidity. The pole shall be seamless and circular in shape with a continuous taper of 16-18 mm diameter change per metre. A 80mm diameter hole shall be provided at 400 mm below ground level for the cable entry.

The pole surface shall be finished in a gel coat that complies with the requirements of SANS 141 and be applied to a uniform thickness of between 250 and 500 microns, achieving a smooth finish that provides a weatherproof, UV resistant, flame resistant and impact strong surface in the colour specified.

The minimum mechanical strength of the pole shall be designed for a fluctuating wind pressure of 500 Pa onto a wind surface area of 0.20 m² under which a maximum deflection of 5 % of its height above ground shall be permissible. The pole shall have a safety factory of 2.5 and be able to be manufactured to any other strength required.

An access door opening is required, the 250 mm x 80 mm cut-out shall be covered by an access door cover manufactured from glass filled nylon impregnated in the same colour as that of the surface coat. It shall be fixed securely by two M4 stainless steel captive Allen head screws that locate into M4 brass nut inserts embedded in the pole.

The pole shall be supplied complete with a hot dipped galvanised baseplate with a minimum size of 300 mm x 300 mm x 1.6 mm, two hot dipped galvanised steel M8 hook bolts and nuts, a hot dipped galvanised gland plate suitable for the incoming and outgoing cables complete with terminal block and mounting rail and a 5 A, 5 kA single pole miniature circuit breaker. The wiring from the MCB shall consist of 2,5 mm² 3c trailing cable and shall be taken up to the luminaire within the pole.

The supply cable to each pole shall be 2 x 16 mm² x 4-core ECC cable. A hole shall be provided at 0.4m below ground level for the supply cables.

Suitable brass terminal shall be provided within the pole and all earth conductors installed with the underground cables shall be connected to this terminal. The fitting shall be earthed to this terminal.

The pole shall bear the SANS 1749 mark and be manufactured by an ISO 9002 accredited factory.

Foundations

No foundations for the poles are required.

Erection

The pole shall be supplied complete with a hot dipped galvanised base plate with a minimum size of 300 mm x 300 mm x 1.6 mm, two hot dipped galvanised steel M8 hook bolts and nuts.

Final Colour

The final colour shall be black suitable for exterior.

3.40. EARTHING AND LIGHTNING PROTECTION

3.40.1. Earthing

The entire installation shall be properly and effectively earthed as prescribed in the Wiring Regulations and to the requirements of the relevant supply authority.

The plant earthing system and main earth bus bar shall be tested for 10 Ohm. If the amount not reach additional earthing equipment shall be installed by the Contractor. Earthing and bonding of the new transformer shall consist of 70mm² copper earth wire and 16mm diameter stainless steel core copper coated earth rods.

The earthing installation shall be integrated with the instrumentation system earth and all other services.

The Contractor, however, will be responsible for the equipotential bonding of installed equipment, e.g. transformers, mechanical equipment, pumps, electrical equipment, cable ladders etc.

The connections for the 70mm² multi-stranded conductors shall be based on M10, high tensile, stainless bolts and nuts or equivalent. The minimum size bolts permitted for connections below 70mm², i.e. 16mm², shall be M8.

The Contractor shall provide these as well as the 70mm² green/yellow insulated conductor from the main earth loop.

The main cable support system as provided by the Contractor may also be used to support these conductors in the most economical route.

Under no circumstances shall any connection points, bolts, screws, etc., used for earthing be utilised for any other purpose.

It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on Goods and Materials that must be earthed where these are not provided. Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged. Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor by means of exothermic welds. Insulation tape shall be used to cover all exposed metal and a PVC cable tie strapped over the tape ends to prevent unwrapping. The common earth shall not be broken.

Earth conductors shall be connected to the earth rod by means of Exothermic Welds. Insulation tape shall be used to cover all exposed metal and a PVC cable tie strapped over the tape ends to prevent unwrapping.

All rods shall be threaded at either end so that extensions can be added to where deep driven installations are required. All connections shall be taped or waterproofed to ensure that corrosion does not affect the joint during the life of the installation.

The rods shall be supplied complete with a driving bolt for protecting the ends of the coupling whilst being driven into the ground.

The top of the rods, after installation, shall be 400mm below final ground level.

3.41. EARTHING & BONDING

The Contractor is to ensure that all earthing and bonding is carried out in accordance with SANS 10142, PRASA standard specifications and the local authority's requirements. The earthing installation is to be carried out by a specialist.

The Contractor should note that as this installation is a Class II Division 2, all metal parts, and equipment are to be earthed and bonded to eliminate static build up. An earth mat is to be installed and the Contractor shall allow for a survey by a specialist and installation of it according to the relevant SANS code. The Contractor shall submit all test results to the Project Manager.

The Contractor shall install an earth point on all motors and metal structures in the PRASA buildings and or where applicable.

A schedule of the work shall be carried out by an Earthing Specialist.

Earthing shall be provided for the LV installation equipment.

The earthing shall be carried out by a specialist and comply with SANS 61024 Parts 1 and 2.

3.42. LIGHTNING PROTECTION TESTING AND COMMISSIONING

The entire installation shall be tested and commissioned in the presence of the Engineer. On completion and handover "As Built" drawing and test results (COC) shall be handed over to the Engineer. The drawings shall depict the location on the earth rods and mats and their respective readings.

3.43. GENERATOR PLANT SPECIFICATION

SCOPE OF WORKS

Supply, delivery, installation, test and commissioning of backup generator set, the size of the set is indicated on the bill of quantities. The scope includes to service and carry out maintenance of existing backup generator set to train stations as indicated on the bill of quantities. The contractor or specialist contractor must use the attached or below form when doing service over and above their own form when they do their service and maintenance. Payment shall not be process without these forms being completed as this form part of the scope of work. The diesel plant schedule and spares list must be completed and submitted

during tender process, this shall be used during construction when or if new generator materials / spares are required.

If the site requires new generator set, the contractor must complete the returnable form below on this document and must be returned with the tender.

GENERAL

The Standard for Uniformity in Construction Procurement published in terms of the Construction Industry Development Board (CIDB) Act, 2000 (Act no. 38 of 2000) / latest document, the Standardized Construction Procurement Documents for Engineering and Construction Works as issued by the CIDB and any other relevant documentation pertaining thereto must be studied and all principles in this regard must be applied to all procurement documentation, practices and procedures.

The Contractor, under this contract, shall supply, install and commission a new emergency generating plant to provide emergency power to the respective PRASA train station.

It is a specific requirement of this enquiry that the successful contractor must have permanent premises situated in a suitable geographic location in order to provide a standby response of two hours maximum to the respective train station as per the bill of quantities.

Tenderers are to note that typical basic standard offers by their suppliers will not be acceptable. All offers must be fully in accordance with the specifications in these tender documents inclusive of all extra items specified.

The scope of work is to procure, manufacture, supply, store, assemble, deliver, install, test and commission, guarantee and maintain for first 12 months a new (as indicated on the Bill of quantities of the station), 230VAC/ 400VAC, 50 Hz emergency generator for the respective train station as indicated on the Bill of Quantities, which will enable the plant to provide a reliable system of emergency power should the normal mains power supply fail at the respective train station as per the bill of quantities. The generator shall have a guarantee of 12 months or 1200 hours, whichever comes first, from the hand over date. During that first 12 months contractor shall provide free spare parts caused by contractor's quality of product. Contractor shall carry out service 4 times during the year as per the scheduled attached on annexure of the document.

The complete diesel generator installation shall comply with the requirements of the PRASA General Technical Specification for emergency generator plant and the additional requirements in this section of the document.

The generator contractor will be responsible for the complete diesel generator installation and associated equipment and power and communication cabling between the generator set and the AMF panel, the set is to include the metal clad insulation of the complete exhaust pipe and silencer system within the enclosure and the supply, oil resistant hose pipes and a funnel. The fuel line from the fuel tank must be fitted with a fuse link operated shut-off valve. Fuse link to be mounted above the plant in the event of a fire. The drain from the radiator and oil sump must be extended to outside the base frame. **The exhaust pipe must discharge outside the building** and be fitted with a mesh at the end to prevent entry of small birds.

It is the generator contractor's responsibility to ensure that the container manufacturer / supplier provides adequate ventilation within the enclosure for the efficient operation of the plant at full load condition.

Adequate electrical protective devices must be provided to shut the engine down before any permanent damage can result to the generator equipment. Refer to 'Alarm and Protection Equipment' clause in the General Technical Specification. The following equipment must also be provided:

A low level cut out probe in the diesel day tank to prevent the engine running dry, in addition to the low level alarm probe.

A low level cut-out probe near the top of the radiator to provide engine cut-out in the event of low coolant or a water leak.

In general, the essential outgoing circuits will be the:

The supply to the kiosk / electrical board on the essential side of the electrical board.

The electrical contractor shall provide the cabling and connections from the PRASA electrical panel to the generator change over, to the generator and back to the essential electrical panel.

Part of this contract is to provide:

A 12 month guarantee of all new diesel generator plant from the date of hand over to the employer.

A day time emergency call out service with a response time of 2 hours during the first year.

A three monthly maintenance inspection including a 30 minute on-load run test and checking the battery charging system and replacing the fuel filters.

A full annual service of the generator plant and replacement of the battery at the end of the 12 month guarantee period.

Guarantee

A guarantee period of 12 months shall apply to all new plant and equipment supplied and installed under this contract. The guarantee period shall commence from the practical completion date.

For details refer to the clause Guarantee in the General Technical Specification.

Maintenance

Maintenance of the specified systems, services and / or parts of equipment and infrastructure shall all be referred to as "Maintenance of an Installation". Maintenance of all completed installations shall ensure reliable functioning and optimum service life thereof. Maintenance responsibilities for each installation including all units and components as specified shall commence after practical completion of the installation and shall leave the Contractor with a functional installation to maintain and guarantee for 12 months.

Maintenance of an installation shall be performed in accordance with the Technical Specifications, the Operating and Maintenance Manuals (where applicable) and the Maintenance Control Plan.

Drawings

Final position of the generator set is indicated on the drawing. Further details shall be discussed on site by the generator specialist and the engineer.

Engine Instruments

Refer to clause Panel Equipment in the General Technical Specification for equipment to be provided.

Battery Charging System

This shall include the engine alternator and regulator (12V or 24V system). Battery specification to suit manufacturer.

Electrical Reticulation

Electrical reticulation work under this contract will involve the installation of the new AMF panel and interconnecting of the power and control cabling and earthing between the generator set, alternator and the AMF panel. Also included under this scope of work is the separate earthing to ground of the generator set and the AMF panel. An emergency stop button shall be fitted on the outside of the enclosure. Wiring between this stop button and the AMF panel shall be undertaken by the generator contractor.

The electrical contractor will install and terminate the out-going cables from the AMF panel to the PRASA electrical board and / or as per drawings.

Cabling between the alternator and the AMF panel shall be suitably rated for the full load rating of the alternator and shall be suitably supported on stainless steel Gr316L cable tray.

All new electrical installation work shall comply with the SANS 10142-1 as amended.

After completion of the work, a compliance certificate for the new electrical installation work for the generator and AMF panel shall be issued to the Engineer.

AMF Panel

The diesel engine must be started automatically when the mains power fails.

The AMF panel must be mounted on the base frame of the engine or alternatively mounted at the end of the set and be visible through a window in the enclosure door.

A correct protective circuit breaker for the respective size of the generator (the generator supplier or contractor must consult with the Engineer for the correct circuit breaker to be installed if uncertain) four pole, with 10/15 kA MCCB shall be provided as the main switch for the incoming supply from the Four pole supply source. A separate main generator circuit breaker rated for the FLC of the alternator, to protect the alternator against short circuit and overload is to be mounted in the AMF panel. The electrical / mechanical change over switch / contactors shall be mounted in the AMF panel. A by-pass switch for maintenance is also to be provided.

In addition, there shall be a cable to the main distribution board to an essential supply side to feed essential busbar which shall have circuit breakers feeding other distribution boards. Refer to the single line diagram for detailed drawing.

The AMF panel shall be fully equipped (including battery charger) and wired as detailed in the standard specification. An approved generator controller unit shall be used – levato RGAM 20 or similar.

In addition to the power cabling a 2,5 mm² 7 core armoured (control) cable and a 4 mm² 4 core armoured cable (for battery charger) will be required. The AMF panel shall also incorporate a red alarm indicator with audible electronic siren and reset button which must be clearly visible through the window in the door. A remote panel to be provided under this scope of works shall consist of a red indicator lamp for a general generator alarm (labelled GENERATOR ALARM)

The remote panel is to be handed over to the Electrical contractor and or client.

Fuel / Water Separator

The diesel generator set shall be provided with an approved fuel separator/filter unit.

The fuel filter unit and replacement filters are available suitable supplier.

Tenderers shall allow for the separator / filter to be installed in the fuel line from the tank to the diesel engine. The unit shall be positioned above the engine drip tray. The separator shall be manufactured to the following specifications.

The filter cartridge must be changed every 3 months even if the diesel engine does not run. Tenderers must allow for the cost of replacing the cartridges in their service rates.

Technical Specification

The diesel / water separators:

- Shall be manufactured from die-cast aluminium.
- Shall be Robust Double Epoxy powder coated.
- Shall have a 10 micron filter cartridge with mechanical shut off, for overwhelming by water.
- Shall have a flow rate of ± 4 litres per minute minimum.
- Shall have an Inlet / Outlet port.
- All parts shall be corrosion resistant and float shall be solid.
- Approximate measurement of unit shall be, Height - ± 325 mm, Width - ± 99 mm, Depth ± 125 mm.
- Shall be 4 Bar pressure tested.

- Shall have a ± 300 millilitre per minute water dump – differential head pressure dumping.
- Shall have a 2mm dump valve aperture.

Operation

- No visual inspections i.e. automatic water dumping.
- No electrical circuits required.
- Complete water separation.

Fuel

Fuel supplied and used in the diesel engine shall be commercially obtainable automotive diesel fuel to SANS 342.

The new generator set shall be provided with a full tank of diesel fuel. The fuel shall be pumped into the day tank for use during testing and commissioning.

A spare 1000 litre tank and bund wall shall be provided under this contract by the generator specialist. The diesel tank shall have a bund wall to catch any fuel spillage. The automatic pump shall be provided under this contract by generator specialist.

Depending on the site or train station, some of the generator(s) shall be housed in a generator room and some of the generator(s) will come with a canopy. Below is the specification for both environments. Correct specification will be indicated on the respective bill of quantities.

Enclosures

The generating plant must be provided with a canopy enclosure for weather proofing the plant and equipment and for sound attenuation. The canopy shall be purpose made and designed by the diesel engine supplier. The canopy shall be made of the epoxy powder painted 3CR12 steel with welded hinged doors for access to the plant for servicing. The doors are to have a rod with double latching similar to container locks. H3 Viro locks. The canopy is to have a single point lifting facility. Lift points shall be provided in the base frame of the gen set for lifting the plant.

OR

Generator Room

The generator room provided for train station where it is specified on the bill of quantities. However, the generator to have lowest noise level. Lift points shall be provided in the base frame of the generator set for lifting the plant. The generator shall be an open set generator.

Annual Service

At the end of the guarantee period a full annual service shall be undertaken in accordance with the following table. Should this service schedule not include all the requirements deemed necessary by the manufacturers of the relevant generator sets, then the contractor is to ensure that the omitted schedule maintenance items are included and that the annual service is in accordance with the manufacturer specifications.

Should the engine use for less than 400 hours in the twelve month period, the schedule below must be used:

The preventive maintenance operations must be applied at the interval (hours or months) which occurs first.

To ensure consistency in tendering, tenderers shall allow in the priced bill of quantities for 3 inspections and the replacement of filters and a full annual services at the end of the guarantee period.

A = 3 Monthly inspection / service and initial training of operators

B = Every 400 hours or 12 months

A	B	Operation
●	●	Check the amount of coolant
●	●	Check the level of the lubricating oil
●	●	Check the restriction indicators for the air filters and, when necessary, renew the filter elements.
●	●	Start and run the engine with 30% load (minimum), until normal temperature of operation is reached. Engine must run for a minimum of 1 hour.
●	●	Drain the water / sediment from the primary fuel filter.
	●	Check the condition and the tension of all drive belts.
	●	Check the specific gravity and the pH value of the coolant.

A	B	Operation
	●	Renew the lubricating Oil
	●	Renew the canisters of the lubricating oil filter
	●	Renew the canister of the main fuel filter
	●	Clean the primary fuel filter
	●	Ensure that the mounting nuts for the turbochargers are tightened securely.
	●	Check the timing of the fuel injection pump
	●	Check that the drive coupling bolts of the fuel injection pump are tightened to 120Nm (88lbf ft)
	●	Ensure that the fuel injectors are checked and corrected or renewed, if necessary *
	●	Ensure that the tappet clearances are checked and adjusted, if necessary *

In addition to the operations listed above, the following must be included in the 12 month annual service.

- Drain and flush the coolant system and renew the coolant mixture.
- The operation of the turbochargers be checked and repaired if necessary by a competent person.
- Check that the air charge cooler and the radiator are clean and free from debris
- The operation of the alternator be checked and repaired if necessary by a competent person.
- Check the battery charging system, and adjust the charging rate if necessary.
- Install a new heavy duty battery each 12 month interval.

Quarterly Maintenance Inspections

A quarterly maintenance inspection is required every 3 months throughout the guarantee period for the plant providing emergency power. A quarterly maintenance schedule is attached which must be photocopied and completed by the service Contractor. The engine must be started by simulating a mains failure and run for at least 30 minutes.

The price for the quarterly inspections shall include all necessary costs such as travelling, labour, tools, cleaning materials, replacing fuel filter cartridges etc. Contractors are advised to assess the rising costs and price these services accordingly, as these costs are fixed and no additional escalation on rates will be permitted.

Monthly Maintenance Services

A monthly maintenance service will not be required for the generator set unless otherwise recommended by the diesel generator set manufacturer. This generator is not a **base load set** that would run continuously day and night to provide electricity.

Emergency Call Outs

Should a breakdown occur during the 12 month free maintenance period, the contractor is expected to visit site within two hours of receiving written notification from PRASA Agent. Any faulty electrical or mechanical equipment shall be replaced at the contractor's cost under the guarantee.

Reimbursement (including travelling) will not be made for call outs to faults on new equipment installed under guarantee unless it can be proven wilful damage or negligence by the Employer's operating staff.

Servicing

All parts and components shall be approved and in accordance with the manufacturer's spare parts' list. Generic or similar parts not approved by the manufacturer of the plant may not be used.

Documentation

General Technical Specification: INSTRUCTION MANUALS. The same clause also specifies the requirement for wall mounted drawings in plant rooms, which are to be provided for in the enclosure of the new generator set.

Four copies of an A4 size hard covered spiral binder with 12 coloured plastic fly sheets suitable to contain the following information shall be provided for the new generator and handed to the Engineer:

- 1) Cover page with title of contract and file numbers
- 2) Contractors details – name, address, contact names and phone/cell numbers
- 3) Consultants details as above

- 4) Hand over certificates – compliance forms, practical completion forms
- 5) AMF panel routine test certificates from supplier – refer SANS 1973 and a schedule of all controller programmed settings
- 6) Site instructions
- 7) Technical data sheets with supplier's names and model numbers – radiator level probes, battery charger unit, generator controller, plug-in relay types and replaceable filter cartridges.
- 8) As built drawings of AMF panel and genset
- 9) Operating and maintenance manuals
- 10) List of all consumables with make and type number – oil, filters etc.

Log Book

An A4 size hard covered service logbook on a chain shall be provided in a metal envelope or chain the book so it will not get lost. The logbook shall be chained to the inside of the enclosure. The logbook is to be filled in each time anyone opens the doors to the enclosure after the set is commissioned. A full detail of servicing and repairs is to be recorded in the book with the run hour reading.

Cleaning / Clearing

Cleaning during maintenance service refers to the high pressure hosing of the engine. Removal and disposal of any oil or diesel in the drip tray.

All mechanical and electrical equipment must be cleaned of dust and oil. The electrical switchboard must be blown out of dust with an air blower.

Clearing refers to the removal of all unauthorised items stored within the canopy to ensure fire safety and compliance with the OHS Act. The enclosure may not be used as a storeroom.

Signage

Mandatory signs to SABS shall be installed inside the enclosure – first aid, resuscitation, fire, etc. All other signage shall be approved by the PRASA Agent (Consultant) before purchasing.

A sign as indicated in clause 11 of the General Technical Specification must be installed inside the enclosure at the electrical indication/control panel.

In addition to the mandatory OHS signs, a plastic laminated schedule shall be mounted inside the enclosure with the contractor's name and contact details together with the name of the PRASA service/maintenance manager and his/her contact details.

A plastic laminated schematic wiring diagram of the electrical control system must also be mounted inside the electrical enclosure.

Two signs shall be installed outside on the door. One at high level with the words "GENERATOR PLANT" and the other with the words "UNAUTHORISED ACCESS NOT PERMITTED"

The generator set plant and the control panel shall also be provided with a unique alpha numeric label identifying the plant for the PRASA e.g. PRASA – 005.

All signs must be fixed with non-corrodible screws.

Commissioning

The diesel generator set and AMF panel is to be tested in the supplier's workshop prior to dispatching to site. Tests in the workshop shall include a load test with a dummy load, equivalent to the full output of the particular alternator and in the presence of the PRASA Agent (Consultant). Temperature rise tests shall also be taken within the enclosure during the load tests.

Training

The contractor shall ensure that the relevant PRASA personnel (at least two persons) are fully versed with the operation, starting procedure and monthly maintenance requirements of the generator sets. The names **and signatures** of the trained officials indicated on the handover certificate shall be forwarded to PRASA Agent (Project Manager / Engineer).

Electrical Competent Person & Identification

The Contractor must have in his permanent employ a person deemed to be electrically competent. Such a person must be in possession of a valid and current certificate certifying he/she is an Installation Electrician. This person will accept a permit to work on behalf of the Contractor associated with system outages. It is a requirement that the above person be resident on the site whenever installation work is being carried out. Work on site shall at all times be supervised by a designated responsible person appointed in writing in terms of the OHS Act No. 85 of 1993.

Whilst on site all staff and labourers employed by the generator contractor shall wear distinctively marked clothing bearing the name of the mechanical contractors or his identification logo.

Visits to Site

Tenderers are advised to visit the site and acquaint themselves with the existing installation, working, site and access conditions. A compulsory site visit will be held as per the details noted in the Tender Notice.

No claims whatsoever shall be entertained due to lack of knowledge of the site conditions.

Attendance on Principal Contractor

It is a requirement that the generator contractor liaise closely with the Contractor on all aspects of the generator plant installation. The generator contractor will be required to attend regular (2 weekly) site meetings with the Contractor.

Indemnity

In carrying out his obligation as the Mandatory to the Employer for this Contract in terms of Section 37(2) of the Occupational Health & Safety Act No. 85 of 1993, the Contractor ensures that he complies with the Act when providing the Works or using plant, materials or equipment. The *Contractor* indemnifies the Employer and the Engineer and their representatives against loss and damage to property, death of, or injury to, a person and claims, proceedings, compensation and costs arising from the Contractor's transgression of the Act, except to the extent that the Employer caused the transgression.

QUALITY CONTROL

The Contractor shall specify to what standards the equipment will be Manufactured e.g. ISO, EN, IEC, CENELEC.

The Contractor shall supply all necessary compliance certificates, handover documents, drawings,

3.44. GENERAL TECHNICAL SPECIFICATION

GENERAL

This is a typical standard specification that covers the supply, delivery, complete installation and testing on site in full working order and the guarantee of new diesel generator plant as detailed below.

Brochures with full technical particulars, performance curves and illustrations of the equipment offered must be submitted with the tender. Contractors may quote their standard equipment, complying as close as possible with the specification, but any deviations from the specifications must be fully detailed.

The schedules following this specification must be completed by the Contractor in all respects.

The Employer reserves the right to accept any portion of any tender and does not bind itself to accept the lowest or any offer.

REQUIREMENTS

The diesel engine alternator set shall be robust in construction, of the heavy duty, industrial engine type with speed not exceeding 1500 RPM and shall comply with SANS 8528. The set shall be fully automatic, i.e. it shall start when any one phase of the main supply fails, and shall shut down when the normal supply is re-established. The set shall be capable of delivering the specific output continuously under the site conditions, without overheating. Maximum ambient temperature can be assumed to be 40° C and the maximum ambient humidity at lowest temperature to be 80 %. The altitude is between below 1 m above sea level. The engine shall be capable of delivering 110% of the specified output for one hour in any period of 12 hours consecutive running, in accordance with BS 5514.

Full particulars, including detailed descriptions, illustrations and curves, with engine performance (output of engine against speed for both intermittent and continuous operation) and fuel consumption curves shall be submitted with the tender.

This shall be an open set frame, the engine and alternator shall be mounted as a complete set on a common steel base, which shall incorporate anti-vibration dampers. The set must be placed on a level concrete floor. A drip tray, large enough to catch a drip from any part of the engine and water discharged from the fuel / water separator filter, must be fitted under the engine. All diesel engines must be fitted with a charging alternator for charging the battery.

VOLTAGE AND OUTPUT

The output shall be rated to suit the specified, kVA, power factor and voltage ratings as shown on the specification schedule. The engine size shall not exceed the specified ratings by more than 25%. Contractor to complete the attached schedule and return it with the BOQ for evaluation.

CONCRETE BASE

The generator plant shall be installed on a reinforced concrete plinth, which must be raised above ground line to prevent water ingress and corrosion. A concrete base shall be cast in situ for each generator plant. The base shall be made of reinforced concrete at least 350mm thick and overlap the plant by 500mm all round. The plinth must protrude 150mm above ground line. The concrete shall have strength of 30MPA after 28 days. It is essential that the base is level. The edges of the base shall be tapered for neatness. Concrete bases shall be cast in position at least 28 days prior to installation of the plant. The base frame of the plant must be bolted / bracketed to the concrete base. Provision must be made in the base for the cable entry and the main earth wire connection. A molthoid strip shall be placed between the concrete base and the generator plant. The generator floor shall withstand a maximum weight of 15 tons. Any designs required for this plinth shall be made by the Contractor and must be approved by a Professional Registered Engineer / Professional Registered Technologist where applicable.

DIESEL ENGINE

Diesel engines shall be manufactured in accordance with BS 5514. The engine must be of the solid injection, compression ignition type, running at a speed not exceeding 1500 r.p.m. The engine must be amply rated for the required electrical output of the set, when running under the specified site conditions. **The engine shall be de-rated for the site conditions.** Unless otherwise indicated, the starting period from either automatic or manual switching-on until the taking over by the generating set, in one step, of a load equal to the specified site electrical output shall not exceed **15 seconds**. This must be guaranteed by the Tenderer. The engine shall be easily started from cold, without the use of any special ignition devices, under summer as well as winter conditions, against full load. Water cooled engines shall be fitted with immersion heaters. Turbo charged engines will only be accepted if the Tenderer submits a written guarantee that the engine can deliver full load within the specified period. Emissions from the exhaust shall be kept to a minimum and shall be given at the time of tender.

A remote drain for draining the sump oil and water from the radiator must be extended to the outside of the base frame.

Battery

The set must be supplied with a fully charged **heavy duty, industrial**, maintenance free lead-acid/calcium type battery, complete with the necessary electrolyte. Batteries shall be of the DELTEC or as approved by the Engineer and shall not be less than 120 Ah rating. The battery will be of sufficient capacity to provide ample starting torque for the engine, which could require up to six consecutive starts. However the battery capacity shall not be less than that recommended by the diesel plant manufacturer.

The battery shall be mounted on a painted non corrodible, battery shelf secured to the base frame. Rubber insertion shall be installed at the bottom of the shelf. The terminals of the battery shall be sprayed red and green with a terminal spray protector.

Where plant is installed indoors within a plant room, a complete set of distilled water bottles, funnel, hydrometer, etc. will be provided in a glass case fixed on to the plant room wall to maintain and test the battery.

Cooling

Air cooled or water cooled engines shall be acceptable. To prevent excessive running temperatures on water cooled engines, an engine-mounted, tropicalised, pressurised radiator with blower-type fan shall be provided to maintain safe operation at 43°C ambient temperature. The radiator shall be designed for an ambient air temperature of 50° C. Total air flow restriction to and from the radiator shall not exceed 0,12 kPa. The Contractor shall provide duct work with flexible connecting section between radiator and discharge louvre frame. Radiators must be dosed with anti-freeze and a suitable corrosion inhibitor. A low level probe shall be mounted near the top of the radiator to alarm with visual indicator and shut-down the plant. Should the radiator be too narrow to accommodate the probe, then the probe shall be installed in an enclosed cylinder with extension pipe fixed to the radiator. The probe shall be of the Electromech AC DC Dynamics LS 103-3 or similar make.

An audible alarm and visual trip system shall be provided on the control panel to indicate that excessive temperatures have been reached.

Lubrication

The main bearings and other important moving parts in the engine shall be lubricated by a forced feed system. An audible alarm and visual trip system shall be provided on the A.M.F. panel to operate the stop solenoid in the event of low oil pressure.

Fuel Pump

An automatic fuel pump must be permanently connected to the fuel tank to enable refuelling from 1000 litre fuel tank. The fuel injection equipment must be suitable for operation with all commercial brands of diesel fuel.

Fuel Tank

The generator shall have its own diesel tank that shall run for 12/6 hours at full load. There will be an additional external 500 litre tank nearby the site.

All fuel pipes shall be hot dip galvanised with appropriate bends to provide an expansion facility and flexible connections with armoured covering for vibration isolation at the engine. Copper shall only be used from the primary filter to the engine pump.

Fuel / Water Separator

A fuel / water separator unit with automatic water dump feature shall be installed in the fuel line from the tank to the diesel engine and shall be mounted above the engine drip tray. The unit shall be of the Duvalco Mk3 DSF type with 10 micron filter cartridge and have a flow rate of +/- 4 litres/min or similar.

Governor

The speed of the engine shall be controlled accurately by a mechanical governor complying with class A1 to BS 5514 such that when full load is suddenly switched off the temporary increase in speed will not exceed 10% above 1500 rpm. The permanent speed variation shall not exceed 2½% of the nominal engine speed. Manual adjustment must be provided on the engine to adjust the normal speed setting.

Engines delivering an output **(as indicated on the train station BoQ) KVA** shall be provided with an electronic governor where the engine is electronic.

Flywheel

A suitable flywheel must be fitted that is large enough to prevent any visible flicker in the lights. The cyclic irregularity of the set must be within the limits specified in BS 5514. The fly wheel must be covered/enclosed.

Silencer and Exhaust System

The complete exhaust system shall be made of stainless steel.

A residential exhaust silencer (to 65 dB (A)), muffler companion flanges, and flexible stainless steel (suitable for coastal conditions) bellows-type exhaust fitting properly sized shall be furnished and installed according to the manufacturer's recommendation. The generator set should be sound attenuated to achieve an ambient sound level 79dB(A) at 7 metres from the plant. The exhaust pipe shall be secured by flanges both sides of the wall of the plant room at the point of exit and shall extend 0,5m above the room gutters and must be fitted with a weather flap. Exhaust pipes through canopy walls must be flanged where it penetrates the canopy wall to permit ease of removal of the canopy. The exhaust pipe must be flexibly connected to the engine to take up vibrations transmitted from the engine. The exhaust pipe and silencer must be lagged inside the generator room to reduce heat and noise transmission.

The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth, due to thermal expansion, be imposed on the engine penetration. Exhaust pipe size shall be sufficient to ensure that exhaust back pressure does not exceed the maximum limitations specified by the engine manufacturer.

The muffler and all indoor exhaust piping shall be lagged by the installing Contractor to maintain a surface temperature not to exceed 150°F (65.5°C). The insulation shall be installed so that it does not interfere with the functioning of the flexible exhaust fitting. Insulation between the manifold and silencer shall be double 25mm layers of FIBREFAX and the silencer and piping to the outer wall insulated using 50mm thick wire backed INSULWOOL of at least

80kg density. The insulation shall be cladded under tension and riveted with 3mm stainless steel rivets. The cladding shall be 0,7 mm thick 430 stainless steel.

ALTERNATOR

Alternators shall be manufactured in accordance with BS 5000. Unless otherwise specified, the alternator shall be of the self excited brushless type enclosed in a ventilated drip-proof housing, and must be capable of supplying the specified kVA continuously with a temperature rise not exceeding the limits laid down in BS 5000 for rotor and stator windings having 'Class H' insulation.

The alternator shall be capable of delivering an output of 110% of the specified output, for 1 hour in any period of 12 hours consecutive running.

The alternator windings will be suitably impregnated and tropicalised to withstand the specified climatic conditions. Alternators shall be of the low harmonic type. An alternator heater will not be required. Contractors are to list the number of similar installations operating in similar climatic conditions.

Regulation

Since the alternator set could be installed in an area where maintenance staffs are not readily available it is essential to offer regulating equipment which is simple and robust in construction. Complicated equipment requiring specialised knowledge will not be considered.

The alternator shall be self regulated and the voltage regulation limits shall not exceed $\pm 1\%$ of the nominal specified voltage, under all load conditions and at the specified power factor, while the engine speed "droop" variations between no load and full load shall not exceed $4\frac{1}{2}\%$.

Performance

The excitation system shall be designed to promote rapid voltage recovery following the sudden application of full load. The voltage shall recover to within $2\frac{1}{2}\%$ of the steady state within 300 milli-seconds following the application of full load and the transient voltage dip shall not exceed 15%.

Coupling

The engine and alternator must be directly coupled with a high class quality flexible coupling which is designed to cope with the most severe torque changes, due to instantaneous load changes in the alternator from no load to full load. The flexible coupling shall be of the HOLSET type or equal and similar.

Computer Power Supply

The Contractor shall ensure that the output has low harmonic distortion and voltage regulation of less than 4%.

AUTOMATIC MAINS FAILURE PANEL

The panel will incorporate all of the specified control and protection equipment required to operate and protect the alternator. Control units must be supported by GSM and have modem support with auto-call function for e-mail or SMS sending. It is important that the equipment used in the control panel has a history of use in RSA and that parts are readily available off the shelf.

The visual and audible alarms, battery-charging unit and mains failure sensing relays will also be incorporated in the panel. All instruments are to be flush mounted.

Where solid-state equipment is used for control circuits etc, these shall be of the printed circuit board design, which can be easily unplugged and replaced with standard replacement cards in the event of failure, testing etc. Spares of these PCB cards etc must be available at all times from the supplier of the emergency equipment.

The Project Manager / Engineer must approve the panel manufacturer's detailed working drawings of the assembly before any fabrication commences. Any other construction or type of assembly proposed as an alternative to that specified must have the approval of the Project Manager / Engineer in writing. The drawings will detail all dimensions of busbars, connections, electrical component make, type and rating.

Positions and layout of busbars, earth bars and gland plates will be shown in front and side elevation drawings.

All panel and equipment shall to be designed in accordance with SABS IEC 60439-1 and SANS 1973-1-2 and shall be suitable for operation on supply voltages of 230/400 Volts, 50 Hz, AC.

Panels designed for plant within plant rooms shall generally be of a floor standing cubicle type assembly, suitable for top and bottom cable entries. Schematic drawings will show the specific requirements applicable to each assembly.

Panels designed for plant shall be mounted on the base frame of the plant and provided with vibration isolation from the generator set.

The entire assembly shall be of strong and rigid construction with suitable folded 3CR12 stainless steel frame work, totally enclosed by means of removable 3CR12 stainless steel covers and hinged 3CR12 stainless steel doors where required. The entire assembly shall be manufactured from 3CR12 sheeting of a minimum 2mm thick.

The overall outside dimensions of the assembly shall be suitable for easy handling of the switchgear as indicated on the drawings. The height of the assembly shall generally not exceed 2 100mm above floor level.

All removable covers shall be secured in position by means of patent screw locking devices approved by the Project Manager / Engineer. All panels shall be suitably braced to ensure rigidity.

Identification labels in accordance with the specification will be screwed to the front of each door on the panel. The label will describe the purpose of the equipment contained within each compartment.

All hinges and door handles shall be of the bolted-on type and shall be manufactured from non-ferrous materials or stainless steel, suitably finished and treated against corrosion by an electro-plating process. All hinges are to be of the lift-off type and samples shall be submitted to the Project Manager/Engineer for approval.

Hinges and door locks shall be of approved SABS quality to ensure satisfactory operation and a pleasant appearance, and where possible the lock and door catch shall consist of one combination unit.

Door latching and de-latching operations shall be smooth and quick, whilst ensuring proper compression of the sealing gaskets.

The repeated opening and closing of the hinged doors and the operations of the door locks and catches shall not cause chipping or scratching of the painted surfaces or any other blemishes to the finished panels.

Each lock shall have two keys, and where more than one locked panel is specified the locks shall be in one master series. All keys, plus one master key, shall be handed to the Department for which a receipt shall be obtained. One master key shall in addition, be handed to the PRASA representative (Consultant).

All keys submitted by the Contractor shall be suitably tagged with the panel designation and location.

Bolts, nuts and washers used throughout the panel shall be of stainless steel with the exception of busbar bolts, nuts and lock-washers which shall be of stainless high tensile steel or high tensile phosphor bronze material.

All screws, bolts, door locks, etc must not be in direct contact with painted surfaces, to avoid sticking or damage to the paintwork.

The 3CR12 panel shall be epoxy powder coated Red (Colour VEP 2002).

This inside of the cabinet door shall be fitted with a suitable holder for the schematic control diagrams, schedules of equipment of the method of operation specification.

All busbars shall comply with the requirements laid down in SANS 1195. The completed busbar system shall be a standard modular system and shall have been tested to SABS approval and a certificate shall be made available confirming the full busbar technical description, current rating and fault rating together with full details of the test results. Busbars shall be rigidly supported by means of approved insulated busbar clamps to prevent damage resulting from the specified short circuit conditions.

Solid high conductivity copper busbars shall be rigidly mounted in the top section of the switch panel. The busbars must be rated for the continuous full load current, as stated, at a current density not exceeding 1,60 Amps per mm².

If a relaxation of SANS 1973 is agreed to permit the drilling of holes, the cross-sectional area as measured is to be reduced by the area of the holes.

The busbars shall run along the entire length of the assembly up to 76mm from either end, and the incoming collector bars shall be fitted directly below the main circuit breaker or incoming HRC fuse unit.

Sufficient space must be allowed for the connection of all the incoming cables as specified. All busbars shall be identified in the phase colours red, white and blue.

The busbars shall be arranged horizontally with the longer side of the cross-sections in the vertical plane and one behind the other in the horizontal plane at 90mm centres.

All connections and extensions to busbars shall be effected by means of high tensile phosphor bronze nuts, bolts and washers or cadmium plated, high tensile steel bolts and nuts which shall also be provided for future extensions. The minimum diameter of any hole will be 10 mm.

A solid copper earth bar shall be provided inside each assembly at the back and along the entire length, at a height of approximately 500mm above floor level, or 200 mm above the gland plates. A bar is to be provided at the top of the assembly where top entries exist and this shall be solidly connected to the bottom earth bar.

The bar will be supported on robust spacers and will have a minimum clearance of 40mm to the sheet steel panel.

The earth bar shall have a cross-section of not less than 40mm X 6mm and shall be drilled with the requisite number of holes for the individual connection of all cable ECC and other earth conductors.

High tensile phosphor bronze or cadmium plated nuts, bolts and lock washers shall be provided through the earth bar at each earthing position and at least 5 additional holes will be provided for future connections, each being fitted with nuts and bolts as above.

The earthing positions shall be evenly spaced along the length of the earth bar and the bar must be clearly identified as the earth.

Alternator Protection

Small alternators shall be protected by a triple pole MCB or air circuit breaker with instantaneous short circuit trips and adjustable thermal overload protection of the correct characteristics which shall be provided on the front of the panel. The settings of this unit will ensure that the alternator is adequately protected against all short circuit conditions. Alternatively, on small alternators, fuse protection may be used in conjunction with a phase failure monitor.

Larger alternators shall be protected by an adjustable electronic circuit breaker.

Parallel Operation

Should parallel operation with other sets or any supply network be specified, it must be possible to synchronise such machines without creating any undue shock or fluctuating conditions.

Alarm and Protection Equipment

Alarm relays with re-set push buttons are required to give visible and audible alarm signals to protect the plant by shutting it down before any permanent damage results. The visual indication will remain uncanceled until the problem causing the trip has been returned to normal.

The protection required will be:

- OVERLOAD
- TEMPERATURE HIGH
- LOW OIL PRESSURE
- OVER SPEED
- UNDERSPEED
- START FAILURE
- LOW WATER LEVEL
- In addition, one DIESEL FUEL LOW level alarm and indication as well as one BATTERY/CHARGER FAILURE alarm and indication must be provided which does not trip the engine. Provision must be made for both these items to be remotely alarmed.
- FUEL TANK EMPTY – to trip the engine before the fuel runs out completely so as to avoid bleeding the engine on refuelling. The lights and associated push buttons will be engraved accordingly.

One common hooter (Klaxon type SY2/725) and red flashing light is required to be mounted on the outside wall of the plant room with the alarm cancel button mounted on the control panel. The alarm system must be supplied from the starting battery.

Provision is also to be made for remote alarm indication and remote cancellation in the charge office.

A remote alarm panel shall be supplied and installed in the charge office with a connecting 2,5mm² 4 core pvc/swa/pvc cable from the generator control panel. The remote alarm panel shall incorporate a mains on and generator on and not in auto indicators, a low fuel, low battery, start fail, and genset fault indicators and relays as well as an electronic sounder (with low sound level) and a silence button. The silence button shall not switch off the pilot lights – pilot lights can only be switched off when the fault has been cleared at the generator panel.

Start and Stop Delay Timers

Where connected to a rural supply system with auto-reclosing protection, an adjustable timer (0-180 sec) will be fitted to prevent starting as a result of transient faults. The engine control system is also to be fitted with an adjustable timer (0-3 minutes and set on 1 minute) which will keep the engine running on load for a pre-set time after the mains power has been restored to normal. An additional timer (0-10 minutes and set on 8 minutes) will keep the engine operating on no load for its 'run-down' period. It shall be possible for the set to take load again without adverse effects.

Operation Selector

A four-position selector switch is to be provided on the AMF panel to select the mode of operation, which could be – 'Auto', 'Manual', 'Test' and 'Off'.

With the selector in the 'Auto' position, the set is to automatically start and stop, according to the mains supply condition.

In the 'Test' position the engine shall be capable of being manually started and stopped without the alternator picking up any electrical load, to ensure that starting equipment, battery etc. are in operational condition. This routine will be repeated every week and a logbook recording this fact must be provided in the plant room.

With the selector in the 'Manual' position, the set must pick up the electrical load when started but it must not be possible for this supply to be paralleled with authorities supply. A change over relay/contactors is therefore to be provided in the main distribution board.

In the 'Off' position the set shall be completely isolated and cannot be started manually or automatically. This setting will be used for maintenance of the machine only.

Battery Charging

The AMF panel is to include a fully automatic battery-charging unit to keep the battery at its optimum condition at all times. The preferred charger unit is the LAVATO model BCE or equal

and approved. The system shall ensure that the batteries are not overcharged by being permanently connected to the charging system. The charging current must reduce to 30% when the battery voltage is above 50%. The charging circuit must be able to inhibit:

A short circuit at the battery charger terminals

Inverse battery polarity

Low battery charge ($< 0.2 U_c$)

The output current of the charger shall not be less than 3 amps at 12 volts.

An alarm relay output will be required.

Fuse protection must be provided on the input supply and on the battery output.

An ammeter and voltmeter suitably scaled to indicate the trickle charging supply will be flush mounted in the front panel. The voltmeter will operate by depressing a spring loaded push button and will not remain in the circuit continuously.

Panel Equipment

The following items of equipment will be fitted to the panel:

- One flush mounted 72mm x 72mm PCI voltmeter scaled to the specified voltage to read all phase-neutral voltages.
- One 7 way voltmeter selector switch to suit item 7.7.1 above.
- One 72mm x 72mm frequency meter showing alternator frequency.
- One run hour meter with cyclometer counter showing the actual running hours of the engine.
- 3 - 2 amp HRC fuses for the voltmeter circuit, including spare fuses.
- 3 - 72mm x 72mm maximum demand indicating ammeters scaled to the specified maximum load current, complete with current transformer, to indicate the current in each phase of the alternator.
- One phase rotation indicator.
- One suitable rated main isolating switch to isolate the complete board.
- One adjustable type triple pole MCB or air circuit breaker rated to protect the alternator.
- One four-position selector switch as specified.

- One emergency stop push button behind a hinged cover.
- Two push buttons (green and red) marked 'Start' and 'Stop' for test operation.
- One complete battery charger with instrumentation to be operated from the mains supply.
- One alternator charge indicator with 30-amp deflection.
- One start-delay timer.
- One stop-delay timer.
- Relays and reset push buttons for engine protection with spare lamps.
- One lube oil pressure gauge and relay with shutdown for low pressure.
- One low fuel level relay device and spare lamps.
- One fuel tank empty cutout relay and spare lamps.
- One low water level relay device and spare lamps.
- One battery/charger relay device and spare lamps
- One 12 Volt DC. Hooter/alarm with protection fuses, cancellation button, etc and terminals for the operation of a remote alarm.
- One push button for manual start operation.
- One set of terminals and all interconnecting wiring including earth connections.
- One on-load by-pass switch in separate cubicle as specified.
- One spring-reserve seasonal time switch or photocell.
- Surge arrestors for all 3 phases and the neutral.
- Any other equipment necessary for the correct and safe operation of the installation.

Marking

All instruments, lights, push buttons etc are to be provided and will be marked with Trafolyte engraved labels, screwed to the panel. The lettering shall be 6mm high. All labels will be in English and any other Official Language as directed by the PRASA representative (Consultant).

All engine instruments shall have clear markings on the faceplates, indicating the normal operating zone(s). Maximum and minimum allowable values/limits and danger zone(s).

The base frame or other suitable location shall be marked with the recommended oil type to be used in the engine.

Change Over System

The main switchboard shall be divided into two sections for 'mains supply' and 'mains/emergency generator supply'. Two specified three pole contactors rated for AC3 operation or two motorised circuit breakers shall be incorporated in the switchboard to facilitate the automatic change over of supplies, but they shall be electrically and mechanically interlocked to prevent the generator from running in parallel with the mains supply.

An engraved plastic danger notice is to be prominently fixed on the switchboard stating that "This switchboard can be automatically energised from the emergency generating set."

By-pass Switch

The main switchboard must be equipped with a manually operated on-load by-pass switch, which shall connect the incoming mains to the automatic control gear or directly to the outgoing feeder. In the latter position, the automatic control gear, including the main contractors, shall be isolated for maintenance purposes. A triple pole on-load isolator is to be provided to isolate the mains. It shall not be possible to start the engine except with the selector switch in the "Test" position.

It is required that this by-pass switch and mains isolator be mounted away from the automatic control gear in a separate compartment either on one side or in the lower portion of the switchboard and that the switches are operated from the front of the cubicle.

EARTHING & LIGHTNING PROTECTION SYSTEM

The system shall comply with the relevant requirements of the following specifications.

- SANS 10313 : Protection of structures against lightning
- SANS 10199 : Design and installation of earth electrodes
- SANS 1063 : Earth Rods and Couplers

Only SABS approved earth rods and couplers bearing the SABS mark must be used.

Earthing

The neutral of the system and the alternator must be solidly earthed. The Contractor shall provide a 500 x 50 x 6mm thick copper bar fixed to the plant room wall on two insulators rated at 500V. The earth mat shall consist of 70mm² bare standard copper conductor and 4 or more 1500mm long x 16mm diameter earth spikes to achieve a maximum resistance of 10 OHMS. The earth mat shall be spaced 4 metres from the plant room. Two 70mm² insulated copper

conductors shall connect the diagonal ends of the earth mat and earth bar within the plant room.

Lightning Protection

Aluminium roof conductor shall be installed on the roof and bonded to a down conductor and then connected to the 1500mm long earth spike via 70mm² insulated copper conductor. Bi-Metallic connectors are to be made at all aluminium and copper connections. The lightning protection and earthing system shall be bonded to ensure that they are at the same potential

Suitable surge arresters must be installed on each phase and the neutral in the AMF control panel and connected to the earth bar.

WARNING NOTICES

A non-corrodable and non deteriorating engraved warning notice will be wall mounted in a conspicuous position reading:

“Danger: This engine will start without notice. Turn selector switch to ‘Off’ position before working on plant. (Do not forget to reset)”.

In addition all statutory notices required by the Occupational Health and Safety Act No. 85 of 1993, for the handling and generation of electrical equipment.

INSPECTION AND TESTING

General

Because of the number of Contracts and the need for the project to function as a co-ordinated whole, particular emphasis will be paid to testing. No test will be recognised unless it is documented in a previously agreed format. The test procedure shall ensure that every combination of switches and events is tested for correct functioning and each such combination is recorded in a test sheet and checked off.

No plant or equipment may be energised until testing is complete and the results accepted by the Project Manager/Engineer.

The Contractor shall supply all test equipment and consumables.

The Contractor shall conduct tests at the following stages. The Project Manager/Engineer shall be advised of the tests one week in advance of the test dates.

- a) At manufacturer's work before equipment is released to site.

- b) During installation where testing is necessary
- c) Before final connections are made
- d) After installation is complete

After the tests are complete the Contractor shall compile and submit a report to the Representative/Agent (Consultant). After submission of the test report the Representative/Agent (Consultant) may call for all or some of the tests to be repeated in his presence. Should any test be unsatisfactory at this time the Representative/Agent (Consultant) reserves the right to have his reasonable abortive costs deducted from the contract sum.

Inspections during Manufacture

The Project Manager/Engineer shall have access at all reasonable times to any works where materials are being manufactured for the purpose to the contract and shall be at liberty to inspect the manufacture at any stage and to witness the carrying out of the specified tests. Every reasonable facility and assistance shall be provided by the Contractor and/or his supplier for the purpose of such inspection by the Representative/Agent (Consultant) or his representative. The Representative/Agent's (Consultant) may reject at any stage of manufacture any material which does not comply with the specification or such modifications thereof as have been agreed by the Representative/Agent (Consultant).

Factory Testing

It shall be the responsibility of the Contractor to carry out such factory tests as are practicable to ensure that all plant, equipment and components supplied under this Contract comply fully with the relevant specifications and can function as intended. Dummy load tests of the alternators full rated output shall be carried out in the suppliers workshops prior to the plant being despatched to site.

Inspection on Arrival at Site

On delivery direct to the erection position or to the storage area, the plant and equipment shall be inspected by the Project Manager/Engineer and the Contractor or his agent. The Project Manager/Engineer shall be at liberty to carry out any tests he may deem fit before acceptance.

Payment for delivery to site shall not be made until the relevant items of plant and equipment have been inspected and accepted by the Project Manager/Engineer.

Repairs to Damage

Damage or defects of any kind, which become apparent on inspection or delivery, shall be repaired by the supplier of such items to the satisfaction of the Representative/Agent (Consultant) immediately upon detection. Where damage is such that, in the opinion of the

Representative/Agent (Consultant), satisfactory repairs are not practicable, the damaged articles shall be replaced at no cost to the Department which shall accept no responsibility for any loss or damage which may be suffered as a result of delays in obtaining the necessary replacements.

Testing After Installation

On completion of the installation of all plant and equipment the Contractor will be required to make appropriate arrangements and supply any instruments or apparatus etc. necessary for the testing of all plant and equipment supplied by the Contractor. Testing shall be in the presence of the Representative/Agent's (Consultant's) representative in order to demonstrate compliance with the requirements or the specification.

All load resistance equipment and instruments including fuel oil will be provided by the Contractor and test reports in duplicate for both series of tests will be submitted to the Representative/Agent (Consultant) within 7 days of such tests.

Site tests must include function tests of all operating systems and protection devices.

Insulation Testing

Before starting the generator set after installation, test the insulation resistance of the alternator windings. The automatic voltage regulator (AVR) must be disconnected and the rotating diodes either shorted out with temporary links or disconnected. Any control wiring must also be disconnected.

A 500 volt Megger or similar instrument should be used. Disconnect any earthing conductor connected between neutral and earth and megger an output terminal to earth. The insulation resistance should exceed 5 megger ohm to earth. Should the insulation resistance be less than 5 megger ohm, the winding must be dried out.

COMMISSIONING

Commissioning shall proceed in accordance with a previously agreed procedure which shall be documented and which shall form the basis of the commissioning report.

During commissioning the operating parameters of each piece of equipment and each device shall be established and recorded at no-load, average and full load conditions.

The final set of points of all adjustable devices shall be recorded.

The Contractor will be required to make appropriate arrangements, and supply the necessary instruments and apparatus, etc., for the testing of all plant and equipment, in the presence of the Representative/Agent's (Consultant's) representative in order to demonstrate compliance with the requirements of the specification.

The Project Manager/Engineer may require valid calibration certificates to be submitted to cover any meters, gauges, or other instruments used in the tests and may, if considered necessary, arrange for the use of additional meters or other instruments in order to establish the degree of accuracy of the tests.

The Contractor shall be responsible for performing all tests on completion and shall provide the services of an approved Commissioning Project Manager / Engineer and all necessary skilled and unskilled labour, as well as the required tools and test equipment. The Project Manager / Engineer shall approve the procedure for carrying out the tests on completion and shall witness all tests and shall approve any adjustments or modifications necessary to achieve satisfactory operation.

The Project Manager / Engineer shall also witness and approve the tests for demonstrating the plants ability to meet the specified duty. Should the Contractor fail to provide the necessary staff to undertake the tests on completion timeously or efficiently, the Project Manager / Engineer may, in order to meet the programme for start-up, make arrangements to have the outstanding duties undertaken by others for the Contractor's account.

Load Balancing

It is important to ensure that a balanced load is presented to the generator set. If loading in one phase is substantially higher than the other phases, it will cause overheating in the alternator windings, imbalance in the phase to phase output voltage and possible damage to the sensitive 3 phase equipment connected to the system. Ensure that no individual phase current exceeds the current rating of the generator set. For connection to an existing distribution system, it may be necessary to reorganise the distribution system to ensure these loading factors are met.

SAFETY PRECAUTIONS

Protection of Persons and Plant

Due cognisance shall be taken of the need to provide adequate protection of persons and plant, from accidents arising or likely to arise from whatever source. To this end, all units of plant which may possibly be subject to damage or become a source of danger to human life either in itself or by virtue of its operation shall be adequately protected as laid down in the Occupational Health and Safety Act No. 85 of 1993.

Appointment of Responsible Person

(a) The Contractor shall cause all work to be carried out under the general supervision of a responsible person appointed by the Contractor in writing in accordance with the provisions of the General Safety Regulation R.11. Supervision of any work; made in terms of the Occupational Health and Safety Act No. 85 of 1993.

(b) A copy of the letter of appointment and of the appointee's written acceptance thereof, shall be lodged with the Representative/Agent (Consultant).

(c) Work on site shall not commence until the documents referred to in sub-clause (b) have been received by the Representative/Agent (Consultant).

(d) Due cognisance shall be taken by the Contractor of Regulation 5 "Work in Confined Spaces", of the O.H.S.A. Regulations and further to this no clearance certificates shall be given by this Department.

Precautions shall be taken to avoid safety and health hazards to workmen. The Contractor shall be responsible for supplying protective clothing etc. for use of the workmen.

DEFECTS LIABILITY PERIOD

The Contractor shall be responsible for the initial routine maintenance and provision of all lubricants, etc., until such time as the plant and equipment is capable of fulfilling its specified operational duties.

Once the plant and equipment has been successfully commissioned and accepted, the Contractor's staff will undertake the routine maintenance of the plant and equipment for a period of 12 months in accordance with operating procedures and routine maintenance requirements to be furnished by the Contractor prior to acceptance.

The Defects Liability Period shall commence concurrent with the guarantee period.

All cos of servicing and maintenance during this period is to be included in the tender price.

Under the agreement the Contractor will arrange for qualified maintenance staff to visit the plant once every three months and shall, in the presence of the Officer –in-Charge:

- Enter into the log book the date of the visit, the tests carried out, adjustments made and any further notes concerning the condition of the plant and its operation. Also log the hour meter reading.
- Lubricate, grease all moving parts and check and clean all items of equipment as specified in the quarterly maintenance schedule addendum "A" and in accordance with the manufacturer's instructions. Replace all fuel filter cartridges.
- The plant to be tested for automatic starting by simulating a mains failure, and run on maximum possible load for at least half an hour. During this test all mechanical and electrical equipment will be checked for correct operation. All trip alarms and change over relays will be tested for correct operation. All necessary adjustments will be made and recorded in the log book.

Should the Contractor find **any** item which may require replacing due to fair wear and tear or any item which has become unserviceable for the same reason, he will immediately report this matter and submit a quotation in writing to the Representative/Agent (Consultant), detailing the cost of such repair.

The Contractor will advise when it becomes necessary to decarbonise the engine and will indicate the cost of this service.

After the expiry of the 12 month guarantee/defects liability period the Contractor will be required to maintain the generator sets and associated equipment for a further 2-year period.

GUARANTEE

The Contractor shall guarantee all plant, equipment and fittings supplied by him and installed under this contract for a period of **twelve months**. The guarantee shall include any latent defects in the plant, equipment, fittings and installation thereof and any labour or other costs inherent in repairing any defects and ensuring that the plant, equipment and fittings remain free of defects and in good working order to the satisfaction of the Representative/Agent (Consultant).

This guarantee shall not be applicable to existing plant and equipment previously installed by others.

Fair wear and tear shall not be considered as requiring any action by the Contractor under the requirements of the contractual guarantee.

Inspection of the plant shall be made by the Contractor in the presence of the Representative/Agent (Consultant), at suitable intervals, to confirm that the plant is operating in a satisfactory manner.

Provision, as required, shall be made in the contract rates, or elsewhere, for any additional costs incurred in providing this contractual guarantee.

TRAINING AND INSTRUCTION

On completion of the installation on site, the Contractor will be required to instruct the Staff member-in-Charge in the safe and satisfactory operation of the plant and will ensure that he/she is fully conversant with the equipment.

INSTRUCTION MANUALS

Three (3) copies of the operating and maintenance manuals shall be provided on delivery of the plant and equipment. These shall come in the form of plastic covered ring files with the following information indelibly printed on their covers.

OPERATING AND MAINTENANCE INSTRUCTIONS FOR THE
GENERATOR SET AT
PRASA

SUPPLIED BY

(Name, address, email, telephone and fax number of Contractor).

Each page, pamphlet, booklet, diagram, drawing etc. shall be separately bound into the manuals in a clear plastic pocket. Each pocket shall be numbered and indexed.

The first page of each set of manuals shall be an index which shall include a list of the numbers and descriptions of all drawings and pamphlets included in the set and also a list of the Representative/Agent (Consultant)'s drawings relating to the relevant sections of the Contract.

The instructions shall include the following:

- a. A list of spares, tools and testing equipment supplied under the Contract.
- b. A list of spare parts and testing equipment which are not supplied under the Contract but which may be required for future major overhaul and/or testing of electrical plant and equipment.
- c. For (a) and (b) above for spares, tools and testing equipment the Suppliers' names, addresses, telephone numbers, fax numbers and costs must be listed.
- d. List of "Name Plate Data" giving full particulars of serial numbers and other descriptive data pertaining to the plant and equipment installed.
- e. List of points requiring lubrication, stating for each point the type and grade of lubricant recommended and full details as to quantity, timing and renewing of lubrication. Before typing the manuals, the Contractor shall contact the Representative/Agent (Consultant) to obtain the name and brand of lubricants generally in use by the Representative/Agent (Consultant) and, wherever possible, suitable grades of lubricant of that particular brand shall be nominated by the Contractor in the manuals.
- f. Particulars of bearings, contacts and other moving parts with instructions relating to any special attention which may be required.

g. Precautions to be taken in starting, running and stopping the plant or equipment by remote or manual control.

h. Routine tests which the Contractor/Supplier(s) would suggest be carried out.

All information mentioned above shall be cross-referenced to the drawings.

Additionally the manuals shall provide the following information which shall also be cross-referenced to the drawings:

- All technical and other information, in English, concerning the equipment.
- Equipment layout drawings.
- Power single line diagrams.
- Control schematic diagrams.
- Narrative description of the control circuit operation.
- Fault finding routines.
- Routine maintenance instructions, procedures and frequencies.
- Equipment and component specification sheets.
- List of equipment and components including manufacturer, catalogue number and suppliers address, fax and telephone numbers.
- Instrument data sheets
- Cable block diagram
- Cable schedules
- Termination schedules
- Issue a certificate of compliance for electrical installations signed off by a currently registered Installation Electrician.

Copies of all computer generated drawings compatible with Autocad version 2002 shall be submitted to the Department on a Compact Disk.

Further one (1) set of drawings relevant to a particular generator and a hard covered A4 size log book shall be placed in a weatherproof glass fibre enclosure adjacent to the generator. This enclosure shall be electric orange in colour, be sized to accommodate drawings folded

to A4 format, be labelled "Electrical Drawings" and shall have provision for fitting a standard padlock.

**SAFETY ARRANGEMENTS AND PROCEDURAL COMPLIANCE WITH THE
OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND
APPLICABLE REGULATIONS.**

- The Contractor shall accept his obligation to complying fully with the Act and applicable Regulations and with PRASA safety requirements.
- The Contractor shall provide a written Health and Safety plan, the file shall be approved before starting with the work
- The Contractor shall keep a safety file at all times.
- The Contractor shall keep a site diary and instruction book.
- The Contractor shall attend PRASA safety induction training before starting with the work.

ENVIRONMENTAL RESPONSIBILITY.

- The Contractor shall separate hazardous or non-hazardous waste and where practical, waste for recycling prior to disposing thereof.
- The Contractor also undertakes to minimize the amount of waste generated or released, whether it is hazardous or non-hazardous waste, as far as possible to reduce the impact on the Environment.

The Contractor undertakes to dispose of waste generated, albeit hazardous or non-hazardous waste in a responsible manner and submit proof of all disposal documents to the Project Manager / Engineer.

ADDENDUM "A"

**GENERATOR : 3 MONTHLY MAINTENANCE
(STANDBY PLANTS)**

ITEMS CHECKED TO BE TICKED OFF

[1]	CHECK AND TOP UP WHERE NECESSARY (SPECIFY TOTAL QUANTITY). EXCESS OF 10 LITRES WILL BE REIMBURSED	YES	NO	[5]	VISUAL INSPECTION OF ELECTRICAL APPARATUS	YES	NO
A	CRANKCASE OIL (QTY)			A	LV CABLES IN ORDER		
B	INJECTOR BOX OIL (QTY)			B	LV CABLE TERMINATIONS IN ORDER		
C	RADIATOR			C	ALL LV SWITCHGEAR COVERS & PANELS INTACT		
				D	ALL SWITCHGEAR INTACT		
[2]	CHECK FUNCTION ADJUST, TIGHTEN AND LUBRICATE (WHERE NECESSARY)			E	SWITCHES / CIRCUIT BREAKERS IN "ON" POSITION		
A	FUEL PUMP TIMING			F	ARE CIRCUIT LEGENDS AVAILABLE?		
B	PUMP DRIVE			G	ARE CIRCUIT LEGENDS COMPLETE?		
C	OIL FEED PUMP			H	ARE CIRCUIT BREAKERS PROPERLY LABELLED?		
D	EXCESS FUEL DEVICE			I	TIME SWITCHES / SET ACCORDINGLY?		
E	GOVERNOR			J	ARE INDICATING PANEL LIGHTS WORKING? IF NOT INDICATE QUANTITY REPLACED		
F	TURBO CHARGER			K	CHECK SELECTOR SWITCH IN ALL POSITIONS		
G	HEAT EXCHANGER			L	CHECK ALARM ENGINE SHUTDOWN FUNCTION ON :		
H	FAN BEARINGS				LOW FUEL WARNING		
I	DYNAMO BEARINGS				START FAILURE		
J	STOP SOLENOID			M	CHECK ALARM ENGINE SHUTDOWN FUNCTION ON :		
K	HAND / ELECTRIC DAY TANK PUMP				HIGH TEMPERATURE		
L	LUBRICATING OIL FILTER ELEMENT				LOW OIL PRESSURE		
					OVER-SPEED		
[3]	CHECK CONDITION, TIGHTEN (WHERE NECESSARY)			N	TEST PLANT FOR 30 MIN ON FULL LOAD		
A	RADIATOR CORE			O	CHECK AND RECORD THE METER READINGS		
B	RADIATOR HOSES				3PH..... PH1.....V PH2.....V PH3.....V		
C	RADIATOR PRESSURE CAP / VALVE				 A A A		
D	WATER HEATER ELEMENT & THERMOSTAT			P	RESET ALL MAXIMUM DEMAND AMMETERS		
E	VEE BELTS						
F	ENGINE MOUNTING			[6]	CLEANING		
G	ENGINE / ALTERNATOR COUPLING			A	CLEAN AIR CLEANER DRY ELEMENT & BATH		
H	EXHAUST SILENCER & PIPES			B	CLEAN FINS AND OIL COOLER		
I	DAY TANK CONDENSATE			C	CLEAN ENGINE		
				D	CLEAN DRIP TRAYS (WHERE FITTED)		
[4]	CHECK FOR LEAKS & TIGHTEN (WHERE NECESSARY)			E	CLEAN DAY TANK AND GAUGE GLASS		
A	DRAIN PLUG						
B	OIL LINES AND SEALS			[7]	DUST AND CLEAN		
C	FUEL LINES AND SEALS			A	DOORS AND FRAMES		
D	INJECTOR SEALS			B	WINDOW PANES AND FRAMES		
E	ALL PACKING SEALS			C	WINDOW GUARDS		
				D	WINDOW CILLS		
				E	WALLS AND CEILINGS		
				F	CABLE DUCTS		
				G	LV SWITCHGEAR		
				H	LV DISTRIBUTION BOARD / CONTROL PANEL		

[1]	CHECK AND TOP UP WHERE NECESSARY (SPECIFY TOTAL QUANTITY). EXCESS OF 10 LITRES WILL BE REIMBURSED	YES	NO	[5]	VISUAL INSPECTION OF ELECTRICAL APPARATUS	YES	NO
[8]	INSPECTION & ATTENDANCE TO SUNDRY ITEMS	YES	NO	[10]	CLEAN AND OIL	YES	NO
A	CABLE DUCT COVERS TO BE IN POSITION			A	DOOR HINGES		
B	WARNING SIGNS IN POSITION ON OUTSIDE DOOR			B	DOOR LOCKS		
C	WARNING / FIRST AID SIGNS IN POSITION ON INSIDE OF PLANT ROOM						
D	FIRE EXTINGUISHER PRESENT AND SERVICABLE						
[9]	REPORT UNDER REMARKS THE CONDITION			[11]	CLEAN AND POLISH		
A	DOORS (HINGES, LOCKS, ETC.)			A	PLANT ROOM FLOORS		
B	WINDOWS INCLUDING GLASS, CILLS, ETC.						
C	YARD FENCING AND GATES (WHERE APPLICABLE)			[12]	REPLACE FUEL FILTER CARTRIDGE		
D	WALLS (ANY CRACKS?)			A	CHANGE FILTER CARTRIDGE - EVERY 3 MONTHS		
E	ROOFS (ANY LEAKS?)						

Contractors are to note that all maintenance to Nickel Cadmium Alkaline batteries, charging equipment and accessories are to be in accordance with the manufacturer's requirements. Any loss or damage to the equipment through negligence on the Contractor's part will be for his account.

[13]	BATTERIES AND CHARGERS	YES	NO	CELL NO	Volts	Specific Gravity (SG)	YES	NO
A	CLEAN BATTERY / CONTAINER / STAND AND TERMINALS WITH LUKE WARM WATER AND DRY OUT			1				
B	NEUTRALISE CORROSION WITH BICARBONATE OF SODA SOLUTION			2				
C	TOP UP ALL CELLS WITH DISTILLED WATER			3				
D	CHECK SPECIFIC GRAVITY OF ELECTROLYTE IN EACH CELL WITH HYDROMETER			4				
E	CLEAN ALL BATTERY TERMINALS AND SPRAY WITH RED AND GREEN TERMINAL PROTECTOR SPRAY			5				
F	CHECK FOR LOOSE CONNECTIONS AND TERMINALS, TIGHTEN WHERE NECESSARY			6				
G	Ensure that battery charger is set on trickle charge			7				
H	15 AMP / VOLTMETER ON CHARGER OPERATIONAL			8				
I	IS TEST BUTTON ON CHARGER OPERATIONAL?			9				
J	CHECK INDICATION LIGHTS ON CHARGER AND REPLACE IF NECESSARY. INDICATE QUANTITY REPLACED (QTY)			10				
				11				
				12				

REMARKS : If answer is "NO" on any of the previous items, state action taken by yourself or to be taken by the Department

SERVICED BY _____
PRINT NAME

MODEL & SERIAL NO OF SET _____

SIGNATURE _____

LOCATION OF SET _____

COMPANY NAME _____

RUN TIME DURING TEST _____

DATE _____

RUN HR METER READING _____ Min.

3.45. RETURNABLE

SCHEDULE OF RATES

Where rates are not included in the Schedules of Quantities, the following rates, which shall be inclusive of, profit, supervision, administration and transport charges, shall be used to assess the value of variations to the contract.

The *Project Manager* may, if he considers that the rates below are unreasonable, request their amendment prior to acceptance of the tender.

1. DIESEL ENGINE PLANT

Item	Description	Unit	Qty	Rate
1.1	Drain and flush and replace crankcase oil	Sum		
1.2	Drain and replace injector box oil	Sum		
1.3	Drain, flush and replace radiator water with anti - freeze	Sum		
1.4	Replace radiator pressure cap / valve	ea	1	
1.5	Replace vee belt	ea	1	
1.6	Replace oil feed pump	ea	1	
1.7	Replace dry air filter	ea	1	
1.8	Replace radiator hoses	ea	2	
1.9	Replace starter motor	ea	1	
1.10	Replace 24V/12V battery charging system - & ensure correct operation	Sum		
1.11	Battery service	Sum		
1.12	Replace 12V battery – heavy duty industrial type	ea	1	
1.13	Rate to supply and install diesel fuel	liter	1	
1.14	Replace Duvalco 10 micron fuel cartridge – in line	ea	1	
1.15	Replace Duvalco 5 micron fuel cartridge – bulk tank	ea	1	

Item	Description	Unit	Qty	Rate

Note: The Contractor shall supply any additional information that may not be included on the above list.

3.46. SCHEDULE OF EQUIPMENT

3.46.1. EMERGENCY GENERATOR SET - AMANZIMTOTI

TO BE COMPLETED FOR EACH MAKE OF NEW PLANT

1. ENGINE

- 1.1. Manufacturer's Name : _____
- 1.2. Country of Origin : _____
- 1.3. Model Number : _____
- 1.4. Continuous Sea Level Rating after allowing
for Ancillary Equipment : _____ kW
- 1.5. Percentage Derating for Site Conditions in
accordance with BS 5514 : _____
- (a) For Altitude : _____
- (b) For Temperature : _____
- (c) For Humidity : _____
- (d) Total Derating : _____
- 1.6. Guaranteed Nett Output on Site : _____ kW
- 1.7. Nominal Speed : _____ RPM
- 1.8. Number of Cylinders : _____
- 1.9. Strokes per Working Cycle : _____
- 1.10. Swept Volume : _____
- 1.11. Fuel Consumption of the Complete
Generating Set on Site in kg/h/kW of
Alternator output at:
- (a) Full Load : _____

(b) 3/4 Load : _____

(c) 1/2 Load : _____

NOTE: A tolerance of 5% shall be allowed above the stated values of fuel consumption.

1.12. Method of Cooling : _____

1.13. Type of Radiator if Water Cooled : _____

1.14. Method of Protection against
High Temperature : _____

1.15. Method of Protection against Low
Oil Pressure : _____

1.16. Minimum Time required for Assumption of
Full Load : _____

1.17. Are Performance Curves attached? : _____

1.18. Make of Fuel Pump : _____

1.19. Make of Fuel Filters : _____

2. Fuel Tank (Day Tank)

2.1. Capacity : _____ litres

2.2. Overall Height of Tank : _____ mm

2.3. Overall Width of Tank : _____ mm

2.4. Overall Length of Tank : _____ mm

3. Fuel Tank (Bulk Storage Tank)

3.1. Capacity (litres) : _____ N/A

3.2. Overall Height of Tank (mm) : N/A _____

3.3. Overall Width of Tank (mm) : N/A _____

3.4. Overall Length of Tank (mm) : N/A _____

4. **Alternator**

- 4.1. Manufacturer's Name : _____
- 4.2. Country of Origin : _____
- 4.3. Output Power (Full Load) : _____ kVA
- 4.4. Nominal Speed : _____ rpm
- 4.5. Type of Enclosure : _____
- 4.6. Class of Insulation : _____
- 4.7. Phase-Phase Voltage : _____
- 4.8. Max. Full Load Current : _____
- 4.9. Efficiency at specified P.F.
and
(a) Full Load : _____
(b) 3/4 Load : _____
(c) 1/2 Load : _____

5. **Automatic Mains Failure Panel**

- 5.1. Manufacturer's Name : _____
- 5.2. Country of Origin : _____
- 5.3. Type of Board : _____
- 5.4. Main Busbar Size : _____
- 5.5. Make of Volt, Amp and Frequency Meters : _____
- 5.6. Ratio of Current Transformers : _____
- 5.7. Make of Hour Meter : _____
- 5.8. Rupturing Capacity : _____

6. **Dimensions of Generator Set**

- 6.1. Overall Length : _____mm
- 6.2. Overall Width : _____mm
- 6.3. Overall Height : _____mm
- 6.4. Overall Weight : _____mm

6.5. Minimum Recommended Dimensions for

Generator Room:

Length : _____m

Width : _____m

Height : _____m

7. **Battery**

- 7.1. Maker's Name : _____
- 7.2. Type of Battery : _____
- 7.3. Voltage of Battery : _____
- 7.4. Number of Cells : _____
- 7.5. Capacity : _____

NOTE: Under no circumstances will the tenderer be permitted to deviate from the materials specified above unless agreed in writing, by the Project Manager, prior to award of tender.

DATE: _____

SIGNATURE OF: _____

3.46.2. EMERGENCY GENERATOR SET – WINKELSPRUIT

TO BE COMPLETED FOR EACH MAKE OF NEW PLANT

1. ENGINE

- 1.1. Manufacturer's Name : _____
- 1.2. Country of Origin : _____
- 1.3. Model Number : _____
- 1.4. Continuous Sea Level Rating after allowing
for Ancillary Equipment : _____ kW
- 1.5. Percentage Derating for Site Conditions in
accordance with BS 5514 : _____
- (a) For Altitude : _____
- (b) For Temperature : _____
- (c) For Humidity : _____
- (d) Total Derating : _____
- 1.6. Guaranteed Nett Output on Site : _____ kW
- 1.7. Nominal Speed : _____ RPM
- 1.8. Number of Cylinders : _____
- 1.9. Strokes per Working Cycle : _____
- 1.10. Swept Volume : _____
- 1.11. Fuel Consumption of the Complete
Generating Set on Site in kg/h/kW of
Alternator output at:
- (a) Full Load : _____
- (b) 3/4 Load : _____
- (c) 1/2 Load : _____

NOTE: A tolerance of 5% shall be allowed above the stated values of fuel consumption.

- 1.12. Method of Cooling : _____
- 1.13. Type of Radiator if Water Cooled : _____
- 1.14. Method of Protection against
High Temperature : _____
- 1.15. Method of Protection against Low
Oil Pressure : _____
- 1.16. Minimum Time required for Assumption of
Full Load : _____
- 1.17. Are Performance Curves attached? : _____
- 1.18. Make of Fuel Pump : _____
- 1.19. Make of Fuel Filters : _____

2. Fuel Tank (Day Tank)

- 2.1. Capacity : _____ litres
- 2.2. Overall Height of Tank : _____ mm
- 2.3. Overall Width of Tank : _____ mm
- 2.4. Overall Length of Tank : _____ mm

3. Fuel Tank (Bulk Storage Tank)

- 3.1. Capacity (litres) : _____ N/A
- 3.2. Overall Height of Tank (mm) : _____ N/A
- 3.3. Overall Width of Tank (mm) : _____ N/A
- 3.4. Overall Length of Tank (mm) : _____ N/A

4. Alternator

- 4.1. Manufacturer's Name : _____

- 4.2. Country of Origin : _____
- 4.3. Output Power (Full Load) : _____ kVA
- 4.4. Nominal Speed : _____ rpm
- 4.5. Type of Enclosure : _____
- 4.6. Class of Insulation : _____
- 4.7. Phase-Phase Voltage : _____
- 4.8. Max. Full Load Current : _____
- 4.9. Efficiency at specified P.F.
and
(a) Full Load : _____
(b) 3/4 Load : _____
(c) 1/2 Load : _____

5. Automatic Mains Failure Panel

- 5.1. Manufacturer's Name : _____
- 5.2. Country of Origin : _____
- 5.3. Type of Board : _____
- 5.4. Main Busbar Size : _____
- 5.5. Make of Volt, Amp and Frequency Meters : _____
- 5.6. Ratio of Current Transformers : _____
- 5.7. Make of Hour Meter : _____
- 5.8. Rupturing Capacity : _____

6. Dimensions of Generator Set

- 6.1. Overall Length : _____ mm
- 6.2. Overall Width : _____ mm

6.3. Overall Height : _____mm

6.4. Overall Weight : _____mm

6.5. Minimum Recommended Dimensions for

Generator Room:

Length : _____m

Width : _____m

Height : _____m

7. Battery

7.1. Maker's Name : _____

7.2. Type of Battery : _____

7.3. Voltage of Battery : _____

7.4. Number of Cells : _____

7.5. Capacity : _____

NOTE: Under no circumstances will the tenderer be permitted to deviate from the materials specified above unless agreed in writing, by the Project Manager, prior to award of tender.

DATE: _____

SIGNATURE OF: _____

3.46.3. EMERGENCY GENERATOR SET

TO BE COMPLETED FOR EACH MAKE OF NEW PLANT

1. ENGINE

- 1.1. Manufacturer's Name : _____
- 1.2. Country of Origin : _____
- 1.3. Model Number : _____
- 1.4. Continuous Sea Level Rating after allowing
for Ancillary Equipment : _____ kW
- 1.5. Percentage Derating for Site Conditions in
accordance with BS 5514 : _____
- (a) For Altitude : _____
- (b) For Temperature : _____
- (c) For Humidity : _____
- (d) Total Derating : _____
- 1.6. Guaranteed Nett Output on Site : _____ kW
- 1.7. Nominal Speed : _____ RPM
- 1.8. Number of Cylinders : _____
- 1.9. Strokes per Working Cycle : _____
- 1.10. Swept Volume : _____
- 1.11. Fuel Consumption of the Complete
Generating Set on Site in kg/h/kW of
Alternator output at:
- (a) Full Load : _____
- (b) 3/4 Load : _____
- (c) 1/2 Load : _____

NOTE: A tolerance of 5% shall be allowed above the stated values of fuel consumption.

- 1.12. Method of Cooling : _____
- 1.13. Type of Radiator if Water Cooled : _____
- 1.14. Method of Protection against
High Temperature : _____
- 1.15. Method of Protection against Low
Oil Pressure : _____
- 1.16. Minimum Time required for Assumption of
Full Load : _____
- 1.17. Are Performance Curves attached? : _____
- 1.18. Make of Fuel Pump : _____
- 1.19. Make of Fuel Filters : _____

2. Fuel Tank (Day Tank)

- 2.1. Capacity : _____ litres
- 2.2. Overall Height of Tank : _____ mm
- 2.3. Overall Width of Tank : _____ mm
- 2.4. Overall Length of Tank : _____ mm

3. Fuel Tank (Bulk Storage Tank)

- 3.1. Capacity (litres) : _____ N/A
- 3.2. Overall Height of Tank (mm) : _____ N/A
- 3.3. Overall Width of Tank (mm) : _____ N/A
- 3.4. Overall Length of Tank (mm) : _____ N/A

4. Alternator

- 4.1. Manufacturer's Name : _____

- 4.2. Country of Origin : _____
- 4.3. Output Power (Full Load) : _____ kVA
- 4.4. Nominal Speed : _____ rpm
- 4.5. Type of Enclosure : _____
- 4.6. Class of Insulation : _____
- 4.7. Phase-Phase Voltage : _____
- 4.8. Max. Full Load Current : _____
- 4.9. Efficiency at specified P.F.
and
(a) Full Load : _____
(b) 3/4 Load : _____
(c) 1/2 Load : _____

5. Automatic Mains Failure Panel

- 5.1. Manufacturer's Name : _____
- 5.2. Country of Origin : _____
- 5.3. Type of Board : _____
- 5.4. Main Busbar Size : _____
- 5.5. Make of Volt, Amp and Frequency Meters : _____
- 5.6. Ratio of Current Transformers : _____
- 5.7. Make of Hour Meter : _____
- 5.8. Rupturing Capacity : _____

6. Dimensions of Generator Set

- 6.1. Overall Length : _____ mm
- 6.2. Overall Width : _____ mm

6.3. Overall Height : _____mm

6.4. Overall Weight : _____mm

6.5. Minimum Recommended Dimensions for

Generator Room:

Length : _____m

Width : _____m

Height : _____m

7. **Battery**

7.1. Maker's Name : _____

7.2. Type of Battery : _____

7.3. Voltage of Battery : _____

7.4. Number of Cells : _____

7.5. Capacity : _____

NOTE: Under no circumstances will the tenderer be permitted to deviate from the materials specified above unless agreed in writing, by the Project Manager, prior to award of tender.

DATE: _____

SIGNATURE OF: _____

SPARE PARTS LIST

Tenderers shall complete the following schedule, listing and pricing all plant parts which are likely to require regular replacement and giving the Tenderers recommendation as to the stocks of spares that should be held by the owner. Unless otherwise stated prices shall be deemed to be inclusive of VAT and shall hold good for the duration of the Contract.

PLANT ITEM	SPARE PART DESCRIPTION	RECOMMENDED STOCKS	PRICE EACH DELIVERED TO WORKS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

PLANT ITEM	SPARE PART DESCRIPTION	RECOMMENDED STOCKS	PRICE EACH DELIVERED TO WORKS
17			
18			
19			
20			

SIGNATURE: _____

DATE: _____

3.47. DRAWINGS

The Contractor produces the detailed layout design and individual wiring diagrams for each starter / panel in AutoCAD format fully in compliance with the Project Manager's requirements. All drawings are to be submitted for approval prior to the start of manufacture.

In addition, the Contractor submits all cable pulling schedules, termination schedules as well as lightning protection and earthing system designs, for approval. Any installation or manufacture of equipment prior to the approval of drawings is entirely at the Contractor's own risk. Similarly, the cable numbering systems, plant ID numbers and tag numbers will be in accordance with the Employer's requirements.

3.48. WORK REQUIRED IN THE COMMISSIONING OF PROTECTION EQUIPMENT

The commissioning of protection equipment for LV systems and electronics can be broken up into a number of broad categories.

- Panel tests and visual Inspection;
- Implementation of applicable technical instructions;
- Secondary tests;
- Primary tests;
- Review and submission of documentation;
- Energisation and on load checks;
- Sign off and handover of electrical and electronic plants for use and operation by the owner.

Each of the categories requires documentation to reflect that the test(s) required have been completed. The documentary evidence must include:

- The relevant equipment or panel name.
- The checks performed;
- The name of the person who performed the checks;
- The date on which the checks were performed;
- The signature of the person who performed the checks.

3.49. PANEL TESTS AND VISUAL INSPECTION

The purpose of this group of activities is to check and produce documentary evidence that:

- The panel and all contained equipment is visibly intact and mechanically sound,

- The panel and contained equipment has not been damaged in transit,
- The panel is wired according to the application drawings supplied, and that the design version between the equipment and the drawings is the same.
- The equipment contained in the panel corresponds in make, model and function to the application drawings.
- The panel and associated equipment is correctly earthed according to the SANS standards.

3.50. IMPLEMENTATION OF APPLICABLE TECHNICAL INSTRUCTIONS.

The purpose of this activity is to ensure that modifications to the protection panels required by approved technical instructions are implemented to the protection equipment prior to secondary injection. Documentation is to be in the form of the instruction with reference number, the name of the person who implemented the instruction and the date of implementation is required.

3.51. SECONDARY TESTS

This group of activities comprises the following:

- Application of settings of all protection devices.
- Relay characteristic tests and logic functions according to settings provided and manufacturer specifications.
- End to end checks for Impedance and current differential schemes.
- Supervisory controls, alarms, indications and analogue outputs are correct to the control centre.
- To ensure that test blocks and shorting strips function correctly.

3.52. PRIMARY TESTS

All primary tests must be according to relative SANS regulation.

3.53. NORMALISATION OF CIRCUITS

During the primary and secondary injection tests, the trip and alarm circuits are usually rendered inoperative by the removal of isolating links, relay trip latches and so on. It is therefore essential that, when the primary and secondary injection tests have been completed, the tripping and alarm circuits be checked. Certain settings may have been altered during testing and these have to be normalized. Certain protection functions may have been deactivated in order to test other complimentary functions and these have to be reactivated as per the settings and configuration documentation.

3.54. CONSOLIDATION AND REVIEW OF TEST RESULTS

The purpose of this group of activities is to consolidate the test results and;

- Ensure sure that all tests originally planned have been completed
- Ensure that all test results are consistent with reasonable Employer expectations
- Ensure that any defects have been addressed
- Ensure that the head of commissioning is satisfied that the equipment is ready to be made live and arrangements have been made with an authorized person and to clear all outstanding work permits.
- Complete the equipment test sheet that permits the equipment to be energised.
- Certificate of Compliance (CoC) must be issued will all other test results reports.

3.55. ENERGISATION AND ON LOAD CHECKS

There are some checks and tests that cannot be performed while the equipment is de-energised.

It must be stressed that the equipment cannot be considered to be completely commissioned until on-load checks have been completed and results documented.

The following checks are required:

- Correct phase rotation.
- Current measurement checks / on-load confirmation of CT ratios.
- On-load stability checks for differential schemes
- On-load directional checks for directional overcurrent and impedance relays.
- Confirmation of transducer loading if applicable.

On the successful completion of the on-load checks, a handover document / mechanism is required that indicates that the equipment has been fully commissioned.

3.56. TRAINING

3.56.1. Electrical Installations

Contractor shall train the PRASA staff on new equipment on how to operate the LV panel and other electrical related installations. Training shall include how to clear faults on the system once it has been attended to. Training to include all other electrical related issues that will be require by maintenance and operating PRASA staff.

3.57. FINAL DOCUMENTATION

The purpose of this phase of the process is to ensure that all documentation and test results are compiled and submitted to the Employer.

- a) Handover Certificate: is to be signed by the Contractor and the Supervisor.
- b) Completed Checklists: A hard copy of the all of checklists of completed activities to be forwarded to the Project Manager. All appropriate tests, dates, responsible persons and signatures are required. Electronic copies of scanned hard copy documents are also acceptable.
- c) Commissioning Test Results: four sets of hard copies of the Commissioning Test Results, including hard copies of manuals, etc are required to be submitted to the Employer. Dates, responsible person's name and signatures are required. Electronic copies of scanned hard copy documents are acceptable. The above shall be included in the data packs to prove completion.
- d) Proof that all applicable technical instructions have been implemented:
 - i. Technical Instructions that may be applicable to the equipment concerned.
- e) Proof of Applied Settings: All settings applied to all relays to be retrieved from the relays (downloaded) and hard or electronic copies to be forwarded to the Project Manager.

SECTION 5 – MECHANICAL ENGINEERING.

1. SUMMARY OF SCOPE

The civils scope of work includes the following:

- Servicing and restoration of water reticulation systems.
- Servicing and restoration of internal waste water drainage system.
- Provision of Potable water storage and potable water pumping station.
- Servicing and restoration of fire detection and early warning fire alarm system.
- Provision of fire extinguishing equipment (Fire Hose Reels, Portable Fire Extinguishers, and Fire Hydrants).
- Provision of Fire Water reticulation network where applicable.
- Servicing and restoration of HVAC Systems.
- Provision of New HVAC Systems.
- Corrosion treatment of New and Existing infrastructure.

2. DOMESTIC WATER RETICULATION

The wet services scope shall be limited to restoring the existing wet services in various facilities; all defective water piping and fittings shall be replaced and concealed as stated in this section.

2.1. DOMESTIC WATER PIPING

The following are applicable:

- Unless stated otherwise, the cold water reticulation shall be through plastic polymer piping.
- All Piping Shall be concealed inside the ceiling voids or chased on the wall for increased security.
- All Piping Shall be concealed inside the ceiling voids or crashed on the wall for increased security.
- All Plastic Piping should be protected from direct sunlight.

- Attention shall be given to the burning characteristics of plastic materials used in high fire risk areas or close to sources of heat that can impair their performance.
- Unless plastic pipes or fittings are suitably protected, they shall not be used in a position where the permeation of gas or any other substance can cause (or is likely to cause) contamination of the water in them.
- Piping systems manufactured from polyethylene shall comply with the requirements of SANS 4427-1, SANS 4427-2, SANS 4427-3 and SANS 4427-5.
- Piping systems manufactured from polypropylene shall comply with the requirements in SANS 15874-1, SANS 15874-2, SANS 15874-3 and SANS 15874-5. The working pressure (for cold water temperatures exceeding 20 °C) of polyethylene and polypropylene pipes shall be rated in accordance with the requirements in SANS 4427-1, SANS 4427-2, SANS 4427-3 and SANS 4427-5, and SANS 15874-1, SANS 15874-2, SANS 15874-3 and SANS 15874-5, respectively.
- PVC-U pipes and fittings that comply with the requirements of SANS 966-1; PVC-M pipes and fittings shall comply with the requirements in SANS 966-2 and PVC-O pipes shall comply with the requirements in SANS 16422.
- Plastics pipes and fittings for hot and cold water supply systems shall comply with one of the following standards:
 - a. for PE-X (cross- linked polyethylene): SANS 15875-1, SANS 15875-2, SANS 15875-3 and SANS 15875-5;
 - b. for PB (polybutylene): SANS 15876-1, SANS 15876-2, SANS 15876-3 and SANS 15876-5;
 - c. for PVC-C (chlorinated polyvinyl chloride): SANS 15877-1, SANS 15877-2, SANS 15877-3 and SANS 15877-5;
 - d. for PE-RT (raised temperature cross linked polyethyelene): SANS 22391-1, SANS 22391-2, SANS 22391-3 and SANS 22391-5; and
 - e. PE-X Multi-layer piping systems: SANS 21003-1, SANS 21003-2, SANS 21003-3 and SANS 21003-5.
- The minimum rating of a polymer pipe used in hot and cold water systems in buildings is class 2, PN16 at 20 °C, 8 bar at 70 °C, and shall be marked as such on the pipe.
- Algae growth can occur in plastics pipes if there is any translucence. Plastic pipes on hot and cold systems shall only be used inside buildings.
- For pipes and fittings, guidance on the application of the system shall be found in SANS 4427-5, SANS 15874-5, SANS 15875-5, SANS 15876-5, SANS 15877-5, SANS 22391-5 and SANS 21003-5. Any plastic piping systems for hot water use shall be class 2 (70 °C operating temperature), and shall have a minimum operating pressure (M.O.P) of 600 kPa (6 bar) at 70 °C.
- For thermal expansion, loop requirements refer to specification.
- All water piping chassed on the wall shall be wrapped with Heavy brown paper as a sheath for expansion.

- Pipe supports should be so positioned that they should be at least 500mm away from a change of direction fitting i.e. tee, elbow, etc.

2.2. Potable Water Storage & Pumps

- Potable water storage tanks shall be constructed from base polyethylene material.
- The tank's profile and capacity shall match that shown/described on the mechanical layouts.
- Unless stated otherwise, the pumps shall be capable of delivering a flow of 2.3 l/s at a pressure head of 45m of water.
- The pump shall be supplied with a control circuit with variable speed drive.
- The pump operation shall be automatic (auto start/stop) and manual override.
- The pumps shall be supplied with diaphragm tank and all necessary fittings and devices recommended by the pump manufacturer.
- The pumps shall be single phase furnished with automatic changeover device to ensure pump rotation.

2.3. Hot Water Heaters

- electric water heater shall be provided, as needed, with
 - a. Safety devices in accordance with SANS 151,
 - b. Thermostats in accordance with SANS 181, including a temperature cut-out device.
- Electric geysers shall be thermally insulated in an acceptable manner to prevent heat loss.
- Suitably sized heat pump shall be used as a primary heat source.
- All hot water generators shall have all the safety devices recommended by the manufacturer.

2.4. Vacuum breakers

- A vacuum breaker shall be positioned at a height of at least 150 mm above the overflow level of any receiving appliance such as a cistern or vessel when the latter is fixed, or 300 mm above the outlet of the fitting in all other cases.
- Control valves such as taps shall not be installed downstream of an atmospheric in-line type vacuum breaker.

- Any vacuum breaker shall be suitably sized as per manufacturer's recommendations.

2.5. Corrosion Protection

All equipment constructed from materials subject to costal corrosion (Heat Pumps & Geyser) shall be provided with approved corrosion protection coating.

2.6. WASTE WATER PIPING

The following are applicable:

- Pipes, fittings, sanitary fixtures, and materials shall be selected to operate effectively under all normal conditions likely to be experienced in the specific installation for the anticipated life of such installation.
- Materials, pipes, components, and fittings that bear the certification mark of the SABS in respect of the relevant standard issued by the SABS are to be used.
- Plastics waste traps and rubber waste traps that comply with the relevant requirements of SABS 1321-1 and SABS 1321-2 shall be used.
- Pipe vent valves for supplementary or alternative venting of drainage installations, which comply with the relevant requirements of SABS 1532.
- uPVC pipes for use above ground, that comply with the relevant requirements of SABS 967.
- uPVC sewer and drain pipes and pipe fittings that comply with the relevant requirements of SABS 791.

2.7. JOINTING OF PIPEWORK AND FITTINGS

The following are applicable:

- Any jointing operation shall be performed in such a way as not to disturb the gradient of the line.
- Pipes shall be joined to one another in such a way that the continuity of the bore is maintained, and flow in the interior of the drain is not obstructed.
- Pipes and fittings to be jointed shall be internally clean, therefore no jointing material shall project inside the bore of the pipes, fixtures, or components, and burrs shall be removed from the ends of pipes, fixtures, or components, and measures shall be taken to prevent jointing materials from entering the bore of pipes, fixtures or components.
- All proprietary joints shall be made in accordance with the manufacturer's instructions. Joints between pipes, or between pipes and fittings, shall be appropriate for the

materials from which such pipes and fittings are made, under normal working conditions, remain watertight to the standard set in 6.8.2, and be able to withstand, without leaking, the internal water pressure of 50 kPa and external water pressure of 30 kPa.

- In the assembly of sanitary pipework, the provision shall be made to accommodate any thermal or differential movement between the pipes and any building or ground, or other construction that forms part of the drainage installation.

Joints shall accommodate any pipe movement that takes place throughout the expected life of the drainage installation

2.8. VENT PIPES

Vent pipes shall be provided in the drainage system to prevent airlocks, and improve the smooth flow of the wastewater in the system.

2.9. ACCESS REQUIREMENTS

The wastewater drainage systems shall be furnished with mechanisms that enable ease of maintenance such as rodding eyes, inspection eyes, and manholes. The provision of these access mechanisms should be provided according to the table below:

Type of access	Minimum dimensions (mm)				
	Recommended max. depth to invert of drain	Internal dimensions		Nominal cover size	
		Rectangular length x width	Circular diameter	Rectangular length x width	Circular diameter
Rodding eye		Preferably the same size as a drain, but not less than 100 mm diameter			
Access fitting	600 except when situated in a chamber	150 x 100 or 225 x 100	150	150 x 100 335 x 100	150
Inspection chamber	1 000	450 x 450	450	450 x 450	450
Manhole		1 200 x 750	1 050	600 x 600	600

2.10. PROTECTION OF PIPING

During construction, all piping shall be protected from foreign matter entering completed pipe sections.

2.11. ISOLATION VALVES AND FITTINGS

Only SABS-approved valves and fittings shall be supplied and fitted on the domestic water system.

- Isolating valves
- Pressure-regulating
- Drain cock
- Vacuum breaker
- Safety valve T & P 400 kPa

Refer to the drawings for pipe schematics and sizes.

2.12. HOLDERBATS – TUBE SUPPORTS AND FITTINGS

The use of nails, wire, etc. as alternatives to the correct fixing will not be accepted.

2.13. DISSIMILAR METALS

The use of copper or other materials other than those in this specification will not be permitted. Use steel or galvanized steel supports. These are to be approved by the engineer before procurement.

2.14. ALLOWANCE OF EXPANSION

All support brackets or steel fixtures should be fixed to allow free movement of the pipe within the fixture. This is to allow for the expansion and contraction of the pipes during the operation of the system.

2.15. POSITIONING

Attention will be paid to the positioning of the supports. A fixture or support should be placed at least 500mm away from a change of direction fitting i.e., tee or elbow.

3. FIRE PROTECTION

The fire protection systems shall be limited to the provision and servicing of the existing fire hose reels, fire hydrants, hand-held fire extinguishers, and the provision of additional signage.

The areas that will be furnished with the new fire protection infrastructure/equipment shall be indicated on the fire protection layouts, which accompany this specification. The drawings show the additional fire protection features for the facilities. The layouts indicate the positions of the firefighting equipment, signage, and firewater reticulation network.

A specialist who has a proven record of accomplishment in this service shall do the servicing or installation of the fire protection equipment.

3.1. SHOP DRAWINGS

The contractor shall prepare workshop drawings for the entire installation showing all necessary sections, plans, details. Builders work, electrical requirements, mounting and hanging details, etc. The contractor will submit these drawings for approval.

3.2. VERIFICATION OF DRAWINGS AND DIMENSIONS

- Carefully check drawings to see that equipment and piping will fit into the spaces provided.
- Install equipment and piping so that no obstructions are caused.
- The location of equipment and piping shown on the engineer's drawings are approximate only. The actual final positions will be shown on the contractor's shop drawings.

3.3. EXCLUSIONS

- Forming holes in walls and making good thereafter.
- Concealing of piping.
- Access doors or panels in ceilings etc.
- Floor drains or any other drain points required for draining equipment.
- Supply and installation of electrical main cables.

3.4. SECURITY AND CLEANLINESS

The contractor and his workforce will have to comply with all security requirements instituted by the main contractor and the client.

The fire protection contractor shall ensure that his workforces are clean and hygienic and that all waste material from the installation is cleared away before the end of each working day.

3.5. FIREWATER PIPING

The fire protection system shall have an independent firewater reticulation system. All fire hose reels within this facility shall be connected to the underground HDPE firewater ring main. The ring main shall be 75-110mm Diameter HDPE Class 16 piping connected to the municipal main water supplies.

- All aboveground firewater piping shall be black mild steel.
- All steel Piping shall be SANS 1109-1.
- Joints between galvanized steel pipes and between galvanized steel pipes and fittings shall be
 - screwed joints that have pipe threads that comply with SANS 1109-1, where pressure-tight joints are to be made on the threads,
 - flanged joints using steel pipe flanges that comply with SANS 1123, or as otherwise approved.
- A suitable thread filler shall be used to obtain watertight joints where necessary, and exposed threads after jointing shall be suitably protected against corrosion.
- When joints are made by either screwed or cast-on flanges, the nuts shall be tightened in opposite pairs.
- Pipes shall not be welded or brazed unless galvanizing is done afterwards.
- The following shall be deemed to be acceptable:
 - malleable cast-iron pipe fittings that comply with the requirements in SANS 14;
 - ductile iron pipes that comply with SANS 1835;
 - steel pipes and pipe fittings with a nominal bore up to 150 mm that are suitable for screwing, in accordance with SANS 1109-1 pipe threads, and that comply with the requirements in SANS 62-2;
 - galvanized steel tubes, tubulars and fittings that have been galvanized in accordance with the requirements of SANS 32; and
 - Steel pipes and fittings that comply with the requirements of SANS 62-1, SANS 719, SANS 815-1 and SANS 815-2, as applicable.
- All steel tubing shall be joined using threaded steel fittings inline with SANS 62-2:2013.
- Prefabricated sections should be flushed before assembly, particularly in large projects where the system might stand before final flushing.

3.6. PROTECTION OF PIPING

During construction, all piping shall be protected from foreign matter entering completed pipe sections.

3.7. FIRE APPLIANCES AND FITTINGS

- The hose reels shall be “Everyway” hose reel complete with 30m rubber hose, chromium-plated stop cock, shut-off nozzle, and wall bracket.

- All hose reels for this installation shall be located at strategic points as indicated in the mechanical drawings accompanying this specification.
- A specially designed chamber shall be erected by the building contractor where these hose reels shall be installed. The chamber is to be furnished with glass doors on aluminium frames for visibility of fire protection equipment. In the event that the chamber is not practical, these fire appliances shall be secured directly against the wall.
- Fire extinguishers shall be installed in all buildings as indicated in the drawing and bill of quantities accompanying this specification.

3.8. FIRE PUMPHOUSE

The project scope is limited to the servicing of the existing pumping stations and not the provision of the new pumping stations.

3.9. HOLDERBATS – PIPE SUPPORTS AND FITTINGS

All firewater piping from the point of conversion underground from HDPE to black mild steel shall be clamped on the adjacent wall as it proceeds within each building. All horizontal piping runs within the ceiling void shall be supported as per specification.

3.9.1. Dissimilar Metals

The use of copper or other materials will not be permitted. Only galvanized steel supports are to be used. These are to be approved by the engineer.

3.9.2. Allowance of Expansion

All support brackets or steel fixtures should be fixed to allow free movement of the pipe within the fixture. This is to allow for the expansion and contraction of the pipes during the operation of the system.

3.9.3. Positioning

Attention will be paid to the positioning of the supports. As a general rule, a fixture or support should be placed at least 500mm away from a change of direction fitting i.e. tee or elbow.

- The use of nails, wire, etc. as alternatives to the correct fixing will not be accepted.

3.9.4. Guide to Maximum Spacing of Piping Supports

Pipe Nominal Size (mm)	Intervals for Vertical Runs (m)	Intervals for Horizontal Runs (m)
15,0	1,9	1,3

20,0	2,5	1,9
5,0	2,5	1,9
32,0	2,8	2,5
40,0	2,8	2,5
50,0	3,9	2,5
65,0	3,9	2,8
80,0	3,9	2,8
100,0	3,9	2,8
150,0	5,0	6,1

3.10. PAINTING

- The paint colour scheme shall comply fully with the Clause mentioned below under the Colour Coding clause.
- Paint all exposed metalwork and equipment which is not a specified manufactured product as follows:
- Thoroughly descale, clean, and degrease.

Black Metalwork

- One coat of PA10 primer
- One universal undercoat
- Two coats of high gloss enamel to ensure complete corrosion protection.

Galvanised Metalwork

- Degrease and prepare surfaces with a wash specifically designed for pre-treatment of galvanized iron.
- One coat of calcium plumbate.
- One universal undercoat.
- Two coats of high gloss enamel to ensure complete corrosion protection.

General Painted Equipment

- Damaged and scratched paint surfaces shall be touched up with identical colour paint.
- Coldwater insulated piping shall be painted.
- Paint shall be of the highest quality and shall be applied strictly in accordance with the manufacturer's specifications.

Colour Coding

Colours as per the attached table “Colour Coding for piped Services” are to be used.

Colour Coding For Piped Services

Contents of Piping	Proposed
Hot Domestic Water	Brilliant Green (H10) Crimson (A03)
Cold Domestic Water	Brilliant Green (H10) Cornflower (F26)
Industrial Hot Water (i.e. Primary Circuit, Central Heating, etc).	Brilliant Green (H10) Golden Yellow (B49)
Firewater	Signal Red (A11)
Sewage	Black
LPG	Light Stone (C37)
Refrigerant	Light Grey (G29)
Diesel	Golden Brown (B13) White
Transformer Oil	Golden Brown (B13) Crimson (A03)
Fuel Oil	Golden Brown (B13) + Label

3.11. ELECTRICAL

- All electrical installations to conform to the following codes.
- The latest revision of SANS 10142 Code of Practice for the wiring of premises.
- The latest revision of SANS 101765
- Machinery and occupational safety regulations.

3.12. OPERATOR TRAINING

The contractor, manufacturing agent, or distributor shall include the services of a factory-trained field service representative to supervise the testing and commissioning.

3.13. MAINTENANCE INSTRUCTIONS

Three copies of the operating and maintenance manuals and “as-built” drawings (both hard copies on computer disc) shall be provided. Drawings stored on computer disc shall be in a format compatible with AutoCAD.

The manuals shall include the following:

- i) Maintenance instructions for all components, troubleshooting guide part numbers of all replacement items, serial numbers of all principal pieces of equipment, etc.
- ii) The names, addresses, and telephone numbers of manufacturers or their agents.
- iii) A complete set of the “as-built” drawings folded to fit the manuals.

3.14. MAINTENANCE AND SERVICES

The Contractor shall be responsible for all maintenance and servicing of the installation during the 12 month guarantee period in accordance with the service schedules attached to this specification and such additional items as required by the manufacturer of the equipment shall be included.

Four (4) services are required during this period commencing three (3) months after the first delivery inspection and spaced approximately three months apart. The final service shall be carried out before the final delivery and expiry of the guarantee.

During the 12 month guarantee period the Contractor shall make good any defects due to inferior materials and workmanship and maintain all equipment in perfect operating condition.

The Contractor shall allow for all expendable materials necessary.

3.15. GUARANTEE PERIOD

- The CONTRACTOR shall unconditionally guarantee all new equipment for a minimum period of twelve (12) months from the date of hand over to the institution.
- If the CONTRACTOR or his supplier has a standard guarantee which exceeds the minimum warranty called for, the remaining portion of such an extended warranty must be ceded to the client.
- The guarantee shall cover the performance of the WORKS and any defects due to inferior materials and/or workmanship, fair wear and tear accepted, and the CONTRACTOR shall repair any such defects without delay.
- This guarantee shall include any losses such as water or any damage done to the building.
- If any such defects are not remedied without delay, the Secretary reserves the right to have such defect repaired at the risk and cost of the CONTRACTOR by another CONTRACTOR whom the Secretary deems to be proficient in the WORK. This is to be without prejudice to any rights the Secretary has against the installation CONTRACTOR or in such instances where he appoints another CONTRACTOR to remedy defects in the WORKS.

4. HVAC

4.1. PAINTING AND CLEANING

- Thoroughly clean and descale and paint all equipment, pipes, and metal parts with two coats zinc chromate, and two coats high gloss enamel. For galvanized surfaces use

one coat of calcium plumbate, one universal undercoat, two coats of high gloss enamel.

- Factory painted equipment shall have scratched and damaged surfaces touched up with the identical colour paint. Paint shall be of the highest quality and shall be applied strictly in accordance with the manufacturer's specifications.
- Damaged floors, walls, ceilings, etc. done by the HVAC contract, shall be repaired by him at his expense to the architects' specifications.
- Paint Colors will be approved by the engineer.
- During the progress of the work, the HVAC contractor shall carefully clean up after his men and shall leave the premises and all portions of the building in which he is working free from debris.

4.2. MECHANICAL VENTILATION SYSTEMS

The mechanical ventilation shall be through ducted systems. The mechanical extractor fans for the ablutions shall be concealed inside the ceiling void where possible. The axial flow fans performance parameters shall be shown on the mechanical HVAC layout. The fans shall operate on a timer during business hours and operate on motion sensors during none-business hours. These fans will be described and detailed on the bills of quantities and the HVAC drawings.

4.3. AIR CONDITIONING UNITS

In facilities with working air condition units, service shall be provide as per the manufacture's specifications.

In facilities with non-working air-conditioning units, new units with similar performance parameters shall be supplied. The most air-conditioning installations shall be inverter-based R32/R410-A with single-phase power supply air-conditioning units. The room temperature shall be regulated through a wired controller which will act as an input device, the set temperature should be regulated automatically irrespective of the heat load gain/loss in the building/dedicated HVAC zone. The temperature shall be monitored through sensors placed within the strategic points of the air-conditioned zone. These items are detailed on the bills of quantities and the HVAC drawings accompanying this specification.

4.4. DUCTWORK

All ductwork to be galvanized sheet metal and constructed to "SMACNA" standard for low pressure ducting. The insulation will be applied to the ducting with contact adhesive, applied to both the ducting and insulation left until touch dry, and then applied to the duct. The insulation must also be secured with nylon polyprop strapping and polyprop buckles.

4.5. REFRIGERATION PIPING

- All refrigerant tubing shall be of the seamless, dehydrated de-oxidized, refrigeration class copper tubing manufactured to ASTM B280-88 and ASTM B 743-88.

- Joints or connections in tubing up to 15mm O.D may be flared or welded and the tubing may be soft drawn.
- The Director will accept SABS “RC” and “RL” refrigeration class copper tubing.
- Fittings or flared joints or connections shall be equal and approved to those manufactured by Imperial Manufacturing Company. Flare nuts shall be of the short “frost-free” type.
- The tubing shall be run in a neat, straight, plumb, or parallel manner. Silver soldered or Silfos welded joints will only be acceptable and such joints shall be easily accessible for inspection purposes.
- Refrigerant tubing shall be supported at approved intervals, not exceeding one meter, and shall be given adequate gradient to ensure proper oil return. Hardwood treated timber batts and copper saddles shall be used to support the refrigerant tubing.
- The tubing shall be supported in such a manner that the suction line can be adequately insulated to prevent condensation drip.
- Tubing shall not be run in such a manner as to impede the removal of compressor heads, etc., and pipework shall not be run in positions where it will be subjected to mechanical damage.
- All tubing shall be accessible for repairs and shall be run in such a manner that it is not subjected to vibration from moving equipment.
- Refrigerant tubing may not be buried directly into wall or floor chases, however, suitable trunking or pipe ducts may be employed for this purpose.
- Where refrigerant tubing is to pass through walls, ceilings, or floors, neat metal or PVC sleeves shall be provided and installed. The sleeves shall finish flush with the faces of the walls, ceiling or floors shall be rodent-proofed after pipes, cables, etc., have been installed through them.
- Pipe sizes must be adequate to provide for the efficient operation of the system. The general specific rule is that the pressure drop in the suction line when operating at design pressures, shall not exceed 10 kPA from the compressor to the cooling unit. The pressure drop in the liquid line from the liquid receiver to the expansion valve is not to exceed 30 kPA. Tubing sizes and methods of installation shall be such as to ensure proper oil return to the compressor.
- All suction lines shall be neatly insulated to prevent condensation drip, by using good quality insulation.

4.6. CONDENSATE DRAIN PIPING

HVAC contractor to supply 25ø PVC class 10 or supplier approved insulated drain piping for air-conditioning systems.

The drain piping is to be insulated with 25mm thick insulation. This piping will be measured in the bills of quantities and positions indicated on the drawings, support this piping every 600mm with approved saddles.

4.7. Corrosion Protection

All equipment constructed from materials subject to costal corrosion (Outdoor condensing units) shall be provided with approved corrosion protection coating.

4.8. ELECTRICAL

4.8.1. Site Wiring (Cable Tray and Cable Ladder)

- All references to cable trays in this document also refer to cable ladders.
- All cables are to be on a cable tray or cable ladder. The type of cable tray or cable ladder used must be approved in advance.
- Cable trays are to be hot-dip galvanized and are to be painted as follows:
 - Clean with Spick & Span galvanized iron cleaner.
 - Cold galvanize any cut edges
 - Prime with calcium plumbate paint
 - Paint orange
- Cable tray brackets are to be hot-dip galvanized, and painted in the same way as cable tray, except that they are to be black.
- As an alternative galvanized cable trays and brackets maybe plastic coated.
- Cable trays are not to be cut to form bends. Elbows and tees are to be factory-made items. Ascenders and descenders are to be beaten around a former.
- Cable trays may be horizontal or vertical unless the drawing is marked to the contrary.
- All take-offs from cable tray runs must be done using tees or bends.
- Cables must not be bunched on a cable tray.
- Only one layer of cables is permitted on cable trays.
- Cables may not cross over on cable trays.
- Here changes of size occur on a cable tray run, this must be done using bends and tees. Abrupt changes in size are not allowed.
- Cable trays must be spaced off the surface that they are fastened on.
- Do not short-circuit vibration isolators on machinery with cable tray.
- Cable tray brackets and supports must be of sufficient strength to prevent sagging, twisting, etc. particularly in the case of large cables.
- Cable trays and conduits are to be properly earthed to the switchboard earth bar.

4.8.2. Earthing

- All equipment is to be earthed.
- All earths are to be made off to the switchboard earth bar.
- The earthing strands in ECC cable, surfix, etc. are to be made off to the proper earthing points at both ends of the cable.

4.8.3. Making Off And Terminating Wires And Cables

- All site made holes in switchboards for glands etc. must be done with a chassis punch. Hole saws are not to be used. In the case of switchboards mounted outside, or in damp conditions, the cut edges of these holes must be treated with cold galvanizing and touched up with the correct colour paint.
- Where cables are made off into boards, this must be done carefully, offsetting the cables neatly and evenly, without cross-overs.
- All cable tails must have sufficient slack to allow tong testers to be used.
- Allow sufficient slack when making cable off to allow for adjustment of pulleys, removal of actuators, etc.
- No more than two lugs or two conductors without lugs are permitted in any terminal.
- Wires connected to numbered terminals are to bear the same number.
- All cables are to be numbered on both ends, directly above the gland shroud, with copper, brass, or stainless steel bands or strips with the number embossed or punched on the strip or band.
- All wires except as noted below are to have lugs crimped to the ends. Lugs on wires 6mm and under are to be insulated. Insulated bootlace ferrules are acceptable when the terminal is designed to accept them. The correct type of crimper is to be used. Ratchet crimpers only are to be used on insulated terminals. No exposed conductors are to be visible on wires which have insulated lugs.
- Single-core conductors are not to have crimped lugs but are to have insulated bootlace ferrules. Wires 10 mm and over which are secured into saddle or screw terminals are to be twisted and bound.

4.8.4. Conduits

- All conduit is to bear the relevant SABS mark.
- Conduits are to be run neatly and parallel to each other.
- Conduits are to be bent and offset with the correct tool. Wrinkling of the inside of bends will not be accepted.
- Through boxes, end boxes and fittings are to be made of the same material as the conduit, except that galvanized boxes and fittings may be used with black conduit.
- Inspection bends, tees, or couplings may not be used.
- All unwired conduits are to have draw-wires installed.
- Open conduit ends and boxes are to be sealed to prevent the ingress of debris.
- Cut conduit ends are to be properly reamed.
- Conduits must be made off to switchboards, boxes, trunking, etc using a coupling and male bush.
- Solid brass bushes must be used on the iron conduit, plastic bushes on the aluminum conduit, and brass or plastic bushes on the plastic conduit.
- Where the enameling or galvanizing of conduit has been removed by threading or tools, then the bare metal is to be painted with cold galvanizing paint.
- Conduit fixings are to be manufactured items designed for the fixing of the conduit. The method of fixing is to be approved before the construction commences.
- Metal conduit is to be fixed at a minimum of 2.0m, and plastic conduit 0.75m. Also, the conduit is to be fixed 150mm before and after each bend, offset, and box. Sagging between fixings will not be accepted.

- Drawer boxes are to be installed after two right-angle bends, or after 10.0m of a straight conduit.
- All plastic conduit joints and fittings are to be glued.

4.8.5. Trunking

- Trunking may not be cut to form bends. Distribution outlets, elbows, tees, ascenders, and descenders are to be factory-made items and must be radiused.
- Internal splices are to be used for joints.
- Sharp fastenings are not to protrude into trunking.
- All cut edges are to be smoothed, and no sharp edges are to be left inside trunking.
- All brackets are to be galvanized.

4.8.6. General

- All conductors are to be stranded.
 - All cables are to be PVC SWA PVC.
 - Screened cable for low voltage controls may be 0.5mm 2 OAM in conduit.
 - No surfix or similar cable may be used.
- All cable trays, ladders, conduits, surface mounted cables, trunking, etc. is to be run parallel to or at right angles to walls and other surfaces and may not be solid over expansion joints.
- Wall-mounted switchboards are to be spaced away from the wall 20mm.
- All cut ends of galvanized material are to be painted with cold galvanizing paint.
- All iron or steel material and fastenings exposed to damp conditions must be hot-dip galvanized. Electro-galvanized or cadmium-plated material will not be accepted unless suitably painted.
- All switchboards, isolators, terminal boxes, etc. located outside, or in any area subject to dampness, must be bottom entry only.
- All installations and wiring are to conform to the following:
 - The latest revision of SABS 0142 code of practice for the wiring of premises.
 - Machinery and occupational safety regulations.
 - Local authority regulations.
- Electrical Compliance Certificates as required by the latest revision of SABS 0142 are to be produced before power is applied to the installation.
- All cable and cable tray routes, wiring methods, etc. must be approved in advance.
- DO NOT alter wiring diagrams, switchgear selections, cable sizes, cable types, equipment positions, etc. without permission.

4.9. COMMISSIONING, ADJUSTING, AND BALANCING

- Equipment shall be commissioned and adjusted so that it will perform as specified and shown on the drawings. A letter from each supplier of equipment shall be sent to the Engineer stating that the equipment has been installed and commissioned entirely in accordance with the supplier's requirements and recommendations.
- The entire control system shall be adjusted and placed in operating by the supplier. Re-adjustments necessary to accomplish the specified results during the first year of operation shall be made without cost to the Employer.
- All duct systems shall be adjusted and balanced so that air quantities at outlets are as specified or shown on the drawings so that distribution from air terminals is free from draughts and uniform over the face of each air terminal.
- Adjustments shall be made so that splitters and volume adjusters close to air terminals will have the least pressure drop consistent with volume requirements. Additional pressure drop required for the balancing of shorter fans shall be obtained by adjustment of the dampers at branch duct take-offs. Adjustable fan drives shall be used for making final adjustments of total air quantities.
- Direct reading velocity meters may be used for comparative adjustment of individual air terminals, but air quantities in ducts that have velocities of 5,0m/s or more shall be measured by means of pitot tubes. Factory fabricated plugged or capped openings for pitot tubes shall be provided as required.
- The setting of dampers, splitters, and other volume adjusting devices shall be permanently inscribed so that they can be restored to their original positions if disturbed at any time.
- Where variable or constant volume regulators or similar devices are installed, the Contractor shall remove one device of each size from the installation as directed by the Engineer and shall send such devices to the CSIR or other approved body, for certification of the installation and shall form the basis for performance comparisons of other devices of the same size if required by the Engineer.
- A full air volume reading shall be taken on the site before the device being sent for certification and the Contractor shall ensure that all conditions necessary, for the correct operation of the device, prevail before the first site volume reading being taken.
- In the event of the installation being in operation at the time of such certification being required, the Contractor shall install devices of the same size as those on which such certification is taking place, to ensure continuity of operation of the installation.
- Fan performance on variable volume systems shall, in addition to any other tests required by the Engineer, be recorded when all variable volume devices are switched to their maximum design volume.

4.10. GENERAL

- The design of the air-conditioning and ventilation systems offered must comply with the :
 - National Building Regulations.
 - Any additional requirements of any local authority including fire and health.

- All wiring to SABS 0142.

4.11. OPERATING AND MAINTENANCE MANUALS

- HVAC contractor to provide manuals with the following contents.
- Descriptive information, operating instructions, inspection and maintenance, reference documents, and equipment reference documents.

4.12. DRAWINGS AND AS-BUILT DRAWINGS

- Workshop drawings to be drawn on CAD by the HVAC contractor and submitted for approval to the engineer.
- These drawings will include all plans, sections, wiring, diagrams, builders' work, etc.
- At the end of the contract, these drawings will be updated and included with the O&M manuals as As-Built drawings.

4.13. MAINTENANCE AND OPERATING INSTRUCTIONS

- Three copies of the Operating and Maintenance Manuals and “As-Built” Drawings to be prepared and submitted to the Engineers Office for checking.
- All relevant names, addresses, and telephone numbers to be included in the manuals.
- The contract shall be considered incomplete until all tests have been conducted to the satisfaction of the Department and all drawings and manuals have been handed over to the Engineer.

4.14. MAINTENANCE AND SERVICING

- The HVAC Contractor shall be responsible for all maintenance and servicing of the installation during the 12 months guarantee period.

4.15. GUARANTEE PERIOD

- The HVAC Contractor shall unconditionally guarantee all newly installed equipment for a minimum period of twelve months (12) from the date of hand over to the Client.
- The guarantee shall cover the performance of the works and any defects due to inferior materials or workmanship. The Contractor shall repair any such defects without delay.

- If any defects are not remedied by the Contractor the Client reserves the right to employ another contractor to do repairs at the expense of the installation Contractor, during the guarantee period.

SECTION 6 – CIVIL ENGINEERING

1. SCOPE OF WORKS

1.1. GENERAL

The Contractor will be responsible for the construction and handing over of occasional resurfacing, sewer and stormwater infrastructure upgrades. Also included in the scope is the supply of as-built drawings and on-site training of the Employer's staff.

1.2. SUMMARY OF SCOPE

The civils scope of work includes the following:

- Site establishment.
- Occasional resurfacing.
- Slurry seal at the platforms.
- Unblocking of existing sewer and stormwater drainage system.
- Excavations for fence foundations.
- Installation of barbed wire on top of the existing fence (brick wall and wire mesh).

2. APPLICABLE STANDARD SPECIFICATIONS

All materials and workmanship shall conform to and comply with the following standards:

- SANS 1200 A : General
- SANS 1200 AB : Engineer's Office
- SANS 1200 C : Site Clearance
- SANS 1200 LE – Stormwater Drainage
- SANS 1200 GA : Concrete (Small Works)
- SANS 1200 MM : Ancillary Roadworks
- SANS 1200 MH: Asphalt Base and Surfacing

3. PARTICULAR SPECIFICATIONS

The list of particular specifications is as follows:

- PSA SANS 1200 A: General

- PSAB SANS 1200 AB: Engineers Office
- PSC SANS 1200 C: Site Clearance
- PSD SANS 1200 D: Earthworks
- PSLE SANS 1200 LE: Stormwater
- PSDM 1200 DM : Earthworks (Roads, Subgrade)
- PSM 1200 M : Roads (General)
- PSME 1200 ME : Subbase
- PSMK 1200 MK : Kerbing, Channelling, Edge Beams, etc
- PSMM 1200 MM : Ancillary Roadworks

4. VARIATIONS AND ADDITIONS TO THE STANDARD SPECIFICATIONS

PSA SANS 1200 A: GENERAL

CONTENTS

PSA2	INTERPRETATIONS
PSA3	MATERIALS
PSA4	PLANT
PSA5	CONSTRUCTION
PSA7	TESTING
PSA8	MEASUREMENT AND PAYMENT
PSA2	INTERPRETATIONS

PSA2-1 **Applicable edition of standards. (Sub clause 2.2)**

Add at the beginning of Sub clause 2.2:

“Unless a specific edition is specified (see the List of Applicable Specifications)

PSA2-2 **Definitions (Sub clause 2.3)**

Add:

Roads/Site Roads: Site roads are defined by a network of public and non-public roads within the Site boundary providing access to the various buildings or areas. Any reference to roads, parking and paved areas for traffic shall be interchangeable.

Party, Parties and Third Party: 1Party11 and 'Parties" means the Client and the

Consultant and 'Third Party' means any other person or entity as the contract requires.

PSA2-3 Abbreviations. (Sub clause 2.4)

Add to Sub clause 2.4(b):

"MAMDD: Modified AASHTO maximum dry density".

PSA2-4 Items In Schedule of Quantities. (Sub clause 2.8.1)

In the fourth line of Sub clause 2.8.1, after the word "specification", add:

"and or in the measurement and payment clause of the particular specification or

Project specification

PSA3 MATERIALS

PSA3-1 Quality. (Sub clause 3.1)

Add the following:

Where a material to be used in this Contract is specified to comply with 'the requirements of a SANS Standard Specification, and such material is available with the official SANS mark, the material used shall bear the official mark.

Whether or not the material bears the mark or is tested, any material found not to be in accordance with the specification shall be rejected and replaced by the

Contractor at his own cost.

Tenderers may be required, at their own expense to submit samples of the

Material offered to the Engineer for his approval and the material supplied under this contract shall be of a standard equal to that of the samples so submitted and approved. Samples will remain the property of the Tenderers, who shall remove them when called upon to do so by the Engineer.

Add the following new sub-clause:

PSA3-3 DELAY DUE TO SUPPLY OF MATERIALS

The Contractor shall ensure that the work is not delayed due to the lack of materials on the site of the works, by placing orders with suppliers for the materials required under this contract as soon as possible after the acceptance of this tender.

The Contractor shall, by producing copies of written orders or written enquiries for supplies, prove to the satisfaction of the Engineer that any delay occasioned by non-availability of materials has been caused by the inability of suppliers to supply and not by his own lack of timely ordering or lack of exhaustive enquiry for supplies, before any extensions of the contract time will be allowed due to such delays.

PSA4 PLANT

Add the following new sub-clauses

PSA4-3 CONSTRUCTION PLANT

Construction plant shall be of a suitable type for carrying out the work for which it is required. Its capacity shall be sufficient to meet the requirements of the work within the contract time. It shall be kept at all times in full working order and repair.

PSA5 CONSTRUCTION

PSA5-1 Survey (Sub clause 5.1)

Add the following paragraph:

Tender drawings shall not be used for construction purposes. Construction drawings and additional detailed information will be made available to the Contractor as and when required.

PSA5-2 Setting out of the Works (Sub clause 5.1.1)

Add the following paragraphs:

The Contractor shall contract or employ a professional land surveyor and supporting team who will check the reference beacons. Agreement shall be reached with the Engineer on the values of the beacons to be used. It is the Contractor's responsibility to maintain and protect all reference beacons. The Contractor shall make available for the duration of the contract period, when required by the Engineer, one skilled and one unskilled survey labourer.

The contract will construct a limited number of official reference and level beacons on the site of the works. The Contractor shall place additional reference beacons on all sides of the work areas for accurate setting out and levelling purposes. These beacons shall be placed in concrete, marked and certified by a professional land surveyor. Beacons shall be checked during construction to confirm the accuracy when instructed by the Engineer.

Prior to the commencement of construction, the Contractor shall measure the existing levels on the area of the works. All survey work to be carried out by a professional land surveyor. All earthworks quantities shall be certified correct by a professional land surveyor. All as built levels and dimensions shall be certified correct by a registered land surveyor.

The Contractor shall advise the Engineer of any conflict between the position of any part of the Works and an existing feature.

PSA5-3 Survey beacons. (Sub clause 5.1.2)

Add the following paragraph:

The Contractor shall search for, locate, protect and record all the beacons before any work commences.

PSA5-5 Protection of overhead and underground services (Sub clause 5.4)

Add the following paragraph

(i) Location and Protection

Various services are known to exist within the PRASA Umlazi Sub Corridor 1 rail reserve. No detection of underground services was carried out due to the nature of the work being more maintenance and refurbishment type. It is therefore the Contractor's responsibility to ensure location and protection of services where excavations are to be carried out.

Any services or structures damaged during construction shall immediately be reported to the Employers Agent or Engineer, and as soon as possible after such damage a written report stating the exact circumstances of the occurrence shall be submitted to the Employers Agent.

All practical measures shall be taken to effect immediate repairs, either by contacting the relevant authority or, where instructed by the Engineer, the Contractor shall perform temporary repairs himself. All repairs the damaged services shall be done at the Contractor's expense.

PSA5-6 Dealing with water (Sub-clause 5.5)

Unless specified, the rates tendered and paid for excavation and the construction of any subsurface structure shall include for dewatering as may be necessary.

In addition to the items as set out in Sub-clause 5.5 the contractor shall also provide pumping equipment, pipes and other equipment as may be necessary to keep excavations dry at all times.

PSA7 Compliance to the quality control plan and testing

Add the following paragraphs:

Prior to the commencing of the Works, the Contractor is to produce and submit a quality control programme (QCP), and the associated approval forms, to the Employers Agent for acceptance. The QCP is to consist of a list of items, which are to be signed off by both the Contractor and Employers Agent on Site, to ensure that the Works on Site comply with the specifications.

The QCP shall incorporate the requirements of all relevant SANS 1200, project specifications and other specifications referred to.

The accepted QCP will not relieve the Contractor of any quality control and/or testing responsibilities stated in the relevant specifications.

Work must be signed off by both the Contractor and the Engineer before it can be processed for payment.

PSA8 MEASUREMENT AND PAYMENT

PSA8-1 Method of measurement, all sections. (Sub clause 8.1.1.)

In the second line of Sub-Clause 8.1.1, after the words "standardized specification or" add: "in the measurement and payment clause of the standard specification or".

PSAB SANS 1200AB: ENGINEER'S OFFICE

CONTENTS

PSAB3	MATERIALS
PSAB4	PLANT
PSAB5	CONSTRUCTION
PSAB8	MEASUREMENT AND PAYMENT

PSAB3 MATERIALS

PSAB3-1 Name board. (Sub clause 3.1)

Two name boards, manufactured as specified In Sub clause 3.1 and as shown on the tender drawings, shall be provided, and shall be erected plumb and level, in the position as directed by the Engineer.

The wording for the name boards shall be as ordered at the commencement of the Works.

PSAB3-2 Engineer's office. (Sub clause 3~2)

The Contractor shall provide two offices of 24m², of which one will be used as storage for samples. The erection position will be indicated by the Engineer.

All windows in the office shall be fitted with burglar proofing over the entire glazed area, and with fly screens over the openings.

The Contractor shall maintain and service, as applicable the facilities specified in SANS 1200 A and PSAB.

The facility shall include:

- a) furnished site offices with air-conditioning and a water connection and basin (1);
- b) unfurnished site offices (1);
- c) ablution facilities with flush unit linked to the sewer system, or chemical toilet if sewer system is not available;
- d) shaded carport (2);
- e) photocopy machine (See PSAB4-3);
- f) wifi internet connection (See PSAB4-1);
- g) survey equipment (See PSAB4-2);
- h) a site instruction book (See PSAB 5-3);
- i) protective clothing for 8 persons (excluding appropriate footwear);
- j) safety equipment (including rotating amber constructions lights; and
- k) emergency medical kit.
- l) Electronic equipment for the Engineer (See PSAB4-3);

Unless specified otherwise, on completion of the Works, these facilities shall revert to the Contractor who shall remove them from the site. The term "use of the Engineer" will be deemed to include; as appropriate, use by the Engineer's staff and the Engineer's Representative and his staff.

Latrine and ablution facility for the engineer: The Contractor shall provide, maintain and service one ablution room for ladies and one ablution room for gents for the exclusive use of the Engineer. This room shall be constructed as specified for the Engineer's office but shall be at least 4 m in size and fitted with one flush toilet and one hand washbasin.

Parking facilities: A lean-to carport with a solid roof for 2 cars giving protection from the sun, wind and rain, and with a ground surface that is neither dusty nor muddy, shall be provided in a position adjacent to the Engineer's office for the exclusive use of the Engineer.

Insurance: The Contractor shall be responsible for insuring all equipment in the engineer's site office against theft and accidental loss for the contract period.

PSAB5 CONSTRUCTION

PSAB5-1 Name board. (Sub clause 5-1)

The name boards shall be removed by the Contractor before the issue of the Certificate of Completion.

PSAB5-2 Survey assistants. (Sub clause 5.6)

In terms of Sub clause 5.5 two suitably trained and experienced workmen to be used as survey assistants shall be made available to the Engineer during working hours as and when required.

PSAB5-3 Site instruction book

Throughout the construction period the Contractor shall supply a carbon triplicate book as a site instruction book.

This book shall be kept on Site and shall be accessible to both the Contractor and the Engineer at all times. It shall be used:

- i. By the Contractor for providing the Engineer with any information regarding the construction of the Works which may be requested and giving notification in writing of inspections, drawings, etc, required by the Contractor, and
- ii. By the Engineer for the purpose of writing day-to-day instructions and confirming any verbal information or instructions given to the Contractor.

One copy of each site note issued shall remain in the book.

PSAB8 MEASUREMENT AND PAYMENT

PSAB8-2 Photocopying machine..... Unit: Sum

The Contractor shall be responsible for the costs of supplying and all maintenance and servicing of the printer/scanner.

The rate shall cover the supply, maintenance and servicing for the full duration of the construction period.

PSC SANS 1200 C: SITE CLEARANCE

CONTENTS

PSC3 MATERIALS

PSC5 CONSTRUCTION

PSC8 MEASUREMENT AND PAYMENT

PSC3 MATERIALS

PSC3-1 Disposal of material (Sub-clause 3.1)

An existing dumpsite for spoil of material (soil, rock; masonry, etc as approved by the engineer, not organic or decomposable material) is not available. All materials from excavations or demolishing shall be carted to commercial off-site dumpsites.

PSC5 CONSTRUCTION

PSC5-1 Areas to be cleared and grubbed. (Sub clause 5.1)

Only the approved minimum area required for the execution of the Works including areas on which material shall be stockpiled for later reuse or on which material shall be dumped and spread, shall be cleared and grubbed. 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.

PSC5-2 Conservation of topsoil. (Sub clause 5.6)

Topsoil up to a depth of 150 mm, if available shall be removed from the above specified cleared areas and stockpiled on approved sites for later reuse. Until required for spreading the stockpiles of topsoil material shall be stabilised by watering or other approved means.

When in the opinion of the Engineer, there is an insufficient quantity of topsoil available from the areas to be cleared the Contractor shall import topsoil from borrow areas designated by the Engineer.

PSC8 MEASUREMENT AND PAYMENT

PSC8-1 Clear and grub. (Sub clause 8.2.1)

Site clearance for pipe trenches will not be measured where such trenches lie within the carriageway of any road.

The rate tendered for clearing and grubbing shall cover the cost of disposal of the material by approved means at places approved by the Engineer.

PSC8-2 Removal of pipes. (Sub clause 8.2.7)

In addition to the requirements of Sub clause 8.2.7, the rate shall cover the cost of locating the pipeline and any additional costs of excavation and backfilling not covered by other normal rates for excavation and backfilling under SANS 1200 DB.

PSC8-4 Removal and conservation of topsoil. (Sub clause 8.2.10)

The rate tendered for the removal of in situ topsoil shall, in addition to the items listed in Sub clause 8.2.10, also cover the cost of preparing the stockpile area, loading and unloading, and stabilizing and protecting the stockpiles of topsoil.

PSD SANS 1200 D: EARTHWORKS

PSD 1 SCOPE (CLAUSE 1)

PSD 3 MATERIALS (CLAUSE 3)

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES (Sub-Clause 3.1)

PSD 3.1.1 Method of Classifying (Sub-Clause 3.1.1)

The Contractor may use any method he chooses to excavate any class of material but his chosen method of excavation shall not determine the classification of the excavation. The Employer's Agent or his Representative will decide on the classification of the materials. In the first instance the classification will be based on inspection of the material to be excavated and on the criteria given in PSD 3.1.2 below. All material shall be considered to be soft material unless agreed and approved otherwise in writing with the Employer's Agent prior to excavation taking place.

In the application of this classification, no differentiation shall be made between " bulk" or "restricted" excavations.

PSD 3.1.2 Classes of Excavation (Sub-Clause 3.1.2)

PSD 3.1.2.1 Classes of Excavation: Conventional Construction

All material encountered in any excavations for any purpose including restricted excavation will be classified as follows:

a. Hard rock excavation

Hard rock excavation shall be excavation in material (including undecomposed boulders exceeding 0,15 cubic metres in individual volume) that cannot be efficiently removed without blasting or without wedging and splitting.

b. Soft excavation

Soft excavation shall be all material not falling into the category of hard rock excavation.

PSD 5 CONSTRUCTION (CLAUSE 5)

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of excavations

The Contractor shall be responsible for all lateral support and the safe-guarding of all excavations, and all costs involved with the proper safeguarding of the excavations shall be included in the tendered rates.

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.2. Excavation

PSD 5.2.2.1 Excavations for General Earthworks and for Structures (Sub-Clause 5.2.2.1)

Working space of 1,0 m wide adjacent to the walls of structures has been allowed for in the Quantities. Any additional working space required by the Contractor, or over-excavation, shall be excavated, backfilled and compacted by the Contractor at his own expense.

PSD 5.2.2.3 Disposal (Sub-Clause 5.2.2.3)

Unless otherwise ordered, surplus and unsuitable material shall be removed from site and disposed of by the Contractor who shall, at his own cost, make all necessary arrangements for locating a spoil site and haulage.

The Employer's Agent may authorise or instruct that surplus and unsuitable material from excavations be placed as compacted fill on the Site in accordance with the relevant clauses of SANS 1200 D, or loaded, tipped and spread at a suitable disposal site, within the free-haul distance, approved by the Employer's Agent.

Where excavated material is disposed of on site or at a location designated by the Employer's Agent, the topsoil shall be stripped to a depth of 150 mm or as directed, stockpiled and reinstated to its original depth over the spoil. The spoil site shall be graded to smooth, free-draining contours.

PSD 5.2.3 Placing and Compaction

PSD 5.2.3.2 Confined Backfilling and Compacting Around Structures

Backfill against structures, within 1,0 m of the structure, shall be approved clean non-cohesive material, either selected material from the excavations or imported material, and shall be compacted to a minimum of 93% Mod. AASHTO density (100% for sand). Payment for this item shall cover all costs involved in supplying, loading, transporting, placing, spreading and compacting the imported material. The volume of backfill will be calculated on a 1.0m wide area for workspace behind the structure walls, and the Contractor shall make provision in his rates for any additional material required for wider excavations.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.1 BASIC PRINCIPLES

Add the following:

Excavations

The Contractor shall determine at tender stage the appropriate method of bulk and trench excavation (plant, labour etc) and tender rates accordingly.

Generally, the excavations will be measured in the categories set out hereunder, i.e.

(ii) Cut to Fill, where the unit rate tendered shall be inclusive of all work and costs required for the bulk excavation of all materials from platform and excavation areas, the transport and placement of the material in the required fill areas, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density.

(iii) Cut to Stockpile where the unit rate tendered shall be inclusive of all works and costs required for the bulk or restricted excavation of materials which are suitable for placement in fill, the loading and transport to the designated stockpile site, and the maintenance of the stockpiles, as directed by the Employer's Agent.

(iv) Cut to Spoil where the unit rate tendered shall be inclusive of all works and costs required for the bulk or restricted excavation of materials which are in excess or are not suitable for placement in fill, the loading and transport and disposal thereof in accordance with PSD 5.2.2.3.

(v) Hand Excavations. Hand excavation rates will only be paid if ordered by the Employer's Agent in writing where the unit rate tendered shall be an extra-over rate for restricted excavation, which shall include for all additional costs involved in providing labour and hand tools required for excavations by hand.

Backfilling

Except for the cut to fill operations described above where measurement and payment of the filling and compaction is included under these items, all other fill construction works and backfilling requires fill material from borrow pits and stockpiles on site or from commercial sources, where the following additional items shall apply;

(a) Construction of fill platform and embankments; where the unit rate tendered shall be inclusive of all works and costs required for the loading and transport of fill material from the stockpiles or borrow pits on site, the placement of the material in the required fill areas, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density, as directed by the Employer's Agent.

(b) Restricted backfilling against structures; where the unit rate tendered shall be inclusive of all works and costs required for the selection, loading and transport of

fill material from the stockpiles or borrow pits on site, the placement of the material in the 1,0m working space against structures, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density (100% for sand), as directed by the Employer's Agent.

(c) An Extra-over item to item (a) above shall be measured for final shaping and trimming of embankment sides.

(d) An Extra-over item to item (b) above shall be measured for imported material from commercial sources.

PSLE Stormwater Drainage (Refer to SABS 1200LE)

PSLE 1 Concrete Pipes (Clause 3.1)

Precast concrete pipes shall be spun, reinforced pipes with ogee (interlocking) joints:

PSLE 2 Bricks (Clause 3.4.1)

Bricks shall be clay bricks complying with SABS 227 - 1970 Burnt Clay Masonry units "FACING" class, FBSE, with a smooth finish and water absorption, when measured in accordance with Clause 4.7 of SABS 227 - 1970, not exceeding 15%. Calcium silicate bricks will not be acceptable for use on the Works.

PSLE 3 Manholes (Clause 5.5.1)

Manholes shall, if not otherwise indicated, be constructed of brickwork.

PSLE 4 Manhole Covers and Frames (Clause 3.4.3)

Manhole covers and frames shall comply with the requirements of SABS 558 Type 2A, in the case of manholes in roads and in areas subjected to traffic loads, and type 6 in areas not

subjected to traffic loads. Filled top types of covers shall be filled with concrete and steel trowelled to a smooth finish. All exposed iron surfaces of covers and frames shall be painted with an approved bituminous composition.

PSLE 6 Payment for Kerb Inlets and Manholes (Clauses 8.2.8 and 8.2.9)

The inlet sections of kerb inlets, excluding the manholes, will be measured and paid for per unit, depending only on their nominal lengths. Prices for inlet sections must allow for all labour and materials required for the complete inlet sections, including excavations, concrete aprons and floor, transition kerbs, brickwork, precast concrete cover slabs, steel pillars, etc.

Manholes, kerb inlet manhole chambers and outlet structures will be measured and paid for with separate items for excavation, concrete, formwork, brickwork, manhole frames and covers, etc.

OCCUPATIONAL HEALTH SAFETY AND SPECIFICATION

PROJECT TITLE

APPOINTMENT OF A CONTRACTOR FOR THE REFURBISHMENT, ALTERATIONS AND
ADDITIONS AT SOUTH COAST CORRIDOR

Prepared for:

PASSENGER RAIL AGENCY OF SOUTH AFRICA

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DOCUMENT INFORMATION

Document Title	Occupational Health and Safety Specification
Project Title	Appointment of a Contractor for the Refurbishment, Alterations at Various PRASA Stations
Client	Prasa Rail Agency of South Africa
Project Engineers	Lodemann
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1. PREAMBLE

In terms of Construction Regulations 2014 section 5 (1) the Client must prepare an Occupational Health and Safety (OHS) Specification for the proposed construction project. This OHS Specification has been compiled by Lodemann, the Refurbishment, alterations and additions at cluster 1.

The Health and Safety specification establishes the generic and specific requirements to enable the Client and the eventual appointed Contractor to satisfy the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) its Regulations and related legislation.

This specification sets out the requirements for eliminating and/ or mitigating health and safety risks, injuries, accidents and incidents on site. It addresses legal compliance, hazard identification, risk assessment, risk management and promotion of health and safety culture within the project. The specification also makes provision for the protection of personnel other than the employees.

2. LEGAL FRAMEWORK

Occupational Health and Safety Act no.85 of 1993 and Its Regulations

Compensation for Occupational Injuries and Disease act no. 130 of 1993

National Disaster Management Act No 57 of 2002 and COVID-19 Regulations

Municipality By-Laws

3. ABBREVIATIONS

CEO – Chief Executive Officer

CR – Construction Regulations 2014

DB – decibels

OHS Spec.: Appointment of a Contractor for the Refurbishment, Alterations and additions at cluster 1

DMR – Driven Machinery Regulations

DSTI - Daily Safe Task Instruction

EMPr – Environmental Management Program

ER – Electrical Installations Regulations

ERW – Environmental Regulations for Workplaces

FR – Facilities Regulations

GAR – General Administration Regulations

GSR – General Safety Regulations

HCSR – Hazardous Chemical Substances Regulations

OHS – Occupational Health and Safety

SABS – South African Bureau of Standards

SACPCMP - South African Council for Project and Construction Management Professions

SANS – South African National Standards

PPE – Personal Protective Equipment

PTO - Planned Task Observations

4. DEFINITIONS

For the purpose of the OHS Specification, the definitions given hereunder must apply. All definitions as listed under the Occupational Health and Safety Act, 1993 and legislation are applicable

“Agent (Pr. CHSA)” means a competent person Registered with the SACPCMP who acts as a representative for a Client in terms of regulation (5)5.

“Client” means PRASA

“Competency” means combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely;

“Competent person” means a person who-

(a) Has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications specific for that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000 (Act No.67 of 2000),

(b) Is familiar with the Occupational Health and Safety Act No. 85 of 1993 and with the applicable regulations made under the Act;

"Construction Manager (*Site Agent*)" means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;

"Construction Site" means a workplace where construction work is being performed;

"Construction Supervisor" (*Site Foreman*) means a competent person responsible for supervising construction activities on a construction site;

"Construction Vehicle" means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;

"Construction work" means any work in connection with –

(a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or

(b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

"The Principal Contractor" means an employer appointed by the client to perform construction work;

"Contractor" means an employer who performs construction work; in this case the

"Fall Protection Plan" means a documented plan, which includes and provides for-

- (a) All risks relating to working from a fall risk position, considering the nature of work undertaken;
- (b) The procedures and methods to be applied in order to eliminate the risk of falling; and
- (c) A rescue plan and procedures;

"OHS File" means a file, or other record containing the information in writing required by these Regulations;

"OHS Plan" means a site activity or project specific documented plan in accordance with the Client's OHS Specification requirements which is based on the Baseline Risk Assessment;

"OHS Specification" means a site activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work;

"Medical Certificate of Fitness" means a certificate contemplated in regulation 7(8) of Construction Regulations 2014;

"OHS Officer" – a person deemed competent by SACPCMP under the relevant category of registration.

"The Act" – Occupational Health and Safety Act No.85 of 1993

5. PROJECT SCOPE OF WORKS

OHS Spec.: Appointment of a Contractor for the Refurbishment, Alterations and additions at cluster 1

The scope of works for the project is as follows:

- Site establishment, Painting, Installation of new signage, Electrical installations, Waterproofing, Civil works, Mechanical works.

6. MINIMUM HEALTH AND SAFETY ADMINISTRATIVE REQUIREMENTS

6.1 OCCUPATIONAL HEALTH AND SAFETY PLAN

The PC/ successful bidder must compile a documented OHS Plan as per CR 7(1) (a) based on the information / requirements contained in this specification and demonstrate to us how he/ she is going to implement health and safety requirements during works. The OHS Plan must be submitted for approval by the Agent prior construction works commencement on site.

6.2 OCCUPATIONAL HEALTH AND SAFETY FILE

The PC must, in terms of CR 7(1)(b) compile and keep on site an OHS file that must include all documentation required in terms of this Specification, Baseline Risk Assessment for the Works, The Act and its Regulations. The PC must submit the OHS file to Health and Safety Specialist for perusal and advise within 14 days of appointment.

6.3 CONSTRUCTION WORK PERMIT

The project will not require a Construction Work Permit (CWP) as it does not meet minimum criteria for a work permit.

6.4 OCCUPATIONAL HEALTH AND SAFETY POLICY

The Contractor must prepare a written policy concerning the protection of the health and safety of employees at work, including the description of his organization and the arrangements for carrying out and reviewing the policy. The OHS policy must be signed by the CEO. A copy of the OHS policy must be prominently displayed on site and also be kept on the OHS file.

6.5 LEGAL APPOINTMENTS

The Client shall appoint the PC (successful bidder) for the works as per CR 5 (1) (k). A section 37 (2) agreement shall also be signed between the Client the PC.

The PC must make appointments as per The Act and its Regulations; structured and guided by the scope of works to be performed.

It is acknowledged that the PC may need to allocate more than one appointment to certain staff members. This practice may only take place if health and safety standards will not be negatively affected. Agent deem such practice as having a negative effect on health and safety standards; then alternative arrangements will have to be made.

Due to the size and risks associated with the project, the site will require a full time Construction Health and Safety Officer to implement and manage OHS compliance on site. The Construction Health and Safety Officer must be registered with the SACPCMP under respective categories.

Below is the table containing the legal appointments that the contractor must appoint on site.

Table 1: Legal Appointments

Item	Regulation	Appointment	Period of Provision	Responsible Person
1.	OHS Act 16.1	CEO	Prior site handover	Principal Contractor
2.	OHS Act 16.2	Contracts Manager	Prior site handover	Principal Contractor
3.	CR 8(1)	Construction Manager	Prior site handover	Principal Contractor
4.	CR 8(2)	Assistant Construction Manager	Need to be determined	Principal Contractor
5.	CR 8(5)	Full Time Construction Health and Safety Officer	Prior site handover	Principal Contractor
6.	CR 8(7)	Construction Supervisor	Prior site handover	Principal Contractor
7.	CR 8(8)	Assistant Construction Supervisor	Need to be determined	Principal Contractor
8.	CR 9(1)	Risk Assessor	Prior site handover	Principal Contractor
9.	CR 10(1)(a)	Fall Protection Planner	Prior site handover	Principal Contractor
10.	CR 12(1)	Temporary Works Designer	Commencement with works	Principal Contractor
11.	CR 12(2)	Temporary Works Supervisor	Commencement with works	Principal Contractor
12.	CR 13(1)(a)	Excavation Supervisor	Prior site handover	Principal Contractor

13.	CR 16(2)	Scaffold Supervisor	Commencement with works	Principal Contractor
14.	CR 16(2)	Scaffolding Erector	Commencement with works	Principal Contractor
15.	CR 16(2)	Scaffolding Inspector	Commencement with works	Principal Contractor
16.	CR 17(1)	Suspended Platform Supervisor	Commencement with works	Principal Contractor
17.	CR 19(8)(a)	Material Hoist Inspector	Commencement with works	Principal Contractor
18.	CR 20 (1)	Bulk mixing supervisor	Commencement with works	Principal Contractor
19.	CR 23(1)(d)	Construction Vehicle and Mobile Plant Operators	Commencement with works	Principal Contractor
20.	CR 24(d)	Temporal Electrical Installations Inspector	Prior site handover	Principal Contractor
21.	CR 28(a)	Stacking and Storage Supervisor	Prior site handover	Principal Contractor
22.	CR 29 (h)	Fire Equipment Inspector	Prior site handover	Principal Contractor
23.	CR 29 (i)	Fire fighters	Commencement with construction work	Principal Contractor
24.	EMR 9	Portable Electrical Inspector	Prior site handover	Principal Contractor
25.	GAR (9)2	Accident/ Incident Investigator	Prior site handover	Principal Contractor
26.	GRS 3(4)	First Aider Attendants – Level 2	Commencement with works	Principal Contractor
27.	GSR 13 (a)	Ladder Inspector	Commencement with works	Principal Contractor
28.	HCSR 3(3)	Hazardous Chemical Substances Supervisor	Prior site handover	Principal Contractor
29.	OHS Act 8(2)(a)	Hand Tools Inspector	Prior site handover	Principal Contractor

30.	OHS Act 17	Health and Safety Representatives	Commencement with works	Principal Contractor
31.	CR 7 (1) (c)	Sub – Contractors	Commencement with works	Principal Contractor
32.	EIR 6	Electrical Contractor	Prior site handover	Principal Contractor

6.6 COMPETENCY OF APPOINTEES

Contractor's competent persons for the various risk management portfolios must fulfil the criteria as stipulated under the definition of Competent Person in accordance with the CR and The Act. All competency certificates must be South African Qualifications Authority (SAQA) accredited. The competency must be subjected to approval by the Agent.

6.7 HEALTH AND SAFETY ORGANOGRAM

An organogram outlining the Health and Safety Management as per appointments under the OHS Act and the Regulations must be provided by the PC and be kept in the health and safety file.

The PC must update the site Health and Safety Management Organogram when there are any changes in the Site Management Structure.

6.8 COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASED

The PC must warrant that all employees are fully covered in terms of the Compensation for Occupational Injuries and Diseases Act 1993 (Act No. 130 of 1993) (COID Act) and that such cover must remain in force for the duration of the project.

All bidders must supply proof of such insurance cover to the Client at the time of the bid.

The PC must ensure that all Sub-Contractors appointed by him are fully covered in terms of the COID Act, and that such cover must remain in force for the duration of their contract.

The PC must also provide Public Liability Cover that must adequately make provisions for any losses and / or his employee's acts and / or omissions whilst working on the Client's premises.

6.9 SUB - CONTRACTORS

All Sub - Contractors will be responsible for their own OHS on site under supervision of the PC. The PC must appoint the Sub – Contractors as per CR 7 (1) (C) (v) and sign a section 37(2) mandatory agreement with them. The OHS requirements for works must form part of Sub - Contractor's tender documents. Selection criteria for Sub- Contractors must include ability to meet health and safety requirements for the works. Sub – Contractor must demonstrate OHS budget allocations for the works.

All Sub – Contractors must open their own OHS Files. The PC must approve Sub – Contractors OHS Plan and agree on the files before they commence on site. The files must be updated monthly as per works progress and will be subjected to monthly Audits by the PC. The PC must monitor all Contractors and ensure compliance on site.

The Sub – Contractors must update and provide monthly incidents statistics, pre – employment and exit medicals status to the PC and Agent.

6.10 HAZARD IDENTIFICATION AND RISK ASSESSMENT

The PC must allow for and cause a Site-Specific Hazard Identification and Risk Assessment exercise to be performed by a competent Risk Assessor before commencement of construction work based on his scope of works, activities to be executed on site. The Risk Assessment must include the following:

- A list of activities to be performed and hazards identified for tasks;
- Health, and safety effects from exposure to hazards;

- Risk rating and its methodology / matrix;
- Control / mitigation measures to identified hazards;
- Method statements and safe working procedures for the high-risk tasks intended to eliminate, reduce and/or control the risks assessed;
- A monitoring and review procedure of the risk assessment as the risks change.

The PC must provide a baseline risk assessment to Sub-Contractor for the works they shall be conducting before any work commences and thereafter at regular intervals as the risks change and as new risks develop.

The PC must allow for and be responsible for ensuring that all persons who could be negatively affected by construction operations are informed and trained according to the hazards and risks and are conversant with the safe work procedures, control measures and other related rules (for example “tool box talk” strategy to be implemented).

Should the Agent or other Clients Representative identify alternative hazardous activities performed by the PC or its Sub - Contractors on site for which a Risk Assessment was not performed, works will be stopped and the PC or Sub - Contractors will be required to perform such an exercise before continuing such work.

6.11 SAFE WORKING PROCEDURES

The Contractor must develop, document and implement safe working procedures (SOP) for all activities involving significant health or safety risk. These procedures must detail the control measures required to effectively manage the health and safety risks associated with the work activities.

SOPs must be consistent with the task-based risk assessment completed for the activity.

Every person engaged in an activity for which a SOP has been developed must receive suitable training on the procedure before commencing the works.

Furthermore, the contractor must develop, document, communicate and implement formal procedures, work instructions and / or programmes for the operation, maintenance, inspection and testing of all plant and equipment (including protective systems and devices) brought onto the project site(s).

6.12 HEALTH AND SAFETY REPRESENTATIVES

The PC and Sub - Contractors must allow for and ensure that OHS Representative(s) as per OHS Act section 17 are appointed and trained to carry out their functions as per section 18 of The Act.

The appointments must be in writing and the OHS Representative must carry out regular inspections, keep records and report all findings to the OHS Officer.

6.13 HEALTH AND SAFETY COMMITTEES

When there is more than one Health and Safety Representative on site, a Health and Safety Committee must be developed as per the requirements of section 19 of The Act. The person nominated by an employer on the health and safety committee must be designated in writing by Contractor for such a period as may be determined by him. Health and Safety Representatives shall be members of the committee for their entire period of designation. The functions of the health and safety committee must be as per OHS Act section 20. The PC must ensure that project Health and Safety Committee Meetings are held a minimum of once a month or more as deemed necessary by the project requirements. The following must be in place regarding the meetings:

- Minutes must be kept on record and filed in the site health and safety file.
- Meetings must be organized and chaired by the PC's Responsible Person appointed in writing.

6.14 MEDICAL FITNESS

The contractor must develop and implement a programme to manage employee fitness for work. All employees working on site for whom the contractor is responsible (i.e., direct employees of the contractor as well as the employees of any appointed sub-contractors) must be subject to this programme.

All employees on site must have valid certificates of medical fitness as per CR 7(1)(g).

The results of an exit medical examination / any certificate of medical examination from a previous employment will not be accepted as a pre-employment medical examination for this project.

The medical examinations described above may only be carried out by an Occupational Medical Practitioner (i.e., a medical doctor who holds a qualification in occupational medicine).

A detailed job (role) description and an exposure profile (noise, dust, heat, working at height, working with machinery, etc.) must be provided for each employee. The medical examinations that an employee undergoes must be based on (i.e., the employee's fitness must be assessed against) the information contained in these documents as well as the baseline risk assessment for the work. This information must be made available to the occupational medical practitioner performing the medical examination.

For each role, the medical criteria for fitness must be documented and these must be based on an evaluation of the physical and medical requirements for the role.

The medical examinations carried out for all drivers and operators must include testing / assessment for medical conditions that could affect the safe operation of vehicles or equipment.

Specific testing / questioning must be carried out to determine if an individual:

- Suffers from epilepsy or any other medical condition deemed to be a risk by the occupational medical practitioner;
- Makes use of chronic medication that could affect performance;
- Is colour-blind; or
- Has poor day or night vision.

The medical examinations carried out for employees that are required to work at height must include testing / questioning to determine if an individual suffers from epilepsy, hypertension (high blood pressure) or any other medical condition deemed to be a risk (with regard to working at height) by the occupational medical practitioner.

Electricians must be tested for colour-blindness.

If an individual is found to be medically “unfit for placement”, the doctor will indicate which work activities cannot be performed by the person;

The individual may still be employed on the project if his medical restrictions can be accommodated and provided that no legislation is transgressed.

A process must be established to manage medical restrictions that may be placed on an employee. For every employee with a medical restriction, regular follow up visits with the occupational medical practitioner must be arranged to ensure that each case is proactively managed.

An employee in a safety critical job must report (to his supervisor) any condition that might impair his ability to safely perform the duties associated with his role. A mechanism must be in place for such reports to be referred to an occupational medical practitioner to determine if the employee is fit to continue with his work.

Proof of all medical examinations (i.e. certificates of fitness signed by an occupational medical practitioner) must be kept on site and these records must be readily available for inspection by the nominated project management representative.

An employee’s certificates of fitness must be included in his personal profile.

No employee may commence work on site without proof that he has undergone a pre-employment medical examination.

Employees must be subjected to exit medical evaluation when their contract ends on site.

All occupational medical data and records must be retained for at least 40 years.

6.15 HEALTH AND SAFETY TRAINING

6.15.1 Induction

The PC must develop and devise an OHS induction program for the site and highlight specific hazards and risks associated to site. All personnel on site must undergo a site-specific health and safety induction training session before starting work and also attend PRASSA Induction process.

A record of attendance must be kept in the OHS File. Induction training must also include training on the risks associated with the works to be executed, safe work procedures and emergency procedures.

All visitors to the site must also be subjected to site-specific induction training highlighting items such as site safety and health risks, steps to follow in the event of emergency, restricted areas and on the site health and safety rules upon entering the site.

6.15.2 Displaying of Information

The site must display as a minimum notices and awareness information as per table below:

Table 2: Warning / Informative signs requirements

Area and/or activity where notice or sign is required	Notice or sign required in terms of
Display of notices and signs	GSR 2B and SABS Code 1186
Entry	GSR 2C (2)
First-aid	GSR 3(6)
Toilets and change rooms	FR 2(5); 4(2)(f)
Storage of flammable materials	GSR 4(8)(a)(i) and (ii) (10(e) only applicable to Contractor's yards)
Grinding wheels	DMR 8(1)(7)
Machinery	General Machinery Regulation 9 (<i>Schedule D</i>)
Explosive powered tools	Construction Regulation 21(2)(f)
Prohibition on smoking and eating or drinking at the workplaces where high risk substances are stored or handled	Facilities Regulation 6(b)
Non-potable water	Facilities Regulation 7(b)

In addition to the above requirements; notices, information and instructions must be displayed on site as per risk assessment requirements.

6.15.3 Awareness Training

The PC must ensure that, on site, toolbox talks pertaining to hazards and risks on site take place at least once a week. These talks must deal with risks relevant to the construction work at hand.

6.15.4 Competency

All Competent persons must have the knowledge, experience, training, and qualifications which are specifically applicable to the work they have been appointed to supervise, control, and execute.

The abovementioned competency requirements will be assessed on a regular basis by the Health and Safety Specialist by means of Audits.

The PC is responsible for ensuring that competent Sub-Contractors are appointed to carry out construction work.

6.16 DAILY SAFE TASK INSTRUCTIONS

DSTI is a pre-start discussion amongst the members of a work team, led by the appointed supervisor, aimed at anticipating hazards and potential risks associated with the activities planned for the day or shift, and ensuring that the necessary control measures are in place to prevent incidents.

At the start of any work, each appointed supervisor must inspect the work area for which he is responsible and ensure that it is safe. He must then conduct a DSTI with his work team specifically concerning the tasks that they will be performing during the course of the day or shift. The relevant Task-Based Risk Assessment for the activity must be used as the basis for the discussion. The correct work method must be reiterated, and the identified hazards, risks and control measures must be discussed with the team (each team member must be given the opportunity to contribute and participate in the discussion).

Any team member arriving late must first be taken through the information that was discussed (work method, hazards, risks and control measures) before being permitted to start working. If the work method changes after activities have already begun, the DSTI must be revisited and updated with the team, and the changes must be signed off by the relevant Contractor Health and Safety Officer.

Every member of the work team must sign the DSTI attendance register. The attendance records must be kept and maintained in the Contractor's OHS File.

The Contractor's OHS Officer must evaluate the content of the DSTI's daily to ensure that they are task-specific. Furthermore, the OHS Officer must attend at least one DSTI per day prior to the start of work. The OHS Officer may not lead the DSTI discussions, as this is the responsibility of the appointed supervisor.

6.17 PLANNED TASK OBSERVATIONS

All Contractor, Management Supervisors must perform PTO to verify that the control measures that have been identified in Safe Work Procedures (and associated Risk Assessments) are being adhered to and are being properly implemented, and to provide guidance where deviations are noted.

Each supervisor must complete at least one PTO per day involving one or more employees in his work team.

When an unsafe act or condition is identified, the supervisor must coach the work team to correct the act or condition in line with the safe work procedure.

Where valid changes to the work method are identified, the supervisor must ensure that the safe work procedure and risk assessment are updated to reflect the current practice.

The Construction Manager and / other Project representatives will carry out PTO's on contractor employees on an ad hoc basis. Should deviations from the contractor's safe work procedures be observed, the work may be stopped until these deviations are rectified.

6.18 INCIDENTS AND EMERGENCY PLAN

The contractor must develop, implement, test and maintain an emergency response plan (incorporating emergency procedures and evacuation procedure) that focuses specifically on the Contractor's team and work activities. The plan must be risk-based and must detail the procedures that must be followed when responding to all potential emergency scenarios such as:

- Vehicle's accidents
- Strike actions

- Political / community protests
- Falls from heights
- Collapse of structures
- Animals' attacks (snakes, bees, scorpions)
- Spillages of hazardous chemical substances / flammable liquids
- Fire
- Flash floods

The plan must be adequately resourced to ensure effective implementation. Accountability for the Emergency Response Plan must be clearly defined. An emergency response team responsible for the implementation, management and execution of the emergency response plan must be established. the roles and responsibilities of each team member must be clearly defined in the plan. Each team member must receive appropriate training to ensure that each role is performed competently.

The process for managing incident communication, notification, and reporting must be incorporated into the emergency response plan. The responsible person(s) must be clearly identified, and the protocols for communicating with internal and external stakeholders must be defined.

Emergency evacuation procedures must be developed and included in the emergency response plan.

The emergency response plan must be formally reviewed (and amended if necessary) on at least an annual basis, and following any emergency situation, to ensure that it remains appropriate and effective.

The Contractor must ensure the following:

- A suitable evacuation alarm (siren) is provided. Alarms must be installed in work areas. All persons working in an area where an evacuation alarm is sounded must respond to it immediately.
- Suitable fire-fighting equipment must be provided and maintained, all work stations must be provided with two or more trained in fire-fighting procedures and the use of fire-fighting equipment.

- Suitable first aid equipment and supplies must be providing. First aid station must be established and an adequate number of appropriately trained First Aiders must be in place.
- Emergency assembly points positioned in safe locations away from buildings, plant and equipment must be designated (and conspicuously signposted). In the event of an evacuation, all persons (i.e. personnel and visitors) must assemble and be accounted for at these emergency assembly points.
- All personnel must receive awareness training on the applicable emergency response procedures, and all visitors entering the site must be properly instructed in these procedures.
- The emergency response procedures must be displayed on each notice board.
- A diagram (site plan) indicating evacuation routes, emergency assembly point locations, and the positioning of emergency equipment (fire extinguishers, first aid boxes, etc.) must be prominently displayed in strategic locations; in all offices, on all notice boards, and in other locations on the site as may be required.
- An up-to-date list of emergency telephone numbers must be compiled and maintained. A copy of this list must be posted at each site entrance, in each office, near each telephone, and on every notice board.
- Emergency response drills must be conducted to test the effectiveness of the emergency procedures and equipment, as well as the knowledge and proficiency of the response personnel. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, hazardous substance spills and drowning. A drill must be carried out one month after site establishment and six-monthly thereafter.
- Each drill must be monitored and the outcomes (highlights and shortcomings) must be documented. Corrective actions must be identified and implemented to address the shortcomings, and the emergency response plan and associated procedures must be amended as required.

Potential off-site emergency scenarios must be included (e.g., emergency scenarios related to the transport of personnel).

Consideration must be given to neighbours, and to the availability and capability of local emergency services. Details of any arrangements with external emergency response service providers must be included.

6.19 FIRST AID ATTENDANCE

The PC must appoint in writing a Level 2 First Aider in terms of Regulation 3 of the General Safety Regulations. Additional first aiders can be level 1. The number of first aiders shall be as follows:

- One first aider for up to 10 workers
- one additional for every additional 10 workers

Where there is separate work station, each work station must have a trained first aider.

Valid certificates to be kept on site in the site health and safety file.

First aiders must be trained to address any incidents of accidental exposure to hazardous chemical substances present on site and COVID-19 emergencies.

Metal box first aid kits are recommended for the works.

Location and quantity of first aid kits must be as follows, it should be noted that the requirements are in consideration high risk activities associated with the project:

- one kit, including specific first aid modules, for up to 5 employees
- one additional kit, with specific modules, for every additional 5 employees
- The main first aid station must be at the site camp and portable kits must be provide in work station, this may include motor vehicles.

It recommended that the contractor identify the Hospital and Health Practitioner to be used in case of medical attention.

The site requires to have isolation room due to the current COVID-19 Pandemic. Room requirements are as follows:

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- The room needs to be large enough to accommodate two people while allowing social distancing. The following items need to be provided in the room:
 - biohazardous waste bin
 - upright chair
 - a desk / table
 - signage indicating emergency telephone numbers

6.20 ACCIDENT & INCIDENT REPORTING, INVESTIGATION AND STATISTICS

Injuries sustained on site are to be categorized into the following categories:

- First aid;
- Near misses;
- Medical attendance (Doctor);
- Disabling; and Fatal injuries

All Sub- Contractors must report medical attendance injuries to the PC no later than the end of the shift and disabling and fatal incidents as soon as they occur.

First aid cases must be recorded in the safety files dressing register.

Medical Attendance accidents must be recorded on the safety file as per annexure 1, the PC's competent person (Incident / Accident Investigator) must investigate these incidents / accidents and forward a copy of the report to the Health and Safety Specialist without within seven days.

Disabling and fatal accidents must immediately be reported to the Health and Safety Specialist telephonically after they occur. The Health and Safety Specialist shall manage these accidents investigations. All incidents as described in Section 24 of the OHS Act must be reported in the prescribed period and manner to the National Department of Labour. Copies of Section 24 reports, including WCL 2 forms must be forwarded to the Health and Safety Specialist.

Near misses must be reported, recorded and investigated.

The PC must establish a procedure for the management of all health and safety incidents. This procedure must define the responsibilities, methodologies and processes that must be followed for:

- Reporting an incident;
- Investigating an incident;
- Analysing an incident to determine the root cause;
- Identifying and implementing corrective actions to prevent a recurrence; and
- Communicating information concerning an incident to relevant persons and / or groups.

An incident must be reported to the Construction Supervisor and section Safety Representative immediately after they occur. The Construction Supervisor / Safety Representative must report incidents / accidents to the Safety Officer and Construction manager on the same work day or shift on which it occurs and preliminary details must be recorded.

The Construction Manager must ensure that an investigation is completed for each incident that occurs, and that Construction Supervisor and section Safety Representative participate in each investigation. Incident investigations must be facilitated by competent and experienced Incident Investigator who have been trained in the appropriate methodology.

Investigation process for near misses, medical attendance, disabling and fatal incidents must be completed within 7 days. Investigation on first aid kit cases must be done monthly and report to be provided.

Each incident must be analysed to determine the root cause, and corrective actions must be identified and prioritised for implementation to eliminate or reduce the risk(s) in order to prevent recurrence of the incident.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e., closing incidents) must be monitored and reported on. The implementation of corrective actions must be verified during monthly audits by the Agent but also no later than 30 calendar days after the conclusion of the incident investigation.

As a minimum, each incident report must include:

- The date, time and location of the incident;
- A detailed description of the incident, including photographs;
- The names of any injured persons;

- Injury details (if applicable);
- A summary of the first aid and / or medical treatment provided (if applicable);
- The current status of any injured persons;
- The root causes of the incident; and
- Detailed corrective actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the Contractor's Construction Manager to assure completeness, accuracy and relevance before it is shared with (communicated to) all project personnel.

Record of monthly incidents / accidents statistics must be provided to the Agent during the time of the Audit.

6.21 NON-CONFORMANCE AND ACTION MANAGEMENT

The contractor must establish a process for identifying and recording corrective actions arising from:

- Incident investigations;
- Hazard identification and risk assessment;
- Measurement and monitoring;
- Improvement plans and suggestions;
- Managing change;
- Audits and inspections; and
- Safety observations and coaching (safety interactions).

The contractor must establish a procedure for managing actions that addresses:

- Identification, categorisation and prioritisation of actions;
- Formal evaluation and approval of actions (management of change process);
- Assignment of responsibilities, resources and schedules for implementation;
- Implementation of actions;
- Tracking and reporting on implementation status; and
- Monitoring and verifying the effectiveness of the actions.

6.22 OHS AUDITS, MONITORING AND REPORTING

The Health and Safety Specialist shall during the duration of the contract conduct OHS Audits of the work operations. The audit shall be consisting of a full audit of physical site activities as well as an audit on the administration of health and safety. Copies of the audit reports will be forwarded to the Principal Contractor, Principal Agent, Client and all stakeholders within seven days. Copies of the Audit report must be kept in the site OHS File. The Health and Safety Specialist may at any time visit the site for an Audit without prior notification to the contractor.

The benchmark for OHS Compliance is set at 85% to ensure safety. The Contractors overall performance as per Audit checklist assessing physical and administration requirements shall be deemed as acceptable when over 85% benchmark is met. When Contractors fails to achieve the benchmark for two consecutive Audits, that shall be taken as failure to meet compliance and sections with non -compliances will be stopped. All deviations have a critic impact on safety and health on site and shall be closed without delays.

If an Audit identifies high risks with immediate dangers to health and safety, the section / tasks posing the risk or the whole site will be stopped until compliance is met.

The PC must allow for and conduct similar audits on all Sub- Contractors under him/ her, provide reports to the Sub-Contractors within seven days and keep copy of the reports in his on the OHS File.

6.23 GENERAL RECORD KEEPING

The PC must keep and maintain Health and Safety records to demonstrate compliance with this Specification, The Act and with the CR on the OHS File which must always be kept in the site office.

The PC must ensure that every Sub-Contractors opens their individual health and safety files, maintains the files and makes them available on request by any duly authorized person.

7. PHYSICAL REQUIRMENTS

7.1 SITE ESTABLISHMENT

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7.1.1 Public Safety and Security

Fencing and Access Control

The PC must fence off construction site camp to prevent unauthorised entry and disruptions.

The site must be fenced off as follows:

- Bonox fence of minimum of 1,6 to 1,8 meters high must be used to fence off the site / work stations parameters.
- The Contractor is required to maintain fencing intact.
- Lockable gates with warm body security must be provide at the site entrances.

The PC must barricade construction working areas to prevent accessing the railway and disruptions or accidents

Work stations must be barricaded as follows:

- Contractor to provide strong physical barrier of more than 1 meter high to fully barricade off the work stations from the rail way or public.
- The Contractor is required to maintain barricades robust.

Warning / informative signs

The entrances of the site must have construction safety warning signs which should contain a minimum of the following information:

- Construction site entrances must display the following signs
 - Name of the PC
 - No unauthorised entry
 - Type of Personal Protective Equipment required for the site as per risk assessment
 - Speed limit (20 km/h)
 - Visitors to report to the site office
- Informative signs indicating following must be displayed in in the vicinity of locations on site:

- Assembly points
- Location of fire extinguishers
- First aid kits and name of first aider
- Location of lifebuoys

7.1.2 Site Camp Layout

Layout of the site must be in a manner that will ensure sufficient space for the following:

- Material storage
- Construction vehicle and plant movement
- Construction vehicle and plant parking

The PC must ensure that the following is considered in areas selected for site camp entablement:

- Existing services to be located and addressed according to Engineers Specifications.
- Adequate space to be allocated in consideration to facilities to be provided.
- Access roads, office areas, employees' facilities, parking areas, turning areas and stacking areas to be properly designated.
- Ground surfaces to be stable with safe gradient and free from slipping, tripping and falling hazards.

7.1.3 Site Access Management

Access control, procedures and systems must be developed for the site.

Access must be controlled as follows:

- The access to be strictly controlled and managed.
- A system for identifying site employees must be developed.

Flagman

The PC shall be required to appoint flagman who have been trained on railway safety and are competent to perform flagman duties when employees are working on train or railway lines.

Flagman must be placed on either side of the construction area to alert employees of train approaching the construction areas.

Flagman must signal employees to move out of the work area when trains are about to pass through the construction area.

Working close or on live electrical equipment

Work to be done during total occupation or during an occupation between trains or under a work permit shall be done in a manner decided by the PC who shall appoint their own protection specialist.

The PC shall organise the Works in a manner which will minimise the number and duration of occupations and work permits required.

Visitors

Visitors (including suppliers) must be advised in advance of the mandatory PPE requirements for the site and must arrive with all of this PPE.

Upon arrival, all visitors must report to the Security Office to be signed in.

All visitors must undergo a visitor induction briefing before entering the site.

Whilst on site, visitors must be accompanied at all times by an appropriately senior employee who has been inducted fully. The visitor(s) must be start at the site office and when the visit is over, must be escorted off site.

Visitors are not permitted to perform any work on site.

Any request (typically made by a government official) to carry out a site inspection must be referred to the Construction Manager. There must be no inspection arrangements without prior approval from the Construction Manager.

Alcohol, Drugs and Other Intoxicating Substances

The contractor must ensure that all personnel under his authority do not at any time enter the site or perform any work whilst under the influence of alcohol, a drug, or any other intoxicating substance.

Entering the site possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.

A drugs and alcohol testing program must be implemented. Persons entering the site must be randomly tested. Any person who tests positive for alcohol or drug consumption will be subject to disciplinary action and shall be permanently removed from the site.

Any person has the opportunity to rather report that he/she is under the influence before accessing the project site – in these cases the employee may only be send home for the day by the responsible project manager representative but will then be tested for the following five days (each day) on his return to the project site. If it is found that the same person is frequently reporting that he/she is under the influence before even accessing the project site. It shall be the responsibility of the nominated project management representative to take disciplinary action and remove such a person's form the project site.

Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing. A full disciplinary procedure must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the PC for his records.

Any person on the construction site who is on prescription drugs must inform the safety officer or the safety representative accordingly

All personnel involved in an incident / accident must immediately be subjected to an alcohol test and a drug test as part of the investigation.

Firearms, Ammunition and Offensive Weapons

Firearms, ammunition, and offensive weapons of any kind are strictly prohibited. No person may enter /shall not be permitted to enter the site carrying any such item.

7.1.4 Fire Breaks

Fire breaks must be provided and maintained at the parameter of construction site camp and the adjoining land. The firebreak must have width of a minimum of 2.5 meters and follow the natural contours of the site. It must not cause soil erosion and be free of inflammable material capable of carrying a wildfire across it.

7.1.5 Facilities

The site facilities must comply with Facilities Regulations, 2004 under the Act.

7.1.6 Electrical Connections

All electrical connections on site must be done by a registered electrical contractor and a COC must be provided upon completion of the installation.

Temporary electrical installations must be inspected weekly by a competent person and records must be kept on the health and safety file.

7.1.7 Lighting

The PC must ensure that lighting on site is in accordance with illumination values per specific area / works as per Environmental Regulations, 1987 under the Act.

7.1.8 Ventilation

Ventilation in the workplace must comply with Environmental Regulations, 1987 under the Act.

The PC shall ensure that every workplace in his undertaking is ventilated either by natural or mechanical means in such a way that:

- The air breathed by employees does not endanger their safety
- The prescribed exposure limits for airborne substances as per legislation not exceeded
- The concentration therein of any explosive or flammable gas, vapour or dust does not exceed the lower explosive limit of that gas, vapour or dust.

Where there is a danger of unsafe air in the breathing zone of an employee, the employer shall provide every such employee with, and ensure that he correctly uses, respiratory protective equipment of a type that reduces the exposure of the employee to a safe level

and the employer shall, further, inform him of the dangers of and the precautionary measures against excessive exposure.

Risk assessment on ventilation must be done for all areas.

7.2 TRANSPORTATION OF EMPLOYEES

The PC and Sub –Contractors shall meet the following requirements for transportation of employees:

- Transport employees on a road worthy vehicle that also complies with CR 23 requirements and transportation to obey road rules.
- Vehicle to have seats and seat belts.
- Transportation of employees together with goods or tools to be prohibited.
- Vehicles transporting employees to be not overloaded.

7.3 PERSONAL PROTECTIVE EQUIPMENT

SABS standards concerning PPE must be complied with at all times.

As a minimum, the following PPE must be issued to all employees and be worn by all persons at all times whilst on a project site:

- Ankle covering safety boots with steel toe protection
- Overalls with reflective taping (long trousers and long-sleeved shirts with collars and cuffs). Each employee to be issued with a minimum of two sets.
- Reflector vests to be worn over overalls. Each employee to be issued with a minimum of two reflective vests.
- Helmets
- Additional PPE requirements must be determined through hazard identification and risk assessment which includes the following PPE must be provided and must be worn as required (e.g., when in a certain area, when performing a certain task, or when working with a certain substance);

- Steel toed gum boots for employees working in water / muddy environments
- Sun hats
- Dust masks
- Ear protection
- Face /eye protection
- Leather / rubber gloves
- SANS 50381-5 leg protection for tree fellers or grass cutters
- Safety harnesses for employees working in an elevated position (1.5m or higher) where the potential exists that such employees may fall

The contractor must ensure that correct PPE must always be worn:

- In accordance with site requirements designated areas on the onsite;
- In zoned areas e.g., noise zones
- As required by a Safe Work Procedure, a risk assessment, or a Material Safety Data Sheet (MSDS).

Each Contractor must provide each of his employees with all required PPE (at no cost to the employee). PPE policy must be developed for the site.

Any employee who does not have all of the PPE that is required for him to perform his duties safely will not be permitted to work.

Each employee must care for his PPE, maintain it in good condition, and inspect it on a daily basis.

If an item of PPE has worn out, has become damaged, or is found to be defective in any way, it must be replaced by the contractor.

PPE must be stored in accordance with the manufacturer's requirements and / or recommendations.

Each employee must receive training in the use, maintenance and limitations of the PPE that is provided to him, and must be made aware of why the PPE is necessary as well as the consequences of not wearing it as instructed (i.e., the potential for injury and / or disciplinary action). Training records must be retained.

Any person who refuses to wear PPE as required must be removed from the site.

Symbolic signs indicating mandatory PPE requirements must be prominently displayed at the entrances of site and at the entrances to sections and / or designated areas on the premises where additional PPE is required. These signs must comply with the applicable national standard (if one exists).

Each contractor must appoint an employee to:

- Control the issuing and replacement of PPE;
- Keep an up-to-date register as proof that items of PPE have been issued to individuals (an employee must sign for the items that he receives);
- Ensure that there is an adequate supply of all required PPE (i.e. maintain PPE stock levels on site); and
- Carry out regular inspections to ensure that PPE is being used correctly, is being maintained in a good, serviceable and hygienic state, and is not being shared between employees.

Personal protective equipment should be last resort in control exposure to hazards. PPE should provide protection to the health and safety of employees as follows:

Head Protection

A safety helmet (or hard hat) worn correctly will help protect the head in the event of:

- An employee being struck on the head by a falling or flying object;
- An employee striking his head against a fixed or protruding object; or
- Accidental head contact being made with an electrical hazard.

A safety helmet must be worn at all times on a project site, with the following exceptions:

- Vehicle and equipment operators inside enclosed cabs;
- In offices and in office or administration buildings; and
- At designated lunch and break areas (provided that no work is in progress in the immediate break area).

A safety helmet must be worn in accordance with the manufacturer's requirements.

A safety helmet must be worn directly on the head. The wearing of a cap or other headgear beneath a safety helmet is prohibited unless the items have been specifically designed to be used in combination (i.e., the arrangement is approved by the safety helmet manufacturer).

The suspension system inside a safety helmet (that acts as a shock absorber) may not be removed.

Safety helmets may only be cleaned using a detergent and water. No solvents may be used.

Eye Protection

If an employee is carrying out, assisting with, or working adjacent to any activity where sparks or projectile particles are being generated, where chemical mists or fumes are being generated, where liquids may splash or spray, where harmful electromagnetic radiation (heat or light) is being generated, or where there is a risk of wind-blown particles entering the eyes, then suitable protective eyewear must be worn at all times (i.e. safety glasses, safety goggles, a face shield, a welding helmet, or a combination of these).

Such activities include:

- Working with rotating equipment (e.g., grinders, drills, mills, lathes, and saws);
- Welding and cutting;
- Chipping, chiselling or caulking;
- Using explosive powered tools;
- Abrasive blasting;
- Sanding; and
- Working with chemical substances (e.g., drilling fluids, acids, solvents, paints, pesticides, etc).

For certain activities, special eye protection is required (e.g., a heat-resistant face shield is required when working near molten metal).

Double eye protection is required for activities such as:

- Grinding, cutting, chipping, chasing and reaming (employees must wear both a full-face shield and safety glasses or goggles); and
- Arc welding (welders must wear both safety glasses and a welding helmet).

Screens must be erected to protect passers-by, where practical.

in certain areas may not be suitable because of increased risk to the eye due to dust or heat.

Hearing Protection

Employees should not be exposed to noise levels exceeding 85db.

“Low noise” tools and machinery must be used wherever possible to reduce noise levels.

Where noise cannot be reduced to an acceptable level through engineering and work practice controls, measures must be put in place to minimise the exposure of employees to the noise (i.e., administrative controls and personal hearing protection).

Areas / activities producing noise levels exceed 85dB, or areas where impulse noise exceeds 140dB, must be designated as noise zones. These noise zones must be clearly demarcated and mapped, signs must be posted, and all employees must be made aware of the requirements for working in such an area.

Suitable hearing protection must be worn in all designated noise zones and when carrying out (or working in the vicinity of) any activity where the noise level exceeds 85dB or impulse noise exceeding 140 db.

Where hearing protection is required, a hearing conservation programme (applicable to all personnel and visitors) must be implemented. The programme must include training in the correct use and proper storage of hearing protection devices as well as replacement requirements. Training must be provided when hearing protection is first issued to an employee and refresher training must be carried out at least annually thereafter. Training records must be retained.

Hearing protection devices must be made available to employees. The hearing protection devices must have adequate noise reduction ratings (i.e., must be able to attenuate the noise level to below 85dB.

Personal hearing protection must be issued on an individual basis and must not be shared.

In addition to personally issued hearing protection, suitable disposable hearing protection must be made available at the entrances to all noise zones.

All hearing protection devices (except for disposable hearing protection) must be properly inspected and cleaned on a regular basis.

Respiratory Protection

Suitable Respiratory Protection Devices (RPDs) must be worn in all designated respirator zones and when carrying out (or working in the vicinity of) any activity where the risk assessment has identified the need for respiratory protection.

RPD's must be selected based on:

- The type(s) of airborne contaminants that are present (gases, vapours, and particulates and aerosols including dusts, fumes, sprays, mists, and smoke);
- The potential particulate size distribution;
- Substance toxicity; and
- The likely concentrations.

Compatibility with the work tasks and other PPE, comfort (as it affects wear-time), and the ability to communicate adequately, must also be considered.

The risk assessment and method statement for the work to be performed, the information contained in the relevant Material Safety Data Sheets (MSDSs), and the results of any air monitoring associated with the substances to be worked with or activities to be carried out, must be used to ensure that the most suitable RPD is selected.

Only RPDs certified to a recognised standard and approved by the nominated project management representative may be used.

Where respiratory protection is required, a respiratory protection programme (applicable to all personnel and visitors) must be implemented.

The respiratory protection programme must include:

- Periodic inspection of RPDs, including before each use;
- Periodic evaluation (by competent persons) of cleaning, sanitising, maintenance and storage practices;

- Performance of positive pressure and negative pressure fit checks by RPD wearers before each use to ensure that the respirator is functioning properly; and
- Training at first issue of an RPD and regular refresher training thereafter in accordance with regulatory requirements or at least once every two years (the training must cover fit testing, use, cleaning, maintenance, filter cartridge replacement, and storage). Training records must be retained.

RPDs must be used, maintained, and stored in compliance with the manufacturer's requirements as well as the respiratory protection programme.

Suitable facilities must be provided for the cleaning and sanitary storage of RPD's.

Hand and Arm Protection

Gloves must be worn when handling or working with equipment, materials or substances with the potential to cause injury or illness.

Suitable gloves must be selected based on the task to be performed and the specific hazard against which the employee requires protection, such as:

- Sharp edges;
- Sharp points and splinters;
- Abrasive surfaces;
- Hazardous chemical substances (toxic, corrosive, sensitising, etc.);
- Extreme temperatures; and
- Viruses, bacteria and parasites

Foot Protection

Ankle covering steel toed boots must be worn at all times whilst on a project site.

Safety boots must provide the following protection:

- Steel toe cap to protect against crushing (impact and compression forces);
- Leather uppers that provide resistance against water penetration and water absorption or and also protects ankles from snakes' bites;
- Slip resistant soles;

And where a risk assessment identifies the need:

- Puncture resistant soles (i.e., steel midsoles) for protection against sharp objects;
- Chemical resistant soles for protection against spilt chemical substances (such as solvents, hydrocarbons, acids, and alkalis);
- Heat resistant soles for protection against hot surfaces or molten metal; or
- Electrical shock resistant soles for protection (insulation) against live electrical conductors.
- Gumboots with steel toe caps must be worn when working in water or very wet conditions

Body Protection

Suitable body protection must be provided as required to protect employees against specific hazards. A range of work activities require body protection in one form or another, including but not limited to:

- Hot work (e.g., welding, burning, cutting and grinding);
- Working with hazardous chemical substances (e.g., acids, solvents, pesticides, etc.); and
- Clean up and disposal of hazardous materials and wastes (e.g., asbestos, hydrocarbons, etc.).

A wide variety of protective garments are available, such as, leather aprons, leather spats, chemical resistant aprons, chemical resistant (or hazmat) suits, and disposable coveralls. Suitable items must be selected to provide protection against the specific hazard(s) to which an employee is exposed. Hazards must be carefully identified and characterised to ensure that the correct protection is used.

Body protection must be sized properly to prevent tearing, the parting of seams, tripping, or restriction of movement.

Sun Protection

The contractor must ensure that all personnel are protected in sunlight through the use of loose long sleeve shirts, long trousers and sun hats. Shade structures must also be made available to all employees.

Electrical Protective Equipment

To reduce the risk of electric shock, electrical insulating equipment appropriate for the voltage that may be encountered must be worn when working on energised electrical installations and when working within two metres of exposed energised conductors.

All rubber electrical insulating equipment (including gloves, sleeves, matting, covers, and line hoses) must be inspected for damage prior to and after each use, and immediately following any incident that can reasonably be suspected of having caused damage.

Rubber insulating equipment with any of the following defects and / or damage may not be used:

- A cut, rip, tear, hole, or puncture;
- Ozone cutting or ozone checking (i.e., the cutting action of ozone on rubber under mechanical stress causing a series of interlacing cracks);
- An embedded foreign object;
- Chemical deterioration (texture changes) such as swelling, softening, hardening, or becoming sticky or inelastic; or
- Any other defect that damages the insulating properties.

Rubber insulating gloves must be electrically tested before first issue and every 12 months thereafter as a minimum. Insulating gloves must also be given an air test along with the daily inspection. Essentially, this involves filling a glove with air and checking for any holes or leakage

Insulating equipment must be stored in such a location and in such a manner so as to protect it from light, temperature extremes, excessive humidity, ozone, and other damaging substances and conditions.

Jewellery

Necklaces, dangling earrings, and bracelets may not be worn on a project site.

No jewellery or other conductive apparel (such as a key chain or watch) may be worn when carrying out energised electrical work.

Task-Specific PPE

In addition to the standard PPE required for a project site (including a safety helmet, safety glasses, safety boots, and high visibility protective clothing), the following task-specific PPE must be used as a minimum by any person carrying out or assisting with such a task:

- Arc Welding – safety glasses and welding helmet (i.e., double eye protection), respiratory protection against the specific airborne contaminants being generated (fumes, gases, dusts, etc.), leather welding gloves, leather apron, leather spats, leather yoke (for work above shoulder height), and knee pads for welders in kneeling positions;
- Gas Welding, Cutting or Brazing – gas cutting or welding goggles with shade 4 filter lenses and full-face shield (i.e., double eye protection), respiratory protection against the specific airborne contaminants being generated (fumes, gases, dusts, etc.), leather gloves (long cuff for welding and cutting, short cuff may be used for brazing), leather apron, leather spats, and leather yoke (for work above shoulder height);
- Grinding – safety glasses or goggles and full-face shield (i.e., double eye protection), hearing protection, respiratory protection where dust or fumes may be generated, leather gloves, leather apron, and leather spats;
- Abrasive Blasting – respiratory protection (air-supplied hood), hearing protection, leather gloves, and leather apron;
- Spray Painting – respiratory protection (air-supplied hood for confined spaces), safety goggles (if the respirator design does not provide this protection), hearing protection (where air compressors are used), chemical resistant gloves, and chemical resistant disposable coveralls.

Visitors PPE

All visitors to wear safety boots, reflective vests and helmets on site. Helmets to be worn when section visited has overhead hazards.

Visitors must be informed to come wearing their own PPE.

Visitors must not be allowed to go to site if PPE requirements are not met. Construction manager and OHS Officer to ensure this compliance is met.

Contractor must inform visitors on PPE requirements before they come to site. Visitors must bring their own PPE to site to avoid sharing of PPE. If the contractor chooses to provide Visitors with PPE, measures to be in place to ensure that such PPE is clean and disinfected.

PPE Policy

PC and Sub – Contractors must have a PPE policy with must outline the following:

- Training on purpose and use of PPE
- Address procedures to be taken when PPE is lost, stolen, worn out, damaged or defective PPE
- Measures to be taken for employees to come to site without issued PPE
- Procedure for issuing visitors with disinfected PPE

7.4 HAZARDS AND POTENTIALLY HAZARDOUS SITUATIONS

The PC must always ensure that works are conducted under safe conditions and environment.

Should a hazardous be identified, works must be stopped, and corrective actions must be applied to ensure safety.

Employees must be encouraged to report condition that seem unsafe to the Safety Representation or Supervisor.

7.5 EXTREME WEATHER CONDITIONS

If the weather condition poses a threat to the health & safety of employees; be it extreme heat, cold, lightning, wet and slippery conditions. The following measures must be in place to address adverse weather conditions:

Heat

Hot areas or activities where employees have experienced or could experience excessive fatigue, muscle cramp, dehydration, dizziness and other symptoms of heat stress must be identified and described.

A thermal stress risk assessment must be conducted in consultation with workers.

The contractor must implement the following measures for works conducted in hot areas:

- Ensure reduction of metabolic heat rate on employees by automation and mechanization of tasks minimize the need for heavy physical work and the resulting build-up of body heat
- Implement administration preventative measure as follows:
 - Allow sufficient acclimatization period before full workload
 - Shorten exposure time and use frequent rest breaks
 - Provide cool – sheltered rest-areas
 - Provide cool drinking water, drinking water to be kept in a cool area
 - If practical, allow workers to set their own pace of work
 - Define emergency procedures. Assign one person trained in first aid to each work shift. Train workers in recognition of symptoms of heat exposure
- Employees to wear loose clothing that permits sweat evaporation but stops radiant heat. Employees exposed to the sun to wear sun hats.

Cold

Cold areas or activities where employees could experience pain or loss of feeling in their hands, severe shivering, excessive fatigue and other symptoms of cold stress must be identified and described.

The contractor must ensure that employees with the following PPE to prevent cold stress:

- Warm clothing for the body.
- Cotton / polyester gloves for cold resistance (such gloves to be worn other gloves required for the task).

Wet Conditions Due to rainy weather

Works must not be conducted on site during rainy weather which has resulted in slippery conditions on the roads and onsite which makes it unsafe.

Thundering Conditions

Changes in weather conditions must be continuously observed on site. When thundering conditions are eminent, works must be stopped and employees must be addressed to take shelter in their rest areas. Taking shelter under poles or tree is prohibited on site.

Visibility

The Construction Manager and the Safety Officer shall ensure that works conducted outside of buildings is not carried out during extreme weather conditions that have resulted in poor visibility. An assessment must be done for tasks during misty/ foggy conditions and works to be suspended in areas that pose risks due to poor visibility until the weather has cleared.

7.6 SITE CLEARANCE ACTIVITIES

All areas where the PC shall be conducting works must be cleared of vegetation and made safe.

Method statement for site clearance must be provided.

Safe working procedures to be in place.

Safe and compliant vehicles, equipment, and hand tools to be used for the tasks, inspection records to be in place.

Where tree felling shall be conducted, method statement and safe working procedure for tree felling to be provided. Tree felling must be conducted by adequately trained and competent personnel. Employees operating chain saws to be competent and wear leg protectors, earmuffs, leather gloves and hard hats.

Emergency procedures for encountering the following animals during site clearance must be in place:

Snakes

- Emergency training and awareness must be provided on types and dangers of common dangerous snakes in the Kwazulu Natal area i.e.:
 - Cape cobra
 - Black mamba
 - puff adder
 - berg adder
 - boomslang
 - rinkhals
 - black spitting cobra
- Employees must be trained on the following regarding snake encounter.
 - Treatment for snake bite requires snake to be properly identified and employees must be trained on this, pictures of snakes must be displayed at the site office notice board;
 - Risk of exposure and prevention;
 - Signs and symptoms of snake bites;
 - What to do in case of a snake bite;
 - Emergency procedures for snake encounter;
 - First aid procedures for snake bites;
- Hospital where polyvalent antivenom can be found must located as per emergency procedures of the snake.

Other animals such as scorpions, beehives, ticks may be encountered during site clearance. Emergency procedures for encountering and attacks by these animals must be provided on the file.

7.7 LONE WORK

A lone worker is an employee who performs an activity that is carried out in isolation from other workers without close or direct supervision. Such staff may be exposed to risk because there is no-one to assist them. Lone work is therefore forbidden on site.

7.8 PLANT AND EQUIPMENT OPERATION

7.8.1 Selection / Suitability

The construction vehicle and plant selected for the works must be able to be driven without any risks in consideration to site terrains which may contain sharp inclines and declines. Before any plant is selected and used to carry out an activity, it must be checked for its suitability for the task, e.g., accessories available, boom length, reach capability, safe working loads.

Construction plant and vehicle selected for operations in the wet environment which includes construction of the coffer dam must be designed to safely operate in wet and muddy environment without safety risks.

All light duty vehicle to be fitted with buggy whips to ensure visibility to attenuated dump trucks and other construction plants.

All construction vehicle and plant operations to comply with CR 23 requirements.

7.8.2 Speed Restrictions and Protections

The maximum speed limit for construction vehicle and plant at the work stations shall be limited to 20 km/h. Compliance shall always be as per signage displayed per section. Construction Manager may in consultation with the Agent and Project Manager allow for speed to be increased to 40 km/ hour after conducting a risk assessment

Vehicle movement routes on site must be clearly indicated through signage. Signage to ensure the safe movement of vehicles, as well as to ensure the health and safety of all employees and public around site must be displayed in strategic locations.

Construction vehicle on public roads must comply with requirements of National Roads Traffic Act, 1996.

7.8.3 Safe Parking

Contractor to designate parking areas for all construction plan and vehicle. Such areas must be fenced off and be provided with security (warm body at night). All construction plant and equipment should be parked in a safe and designated area when not in use. The following should always be in place:

- The hand parking brake must always be engaged when vehicles are parked.
- Buckets, lifting gear, loads, etc should also be lowered to the ground and keys should be removed from the ignition and stored safely.
- Wheel stoppers must be applied when trucks are parked without operators in them.
- Light duty vehicles parked in sloppy conditions to also apply wheel stoppers.
- No cars or construction vehicles should be left alone with running engines.

7.8.4 Overhead Lines

The operation and movement of plant and equipment under / close to overhead lines can be dangerous. Where the cables are live, suitable and appropriate measures must be put in place to ensure that construction plant or loads do not touch or come within the arcing distance of the overhead lines.

The PC must treat all electrical cables or equipment as live.

Employees may not carry any equipment vertically when in the railway line vicinity or even near railway lines as it poses the risk of being in contact with overhead lines.

Employees carrying equipment to site may only carry equipment horizontally and if the equipment is too long, they shall ensure that 2 or more employees assist in carrying the equipment horizontally.

Typically, warning goal posts with associated signs should be erected 100 meters either side of the lines. Any passing plant must only access under the lines via the goal posts.

7.9 EXCAVATIONS

Prior conducting any excavation, a detailed risk assessment taking into consideration the depth and the type of soil as per Geotechnical Reports must be conducted. Method statement must be provided for all excavation's deeper than 1.5 meters.

All excavations must be carried out as per CR 13

All excavation work has to comply with the following:

- Excavation work must be carried out under the supervision of a competent person with experience in excavation work who has been appointed in writing
- Before excavation work begins the stability of the ground must be evaluated
- The location and nature of any existing services must be established before any excavation is commenced with and any service that may be affected by the excavation must be addressed as per Engineer's specification.
- Whilst excavation work is being performed, the PC must take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material.
- Excavation's deeper than 1.5 meters must be maintained safe comply with CR 13.2
- No person may be required or permitted to work in an excavation with a risk of collapsing that has not been adequately shored or braced.
- Shoring and bracing design must be approved by an Engineer and be constructed to safely support the sides of the excavation and prevent it from collapsing
- Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist must be obtained whose opinion will be decisive. The opinion must be in writing and signed by the engineer or technologist as well as the appointed excavator
- Neighbouring roads that may be affected or endangered by the excavation must be suitably protected; no vehicle / plant or vehicle shall come 1 meter to the edges of excavations.
- Excavated material to also be kept 1 meter from excavation edge.
- Loose material excavated material and stones that could fall from the overhead excavations to be removed and be kept at minimum of 1 meter away from the edges.
- Excavations to be maintained safe and water to be drained away from the face and be mechanically pumped out from inside the excavations continuously.
- Excavations deeper than 1.5 meters must be accessed using a ladder.

- Every excavation, including the shoring and bracing or any other method to prevent collapse, must be inspected by the appointed competent person as follows:
 - Daily before work commences
 - After every blasting operation
 - After an unexpected collapse of the excavation or part thereof
 - After substantial damage to any support
 - After rain
- The results of any inspections must be recorded in a register kept on site
- Every excavation that is deeper than 1.5 meters / any excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, must be adequately barricaded or fenced off to at least 1.1 meters high.
- Excavation less than 1,5 meters deep which are within the fence site must be demarcated using danger tape.
- Vicinity of the excavation must display signage indicating of open excavations.

7.10 EDGE PROTECTION

All open edges from above 1.5 meters must be guarded with suitable guards that are strong enough to restrain a fully grown human from falls. Open edge protection must be a minimum of 1.1m high and be clearly visible.

Vehicles and plant must keep 1 meter away from open edges. Method statements to be provided for works that may require construction vehicles or plant to work in near open edges.

All edges that may be deemed by the Health and Safety Specialist pose safety risks must be provided with protection.

7.11 TEMPORARY WORKS

The PC must ensure that the provisions of CR 12 are adhered to for temporary works to be conducted on site.

All temporary works must be designed by a competent Engineer appointed as Temporary Works Designer as per CR 12.1.

Design for temporary works shall be as per Client's specifications.

Ground conditions where temporary works structure is to be erected must be tested by a competent person and recommendations implemented.

Temporary works drawings or any other relevant document including construction sequences and methods statements per structure must be kept on site. Drawings to be displayed at the site office.

Temporary works structure must be erected under supervision of a trained and competent Temporary Works Supervisor as per CR 12 (2) who shall ensure that the structure it is stable on the ground and support vertical and lateral loads exerted on them without risk of collapse.

All persons required to erect, move or dismantle temporary works structures must be provided with adequate training and instruction to perform those operations safely.

All equipment used in temporary works structure must carefully examined and checked for suitability by a competent person, before being used.

A contractor must ensure that, all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that temporary works is not designed to withstand. Provision must be made for safe access and egress to temporary works as per site working at heights and fall protection plan.

If after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it must be safely rectified or reinforced immediately as per temporary works designer and site engineer's recommendations.

Casting of concrete on temporary works shall only be conducted once the Temporal Works Supervisor has inspected the structure and authorised in writing.

Temporary works structure must be inspected by the Temporal Works Supervisor immediately before, during and after concrete placement, after inclement weather or any other imposed

load on a daily basis until temporal works structure has been removed. Results must be recorded in a register kept on site.

Temporal works shall only be removed once the Temporal Works Supervisor has authorised in writing that the concrete has acquired sufficient strength to support its own weight and imposed loads.

All certificates and inspection records must be kept in the safety file.

7.12 LIFTING AND TACKLING

The PC and Sub-Contractors must ensure that lifting and tackling is conducted in a manner approved by the Engineer. Risk assessment, method statements and safe working producers must be provided and approved for all lifting and tackling tasks.

Lifting equipment must be designed and constructed in accordance with the manufactures/designer's specifications as well as generally accepted technical standards and operated, used, inspected and maintained in accordance with the manufactures requirements as well as that of the Driven Machinery Regulation 18 of the OHS Act.

The PC and Sub-Contractors must ensure that all lifting Cranes operations are in compliance with CR 22 in addition to compliance with Driven Machinery Regulations, 2008.

The following requirements as per Driven Machinery Regulations must be complied with:

- The lifting equipment must be operated by a competent person who has valid the medical fitness certificate.
- Lifting equipment must be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the table of maximum loads should be used by the driver/operator.
- Lifting equipment fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML.
- Every hook or load attaching device must be designed such or fitted with a device that will prevent the load from slipping off or disconnecting.

- Every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the manufacturer's prescription or to 110% of the MML.
- All ropes, chains, hooks or other attaching devices, sheaves, booms, outriggers and pads, brakes, load indicating device, safety devices forming an integral part of a lifting machine must have test certificates not older than 3 months.
- All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book

Qualified slinger & signallers must be appointed for ensuring safe load hooking, guiding load, landing and unhooking loads. They must communicate effectively using approved signalling techniques with the operator of the lifting crane / truck. No lifting operations shall be conducted without slinger / signaller in place.

Section where lifting operations are taking place must be barricaded. Only authorised personnel shall be allowed in the area.

Before a lifted load is moving, a siren must sound to alert all personnel in the area and it should stop when the load has been positioned.

7.13 CONCRETE WORKS

Works to be planned accordingly; temporary works and reinforcement steel to be completed and certified by a competent person before any placement of concrete is done.

Method statement for the works to be provided.

Traffic management plan for the activity to be developed, considering truck routes and parking.

OHS files for the concrete supplier to be approved before the day of the task.

Ground conditions where the pump trucks shall be positioned to be stable, be able to withstand vibrations without safety risk and be approved by a competent person.

Inspection to be done on the done on the structure before concrete pouring.

Personnel involved in the operation to wear PPE; reflective vests, gum boots, long rubber gloves, waterproof aprons, hard hats and goggles. Only authorised, trained and instructed personnel to be allowed in the area.

Operations must be done under supervision and a spotter & signaller who shall clearly communicate with the pump operator to be provided.

When concrete requires to be vibrated, vibrator to be suitable, be inspected for safety before use and be operated by a competent person.

Cleaning of concrete splashes and concrete trucks must be done in compliance with the project's EMPr.

Method statement and safe working procedures for onsite mixing of concrete must be provided when this mixing is to be done on site. Employees working with cement to wear dust masks, steel toed gum boots and all PPE requirements as per MSDS to be met.

7.14 STRUCTURES

A contractor must ensure the following is in place to ensure safety of structures as per CR 11:

- All reasonably practicable steps are taken to prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;
- No structure or part of a structure is loaded in a manner which would render it unsafe; and all drawings pertaining to the design of the relevant structure are kept on site and are available on request to an inspector, other contractors, the client and the client's agent or employee.
- Inspections of the structure are carried out periodically by competent persons in order to render the structure safe for continued use.

- Completed structures are inspected at least once every six months for the first two years and thereafter yearly.
- The structure is maintained in such a manner that it remains safe for continued use.
- The records of inspections and maintenance are kept and made available on request to an inspector.

7.15 WORKING AT HEIGHTS

All applicable legislation concerning work performed from an elevated position must be complied with at all times.

Fall protection measures must be in place as per CR 10 whenever the potential exists for a person to fall from elevated position of 1.5 meters or more.

7.15.1 Fall prevention

Risk Assessment and Permitting

Prior to commencing with any work at height, an assessment must be conducted to determine if the work requires the use of fall protection equipment, and if so, which fall protection system is the most appropriate for the work.

The following documentation is required for any work where fall protection is required (i.e., where a risk of falling exists):

- A Risk Assessment for the task to be performed;
- A Fall Protection (and Rescue) Plan;
- A Safe Work Procedure for the task to be performed; and
- As part of the Risk Assessment and planning processes, the following must be considered:
 - Hazards relating to accessing the location at height;
 - The nature of the work location;
 - The nature of the work activities to be undertaken at height;
 - Environmental and weather conditions;

- The presence of nearby persons who may be at risk due to falling objects (potentially) or who's activities may be affected by the work being performed at height;
- The selection of fall protection equipment (considering fall clearances) and / or access equipment;
- The selection of anchorage points;
- The load ratings of access platforms (scaffolding), work areas, anchorage points, life lines and etc.;
- The condition of supporting structures
- Exposure to heat sources;
- The use of a mobile elevating work platform, man basket, or boatswain's chair; and
- Any other conditions that may affect the safe execution of the task.

Work platform

All work platforms and walkways elevated 2 metre or more must have complete floors, and edge protection must be in place in the form of toe boards and sturdy guard rails properly secured (i.e., bolted, welded, clamped, etc.) to prevent accidental displacement. Safe means of access and egress must be provided.

Guard rails must be capable of withstanding a force of at least 150 kilograms applied in any direction at any point.

The top rail must be positioned at a height of 1.1 metre above the working surface, and a mid-rail must be provided.

Floor openings, holes and edges

Any opening or hole (temporary or permanent) in a floor, platform or walkway must be protected by sturdy guard rails or a cover to prevent a person from stepping into or falling through the gap. Covers must be strong enough to support the loads that will be imposed on them and must be secured to prevent accidental displacement.

Fall Protection

Whenever there is a risk of falling from a position which is elevated by 1.5 metres or more or whenever work must be carried out within 1.5 metres of an opening through which (or an edge over which) a person could fall, no work may commence unless:

- Fall protection by physical barrier / fall rescue plan is in place (prepared by a competent person, who is appointed in writing).
- A detailed task-specific risk assessment has been carried out;
- A safe work procedure is in place for the task to be performed;

Fall Arrest Equipment

The use of fall restraint or fall arrest systems must be avoided wherever and whenever possible through the installation of physical barriers that protect persons from falling. Only if physical barriers protecting against free falls at heights 1.5 meters or more cannot be installed must fall protection equipment be used.

Fall protection (fall restraint or fall arrest) systems are items of personal protective equipment and, if required, must be purchased, installed and provided to employees.

There must be a system for ensuring that fall protection equipment is:

- Tested and certified for use;
- Inspected by the user before use; and
- Destroyed following a fall or where inspection has shown evidence of excessive wear or mechanical malfunction.

Approved full body harness with two shock absorbing lanyards or two short restraining lanyards and secure anchorage points (and lifeline) must be provided as fall arrest equipment.

When selecting fall arrest equipment, care must be taken to ensure that the potential fall distance is greater than the height of the person plus the length of the lanyard with its shock absorber deployed (taking the height of attachment into account).

Anchorage points must, where practical, be above the head of the person, and must ensure that in the event of a fall the person will neither swing nor touch the ground.

All anchorage points and lifeline systems must be designed and approved by a professional structural engineer.

All persons that are required to work at height must first be trained and certified competent to do so. Furthermore, each person must be in possession of a valid medical certificate of fitness specifically indicating that the person is fit to work at height.

All persons required to use personal fall protection equipment must be trained and certified competent in the correct selection, use, maintenance and inspection of such equipment.

All fall protection equipment must be thoroughly inspected on a monthly basis by competent persons appointed in writing and each item of equipment must be tagged to show when it was last inspected. All inspections must be recorded in a register.

On finding defective or damaged equipment, appropriate action must be taken by the competent person (i.e., the destruction of the equipment to prevent further use).

Persons making use of personal fall protection equipment must do so in strict accordance with the instructions or requirements specified by the manufacturer or supplier of the equipment or system.

Specific pre-use inspection, maintenance and fitting protocols must be established in accordance with the manufacturer's requirements or guidelines and these protocols must be followed by all users of the fall protection equipment.

Competent supervision must be in place at all times for all work carried out at height. Supervisors must be appointed in writing.

Emergency response (rescue) procedures for the rapid retrieval of suspended persons in the event of a fall from height must be prepared and tested.

No person required to use personal fall protection equipment may work in isolation (a minimum of two persons working together is required).

A person may climb or descend a ladder without fall protection provided that he is able to use both hands and legs to do so, faces the ladder, and uses one step at a time. The ladder must be tied off or supported at its base.

Prior to any roof work being performed, or prior to persons accessing a roof, a structural engineer must verify that the roof is of sound construction and that it is capable of supporting the weight of the persons as well as any equipment that may be required. Should the engineer's findings be to the contrary, alternative methods of performing the work must be found.

Elevating Work Platforms

Before hiring or purchasing an elevating work platform (e.g., a scissor lift, man lift, boom lift, cherry picker or similar equipment), the certification of the equipment (with regard to suitability of design and construction) must be verified.

Before using an elevating work platform, it must be verified that the equipment is in good working order and has been serviced regularly. The service record and instruction manual must be kept on site. A system must be in place to ensure that the equipment is maintained and inspected as required by the manufacturer and / or local regulations.

Load bearing capacity must be displayed.

Operators must be formally trained through an accredited training provider and certified competent in the operation of the equipment.

Before using an elevating work platform, the operator must inspect the equipment and a pre-use checklist must be completed.

A mobile elevating work platform must not be driven unless the “basket” has been lowered and secured in a stable position.

An elevating work platform must only be operated on a firm surface with the outriggers extended (where fitted).

An elevating work platform must not be operated on a grade or slope beyond the capability of the machine (every mobile elevating work platform that is used must be fitted with an inclinometer which sounds an audible alarm before the maximum safe incline has been reached).

The area beneath the “basket” and the boom must be barricaded.

A second competent operator of the mobile elevated work platform to be in place on the ground level – to ensure that the elevated work platform could be lowered in case of an emergency.

A spotter must be used at all times when moving a mobile elevating work platform and when the “basket” is in an elevated position.

Falling Objects

In the process of planning work activities, the risks associated with falling objects (i.e. materials, tools or equipment) must be assessed and appropriate control measures must be identified, implemented, and monitored taking the following hierarchy of controls into consideration:

- Preventing objects from falling – by using containment sheeting, lanyards to secure tools (to a person or to the structure), ropes or chains to secure equipment (to the structure), lift boxes, cages, etc. and by properly securing loads when lifted by crane or hoist;
- Protecting people from falling objects – by establishing barricaded exclusion zones, installing catch platforms or catch nets, displaying warning signage, and posting safety watchers and / or traffic controllers; and
- Personal Protective Equipment (particularly safety helmets and safety boots) – protective equipment is a last line of defence and must be worn.

Where overhead work is being carried out, barricading must be erected around the work area (at the level at which the work is taking place and at every level below including ground level) to prevent persons from entering such an area and potentially being struck by falling objects.

Wherever hazards related to falling objects exist, appropriate warning signage (i.e., “overhead work in progress” and “no unauthorised access”) must be prominently displayed.

No items are permitted to lie loose in elevated positions (e.g., nuts and bolts must be securely stored) and good housekeeping standards must be maintained at all times.

No tools, equipment, material, debris, waste, etc. may be dropped from height. Objects must be lowered or chuted to ground level in a safe and controlled manner.

7.15.2 Scaffolding

Training, Competency and Supervision

Scaffolding used on site must comply with SANS 10085 standards.

Scaffolding must be designed by a competent person to ensure calculations of safe working loads and maximum permissible heights. Scaffolding designs must be available on site.

Scaffolding may only be erected, maintained, altered or dismantled under the strict personal supervision of a competent Scaffolding Supervisor (or Scaffolding Inspector) who has been appointed in writing.

Scaffolding may only be erected, maintained, altered or dismantled by competent and appointed Scaffolding Erectors. It is the Scaffolding Supervisor's responsibility to ensure that all persons carrying out such work are suitably trained and experienced.

A certificate of competency issued by a SAQA accredited and approved training provider must be produced for each Scaffolding Supervisor and each Scaffolding Erector.

Erection and Dismantling of Scaffolding

Surface which scaffolding shall be erected must be approved by the Scaffolding Supervisor. Where doubt exist, approval from professional engineer must be obtained.

Methodology and safe working procedure to be provided for scaffolding erecting must be provided. Stability of the scaffolding to be maintained at all times, which included during erecting, bracing and dismantling.

Only approved scaffolding components may be used to erect a scaffold. Scaffolding must be erected, modified and used in accordance with the manufacturer's guidelines or recommendations, and in strict compliance with standards and design.

Each person erecting, maintaining, altering or dismantling scaffolding must use fall arrest equipment at all times (i.e., a full body safety harness with two shock absorbing lanyards fitted with scaffold hooks). The work must be planned to enable every Scaffolding Erector to be securely anchored and lifelines at all times.

The area around the base of a scaffold must be barricaded to prevent unauthorised access into the work area. When scaffolding is erected or dismantled on a level, platform, or floor lying above ground level and the potential exists for components to fall to levels below the level on which the scaffolding is positioned, then the area directly below the scaffolding on each of those levels must also be barricaded. Appropriate warning signage (i.e., "overhead work in progress" and "no unauthorised access") must be prominently displayed.

Methodology for safe lifting scaffolding components must be in place. Hoists, lifts and approved material baskets must be used (where available) to lift scaffolding components to elevated positions.

No scaffolding components, tools, or any other material may be dropped from height or thrown from one level to another. Components, tools and materials must be lowered or lifted in a controlled manner. Use may be made of a chute.

Each tool must be secured to the wrist, harness or structure by means of a lanyard. A tool bag (around the waist or over the shoulder) may be used for carrying tools up and down a scaffold structure. Tools or equipment may not be carried by hand up or down a structure, as both hands must be used for climbing. If necessary, a rope must be used for lifting or lowering tools or equipment.

While a scaffold is being erected or dismantled, no scaffolding components may be stacked on the scaffold structure unless it has been designed for that purpose. Any loading of a scaffold structure must be authorised in writing by a structural engineer.

Scaffolding may not stand on steel grating unless the grating is adequately supported from below. Scaffolding must rather stand on the structure that supports the grating.

Before scaffolding is erected in close proximity to an electrical installation or live conductors, an electrical engineer must inspect the area and determine whether or not the scaffolding must be earthed. Should the scaffolding require earthing, this must be done as soon as possible while the scaffolding is being erected.

Scaffolding may not be erected if it is raining or in strong winds.

Scaffolding must not be:

- Left partially erected or partially dismantled except for normal work stoppages (for example, over weekends) and with approval of the scaffolding supervisor
- Left in an unsafe condition (if scaffolding is unavoidably in an unsafe condition, barricading must be in place to prevent unauthorised access and the required red tags must be prominently displayed on the scaffold structure); or

- Moved or altered while work is in progress.

Mobile scaffolding must be equipped with brakes, which must be engaged at all times when the scaffolding is in use. A scaffold may not be moved if any person is on the structure.

Safe Scaffolding Access

Safe and convenient access must be provided to every scaffold platform by means of properly installed ladders or approved stairways, which must remain unobstructed at all times.

Climbing up or down a scaffold on the braces or ledgers is forbidden.

All ladders used to access scaffolding must be securely attached to the scaffold structure.

Hook-on and attachable ladders must be specifically designed for use with the type of scaffolding being used.

If a ladder is used to access a scaffold platform at a height greater than 1.5 metres above the ground, then the ladder must be secured internally (i.e., within the scaffold structure) and there must be an opening (closed with a trap-door) in the platform at the top of the ladder.

If the scaffold platform is at a height of less than 1.5 metres above the ground, then the ladder may be attached externally provided the guard rails around the platform are modified to allow access (the opening in the guard rails must be kept closed using a self-closing gate). No person may climb over or through the guard rails to gain access to a platform.

If a vertical ladder used on scaffolding is more than 5 metres in length it must be equipped with a ladder cage extending from a point 2 metres from the base of the ladder to a height of 1 metre above the platform (or the uppermost platform) that the ladder is providing access to.

Circular ladder cages must have an internal diameter of no more than 700mm. Square ladder cages must have internal dimensions of no more than 700mm by 700mm.

The requirement for a ladder cage may be waived if platforms are provided at height intervals not exceeding 4 metres, with the vertical ladder secured on the inside of the scaffolding framework and an opening (closed with a trap-door) in each platform.

Vertical ladders must be braced at three metre intervals (as a minimum) to prevent undue movement.

All vertical ladders providing access to a platform must be left in place for as long as the scaffold remains in place and must be inspected as part of the scaffold structure.

Any deviation from the requirements stipulated above must be subjected to a risk assessment and the Construction Supervisor must authorise the deviation in writing.

Scaffolding Platforms

Safe working platforms must be provided.

Every work platform must be complete (i.e., from ledger to ledger in order to prevent personnel, materials, tools, etc. from falling through the platform.

Every work platform must be constructed from manufactured steel scaffold boards of equal thickness. Timber boards are not permitted under any circumstances.

Each steel scaffold board must be securely hooked (fastened) onto the ledgers or transoms that support it.

On all sides except the one facing the structure, every scaffold platform must be provided with:

- Sturdy guard rails positioned 500mm above the platform floor (the mid rail) and 1100mm above the platform floor (the top rail); and

Steel toe boards that are at least 150mm high and securely attached such that no gap exists between the toe boards and the platform floor.

Scaffold platforms must be as close to the structure as is practicable (but not closer than 75mm)

Scaffold platforms must, at all times, be kept free of waste, protruding objects, and any other obstructions. Platforms must be cleaned if necessary, to ensure that they are maintained in a non-slip state.

Inspection of Scaffolding

Scaffolding to be inspected after erecting for safety, a green tag (displaying the words, "Scaffold Safe for Use") or a red tag (displaying the words, "Danger: Do Not Use Scaffold") must be prominently displayed on each scaffold at all times. The tag must be positioned close to the base of the ladder or staircase provided for safe access.

As a minimum, a green tag must display the Scaffolding Supervisor's name, load bearing capacity, the date that the scaffold was erected, and the date that the scaffold was last inspected.

Hand over certificate to be issued by Scaffolding supervisor to Construction supervisor per scaffolding before use.

Only an appointed Scaffolding Supervisor may attach, change, update the information on, or remove these tags.

Scaffolding must thereafter be inspected weekly, after inclement weather and after altering and records must be kept on the file.

A record of each inspection (date and time of inspection, location of scaffolding, findings, etc.) must be captured in a register. The register(s) must be maintained by the Scaffolding Supervisor(s) carrying out the inspections.

Using Scaffolding

The Contractor must inspect the erected structure prior to acceptance and must ensure, as far as is reasonably possible, that the scaffold is safe and fit for purpose before allowing his team to make use of the scaffold.

In particular, the user must ensure that:

- The scaffold and the platforms have been constructed to meet the loading requirements of the work that is to be carried out (the Scaffolding Supervisor must be consulted in this regard);
- The Scaffolding Supervisor has checked that adequate ties and braces are in place;

- The work platforms are in the correct positions and are complete with toe boards and guard rails;
- Safe and convenient access has been provided (ladders and / or stairways); and
- A green (“Scaffold Safe for Use”) tag has been attached to the scaffold by the Scaffolding Supervisor.

Use of an incomplete or unsafe scaffold is prohibited.

Unsteady or non-rigid scaffolds must not be used and inadequacies must be reported to, and rectified by, the responsible Scaffolding Supervisor.

The user of a scaffold must ensure that every person in his team is aware that no alterations to the scaffold may be made by the team during the course of their work, and that if any alterations are required, they must be made by competent Scaffolding Erectors under the supervision of an appointed Scaffolding Supervisor.

A scaffold may not be used:

- If a red tag is displayed indicating that the scaffold is not safe to use; or
- During inclement weather, defined as wind speeds greater than 40km/h, thunderstorms, or heavy rain (in excess of 40mm/h).

With due consideration of possible educational limitations, the contractor must ensure that all persons understand what green and red tags mean.

The area around the base of a scaffold must be appropriately barricaded to prevent unauthorised access into the work area. Appropriate warning signage (i.e., “overhead work in progress” and “no unauthorised access”) must be prominently displayed.

Loose tools and / or materials on scaffold platforms must be secured using lanyards, wire or fibre rope, or must be placed in secured containers.

Where appropriate, “catch nets” deemed may be installed as an additional safety measure to prevent materials or tools from falling to the ground.

The storage or placement of materials on scaffolding platforms must be kept to a minimum. Debris as well as tools and materials that are no longer required must be removed from all working platforms at least once per day.

Scaffolding platforms must be cleaned regularly.

A heavy load may not be placed on a scaffolding platform unless the scaffold has been designed and constructed specifically for that purpose. Any loading of a scaffold structure must be authorised in writing by a structural engineer.

Scaffolds may not be used as hoisting towers or to support piping or equipment.

Each person working from scaffolding must wear fall protection (i.e., a full body safety harness with two shock absorbing lanyards fitted with scaffold hooks) and must be securely anchored at all times.

All work must be carried out from properly constructed work platforms. Standing on railings or braces in order to perform work is forbidden.

Where work on an electrical system is to be undertaken from a scaffold, an electrical engineer (employed by Project or the client) must determine whether or not the scaffolding structure requires bonding and earthing. The scaffolding may not be used until this has been determined, and if required, until the structure has been bonded and earthed.

Storage of Scaffolding Components

All scaffolding components must be stored in a demarcated storage area in such a manner that they are not exposed to environmental extremes and will not cause injury to persons. Suitable barricading / demarcation must be erected to prevent unauthorised entry to scaffolding storage area.

Each scaffolding stack must be stable and components must be neatly placed to ensure that no ends protrude into any pathway. The various components must be stacked separately.

Any storage area for scaffolding components must be positioned such that it will not interfere with any onsite activity (including the operation of any plant or equipment), block any access

way, or obstruct access to any plant or equipment. Before establishing a storage area, the location must be agreed with the nominated project management representative.

7.15.3 Ladders

All ladders used on site must be of sound construction and adequate strength. Ladders must comply with GDR 13A requirements.

The use of makeshift ladders is forbidden.

All ladders must be numbered, listed in a register, and inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register).

Before using a ladder, the user must inspect it for damage.

Ladders with missing, broken, cracked or loose rungs, split stiles, missing or broken spreaders (stepladders) or any other form of damage or defect may not be used.

A damaged ladder must be removed from service (and tagged, "out of service") without delay and must then either be repaired (if possible) or destroyed to prevent further use.

Safe working procedures for use of ladders must be communicated to personnel.

Ladders may only be used as a means of access and egress. The use of ladders as working platforms is prohibited, except for inspection and carrying out minor tasks (i.e., light work and short duration).

All portable ladders must be fitted with non-skid safety feet (or some other means to prevent the base of the ladder from slipping) and the feet must always be placed (stand) on a firm level surface.

The use of bricks, stones, wood or any other material to level the stiles of a ladder is prohibited.

Ladders may not be placed on movable bases such as boxes, tables, etc.

The base or foot of a ladder must always be secured to prevent it from slipping. The ladder must be held by an assistant if the base cannot be secured in any other way (e.g., tied off).

A straight ladder must extend at least one metre above its support (or above the working platform that it is providing access to). The top of the ladder must be tied off (or otherwise secured to its support) to prevent accidental movement.

A straight ladder must be placed at a safe angle, i.e., tilted at a ratio of approximately 4:1, meaning that the base of the ladder must be one metre away from the wall (or other vertical surface) for every four metres of height to the point of support.

A stepladder may never be used as a straight ladder. A stepladder must be opened fully and the spreaders must be locked securely.

When using an extension ladder, at least four rungs must always overlap at the centre of the ladder.

Ladders may not be joined together unless they have been specifically designed and manufactured for that purpose.

A ladder may not be placed against a window, glass or any other material which is unlikely to withstand the force exerted on it by the top of the ladder.

Materials and / or equipment may not be placed in close proximity to the base or landing of any ladder.

When ascending or descending a ladder, a person must always face the ladder and use both hands.

Nothing may be carried up or down a ladder if it prevents the person from holding on to the ladder with both hands. Tools must always be properly secured. This can be achieved by attaching them to the wrist using lanyards or placing them in a tool belt around the waist. Tools and materials may also be carried in a bag over the shoulder or hoisted to the landing using a tool bag and rope.

Only one person at a time may use (i.e., be positioned on) a ladder.

No person may stand or step above the third rung from the top of a straight ladder or above the second highest step of a stepladder.

Overreaching from a ladder is prohibited. If the target is not within comfortable reach, the person must climb down and reposition the ladder.

No person may run up or down a ladder, or jump from the lower rungs or steps to the ground.

All ladders must be properly maintained and cared for.

Ladders must be stored under cover and should be hung in a horizontal position from several brackets.

No ladder may be left lying on the ground or be left exposed to the weather. A ladder left lying on the ground presents a tripping hazard and it may be damaged by vehicles running over it.

No ladder may be left in such a position where it may fall over, be accidentally knocked over, or be blown over by the wind.

Ladders may not be painted, as the paint may conceal damage, defects, labels or other markings.

Ladders must be kept clean, as dirt may conceal damage or defects. Oil or grease accumulation on the rungs of a ladder may cause a person to slip.

Before making use of a ladder, each person must make an effort to remove mud, oil, grease, etc. from his boots.

7.16 CONFINED SPACE

A confined space is a space with limited entry and egress. Examples of confined spaces on site include the interior of a storage tank, pipelines and tunnels; occasionally entered by maintenance workers but not intended for human occupancy. Hazards in a confined space often include harmful dust or gases, asphyxiation, submersion in liquids or free flowing granular solids, combustible or flammable substances. Confined spaces entry points must be secured (locked) to prevent unauthorised entry.

Safe working procedures must be developed for entering confined space. The safe working procedure should address the following:

- Identifying work area as confined space.
- Hazard identification before entering space which includes testing for gases, any liquids or solids substances that are present or could gain entry during maintenance.
- Monitoring plan; monitoring plan for entering confined space must be in place, i.e., tags at the entrance with name of person entering, safety watch of the confined space and radio communication
- Rescue plan; plan for rescuing a person in confined space must be addressed i.e., using of safety harnesses. Rescue personnel must be physically capable of carrying out a rescue.
- PPE issue; suitable PPE as per hazard identification must provide and be in good working order.

- Training; person entering confined space must be trained on hazards associated with works, safe working procedure and PPE use.
- First aid and emergency plan for entering confined space must be in place. First aid must be readily available in the workstation and communications must be available at the worksite to emergency response organizations i.e.; Fire Department, Ambulance
- Entry permit; competent person designated by the Contractor to issue entry permits for entering confirmed spaces after ensuring that all above safety requirements are adhered to. Entry permit to indicate name of the person entering space, description of work, communication used, date, time and duration of work.

7.17 LOCKOUT PROCEDURES

Lockout procedure is a planned safety procedure which involves turning off the energy supply of machinery and equipment to ensure safety. This procedure protects workers from the risks posed by live machinery or electricity.

The Contractor should develop set of procedures to cover the requirements of lockout i.e., during the following operations:

- Servicing and/or maintenance of plant, machinery, equipment and electricity
- During breakdowns
- During parking and/or or not using of plant, equipment and machinery
- Prior commissioning of systems, areas
- Refuelling
- Inspections / checklists
- Leaving cab

The contractor must ensure that the following steps for lockout procured are adhered:

- **Pre-lockout** starts with the issue of a lockout work permit by the responsible person. This is followed by the drawing of locks and keys, deactivating the equipment or process through conventional or other means and the securing of the lock on the lockout device. This is accompanied by the completion and hanging of the tag on the lock. This tag must show who is working on the machine and the date on which the lockout was done. It also makes it easy to see if the lockout is currently in use.
- **Mid-lockout** continues by ensuring that the correct control has been locked effectively disconnecting the power. Secure the key on the person who performed the lockout and start the maintenance or other work. This stage continues until all work is

complete.

- **Post-lockout** begins with a thorough inspection to remove all tools, loose parts and other maintenance equipment. Replace all the machine guards and other guards. Personnel must all be accounted for and be clear of all moving or hazardous mechanisms. Power is then restored and the necessary tests carried out before resuming normal operation

7.18 GENERAL MACHINERY

The PC must ensure compliance with the GMR,1988 and amendments thereto, which include inspecting machinery regularly, allowing for and appointing a competent person to inspect and ensure maintenance, allow for supplying and issuing PPE and allowing for training those who use machinery.

7.18.1 Portable Electrical Tools

The PC must ensure that all electrical tools, electrical distribution boards, extension leads, and plugs are kept in a safe working order.

The PC must allow for and ensure the following:

- That a competent person undertakes routine inspections and records are kept on site.
- That only authorized trained persons use the tools.
- That safe working procedures apply.
- That awareness training is carried out and compliance is enforced at all times.
- That PPE is provided and used.
- Tools are inspected by a competent person monthly and records are kept in the register.
- Users inspect the tools daily before use and report any faults.

7.18.2 Compressed Gas Cylinders

The contractor must establish a suitable storage area for oxygen, acetylene, LPG and argon cylinders in compliance with the following requirements:

- The storage area must be located at least 10 metres away from any building, and must be well ventilated;
- The storage area must have a concrete floor;
- The storage area must be enclosed using wire mesh fencing (as this will ensure adequate ventilation). This enclosure must be kept locked. Access into the storage area must be limited and controlled;
- A protective covering or roof must be fitted to the enclosure to provide shade;
- The enclosure may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials at all times;
- Appropriate warning signage (i.e., “no smoking” and “no naked flames”) must be prominently displayed on the enclosure;
- A 9kg dry chemical powder fire extinguisher must be mounted near the entrance to the enclosure
- If electrical lighting is required, it must be of an approved intrinsically safe type;
- Oxygen, acetylene, argon and LPG cylinders must be stored separately in the enclosure. Furthermore, full and empty cylinders must be separated. Separate storage sections must be clearly designated within the enclosure for the different gas types, and for full and empty cylinders, i.e., oxygen – full, oxygen – empty, acetylene – full, acetylene – empty, etc.;
- When a cylinder is empty, the cylinder cap must be replaced to protect the valve. Empty cylinders must be clearly marked (there must be no need to open valves to check if cylinders are full or empty);
- All cylinders must be stored in an upright position and must be secured in this position by chaining, strapping or clamping them individually to a wall, a cylinder trolley, rack or carrier, or some other rigid structure;
- Cylinders must be stored in rows (when necessary due to the number of cylinders) with aisles between the rows to facilitate easy and rapid removal in the event of a fire;
- Oxygen cylinders may never be stored near highly combustible materials, particularly oil and grease, or near fuel gas cylinders. When in storage, oxygen cylinders must be separated from fuel gas (LPG and acetylene) cylinders by a distance of 6 metres or by a 2-metre-high wall made of fire-resistant material;

- The total quantity of gases stored on site must be limited to a 2-week supply.

Compressed gas cylinders must always stand upright (i.e., when being used, stored or transported) and must be properly and individually secured to prevent them from falling over.

Cylinders must be protected from flame, heat and from being struck by moving equipment and falling objects.

When handling gas cylinders (whether full or empty), care must be taken to prevent sudden impacts.

Whenever a cylinder is not in use, the protective cap must be in place to prevent the valve from being damaged.

Gas cylinders may not be carried, dragged, rolled or slid across a floor or surface.

When gas cylinders are to be moved / used, they must be placed in a proper cylinder trolley fitted with a minimum of 4.5kg dry chemical powder fire extinguisher.

Gas cylinders may not be taken into a confined space. Gas hoses that are run into a confined space must be removed during breaks.

A flashback arrestor and a check valve (non-return valve) must be installed between the regulator and the hose and between the hose and the torch on the oxygen line and on the fuel (acetylene) line.

Connection fittings may not be forced, and safety devices associated with cylinder valves or regulators may not be altered / tampered with.

Gas hoses may not be joined. Only approved hose connectors of the crimp type are permitted. Wire and jubilee clamps are prohibited.

Only high-quality ancillary equipment may be used. This includes flashback arrestors, hoses, clamps, spindle keys, nozzles and torches.

Only trained and competent personnel may operate gas welding / cutting equipment and appliances.

When an employee opens the valve to a cylinder, he must stand to one side and open it slowly. Valves may never be left partly open – they must either be closed or be opened fully.

Leaking cylinders must immediately be removed from service and the workplace (if it is safe to do so).

Gas cylinders must be prevented from coming into contact with electrical circuits, e.g., welding leads. Never strike an arc on a cylinder.

7.18.3 Pneumatically Powered Tools and Equipment

When using pneumatic powered tools, the designated tool pressure must be attained by the use of a regulator.

Pneumatic tools to be operated by a trained and competent person.

Pneumatic powered tools must be disconnected when not in use. They must not be disconnected from the air supply until all the residual pressure has been released or contained by a shut-off device. Hoses must not be kinked as a means of containment.

Employees operating pneumatic powered tools, and any potentially affected employee in the vicinity of use, must wear suitable personal protective equipment.

All rotary compressed air tools (e.g., drills) must have the rated revolution per minute (RPM) permanently marked on the casing. Only attachments of compatible RPM must be used with these machines.

The actual RPM of the tool must be checked every three months to ensure that the speed is as rated to manufacture specifications.

Pneumatic powered tools must be secured to the air supply hose by an approved positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers must be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

Compressed air must not be used for cleaning purposes to ensure safety. Compressed air must not be pointed at any part of the body or used for cleaning clothing.

7.18.4 Fuel Powered Tools and Equipment

Fuel powered tools must be shut down and allowed to cool before being refuelled, serviced, or maintained. Fuel must be transported, handled, and stored in approved fuel containers. Where possible, diesel driven engines must be used in preference to petrol driven engines. All fuel

powered tools must be included on the contractor's Equipment Register only approved equipment to be used on site.

When fuel powered tools are used in enclosed spaces, the space must be ventilated and the atmosphere monitored to measure toxic gas concentrations. This type of activity must only be undertaken in exceptional circumstances and requires the approval by the Safety Agent.

7.18.5 Hydraulically Powered Tools and Equipment

Hydraulic powered tools must use only approved fluid that retains its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's stated safe operating pressures for hoses, valves, pipes, filters and fittings must not be exceeded.

Only manufacturer approved hoses, valves, pipes, filters and fittings must be used.

7.19 HAND TOOLS

Employees required to use hand tools must receive training relevant to the tool and have their competency assessed in the operation, inspection and maintenance of the tool. Where necessary, additional applicable personal protective equipment must be worn when using hand tools.

Wrenches, including adjustable, pipe, end, and socket wrenches, must not be used when the jaws are sprung to a point where slippage occurs. Impact tools such as drift pins, wedges and chisels, must be kept free of mushroomed heads. The wooden handles of tools must be kept free of splinters or cracks.

Adjustable wrenches must not be used in lieu of ring or open-end type spanners, unless a risk assessment has been conducted and the use of the adjustable wrench is approved by the nominated project management representative. Wherever possible, ring spanners must be used in preference to open end spanners.

Correct hand tools for the job must be used, e.g., screwdrivers must not be used as chisels, and pliers must not be used as hammers.

All wedges and drifts that may spring, fly or fall to lower levels upon impact must be fitted with an attachment which attaches a safety "lanyard" to a solid structure to restrain the impact tool from becoming a projectile.

All hand tools used in elevated areas, that may be dropped or fall to lower levels must be fitted with safety lanyards and attached to solid structures or in the case of podges, scaffold keys etc., attached by wrist lanyard to the user.

Purpose built tools and equipment may not be used unless a risk assessment has been conducted and authorised by the nominated project management representative.

Inspection of Equipment and Tools

All tools must be inspected by the user before, during and after use. If any faults are identified, the tool must be taken out of service and not used until repaired. Faulty tools that are not able to be repaired must be tagged “out of service” and removed from site.

7.20 MANUAL HANDLING

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done. A risk assessment must be conducted in consultation with employees.

The contractor must plan his work in a manner that shall reduce manual handling as far as reasonably practicable and use by using mechanical means i.e., use of pallet truck, forklift truck, powered hoists.

The following should be considered with conducting the Risk Assessment with regards Manual Handling and also take into consideration the task factors, physical demands and tools involved in the task:

- Load weight/frequency;
- Hand distance from lower back;
- Asymmetrical trunk/load;
- Postural constraints;
- Grip on the load;
- Floor surface;
- Environmental factors;
- Carry distance; and
- Obstacles en route

As a guideline 25 kg is considered to be the limit of what a person can safely handle. Where there are loads exceeding 25 kg the risk of handling the load must be mitigated to assure minimal potential for any injury.

The following measures must be in place when handling loads to ensure safety:

- Reduce carrying distances, material to be delivered as close to the working area as possible
- Assessing the weight to be carried to carried and ensure sufficient man power.
- Ensure proper grasping. Get a firm grip. The roots of the fingers and the palm of the hand should grip the load.
- Ensure good handling and lifting techniques i.e., keep the load as close to the body, waist as far as possible, avoid twisting the back or leaning sideways, keeping the head up, moving smoothly
- Plan for rest midway where the distance is long
- Clear communication & good coordination to be in place
- If more than one person is involved in a task a communication procedure must be agreed in advance. Lowering the load must be done in a controlled manner. Dropping a load is dangerous and must be avoided.
- Extra care should be taken when lifting awkwardly shaped objects

7.21 VIBRATION

As far as possible, exposure to vibration must be eliminated.

However, if this is not possible, short-term solutions to decrease exposure include:

- Reducing the vibration levels;
- Removing the person from the vibrating equipment / tools;
- Reducing the period of time that the person works with the vibrating equipment / tools (at least 30 minutes break after 30 minutes working with a machine that vibrates excessively).

In order to reduce exposure to vibration:

- Consider buying equipment that operates effectively at lower speeds;
- Buy equipment with built-in damping materials;
- Buy lighter tools if they are available - they require less of a grip;
- Maintain the equipment;

- Make sure equipment is balanced and there are no worn parts;
- Use remote controls when they are available;
- Reduce your grip on the equipment when it is safe. The less time you actually have your hands on the equipment the better. Relax your hands during these brief breaks;
- Take scheduled breaks; and
- Do other tasks that allow you to move away from vibrating tools and equipment.

7.22 HAZARDOUS CHEMICAL SUBSTANCES

All employees required to use Hazardous Chemical Substances (HCS) or products containing HCS must be adequately and comprehensively trained with regard to the requirements of the Hazardous Chemical Substances Regulations, 1995 and amendments thereto, the potential sources of exposure and the potential risks to their health caused by exposure.

Only authorised and trained personnel should handle / work in areas with hazardous chemical substances.

No chemical substance may be brought onto site unless it has been approved construction manager and it appears on the approved chemical substances register which will be made available to all contractors.

The register will contain the following information:

- Trade name / product name of substance;
- Manufacturer / supplier of substance;
- Maximum inventory;
- Storage requirements and precautions;
- Inventory of special emergency items held for handling spillages, fires, etc. (e.g., reagents to neutralise spillages, firefighting foam, etc.); and
- Approved disposal methods.

Any chemical substance brought onto site without adherence to the requirements stipulated above shall be removed from site immediately.

The contractor must ensure that a Material Safety Data Sheet (MSDS) is obtained for each chemical substance brought onto site. A file, or files, containing all of the MSDS's must be maintained and must be readily available to all personnel on site (particularly first aiders) as

well as other potentially affected parties (e.g., emergency services personnel, persons from the local community, etc.). The MSDS's must be in the language(s) commonly used on site.

The contractor must appoint a trained and competent Hazardous Chemical Substances Coordinator who understands and is able to evaluate the risks associated with a wide variety of substances. This person shall be responsible for:

- Assessing the hazardous properties and risks associated with all chemical substances brought onto site by the contractor and appointed sub-contractors (using the MSDS's);
- Determining precautions and safe practices for transportation, use, handling, storage and disposal (including PPE requirements) (using the MSDS's);
- Determining first aid and emergency response requirements / procedures (using the MSDS's);
- Maintaining the MSDS file;
- Managing and monitoring the consumption of inventory; and
- Providing an "as needed" service to site personnel and suppliers.

The risks associated with the transportation, use, handling, storage and disposal of all hazardous chemical substances brought onto site must be assessed and managed by the contractor through a process that incorporates risk assessment.

Whenever a task-based risk assessment is carried out, consideration must be given to the use of chemical substances (e.g., greases, solvents, etc.).

The contractor must provide safe work procedures for the transportation, use, handling, storage and disposal of all hazardous chemical substances to be used on site.

The contractor must provide his employees with all of the PPE that is necessary to prevent exposure / injury while handling / using the hazardous chemical substances that they will be required to work with. Appropriate PPE must be selected with consideration given to the potential hazards, permeability, penetration, resistance to damage and compatibility with the work tasks.

The contractor's employees must be trained in the safe transportation, use, handling, storage and disposal of the hazardous chemical substances that they will be required to work with or may come into contact with. The training must specifically address PPE requirements (including the correct selection, fitment and use thereof).

All personnel must be trained to understand the potential health effects associated with exposure to hazardous chemical substances and therefore the importance of Safe Work Procedures and PPE. All personnel must be trained on emergency response procedures and first aid measures.

An emergency response plan for incidents involving hazardous chemical substances must be in place. Regular and appropriately staged emergency drills (possibly involving external spill response and ambulance support services) must be held and lessons learnt must be incorporated into the emergency response plan.

The contractor must provide appropriate storage facilities for all hazardous chemical substances to be used on site. The storage facilities must be secure and protected from damage. They must also be designed for easy access for firefighting purposes. Where applicable, the storage facility must protect chemical containers from physical damage due to temperature extremes, moisture, corrosive mists or vapours, and vehicles.

The inventory of hazardous chemical substances stored on site must be kept to a minimum. The quantity of each chemical stored must be justifiable.

Storage and segregation requirements for all hazardous chemical substances to be used on site must be based on:

- The quantities of the substances stored;
- The physical state of the substances (solid, liquid or gas);
- The degree of incompatibility; and
- The known behaviour of the substances.

Access to areas where hazardous chemical substances are stored and handled must be limited and controlled.

Every chemical substance container must be adequately and clearly labelled to identify its contents, to indicate precautionary requirements for the substance, and to indicate the date of expiry (if applicable). Pipes used to transfer / convey / distribute chemical substances must be clearly identified (e.g., colour coding). Directional flow must be indicated where practical.

Before any item, equipment or empty container containing a chemical residue is disposed of as general waste, it must be properly decontaminated (where applicable). Before being disposed of, empty chemical containers must also be rendered unusable for carrying water (by puncturing, cutting or crushing them).

Hazardous chemical substance waste (i.e., redundant / expired hazardous chemical substances, containers containing residues, contaminated items / materials, etc.) must be disposed of in accordance with the EMPr.

A system must be in place to ensure that the risks are assessed before any changes are made to equipment and / or processes for the transportation, storage, handling, use or disposal of a hazardous chemical substance.

A programme must be in place to continually investigate possibilities / opportunities for replacing hazardous substances with safer alternatives.

7.23 FUEL / FLAMMABLE LIQUID

Method statement for refuelling on site must be provided. Construction Manager to approve all fuel storages on site.

If the on-site storage of a fuel or a flammable liquid is approved, the contractor must ensure the following:

- The quantity of fuel / flammable liquid to be stored on site must be kept to the minimum that is required;
- The storage area must be located in a well-ventilated area at least 10 metres away from any building, drain, boundary or any combustible material;
- If more than 200 litres of fuel / flammable liquid are to be stored, the tank must be installed / the containers must be positioned within and be approved by Local Fire Chief Inspector.
- The bund must be impermeable. It must have a solid concrete floor and the walls must be constructed out of brick and must be plastered on the inside;
- The bund must be fitted with a lockable drain valve (for draining away rainwater), which must remain locked in the closed position. The valve may only be opened under supervision and in accordance with a written procedure;
- The fuel / flammable liquid storage area may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials (including rubbish, brush and long grass) at all times;
- Access to the storage area must be controlled

- Appropriate warning signage (i.e., “flammable liquid”, “no smoking” and “no naked flames”) must be prominently displayed at the storage area. The contents and volume of each tank must be indicated;
- In order to contain spillages, the offloading / refuelling bay at the fuel / flammable liquid storage area must have a solid concrete base surrounded by bund walls, ramps or humps and / or spill trenches (covered with steel grating) that lead into a sump;
- Fuel dispensing pumps must be protected against impact damage;
- All fuel / flammable liquid storage tanks and dispensing equipment must be electrically bonded and properly earthed;
- All electrical installations and fittings must be of an approved intrinsically safe type;
- Two 9kg dry chemical powder fire extinguishers must be mounted in an easily accessible position near the entrance gate to the fuel / flammable liquid storage area. Depending on the size of the storage area, additional fire extinguishers may be required to ensure that an extinguisher is no further than 15 metres away from any point on the perimeter of the storage area;
- Smoking or open flames within 10 metres of a fuel / flammable liquid storage / refuelling area is strictly prohibited;
- No petrol- or diesel-powered vehicle or equipment may be refuelled while the engine / motor is running;
- Cellular phones must be switched off in fuel / flammable liquid storage / refuelling areas;
- Spill clean-up kits (containing a suitable absorbent fibre product) must be provided;
- Any spillages must be cleaned up immediately and all contaminated cleaning materials must be disposed of in accordance with the applicable legislation;
- Emergency plan for spillages must be provided. If a flammable liquid is spilt or is leaking from a container / vessel, the area must be cordoned off and appropriate warning signage must be displayed to keep unauthorised personnel away from the affected area. Every effort must be made to contain the spillage. All hot work in the vicinity must be stopped immediately. If the leak or spillage cannot be contained or stopped, then appropriate emergency response procedures must be

activated including the evacuation of all persons in the vicinity. Suitable firefighting equipment must be positioned ready for use should the spilt product ignite.

- Drip trays must be used wherever required;
- All tanks, drums, cans, etc. containing flammable liquids must be tightly closed and properly sealed except for when a container is being filled or when a product is being decanted;
- The transport or storage of corrosive or flammable liquids in open containers is strictly prohibited
- Only required quantities of flammable liquids (paints, solvents, etc.) must be stored on site. Each product must be kept either in its original container or in an approved container which must be properly sealed. Each container must be clearly labelled to indicate its contents. When not in use, all such containers must be stored in a well-ventilated steel cabinet which must be kept locked to prevent unauthorised access;
- Safe Work Procedures must be compiled for the transportation (including delivery), offloading, storage, handling and use of any fuel / flammable liquid on site;
- Safe working procedure for vehicles refuelling must be displayed on site
- All personnel that will be required to work with or may come into contact with a flammable liquid must be made aware of the hazards associated with the product and must be thoroughly trained in the safe transportation, use, handling and storage thereof.

7.24 STACKING OF MATERIALS

Stacking and storage of materials must be performed under the supervision of a Competent Person who has been appointed in writing as required by CR.

Storage areas must be designated, kept neat and under control. In addition to the abovementioned the requirements of General Safety Regulations, 1986 must be complied with.

Adequate space stacking, storage and lay down areas must be provided on site.

Stacking, storage and laydown areas must be demarcated and be kept neat.

The base of any stack is level and capable of sustaining the weight exerted on it by the stack. The items in the lower layers can support the weight exerted by the top layers.

The height of the stack must not be higher than 3 times the size of the base.

Stacked material with a risk of rolling i.e., pipes must be secured with roll chocks suitable material.

All site material must be stored within the barricaded site, in the event that material is stored outside the fenced site, it must be barricade with a strong physical barrier that is clearly visible to prevent access.

Hazardous chemical substances must be stored in dry storeroom as per specifications of their material safety data sheets.

All irregular shaped items must be stacked at floor / ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the commodities being stacked and stacked in such a manner that the items do not topple over or change position due to subsidence or weight transfer when being moved.

Where these materials are stacked on shelves or racks, the shelves or racks must be designed to carry the weight of the commodity being stacked.

All racks or shelves where heavy material or commodities are stacked must have a weight carrying limitation clearly marked on the structure and have a safety factor of at least +10% of maximum total carrying capacity.

All materials, which could be damaged due to inclement weather, must be stored under cover.

Waste material that is combustible must not be allowed to accumulate in sufficient quantities to create a hazard.

The storage of material, small equipment, tools, files and general items in cupboards and on shelves must be neat and controlled at all times. Incompatible substances must not be stored in or on the same cupboard or shelf.

7.25 FIRE PROTECTION AND PREVENTION

The Contractor must compile a fire protection and prevention plan for the work that will be carried out on site.

The Contractor must assess / survey his area of responsibility and identify locations where the risk of fire is high. Cognisance must be taken of the fact that certain locations may need to be designated as high risk due to the presence of large quantities of flammable or combustible materials / substances. For all high-risk areas, the contractor must ensure that additional precautions are taken to prevent fires and strict control is exercised over any hot work (i.e., welding, cutting, grinding, etc.) that is carried out.

The contractor must supply and maintain all required firefighting equipment. The type, capacity, positioning, and number of firefighting appliances must be to the satisfaction of the nominated project management representative and must meet the requirements of the applicable legislation.

Firefighting equipment, fixed and portable, must be strategically located with a view to being able to rapidly deploy the equipment in order to bring potentially dangerous and destructive fires under control while still in their infancy.

All fire extinguishers (and any other firefighting equipment) placed on site must be:

- Conspicuously numbered;
- Recorded in a register;
- Visually inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register and the competent person must sign off on the entries made); and
- Inspected and serviced by an accredited service provider every year (the Agent may require that this frequency be increased depending on the environmental conditions (e.g., high dust levels, water, heat, etc.) to which the fire extinguishers are exposed).

Any fire extinguisher that has a broken seal, has depressurised, or shows any sign of damage must be sent to an accredited service provider for repair and / or recharging. Details must be recorded in the register.

Firefighting equipment may not be used for any purpose other than fighting fires. Disciplinary action must be taken against any person who misuses or wilfully damages any firefighting equipment.

Access to firefighting equipment, fixed or portable, must be kept unobstructed at all times.

Approved signage must be in place to clearly indicate the location of each permanently mounted fire extinguisher, fire hose reel, etc.

The contractor must ensure that all persons working in / entering his area of responsibility are made aware of where all firefighting appliances and alarm points are located.

The contractor must ensure that his employees (and those of any appointed sub-contractors) are trained in firefighting procedures and the use of firefighting equipment.

The contractor must compile an emergency response procedure detailing the actions that must be taken in the event of a fire or a fire / evacuation alarm.

All personnel working within the contractor's area of responsibility must be trained, and all visitors must be instructed, on this procedure. Copies of the procedure must be prominently displayed in the workplace in all languages commonly used on the site.

A person discovering a fire must extinguish the fire if he can do so safely, and then immediately report the incident to his supervisor. If the person cannot extinguish the fire, he must raise the nearest alarm and then report the fire as quickly as possible to his supervisor, the person responsible for the area, and / or Security.

On hearing a fire / evacuation alarm, all persons must make any operational plant or equipment safe, and then proceed to the nearest emergency assembly point and await instructions.

All incidents of fire (including the use or misuse of any firefighting equipment) must be reported to the Agent immediately. Used fire extinguishers must be replaced by the contractor without delay.

No hot work (i.e., welding, cutting, grinding, etc.) or any other activity that could give rise to a fire may be performed outside of a designated workshop without a Permit to Work having been issued.

Wherever hot work is being carried out, a fire extinguisher must be at hand. Where the risk assessment determines that it is necessary, a fire watch must be stationed.

Supervisors must carry out workplace inspections regularly to ensure adherence to fire prevention measures and procedures.

At the end of every working period (i.e., before each tea / lunch break and at the end of every shift / day), the workplace must be thoroughly inspected to ensure that no material is left smouldering and no condition / situation exists that could give rise to a fire.

The contractor must ensure that all supervisors and all employees carrying out or assisting with any hot work or any other activity that could give rise to a fire have been trained in firefighting procedures and the use of firefighting equipment. The training must be conducted by an accredited training provider.

When using electrical equipment, all cables must be in good condition and the nearest convenient socket must be used.

No power socket may be loaded beyond its rated capacity through the use of adaptors, etc.

Makeshift electrical connections are not permitted under any circumstances.

Water-based firefighting equipment must not be used on electrical equipment or burning liquids.

Each construction plant used on site for work purposes and each item of mobile equipment with a diesel or petrol engine must be fitted with a permanently mounted fire extinguisher.

Smoking is only permitted in designated smoking areas. Cigarette ends / butts must be properly stubbed out in the ashtrays provided and never thrown into waste bins.

The contractor must ensure that good housekeeping practices are enforced, as this is crucial to the prevention of fires.

All combustible waste materials must be removed from the workplace on a daily basis (at the end of each shift) and placed in waste receptacles located at least 5 metres away from any structure.

The accumulation of waste materials in out-of-the-way places is prohibited.

Offices, desks, cabinets, etc. must always be kept tidy and uncluttered. Waste paper bins must be emptied regularly.

All walkways, passages and stairways must be kept clear (i.e., must be unobstructed) at all times, as they may need to be used as a means of escape.

The areas around and the routes to all exits, fire escape doors, and fire extinguishers must be kept clear (i.e., must be unobstructed) at all times.

"No Smoking" signs must be conspicuously displayed in and around all storage areas / rooms.

Waste may not be burned under any circumstances.

Whenever any work is carried out involving the use of a flammable substance / material, the area must be cordoned off and appropriate warning signage (i.e. "no unauthorised entry", "no smoking" and "no naked flames") must be displayed.

7.26 SMOKING

The contractor must not permit smoking on site except within designated smoking areas selected in accordance with the applicable legislation. Such an area must be clearly demarcated and the required signage must be displayed.

Any person found smoking or discarding a cigarette butt outside of a designated smoking area must be disciplined accordingly.

In all designated smoking areas, adequate non-combustible commercial ashtrays and / or cigarette butt receptacles (butt cans) must be provided.

Ashtrays and other receptacles provided for the disposal of smoking materials must not be emptied into rubbish bins or any other container holding combustible materials.

"No Smoking" signs must be strictly observed.

7.27 HOUSEKEEPING

Housekeeping must be implemented on site as per CR 27.

Housekeeping program must be developed for the site, and be well resourced. Housekeeping supervisor and housekeeping team should be appointed. Housekeeping program should outline procedures for implementing and maintaining good housekeeping on site at all times.

All items of scrap, unsuitable of cuts and rubble should be continuously removed from working to dedicated temporal waste collection areas.

All hand tools and working material are properly store in designated areas.

An area designated for temporal storage of rubble should be demarcated.

Large quantities of waste must not be allowed to accumulate on site. Waste must be disposed of in an approved land fill site.

7.28 WASTE MANAGEMENT

Method statement for waste management plan must be developed.

Waste must be stored on site in a manner that will not create safety hazards and in accordance with Project's EMPr

Separate bins for general and hazardous waste must be provided on site.

Spill kits must be provided on site. Drip trays must be provided for keeping under stationery plant.

Waste should be disposed of properly in approved landfill site as per hazard it contains.

7.29 WELFARE FACILITIES

The PC must allow for and supply:

- Changeroom facilities, separate for each gender which shall include shower facilities; at least one shower facility which must have hot and cold water for every 15 employees.
- Ablution facilities must be provided at the site office area and at the work stations as per CR 30(1)

- Ablution facilities must always be within 200 meters radius from workstations. Separate facilities must be provided for males and females.
- Where working positions move constantly, safe means of moving toilets with works must be provided.
- Ablutions must be serviced weekly and slips for servicing must be kept on the file.
- Sheltered eating areas at all workstations; eating areas to have hand washing facilities. Eating areas must have sits and table that accommodates all employees safely in accordance with current legislation.
- Portable water must be provided on site. Water to be provided in all workstations using suitable containers and be kept cool in the shade. Employees must bring their own empty containers for collecting drinking water.

8. COVID-19 MANAGEMENT

8.1. INTRODUCTION

Coronaviruses are a large family of viruses transmitting between animals and people. COVID-19 is a new strain of coronavirus that has not been previously identified in humans. COVID-19 infection can cause mild to severe disease and be fatal in some. Common observed symptoms include fever, cough, shortness of breath, sore throat, and breathing difficulties. In more severe cases, infection can cause pneumonia or severe acute respiratory syndrome, particularly in those with other chronic underlying health conditions, and even death.

The virus that causes COVID-19 is mainly transmitted through droplets generated when an infected person coughs, sneezes, or exhales. These droplets are too heavy to hang in the air, and quickly fall on floors or surfaces. People can be infected by breathing in the virus if they are within close proximity of someone who has COVID-19, or by touching a contaminated surface and then their eyes, nose or mouth.

Considering that COVID-19 is a novel disease, new information on it may arise any day and will require changes to be made on how it is addressed to protect health. The country is

currently under Lockdown which has 5 stages, our site shall comply with the Regulations and Guidelines per current stage as declared by the President.

8.2 SITE COVID -19 MANAGEMENT PROGRAM

8. 2.1 COVID – 19 Policy

The Contractor must develop a Policy that shall address his commitment and measures to be taken to control and prevent the spread of COVID-19 on site. The Policy shall be signed by the site Chief Executive Officer (CEO) and shall be displayed on site.

8.2.2 Risk Assessment

The PC(PC) shall conduct a site-specific risk assessment for COVID-19 as per Regulations for Hazardous Biological Agents Regulations, 2001 section 6. The risk assessment must identify risks of exposure to COVID-19 virus and determine controls in line with available information, guidelines and Regulations for COVID-19 in the work environment.

The risk assessment must not be conducted by an individual but by a group of experts / personnel for the proposed construction site who understands the environment and practices to be conducted.

With COVID-19, it may not be possible to eliminate the hazard, the most effective protection measures are engineering controls, administrative controls, safe work practices (a type of administrative control), and Personal Protection Equipment (PPE).

8.2.3 COVID-19 Management Plan

After conducting the proper risk analysis, the PC shall develop a COVID-19 management plan which must address measures he shall implement to prevent the spread of COVID-19 at the work place. It shall be similar to the plan required under COVID-19 Regulation 16(6)(b) issued under the Disaster Management Act, 2002 and shall comply with this specification. The plan shall be updated upon updating of the specification based on developments and updates that shall be passed down by the state for controlling the spread of COVID-19 in the Republic of South Africa.

8.2.4 Permit to Work During COVID-19 Pandemic

COVID-19 Regulations stages of lockdown must be observed on site. The site shall only operate upon meeting the criteria tabled under lockdown stages. Where the site requires to operate outside existing lockdown criteria as per stages, permit for works shall be obtained through consultation with the Client.

8.2.5 Roles and Responsibilities

For the purpose of managing Covid-19 on site the PC shall develop a COVID-19 management team. The COVID-19 team shall be consisting of the following members:

- COVID-19 Compliance Officer – To ensure implementation and full compliance with COVID-19 plan on site. Personnel who is a manager shall be appointed for this role.
- COVID-19 Safety Representatives – Site Safety Representative to assume this duty, they shall assist in ensuring that COVID-19 management programs are well carried through on site and identify where there are deviations and gaps, resolve deviations immediately where practical and or report to the COVID-19 Compliance Officer.
- COVID-19 Hygiene Personnel – Personnel to be appointed on site to clean and disinfect surfaces.
- First aider – Site First Aiders to retain their duties and assist in attending to first aid requirements in relation to COVID-19.
- Construction Supervisor – he must ensure work is carried out accordingly while observing COVID-19 Regulations and guidelines.

8.2.6 Rules of Engagement / Commencing Works on Site

The site shall as far as reasonably practicably have a workforce that shall not spread the COVID-19 virus to other employees. The PC shall implement the following to ensure a healthy workforce upon resuming works:

A. Social / Physical Distancing

- The PC must ensure social / physical distancing between personnel on site. He shall ensure that there is a minimum of one and a half meters between personnel at all times.
- The PC shall, as far as practicable, plan his site, activities and number of employees in a manner that shall allow social distancing.

- Personnel over the age of 60 and those with underlying medical diseases such as heart disease, cancer, diabetes and chronic respiratory disease shall continue with self-isolation for their protection / conduct remote work activities.

B. Screening of Personnel, Medical Evaluation and Medical Surveillance

The PC shall develop a screening program for personnel entering the site.

The screening program shall be set as per C 19 OHS screening guideline as follows:

- A screening station must be set up at the site entrance for screening person before allowing them access to site, to ascertain whether they have any of the observable symptoms associated with COVID-19, namely fever (screen using no touch infrared thermometer for body temperature above 38), cough, sore throat, redness of eyes or shortness of breath (or difficulty in breathing). Symptoms screening shall be done daily on site and completed screening form shall be kept on the file.
- The PC shall require every personnel who has entered the site to report whether they suffer from any of the following additional symptoms: body aches, loss of smell or loss of taste, nausea, vomiting, diarrhea, fatigue, weakness or tiredness.
- The PC shall comply with guidelines issued by the National Department of Health in respect of – symptom screening.
- The PC shall require employees to immediately inform the Safety Officer if they experience any of the symptoms above while at work.
- If a worker presents with those symptoms at the site entrance during screening, or advises the Safety Officer of these symptoms during works, the following shall be done:
 - Not permit the worker to enter the workplace or report for work; and must be sent home for self-isolation for a period of a minimum of 10 days
 - If the worker is already at work immediately- isolate the worker, and arrange for the worker to be transported in a manner that does not place other workers or members of the public at risk for assessment by a health practitioner.
 - Assess the risk of transmission, disinfect the area and the worker's workstation, refer those workers who may be at risk for screening and take any other appropriate measure to prevent possible transmission.

- If an employee's visits a doctor and test positive for COVID-19.
- The PC shall identify employees that were close contacts and send them so isolation for 10 days and only allow them back to work after isolation and after screening and ensuring they do not have observable signs for COVID -19.
- Employees who have tested positive for COVID-19 shall only come back to work once they have completed 10 days isolation period and no longer have observable signs for COVID-19.
- The PC shall place employees in isolation on paid sick leave in terms of section 22 of the Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997) or if the employee's sick leave entitlement under the section is exhausted, make application for an illness benefit in terms of clause 4 of the Directive issued on 25 March 2020 on the COVID-19 Temporary Employer Relief Scheme under regulation 10(8) of the Regulations promulgated in terms of section 27(2) of the Disaster Management Act.
- The PC shall ensure that the employee is not discriminated against on grounds of having tested positive for COVID-19 in terms of section 6 of the Employment Equity Act, 1998 (Act No. 55 of 1998).

8.2.7 Transportation of Employees

Employees must be trained about public transport Regulations in terms of COVID-19 to extend the degree of their level of understanding and safety in terms of getting infected during the travel to and from work.

The Contractor shall ensure that site employees transportation complies with all travel regulations and guidelines for COVID-19 as follows:

- Maximum occupancy of vehicles to allow for social distancing.
- Vehicle sanitized before passengers' board.
- Passengers sanitize their hands before and after embarking and are wearing face masks prior to boarding.

8.2.8 Hygiene Management Program for COVID – 19

The site must develop, document and implement a hygiene management program for COVID-19. Resources for creating and maintaining a hygienic working environment must be provided. The following minimum requirements must be met on site:

A. Site Access Points

The PC shall ensure that the following measures are in place at the site access point:

- Personnel, be it workers or visitors, without relevant face masks should not be allowed to enter construction sites; and workers should wear face masks at all times.
- May develop staggered start and finish times to reduce congestion and contact at all times.
- Monitoring of site access points to ensure social distancing, ensure a minimum of one and half meters between people entering and waiting to enter site or leave the site.
- Establish hand sanitizing station to ensure all personnel have their hand sanitized before proceeding to completing the register and screening declaration and when they leave the site.
- Establish screening stations at the site entrance where all personnel entering shall undergo temperature screening and complete a symptoms declaration.
- Ensure that all personnel entering the site signs the site register

B. Hands Disinfecting

- All personnel entering or leaving the site must have their hands disinfected through using an ethyl-based hand sanitizer (containing 70% alcohol) or wash their hands at a hand washing station positioned at site entrance with soap and running water for 1 minute.
- Employees are required to wash or sanitize their hands regularly at work. Hand disinfecting stations must be made available in all work stations and at welfare facilities.
- Hand drying material at hand washing stations shall be disposable.

C. Surfaces Disinfecting

- The PC shall ensure that measures are in place for ensuring that on site surfaces and equipment are disinfected before work begins, regularly during the working period and after work ends.
- All areas such as toilets, common areas, door handles, shared electronic equipment, hand rails shall be regularly cleaned and disinfected.
- Surfaces must be disinfected using 70% alcohol disinfecting sprays with disposable wipes.

D. Vehicles Hygiene

- Each vehicle must have dedicated driver to avoid spreading of germs.
- Vehicles sharing should be avoided, where vehicles have to be shared each user must disinfect surfaces which includes door handles, and the interior of vehicle before and after use.

9.2.9 Personal Protective Equipment

While engineering and administrative controls are considered more effective in minimizing exposure to COVID-19, PPE is also regarded as essential to controlling the spread of the virus. Employees should be issued and wear the following PPE on site:

A. Face Masks

Face masks are no longer a legal requirement in the Republic of South Africa.

B. Face Shields

Face shields are no longer a legal requirement in the Republic of South Africa.

C. Gloves

- It is preferable that surgical gloves are not worn by employees on site as a PPE for COVID-19 as they discourage hands disinfecting.

- Gloves shall be work on site as per activities risk assessments i.e., leather gloves / water proof rubber gloves and surgical gloves for first aid attendance and hygiene implementing team.
- All PPE on site which includes gloves shall never be shared.

D. Overalls & Reflective Vests

The following measures must be in place regarding issue and use of overalls and reflective vests on site:

- All employees shall be issued with a minimum of two pairs of overalls and reflective vests on site to ensure that are always wearing hygienic PPE.
- Employees must wash and maintain PPE in a hygienic manner.

E. Other PPE

- Other PPE which includes helmets, ear protection and etc. shall never be share on site.
- Employees PPE shall be clearly labelled and should be stored separately in a designated area.
- Issuing visitors / suppliers with PPE shall be prohibited on site, visitors must be notified in advance on site requirements for PPE and they must come with their own.

8.2.10 Employees Facilities

A. Toilet facilities

- The PC shall ensure adequate number of toilet facilities on site to ensure social distancing.
- Social distancing marking shall be done outside toilet facilities.
- Hands disinfecting facilities shall be provided at the entrance of the toilets to ensure disinfecting of hands before and after entering the toilets
- All toilet facilities on site must have their surfaces cleaned and disinfected regularly in a day i.e., door handles, toilet seats, flushing mechanisms, tabs and sinks.

- Portable toilets should be avoided wherever possible, but where in use these should be emptied more frequently (minimum once a week).

B. Changerooms

- Every employee shall have lockable storage for personal belongings on site.
- Change room must be of adequate size to ensure that physical distancing of one and half meters is maintained.
- No personal belongings shall be kept on site, only daily requirements must be kept.

C. Eating areas

- Social distancing shall be implemented and maintained in the eating area; break times may be staggered to reduce congestion and contact at all times.
- Eating areas must be provided with hand washing facilities / hand sanitizers for disinfecting hands before and after meals.
- Tables should be cleaned and disinfected between each use.
- All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs.
- Employees to be trained on personal hygiene during meal times i.e. avoiding sharing of food or eating utensils.
- All rubbish should be put straight in the general waste bin and not left for someone else to clear up.

D. Drinking Water

- There shall be no sharing of drinking water utensils on site.
- Employees should be asked to bring refillable drinking water bottles from home.
- Drinking water should be provided from taps which should be cleaned and sanitized regularly during the day.

8.2.11 Training & Awareness

The PC shall provide information and training on COVID-19 on site. COVID-19 training and awareness program shall be based information provided on the Legislation, NICD &WHO and address the following:

- What is COVID-19

- What are its signs and symptoms?
- What are its sources of exposure?
- Hazards and Risks to COVID-19
- Role players on COVID-19 management program on site
- Screening and it's role on site
- Reporting symptoms of COVID-19 -19
- Hygiene Management & practices in place for the site
- PPE use and disinfecting
- Handling, changing and washing of cloth masks
- Personal hygiene
- Employee benefits or non-benefits (Remuneration, UIF Claims, Compensation Claims etc.)
- Zero-tolerance policy towards workplace discrimination, violence and harassment, etc.
- COVID-19 information contact numbers

The site training program shall be drafted as follows:

- COVID-19 induction training to be provided electronically / telephonically before personnel come to site and it should address the following:
 - The nature of COVID-19 virus, site rules and requirements regarding the control of spread of the virus, screening requirements, medical evaluation and surveillance.
- COVID-19 Continuous site training:
 - COVID-19 risk assessment training
 - Daily tasks observation training; COVID-19 safety requirements to be address for every task.
 - Awareness training; this shall form part of tool box talks, it shall provide refresher training on COVID-19 and also pass through new information on COVID -19 developments.

8. 2.12 Signage

A. Access Rules

The PC shall install signage with site rules specific to prevention of spread of COVID-19 virus at access points of the site.

B. Notices/Posters with Protocols

Notices and posters shall be placed and installed to raise awareness and regarding protocols to be followed on site. These notices and posters shall be placed conspicuously at various points on the site including the following places:

- Entrance
- Site notice board
- Site Offices
- Eating areas
- Next to toilets, bathrooms and changerooms
- Hand washing stations
- Storerooms

9.2.13 Waste Management

- COVID-19 waste shall be treated as infectious waste/ biohazardous waste, this includes but not limited to the following waste:
 - Discarded PPE i.e. gloves, masks
 - Discarded paper towels
 - Discarded surface cleaning wipes
- As COVID -19 waste should be regarded as biohazardous, it shall be handled as follows:
 - Waste bins for COVID – 19 waste must be foot operated, have tight closing lids and be fitted with plastics.
 - Waste bins must be provided with clear visible signage indicating COVID-19 – Biohazardous waste.
 - Bins should be provided in strategic locations on site i.e. work stations, in a 50-meter radius, eating areas, changerooms, toolsets and offices.
 - Bins to be maintained in a hygienic manner and be regularly sanitized.
- COVID – 19 waste to be disposed of in a safe manner as follows:

- Bags for disposing must be tightly sealed.
- Delayed time of 72 hours must be allowed before disposing waste to municipal areas.

8.2.14 Site Visitors Management

- Site visitors must be screened before being allowed on site (i.e. temperature screening).
- Visitors must not be allowed on site without face masks.
- Visitors must bring their own PPE required for the site i.e. reflective vests and helmets.
- Visitors must be inducted on COVID-19 site rules and requirements.
- Visitors shall only come on site upon appointment.
- Non-essential visitors must be discouraged from coming to site.

8.2.15 Site Meetings Management

- Where practical face to face meetings must be reduced during the pandemic.
- In case of essential meetings, the following must be adhered to:
 - Non-essential personnel for the meeting must be discouraged from attending.
 - The room where meeting is to be held must be big enough to allow social distancing.
 - Physical distancing space of must be allowed between chairs.
 - Surfaces on the meeting room must be disinfected before and after the meeting.
 - Room must be well ventilated.
 - Personnel in the meeting shall wear face screens to ensure protection during talking so they can freely remove masks while talking as masks reduces the sound while person talk.

8.2.16 Alcohol and Drug Testing

Alcohol testing may only be done using single use test units, and must be disposed of in the appropriate COVID-19 waste bins. Drug testing shall only be done by an occupational health facility either using urine or blood sampling. A protocol shall be drawn up by the PC to manage this with the occupational health service being used.

8.2.17 Ventilation

The PC shall ensure that all work areas are well ventilated by natural or mechanical means to reduce concentration of air contaminants in the room. Mechanical ventilation specialist shall be consulted regarding ensuring hygienic air handling units.

8.2.18 Emergency Planning for COVID-19

A. First Aid

- Number of people in contact with a sick person suspected to have COVID-19 shall be limited
- First aid attendants / those in direct care for someone who may have COVID-19 should wear respiratory protection (e.g. N-95 mask), face shield, disposable surgical gloves and a disposable isolation gown/ apron.
- Surfaces that have been touched by suspected person to be disinfected following site surfaces disinfecting procedure. First aider to disinfect surfaces while still wearing PPE.
- Following care, first aid providers should perform hand hygiene as they would normally do and discard PPE following usual procedures.
- In case of requiring CPR, hands only CPR shall be conducted on site while calling emergency services.

B. Evacuation Plans

OHS Spec.: Appointment of a Contractor for the Refurbishment, Alterations and additions at cluster 1

- Personnel suspected to have COVID-19 on site shall be evacuated for self-isolation for 10 days.
- Evacuation vehicle shall comply with COVID-19 protocols for social distancing and sanitizing.
- If a person is tested positive for COVID-19, personnel in contact with him / her must be identified and be sent for self-isolation for 10 days and only be allowed back to work once they no longer have observable symptoms.
- Personnel tested positive for COVID-19 shall be sent for isolation and return to work after 10 days / when they no longer have observable symptoms.

8.3. COVID -19 MONITORING, MANAGEMENT & COMPLIANCE

- Site COVID-19 management plan and program must be monitored and managed as per site appointments and organogram.
- COVID-19 management documentation shall be kept and uptodate on site in the health and safety file.
- Every personnel not complying with COVID-19 rules must be disciplined as per site policy.
- Reference to penalties referred in the National Disaster Management Act, its Regulations, and the Occupational Health & Safety Act, and its Regulations (including Construction Regulations) shall apply, and it is a criminal offence to cede to non-compliance herein.

8.4. COMPENSATION FOR OCCUPATIONAL DISEASES

If there is evidence that the worker contracted COVID-19 as a result of occupational exposure, the PC shall lodge a claim for compensation in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993) in accordance with Notice 193 published on 3 March 2020.

8.5. COVID-19 EMERGENCY CONTACT LINES

The following COVID-19, 24 hours information contact numbers must be communicated and displayed on site:

- Emergency Hotline : 0800 029 999
- WhatsApp Support Line : 0600 123 456
- Disaster Distress Helpline : 0800 567 567

8.6. COVID-19 DOCUMENT MANAGEMENT

COVID-19 management program must be documented as part of the health and safety file.

The documentation shall contain but not limited to the following:

- COVID-19 Policy
- COVID-19 site specific risk assessment
- COVID-19 safety plan
- Permit obtaining program and forms
- Screening register, screening forms and medical reports
- Training program and registers
- PPE issue registers
- Hygiene management program
- Waste management program
- Hygiene checklist

9. CLOSE OUT REQUIREMENTS

Upon completion of the project, the PC and Sub –Contractors shall submit a well-documented consolidated Health and Safety file (to be in electronic form) to the appointed Health and Safety Specialist, confirming the Health and Safety history of the project.

The following summary of information is required, to be filed in a disc format, but not limited to:

- Monthly Health and Safety Audits by the Health and Safety Specialist
- Monthly Sub – Contractors Audits by the PC
- Minutes of the Health and Safety meetings
- Monthly site Health and Safety Reports
- Incidents, Accidents & Injuries on Duty

- Workman's Compensation Claims
- Environmental rehabilitation status
- The PC's / Sub Contractors project Health and Safety File

Handover of the consolidated health and safety file can only commence once all personnel have been demobilized and nil man-hours are recorded. Electronic submission must be provided to the Health and Safety Specialist

The Health and Safety Specialist will evaluate the Health and Safety performance of the PC i.e., compliance, performance, quality and refer in a cover letter which will be added to the PCs consolidated file.

10. COST OF COMPLYING WITH THE OHASA AND CR 2014

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHASA), the Construction Regulations 2014, and the OHS Specification for the works.

Should the Contractor fail to comply with any of the provisions of the OHASA, Construction Regulations 2014, or OHS Specification, he shall be liable for penalties as provided for in any of the aforementioned documents.

11. CONCLUSION

Due to fact that this document is based on legislative requirements, the Client requires that all Contractors comply with the requirements of this document and all other relevant legislative requirements not covered by this document.

The Client or its duly appointed representative reserves the right to stop any Contractor or Sub-Contractor from working whenever Safety, Health or Environmental requirements are being violated. Any resultant costs of such work stoppages will be for the relevant Contractor's account.

The requirements as specified by the Client in this document must not be deemed to be exhaustive and the Client reserves the right to make changes as and if the Client deems fit.

The Client will not entertain any claim of any nature whatsoever which arises as result of costs incurred or delays being experienced due to the Contractor not complying with the requirements of this document and/or any other applicable legislative requirements imposed on the Contractor.

DOCUMENT APPROVAL AND SIGNING OFF

Compiled by	Approved by
Construction Health and Safety Specialist:	Project Manager
Name: Gregory Jacobs	Name: Cindy Nhlangothi
	

Item No	Quantity	Rate	Amount
<u>SECTION NO. 1</u>			
<u>BILL NO. 1</u>			
<u>PRELIMINARIES AND GENERAL</u>			
<u>BUILDING AGREEMENT AND PRELIMINARIES</u>			
The JBCC Principal Building Agreement (May 2018 Edition 6.2) prepared by the Joint Building Contracts Committee shall be the applicable building agreement, amended as hereinafter described The JBCC Principal Building Agreement contract data form an integral part of this agreement The Preliminaries revision 1 (February 2016) published by the Association of South African Quantity Surveyors for use with the JBCC Principal Building Agreement Edition 6.2 shall be deemed to be incorporated in these bills of quantities, amended as hereinafter described The contractor is deemed to have referred to the abovementioned documents for the full intent and meaning of each clause The clauses in the abovementioned documents are hereinafter referred to by clause number and heading only Where any item is not relevant to this agreement such item is marked N/A signifying "not applicable"			
<u>PREAMBLES FOR TRADES</u>			
<i>The Model Preambles for Trades 2008 published by the Association of South African Quantity Surveyors is designed to support and extend the abbreviated descriptions utilised in these bills of quantities by inter alia referring to SANS construction standards.</i> <i>Note that the text of the Standard System of Measuring Building Work (seventh edition) and that of the Standard Method of Measuring Building Work for Africa 2015 (first edition) is the same</i>			
Carried Forward		R	
Section No. 1 Bill No. 1 Preliminaries			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward The Model Preambles for Trades 2008 as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained Supplementary preambles and/or specifications are incorporated in these bills of quantities to satisfy the requirements of this project. Such supplementary preambles and/or specifications shall take precedence over the provisions of the Model Preambles The contractor's prices for all items throughout these bills of quantities shall take account of and include for all of the obligations, requirements and specifications given in the Model Preambles and in any supplementary preambles and/or specifications		R	
Carried Forward Section No. 1 Bill No. 1 Preliminaries		R	

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Brought Forward <u>NOTES TO TENDERERS</u> Tenderers are to inspect the drawings issued with these Bills of Quantities and to satisfy themselves with the nature and the requirements of the Contract works. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to read the descriptions, which are intended as a means of identifying various facets of the work, in conjunction with the drawings. Tenderers shall allow for all costs in connection with the various items taking full cognisance of both the drawings and the Bills of Quantities. Tenderers shall notify the Quantity Surveyor in writing of any discrepancies encountered upon which clarification will be given by the Quantity Surveyor in writing to the Tenderer. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard Tenderers are to note that setting out of the works will be the complete responsibility of the Tenderer and they should therefore acquaint themselves with the site boundaries, site co-ordinates, datum levels etc. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to note that all items with ZERO quantities are Rate Only items and should be priced as such. Tenderers are to note that there might be specified suppliers to be used for certain trades as per the annexure to this tender document. Tenderers should familiarise themselves with the suppliers on the list and ensure to allow for accordingly. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to fully acquaint themselves with the construction period and shall allow for any night shift if required. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard.	R
Carried Forward Section No. 1 Bill No. 1 Preliminaries	R

Brought Forward			R
<u>STRUCTURE OF THIS PRELIMINARIES BILL</u>			
Section A : A recital of the headings of the individual clauses of the aforementioned JBCC Principal Building Agreement			
Section B : A recital of the headings of the individual clauses of the aforementioned Preliminaries document			
Section C : Any special clauses to meet the particular circumstances of the project			
<u>PRICING OF PRELIMINARIES</u>			
Should the contractor select Option A in the contract data for the adjustment of preliminaries , the amounts entered against the relevant items in these preliminaries are to be divided into one or more of the three categories provided namely fixed (F), value related (V) and time related (T)			
<u>SECTION A: PRINCIPAL BUILDING AGREEMENT</u>			
<u>Interpretation (A1-A7)</u>			
1	Clause 1.0 - Definitions and interpretation		
	F:..... V:..... T:.....	Item	
2	Clause 2.0 - Law, regulations and notices		
	F:..... V:..... T:.....	Item	
3	Clause 3.0 - Offer and acceptance		
	F:..... V:..... T:.....	Item	
4	Clause 4.0 - Assignment and cession		
	F:..... V:..... T:.....	Item	
Carried Forward			R
Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
5	Clause 5.0 - Contract documents F:..... V:..... T:.....	Item	
6	Clause 6.0 - Employer's agents F:..... V:..... T:.....	Item	
7	Clause 7.0 - Design responsibility F:..... V:..... T:.....	Item	
	<u>Insurance and security (A8-A11)</u>		
8	Clause 8.0 - Works risk F:..... V:..... T:.....	Item	
9	Clause 9.0 - Indemnities F:..... V:..... T:.....	Item	
10	Clause 10.0 - Insurances F:..... V:..... T:.....	Item	
11	Clause 11.0 - Security F:..... V:..... T:.....	Item	
	<u>Execution (A12 - A17)</u>		
12	Clause 12.0 - Duties of the parties F:..... V:..... T:.....	Item	
	Carried Forward		R
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Brought Forward			R
13	Clause 13.0 - Setting out F:..... V:..... T:.....	Item	
14	Clause 14.0 - Nominated subcontractors F:..... V:..... T:.....	Item	
15	Clause 15.0 - Selected subcontractors F:..... V:..... T:.....	Item	
16	Clause 16.0 - Direct contractors Attendance on direct contractors In respect of direct contractors the contractor shall: F:..... V:..... T:.....	Item	
17	Clause 17.0 - Contract instructions Site instructions Instructions issued on site are to be recorded in a site instruction book which is to be supplied and maintained on site by the contractor F:..... V:..... T:..... <u>Completion (A18 - A24)</u>	Item	
18	Clause 18.0 - Interim completion F:..... V:..... T:.....	Item	
19	Clause 19.0 - Practical completion F:..... V:..... T:.....	Item	
Carried Forward			R
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	Brought Forward		R
20	Clause 20.0 - Sectional completion		
	F:..... V:..... T:.....	Item	
21	Clause 21.0 - Defects liability period and final completion		
	F:..... V:..... T:.....	Item	
22	Clause 22.0 - Latent defects liability period		
	F:..... V:..... T:.....	Item	
23	Clause 23.0 - Revision of date for practical completion		
	Substitution of materials and goods		
	The removal or substitution of any materials and goods which do not conform to the specification or the contract drawings shall not constitute grounds for the extension of the construction period nor for the adjustment of the contract value [17.1.8, 23.1 & 2]		
	F:..... V:..... T:.....	Item	
24	Clause 24.0 - Penalty for late or non-completion		
	F:..... V:..... T:..... [To be determined based on the contract sum]	Item	
	<u>Payment (A25 - A27)</u>		
25	Clause 25.0 - Payment		
	F:..... V:..... T:.....	Item	
26	Clause 26.0 - Adjustment of the contract value and final account		
	Carried Forward		R
	Section No. 1		
	Bill No. 1		
	Preliminaries		

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Brought Forward		R
	F:..... V:..... T:.....	Item
27	Clause 27.0 - Recovery of expense and/or loss	
	F:..... V:..... T:.....	Item
<u>Suspension and termination (A28 - A29)</u>		
28	Clause 28.0 - Suspension by the contractor	
	F:..... V:..... T:.....	Item
29	Clause 29.0 - Termination	
	F:..... V:..... T:.....	Item
<u>Dispute resolution (A30)</u>		
30	Clause 30.0 - Dispute resolution	
	F:..... V:..... T:.....	Item
	The required information of the parties and the amount of the contract sum shall be inserted in the agreement for signature of the agreement by the parties	
	F:..... V:..... T:.....	Item
	F:..... V:..... T:.....	Item
Carried Forward		R
Section No. 1 Bill No. 1 Preliminaries		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward	R
<u>42.1 CONTRACTING AND OTHER PARTIES</u>	
42.1.1 Employer:	
Passenger Rail Agency of South Africa	
Postal address:	
PO Box 51324 Durban 4062	
Tel.: (031) 813 0376	
Physical Address:	
65 Masabalala Yengwa Avenue Durban Station Durban 4000	
<u>42.2 CONTRACT DETAILS</u>	
42.2.1 Works Description:	
Refurbishment, Alterations and Additions at Amanzimtoti Station for a period of six (6) months	
42.2.2 Site Description:	
Amanzimtoti Train Station	
42.2.3 Work or installations by direct contractors:	
N/A	
42.2.4 This agreement is for a government contract where there are specific options that are applicable to a State organ only	
Yes	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

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Brought Forward	R
42.2.5 Date on which possession of the site is intended to be given: TBC	
42.2.6 Period for the commencement of the works after the contractor takes possession: TBC	
42.2.7 For the works as a whole . Intended date of practical completion and the penalty per calendar day	
Six (6) Months after contractual commencement date	
0.04% of contract amount per calendar day Penalty Amount	
42.2.8 For the works in sections : Intended date of practical completion and the penalty per calendar day: N/A	
42.2.9 The law applicable to this agreement shall be that of	
<i>South Africa (country)</i>	
<u>42.3 INSURANCES</u>	
42.3.1 Contract works insurance to be effected by:	
<i>Contractor:</i>	
<i>For the Sum of R Contract Amount + 30.00 %</i>	
<i>With a deductible of - to be determined by the contractor</i>	
42.3.2 Supplementary insurance is required	
<i>No</i>	
Carried Forward	R
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Brought Forward 42.3.3 Public liability insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R 1 000 000-00</i> <i>With a deductible of - to be determined by the contractor</i> <u>42.4 DOCUMENTS</u> 42.4.1 Waivers of contractors lien or right of continuing possession is required Yes 42.4.2 Number of construction document copies to be supplied to the contractor free of charge: 3 Number of 42.4.3 Bills of Quantities/Lump sum document schedule of rates drawn up in accordance with: “Standard System of Measuring Builders’ Work” 42.4.4 On acceptance of the tender the bills of quantities/lump sum document is to be submitted within: <i>The priced bills of quantities must be handed in with the tender</i> 42.4.5 JBCC Engineering General Conditions are to be included in the contract documents: No 42.4.6 The contract value is to be adjusted using escalation adjustment indices N/A Where JBCC CPAP is to be used <i>Base Month</i> N/A 42.4.7 Details of changes made to the provision of JBCC standard documentation: <u>SECTION B: PRELIMINARIES</u> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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	Brought Forward		R	
	<u>Interpretation (B1)</u>			
31	Clause 1.1 - Definitions F:..... V:..... T:.....	Item		
32	Clause 1.2 - Interpretation F:..... V:..... T:.....	Item		
	<u>Documents (B2)</u>			
33	Clause 2.1 - Checking of documents F:..... V:..... T:.....	Item		
34	Clause 2.2 - Provisional bills of quantities F:..... V:..... T:.....	Item		
35	Clause 2.3 - Availability of construction information F:..... V:..... T:.....	Item		
36	Clause 2.4 - Ordering of materials and goods F:..... V:..... T:.....	Item		
	<u>Previous work and adjoining properties (B3)</u>			
37	Clause 3.1 - Previous work - dimensional accuracy F:..... V:..... T:.....	Item		
38	Clause 3.2 - Previous work - defects F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
39	Clause 3.3 - Inspection of adjoining properties F:..... V:..... T:..... <u>The site (B4)</u>	Item	
40	Clause 4.1 - Defined works area F:..... V:..... T:.....	Item	
41	Clause 4.2 - Handover of site in stages F:..... V:..... T:.....	Item	
42	Clause 4.3 - Enclosure of the works F:..... V:..... T:.....	Item	
43	Clause 4.4 - Geotechnical investigation F:..... V:..... T:.....	Item	
44	Clause 4.5 - Encroachments F:..... V:..... T:.....	Item	
45	Clause 4.6 - Existing premises occupied F:..... V:..... T:.....	Item	
46	Clause 4.7 - Services - known F:..... V:..... T:.....	Item	
47	Clause 4.8 - Protection of trees and/or relevant natural features F:..... V:..... T:.....	Item	
	Carried Forward		R
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	Brought Forward		R	
	<u>Management of contract (B5)</u>			
48	Clause 5.1 - Management of the works F:..... V:..... T:.....	Item		
49	Clause 5.2 - Progress meetings F:..... V:..... T:.....	Item		
50	Clause 5.3 - Technical meetings F:..... V:..... T:.....	Item		
	<u>Samples, shop drawings and manufacturer's instructions (B6)</u>			
51	Clause 6.1 - Samples of materials F:..... V:..... T:.....	Item		
52	Clause 6.2 - Workmanship samples F:..... V:..... T:.....	Item		
53	Clause 6.3 - Shop drawings F:..... V:..... T:.....	Item		
54	Clause 6.4 - Compliance with manufacturer's instructions F:..... V:..... T:.....	Item		
	<u>Deposits and fees (B7)</u>			
55	Clause 7.1 - Deposits and fees F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
	<u>Temporary services (B8)</u>			
56	Clause 8.1 - Water F:..... V:..... T:.....	Item		
57	Clause 8.2 - Electricity F:..... V:..... T:.....	Item		
58	Clause 8.3 - Ablution and welfare facilities F:..... V:..... T:.....	Item		
59	Clause 8.4 - Communication facilities F:..... V:..... T:.....	Item		
	<u>Prime cost amounts (B9)</u>			
60	Clause 9.1 - Responsibility for prime cost amounts F:..... V:..... T:.....	Item		
	<u>Attendance on subcontractors (B10)</u>			
61	Clause 10.1 - General attendance F:..... V:..... T:.....	Item		
62	Clause 10.2 - Special attendance F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R	
	<u>General (B11)</u>			
63	Clause 11.1 - Protection of the works F:..... V:..... T:.....	Item		
64	Clause 11.2 - Protection/isolation of existing/sectionally occupied works F:..... V:..... T:.....	Item		
65	Clause 11.3 - Security of the works F:..... V:..... T:.....	Item		
66	Clause 11.4 - Notice before covering work F:..... V:..... T:.....	Item		
67	Clause 11.5 - Disturbance F:..... V:..... T:.....	Item		
	Clause 11.6 - Environmental disturbance F:..... V:..... T:.....	Item		
68	Clause 11.7 - Works cleaning and clearing F:..... V:..... T:.....	Item		
69	Clause 11.8 - Vermin F:..... V:..... T:.....	Item		
70	Clause 11.9 - Overhand work F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R
71	Clause 11.11 - Advertising F:..... V:..... T:..... <u>Preliminaries schedule (B12)</u>	Item	
72	Information for completion of the preliminaries schedule Information necessary for elections and completion of those clauses contained in the preliminaries schedule which are necessary for tender purposes is given hereunder. Where no information is given it shall mean that no specific requirements are expected or that the clause is not relevant to this specific contract 12.1 - Provisional bills of quantities [2.2] The quantities are provisional - <u>Yes</u> 12.2 - Availability of construction information [2.3] Construction documentation is complete - <u>Yes</u> 12.3 - Previous work - dimensional accuracy [3.1] 12.4 - Previous work - defects [3.2] 12.5 - Inspection of adjoining properties [3.3] 12.6 - Defined works area [4.1] 12.7 - Handover of site in stages [4.2] 12.8 - Enclosure of the works [4.3] 12.9 - Geotechnical investigation [4.4] 12.10 - Existing premises occupied [4.6] 12.11 - Services - known [4.7] 12.12 - Protection of trees and/or relevant natural features [4.8]		
	Carried Forward		R
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Brought Forward	R
12.13 - Water [8.1] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.14 - Electricity [8.2] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.15 - Ablution and welfare facilities [8.3] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> 12.16 - Communication facilities [8.4] 12.17 - Protection of the works [11.1] 12.18 - Protection/isolation of existing/sectionally occupied works [11.2] Protection/isolation is required - <u>Yes</u> 12.19 - Disturbance [11.5] 12.20 - Environmental disturbance [11.6] Controlling all forms of pollution The contractor shall be responsible for and take all precautions in controlling by whatever means necessary all forms of pollution emanating from the site during the construction period due <i>inter alia</i> to noise, artificial light, wind-blown sand, dust, deposits of mud, etc The contractor is to ensure that all roads which border the site and is used by the contractor during the execution of the works are kept clean and free of any dirt or debris caused by the execution of the works	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

Brought Forward		R
F:..... V:..... T:.....	Item	
SECTION C: SPECIFIC PRELIMINARIES		
Section C		
Section C contains specific preliminary items which apply to this contract except where N/A (Not Applicable) appears against an item The warranty will not be enforced if the work is damaged by defects in the execution of the works, in which case the responsibility for replacement shall rest entirely with the contractor		
F:..... V:..... T:.....	Item	
73 Overtime		
Should overtime be required to be worked for any reason whatsoever, the cost of such overtime is to be borne by the contractor unless the principal agent has specifically authorised, prior to execution thereof, that costs for such overtime are to be borne by the employer		
F:..... V:..... T:.....	Item	
74 Co-operation of the contractor for cost management		
It is specifically agreed that the contractor accepts the obligation of assisting the principal agent in implementing proper cost management. The contractor will be advised by the principal agent of all cost management procedures which will be implemented to ensure that the contract value does not exceed the budget		
F:..... V:..... T:.....	Item	
Carried Forward		R
Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R
75	Overloading The contractor shall take all necessary steps to ensure that no damage occurs due to overloading of any portion of the works or temporary works eg scaffolding, etc. The contractor shall submit details of his proposed loading, storage, plant erection, etc to the principal agent for approval prior to proceeding with such loading, storing or erecting and shall comply with and pay for the principal agent's requirements in connection with the provision of temporary support work, etc. Any damage caused to the works by overloading shall be made good by the contractor at his sole expense F:..... V:..... T:.....	Item	
76	Propping of floors below The contractor is advised that propping of floors below may be required if he wishes to use any areas of completed suspended reinforced concrete slabs for vehicle access, storage of materials and goods and location of plant, scaffolding, etc. The location of these areas and any necessary propping shall be approved by the principal agent and the cost thereof shall be borne by the contractor F:..... V:..... T:.....	Item	
77	Testing of flat roof waterproofing for watertightness Flat roof waterproof areas shall be prepared with small sand dykes around them of a size and enclosing an area approved by the principal agent, flooded with water and kept "ponded" for at least forty (40) hours as a test to ensure the watertightness of the waterproofing and before any further construction work is carried out above the waterproofing F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R
	The contractor is to submit to the principal agent on an annual basis a schedule of spend, split into vendors engaged as subcontractors and suppliers indicating their BBBEE rating including proof of the said rating F:..... V:..... T:.....	Item	
78	Advertising rights The employer may elect to contract with advertising agencies for the erection of advertising hoardings, banners, wraps or the like for the duration of the contract. The contractor shall not prevent such an arrangement and will assist in the facilitation of same. Position and type of advertising structure to be agreed with the principal agent so as not to hinder the contractor in meeting the obligations under this agreement F:..... V:..... T:.....	Item	
79	Confidentiality The contractor undertakes to maintain in confidence any and all information regarding this project and shall obtain appropriate similar undertakings from all subcontractors and suppliers. Such information shall not be used in any way except in connection with the execution of the works No information regarding this project shall be published or disclosed without the prior written consent of the employer F:..... V:..... T:.....	Item	
	Carried Forward		R
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	Brought Forward		R
80	Media releases All rights of publication of articles in the media, together with any advertising relating thereto or in any way connected with this project, shall vest with the employer The contractor together with his subcontractors shall not, without the prior written consent of the employer, cause any statement or advertisement connected with this project to be printed, screened or aired by the media F:..... V:..... T:..... <u>SUMMARY OF CATEGORIES</u> Category : Fixed R..... Category : Value R..... Category : Time R.....	Item	
	Carried to Final Summary		R
	Section No. 1 Bill No. 1 Preliminaries		

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO.1</u>			
<u>ALTERATIONS (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 102 - Alterations			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition), as published by the Association of South African Quantity Surveyors, shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items, fully described in the said General Preambles, will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>View site:</u>			
Before submitting his tender, the Contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished.			
No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained			
<u>Old materials to become property of the Contractor:</u>			
Old materials from alterations, except where described as to be re-used or handed over, become the property of the Contractor, who must allow credit for same in the last item of the "Alterations" trade			
Carried Forward		R	
Section No. 2 Bill No. 1 Alterations			

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Brought Forward <u>Old materials to be carted away:</u> Old materials from the alterations, except where described as to be re-used or handed over, as well as all rubbish, etc must be regularly carted from the site and not be allowed to accumulate on or around the site <u>Old materials to be re-used:</u> None of the old materials are to be used for new work, except where specifically described as being set aside for re-use <u>Handing over of materials:</u> Where certain materials or articles from demolitions or alterations are described as to be "handed over to the Employer", it shall be taken to mean "handed over by the Contractor to the Principal Agent" and such materials or articles shall be properly stored by the Contractor until handing over thereof and shall include all necessary transport The Contractor must obtain an official receipt from the Principal Agent listing the materials or articles and dates of handing over Should the Contractor fail to submit the receipt when requested to do so, it shall be deemed that the materials or articles are still in his possession and he will be held liable to the Employer for the full replacement value thereof, which amount will be deducted from any monies due to the Contractor <u>Explosives:</u> No explosives whatsoever may be used for demolition purposes, unless otherwise stated		R	
Carried Forward Section No. 2 Bill No. 1 Alterations		R	

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Brought Forward	R
<u>GENERAL</u> <u>The contractor shall carry out the whole of the work with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide and erect any temporary tarpaulins and temporary plumbing that may be necessary during the progress of the works, all to the satisfaction of the Architect, and remove when directed.</u> <u>Any water supplies pipes and other piping that may be met with and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the Architect.</u> <u>Doors, fanlights, fittings, frames, linings, etc shall be thoroughly overhauled before re-fixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc and easing, oiling, adjusting and repairing ironmongery if necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted wood to match timber.</u> <u>Where doors, windows, etc are described as taken out this shall be understood to include for removal of all beads, architraves, ironmongery, etc and doors which are re-fixed are to be provided with new architraves (elsewhere measured).</u> <u>Prices for taking out and removing doors and frames shall include for removing door stops, cabin locks, etc and making good to match existing.</u> <u>With regard to building up openings in existing walls, cement screeds and pavings, granolithic, etc, shall be levelled and prepared for raising of brickwork.</u> <u>Allow for making good all existing plastered walls where damaged by furniture, etc, and stopping up all screw and holes before painting.</u> <u>Making good finishes shall be deemed to include making good of the brick and concrete surfaces onto which new finishes are applied, where necessary.</u>	
Carried Forward	R
Section No. 2 Bill No. 1 Alterations	

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Brought Forward				R
<u>The contractor will be required to take all dimensions affecting existing building on the site and he will be held solely responsible for the accuracy of all such dimensions.</u> <u>Hazardous materials:</u> Demolitions of buildings, services, external works, site services, etc are to include for the safe removal and disposal of <u>asbestos or asbestos products or other hazardous materials</u> by approved Registered Specialists <u>TEMPORARY BARRIERS, SCREENS, ETC</u> <u>Temporary barriers, screens, etc including removal:</u>				
1	Dust screen 2100mm high formed of suitable timber framing with 250 micron polyethylene sheeting stapled on including corners, ends, etc, to be used on all the phases of the construction project and in accordance to the Health and Safety specifications and regulations	m	450	
<u>REMOVAL OF EXISTING WORK</u>				
<u>Breaking down and removing brickwork, etc:</u>				
2	One brickwalls	m2	71	
<u>Taking out and removing doors, windows, etc including thresholds, sills, etc from brickwork (altering openings and making good finishes elsewhere):</u>				
3	Timber single door and frame not exceeding 2,5m ²	No	31	
Carried Forward				R
Section No. 2 Bill No. 1 Alterations				

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Brought Forward			R
<u>Carefully taking out and handing over to the Employer doors, windows, etc including taking out and removing thresholds, sills, etc from brickwork and preparing openings to receive new similar doors, windows, etc (elsewhere measured) and making good cement plaster on both sides and into reveals:</u>			
4	Roller shutter door approximately 2485mm wide x 2500mm high overall (TP-08)	No	14
<u>Taking down and removing roof coverings, accessories, etc.:</u>			
5	Profiled sheet metal roof covering including timber purlins	m2	773
<u>Taking down and removing ceilings, partitions, etc:</u>			
6	Gypsum plasterboard ceilings, including cornices, timber bandering, etc.	m2	132
<u>Taking out/off and removing ironmongery:</u>			
7	Toilet paper holder from wall	No	17
<u>Hacking up/off and removing ceramic and porcelain tiles, including removing mortar bed or adhesive from concrete or brickwork and preparing surfaces for new screed, plaster, tile finishes, etc:</u>			
8	Tiles to floors	m2	133
9	Tiles to walls	m2	643
10	Tile skirtings 100mm high	m	176
<u>Taking out and removing piping, sanitary fittings, etc including cutting off as necessary, disconnecting piping from fittings and blocking off and making good damaged plasterwork to walls and screeds to floors (all redecoration work elsewhere):</u>			
11	Vitreous china wash hand basin, including short lengths of piping, etc.	No	2
Carried Forward			R
Section No. 2 Bill No. 1 Alterations			

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	Brought Forward			R
12	Vitreous china WC pan with flush valve, including short lengths of piping, etc.	No	17	
13	150 Litre hot water geyser mounted in roof space including drip tray, valves, connecting pipework, etc.	No	17	
14	Shower, complete	No	1	
	<u>Taking out/off and removing glass and mirrors:</u>			
15	Mirror 600 x 600mm high from wall	No	17	
	<u>MAKING GOOD OF FINISHES, ETC</u>			
	<u>Making good concrete:</u>			
16	Floors in patches	m2	110	
	<u>Making good internal/external cement plaster:</u>			
17	Walls in patches	m2	1,383	
	<u>Making good platform surfaces:</u>			
18	Surfaces in patches	m2	3,033	
	<u>GENERAL REPAIRWORK</u>			
	<u>Repairwork to existing brick walls:</u>			
19	Waterjetting surfaces of existing facebrick walls with high pressure low-volume water jetting lance to remove all dirt, brushing down and washing to remove surface contamination, mould, fungus, damp and treating with two coats of antifungal wash and leaving perfectly clean on completion	m2	626	
	<u>ALTERATIONS, SERVICING AND REPAIRWORK TO EXISTING DOORS, FRAMES AND WINDOWS</u>			
	<u>Notes:</u>			
	The removal and reinstatement of doors, frames, windows, etc for the purpose of altering, servicing and/or repairing are measured elsewhere			
	Carried Forward			R
	Section No. 2			
	Bill No. 1			
	Alterations			

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	Brought Forward			R
	The removal of ironmongery, glass, putty, etc and the refixing, reglazing and redecorating of existing doors, frames, windows, etc are all measured elsewhere Repairing and/or replacement of existing ironmongery is measured elsewhere <u>Supplementary Preambles:</u> Repairwork to timber to include for the following, unless otherwise described: 1. Timber used in repairs is to match existing in type, moisture content, colour and grain as closely as possible 2. Approved modern, high-strength waterproof glues which can accommodate any timber movement should be used together with sawdust filler of matching timber 3. Only non-corrosive fixings are to be used 4. All clamping and pinning as necessary <u>EXISTING WINDOWS</u> <u>Servicing of existing windows including thoroughly cleaning down of all dirt, scale and general contamination from all surfaces, pulleys, handles, rods, fanlight openers, catches, etc. and servicing and lubricating all moving parts, carefully removing all paint from and polishing all brassware and replacing of damaged or missing screws, nuts, etc. (repairing or replacement of existing ironmongery, removal of glass, putty, etc. re-glazing and preparing for and redecorating of existing frames, sashes, etc. all elsewhere measured):</u>			
20	Aluminium window size 500 x 1185mm high overall with burglar bars (WT-01)	No	9	
21	Aluminium window size 600 x 900mm high overall with burglar bars (WT-02)	No	20	
	Carried Forward			R
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[illegible]

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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 2</u>			
	<u>MASONRY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 116 - Brick and Blockwork			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>BRICKWORK</u>			
	<u>General:</u>			
	Non-load bearing brickwork is to be built to full height less 20mm gap next to the ceiling and is to be left for 14 days before grouting up in 1:3 cement mortar.			
	<u>Sizes in descriptions:</u>			
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick			
	<u>Hollow walls:</u>			
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole			
	Carried Forward		R	
	Section No. 2 Bill No. 2 Masonry			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward	R
<u>Bagged and sealed walls:</u> Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats bitumen emulsion waterproofing coating <u>Face bricks :</u> Bricks shall be ordered timeously to obtain uniformity in size and colour All face brickwork shall be regularly cleaned down as the work proceeds and shall be protected as necessary by an approved method <u>Pointing:</u> Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include smooth floated square recessed, hollow recessed, weathered pointing, etc <u>BLOCKWORK</u> <u>Concrete masonry units:</u> Blocks are to be either solid or hollow modular dense concrete masonry units having a compressive strength of 7MPa <u>Wall ties for blockwork:</u> Wall ties shall be polypropylene ties complying with BS 76377. Ties for hollow walls shall be of sufficient length to allow not less than 75mm of each end to be built into the blockwork. Ties are to be spaced at intervals of not more than 1m in the horizontal direction and not more than 400mm staggered in the vertical direction except at openings, vertical joints or ends of walls where they are to be placed vertically above each other <u>Blockwork:</u> Blockwork shall comply with SANS 10145 "Concrete Masonry Construction"	
Carried Forward	R
Section No. 2 Bill No. 2 Masonry	

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Brought Forward			R
Surfaces to be plastered shall have joints raked out to a depth of at least 10mm to provide a key. Cavities of hollow walls shall be kept free of mortar droppings or other undesirable matter. Every second perpend of the bottom course of the external skin of hollow walls shall be left open as a weep hole			
<u>Standard complementary blocks:</u>			
Descriptions of blockwork shall be deemed to include standard complementary blocks such as corner, three-quarter, half and quarter blocks required in the construction of corners, reveals, jambs, ends, etc to solid and hollow walls and for bonding as necessary			
<u>DECORATIVE BLOCKS</u>			
Blocks shall be of approved manufacture, sound, well burnt or cured and uniform and true in size, shape and colour			
<u>SUPERSTRUCTURE</u>			
<u>Brickwork of NFP bricks in class II mortar</u>			
1	Half brick walls	m2	5
<u>BRICKWORK SUNDRIES</u>			
	Cutting toothings and bonding new brickwork to existing	m2	RATE ONLY
<u>Joint forming material in movement joints:</u>			
2	12mm Fibre board built in vertically through brick walls	m	RATE ONLY
<u>2,5mm Brickwork reinforcement:</u>			
3	75mm Wide reinforcement built in horizontally	m	15
<u>Prestressed fabricated concrete lintels, including necessary temporary supports:</u>			
4	75 x 110mm Lintels in lengths not exceeding 3m long	m	RATE ONLY
<u>Turning pieces to lintels, etc:</u>			
5	220mm Wide turning pieces	m	RATE ONLY
Carried Forward			R
Section No. 2 Bill No. 2 Masonry			

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Brought Forward Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 2 Masonry		R R	

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 3</u>			
<u>WATERPROOFING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 120 - Waterproofing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Waterproofing:</u>			
Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee. Waterproofing to roofs shall be laid to even falls to outlets, etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs			
Carried Forward		R	
Section No. 2 Bill No. 3 Waterproofing			

Brought Forward		R
<u>DAMPPROOFING OF WALLS AND FLOORS</u>		
<u>One layer 375 micron embossed polyethylene dampproof course (SANS 952-1985 type B):</u>		
1	In walls	m2 10
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 3 Waterproofing		R

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 4</u>			
<u>ROOF COVERINGS</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the ends of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
Profiled metal roof sheeting and accessories shall be supplied with a 10 year guarantee and be installed by an approved installer			
All fixing holes shall be drilled and not punched			
Roof covering accessories shall be manufactured from the same material as used for roof covering			
<u>PROFILED METAL SHEETING AND ACCESSORIES (WORK GROUP 124)</u>			
Carried Forward		R	
Section No. 2 Bill No. 4 Roof Coverings			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>0,53mm "Klip-Tite 700" or similar approved, profile Z275 spelter galvanised steel light industrial troughed interlocking roof sheeting in single lengths and accessories, with "Chromodek" or similar approved finish to one side, fixed to timber purlins:</u>			
1	Roof coverings with pitch not exceeding 25 degrees	m2	773
<u>Accessories:</u>			
2	Ridge capping 462mm girth	m	102
3	Narrow and broad flute closers	m	318
<u>ROOF AND WALL INSULATION (WORK GROUP 122)</u>			
<u>Heavy industrial grade aluminium foil based insulation:</u>			
4	Two sided bubble insulation membrane	m2	773
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 4 Roof Coverings			R

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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 5</u>			
	<u>CARPENTRY AND JOINERY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 126 - Carpentry & Joinery			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Fixing:</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
	<u>Joinery:</u>			
	Descriptions of frames shall be deemed to include frames, transomes, rails, etc			
	Carried Forward		R	
	Section No. 2 Bill No. 5 Carpentry and Joinery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward	R
Descriptions of hardwood joinery shall be deemed to include sinking and pelleting heads and nuts of bolts <u>Particle board</u> All particle board shall comply with SANS 50312 having the required marking as per SANS 50312/EN 312 <u>Decorative thermosetting plastic laminate covering:</u> Laminate covering shall be glued under pressure and edge strips of same shall be butt jointed at junctions with adjacent similar finish <u>Sizes:</u> Sizes are nominal and the Contractor shall make allowance in his prices for minor variances in stated finished sizes of timber doors, door members, door frames, architraves, etc <u>Prices</u> Prices for all joinery work are to include for general framing, housing and notching, arris rounded angles, glueing, blocking, planting on, screwing, adhesives, dowels, pellets, cross tongues, screws and nails and setting up complete and also for all square cutting and waste. Tops shall be secured with metal or hardwood buttons.	
Carried Forward	R
Section No. 2 Bill No. 5 Carpentry and Joinery	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
AMANZIMTOTI STATION

Brought Forward			R
<u>ROOFS, ETC</u>			
<u>EAVES, VERGES, ETC</u>			
<u>Medium density plain fibre-cement fascias and barge boards:</u>			
1	19 x 235mm Fascias and barge boards, including aluminium H-profile jointing strips	m	318
<u>FLOORS, ETC</u>			
<u>SKIRTINGS</u>			
<u>Wrought meranti:</u>			
2	19 x 76mm Skirtings including 19mm quadrant bead, nailed	m	74
<u>DOORS, ETC</u>			
<u>Solid hardwood with slated panels with sides and counselled edges to suit opening, hung to steel frames:</u>			
3	44mm Door 820 x 2100mm high, including 390 x 300mm high framed openings (TP-01)	No	6
4	44mm Door 900 x 2400mm high, including 390 x 300mm high framed openings (TP-02)	No	18
5	44mm Door 890 x 2125mm high (TP-03)	No	1
6	44mm Door 813 x 2125mm high (TP-04)	No	1
7	44mm Door 813 x 2125mm high (TP-06)	No	3
<u>BUDGETARY ALLOWANCE</u>			
8	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry carpentry and joinery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 5			
Carpentry and Joinery			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 6</u>			
<u>CEILINGS, PARTITIONS AND ACCESS FLOORING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 129 - Ceilings			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
<u>Ceilings:</u>			
Unless otherwise described, ceilings shall be deemed to be horizontal			
Carried Forward		R	
Section No. 2 Bill No. 6 Ceilings, Partitions and Access Flooring			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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	Brought Forward			R
	<u>Bulkheads:</u> Bulkheads are defined as those portions of ceilings which are stepped down from the general ceiling level in a particular room or area and which generally occur along the perimeter. Their purpose is either to conceal services or to create architectural features Bulkheads have only been described as such where they conform to the above definition and where the horizontal, vertical or sloping dimensions do not exceed 1200mm. Where these dimensions are more than 1200mm such portions of ceilings have been included in the appropriate general items of ceilings Unless otherwise described, bulkheads shall be deemed to be horizontal along the length <u>Openings:</u> Prices for openings for light fittings, ventilation grilles, air conditioning diffusers, etc. are to include for any necessary additional support, trimming around, etc. <u>Steel components:</u> All steel components for ceilings, partitions, etc are to be galvanised in accordance with SANS 121 <u>INSULATION</u> <u>Non-combustible fibreglass insulation of a density of not less than 10kg/m3 bonded with an inert thermo-setting resin:</u>			
1	120mm Insulation in blanket form, closely fitted and laid on top of branderling between roof timbers, etc.	m2	132	
	Carried Forward			R
	Section No. 2 Bill No. 6 Ceilings, Partitions and Access Flooring			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward			R
<u>NAILED UP CEILINGS</u>			
<u>9.5mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>			
2	Ceilings including 38 x 38mm sawn softwood brandering at 400mm centres and cross brandering at 400mm centres	m2	8
<u>12mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>			
3	Ceilings including 38 x 38mm sawn softwood brandering at 400mm centres and cross brandering at 400mm centres	m2	60
4	Extra over ceiling for 600 x 600mm trap door of 38 x 38mm wrought softwood rebated framing with one cross brander, covered with ceiling board and fitted flush in opening, including necessary trimmers around	No	9
<u>Gypsum plasterboard cornices:</u>			
5	75mm Coved cornices	m	323
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 6			
Ceilings, Partitions and Access Flooring			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 7</u> <u>IRONMONGERY</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 132 - Ironmongery <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration			
Carried Forward		R	
Section No. 2 Bill No. 7 Ironmongery			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward				R
<u>Locks:</u>				
Notwithstanding Clause 2, Item 3 of the "Ironmongery" trade of the "Standard System of Measuring Building Work, Seventh Edition", descriptions of locks shall be deemed to include two keys per lock				
<u>Finishes to ironmongery:</u>				
Where applicable, finishes to ironmongery are indicated by suffixes in accordance with the following list:				
BS	Satin bronze lacquered			
CH	Chromium plated			
SC	Satin chromium plated			
SE	Silver enamelled			
GE	Grey enamelled			
AN	Anodised natural			
AS	Anodised silver			
AB	Anodised bronze			
AG	Anodised gold			
ABL	Anodised black			
PB	Polished brass			
PL	Polished and lacquered			
PT	Epoxy coated			
SD	Sanded			
BBS	Brushed stainless steel			

<u>HINGES, BOLTS, ETC</u>				
<u>"Union" or similar approved:</u>				
1	"Ref. CZ80941SCR" or similar approved sliding indicator bolt set	No	20	
<u>LOCKS</u>				
2	Commercial cylinder sash lock	No	17	
3	75mm Three lever upright mortice rebated lockset with satin chrome furniture (TP-01)	No	10	
<u>"Calini" or similar approved:</u>				
4	"Ref. IW2051" or similar approved double cylinder suitable for master key	No		
				RATE ONLY
Carried Forward				R
Section No. 2 Bill No. 7 Ironmongery				

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Brought Forward			R
<u>HANDLES</u>			
<u>"Union Assa Abloy" or similar approved:</u>			
5	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle with back plates	No 20	
6	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle	No	RATE ONLY
7	100mm Chromium plated bow handle bolted through door with the bolt ends hammered to prevent the nuts being removed	No 10	
<u>PUSH PLATES AND KICK PLATES</u>			
<u>1,2mm Thick satin finished stainless steel plates countersunk screwed along edges at not exceeding 200mm centres:</u>			
8	300 x 150mm Kick plate	No 17	
<u>DOOR CLOSERS</u>			
<u>"Union Assa Abloy" or similar approved:</u>			
9	"Ref. 7770" door closer	No 2	
<u>SUNDRIES</u>			
<u>"Union Assa Abloy" or similar approved:</u>			
10	"Ref. 99022SS" door stop, plugged	No 24	
Carried Forward			R
Section No. 2 Bill No. 7 Ironmongery			

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Brought Forward			R
<u>BATHROOM FITTINGS</u>			
<u>"Franke" or similar approved:</u>			
11	"Ref. EXOS618X" soap dispenser, plugged	No	2
12	"Ref. BS646" stainless steel soap dish, plugged	No	2
13	"Ref. STRX672" stainless steel lockable toilet roll holder, plugged	No	17
14	"Ref. RODX602 " paper towel dispenser and waste bin combination, plugged	No	19
15	"Ref. BS611V" stainless steel sanitary towel disposal bin, plugged	No	17
16	32mm "Ref. CNTX750" stainless steel back grab rail 750mm long, plugged	No	1
17	32mm "Ref. CNTX700A" stainless steel side grab rail 874mm girth, plugged	No	1
18	"Ref. CNTX400A" fold down shower seat, plugged	No	2
<u>BUDGETARY ALLOWANCE</u>			
19	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry ironmongery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 7			
Ironmongery			

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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 8</u>			
	<u>STRUCTURAL STEELWORK</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 134 - Structural Steelwork in Buildings			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Specification:</u>			
	All structural steel must comply with SANS 1200H (Degree of Accuracy II)			
	All hot rolled structural steel sections must comply with SANS 1431 grade 300W, unless otherwise specified on the drawings			
	Unless otherwise designated, all bolts and nuts will be grade 4.6 to SANS 135 and BS 916. Descriptions of bolts shall be deemed to include nuts and washers. Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
	Carried Forward		R	
	Section No. 2 Bill No. 8 Structural Steelwork			

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Brought Forward		R
All connections must be welded all round with a 6mm fillet weld, unless otherwise specified on the drawings		
<u>Drawings and shop details:</u>		
The Contractor shall be responsible for preparing shop drawings and details which must be submitted to the Principal Agent for approval prior to commencement of fabrication.		
Before commencing any fabrication, the steel fabricator must check the accessibility of the site and design the sizes of individual parts accordingly		
<u>Hot-dipped galvanizing:</u>		
After fabrication and prior to delivery to site, all steelwork described as hot-dipped galvanized, is to be descaled and thoroughly cleaned by pickling, after which it is to be hot dip galvanized in accordance with the requirements of SANS 121/1501461		
<u>Descriptions:</u>		
Descriptions of bolts shall be deemed to include nuts and washers		
Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete		
Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete		
<u>BUDGETARY ALLOWANCE</u>		
Provide a budgetary allowance of One Hundred Thousand Rand for sundry alterations to structural steelworks be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		
Item		
<u>Paint testing:</u>		
Subcontract amount of Twenty Five Thousand Rand for quality control inspection by an authorised independent authority		SUM
Carried Forward		R
Section No. 2 Bill No. 8 Structural Steelwork		

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Brought Forward		R
3	Profit	%
4	Attendance	%
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 8 Structural Steelwork		R

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 9</u>			
<u>METALWORK</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 136 - Metalwork			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Descriptions of bolts, anchors, etc:</u>			
Descriptions of bolts shall be deemed to include nuts and washers			
Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
Items described as "holed for bolt(s)" shall be deemed to exclude the bolts, unless otherwise described			
Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres			
Carried Forward		R	
Section No. 2 Bill No. 9 Metalwork			

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Brought Forward <u>Fixing:</u> Unless otherwise described, descriptions of items shall be deemed to include for fixing to brickwork or concrete Where items are described as "bolted", the bolts are measured elsewhere as stated in clause N.7 of the Model Preambles			R
Section No. 2 Bill No. 9 Metalwork			R

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Brought Forward			R
<u>PRESSED STEEL DOOR FRAMES</u>			
<u>1,6mm Rebated frames suitable for one brick walls:</u>			
1	Frame for door 820 x 2400mm high with three hinges per leaf (TP-02)	No 1	
2	Frame for door 810 x 2125mm high with three hinges per leaf (TP-03)	No 2	
3	Frame for door 813 x 2125mm high with three hinges per leaf (TP-04)	No 1	
4	Frame for door 813 x 2125mm high with three hinges per leaf (TP-06)	No 3	
<u>PRESSED STEEL COMBINATION DOORS AND FRAMES</u>			
<u>Flush both sides doors:</u>			
5	835 x 2070mm High anti-corrosive galvanised and epoxy coated mild steel door with concealed sides and edges (TP-01)	No 2	
6	835 x 2070mm High anti-corrosive galvanised and epoxy coated mild steel door with concealed sides and edges (TP-05)	No 1	
<u>ALUMINIUM WINDOWS, DOORS, ETC</u>			
<u>Aluminium windows, doors, etc:</u>			
The successful tenderer shall be responsible for the complete design work including determining required section sizes and fixing details, all subject to the Project Manager's approval			
Doors, windows, etc shall be designed and constructed to withstand wind pressures of 1,1kn/m2 (unfactored) and 1,5kn/m2 (factored)			
All calculations shall be submitted to the Project Manager for approval			
Carried Forward			R
Section No. 2 Bill No. 9 Metalwork			

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SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward Doors and windows shall comply with AAAMSA design criteria Glazing shall comply with SAGGA regulations. Glass thicknesses shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings Doors and windows shall be supplied with protective tape and plastic which shall be removed only once surrounding trades have been completed The following certificates shall be provided prior to commencement of site work: 1 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product 2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively 3 A copy of the relevant Performance Compliance Report from the system suppliers 4 A copy of the relevant Safiera Energy Rating Certification 5 A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process 6 A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 10400-N, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked 7 A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degradation for a period of not less than five years		R	
Carried Forward Section No. 2 Bill No. 9 Metalwork		R	

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Brought Forward		R	
All windows and door joints must be sealed to the inside with "Dow Corning" or similar approved silicone during manufacturing All dimensions shall be verified on site before commencing the work and a full set of shop drawings showing all relevant details shall be submitted to the Architect for his approval, prior to the manufacture of the units <u>Sizes</u> Where sizes are given these are nominal sizes <u>Ironmongery</u> The tenderer must allow in his pricing for supply and fixing of ALL ironmongery Heavy duty high quality fittings must be allowed for and samples will be required for approval by the Project Manager <u>STEEL ROLLER SHUTTERS, ETC</u> <u>Natural anodised zincalume roller shutters:</u>			
7	Steel security gate approximately 2485mm wide x 2500mm high overall (TP-08)	No	14
<u>BUDGETARY ALLOWANCE</u>			
8	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry metalwork to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2		R	
Section No. 2			
Bill No. 9			
Metalwork			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 10</u>			
<u>PLASTERING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 142 - In situ finishes			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Moisture tests:</u>			
Before any finishes, coverings, etc are applied to screeds, plastering, etc or any other in-situ finish, moisture tests are to be carried out to the complete satisfaction of the Project Manager to ensure that these surfaces have the correct moisture content for the finish to be applied			
<u>Labours, etc</u>			
Labours such as fair, rounded and chamfered edges, trowel cuts, throats, V-joints, angles, etc shall be deemed to be included in the descriptions			
Carried Forward		R	
Section No. 2 Bill No. 10 Plastering			

Brought Forward <u>Sample Panels</u> A sample panel size 1m x1m, of each of the various plaster type wall and floor finishes in this contract, shall be prepared for the approval of the Project Manager and the cost of the sample panel(s) shall be deemed to be included in the overall costs of the <u>relevant</u> wall and floor finishes <u>GRANOLITHIC</u> <u>Method:</u> The method to be used shall be either the monolithic method or the bonded method <u>Preparation:</u> For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic applied immediately thereafter. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slab shall then be wetted and kept damp for at least six hours before applying the granolithic <u>Mix:</u> Unless otherwise described, granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SANS 1083 and shall generally be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregate shall be increased to the maximum size compatible with the thickness of the granolithic	R
Carried Forward Section No. 2 Bill No. 10 Plastering	R

Brought Forward <u>Panels:</u> Granolithic shall be laid in panels not exceeding 14m² for monolithic finishes, not exceeding 9,5m² for bonded finishes and not exceeding 6m² for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width Where possible joints between panels shall be positioned over joints in the floor slab and shall be at least 3mm wide through the full thickness of the finish, separated by strips of wood or fibreboard and finished with V-joints <u>Laying:</u> Monolithic granolithic shall be applied to the partially set slab and thoroughly compacted and lightly wood floated to the required levels Bonded granolithic shall be applied to the slab after applying a 1:1 sand-and-cement slurry brushed over the surface and allowed to partially set before applying the granolithic. The granolithic shall be thoroughly compacted and lightly wood floated to the required levels After wood floating, the monolithic and bonded granolithic shall remain undisturbed until bleeding has ceased and the surface has stiffened. Any remaining bleed water and laitance shall then be removed and the surface steel trowelled or power floated <u>Curing, seasoning and protection:</u> Granolithic shall be covered with clean hessian with waterproof building foil over and kept wet for at least seven days after laying <u>Colour:</u> Coloured granolithic shall be tinted with an approved colouring pigment mixed into a true and even colour	R
Carried Forward Section No. 2 Bill No. 10 Plastering	R

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Brought Forward			R
<u>TINTED WHITE CEMENT SCREEDS</u>			
Tinted screed shall be composed of one bag White Portland Cement or similar approved and two wheelbarrows "Malmesbury" or similar approved sand. Surfaces shall be finished with a steel trowel to leave a smooth finish and coated with two coats "Earthcote S.I. Floorcote" or similar approved two-pack polyurethane floor sealer applied as per the manufacturer's recommendations			
NOTE: Tinted screeds are to be strengthened with "Primal Eccos" acrylic polymer (15% of the water volume is to be substituted with the acrylic polymer during the mixing process)			
Coarse sand is to be used for these screeds			
All tinting, finishing, strengthening, etc are to be mixed, applied, etc strictly in accordance with the manufacturer's instructions			
<u>CEMENT PLASTER</u>			
Unless otherwise described, cement plaster shall be taken to mean Class 1 cement plaster i.e. 1:4 cement:sand plaster (common cement)			
<u>INTERNAL PLASTER</u>			
<u>Cement plaster wood floated for tiles, on brickwork:</u>			
1	On walls	m2	9
2	On narrow widths	m2	5
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 10			
Plastering			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 11</u>			
<u>TILING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 144 - Tiling			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Unless described as "fixed with adhesive to plaster (plaster elsewhere)", descriptions of tiling on brick or concrete walls, columns, etc shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors, etc shall be deemed to include 1:3 cement plaster bedding			
Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat			
Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts from the "Tal Goldstar" or similar approved range of products as recommended by the manufacturer of the tiles			
Carried Forward		R	
Section No. 2 Bill No. 11 Tiling			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward			R
<u>Preparatory work to existing painted plastered surfaces:</u>			
Preparation of all existing painted plastered surfaces is to include for removing all loose and flaking material by wire brushing, thoroughly washing down and allowing to dry completely and applying one coat masonry bonding agent			
<u>WALL TILING</u>			
<u>Ceramic tiles (Allow a Prime Cost Amount of R 350/m2 delivered to site) fixed with adhesive to plaster (plaster elsewhere) and flush pointing with and including waterproof grout:</u>			
1	On walls	m2	648
2	On narrow widths	m2	60
3	On walls in isolated panels, splashbacks, etc.	m2	5
<u>FLOOR TILING</u>			
<u>Porcelain floor tiles (Allow a Prime Cost Amount of R 350/m2 delivered to site) fixed with adhesive to screed (screed elsewhere) and flush pointing with and including waterproof grout:</u>			
4	On floors	m2	133
5	Skirting 100mm high (of fair cut tiles)	m	
<u>SUNDRIES</u>			
<u>Stainless steel dividing strips:</u>			
6	28 x 10 x 2,5mm L-section dividing strips between tiles	m	176
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 11			
Tiling			

RATE ONLY

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Brought Forward	R
<u>French drains:</u> Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site <u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>Stainless steel basins, sinks, wash troughs, urinals, etc:</u> Stainless steel for economy basins, domestic sinks and worktops shall be Type 430 (17/0) Stainless steel for urinals, basins, quality sinks, wash troughs, institutional equipment, etc shall be Type 304 (18/8) Stainless steel for laboratory sinks, photographic equipment, etc shall be Type 316 (18/8) Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable <u>Sealing of edges:</u> Outer edges of sinks, basins, baths, urinals, etc are to be sealed against adjacent surfaces with approved mildew resistant silicone sealant and prices must include therefor <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings	
Carried Forward	R
Section No. 2 Bill No. 12 Plumbing and Drainage	

Brought Forward	R
<u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground	
Carried Forward	R
Section No. 2 Bill No. 12 Plumbing and Drainage	

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Brought Forward	R
Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claims for extra bushes, reducers, etc will be entertained <u>Fixing of pipes:</u> Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc casting in, building in or suspending not exceeding 1m below suspension level <u>Paper wrapping to pipes:</u> Pipes chased into brickwork must be wrapped with two layers of stout brown paper tied with wire. Rates are to include for wrapping around joints and fittings <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SANS 1200L (provision for disinfection elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 12 Plumbing and Drainage	

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Brought Forward	R
<u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SANS 1200L : Medium-pressure pipelines SANS 1200LD : Sewers SANS 1200LE : Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding	
Carried Forward	R
Section No. 2 Bill No. 12 Plumbing and Drainage	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward <u>General:</u> Descriptions of cast iron roof outlets shall be deemed to include joints to pipes and casting into concrete (adaptors for joints to PVC pipes, etc are given separately) Descriptions of overflow pipes where measured in number, shall be deemed to include joints to cisterns and splay cut ends Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured) and shall have straight or side outlets and "P" or "S" traps as necessary Description of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings. <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere)		R	
Carried Forward Section No. 2 Bill No. 12 Plumbing and Drainage		R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward			R
<u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration -----			
<u>SANITARY FITTINGS (WORK GROUP 148)</u>			
<u>"Franke" or similar approved stainless steel:</u>			
1	1050 x 535mm "Trendline 711 Code: 1030006" sink with 350 x 460mm end bowl, on cupboard (cupboard elsewhere)	No	1
<u>"Vaal" or similar approved:</u>			
2	455 x 290mm "Hibiscus" 7050 wash hand basin bolted to wall	No	2
3	"Hibiscus" 772402 close-coupled WC suite comprising pan with double flap heavy duty thermoset seat (Code: 8531Z0) and matching 9 litre cistern	No	1
<u>WASTE UNIONS, ETC</u>			
<u>"Cobra Watertech" or similar approved:</u>			
4	40mm Code 317 CP basin waste union and code 309CP anti-theft plug	No	2
<u>TRAPS, ETC</u>			
<u>uPVC:</u>			
5	40mm "P" or "S" trap	No	2
Carried Forward			R
Section No. 2 Bill No. 12 Plumbing and Drainage			

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Brought Forward			R
<u>TAPS, VALVES, ETC</u>			
<u>"Cobra Watertech" or similar approved:</u>			
6	15mm Code1065-15CP fullway isolating ball valve	No 2	
7	15mm Code 902CP "Focus" basin mixer with waste union, etc and angle flow regulating valves	No 2	
<u>AS-BUILT DRAWINGS</u>			
8	Provision of as-built drawings	Item	
<u>BUDGETARY ALLOWANCE</u>			
9	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry plumbing works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 12			
Plumbing and Drainage			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 13</u>			
<u>GLAZING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 150 - Glazing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Float glass:</u>			
The term "float glass" is used for monolithic annealed glass			
<u>Laminated glass:</u>			
Laminated glass to have polyvinyl butyral (PVB) interlayer(s)			
Carried Forward		R	
Section No. 2 Bill No. 13 Glazing			

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Brought Forward			R
<u>GLAZING TO STEEL WITH PUTTY</u>			
<u>6,38mm Normal strength (NS) clear laminated safety glass:</u>			
1	Panes not exceeding 0,5m2	m2	2
2	Panes exceeding 0,5m2 and not exceeding 2,0m2	m2	3
<u>TOPS, SHELVES, DOORS, MIRRORS, ETC</u>			
<u>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges fixed with double sided adhesive tape:</u>			
3	Mirror 600 x 1200mm high	No	2
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 13			
Glazing			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 14</u> <u>PAINTWORK</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 152 - Painting <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>PREPARATORY WORK TO EXISTING WORK</u> <u>Previously painted plastered surfaces:</u> Surfaces shall be thoroughly washed down and allowed to dry completely before any paint is applied. Blistered or peeling paint shall be completely removed and minor cracks shall be opened, filled with a suitable filler and finished smooth <u>Previously painted metal surfaces:</u> Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal			
Section No. 2 Bill No. 14 Paintwork		Carried Forward	R

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	Brought Forward			R
	<u>Previously painted wood surfaces:</u> Surfaces shall be thoroughly cleaned down. Blistered or peeling paint shall be completely removed and cracks and crevices shall be primed, filled with suitable filler and finished smooth <u>PAINT SPECIFICATIONS</u> All painting shall be done in accordance with "Plascon" or similar approved, etc specifications, unless otherwise described <u>COLOURS</u> When staining timber, the resultant colour or shade must be to the complete satisfaction of the Project Manager before any overcoating or preservative is applied Paintwork is classified in the following different colour groups: "White", "Pastel", "Deep" and "Transparent" in accordance with the "Natural Colour System" (NCS) adopted by the SA National Standards Unless otherwise described, all paintwork shall be deemed to be classified in the "White" colour group <u>PAINTWORK, ETC TO PREVIOUSLY PAINTED WORK</u> <u>ON INTERNAL FLOATED PLASTER SURFACES</u> <u>One coat superior quality acrylic emulsion paint for interior and exterior use, on work in sound condition:</u>			
1	Walls	m2	734	
	<u>ON FIBRE-CEMENT BOARD SURFACES</u> <u>One coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use, on:</u>			
2	Ceilings and cornices, including priming metal cover strips and nailheads	m2	132	
	Carried Forward			R
	Section No. 2 Bill No. 14 Paintwork			

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	Brought Forward			R
3	On fascias and barge boards, etc. not exceeding 300mm girth	m	20	
	<u>METAL SURFACES WITH</u>			
	<u>One coat alkyd based zinc phosphate primer and two coats premium quality polyurethane enamel paint, on steel:</u>			
4	Doors	m2	2	
5	Window with burglars	m2	5	
6	Roof coverings	m2	748	
	<u>ON WOOD SURFACES</u>			
	<u>One coat primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on:</u>			
7	Doors	m2	34	
Carried Forward to Summary of Section No. 2				R
Section No. 2				
Bill No. 14				
Paintwork				

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**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Item No		Quantity	Rate	Amount
	<u>SECTION 3</u>			
	<u>BILL NO. 1</u>			
	<u>EXTERNAL WORK (PROVISIONAL)</u>			
	<u>(ALL TRADES)</u>			
	<u>WORK GROUP ALLOCATION</u>			
	The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
	<u>PREAMBLES</u>			
	The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Nature of ground:</u>			
	The nature of the ground is assumed to be loose sandy material, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be gravel, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be silty clay with loose river boulders varying in size up to approximately 450mm diameter, all of which will be deemed as "earth", but possibly interspersed with "hard rock"			
	Carried Forward		R	
	Section No. 3 Bill No. 1 External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward	R
Trial holes indicate that the nature of the ground is silty clay to a depth of approximately 500mm with fine to medium loose sandy material below, therefore "earth" A soils investigation has been carried out on the site by the Engineer and the report is annexed to these bills of quantities. The soils report indicates that the ground varies between transported soils at surface comprising gravel layers of varying thickness and interspersed with clay, and weathered shales varying from very soft rock to medium hard rock consistency, all of which will be deemed as "earth". All very hard unweathered shale, ironstone, etc the removal of which necessitates the use of explosives or heavy duty hydraulic percussion hammers (peckers), will be classified as "hard rock" Should the Contractor encounter any "soft" or "hard" rock in the excavations, he shall immediately notify the Engineer who shall be the sole arbiter as to what constitutes "soft" or "hard" rock for final account purposes <u>Subterranean water:</u> No subterranean water is expected <u>Excavation for working space in rock:</u> Notwithstanding clause 11 of the Standard System of Measuring Building Work, excavation for working space in rock will be measured in cubic metres to the extent executed and given as "extra over" bulk excavation or trench and hole excavation as the case may be <u>Carting away of excavated material:</u> Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site <u>Filling:</u> Notwithstanding the reference to prescribed multiple handling in Clause 1 of the Standard System of Measuring Building Work, prices for filling and backfilling shall include for all selection and any necessary multiple handling of material	
Carried Forward	R
Section No. 3 Bill No. 1 External Works (Provisional)	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
AMANZIMTOTI STATION

Brought Forward			R
<u>Testing:</u>			
<i>Prices for backfilling to trenches and holes only are to include for all necessary density tests in accordance with SANS 1200D</i>			
<u>Maintenance period:</u>			
The maintenance period to civil works such as roads, parking and related earthworks shall be twelve calendar months			
<u>DEMOLITIONS, ETC (WORK GROUP 104)</u>			
<u>Breaking up and removing:</u>			
1	Existing tar surfaces and replace with 30mm tar (Tar measured elsewhere)	m2	100
<u>Taking down and removing:</u>			
2	2400mm High precast concrete panel fence	m	50
<u>SITE CLEARANCE, ETC (WORK GROUP 104)</u>			
<u>Site clearance:</u>			
3	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth	m2	500
<u>ROADS, PAVINGS, ETC.</u>			
<u>ROADWORK</u>			
<u>Site clearance</u>			
4	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	100
<u>Excavation not exceeding 2m deep</u>			
5	Over site between buildings, retaining walls, etc. to reduce levels and depositing excavated material in prescribed stock piles on site	m3	33
Carried Forward			R
Section No. 3 Bill No. 1 External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>Extra over bulk excavation in earth for excavation in</u>			
6	Soft rock	m3	5
7	Hard rock	m3	3
<u>Extra over bulk excavation in earth for breaking up and removing</u>			
8	30mm Asphalt	m3	5
<u>Extra over all excavations for carting away</u>			
9	Surplus material from stock piles on site to a dumping site to be located by the contractor	m3	33
<u>Keeping excavations free of water</u>			
10	Keeping excavations free of all water other than subterranean water	Item	
<u>Earth filling supplied by the contractor under pavings etc</u>			
11	Over site of G7 material in accordance with SABS 1200 DM compacted to 93% Mod AASHTO density	m3	15
12	Over site of G5 material in accordance with SABS 1200 DM compacted to 95% Mod AASHTO density	m3	15
<u>Compaction of surfaces</u>			
13	Compaction of ground surface under roads, pavings, etc. including scarifying for a depth of 75mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m2	100
<u>Prescribed density tests on filling</u>			
14	In-situ dry density (sand replacement) test in accordance with method A10 (a) of TMH 1	No	8
15	Maximum dry density and optimum moisture content test in accordance with method A7 of TMH 1	No	8
Carried Forward			R
Section No. 3 Bill No. 1 External Works (Provisional)			

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Brought Forward			R
<u>Bituminous premix road surfacing:</u>			
16	35mm Thick paving to parking areas, roadways, etc. including bitumen spray to base course	m2	100
<u>Bituminous surface treatment with aggregate and slurry seal 13.2mm aggregate</u>			
17	Bitumen rubber binder in the tack coat and 60%net bitumen emulsion in the penetration spray	m2	100
<u>Variations in quantities of prime and bituminous binders</u>			
18	RTH 3/12P or RTL 3/12P tar prime		147
<u>Paintwork:</u>			
<u>Prepare and apply one coat white reflective road marking paint on bituminous road surfacing, precast concrete paving blocks, etc:</u>			
19	100mm Wide line	m	527
<u>FENCING (WORK GROUP 136)</u>			
<u>Precast concrete fencing</u>			
20	Precast concrete palisade fencing 2.40m high	m	50
<u>New gates:</u>			
21	Double leaf Sliding Gate 6.2 x 1.8m to suit palisade fence	No	1
<u>BUDGETARY ALLOWANCE</u>			
22	Provide a budgetary allowance of Fifteen Thousand Rand for sundry external works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 3			R
Section No. 3			
Bill No. 1			
External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Item No	Quantity	Rate	Amount
<u>SECTION 3</u>			
<u>BILL NO. 2</u>			
<u>SITE SERVICES (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
<u>PREAMBLES</u>			
The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Stormwater channels:</u>			
Descriptions of channels shall be deemed to include necessary excavation, surface preparation, compaction, etc and disposal of surplus material on site			
<u>French drains:</u>			
Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site			
Carried Forward		R	
Section No. 3 Bill No. 2 Site Services (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward <u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings <u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions	R
Carried Forward Section No. 3 Bill No. 2 Site Services (Provisional)	R

Brought Forward <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016 Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claim for extra bushes, reducers, etc will be entertained <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SABS 1200L (provision for disinfection elsewhere)		R	
Carried Forward Section No. 3 Bill No. 2 Site Services (Provisional)		R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward <u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SABS 1200L : Medium-pressure pipelines SABS 1200LD : Sewers SABS 1200LE: Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding <u>General:</u> Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site	R
Carried Forward Section No. 3 Bill No. 2 Site Services (Provisional)	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere) ----- <u>SOIL DRAINAGE (WORK GROUP 146)</u>			
1	Excavation in earth not exceeding 1m deep for pipe trenches	m3	53
2	Excavation in earth exceeding 1m and not exceeding 2m deep for pipe trenches	m3	76
3	Excavation in earth exceeding 2m and not exceeding 3m deep for pipe trenches	m3	95
4	Backfilling to pipe trenches	m3	1
5	Selected granular filling in bedding under and filling around pipes	m3	66
<u>Heavy duty (Class 34) uPVC sewer and drain pipes:</u>			
6	110mm Pipes laid in trenches (trenches elsewhere)	m	10
7	160mm Pipes laid in trenches (trenches elsewhere)	m	170
<u>Extra over heavy duty (Class 34) uPVC sewer and drain pipes for fittings:</u>			
8	110mm Bend	No	6
9	110mm Junction	No	5
10	110mm Rodding eye	No	3
Carried Forward			R
Section No. 3 Bill No. 2 Site Services (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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	Brought Forward			R
11	110mm Reducing junction	No	3	
12	160mm Overflow gulley head	No	2	
13	160mm Access reducing junction	No	2	
14	160mm Access junction	No	6	
	<u>Cast iron covers, etc:</u>			
15	1000mm Diameter manhole cover and frame	No	6	
16	Lifting-key for manhole cover (handed to Employer)	No	6	
	<u>Precast Concrete Manhole</u>			
	<u>Manhole formed of precast concrete manhole rings, components all bedded and jointed with approved water tight jointing, 260mm thick 20MPa/19mm mass concrete base projecting 75mm beyond external face of chamber ring and sealed to ring with 75mm wide x 125mm high 20MPa/19mm mass concrete triangular fillet, complete with precast concrete medium duty cover and frame, with and including neccessary step iron, 20MPa/19mm mass concrete benching in bottom with top surfaces to falls and including 160mm vitrified clay channels, channel bends, channel junctions, etc., additional excavation and backfilling compacted to 93% modified AASHTO density</u>			
17	1000mm Diameter manhole not exceeding 1m deep	No	2	
18	1000mm Diameter manhole exceeding 1m but not exceeding 2m deep	No	2	
19	1000mm Diameter manhole exceeding 2m but not exceeding 3m deep	No	2	
20	Cutting into existing 160mm drain pipe for and forming junction with 110mm pipe	No	1	
	<u>Alterations:</u>			
21	Excavate for and locate existing 160mm diameter uPVC soil drain pipe approximately 2000mm deep and connect to 160mm diameter uPVC pipe including all necessary fittings, backfilling, etc	No	3	
	Carried Forward			R
	Section No. 3			
	Bill No. 2			
	Site Services (Provisional)			

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Brought Forward		R
<u>Testing:</u>		
22	Testing soil drainage system	Item
<u>AS-BUILT DRAWINGS</u>		
23	Provision of as-built drawings	Item
<u>BUDGETARY ALLOWANCE</u>		
24	Provide a budgetary allowance of Seventy Five Thousand Rand for the decommissioning of an old and construction of a new septic tank to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item
Carried Forward to Summary of Section No. 3		R
Section No. 3		
Bill No. 2		
Site Services (Provisional)		

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Bill No	SECTION SUMMARY - External Works	Page No	Amount
1	External Works (Provisional)	82	
2	Site Services (Provisional)	89	
Carried to Final Summary Section No. 3			R

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Item No	Quantity	Rate	Amount
<u>SECTION NO. 4</u>			
<u>BILL NO. 1</u>			
<u>ELECTRICAL INSTALLATION</u>			
<u>LOW VOLTAGE</u>			
<u>DISCONNECTION/ REMOVAL OF REDUNDANT ELECTRICAL EQUIPMENT</u>			
<u>The following equipment shall be isolated, disconnected, removed and handed over to the Employer's</u>			
1	Decommissioning and stripping of existing electrical installations including cables, conductors, luminaires, control devices, DB's, etc in the existing building.		SUM
<u>LV SWITCHGEAR</u>			
<u>DBs and LV Switchgear</u>			
<u>Manufacture, deliver to site, install, commission, test kiosks, distribution boards as per specification and single line diagram, to be housed in electrical. All electrical panels shall be stainless steel material, rates to include powder coated, busbars and drilling, busbar connections internal wiring etc. Refer to single line diagram for electrical panel colour</u>			
2	Kiosk - Main DB	No 1	
3	Kiosk - Hawkers	No 1	
<u>CABLES AND CONDUCTORS</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>Supply, deliver to site cables and conductors as specified. Install, rack, strap and testing of cables as per specification including clamps, ties and cable numbering system</u>			
4	2,5mm conductors (mixed colours - live, neutral and earth)	m	620
5	4,0mm conductors (mixed colours - live, neutral and earth)	m	100
6	2.5 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	30
7	10 mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	250
<u>CABLES TERMINATIONS</u>			
<u>Termination of cables shall include supply installation and testing of the glands with corrosion guard , making-off the cable, lugs, and fitting the gland to the board gland plate, switchgear or equipment and final connection of cable tails into board or terminals. Include for Reducing Glands and shrouds where applicable. NB: IP65 Glands are to be used where applicable.</u>			
8	10 mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	4
9	2,5mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	2
10	20mm PVC Conduit including all necessary accessories. Rate to include chasing wall for conduit in the wall, close wall and make good.	m	260
<u>LUMINARIES AND CONTROL DEVICES</u>			
<u>Supply, deliver, accept and store the following luminaries, complete with lamps and control gear as per specification. See and refer to the specification document for details of each luminary.</u>			
11	Type A5 - IP65 Rated, 30W / +/-4440 lm LED - 4000k vapour-proof Surface-mounted weather-proof luminaire, GRP body and acrylic diffuser, with 50000 hours lifespan.	No	8
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

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Brought Forward			R
12	Type B1 - IP65 Rated high-pressure die cast aluminium base and trim ring 20W/ +/- 2600lm LED - 4000k bulkhead luminaire with an opal high-impact acrylic diffuser, with 50000 hours lifespan.	No	11
13	Type FL1 - 180W / +/-27000lm LED (4000k) Streetlight rated IP66 with powder coating as per specification	No	5
14	Retrofit existing luminaire by replacing existing with 36W T8 / T5 lamps with a LED tube 28W / 2100lumen on a 4ft luminaire	No	20
15	Photo electric cell as per specification	No	2
16	New steel cage for lighting. Cage shall be hot dip galvanised	No	8
17	Supply and installation of 20 Amp 1-Pole surface mounted isolator, complete with all necessary accessories	No	1
18	Supply and installation of 20 Amp, IP66, 1-pole surface isolator mounted on the security steel cage, complete with all necessary accessories	No	1
<u>Supply, install, test and commissioning of the Lightning protection of the buildings on two corners of the buildings, complete with all necessary required material, accessories for a complete installation. Contractor to use copper earth spike, aluminium or copper conductors as per specification, and have testing points for the building. Rates to include all necessary required accessories for a complete installation. The installation must comply with SANS 10313.</u>			
19	Hawkers/Shops & ablutions		SUM
<u>GENERATOR SET</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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	Brought Forward		R	
	<u>Manufacture, deliver to site, install, test and commission of a generator set 400 volts at 50Hz as per specification and single line diagram. The generator shall be enclosed or containerised on a stainless steel Gr1316. Rates to include for steelwork and powder coated, busbars and drilling, busbar connections internal wiring, earthing for the generator set, etc. Refer to attached single line diagram. ♦</u>			
20	60kVA, 400V, 3phase silent Diesel Engine Alternator Set including automatic change-over panel and weatherproof 3CR12-steel canopy.	SUM		
21	Stainless steel Metal cladded thermal insulation of exhaust pipe and silencer within the enclosure.	SUM		
22	Water Trap/Fuel Filter cartridge	SUM		
	<u>Electrical reticulation</u>			
23	Interconnecting control & power cabling between genset and alternator and AMF panel	SUM		
24	Support & protection of exposed cabling between genset & AMF panel	SUM		
25	Electronic hooter & red flashing general alarm light mounted on the AMF panel.	SUM		
26	Remote alarm indicator panel complete the red indicator lamp and label - GENERATOR FAULT	SUM		
27	External emergency stop push button and cabling	SUM		
28	Earthing of the generator set	SUM		
	<u>Commissioning</u>			
29	Test & commission on site with load	SUM		
30	Resistance testing of earth system	SUM		
31	Balancing of the essential loads	SUM		
32	Electrical Certification of Compliance	SUM		
	Carried Forward		R	
	Section No. 4 Bill No. 1 Electrical Installation			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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	Brought Forward			R
	<u>Signage</u>			
33	As per OHS Act - fire & resussitation etc.			SUM
34	Generator "Manual Start/Test Procedure"			SUM
35	Electricity logo on door to AMF panel			SUM
36	Contractors & PRASA's details - laminated plastic			SUM
	<u>General</u>			
37	Diesel fuel for full tank			SUM
38	Laminated plastic framed schematic wiring diagram fixed to the inside of the enclosure adjacent the AMF panel	No	1	
39	A4 size log book on chain in metal envelope in door	No	1	
40	Operational training of Employer's staff			SUM
41	Manuals - 3 sets			SUM
42	Drawings			SUM
	<u>Service</u>			
43	Monthly Inspection every quarter + new fuel filters for 1st year	No	4	
44	Full annual service + new battery for 1st year	No	1	
45	Removal of existing generator set off site to Durban depot			SUM
	<u>TEST AND COMMISSIONING</u>			
	<u>Test and commission the complete electrical installation including completion of quality check sheets, Compliance Certificates & test results and submitting them to the Employer's Representative.</u>			
46	Test and commission the complete electrical installation including Certificates of Compliance & test results to the Engineer.			SUM
	Carried to Final Summary			R
	Section No. 4			
	Bill No. 1			
	Electrical Installation			

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Item No			Quantity	Rate	Amount
	<u>SECTION 5</u>				
	<u>BILL NO. 1</u>				
	<u>HVAC INSTALLATIONS</u>				
	<u>Supply, deliver and install the following HVAC units as per specification:</u>				
1	3.5 kW cooling midwall split indoor unit	No	3		
2	3.5 kW inverter type outdoor condensing unit	No	3		
3	Refrigeration copper piping with thermal insulation and all associated fittings	m	155		
4	PVC condensate drain piping with insulation	m	15		
5	Wired controller	No	3		
6	Provide full service to the through wall / window type unit	No	2		
7	Fabricate, supply, and install lockable security cages around each outdoor condensing unit	No	3		
8	Application of approved coastal treatment for the outdoor condensing units	No	3		
	Carried Forward to Summary of Section No. 5				
	Section No. 5				R
	Bill No. 1				
	HVAC Installations				

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Item No		Quantity	Rate	Amount
	<u>SECTION 5</u>			
	<u>BILL NO. 2</u>			
	<u>WET SERVICES</u>			
	<u>COLD WATER INSTALLATION</u>			
	<u>Supply, install, and commission the water reticulation systems per specification</u>			
	<u>Class 12 HDPE piping laid and buried trenches not exceeding 800mm deep</u>			
1	32mm diameter HDPE CI 12 underground water pipe	m	10	
	<u>Fittings for HDPE class 12 piping</u>			
2	25mm diameter Adaptor to pex piping	m	2	
3	32mm diameter Equal tee	m	2	
4	32mm diameter - 25mm diameter Reducer	m	2	
	<u>PEX piping</u>			
5	15mm diameter pipe	m	101	
6	22mm diameter pipe	m	30	
7	28mm diameter pipe	m	12	
	<u>PEX piping fittings</u>			
8	15mm diameter Elbow	No	37	
9	22mm diameter Elbow	No	4	
10	28mm diameter Elbow	No	1	
11	22mm diameter Equal tee	No	20	
	Carried Forward		R	
	Section No. 5			
	Bill No. 2			
	Wet Services			

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Brought Forward				R
12	22-15mm diameter Reducer	No	36	
13	28-15mm diameter Reducer	No	4	
14	28-22mm diameter Reducer	No	2	
<u>Plastic pipe compression fittings and valves</u>				
15	15mm Female elbow	No	32	
16	22mm diameter Isolation valve	No	4	
17	22mm diameter strainer valve	No	4	
18	28mm diameter Isolation valve	No	1	
19	28mm diameter strainer valve	No	1	
<u>Pipe hangers - anchor, treaded rod & hilti hanger</u>				
20	15mm diameter	No	20	
21	22mm diameter	No	15	
22	28mm diameter	No	3	
<u>Heavy brown paper loosely wrapped around pipe as sheath for expansion</u>				
23	15-22mm diameter	m	80	
<u>Potable water system</u>				
24	10 000 l PVC Potable water tank with all associated isolation valves and strainers	No	1	
25	Variable speed potable water booster pump capable of delivering 2.3 l/s at 45m of H ₂ O with all associated valves, fitting, PVC pipework, and auto start/stop control circuit.	No	2	
26	Fabricate, supply, and install lockable security cages around the duty/standby potable water pumps	No	1	
<u>DRAINAGE, ETC</u>				
Carried Forward				R
Section No. 5 Bill No. 2 Wet Services				

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	Brought Forward			R
	<u>Sewer and drainage pipes and fittings shall be through solid wall Class 34 uPVC socketed soil piping in according to SABS 791, jointed and sealed with butyl rubber rings soil, waste and vent pipes and fittings shall be according to SABS 967 and solvent jointed cold water supply pressure pipes fittings shall be according SABS 966 and jointed by means of the "Lyng" type jointing system. Pipes shall be fixed and jointed according to SABS 0112</u>			
	<u>Class 34 uPVC pipe</u>			
27	50mm diameter pipe	m	40	
28	110mm diameter pipe	m	70	
	<u>Class 34 uPVC fittings</u>			
29	50mm diameter 90 Deg bend	No	18	
30	110mm diameter 90 Deg bend	No	12	
31	110mm diameter 90 Deg access bend	No	15	
32	50mm diameter 45 Deg bend	No	20	
33	110mm diameter 45 Deg bend	No	15	
34	110mm diameter Pan connector	No	15	
35	50mm diameter Equal access junction	No	12	
36	110mm diameter - 50mm diameter junction	No	9	
37	110mm diameter Equal access junction	No	15	
	Carried Forward to Summary of Section No. 5			R
	Section No. 5			
	Bill No. 2			
	Wet Services			

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Item No	Quantity	Rate	Amount
<u>SECTION 6</u> <u>BILL NO. 1</u> <u>PROVISIONAL AMOUNTS</u> <u>PREAMBLES</u> The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said Model Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>General:</u> Subcontract amounts are net. Subcontract amounts are for material and equipment supplied and installed complete by firms of specialists Each subcontract amount may comprise more than one element of work. Therefore, each subcontract amount may include for work to be carried out by more than one subcontractor <u>Profit:</u> Where stated, the contractor may allow for profit if required			
Carried Forward			R
Section No. 6 Bill No. 1 Provisional Sums, ETC			

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Brought Forward	R
<u>General attendance on nominated/selected subcontractors:</u> The item "General Attendance" which follows each subcontract amount for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following: 1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor 2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract work is to be carried out but excluding water, fuel and power for commissioning of any installation 3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials 4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site 5. The use, at reasonable times by arrangement of the contractor's erected hoisting equipment 6. Making good in all trades and cleaning down and removal of rubbish on completion <u>Special attendance on nominated/selected subcontractors:</u> Where stated, special attendance as set out in clause 8.1 of section B of the Preliminaries will be described in detail in this bill <u>Builder's work:</u> Builder's work in connection with specialist services is given elsewhere in these bills of quantities	
Carried Forward	R
Section No. 6 Bill No. 1 Provisional Sums, ETC	

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Brought Forward			R
<u>PROTECTION SERVICES</u>			
1	Sub-contract amount of Four Hundred Thousand Rand for the provision of protection services to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	400,000.00
2	Profit	%	
3	General attendance	%	
<u>STATION FIXED FURNITURE</u>			
4	Subcontract amount of One Hundred and Fifty Thousand Rand for the provision of fixed station furniture installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	150,000.00
5	Profit	%	
6	General Attendance	%	
<u>STATION SIGNAGE</u>			
7	Subcontract amount of One Hundred and Seventy Five Thousand Rand for the provision of station signage installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	175,000.00
8	Profit	%	
9	General attendance	%	
<u>BUILT-IN CUPBOARDS</u>			
10	Subcontract amount of Twenty Five Thousand Rand for the provision of Built-In Cupboards installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	25,000.00
11	Profit	%	
12	General attendance	%	
Carried Forward			
Section No. 6 Bill No. 1 Provisional Sums, ETC			

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Section No	Page No	Amount
<u>FINAL SUMMARY</u>		
1 Preliminaries and General	22	
2 Building Works	77	
3 External Works	90	
4 Electrical Installations	95	
5 Mechanical Installations	100	
6 Provisional Sums	104	
SUB TOTAL (EXCLUDING CONTINGENCIES)		R
<u>CONTRACT CONTINGENCIES</u>		
Allow the sum of 10% for Contingencies to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required		R
SUBTOTAL (INCLUDING CONTINGENCIES)		R
<u>VALUE ADDED TAX</u>		
Value Added Tax [15%]		R
Carried to Form of Tender		R

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Item No		Quantity	Rate	Amount
	<u>SECTION NO. 1</u>			
	<u>BILL NO. 1</u>			
	<u>PRELIMINARIES AND GENERAL</u>			
	<u>BUILDING AGREEMENT AND PRELIMINARIES</u>			
	The JBCC Principal Building Agreement (May 2018 Edition 6.2) prepared by the Joint Building Contracts Committee shall be the applicable building agreement, amended as hereinafter described			
	The JBCC Principal Building Agreement contract data form an integral part of this agreement			
	The Preliminaries revision 1 (February 2016) published by the Association of South African Quantity Surveyors for use with the JBCC Principal Building Agreement Edition 6.2 shall be deemed to be incorporated in these bills of quantities , amended as hereinafter described			
	The contractor is deemed to have referred to the abovementioned documents for the full intent and meaning of each clause			
	The clauses in the abovementioned documents are hereinafter referred to by clause number and heading only			
	Where any item is not relevant to this agreement such item is marked N/A signifying "not applicable"			
	<u>PREAMBLES FOR TRADES</u>			
	<i>The Model Preambles for Trades 2008 published by the Association of South African Quantity Surveyors is designed to support and extend the abbreviated descriptions utilised in these bills of quantities by inter alia referring to SANS construction standards.</i>			
	<i>Note that the text of the Standard System of Measuring Building Work (seventh edition) and that of the Standard Method of Measuring Building Work for Africa 2015 (first edition) is the same</i>			
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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Brought Forward	R
The Model Preambles for Trades 2008 as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained Supplementary preambles and/or specifications are incorporated in these bills of quantities to satisfy the requirements of this project. Such supplementary preambles and/or specifications shall take precedence over the provisions of the Model Preambles The contractor's prices for all items throughout these bills of quantities shall take account of and include for all of the obligations, requirements and specifications given in the Model Preambles and in any supplementary preambles and/or specifications	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

Brought Forward	R
<u>NOTES TO TENDERERS</u> Tenderers are to inspect the drawings issued with these Bills of Quantities and to satisfy themselves with the nature and the requirements of the Contract works. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to read the descriptions, which are intended as a means of identifying various facets of the work, in conjunction with the drawings. Tenderers shall allow for all costs in connection with the various items taking full cognisance of both the drawings and the Bills of Quantities. Tenderers shall notify the Quantity Surveyor in writing of any discrepancies encountered upon which clarification will be given by the Quantity Surveyor in writing to the Tenderer. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard Tenderers are to note that setting out of the works will be the complete responsibility of the Tenderer and they should therefore acquaint themselves with the site boundaries, site co-ordinates, datum levels etc. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to note that all items with ZERO quantities are Rate Only items and should be priced as such. Tenderers are to note that there might be specified suppliers to be used for certain trades as per the annexure to this tender document. Tenderers should familiarise themselves with the suppliers on the list and ensure to allow for accordingly. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to fully acquaint themselves with the construction period and shall allow for any night shift if required. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard.	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

Brought Forward			R
<u>STRUCTURE OF THIS PRELIMINARIES BILL</u>			
Section A : A recital of the headings of the individual clauses of the aforementioned JBCC Principal Building Agreement			
Section B : A recital of the headings of the individual clauses of the aforementioned Preliminaries document			
Section C : Any special clauses to meet the particular circumstances of the project			
<u>PRICING OF PRELIMINARIES</u>			
Should the contractor select Option A in the contract data for the adjustment of preliminaries , the amounts entered against the relevant items in these preliminaries are to be divided into one or more of the three categories provided namely fixed (F), value related (V) and time related (T)			
<u>SECTION A: PRINCIPAL BUILDING AGREEMENT</u>			
<u>Interpretation (A1-A7)</u>			
1	Clause 1.0 - Definitions and interpretation		
	F:..... V:..... T:.....	Item	
2	Clause 2.0 - Law, regulations and notices		
	F:..... V:..... T:.....	Item	
3	Clause 3.0 - Offer and acceptance		
	F:..... V:..... T:.....	Item	
4	Clause 4.0 - Assignment and cession		
	F:..... V:..... T:.....	Item	
Carried Forward			R
Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
5	Clause 5.0 - Contract documents F:..... V:..... T:.....	Item	
6	Clause 6.0 - Employer's agents F:..... V:..... T:.....	Item	
7	Clause 7.0 - Design responsibility F:..... V:..... T:.....	Item	
	<u>Insurance and security (A8-A11)</u>		
8	Clause 8.0 - Works risk F:..... V:..... T:.....	Item	
9	Clause 9.0 - Indemnities F:..... V:..... T:.....	Item	
10	Clause 10.0 - Insurances F:..... V:..... T:.....	Item	
11	Clause 11.0 - Security F:..... V:..... T:.....	Item	
	<u>Execution (A12 - A17)</u>		
12	Clause 12.0 - Duties of the parties F:..... V:..... T:.....	Item	
	Carried Forward		R
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Brought Forward			R
13	Clause 13.0 - Setting out F:..... V:..... T:.....	Item	
14	Clause 14.0 - Nominated subcontractors F:..... V:..... T:.....	Item	
15	Clause 15.0 - Selected subcontractors F:..... V:..... T:.....	Item	
16	Clause 16.0 - Direct contractors Attendance on direct contractors In respect of direct contractors the contractor shall: F:..... V:..... T:.....	Item	
17	Clause 17.0 - Contract instructions Site instructions Instructions issued on site are to be recorded in a site instruction book which is to be supplied and maintained on site by the contractor F:..... V:..... T:..... <u>Completion (A18 - A24)</u>	Item	
18	Clause 18.0 - Interim completion F:..... V:..... T:.....	Item	
19	Clause 19.0 - Practical completion F:..... V:..... T:.....	Item	
Carried Forward			R
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	Brought Forward		R	
20	Clause 20.0 - Sectional completion			
	F:..... V:..... T:.....	Item		
21	Clause 21.0 - Defects liability period and final completion			
	F:..... V:..... T:.....	Item		
22	Clause 22.0 - Latent defects liability period			
	F:..... V:..... T:.....	Item		
23	Clause 23.0 - Revision of date for practical completion			
	Substitution of materials and goods			
	The removal or substitution of any materials and goods which do not conform to the specification or the contract drawings shall not constitute grounds for the extension of the construction period nor for the adjustment of the contract value [17.1.8, 23.1 & 2]			
	F:..... V:..... T:.....	Item		
24	Clause 24.0 - Penalty for late or non-completion			
	F:..... V:..... T:..... [To be determined based on the contract sum]	Item		
	<u>Payment (A25 - A27)</u>			
25	Clause 25.0 - Payment			
	F:..... V:..... T:.....	Item		
26	Clause 26.0 - Adjustment of the contract value and final account			
	Carried Forward		R	
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Brought Forward		R
	F:..... V:..... T:.....	Item
27	Clause 27.0 - Recovery of expense and/or loss	
	F:..... V:..... T:.....	Item
<u>Suspension and termination (A28 - A29)</u>		
28	Clause 28.0 - Suspension by the contractor	
	F:..... V:..... T:.....	Item
29	Clause 29.0 - Termination	
	F:..... V:..... T:.....	Item
<u>Dispute resolution (A30)</u>		
30	Clause 30.0 - Dispute resolution	
	F:..... V:..... T:.....	Item
	The required information of the parties and the amount of the contract sum shall be inserted in the agreement for signature of the agreement by the parties	
	F:..... V:..... T:.....	Item
	F:..... V:..... T:.....	Item
Carried Forward		R
Section No. 1 Bill No. 1 Preliminaries		

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Brought Forward	R
<u>42.1 CONTRACTING AND OTHER PARTIES</u>	
42.1.1 Employer:	
Passenger Rail Agency of South Africa	
Postal address:	
PO Box 51324 Durban 4062	
Tel.: (031) 813 0376	
Physical Address:	
65 Masabalala Yengwa Avenue Durban Station Durban 4000	
<u>42.2 CONTRACT DETAILS</u>	
42.2.1 Works Description:	
Refurbishment, Alterations and Additions at Amanzimtotti Protection Services for a period of six (6) months	
42.2.2 Site Description:	
Amanzimtotti Train Station	
42.2.3 Work or installations by direct contractors:	
N/A	
42.2.4 This agreement is for a government contract where there are specific options that are applicable to a State organ only	
Yes	
Carried Forward	R
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Brought Forward	R
42.2.5 Date on which possession of the site is intended to be given: TBC	
42.2.6 Period for the commencement of the works after the contractor takes possession: TBC	
42.2.7 For the works as a whole . Intended date of practical completion and the penalty per calendar day	
Six (6) Months after contractual commencement date	
0.04% of contract amount per calendar day Penalty Amount	
42.2.8 For the works in sections : Intended date of practical completion and the penalty per calendar day: N/A	
42.2.9 The law applicable to this agreement shall be that of	
<i>South Africa (country)</i>	
<u>42.3 INSURANCES</u>	
42.3.1 Contract works insurance to be effected by:	
<i>Contractor:</i>	
<i>For the Sum of R Contract Amount + 30.00 %</i>	
<i>With a deductible of - to be determined by the contractor</i>	
42.3.2 Supplementary insurance is required	
<i>No</i>	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

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Brought Forward 42.3.3 Public liability insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R 1 000 000-00</i> <i>With a deductible of - to be determined by the contractor</i> <u>42.4 DOCUMENTS</u> 42.4.1 Waivers of contractors lien or right of continuing possession is required Yes 42.4.2 Number of construction document copies to be supplied to the contractor free of charge: 3 Number of 42.4.3 Bills of Quantities/Lump sum document schedule of rates drawn up in accordance with: “Standard System of Measuring Builders’ Work” 42.4.4 On acceptance of the tender the bills of quantities/lump sum document is to be submitted within: <i>The priced bills of quantities must be handed in with the tender</i> 42.4.5 JBCC Engineering General Conditions are to be included in the contract documents: No 42.4.6 The contract value is to be adjusted using escalation adjustment indices N/A Where JBCC CPAP is to be used <i>Base Month</i> N/A 42.4.7 Details of changes made to the provision of JBCC standard documentation: <u>SECTION B: PRELIMINARIES</u> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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	Brought Forward		R	
	<u>Interpretation (B1)</u>			
31	Clause 1.1 - Definitions F:..... V:..... T:.....	Item		
32	Clause 1.2 - Interpretation F:..... V:..... T:.....	Item		
	<u>Documents (B2)</u>			
33	Clause 2.1 - Checking of documents F:..... V:..... T:.....	Item		
34	Clause 2.2 - Provisional bills of quantities F:..... V:..... T:.....	Item		
35	Clause 2.3 - Availability of construction information F:..... V:..... T:.....	Item		
36	Clause 2.4 - Ordering of materials and goods F:..... V:..... T:.....	Item		
	<u>Previous work and adjoining properties (B3)</u>			
37	Clause 3.1 - Previous work - dimensional accuracy F:..... V:..... T:.....	Item		
38	Clause 3.2 - Previous work - defects F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R	
39	Clause 3.3 - Inspection of adjoining properties F:..... V:..... T:.....	Item		
	<u>The site (B4)</u>			
40	Clause 4.1 - Defined works area F:..... V:..... T:.....	Item		
41	Clause 4.2 - Handover of site in stages F:..... V:..... T:.....	Item		
42	Clause 4.3 - Enclosure of the works F:..... V:..... T:.....	Item		
43	Clause 4.4 - Geotechnical investigation F:..... V:..... T:.....	Item		
44	Clause 4.5 - Encroachments F:..... V:..... T:.....	Item		
45	Clause 4.6 - Existing premises occupied F:..... V:..... T:.....	Item		
46	Clause 4.7 - Services - known F:..... V:..... T:.....	Item		
47	Clause 4.8 - Protection of trees and/or relevant natural features F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R	
	<u>Management of contract (B5)</u>			
48	Clause 5.1 - Management of the works F:..... V:..... T:.....	Item		
49	Clause 5.2 - Progress meetings F:..... V:..... T:.....	Item		
50	Clause 5.3 - Technical meetings F:..... V:..... T:.....	Item		
	<u>Samples, shop drawings and manufacturer's instructions (B6)</u>			
51	Clause 6.1 - Samples of materials F:..... V:..... T:.....	Item		
52	Clause 6.2 - Workmanship samples F:..... V:..... T:.....	Item		
53	Clause 6.3 - Shop drawings F:..... V:..... T:.....	Item		
54	Clause 6.4 - Compliance with manufacturer's instructions F:..... V:..... T:.....	Item		
	<u>Deposits and fees (B7)</u>			
55	Clause 7.1 - Deposits and fees F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
	<u>Temporary services (B8)</u>			
56	Clause 8.1 - Water F:..... V:..... T:.....	Item		
57	Clause 8.2 - Electricity F:..... V:..... T:.....	Item		
58	Clause 8.3 - Ablution and welfare facilities F:..... V:..... T:.....	Item		
59	Clause 8.4 - Communication facilities F:..... V:..... T:.....	Item		
	<u>Prime cost amounts (B9)</u>			
60	Clause 9.1 - Responsibility for prime cost amounts F:..... V:..... T:.....	Item		
	<u>Attendance on subcontractors (B10)</u>			
61	Clause 10.1 - General attendance F:..... V:..... T:.....	Item		
62	Clause 10.2 - Special attendance F:..... V:..... T:.....	Item		
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	Brought Forward		R	
	<u>General (B11)</u>			
63	Clause 11.1 - Protection of the works F:..... V:..... T:.....	Item		
64	Clause 11.2 - Protection/isolation of existing/sectionally occupied works F:..... V:..... T:.....	Item		
65	Clause 11.3 - Security of the works F:..... V:..... T:.....	Item		
66	Clause 11.4 - Notice before covering work F:..... V:..... T:.....	Item		
67	Clause 11.5 - Disturbance F:..... V:..... T:..... Clause 11.6 - Environmental disturbance F:..... V:..... T:.....	Item Item		
68	Clause 11.7 - Works cleaning and clearing F:..... V:..... T:.....	Item		
69	Clause 11.8 - Vermin F:..... V:..... T:.....	Item		
70	Clause 11.9 - Overhand work F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R
71	Clause 11.11 - Advertising F:..... V:..... T:..... <u>Preliminaries schedule (B12)</u>	Item	
72	Information for completion of the preliminaries schedule Information necessary for elections and completion of those clauses contained in the preliminaries schedule which are necessary for tender purposes is given hereunder. Where no information is given it shall mean that no specific requirements are expected or that the clause is not relevant to this specific contract 12.1 - Provisional bills of quantities [2.2] The quantities are provisional - <u>Yes</u> 12.2 - Availability of construction information [2.3] Construction documentation is complete - <u>Yes</u> 12.3 - Previous work - dimensional accuracy [3.1] 12.4 - Previous work - defects [3.2] 12.5 - Inspection of adjoining properties [3.3] 12.6 - Defined works area [4.1] 12.7 - Handover of site in stages [4.2] 12.8 - Enclosure of the works [4.3] 12.9 - Geotechnical investigation [4.4] 12.10 - Existing premises occupied [4.6] 12.11 - Services - known [4.7] 12.12 - Protection of trees and/or relevant natural features [4.8]		
	Carried Forward		R
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Brought Forward	R
12.13 - Water [8.1] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.14 - Electricity [8.2] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.15 - Ablution and welfare facilities [8.3] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> 12.16 - Communication facilities [8.4] 12.17 - Protection of the works [11.1] 12.18 - Protection/isolation of existing/sectionally occupied works [11.2] Protection/isolation is required - <u>Yes</u> 12.19 - Disturbance [11.5] 12.20 - Environmental disturbance [11.6] Controlling all forms of pollution The contractor shall be responsible for and take all precautions in controlling by whatever means necessary all forms of pollution emanating from the site during the construction period due <i>inter alia</i> to noise, artificial light, wind-blown sand, dust, deposits of mud, etc The contractor is to ensure that all roads which border the site and is used by the contractor during the execution of the works are kept clean and free of any dirt or debris caused by the execution of the works	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

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	Brought Forward		R
75	Overloading The contractor shall take all necessary steps to ensure that no damage occurs due to overloading of any portion of the works or temporary works eg scaffolding, etc. The contractor shall submit details of his proposed loading, storage, plant erection, etc to the principal agent for approval prior to proceeding with such loading, storing or erecting and shall comply with and pay for the principal agent's requirements in connection with the provision of temporary support work, etc. Any damage caused to the works by overloading shall be made good by the contractor at his sole expense F:..... V:..... T:.....	Item	
76	Propping of floors below The contractor is advised that propping of floors below may be required if he wishes to use any areas of completed suspended reinforced concrete slabs for vehicle access, storage of materials and goods and location of plant, scaffolding, etc. The location of these areas and any necessary propping shall be approved by the principal agent and the cost thereof shall be borne by the contractor F:..... V:..... T:.....	Item	
77	Testing of flat roof waterproofing for watertightness Flat roof waterproof areas shall be prepared with small sand dykes around them of a size and enclosing an area approved by the principal agent, flooded with water and kept "ponded" for at least forty (40) hours as a test to ensure the watertightness of the waterproofing and before any further construction work is carried out above the waterproofing F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R	
	The contractor is to submit to the principal agent on an annual basis a schedule of spend, split into vendors engaged as subcontractors and suppliers indicating their BBBEE rating including proof of the said rating F:..... V:..... T:.....	Item		
78	Advertising rights The employer may elect to contract with advertising agencies for the erection of advertising hoardings, banners, wraps or the like for the duration of the contract. The contractor shall not prevent such an arrangement and will assist in the facilitation of same. Position and type of advertising structure to be agreed with the principal agent so as not to hinder the contractor in meeting the obligations under this agreement F:..... V:..... T:.....	Item		
79	Confidentiality The contractor undertakes to maintain in confidence any and all information regarding this project and shall obtain appropriate similar undertakings from all subcontractors and suppliers. Such information shall not be used in any way except in connection with the execution of the works No information regarding this project shall be published or disclosed without the prior written consent of the employer F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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80	Brought Forward Media releases All rights of publication of articles in the media, together with any advertising relating thereto or in any way connected with this project, shall vest with the employer The contractor together with his subcontractors shall not, without the prior written consent of the employer, cause any statement or advertisement connected with this project to be printed, screened or aired by the media F:..... V:..... T:..... <u>SUMMARY OF CATEGORIES</u> Category : Fixed R..... Category : Value R..... Category : Time R..... Carried to Final Summary Section No. 1 Bill No. 1 Preliminaries	Item	R	
				R

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO.1</u>			
<u>ALTERATIONS (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 102 - Alterations			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition), as published by the Association of South African Quantity Surveyors, shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items, fully described in the said General Preambles, will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>View site:</u>			
Before submitting his tender, the Contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished.			
No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained			
<u>Old materials to become property of the Contractor:</u>			
Old materials from alterations, except where described as to be re-used or handed over, become the property of the Contractor, who must allow credit for same in the last item of the "Alterations" trade			
Carried Forward		R	
Section No. 2 Bill No. 1 Alterations			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward <u>Old materials to be carted away:</u> Old materials from the alterations, except where described as to be re-used or handed over, as well as all rubbish, etc must be regularly carted from the site and not be allowed to accumulate on or around the site <u>Old materials to be re-used:</u> None of the old materials are to be used for new work, except where specifically described as being set aside for re-use <u>Handing over of materials:</u> Where certain materials or articles from demolitions or alterations are described as to be "handed over to the Employer", it shall be taken to mean "handed over by the Contractor to the Principal Agent" and such materials or articles shall be properly stored by the Contractor until handing over thereof and shall include all necessary transport The Contractor must obtain an official receipt from the Principal Agent listing the materials or articles and dates of handing over Should the Contractor fail to submit the receipt when requested to do so, it shall be deemed that the materials or articles are still in his possession and he will be held liable to the Employer for the full replacement value thereof, which amount will be deducted from any monies due to the Contractor <u>Explosives:</u> No explosives whatsoever may be used for demolition purposes, unless otherwise stated		R	
Carried Forward Section No. 2 Bill No. 1 Alterations		R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward	R
<u>GENERAL</u> <u>The contractor shall carry out the whole of the work with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide and erect any temporary tarpaulins and temporary plumbing that may be necessary during the progress of the works, all to the satisfaction of the Architect, and remove when directed.</u> <u>Any water supplies pipes and other piping that may be met with and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the Architect.</u> <u>Doors, fanlights, fittings, frames, linings, etc shall be thoroughly overhauled before re-fixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc and easing, oiling, adjusting and repairing ironmongery if necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted wood to match timber.</u> <u>Where doors, windows, etc are described as taken out this shall be understood to include for removal of all beads, architraves, ironmongery, etc and doors which are re-fixed are to be provided with new architraves (elsewhere measured).</u> <u>Prices for taking out and removing doors and frames shall include for removing door stops, cabin locks, etc and making good to match existing.</u> <u>With regard to building up openings in existing walls, cement screeds and pavings, granolithic, etc, shall be levelled and prepared for raising of brickwork.</u> <u>Allow for making good all existing plastered walls where damaged by furniture, etc, and stopping up all screw and holes before painting.</u> <u>Making good finishes shall be deemed to include making good of the brick and concrete surfaces onto which new finishes are applied, where necessary.</u>	
Carried Forward	R
Section No. 2 Bill No. 1 Alterations	

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Brought Forward				R
<u>The contractor will be required to take all dimensions affecting existing building on the site and he will be held solely responsible for the accuracy of all such dimensions.</u> <u>Hazardous materials:</u> Demolitions of buildings, services, external works, site services, etc are to include for the safe removal and disposal of <u>asbestos or asbestos products or other hazardous materials</u> by approved Registered Specialists <u>TEMPORARY BARRIERS, SCREENS, ETC</u> <u>Temporary barriers, screens, etc including removal:</u>				
1	Dust screen 2100mm high formed of suitable timber framing with 250 micron polyethylene sheeting stapled on including corners, ends, etc, to be used on all the phases of the construction project and in accordance to the Health and Safety specifications and regulations	m	150	
<u>Taking out and removing doors, windows, etc including thresholds, sills, etc from brickwork (altering openings and making good finishes elsewhere):</u>				
2	Timber single door and frame not exceeding 2,5m ²	No	22	
<u>Taking down and removing roof coverings, accessories, etc.:</u>				
3	Roof tiling	m ²	415	
<u>Taking down and removing ceilings, partitions, etc:</u>				
4	Gypsum plasterboard ceilings, including cornices, timber bandering, etc.	m ²	208	
<u>Taking out/off and removing ironmongery:</u>				
5	Toilet paper holder from wall	No	4	
Carried Forward				R
Section No. 2 Bill No. 1 Alterations				

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Brought Forward			R
<u>Hacking up/off and removing ceramic and porcelain tiles, including removing mortar bed or adhesive from concrete or brickwork and preparing surfaces for new screed, plaster, tile finishes, etc:</u>			
6	Tiles to floors	m2	208
7	Tiles to walls	m2	320
8	Tile skirtings 100mm high	m	274
<u>Taking out and removing piping, sanitary fittings, etc including cutting off as necessary, disconnecting piping from fittings and blocking off and making good damaged plasterwork to walls and screeds to floors (all redecoration work elsewhere):</u>			
9	Vitreous china wash hand basin, including short lengths of piping, etc.	No	7
10	Vitreous china WC pan with flush valve, including short lengths of piping, etc.	No	4
11	150 Litre hot water geyser mounted in roof space including drip tray, valves, connecting pipework, etc.	No	4
<u>Taking out/off and removing glass and mirrors:</u>			
12	Mirror 600 x 600mm high from wall	No	39
<u>MAKING GOOD OF FINISHES, ETC</u>			
<u>Making good concrete:</u>			
13	Floors in patches	m2	156
<u>Making good internal/external cement plaster:</u>			
14	Walls in patches	m2	745
<u>GENERAL REPAIRWORK</u>			
Carried Forward			R
Section No. 2 Bill No. 1 Alterations			

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Brought Forward			R
<u>Servicing of existing windows including thoroughly cleaning down of all dirt, scale and general contamination from all surfaces, pulleys, handles, rods, fanlight openers, catches, etc. and servicing and lubricating all moving parts, carefully removing all paint from and polishing all brassware and replacing of damaged or missing screws, nuts, etc. (repairing or replacement of existing ironmongery, removal of glass, putty, etc. re-glazing and preparing for and redecorating of existing frames, sashes, etc. all elsewhere measured):</u>			
16	Aluminium window size 500 x 1185mm high overall with burglar bars (WT-01)	No	4
17	Aluminium window size 600 x 900mm high overall with burglar bars (WT-02)	No	22
<u>BUDGETARY ALLOWANCE</u>			
18	Provide a budgetary allowance of Fifty Thousand Rand for sundry alterations to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 1			
Alterations			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 2</u>			
<u>ROOF COVERINGS</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the ends of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
Profiled metal roof sheeting and accessories shall be supplied with a 10 year guarantee and be installed by an approved installer			
All fixing holes shall be drilled and not punched			
Roof covering accessories shall be manufactured from the same material as used for roof covering			
<u>TILES</u>			
<u>User note:</u>			
The fixing recommendations of the manufacturer of the tiles used for the specific region and/or situation are to be incorporated as supplementary preambles			
Carried Forward		R	
Section No. 2 Bill No. 2 Roof Coverings			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>340 x 420mm "Double Roman" or similar approved concrete/terra cotta tiles nailed with non-corrosive tile nails to 38 x 38mm sawn softwood battens at 340mm centres</u>			
1	Roof covering with pitch not exceeding 25 degrees	m2	415
2	Ridge tiles to match roofing tiles bedded and pointed in 1:3 cement mortar tinted to match tile colour	m	34
<u>ROOF AND WALL INSULATION (WORK GROUP 122)</u>			
<u>Heavy industrial grade aluminium foil based insulation:</u>			
3	Two sided bubble insulation membrane	m2	415
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 2			
Roof Coverings			

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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 3</u>			
	<u>CARPENTRY AND JOINERY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 126 - Carpentry & Joinery			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Fixing:</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
	<u>Joinery:</u>			
	Descriptions of frames shall be deemed to include frames, transomes, rails, etc			
	Descriptions of hardwood joinery shall be deemed to include sinking and pelleting heads and nuts of bolts			
	Carried Forward		R	
	Section No. 2 Bill No. 3 Carpentry and Joinery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward <u>Particle board</u> All particle board shall comply with SANS 50312 having the required marking as per SANS 50312/EN 312 <u>Decorative thermosetting plastic laminate covering:</u> Laminate covering shall be glued under pressure and edge strips of same shall be butt jointed at junctions with adjacent similar finish <u>Sizes:</u> Sizes are nominal and the Contractor shall make allowance in his prices for minor variances in stated finished sizes of timber doors, door members, door frames, architraves, etc <u>Prices</u> Prices for all joinery work are to include for general framing, housing and notching, arris rounded angles, glueing, blocking, planting on, screwing, adhesives, dowels, pellets, cross tongues, screws and nails and setting up complete and also for all square cutting and waste. Tops shall be secured with metal or hardwood buttons.		R	
Carried Forward Section No. 2 Bill No. 3 Carpentry and Joinery		R	

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Brought Forward			R
<u>ROOFS, ETC</u>			
<u>EAVES, VERGES, ETC</u>			
<u>Medium density plain fibre-cement fascias and barge boards:</u>			
1	19 x 235mm Fascias and barge boards, including aluminium H-profile jointing strips [LI]	m	94
<u>FLOORS, ETC</u>			
<u>SKIRTINGS</u>			
<u>Wrought meranti:</u>			
2	19 x 76mm Skirtings including 19mm quadrant bead, nailed	m	274
<u>DOORS, ETC</u>			
<u>Solid hardwood with slated panels with sides and counselled edges to suit opening, hung to steel frames:</u>			
3	44mm Door 820 x 2100mm high, including 390 x 300mm high framed openings (TP-01)	No	11
4	44mm Door 900 x 2400mm high, including 390 x 300mm high framed openings (TP-02)	No	11
5	44mm Door 890 x 2125mm high (TP-03)	No	7
6	44mm Door 813 x 2125mm high (TP-04)	No	4
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fire doors:</u>			
Fire doors are to be in accordance with SANS 1253			
Carried Forward			R
Section No. 2 Bill No. 3 Carpentry and Joinery			

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Brought Forward		R
<u>BUDGETARY ALLOWANCE</u>		
7	Provide a budgetary allowance of Fifteen Thousand Rand for sundry carpentry and joinery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item
Carried Forward to Summary of Section No. 2		R
Section No. 2		
Bill No. 3		
Carpentry and Joinery		

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 4</u>			
<u>CEILINGS, PARTITIONS AND ACCESS FLOORING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 129 - Ceilings			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
<u>Ceilings:</u>			
Unless otherwise described, ceilings shall be deemed to be horizontal			
Carried Forward		R	
Section No. 2 Bill No. 4 Ceilings, Partitions and Access Flooring			

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	Brought Forward			R
	<u>Bulkheads:</u> Bulkheads are defined as those portions of ceilings which are stepped down from the general ceiling level in a particular room or area and which generally occur along the perimeter. Their purpose is either to conceal services or to create architectural features Bulkheads have only been described as such where they conform to the above definition and where the horizontal, vertical or sloping dimensions do not exceed 1200mm. Where these dimensions are more than 1200mm such portions of ceilings have been included in the appropriate general items of ceilings Unless otherwise described, bulkheads shall be deemed to be horizontal along the length <u>Openings:</u> Prices for openings for light fittings, ventilation grilles, air conditioning diffusers, etc. are to include for any necessary additional support, trimming around, etc. <u>Steel components:</u> All steel components for ceilings, partitions, etc are to be galvanised in accordance with SANS 121 <u>INSULATION</u> <u>Non-combustible fibreglass insulation of a density of not less than 10kg/m3 bonded with an inert thermo-setting resin:</u>			
1	120mm Insulation in blanket form, closely fitted and laid on top of branderling between roof timbers, etc.	m2	156	
	Carried Forward			R
	Section No. 2 Bill No. 4 Ceilings, Partitions and Access Flooring			

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Brought Forward			R
<u>NAILED UP CEILINGS</u>			
<u>9.5mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>			
2	Ceilings including 38 x 38mm sawn softwood brandering at 400mm centres and cross brandering at 400mm centres	m2	156
<u>12mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>			
3	Ceilings including 38 x 38mm sawn softwood brandering at 400mm centres and cross brandering at 400mm centres	m2	52
4	Extra over ceiling for 600 x 600mm trap door of 38 x 38mm wrought softwood rebated framing with one cross brander, covered with ceiling board and fitted flush in opening, including necessary trimmers around	No	18
<u>Gypsum plasterboard cornices:</u>			
5	75mm Coved cornices	m	274
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 4			
Ceilings, Partitions and Access Flooring			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 5</u> <u>IRONMONGERY</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 132 - Ironmongery <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration			
Carried Forward		R	
Section No. 2 Bill No. 5 Ironmongery			

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Brought Forward			R
<u>Locks:</u> Notwithstanding Clause 2, Item 3 of the "Ironmongery" trade of the "Standard System of Measuring Building Work, Seventh Edition", descriptions of locks shall be deemed to include two keys per lock <u>Finishes to ironmongery:</u> Where applicable, finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin bronze lacquered CH Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AN Anodised natural AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded BBS Brushed stainless steel <u>HINGES, BOLTS, ETC</u> <u>"Union" or similar approved:</u>			
1	"Ref. CZ80941SCR" or similar approved sliding indicator bolt set	No	4
<u>LOCKS</u>			
2	Commercial cylinder sash lock	No	4
3	75mm Three lever upright mortice rebated lockset with satin chrome furniture (TP-01)	No	18
<u>"Calini" or similar approved:</u>			
4	"Ref. IW2051" or similar approved double cylinder suitable for master key	No	7
<u>HANDLES</u>			
Carried Forward			R
Section No. 2 Bill No. 5 Ironmongery			

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Brought Forward			R	
<u>"Union Assa Abloy" or similar approved:</u>				
5	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle with back plates	No	4	
6	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle	No		RATE ONLY
7	100mm Chromium plated bow handle bolted through door with the bolt ends hammered to prevent the nuts being removed	No	18	
<u>DOOR CLOSERS</u>				
<u>"Union Assa Abloy" or similar approved:</u>				
8	"Ref. 7770" door closer	No	22	
<u>SUNDRIES</u>				
<u>"Union Assa Abloy" or similar approved:</u>				
9	"Ref. 99022SS" door stop, plugged	No	15	
Carried Forward			R	
Section No. 2 Bill No. 5 Ironmongery				

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Brought Forward			R
<u>BATHROOM FITTINGS</u>			
<u>"Franke" or similar approved:</u>			
10	"Ref. EXOS618X" soap dispenser, plugged	No	21
11	"Ref. STRX672" stainless steel lockable toilet roll holder, plugged	No	4
12	"Ref. RODX602 " paper towel dispenser and waste bin combination, plugged	No	14
<u>BUDGETARY ALLOWANCE</u>			
13	Provide a budgetary allowance of Fifteen Thousand Rand for sundry ironmongery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 5			
Ironmongery			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 6</u> <u>METALWORK</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 136 - Metalwork <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Descriptions of bolts, anchors, etc:</u> Descriptions of bolts shall be deemed to include nuts and washers Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete Items described as "holed for bolt(s)" shall be deemed to exclude the bolts, unless otherwise described Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres			
Carried Forward		R	
Section No. 2 Bill No. 6 Metalwork			

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Brought Forward <u>Fixing:</u> Unless otherwise described, descriptions of items shall be deemed to include for fixing to brickwork or concrete Where items are described as "bolted", the bolts are measured elsewhere as stated in clause N.7 of the Model Preambles			R
Section No. 2 Bill No. 6 Metalwork			R

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>PRESSED STEEL DOOR FRAMES</u>			
<u>1,6mm Rebated frames suitable for one brick walls:</u>			
1	Frame for door 820 x 2400mm high with three hinges per leaf (TP-02)	No	18
2	Frame for door 813 x 2125mm high with three hinges per leaf (TP-04)	No	4
<u>ALUMINIUM WINDOWS, DOORS, ETC</u>			
<u>Aluminium windows, doors, etc:</u>			
The successful tenderer shall be responsible for the complete design work including determining required section sizes and fixing details, all subject to the Project Manager's approval			
Doors, windows, etc shall be designed and constructed to withstand wind pressures of 1,1kn/m2 (unfactored) and 1,5kn/m2 (factored)			
All calculations shall be submitted to the Project Manager for approval			
Doors and windows shall comply with AAAMSA design criteria			
Glazing shall comply with SAGGA regulations. Glass thicknesses shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings			
Doors and windows shall be supplied with protective tape and plastic which shall be removed only once surrounding trades have been completed			
The following certificates shall be provided prior to commencement of site work:			
1	A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product		
Carried Forward			R
Section No. 2 Bill No. 6 Metalwork			

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Brought Forward		R
2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively 3 A copy of the relevant Performance Compliance Report from the system suppliers 4 A copy of the relevant Safiera Energy Rating Certification 5 A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process 6 A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 10400-N, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked 7 A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degradation for a period of not less than five years All windows and door joints must be sealed to the inside with "Dow Corning" silicone or similar approved during manufacturing All dimensions shall be verified on site before commencing the work and a full set of shop drawings showing all relevant details shall be submitted to the Architect for his approval, prior to the manufacture of the units <u>Sizes</u> Where sizes are given these are nominal sizes		
Carried Forward		R
Section No. 2 Bill No. 6 Metalwork		

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Brought Forward		R
<u>Ironmongery</u> The tenderer must allow in his pricing for supply and fixing of ALL ironmongery Heavy duty high quality fittings must be allowed for and samples will be required for approval by the Project Manager <u>BUDGETARY ALLOWANCE</u> 3 Provide a budgetary allowance of Fifteen Thousand Rand for sundry metalwork to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 6 Metalwork		R

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 7</u> <u>TILING</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 144 - Tiling <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Fixing:</u> Unless described as "fixed with adhesive to plaster (plaster elsewhere)", descriptions of tiling on brick or concrete walls, columns, etc shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors, etc shall be deemed to include 1:3 cement plaster bedding Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts from the "Tal Goldstar" or similar approved range of products as recommended by the manufacturer of the tiles			
Carried Forward		R	
Section No. 2 Bill No. 7 Tiling			

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Brought Forward			R
<u>Preparatory work to existing painted plastered surfaces:</u>			
Preparation of all existing painted plastered surfaces is to include for removing all loose and flaking material by wire brushing, thoroughly washing down and allowing to dry completely and applying one coat masonry bonding agent			
<u>WALL TILING</u>			
<u>350 x 350mm Ceramic tiles (Allow a Prime Cost Amount of R 250/m2 delivered to site) fixed with adhesive to plaster (plaster elsewhere) and flush pointing with and including waterproof grout:</u>			
1	On walls	m2	320
2	On narrow widths	m2	16
<u>FLOOR TILING</u>			
<u>Porcelain floor tiles (Allow a Prime Cost Amount of R 350/m2 delivered to site) fixed with adhesive to screed (screed elsewhere) and flush pointing with and including waterproof grout:</u>			
3	On floors	m2	208
4	Skirting 100mm high (of fair cut tiles)	m	118
<u>SUNDRIES</u>			
<u>Stainless steel dividing strips:</u>			
5	28 x 10 x 2,5mm L-section dividing strips between tiles	m	118
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 7			
Tiling			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 8</u>			
<u>PLUMBING AND DRAINAGE</u>			
<u>(PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Wire gratings:</u>			
Descriptions of gutter outlets, etc shall be deemed to include wire balloon gratings			
<u>Stormwater channels:</u>			
Descriptions of channels shall be deemed to include necessary excavation, surface preparation, compaction, etc and disposal of surplus material on site			
Carried Forward		R	
Section No. 2 Bill No. 8 Plumbing and Drainage			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward	R
<u>French drains:</u> Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site <u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>Stainless steel basins, sinks, wash troughs, urinals, etc:</u> Stainless steel for economy basins, domestic sinks and worktops shall be Type 430 (17/0) Stainless steel for urinals, basins, quality sinks, wash troughs, institutional equipment, etc shall be Type 304 (18/8) Stainless steel for laboratory sinks, photographic equipment, etc shall be Type 316 (18/8) Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable <u>Sealing of edges:</u> Outer edges of sinks, basins, baths, urinals, etc are to be sealed against adjacent surfaces with approved mildew resistant silicone sealant and prices must include therefor <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings	
Carried Forward	R
Section No. 2 Bill No. 8 Plumbing and Drainage	

Brought Forward	R
<u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground	
Carried Forward	R
Section No. 2 Bill No. 8 Plumbing and Drainage	

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Brought Forward	R
Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claims for extra bushes, reducers, etc will be entertained <u>Fixing of pipes:</u> Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc casting in, building in or suspending not exceeding 1m below suspension level <u>Paper wrapping to pipes:</u> Pipes chased into brickwork must be wrapped with two layers of stout brown paper tied with wire. Rates are to include for wrapping around joints and fittings <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SANS 1200L (provision for disinfection elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 8 Plumbing and Drainage	

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Brought Forward	R
<u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SANS 1200L : Medium-pressure pipelines SANS 1200LD : Sewers SANS 1200LE : Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding	
Carried Forward	R
Section No. 2 Bill No. 8 Plumbing and Drainage	

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward	R
<u>General:</u> Descriptions of cast iron roof outlets shall be deemed to include joints to pipes and casting into concrete (adaptors for joints to PVC pipes, etc are given separately) Descriptions of overflow pipes where measured in number, shall be deemed to include joints to cisterns and splay cut ends Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured) and shall have straight or side outlets and "P" or "S" traps as necessary Description of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings. <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 8 Plumbing and Drainage	

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Brought Forward			R
<u>Proprietary items:</u>			
Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items			
Note that the manufacturers names specified in this trade are for the purposes of competitive pricing.			
Prices are to be based on the specific products/articles specified.			
On request, returnable samples are to be provided to the Project Manager for consideration			
<u>SANITARY FITTINGS (WORK GROUP 148)</u>			
<u>"Franke" or similar approved stainless steel:</u>			
1	1050 x 535mm "Trendline 711 Code: 1030006" sink with 350 x 460mm end bowl, on cupboard (cupboard elsewhere)	No	1
<u>"Vaal" or similar approved:</u>			
2	455 x 290mm "Hibiscus" 7050 wash hand basin bolted to wall	No	7
<u>WASTE UNIONS, ETC</u>			
<u>"Cobra Watertech" or similar approved:</u>			
3	40mm Code 317 CP basin waste union and code 309CP anti-theft plug	No	7
<u>TRAPS, ETC</u>			
<u>uPVC:</u>			
4	40mm "P" or "S" trap	No	7
<u>TAPS, VALVES, ETC</u>			
<u>"Cobra Watertech" or similar approved:</u>			
5	15mm Code1065-15CP fullway isolating ball valve	No	7
Carried Forward			R
Section No. 2 Bill No. 8 Plumbing and Drainage			

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Brought Forward			R
6	15mm Code 902CP "Focus" basin mixer with waste union, etc and angle flow regulating valves	No	7
<u>AS-BUILT DRAWINGS</u>			
7	Provision of as-built drawings		Item
<u>BUDGETARY ALLOWANCE</u>			
8	Provide a budgetary allowance of Fifteen Thousand Rand for sundry plumbing works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		Item
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 8			
Plumbing and Drainage			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 9</u>			
<u>GLAZING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 150 - Glazing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Float glass:</u>			
The term "float glass" is used for monolithic annealed glass			
<u>Laminated glass:</u>			
Laminated glass to have polyvinyl butyral (PVB) interlayer(s)			
Carried Forward		R	
Section No. 2 Bill No. 9 Glazing			

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Brought Forward			R
<u>GLAZING TO STEEL WITH PUTTY</u>			
<u>6,38mm Normal strength (NS) clear laminated safety glass:</u>			
1	Panes exceeding 0,5m2 and not exceeding 2,0m2	m2	29
<u>TOPS, SHELVES, DOORS, MIRRORS, ETC</u>			
<u>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges fixed with double sided adhesive tape:</u>			
2	Mirror 600 x 1200mm high	No	12
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 9			
Glazing			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 10</u> <u>PAINTWORK</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 152 - Painting <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>PREPARATORY WORK TO EXISTING WORK</u> <u>Previously painted plastered surfaces:</u> Surfaces shall be thoroughly washed down and allowed to dry completely before any paint is applied. Blistered or peeling paint shall be completely removed and minor cracks shall be opened, filled with a suitable filler and finished smooth <u>Previously painted metal surfaces:</u> Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal			
Section No. 2 Bill No. 10 Paintwork		Carried Forward	R

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	Brought Forward			R
	<u>Previously painted wood surfaces:</u> Surfaces shall be thoroughly cleaned down. Blistered or peeling paint shall be completely removed and cracks and crevices shall be primed, filled with suitable filler and finished smooth <u>PAINT SPECIFICATIONS</u> All painting shall be done in accordance with "Plascon" or similar approved, etc specifications, unless otherwise described <u>COLOURS</u> When staining timber, the resultant colour or shade must be to the complete satisfaction of the Project Manager before any overcoating or preservative is applied Paintwork is classified in the following different colour groups: "White", "Pastel", "Deep" and "Transparent" in accordance with the "Natural Colour System" (NCS) adopted by the SA National Standards Unless otherwise described, all paintwork shall be deemed to be classified in the "White" colour group <u>PAINTWORK, ETC TO PREVIOUSLY PAINTED WORK</u> <u>ON INTERNAL FLOATED PLASTER SURFACES</u> <u>One coat superior quality acrylic emulsion paint for interior and exterior use, on work in sound condition:</u>			
1	Walls	m2	424	
	<u>ON FIBRE-CEMENT BOARD SURFACES</u> <u>One coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use, on:</u>			
2	Ceilings and cornices, including priming metal cover strips and nailheads	m2	208	
	Carried Forward			R
	Section No. 2 Bill No. 10 Paintwork			

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Brought Forward			R
3	On fascias and barge boards, etc. not exceeding 300mm girth	m	187
<u>ON WOOD SURFACES</u> <u>One coat primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on:</u>			
4	Doors	m2	72
Carried Forward to Summary of Section No. 2			R
Section No. 2 Bill No. 10 Paintwork			

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Bill No	SECTION SUMMARY - Building Works	Page No	Amount
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3	Carpentry and Joinery	35	
4	Ceilings, Partitions and Access Flooring	38	
5	Ironmongery	42	
6	Metalwork	47	
7	Tiling	49	
8	Plumbing and Drainage	57	
9	Glazing	59	
10	Paintwork	62	
Carried to Final Summary			R
Section No. 2			

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**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Item No		Quantity	Rate	Amount
	<u>SECTION 5</u>			
	<u>BILL NO. 2</u>			
	<u>WET SERVICES</u>			
	<u>COLD WATER INSTALLATION</u>			
	<u>Supply, install, and commission the water reticulation systems per specification</u>			
	<u>Class 12 HDPE piping laid and buried trenches not exceeding 800mm deep</u>			
1	32mm diameter HDPE CI 12 underground water pipe	m	45	
	<u>Fittings for HDPE class 12 piping</u>			
2	25mm diameter Adaptor to pex piping	m	1	
3	32mm - 28mm diameter Adaptor to pex piping	m	1	
4	32mm diameter Equal tee	m	2	
5	32mm diameter - 25mm diameter Reducer	m	3	
	<u>PEX piping</u>			
6	15mm diameter pipe	m	10	
7	22mm diameter pipe	m	10	
	<u>PEX piping fittings</u>			
8	15mm diameter Elbow	No	5	
9	22mm diameter Elbow	No	5	
10	15mm diameter Equal tee	No	5	
11	22mm diameter Equal tee	No	5	
	Carried Forward		R	
	Section No. 4			
	Bill No. 2			
	Wet Services			

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Brought Forward				R
12	22-15mm diameter Reducer	No	5	
	<u>Plastic pipe compression fittings and valves</u>			
13	15mm diameter Female elbow	No	5	
14	22mm diameter - 15mm diameter Female reducing tee	No	5	
15	22mm diameter Isolation valve	No	5	
16	22mm diameter strainer valve	No	5	
	<u>Pipe hangers - anchor, treaded rod & hilti hanger</u>			
17	15mm diameter	No	5	
18	22mm diameter	No	5	
	<u>Heavy brown paper loosely wrapped around pipe as sheath for expansion</u>			
19	15-22mm diameter	m	5	
	<u>Potable water system</u>			
20	10 000 l PVC Potable water tank with all associated isolation valves and strainers	No	1	
21	Variable speed potable water booster pump capable of delivering 2.3 l/s at 45m of H2O with all associated valves, fitting, PVC pipework, and auto start/stop control circuit.	No	2	
22	Fabricate, supply, and install lockable security cages around the duty/standby potable water pumps	No	1	
23	3.8 kW heat pump with all associated piping and fittings installed as per manufacturer's recommendation	No	1	
24	Application of approved coastal treatment for the outdoor condensing units	No	1	
	<u>DRAINAGE, ETC</u>			
Carried Forward				R
Section No. 4 Bill No. 2 Wet Services				

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	Brought Forward			R
	<u>Sewer and drainage pipes and fittings shall be through solid wall Class 34 uPVC socketed soil piping in according to SABS 791, jointed and sealed with butyl rubber rings soil, waste and vent pipes and fittings shall be according to SABS 967 and solvent jointed cold water supply pressure pipes fittings shall be according SABS 966 and jointed by means of the "Lyng" type jointing system. Pipes shall be fixed and jointed according to SABS 0112</u>			
	<u>Class 34 uPVC pipe</u>			
25	50mm diameter pipe	m	2	
26	110mm diameter pipe	m	2	
	<u>Class 34 uPVC fittings</u>			
27	50mm diameter 90 Deg bend	No	2	
28	110mm diameter 90 Deg bend	No	4	
29	110mm diameter 90 Deg access bend	No	4	
30	50mm diameter 45 Deg bend	No	2	
31	110mm diameter 45 Deg bend	No	2	
32	110mm diameter Pan connector	No	4	
33	50mm diameter Equal access junction	No	3	
34	110mm diameter - 50mm diameter junction	No	2	
35	110mm diameter Equal access junction	No	4	
	Carried Forward to Summary of Section No. 4			R
	Section No. 4			
	Bill No. 2			
	Wet Services			

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[illegible]

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Item No	Quantity	Rate	Amount
<u>SECTION 6</u> <u>BILL NO. 1</u> <u>PROVISIONAL AMOUNTS</u> <u>PREAMBLES</u> The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said Model Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>General:</u> Subcontract amounts are net. Subcontract amounts are for material and equipment supplied and installed complete by firms of specialists Each subcontract amount may comprise more than one element of work. Therefore, each subcontract amount may include for work to be carried out by more than one subcontractor <u>Profit:</u> Where stated, the contractor may allow for profit if required			
Carried Forward			R
Section No. 5 Bill No. 1 Provisional Sums, ETC			

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Brought Forward	R
<u>General attendance on nominated/selected subcontractors:</u> The item "General Attendance" which follows each subcontract amount for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following: 1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor 2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract work is to be carried out but excluding water, fuel and power for commissioning of any installation 3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials 4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site 5. The use, at reasonable times by arrangement of the contractor's erected hoisting equipment 6. Making good in all trades and cleaning down and removal of rubbish on completion <u>Special attendance on nominated/selected subcontractors:</u> Where stated, special attendance as set out in clause 8.1 of section B of the Preliminaries will be described in detail in this bill <u>Builder's work:</u> Builder's work in connection with specialist services is given elsewhere in these bills of quantities	
Carried Forward	R
Section No. 5 Bill No. 1 Provisional Sums, ETC	

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Brought Forward			R
<u>STATION FIXED FURNITURE</u>			
1	Subcontract amount of Twenty Five Thousand Rand for the provision and installation of station fixed furniture complete as directed by the Principal Agent to be deducted in whole or in part as necessary	Item	25,000.00
2	Profit	%	
3	General Attendance	%	
<u>STATION SIGNAGE</u>			
4	Subcontract amount of Fifty Thousand Rand for the provision and installation of station signage complete as directed by the Principal Agent to be deducted in whole or in part as necessary	Item	50,000.00
5	Profit	%	
6	General attendance	%	
<u>BUILT-IN CUPBOARDS</u>			
7	Subcontract amount of Twenty Five Thousand Rand for the provision and installation of Built-In Cupboards complete as directed by the Principal Agent to be deducted in whole or in part as necessary	Item	25,000.00
8	Profit	%	
9	General attendance	%	
<u>COMMUNITY LIAISON OFFICER</u>			
10	Subcontract amount of one Ninety Thousand Rand for Community Liaison Officer for a period of six (6) months	Item	90,000.00
11	Profit	%	
12	General attendance	%	
Carried to Final Summary			
Section No. 5			
Bill No. 1			
Provisional Sums, ETC			

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Section No	<u>FINAL SUMMARY</u>	Page No	Amount
1	Preliminaries and General	22	
2	Building Works	63	
3	Electrical Installations	64	
4	Mechanical Installations	69	
5	Provisional Sums	72	
SUB TOTAL (EXCLUDING CONTINGENCIES)			R
<u>CONTRACT CONTINGENCIES</u>			
Allow the sum of 10% for Contingencies to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required			
			R
SUBTOTAL (INCLUDING CONTINGENCIES)			R
<u>VALUE ADDED TAX</u>			
Value Added Tax [15%]			R
Carried to Form of Tender			R

Item No	Quantity	Rate	Amount
<u>SECTION NO. 1</u>			
<u>BILL NO. 1</u>			
<u>PRELIMINARIES AND GENERAL</u>			
<u>BUILDING AGREEMENT AND PRELIMINARIES</u>			
The JBCC Principal Building Agreement (May 2018 Edition 6.2) prepared by the Joint Building Contracts Committee shall be the applicable building agreement, amended as hereinafter described The JBCC Principal Building Agreement contract data form an integral part of this agreement The Preliminaries revision 1 (February 2016) published by the Association of South African Quantity Surveyors for use with the JBCC Principal Building Agreement Edition 6.2 shall be deemed to be incorporated in these bills of quantities, amended as hereinafter described The contractor is deemed to have referred to the abovementioned documents for the full intent and meaning of each clause The clauses in the abovementioned documents are hereinafter referred to by clause number and heading only Where any item is not relevant to this agreement such item is marked N/A signifying "not applicable"			
<u>PREAMBLES FOR TRADES</u>			
<i>The Model Preambles for Trades 2008 published by the Association of South African Quantity Surveyors is designed to support and extend the abbreviated descriptions utilised in these bills of quantities by inter alia referring to SANS construction standards.</i> <i>Note that the text of the Standard System of Measuring Building Work (seventh edition) and that of the Standard Method of Measuring Building Work for Africa 2015 (first edition) is the same</i>			
Carried Forward		R	
Section No. 1 Bill No. 1 Preliminaries			

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Brought Forward The Model Preambles for Trades 2008 as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained Supplementary preambles and/or specifications are incorporated in these bills of quantities to satisfy the requirements of this project. Such supplementary preambles and/or specifications shall take precedence over the provisions of the Model Preambles The contractor's prices for all items throughout these bills of quantities shall take account of and include for all of the obligations, requirements and specifications given in the Model Preambles and in any supplementary preambles and/or specifications		R	
Carried Forward Section No. 1 Bill No. 1 Preliminaries		R	

Brought Forward <u>NOTES TO TENDERERS</u> Tenderers are to inspect the drawings issued with these Bills of Quantities and to satisfy themselves with the nature and the requirements of the Contract works. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to read the descriptions, which are intended as a means of identifying various facets of the work, in conjunction with the drawings. Tenderers shall allow for all costs in connection with the various items taking full cognisance of both the drawings and the Bills of Quantities. Tenderers shall notify the Quantity Surveyor in writing of any discrepancies encountered upon which clarification will be given by the Quantity Surveyor in writing to the Tenderer. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard Tenderers are to note that setting out of the works will be the complete responsibility of the Tenderer and they should therefore acquaint themselves with the site boundaries, site co-ordinates, datum levels etc. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to note that all items with ZERO quantities are Rate Only items and should be priced as such. Tenderers are to note that there might be specified suppliers to be used for certain trades as per the annexure to this tender document. Tenderers should familiarise themselves with the suppliers on the list and ensure to allow for accordingly. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to fully acquaint themselves with the construction period and shall allow for any night shift if required. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard.	R
Carried Forward Section No. 1 Bill No. 1 Preliminaries	R

Brought Forward			R
<u>STRUCTURE OF THIS PRELIMINARIES BILL</u>			
Section A : A recital of the headings of the individual clauses of the aforementioned JBCC Principal Building Agreement			
Section B : A recital of the headings of the individual clauses of the aforementioned Preliminaries document			
Section C : Any special clauses to meet the particular circumstances of the project			
<u>PRICING OF PRELIMINARIES</u>			
Should the contractor select Option A in the contract data for the adjustment of preliminaries , the amounts entered against the relevant items in these preliminaries are to be divided into one or more of the three categories provided namely fixed (F), value related (V) and time related (T)			
<u>SECTION A: PRINCIPAL BUILDING AGREEMENT</u>			
<u>Interpretation (A1-A7)</u>			
1	Clause 1.0 - Definitions and interpretation F:..... V:..... T:.....	Item	
2	Clause 2.0 - Law, regulations and notices F:..... V:..... T:.....	Item	
3	Clause 3.0 - Offer and acceptance F:..... V:..... T:.....	Item	
4	Clause 4.0 - Assignment and cession F:..... V:..... T:.....	Item	
Carried Forward			R
Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
5	Clause 5.0 - Contract documents F:..... V:..... T:.....	Item	
6	Clause 6.0 - Employer's agents F:..... V:..... T:.....	Item	
7	Clause 7.0 - Design responsibility F:..... V:..... T:.....	Item	
	<u>Insurance and security (A8-A11)</u>		
8	Clause 8.0 - Works risk F:..... V:..... T:.....	Item	
9	Clause 9.0 - Indemnities F:..... V:..... T:.....	Item	
10	Clause 10.0 - Insurances F:..... V:..... T:.....	Item	
11	Clause 11.0 - Security F:..... V:..... T:.....	Item	
	<u>Execution (A12 - A17)</u>		
12	Clause 12.0 - Duties of the parties F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R	
13	Clause 13.0 - Setting out F:..... V:..... T:.....	Item		
14	Clause 14.0 - Nominated subcontractors F:..... V:..... T:.....	Item		
15	Clause 15.0 - Selected subcontractors F:..... V:..... T:.....	Item		
16	Clause 16.0 - Direct contractors Attendance on direct contractors In respect of direct contractors the contractor shall: F:..... V:..... T:.....	Item		
17	Clause 17.0 - Contract instructions Site instructions Instructions issued on site are to be recorded in a site instruction book which is to be supplied and maintained on site by the contractor F:..... V:..... T:..... <u>Completion (A18 - A24)</u>	Item		
18	Clause 18.0 - Interim completion F:..... V:..... T:.....	Item		
19	Clause 19.0 - Practical completion F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
20	Clause 20.0 - Sectional completion			
	F:..... V:..... T:.....	Item		
21	Clause 21.0 - Defects liability period and final completion			
	F:..... V:..... T:.....	Item		
22	Clause 22.0 - Latent defects liability period			
	F:..... V:..... T:.....	Item		
23	Clause 23.0 - Revision of date for practical completion			
	Substitution of materials and goods			
	The removal or substitution of any materials and goods which do not conform to the specification or the contract drawings shall not constitute grounds for the extension of the construction period nor for the adjustment of the contract value [17.1.8, 23.1 & 2]			
	F:..... V:..... T:.....	Item		
24	Clause 24.0 - Penalty for late or non-completion			
	F:..... V:..... T:.....	Item		
	<u>Payment (A25 - A27)</u>			
25	Clause 25.0 - Payment			
	F:..... V:..... T:.....	Item		
26	Clause 26.0 - Adjustment of the contract value and final account			
	Carried Forward		R	
	Section No. 1			
	Bill No. 1			
	Preliminaries			

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Brought Forward		R
	F:..... V:..... T:.....	Item
27	Clause 27.0 - Recovery of expense and/or loss	
	F:..... V:..... T:.....	Item
<u>Suspension and termination (A28 - A29)</u>		
28	Clause 28.0 - Suspension by the contractor	
	F:..... V:..... T:.....	Item
29	Clause 29.0 - Termination	
	F:..... V:..... T:.....	Item
<u>Dispute resolution (A30)</u>		
30	Clause 30.0 - Dispute resolution	
	F:..... V:..... T:.....	Item
	The required information of the parties and the amount of the contract sum shall be inserted in the agreement for signature of the agreement by the parties	
	F:..... V:..... T:.....	Item
	F:..... V:..... T:.....	Item
Carried Forward		R
Section No. 1 Bill No. 1 Preliminaries		

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Brought Forward		R	
<u>42.1 CONTRACTING AND OTHER PARTIES</u>			
42.1.1			
Employer:			
Passenger Rail Agency of South Africa			
Postal address:			
PO Box 51324			
Durban			
4062			
Tel.: (031) 813 0376			
Physical Address:			
65 Masabalala Yengwa Avenue			
Durban Station			
Durban			
4000			
<u>42.2 CONTRACT DETAILS</u>			
42.2.1 Works Description:			
Refurbishment, Alterations and Additions at Warner Beach Station for a period of six (6) months			
42.2.2 Site Description:			
Warner Beach Train Station			
42.2.3 Work or installations by direct contractors:			
N/A			
42.2.4 This agreement is for a government contract where there are specific options that are applicable to a State organ only			
Yes			
Carried Forward		R	
Section No. 1			
Bill No. 1			
Preliminaries			

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Brought Forward 42.2.5 Date on which possession of the site is intended to be given: TBC 42.2.6 Period for the commencement of the works after the contractor takes possession: TBC 42.2.7 For the works as a whole. Intended date of practical completion and the penalty per calendar day Six (6) Months after contractual commencement date 0.04% of contract amount per calender day Penalty Amount 42.2.8 For the works in sections: Intended date of practical completion and the penalty per calendar day: N/A 42.2.9 The law applicable to this agreement shall be that of <i>South Africa (country)</i> <u>42.3 INSURANCES</u> 42.3.1 Contract works insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R Contract Amount + 30.00 %</i> <i>With a deductible of - to be determined by the contractor</i> 42.3.2 Supplementary insurance is required <i>No</i> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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Brought Forward 42.3.3 Public liability insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R 1 000 000-00</i> <i>With a deductible of - to be determined by the contractor</i> <u>42.4 DOCUMENTS</u> 42.4.1 Waivers of contractors lien or right of continuing possession is required Yes 42.4.2 Number of construction document copies to be supplied to the contractor free of charge: 3 Number of 42.4.3 Bills of Quantities/Lump sum document schedule of rates drawn up in accordance with: “Standard System of Measuring Builders’ Work” 42.4.4 On acceptance of the tender the bills of quantities/lump sum document is to be submitted within: <i>The priced bills of quantities must be handed in with the tender</i> 42.4.5 JBCC Engineering General Conditions are to be included in the contract documents: No 42.4.6 The contract value is to be adjusted using escalation adjustment indices N/A Where JBCC CPAP is to be used <i>Base Month</i> N/A 42.4.7 Details of changes made to the provision of JBCC standard documentation: <u>SECTION B: PRELIMINARIES</u> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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	Brought Forward		R	
	<u>Interpretation (B1)</u>			
31	Clause 1.1 - Definitions F:..... V:..... T:.....	Item		
32	Clause 1.2 - Interpretation F:..... V:..... T:.....	Item		
	<u>Documents (B2)</u>			
33	Clause 2.1 - Checking of documents F:..... V:..... T:.....	Item		
34	Clause 2.2 - Provisional bills of quantities F:..... V:..... T:.....	Item		
35	Clause 2.3 - Availability of construction information F:..... V:..... T:.....	Item		
36	Clause 2.4 - Ordering of materials and goods F:..... V:..... T:.....	Item		
	<u>Previous work and adjoining properties (B3)</u>			
37	Clause 3.1 - Previous work - dimensional accuracy F:..... V:..... T:.....	Item		
38	Clause 3.2 - Previous work - defects F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
39	Clause 3.3 - Inspection of adjoining properties F:..... V:..... T:..... <u>The site (B4)</u>	Item	
40	Clause 4.1 - Defined works area F:..... V:..... T:.....	Item	
41	Clause 4.2 - Handover of site in stages F:..... V:..... T:.....	Item	
42	Clause 4.3 - Enclosure of the works F:..... V:..... T:.....	Item	
43	Clause 4.4 - Geotechnical investigation F:..... V:..... T:.....	Item	
44	Clause 4.5 - Encroachments F:..... V:..... T:.....	Item	
45	Clause 4.6 - Existing premises occupied F:..... V:..... T:.....	Item	
46	Clause 4.7 - Services - known F:..... V:..... T:.....	Item	
47	Clause 4.8 - Protection of trees and/or relevant natural features F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R	
	<u>Management of contract (B5)</u>			
48	Clause 5.1 - Management of the works F:..... V:..... T:.....	Item		
49	Clause 5.2 - Progress meetings F:..... V:..... T:.....	Item		
50	Clause 5.3 - Technical meetings F:..... V:..... T:.....	Item		
	<u>Samples, shop drawings and manufacturer's instructions (B6)</u>			
51	Clause 6.1 - Samples of materials F:..... V:..... T:.....	Item		
52	Clause 6.2 - Workmanship samples F:..... V:..... T:.....	Item		
53	Clause 6.3 - Shop drawings F:..... V:..... T:.....	Item		
54	Clause 6.4 - Compliance with manufacturer's instructions F:..... V:..... T:.....	Item		
	<u>Deposits and fees (B7)</u>			
55	Clause 7.1 - Deposits and fees F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
	<u>Temporary services (B8)</u>			
56	Clause 8.1 - Water F:..... V:..... T:.....	Item		
57	Clause 8.2 - Electricity F:..... V:..... T:.....	Item		
58	Clause 8.3 - Ablution and welfare facilities F:..... V:..... T:.....	Item		
59	Clause 8.4 - Communication facilities F:..... V:..... T:.....	Item		
	<u>Prime cost amounts (B9)</u>			
60	Clause 9.1 - Responsibility for prime cost amounts F:..... V:..... T:.....	Item		
	<u>Attendance on subcontractors (B10)</u>			
61	Clause 10.1 - General attendance F:..... V:..... T:.....	Item		
62	Clause 10.2 - Special attendance F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
	<u>General (B11)</u>			
63	Clause 11.1 - Protection of the works F:..... V:..... T:.....	Item		
64	Clause 11.2 - Protection/isolation of existing/sectionally occupied works F:..... V:..... T:.....	Item		
65	Clause 11.3 - Security of the works F:..... V:..... T:.....	Item		
66	Clause 11.4 - Notice before covering work F:..... V:..... T:.....	Item		
67	Clause 11.5 - Disturbance F:..... V:..... T:.....	Item		
	Clause 11.6 - Environmental disturbance F:..... V:..... T:.....	Item		
68	Clause 11.7 - Works cleaning and clearing F:..... V:..... T:.....	Item		
69	Clause 11.8 - Vermin F:..... V:..... T:.....	Item		
70	Clause 11.9 - Overhand work F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
71	Clause 11.11 - Advertising F:..... V:..... T:..... <u>Preliminaries schedule (B12)</u>	Item	
72	Information for completion of the preliminaries schedule Information necessary for elections and completion of those clauses contained in the preliminaries schedule which are necessary for tender purposes is given hereunder. Where no information is given it shall mean that no specific requirements are expected or that the clause is not relevant to this specific contract 12.1 - Provisional bills of quantities [2.2] The quantities are provisional - <u>Yes</u> 12.2 - Availability of construction information [2.3] Construction documentation is complete - <u>Yes</u> 12.3 - Previous work - dimensional accuracy [3.1] 12.4 - Previous work - defects [3.2] 12.5 - Inspection of adjoining properties [3.3] 12.6 - Defined works area [4.1] 12.7 - Handover of site in stages [4.2] 12.8 - Enclosure of the works [4.3] 12.9 - Geotechnical investigation [4.4] 12.10 - Existing premises occupied [4.6] 12.11 - Services - known [4.7] 12.12 - Protection of trees and/or relevant natural features [4.8]		
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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Brought Forward	R
12.13 - Water [8.1] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.14 - Electricity [8.2] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.15 - Ablution and welfare facilities [8.3] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> 12.16 - Communication facilities [8.4] 12.17 - Protection of the works [11.1] 12.18 - Protection/isolation of existing/sectionally occupied works [11.2] Protection/isolation is required - <u>Yes</u> 12.19 - Disturbance [11.5] 12.20 - Environmental disturbance [11.6] Controlling all forms of pollution The contractor shall be responsible for and take all precautions in controlling by whatever means necessary all forms of pollution emanating from the site during the construction period due <i>inter alia</i> to noise, artificial light, wind-blown sand, dust, deposits of mud, etc The contractor is to ensure that all roads which border the site and is used by the contractor during the execution of the works are kept clean and free of any dirt or debris caused by the execution of the works	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

Brought Forward		R
F:..... V:..... T:.....	Item	
<u>SECTION C: SPECIFIC PRELIMINARIES</u>		
Section C		
Section C contains specific preliminary items which apply to this contract except where N/A (Not Applicable) appears against an item		
The warranty will not be enforced if the work is damaged by defects in the execution of the works , in which case the responsibility for replacement shall rest entirely with the contractor		
F:..... V:..... T:.....	Item	
73 Overtime		
Should overtime be required to be worked for any reason whatsoever, the cost of such overtime is to be borne by the contractor unless the principal agent has specifically authorised, prior to execution thereof, that costs for such overtime are to be borne by the employer		
F:..... V:..... T:.....	Item	
74 Co-operation of the contractor for cost management		
It is specifically agreed that the contractor accepts the obligation of assisting the principal agent in implementing proper cost management. The contractor will be advised by the principal agent of all cost management procedures which will be implemented to ensure that the contract value does not exceed the budget		
F:..... V:..... T:.....	Item	
Carried Forward		R
Section No. 1 Bill No. 1 Preliminaries		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

	Brought Forward		R
75	Overloading The contractor shall take all necessary steps to ensure that no damage occurs due to overloading of any portion of the works or temporary works eg scaffolding, etc. The contractor shall submit details of his proposed loading, storage, plant erection, etc to the principal agent for approval prior to proceeding with such loading, storing or erecting and shall comply with and pay for the principal agent's requirements in connection with the provision of temporary support work, etc. Any damage caused to the works by overloading shall be made good by the contractor at his sole expense F:..... V:..... T:.....	Item	
76	Propping of floors below The contractor is advised that propping of floors below may be required if he wishes to use any areas of completed suspended reinforced concrete slabs for vehicle access, storage of materials and goods and location of plant, scaffolding, etc. The location of these areas and any necessary propping shall be approved by the principal agent and the cost thereof shall be borne by the contractor F:..... V:..... T:.....	Item	
77	Testing of flat roof waterproofing for watertightness Flat roof waterproof areas shall be prepared with small sand dykes around them of a size and enclosing an area approved by the principal agent, flooded with water and kept "ponded" for at least forty (40) hours as a test to ensure the watertightness of the waterproofing and before any further construction work is carried out above the waterproofing F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R
	The contractor is to submit to the principal agent on an annual basis a schedule of spend, split into vendors engaged as subcontractors and suppliers indicating their BBBEE rating including proof of the said rating F:..... V:..... T:.....	Item	
78	Advertising rights The employer may elect to contract with advertising agencies for the erection of advertising hoardings, banners, wraps or the like for the duration of the contract. The contractor shall not prevent such an arrangement and will assist in the facilitation of same. Position and type of advertising structure to be agreed with the principal agent so as not to hinder the contractor in meeting the obligations under this agreement F:..... V:..... T:.....	Item	
79	Confidentiality The contractor undertakes to maintain in confidence any and all information regarding this project and shall obtain appropriate similar undertakings from all subcontractors and suppliers. Such information shall not be used in any way except in connection with the execution of the works No information regarding this project shall be published or disclosed without the prior written consent of the employer F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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WARNER BEACH STATION**

	Brought Forward	R	
80	Media releases All rights of publication of articles in the media, together with any advertising relating thereto or in any way connected with this project, shall vest with the employer The contractor together with his subcontractors shall not, without the prior written consent of the employer , cause any statement or advertisement connected with this project to be printed, screened or aired by the media F:..... V:..... T:..... SUMMARY OF CATEGORIES Category : Fixed R..... Category : Value R..... Category : Time R.....	Item	
	Carried to Final Summary	R	
	Section No. 1 Bill No. 1 Preliminaries		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO.1</u>			
<u>ALTERATIONS (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 102 - Alterations			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition), as published by the Association of South African Quantity Surveyors, shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items, fully described in the said General Preambles, will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>View site:</u>			
Before submitting his tender, the Contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished.			
No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained			
<u>Old materials to become property of the Contractor:</u>			
Old materials from alterations, except where described as to be re-used or handed over, become the property of the Contractor, who must allow credit for same in the last item of the "Alterations" trade			
Carried Forward		R	
Section No. 2 Bill No. 1 Alterations			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION**

Brought Forward <u>Old materials to be carted away:</u> Old materials from the alterations, except where described as to be re-used or handed over, as well as all rubbish, etc must be regularly carted from the site and not be allowed to accumulate on or around the site <u>Old materials to be re-used:</u> None of the old materials are to be used for new work, except where specifically described as being set aside for re-use <u>Handing over of materials:</u> Where certain materials or articles from demolitions or alterations are described as to be "handed over to the Employer", it shall be taken to mean "handed over by the Contractor to the Principal Agent" and such materials or articles shall be properly stored by the Contractor until handing over thereof and shall include all necessary transport The Contractor must obtain an official receipt from the Principal Agent listing the materials or articles and dates of handing over Should the Contractor fail to submit the receipt when requested to do so, it shall be deemed that the materials or articles are still in his possession and he will be held liable to the Employer for the full replacement value thereof, which amount will be deducted from any monies due to the Contractor <u>Explosives:</u> No explosives whatsoever may be used for demolition purposes, unless otherwise stated	R
Carried Forward Section No. 2 Bill No. 1 Alterations	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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WARNER BEACH STATION

Brought Forward	R
<u>GENERAL</u> <u>The contractor shall carry out the whole of the work with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide and erect any temporary tarpaulins and temporary plumbing that may be necessary during the progress of the works, all to the satisfaction of the Architect, and remove when directed.</u> <u>Any water supplies pipes and other piping that may be met with and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the Architect.</u> <u>Doors, fanlights, fittings, frames, linings, etc shall be thoroughly overhauled before re-fixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc and easing, oiling, adjusting and repairing ironmongery if necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted wood to match timber.</u> <u>Where doors, windows, etc are described as taken out this shall be understood to include for removal of all beads, architraves, ironmongery, etc and doors which are re-fixed are to be provided with new architraves (elsewhere measured).</u> <u>Prices for taking out and removing doors and frames shall include for removing door stops, cabin locks, etc and making good to match existing.</u> <u>With regard to building up openings in existing walls, cement screeds and pavings, granolithic, etc, shall be levelled and prepared for raising of brickwork.</u> <u>Allow for making good all existing plastered walls where damaged by furniture, etc, and stopping up all screw and holes before painting.</u> <u>Making good finishes shall be deemed to include making good of the brick and concrete surfaces onto which new finishes are applied, where necessary.</u>	
Carried Forward	R
Section No. 2 Bill No. 1 Alterations	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward				R
<u>The contractor will be required to take all dimensions affecting existing building on the site and he will be held solely responsible for the accuracy of all such dimensions.</u> <u>Hazardous materials:</u> Demolitions of buildings, services, external works, site services, etc are to include for the safe removal and disposal of <u>asbestos or asbestos products or other hazardous materials</u> by approved Registered Specialists ----- <u>TEMPORARY BARRIERS, SCREENS, ETC</u> <u>Temporary barriers, screens, etc including removal:</u>				
1	Dust screen 2100mm high formed of suitable timber framing with 250 micron polyethylene sheeting stapled on including corners, ends, etc. to be used on all the phases of the construction project and in accordance to the Health and Safety specifications and regulations	m	200	
<u>REMOVAL OF EXISTING WORK</u>				
<u>Taking out and removing doors, windows, etc including thresholds, sills, etc from brickwork (altering openings and making good finishes elsewhere):</u>				
2	Timber single door and frame not exceeding 2,5m ²	No	9	
<u>Taking down and removing roof coverings, accessories, etc.:</u>				
3	Asbestos roof covering	m2	404	
<u>Taking down and removing ceilings, partitions, etc:</u>				
4	Gypsum plasterboard ceilings, including cornices, timber bandering, etc.	m2	69	
Carried Forward				R
Section No. 2 Bill No. 1 Alterations				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

	Brought Forward			R
	<u>Taking out/off and removing ironmongery:</u>			
5	Toilet paper holder from wall	No	6	
	<u>Hacking up/off and removing ceramic and porcelain tiles, including removing mortar bed or adhesive from concrete or brickwork and preparing surfaces for new screed, plaster, tile finishes, etc:</u>			
6	Tiles to floors	m2	70	
7	Tiles to walls	m2	221	
	<u>Taking out and removing piping, sanitary fittings, etc including cutting off as necessary, disconnecting piping from fittings and blocking off and making good damaged plasterwork to walls and screeds to floors (all redecoration work elsewhere):</u>			
8	Vitreous china wash hand basin, including short lengths of piping, etc.	No	4	
9	Vitreous china WC pan with flush valve, including short lengths of piping, etc.	No	6	
10	150 Litre hot water geyser mounted in roof space including drip tray, valves, connecting pipework, etc.	No	6	
	<u>Taking out/off and removing glass and mirrors:</u>			
11	Mirror 600 x 600mm high from wall	No	3	
	<u>MAKING GOOD OF FINISHES, ETC</u>			
	<u>Making good concrete:</u>			
12	Floors in patches	m2	154	
13	Roof slabs in patches	m2	81	
	<u>Making good internal/external cement plaster:</u>			
14	Walls in patches	m2	296	
	<u>Making good platform surfaces:</u>			
15	Surfaces in patches	m2	3,351	
	Carried Forward			R
	Section No. 2			
	Bill No. 1			
	Alterations			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

	Brought Forward			R
	<u>GENERAL REPAIRWORK</u>			
	<u>Repairwork to existing brick walls:</u>			
16	Waterjetting surfaces of existing facebrick walls with high pressure low-volume water jetting lance to remove all dirt, brushing down and washing to remove surface contamination, mould, fungus, damp and treating with two coats of antifungal wash and leaving perfectly clean on completion	m2	289	
	<u>ALTERATIONS, SERVICING AND REPAIRWORK TO EXISTING DOORS, FRAMES AND WINDOWS</u>			
	<u>Notes:</u>			
	The removal and reinstatement of doors, frames, windows, etc for the purpose of altering, servicing and/or repairing are measured elsewhere			
	The removal of ironmongery, glass, putty, etc and the refixing, reglazing and redecorating of existing doors, frames, windows, etc are all measured elsewhere			
	Repairing and/or replacement of existing ironmongery is measured elsewhere			
	<u>Supplementary Preambles:</u>			
	Repairwork to timber to include for the following, unless otherwise described:			
	1. Timber used in repairs is to match existing in type, moisture content, colour and grain as closely as possible			
	2. Approved modern, high-strength waterproof glues which can accommodate any timber movement should be used together with sawdust filler of matching timber			
	3. Only non-corrosive fixings are to be used			
	4. All clamping and pinning as necessary			
	<u>EXISTING WINDOWS</u>			
	Carried Forward			R
	Section No. 2			
	Bill No. 1			
	Alterations			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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WARNER BEACH STATION

Brought Forward			R
<u>Servicing of existing windows including thoroughly cleaning down of all dirt, scale and general contamination from all surfaces, pulleys, handles, rods, fanlight openers, catches, etc. and servicing and lubricating all moving parts, carefully removing all paint from and polishing all brassware and replacing of damaged or missing screws, nuts, etc. (repairing or replacement of existing ironmongery, removal of glass, putty, etc. re-glazing and preparing for and redecorating of existing frames, sashes, etc. all elsewhere measured):</u>			
17	Aluminium window size 500 x 1185mm high overall with burglar bars (WT-01)	No	6
18	Ditto, but size 1670 x 700mm high overall with burglar bars (WT-06)	No	12
<u>BUDGETARY ALLOWANCE</u>			
19	Provide a budgetary allowance of Ten Thousand Rand for sundry alterations to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 1			
Alterations			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 2</u>			
<u>ROOF COVERINGS</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the ends of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
Profiled metal roof sheeting and accessories shall be supplied with a 10 year guarantee and be installed by an approved installer			
All fixing holes shall be drilled and not punched			
Roof covering accessories shall be manufactured from the same material as used for roof covering			
<u>PROFILED METAL SHEETING AND ACCESSORIES (WORK GROUP 124)</u>			
Carried Forward		R	
Section No. 2 Bill No. 2 Roof Coverings			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward			R
<u>0,53mm "Klip-Tite 700" or similar approved profile Z275 spelter galvanised steel light industrial troughed interlocking roof sheeting in single lengths and accessories, with "Chromodek" or similar approved finish to one side, fixed to timber/steel purlins:</u>			
1	Roof coverings with pitch not exceeding 25 degrees	m2	404
<u>Accessories:</u>			
2	Ridge capping 462mm girth	m	41
3	Narrow and broad flute closers	m	118
<u>ROOF AND WALL INSULATION (WORK GROUP 122)</u>			
<u>Heavy industrial grade aluminium foil based insulation:</u>			
4	Two sided bubble insulation membrane	m2	404
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 2 Roof Coverings			R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 3</u>			
	<u>CARPENTRY AND JOINERY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 126 - Carpentry & Joinery			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Fixing:</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
	<u>Joinery:</u>			
	Descriptions of frames shall be deemed to include frames, transomes, rails, etc			
	Descriptions of hardwood joinery shall be deemed to include sinking and pelleting heads and nuts of bolts			
	Carried Forward		R	
	Section No. 2 Bill No. 3 Carpentry and Joinery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward <u>Particle board</u> All particle board shall comply with SANS 50312 having the required marking as per SANS 50312/EN 312 <u>Decorative thermosetting plastic laminate covering:</u> Laminate covering shall be glued under pressure and edge strips of same shall be butt jointed at junctions with adjacent similar finish <u>Sizes:</u> Sizes are nominal and the Contractor shall make allowance in his prices for minor variances in stated finished sizes of timber doors, door members, door frames, architraves, etc <u>Prices</u> Prices for all joinery work are to include for general framing, housing and notching, arris rounded angles, glueing, blocking, planting on, screwing, adhesives, dowels, pellets, cross tongues, screws and nails and setting up complete and also for all square cutting and waste. Tops shall be secured with metal or hardwood buttons.		R	
Section No. 2 Bill No. 3 Carpentry and Joinery	Carried Forward	R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward			R
<u>ROOFS, ETC</u>			
<u>EAVES, VERGES, ETC</u>			
<u>Medium density plain fibre-cement fascias and barge boards:</u>			
1	19 x 235mm Fascias and barge boards, including aluminium H-profile jointing strips [LI]	m	118
<u>FLOORS, ETC</u>			
<u>DOORS, ETC</u>			
<u>Solid hardwood with slated panels with sides and counselled edges to suit opening, hung to steel frames:</u>			
2	44mm Door 890 x 2125mm high (TP-03)	No	3
3	44mm Door 813 x 2125mm high (TP-04)	No	6
<u>BUDGETARY ALLOWANCE</u>			
4	Provide a budgetary allowance of Fifteen Thousand Rand for sundry carpentry and joinery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 3			
Carpentry and Joinery			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 4</u> <u>CEILINGS, PARTITIONS AND ACCESS FLOORING</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 129 - Ceilings <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Fixing:</u> Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere <u>Ceilings:</u> Unless otherwise described, ceilings shall be deemed to be horizontal			
Carried Forward		R	
Section No. 2 Bill No. 4 Ceilings, Partitions and Access Flooring			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward				R
<u>Bulkheads:</u>				
Bulkheads are defined as those portions of ceilings which are stepped down from the general ceiling level in a particular room or area and which generally occur along the perimeter. Their purpose is either to conceal services or to create architectural features				
Bulkheads have only been described as such where they conform to the above definition and where the horizontal, vertical or sloping dimensions do not exceed 1200mm. Where these dimensions are more than 1200mm such portions of ceilings have been included in the appropriate general items of ceilings				
Unless otherwise described, bulkheads shall be deemed to be horizontal along the length				
<u>Openings:</u>				
Prices for openings for light fittings, ventilation grilles, air conditioning diffusers, etc. are to include for any necessary additional support, trimming around, etc.				
<u>Steel components:</u>				
All steel components for ceilings, partitions, etc are to be galvanised in accordance with SANS 121				
<u>NAILED UP CEILINGS</u>				
<u>12mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>				
1	Ceilings including 38 x 38mm sawn softwood bandering at 400mm centres and cross bandering at 400mm centres	m2	69	
2	Extra over ceiling for 600 x 600mm trap door of 38 x 38mm wrought softwood rebated framing with one cross brander, covered with ceiling board and fitted flush in opening, including necessary trimmers around [LI] 428.40	No	3	
<u>Gypsum plasterboard cornices:</u>				
3	75mm Coved cornices	m	81	
Carried Forward to Summary of Section No. 2				R
Section No. 2				
Bill No. 4				
Ceilings, Partitions and Access Flooring				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 5</u> <u>IRONMONGERY</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 132 - Ironmongery <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration			
Carried Forward			R
Section No. 2 Bill No. 5 Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward			R
<u>Locks:</u> Notwithstanding Clause 2, Item 3 of the "Ironmongery" trade of the "Standard System of Measuring Building Work, Seventh Edition", descriptions of locks shall be deemed to include two keys per lock <u>Finishes to ironmongery:</u> Where applicable, finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin bronze lacquered CH Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AN Anodised natural AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded BBS Brushed stainless steel <u>HINGES, BOLTS, ETC</u> <u>"Union" or similar approved:</u>			
1	"Ref. CZ80941SCR" or similar approved sliding indicator bolt set	No	6
<u>LOCKS</u>			
2	Commercial cylinder sash lock	No	6
3	75mm Three lever upright mortice rebated lockset with satin chrome furniture (TP-01)	No	3
<u>"Calini" or similar approved:</u>			
4	"Ref. IW2051" or similar approved double cylinder suitable for master key	No	1
<u>HANDLES</u>			
Carried Forward			R
Section No. 2 Bill No. 5 Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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WARNER BEACH STATION

Brought Forward			R
<u>"Union Assa Abloy" or similar approved:</u>			
5	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle	No	3
6	100mm Chromium plated bow handle bolted through door with the bolt ends hammered to prevent the nuts being removed	No	3
<u>PUSH PLATES AND KICK PLATES</u>			
<u>1,2mm Thick satin finished stainless steel plates countersunk screwed along edges at not exceeding 200mm centres:</u>			
7	300 x 150mm Kick plate	No	3
<u>DOOR CLOSERS</u>			
<u>"Union Assa Abloy" or similar approved:</u>			
8	"Ref. 7770" door closer	No	3
<u>SUNDRIES</u>			
<u>"Union Assa Abloy" or similar approved:</u>			
9	"Ref. 99022SS" door stop, plugged	No	6
Carried Forward			R
Section No. 2			
Bill No. 5			
Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WARNER BEACH STATION

Brought Forward			R
<u>BATHROOM FITTINGS</u>			
<u>"Franke" or similar approved:</u>			
10	"Ref. EXOS618X" soap dispenser, plugged	No	6
11	"Ref. BS646" stainless steel soap dish, plugged	No	3
12	"Ref. STRX672" stainless steel lockable toilet roll holder, plugged	No	3
13	"Ref. RODX602 " paper towel dispenser and waste bin combination, plugged	No	2
14	"Ref. BS611V" stainless steel sanitary towel disposal bin, plugged	No	2
<u>BUDGETARY ALLOWANCE</u>			
15	Provide a budgetary allowance of Fifteen Thousand Rand for sundry ironmongery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 5			
Ironmongery			

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WARNER BEACH STATION

Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 6</u>			
	<u>STRUCTURAL STEELWORK</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 134 - Structural Steelwork in Buildings			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Specification:</u>			
	All structural steel must comply with SANS 1200H (Degree of Accuracy II)			
	All hot rolled structural steel sections must comply with SANS 1431 grade 300W, unless otherwise specified on the drawings			
	Unless otherwise designated, all bolts and nuts will be grade 4.6 to SANS 135 and BS 916. Descriptions of bolts shall be deemed to include nuts and washers. Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
	Carried Forward		R	
	Section No. 2 Bill No. 6 Structural Steelwork			

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WARNER BEACH STATION

Brought Forward		R
All connections must be welded all round with a 6mm fillet weld, unless otherwise specified on the drawings		
<u>Drawings and shop details:</u>		
The Contractor shall be responsible for preparing shop drawings and details which must be submitted to the Principal Agent for approval prior to commencement of fabrication.		
Before commencing any fabrication, the steel fabricator must check the accessibility of the site and design the sizes of individual parts accordingly		
<u>Hot-dipped galvanizing:</u>		
After fabrication and prior to delivery to site, all steelwork described as hot-dipped galvanized, is to be descaled and thoroughly cleaned by pickling, after which it is to be hot dip galvanized in accordance with the requirements of SANS 121/1501461		
<u>Descriptions:</u>		
Descriptions of bolts shall be deemed to include nuts and washers		
Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete		
Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete		
<u>BUDGETARY ALLOWANCE</u>		
Provide a budgetary allowance of Fifty Thousand Rand for sundry alterations to structural steelworks be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		
Item		
<u>Paint testing:</u>		
Subcontract amount of Fifteen Thousand Rand for quality control inspection by an authorised independent authority		SUM
Carried Forward		R
Section No. 2 Bill No. 6 Structural Steelwork		

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 7</u>			
<u>METALWORK</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 136 - Metalwork			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Descriptions of bolts, anchors, etc:</u>			
Descriptions of bolts shall be deemed to include nuts and washers			
Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
Items described as "holed for bolt(s)" shall be deemed to exclude the bolts, unless otherwise described			
Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres			
Carried Forward			R
Section No. 2 Bill No. 7 Metalwork			

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Brought Forward Fixing: Unless otherwise described, descriptions of items shall be deemed to include for fixing to brickwork or concrete Where items are described as "bolted", the bolts are measured elsewhere as stated in clause N.7 of the Model Preambles		R	
Section No. 2 Bill No. 7 Metalwork	Carried Forward	R	

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Brought Forward			R
<u>PRESSED STEEL DOOR FRAMES</u>			
<u>1,6mm Rebated frames suitable for one brick walls:</u>			
1	Frame for door 810 x 2125mm high with three hinges per leaf (TP-03)	No	3
2	Frame for door 813 x 2125mm high with three hinges per leaf (TP-04)	No	6
<u>ALUMINIUM WINDOWS, DOORS, ETC</u>			
<u>Aluminium windows, doors, etc:</u>			
The successful tenderer shall be responsible for the complete design work including determining required section sizes and fixing details, all subject to the Project Manager's approval			
Doors, windows, etc shall be designed and constructed to withstand wind pressures of 1,1kn/m2 (unfactored) and 1,5kn/m2 (factored)			
All calculations shall be submitted to the Project Manager for approval			
Doors and windows shall comply with AAAMSA design criteria			
Glazing shall comply with SAGGA regulations. Glass thicknesses shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings			
Doors and windows shall be supplied with protective tape and plastic which shall be removed only once surrounding trades have been completed			
The following certificates shall be provided prior to commencement of site work:			
1	A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product		
Carried Forward			R
Section No. 2 Bill No. 7 Metalwork			

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Brought Forward		R
2	A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively	
3	A copy of the relevant Performance Compliance Report from the system suppliers	
4	A copy of the relevant Safiera Energy Rating Certification	
5	A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process	
6	A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 10400-N, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked	
7	A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degradation for a period of not less than five years	
All windows and door joints must be sealed to the inside with "Dow Corning" or similar approved silicone during manufacturing		
All dimensions shall be verified on site before commencing the work and a full set of shop drawings showing all relevant details shall be submitted to the Architect for his approval, prior to the manufacture of the units		
<u>Sizes</u>		
Where sizes are given these are nominal sizes		
Carried Forward		R
Section No. 2 Bill No. 7 Metalwork		

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Brought Forward		R
<u>Ironmongery</u> The tenderer must allow in his pricing for supply and fixing of ALL ironmongery Heavy duty high quality fittings must be allowed for and samples will be required for approval by the Project Manager <u>BUDGETARY ALLOWANCE</u> 3 Provide a budgetary allowance of Ten Thousand Rand for sundry metalwork to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		
	Item	
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 7 Metalwork		R

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 8</u>			
<u>TILING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 144 - Tiling			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Unless described as "fixed with adhesive to plaster (plaster elsewhere)", descriptions of tiling on brick or concrete walls, columns, etc shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors, etc shall be deemed to include 1:3 cement plaster bedding			
Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat			
Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts from the "Tal Goldstar" or similar approved range of products as recommended by the manufacturer of the tiles			
Carried Forward		R	
Section No. 2 Bill No. 8 Tiling			

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Brought Forward			R
<u>Preparatory work to existing painted plastered surfaces:</u>			
Preparation of all existing painted plastered surfaces is to include for removing all loose and flaking material by wire brushing, thoroughly washing down and allowing to dry completely and applying one coat masonry bonding agent			
<u>WALL TILING</u>			
<u>350 x 350mm Ceramic tiles (Allow a Prime Cost Amount of R 250/m2 delivered to site) fixed with adhesive to plaster (plaster elsewhere) and flush pointing with and including waterproof grout:</u>			
1	On walls	m2	221
2	On narrow widths	m2	22
<u>FLOOR TILING</u>			
<u>600 x 600mm Porcelain floor tiles (Allow a Prime Cost Amount of R 350/m2 delivered to site) fixed with adhesive to screed (screed elsewhere) and flush pointing with and including waterproof grout:</u>			
3	On floors	m2	70
4	Skirting 100mm high (of fair cut tiles)	m	81
<u>SUNDRIES</u>			
<u>Stainless steel dividing strips:</u>			
5	28 x 10 x 2,5mm L-section dividing strips between tiles	m	81
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 8			
Tiling			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 9</u>			
<u>PLUMBING AND DRAINAGE</u>			
<u>(PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Wire gratings:</u>			
Descriptions of gutter outlets, etc shall be deemed to include wire balloon gratings			
<u>Stormwater channels:</u>			
Descriptions of channels shall be deemed to include necessary excavation, surface preparation, compaction, etc and disposal of surplus material on site			
Carried Forward		R	
Section No. 2 Bill No. 9 Plumbing and Drainage			

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Brought Forward <u>French drains:</u> Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site <u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>Stainless steel basins, sinks, wash troughs, urinals, etc:</u> Stainless steel for economy basins, domestic sinks and worktops shall be Type 430 (17/0) Stainless steel for urinals, basins, quality sinks, wash troughs, institutional equipment, etc shall be Type 304 (18/8) Stainless steel for laboratory sinks, photographic equipment, etc shall be Type 316 (18/8) Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable <u>Sealing of edges:</u> Outer edges of sinks, basins, baths, urinals, etc are to be sealed against adjacent surfaces with approved mildew resistant silicone sealant and prices must include therefor <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings	R
Carried Forward Section No. 2 Bill No. 9 Plumbing and Drainage	R

Brought Forward <u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground	R
Carried Forward Section No. 2 Bill No. 9 Plumbing and Drainage	R

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Brought Forward	R
Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claims for extra bushes, reducers, etc will be entertained <u>Fixing of pipes:</u> Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc casting in, building in or suspending not exceeding 1m below suspension level <u>Paper wrapping to pipes:</u> Pipes chased into brickwork must be wrapped with two layers of stout brown paper tied with wire. Rates are to include for wrapping around joints and fittings <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SANS 1200L (provision for disinfection elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 9 Plumbing and Drainage	

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Brought Forward <u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SANS 1200L : Medium-pressure pipelines SANS 1200LD : Sewers SANS 1200LE : Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding		R	
Carried Forward Section No. 2 Bill No. 9 Plumbing and Drainage		R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward <u>General:</u> Descriptions of cast iron roof outlets shall be deemed to include joints to pipes and casting into concrete (adaptors for joints to PVC pipes, etc are given separately) Descriptions of overflow pipes where measured in number, shall be deemed to include joints to cisterns and splay cut ends Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured) and shall have straight or side outlets and "P" or "S" traps as necessary Description of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings. <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere)		R	
Carried Forward Section No. 2 Bill No. 9 Plumbing and Drainage		R	

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R	
<u>Proprietary items:</u>				
Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items				
Note that the manufacturers names specified in this trade are for the purposes of competitive pricing.				
Prices are to be based on the specific products/articles specified.				
On request, returnable samples are to be provided to the Project Manager for consideration				
<u>SANITARY FITTINGS (WORK GROUP 148)</u>				
<u>"Franke" or similar approved stainless steel:</u>				
1	1050 x 535mm "Trendline 711 Code: 1030006" sink with 350 x 460mm end bowl, on cupboard (cupboard elsewhere)	No		RATE ONLY
<u>"Vaal" or similar approved:</u>				
2	455 x 290mm "Hibiscus" 7050 wash hand basin bolted to wall	No	5	
3	"Hibiscus" 772402 close-coupled WC suite comprising pan with double flap heavy duty thermoset seat (Code: 8531Z0) and matching 9 litre cistern	No	6	
<u>WASTE UNIONS, ETC</u>				
<u>"Cobra Watertech" or similar approved:</u>				
4	40mm Code 317 CP basin waste union and code 309CP anti-theft plug	No	6	
<u>TRAPS, ETC</u>				
<u>uPVC:</u>				
5	40mm "P" or "S" trap	No	6	
<u>TAPS, VALVES, ETC</u>				
Carried Forward			R	
Section No. 2 Bill No. 9 Plumbing and Drainage				

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Brought Forward			R
<u>"Cobra Watertech" or similar approved:</u>			
6	15mm Code1065-15CP fullway isolating ball valve	No	6
7	15mm Code 902CP "Focus" basin mixer with waste union, etc and angle flow regulating valves	No	5
<u>AS-BUILT DRAWINGS</u>			
8	Provision of as-built drawings		Item
<u>BUDGETARY ALLOWANCE</u>			
9	Provide a budgetary allowance of Fifteen Thousand Rand for sundry plumbing works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		Item
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 9			
Plumbing and Drainage			

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 10</u>			
<u>GLAZING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 150 - Glazing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Float glass:</u>			
The term "float glass" is used for monolithic annealed glass			
<u>Laminated glass:</u>			
Laminated glass to have polyvinyl butyral (PVB) interlayer(s)			
Carried Forward		R	
Section No. 2 Bill No. 10 Glazing			

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Brought Forward			R
<u>GLAZING TO STEEL WITH PUTTY</u>			
<u>6,38mm Normal strength (NS) clear laminated safety glass:</u>			
1	Panes not exceeding 0,5m2	m2	5
<u>TOPS, SHELVES, DOORS, MIRRORS, ETC</u>			
<u>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges fixed with double sided adhesive tape:</u>			
2	Mirror 600 x 1200mm high	No	6
Carried Forward to Summary of Section No. 2			
Section No. 2			
Bill No. 10			
Glazing			

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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 11</u>			
	<u>PAINTWORK</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 152 - Painting			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>PREPARATORY WORK TO EXISTING WORK</u>			
	<u>Previously painted plastered surfaces:</u>			
	Surfaces shall be thoroughly washed down and allowed to dry completely before any paint is applied. Blistered or peeling paint shall be completely removed and minor cracks shall be opened, filled with a suitable filler and finished smooth			
	<u>Previously painted metal surfaces:</u>			
	Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal			
	Carried Forward		R	
	Section No. 2 Bill No. 11 Paintwork			

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	Brought Forward			R
	<u>Previously painted wood surfaces:</u> Surfaces shall be thoroughly cleaned down. Blistered or peeling paint shall be completely removed and cracks and crevices shall be primed, filled with suitable filler and finished smooth <u>PAINT SPECIFICATIONS</u> All painting shall be done in accordance with "Plascon" or similar approved, etc specifications, unless otherwise described <u>COLOURS</u> When staining timber, the resultant colour or shade must be to the complete satisfaction of the Project Manager before any overcoating or preservative is applied Paintwork is classified in the following different colour groups: "White", "Pastel", "Deep" and "Transparent" in accordance with the "Natural Colour System" (NCS) adopted by the SA National Standards Unless otherwise described, all paintwork shall be deemed to be classified in the "White" colour group <u>PAINTWORK, ETC TO PREVIOUSLY PAINTED WORK</u> <u>ON INTERNAL FLOATED PLASTER SURFACES</u> <u>One coat superior quality acrylic emulsion paint for interior and exterior use, on work in sound condition:</u>			
1	Walls	m2	296	
	<u>ON FIBRE-CEMENT BOARD SURFACES</u> <u>One coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use, on:</u>			
2	Ceilings and cornices, including priming metal cover strips and nailheads	m2	69	
	Carried Forward			R
	Section No. 2 Bill No. 11 Paintwork			

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	Brought Forward			R
3	On fascias and barge boards, etc. not exceeding 300mm girth	m	118	
	<u>METAL SURFACES WITH</u>			
	<u>One coat alkyd based zinc phosphate primer and two coats premium quality polyurethane enamel paint, on steel:</u>			
4	Doors	m2	11	
5	Roof coverings	m2	404	
	<u>ON WOOD SURFACES</u>			
	<u>One coat primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on:</u>			
6	Doors	m2	10	
Carried Forward to Summary of Section No. 2				R
Section No. 2				
Bill No. 11				
Paintwork				

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7	Metalwork	48	
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Carried to Final Summary			R
Section No. 2			

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Item No		Quantity	Rate	Amount
	<u>SECTION 3</u>			
	<u>BILL NO. 1</u>			
	<u>EXTERNAL WORK (PROVISIONAL)</u>			
	<u>(ALL TRADES)</u>			
	<u>WORK GROUP ALLOCATION</u>			
	The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
	<u>PREAMBLES</u>			
	The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Nature of ground:</u>			
	The nature of the ground is assumed to be loose sandy material, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be gravel, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be silty clay with loose river boulders varying in size up to approximately 450mm diameter, all of which will be deemed as "earth", but possibly interspersed with "hard rock"			
	Carried Forward		R	
	Section No. 3			
	Bill No. 1			
	External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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WARNER BEACH STATION

Brought Forward	R
Trial holes indicate that the nature of the ground is silty clay to a depth of approximately 500mm with fine to medium loose sandy material below, therefore "earth" A soils investigation has been carried out on the site by the Engineer and the report is annexed to these bills of quantities. The soils report indicates that the ground varies between transported soils at surface comprising gravel layers of varying thickness and interspersed with clay, and weathered shales varying from very soft rock to medium hard rock consistency, all of which will be deemed as "earth". All very hard unweathered shale, ironstone, etc the removal of which necessitates the use of explosives or heavy duty hydraulic percussion hammers (peckers), will be classified as "hard rock" Should the Contractor encounter any "soft" or "hard" rock in the excavations, he shall immediately notify the Engineer who shall be the sole arbiter as to what constitutes "soft" or "hard" rock for final account purposes <u>Subterranean water:</u> No subterranean water is expected <u>Excavation for working space in rock:</u> Notwithstanding clause 11 of the Standard System of Measuring Building Work, excavation for working space in rock will be measured in cubic metres to the extent executed and given as "extra over" bulk excavation or trench and hole excavation as the case may be <u>Carting away of excavated material:</u> Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site <u>Filling:</u> Notwithstanding the reference to prescribed multiple handling in Clause 1 of the Standard System of Measuring Building Work, prices for filling and backfilling shall include for all selection and any necessary multiple handling of material	
Carried Forward	R
Section No. 3 Bill No. 1 External Works (Provisional)	

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Brought Forward			R
<u>Testing:</u> <i>Prices for backfilling to trenches and holes only are to include for all necessary density tests in accordance with SANS 1200D</i>			
<u>Maintenance period:</u> The maintenance period to civil works such as roads, parking and related earthworks shall be twelve calendar months			
<u>DEMOLITIONS, ETC (WORK GROUP 104)</u>			
<u>Taking down and removing:</u>			
1	2400mm High precast concrete panel fence	m	70
<u>SITE CLEARANCE, ETC (WORK GROUP 104)</u>			
<u>Site clearance:</u>			
2	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth	m2	500
<u>FENCING (WORK GROUP 136)</u>			
<u>"Clearvu" or similar approved galvanised steel security fence with posts at 3382mm centres, erected complete including concrete bases, stays, rails, verticals, galvanised steel bolts, straining eye bolts, single overhang with 3 strands of barbed wire, etc. and finished with epoxy coating and including site clearance, preparation of ground, etc:</u>			
3	Security fence 3000mm high	m	70
<u>Precast concrete fencing</u>			
4	Precast concrete palisade fencing 2.40m high	m	70
Carried Forward			R
Section No. 3 Bill No. 1 External Works (Provisional)			

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Item No			Quantity	Rate	Amount
	<u>SECTION 4</u>				
	<u>BILL NO. 1</u>				
	<u>ELECTRICAL INSTALLATION</u>				
	<u>LOW VOLTAGE</u>				
	<u>LV SWITCHGEAR</u>				
	<u>DBs and LV Switchgear</u>				
	<u>Manufacture, deliver to site, install, commission, test kiosks, distribution boards as per specification and single line diagram, to be housed in electrical. All electrical panels shall be stainless steel material, rates to include powder coated, busbars and drilling, busbar connections internal wiring etc. Refer to single line diagram for electrical panel colour and specification document for details</u>				
1	Main DB	No	1		
2	Kiosk	No	1		
3	DB - 1	No	1		
4	DB - 2	No	1		
5	UT4 IP65 Box surface mounted with 32A 1-pole isolator, 3x circuit breakers with complete busbar.	No	1		
	<u>CABLES AND CONDUCTORS</u>				
	<u>Supply, deliver to site cables and conductors as specified. Install, rack, strap and testing of cables as per specification including clamps, ties and cable numbering system</u>				
6	2,5mm conductors (mixed colours - live, neutral and earth)	m	4,000		
7	4,0mm conductors (mixed colours - live, neutral and earth)	m	2,000		
	Carried Forward				R
	Section No. 4 Bill No. 1 Electrical Installation				

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	Brought Forward			R
8	4,0 mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	50	
9	6.0mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	80	
10	10 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	500	
11	16mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	300	
12	16mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	150	
13	25 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	100	
<u>CABLE TERMINATIONS</u>				
<u>Termination of cables shall include supply installation and testing of the glands with corrosion guard , making-off the cable, lugs, and fitting the gland to the board gland plate, switchgear or equipment and final connection of cable tails into board or terminals. Include for Reducing Glands and shrouds where applicable. NB: IP65 Glands are to be used where applicable.</u>				
14	4,0 mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	4	
15	6.0mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	2	
16	10 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	12	
17	16mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	6	
18	16mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	4	
19	25 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	2	
20	20mm steel conduit including all necessary accessories. Rate to include chasing wall for conduit in the wall, close wall and make good.	m	50	
21	20mm PVC conduit including all necessary accessories. Rate to include chasing wall for conduit in the wall, close wall and make good	m	1,500	
22	32mm steel conduit including all necessary accessories. Rate to include chasing wall for conduit in the wall, close wall and make good.	m	220	
Carried Forward				R
Section No. 4 Bill No. 1 Electrical Installation				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
23	65mm round PVC round box complete with all required accessories	No	50
24	65mm round steel round box complete with all required accessories	No	20
<u>LUMINARIES AND CONTROL DEVICES</u>			
<u>Supply, deliver, accept and store the following luminaries, complete with lamps and control gear as per specification. See and refer to the specification document for details of each luminaire</u>			
25	Type A13 - IP65 Rated, 30W / +/-4440 lm LED - 4000k Rough-guard surface-mounted weather-proof luminaire. Refer to specification document for details	No	8
26	Type A5 - IP65 Rated, 30W / +/-4440 lm LED - 4000k vapour-proof surface-mounted weather-proof luminaire. Refer to specification document for details	No	18
27	Type B1 - IP65 Rated high-pressure die cast aluminium base and trim ring 20W/ +/- 2600lm LED - 4000k bulkhead luminaire. Refer to specification document for details.	No	30
28	Type FL 3 - 75W / +/-9250lm LED (2700k) Streetlight rated IP66 with powder coating. Refer to specification document for details.	No	9
29	Type C6 - 80W / +/-10000lumen LED (4000k) Floodlight, rated IP65 with powder coating. Refer to specification document for details	No	7
30	Photo electric cell. Refer to specification document for details	No	5
<u>LIGHT SWITCHES, SOCKET OUTLET, WELDING ISOLATORS AND ACCESSORIES</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

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Brought Forward			R
<u>Supply, deliver and installation of the following control devices and accessories as per specification. Rate must allow for the termination and connecting of the PVC conductor to the accessory, fixing to the conduit box and the fitting of the cover plate. (PVC covers)</u>			
31	Supply and installation of 15Amp, 1 lever, 1-way, white toggle, white coloured plate, light circuit switch complete with cover and all accessories	No 20	
32	Supply and install 16A, 3pin, 2pin 230V switched socket outlets, white coloured plate with white toggle	No 20	
33	Supply and install 16A, 3pin, 230V double switched socket outlets, red cover plate, red toggle with chamfered earth	No 20	
34	Supply and installation of 20Amp, 1-pole surface mounted isolator, complete with all necessary accessories	No 5	
35	Supply and installation of 20Amp, IP66, 1-Pole surface mounted isolator, complete with all necessary accessories	No 2	
36	New steel cage for vapour-proof luminaire lighting - 1200mm long. Cage shall be hot dip galvanised	No 15	
<u>CONDUIT BOXES / DRAW BOXES</u>			
<u>Supply, deliver and install the following conduit surface mounted boxes. Rate must allow for the termination of conduit</u>			
37	100mm x 100mm hot deep galvanised draw box recessed mounted on wall	No 40	
38	100mm x 50mm hot deep galvanised draw box recessed mounted on wall	No 20	
39	4-way junction box IP66	No 12	
<u>EXCAVATIONS</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

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Brought Forward			R
<u>For all low voltage cables from existing Municipality Substation to meter room and buildings through manholes as per drawings.</u>			
<u>Trenching shall be calculated using the formula below: (700mm deep * 0.4m wide * length)</u>			
40	Excavate in concrete/tar and hard soil, backfilling and compaction to 93% MOD AASHTO	m3 100	
41	Re-instate tar for above item	m3 100	
<u>SUNDRIES</u>			
42	LV reticulation - Preparation of 'As-Built' drawings and manuals as per this specification.	No 1	
43	Labelling of light switches, sockets and isolators outlets as per drawing pop riveted to cover plate.		SUM
44	Supply of hard bound spiral folders containing commissioning/COC certificates, test results & operating & maintenance manuals for the LV equipment, cabling, light fittings, etc.	No 3	
<u>Supply, install, test and commissioning of the lightning protection of the buildings on two corners of the buildings, complete with all necessary required material, accessories for a complete installation. Contractor to use copper earth spike, aluminium or copper conductors as per specification, and have testing points for the building. Rates to include all necessary required accessories for a complete installation. The installation must comply with SANS 10313. Contractor to issue test certificate per building</u>			
45	Security office (L-35.1m, W-8.2m and H-3.1m)		SUM
46	Relay room (L-7.4m, W-5.51 and H-3.1m)		SUM
47	Public waiting area (L-6.03m, W-4.44m and H-3.1)		SUM
<u>TEST AND COMMISSIONING</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

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Item No		Quantity	Rate	Amount
	<u>SECTION 5</u>			
	<u>BILL NO. 2</u>			
	<u>WET SERVICES</u>			
	<u>COLD WATER INSTALLATION</u>			
	<u>Supply, install, and commission the water reticulation systems per specification</u>			
	<u>Class 12 HDPE piping laid and buried trenches not exceeding 800mm deep</u>			
1	25mm diameter HDPE CI 12 underground water pipe	m	40	
	<u>Fittings for HDPE class 12 piping</u>			
2	25mm diameter Adaptor to pex piping	m	1	
	<u>PEX piping</u>			
3	15mm diameter pipe	m	78	
4	22mm diameter pipe	m	52	
	<u>PEX piping fittings</u>			
5	15mm diameter Elbow	No	25	
6	22mm diameter Elbow	No	2	
7	22mm diameter Equal tee	No	13	
8	22-15mm diameter Reducer	No	16	
	<u>Plastic pipe compression fittings and valves</u>			
9	15mm Female elbow	No	15	
10	22mm diameter Isolation valve	No	4	
11	22mm diameter strainer valve	No	1	
	Carried Forward		R	
	Section No. 5			
	Bill No. 2			
	Wet Services			

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	Brought Forward		R
	<u>Pipe hangers - anchor, treaded rod & hilti hanger</u>		
12	15mm diameter	No	12
13	22mm diameter	No	25
	<u>Heavy brown paper loosely wrapped around pipe as sheath for expansion</u>		
14	15-22mm diameter	No	53
	<u>Pipe Leging for hot water piping</u>		
15	15mm diameter	m	15
16	15mm diameter	m	17
	<u>Potable water system</u>		
17	5000 Litre PVC Portable water tank with all associated isolation valves and strainers	No	1
18	Variable speed potable water booster pump capable of delivering 2.3 l/s at 45m of H2O with all associated valves, fitting, PVC pipework, and auto start/stop control circuit.	No	2
19	Fabricate, supply, and install lockable security cages around the duty/standby potable water pumps	No	1
20	100 Litre hot water geyser with all associated PVC piping and fittings installed as per manufacturer's specifications	No	1
21	2.5 kW heat pump with all associated piing and fittings installed as per manufacturer's recommendation	No	1
22	Application of approved coastal treatment for the outdoor heat pump units	No	1
23	Fabricate, supply, and install lockable security cages around heat pump unit	No	1
	<u>DRAINAGE, ETC</u>		
	Carried Forward		R
	Section No. 5 Bill No. 2 Wet Services		

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	Brought Forward			R
	<u>Sewer and drainage pipes and fittings shall be through solid wall Class 34 uPVC socketed soil piping in according to SABS 791, jointed and sealed with butyl rubber rings soil, waste and vent pipes and fittings shall be according to SABS 967 and solvent jointed cold water supply pressure pipes fittings shall be according SABS 966 and jointed by means of the "Lyng" type jointing system. Pipes shall be fixed and jointed according to SABS 0112</u>			
	<u>Class 34 uPVC pipe</u>			
24	50mm diameter pipe	m	15	
25	110mm diameter pipe	m	22	
	<u>Class 34 uPVC fittings</u>			
26	50mm diameter 90 Deg bend	No	20	
27	110mm diameter 90 Deg bend	No	3	
28	110mm diameter 90 Deg access bend	No	3	
29	50mm diameter 45 Deg bend	No	9	
30	110mm diameter 45 Deg bend	No	3	
31	110mm diameter Pan connector	No	3	
32	50mm diameter Equal access junction	No	2	
33	110mm diameter - 50mm diameter junction	No	5	
34	110mm diameter Equal access junction	No	3	
	Carried Forward to Summary of Section No. 5			R
	Section No. 5			
	Bill No. 2			
	Wet Services			

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Item No	Quantity	Rate	Amount
<u>SECTION 6</u> <u>BILL NO. 1</u> <u>PROVISIONAL AMOUNTS</u> <u>PREAMBLES</u> The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said Model Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>General:</u> Subcontract amounts are net. Subcontract amounts are for material and equipment supplied and installed complete by firms of specialists Each subcontract amount may comprise more than one element of work. Therefore, each subcontract amount may include for work to be carried out by more than one subcontractor <u>Profit:</u> Where stated, the contractor may allow for profit if required			
Carried Forward			R
Section No. 6 Bill No. 1 Provisional Sums, ETC			

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Brought Forward	R
<u>General attendance on nominated/selected subcontractors:</u> The item "General Attendance" which follows each subcontract amount for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following: 1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor 2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract work is to be carried out but excluding water, fuel and power for commissioning of any installation 3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials 4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site 5. The use, at reasonable times by arrangement of the contractor's erected hoisting equipment 6. Making good in all trades and cleaning down and removal of rubbish on completion <u>Special attendance on nominated/selected subcontractors:</u> Where stated, special attendance as set out in clause 8.1 of section B of the Preliminaries will be described in detail in this bill <u>Builder's work:</u> Builder's work in connection with specialist services is given elsewhere in these bills of quantities	
Carried Forward	R
Section No. 6 Bill No. 1 Provisional Sums, ETC	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward		R	
<u>CONNECTION FEES</u>			
1	Subcontract amount of Fifty Thousand Rand for the application and power connection for the train station from eThekweni Municipality. Amount to be paid at the discretion of Project Manager/Engineer and the Employer upon receiving quotation or invoice from the Municipality via the contractor	Item	50,000.00
2	Contractor's handling fee	%	
<u>PROTECTION SERVICES</u>			
3	Subcontract amount of Two Hundred Thousand Rand for the provision of protection services to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	200,000.00
4	Profit	%	
5	General attendance	%	
<u>STATION FIXED FURNITURE</u>			
6	Subcontract amount of Twenty Five Thousand Rand for the provision of station fixed furniture installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	25,000.00
7	Profit	%	
8	General Attendance	%	
<u>STATION SIGNAGE</u>			
9	Subcontract amount of Fifty Thousand Rand for the provision of station signage installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	50,000.00
10	Profit	%	
11	General attendance	%	
Carried Forward		R	
Section No. 6 Bill No. 1 Provisional Sums, ETC			

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Brought Forward			R
<u>BUILT-IN CUPBOARDS</u>			
12	Subcontract amount of Fifteen Thousand Rand for the provision of Built-In Cupboards installed complete to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	15,000.00
13	Profit	%	
14	General attendance	%	
<u>COMMUNITY LIAISON OFFICER</u>			
15	Subcontract amount of one Ninety Thousand Rand for Community Liaison Officer for a period of six (6) months	Item	90,000.00
16	Profit	%	
17	General attendance	%	
<u>BUDGETARY AMOUNTS</u>			
<u>METER ROOM</u>			
18	Provide a budgetary allowance of Twenty Five Thousand Rand for meter room to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried to Final Summary			
Section No. 6			
Bill No. 1			
Provisional Sums, ETC			

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Section No	Page No	Amount
<u>FINAL SUMMARY</u>		
1 Preliminaries and General	22	
2 Building Works	64	
3 External Works	68	
4 Electrical Installations	74	
5 Mechanical Installations	80	
6 Provisional Sums	84	
SUB TOTAL (EXCLUDING CONTINGENCIES)		R
<u>CONTRACT CONTINGENCIES</u>		
Allow the sum of 10% for Contingencies to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required		R
TOTAL (INCLUDING CONTINGENCIES)		R
<u>VALUE ADDED TAX</u>		
Value Added Tax [15%]		R
Carried to Form of Tender		R

Item No	Quantity	Rate	Amount
<u>SECTION NO. 1</u>			
<u>BILL NO. 1</u>			
<u>PRELIMINARIES AND GENERAL</u>			
<u>BUILDING AGREEMENT AND PRELIMINARIES</u>			
The JBCC Principal Building Agreement (May 2018 Edition 6.2) prepared by the Joint Building Contracts Committee shall be the applicable building agreement, amended as hereinafter described The JBCC Principal Building Agreement contract data form an integral part of this agreement The Preliminaries revision 1 (February 2016) published by the Association of South African Quantity Surveyors for use with the JBCC Principal Building Agreement Edition 6.2 shall be deemed to be incorporated in these bills of quantities, amended as hereinafter described The contractor is deemed to have referred to the abovementioned documents for the full intent and meaning of each clause The clauses in the abovementioned documents are hereinafter referred to by clause number and heading only Where any item is not relevant to this agreement such item is marked N/A signifying "not applicable"			
<u>PREAMBLES FOR TRADES</u>			
<i>The Model Preambles for Trades 2008 published by the Association of South African Quantity Surveyors is designed to support and extend the abbreviated descriptions utilised in these bills of quantities by inter alia referring to SANS construction standards.</i> <i>Note that the text of the Standard System of Measuring Building Work (seventh edition) and that of the Standard Method of Measuring Building Work for Africa 2015 (first edition) is the same</i>			
Carried Forward		R	
Section No. 1 Bill No. 1 Preliminaries			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward The Model Preambles for Trades 2008 as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained Supplementary preambles and/or specifications are incorporated in these bills of quantities to satisfy the requirements of this project. Such supplementary preambles and/or specifications shall take precedence over the provisions of the Model Preambles The contractor's prices for all items throughout these bills of quantities shall take account of and include for all of the obligations, requirements and specifications given in the Model Preambles and in any supplementary preambles and/or specifications		R	
Carried Forward Section No. 1 Bill No. 1 Preliminaries		R	

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

Brought Forward <u>NOTES TO TENDERERS</u> Tenderers are to inspect the drawings issued with these Bills of Quantities and to satisfy themselves with the nature and the requirements of the Contract works. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to read the descriptions, which are intended as a means of identifying various facets of the work, in conjunction with the drawings. Tenderers shall allow for all costs in connection with the various items taking full cognisance of both the drawings and the Bills of Quantities. Tenderers shall notify the Quantity Surveyor in writing of any discrepancies encountered upon which clarification will be given by the Quantity Surveyor in writing to the Tenderer. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard Tenderers are to note that setting out of the works will be the complete responsibility of the Tenderer and they should therefore acquaint themselves with the site boundaries, site co-ordinates, datum levels etc. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to note that all items with ZERO quantities are Rate Only items and should be priced as such. Tenderers are to note that there might be specified suppliers to be used for certain trades as per the annexure to this tender document. Tenderers should familiarise themselves with the suppliers on the list and ensure to allow for accordingly. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard. Tenderers are to fully acquaint themselves with the construction period and shall allow for any night shift if required. Failure to do so will be the complete responsibility of the Tenderer and no claims whatsoever will be entertained in this regard.	R
Carried Forward Section No. 1 Bill No. 1 Preliminaries	R

Brought Forward			R
<u>STRUCTURE OF THIS PRELIMINARIES BILL</u>			
Section A : A recital of the headings of the individual clauses of the aforementioned JBCC Principal Building Agreement			
Section B : A recital of the headings of the individual clauses of the aforementioned Preliminaries document			
Section C : Any special clauses to meet the particular circumstances of the project			
<u>PRICING OF PRELIMINARIES</u>			
Should the contractor select Option A in the contract data for the adjustment of preliminaries , the amounts entered against the relevant items in these preliminaries are to be divided into one or more of the three categories provided namely fixed (F), value related (V) and time related (T)			
<u>SECTION A: PRINCIPAL BUILDING AGREEMENT</u>			
<u>Interpretation (A1-A7)</u>			
1	Clause 1.0 - Definitions and interpretation		
	F:..... V:..... T:.....	Item	
2	Clause 2.0 - Law, regulations and notices		
	F:..... V:..... T:.....	Item	
3	Clause 3.0 - Offer and acceptance		
	F:..... V:..... T:.....	Item	
4	Clause 4.0 - Assignment and cession		
	F:..... V:..... T:.....	Item	
Carried Forward			R
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	Brought Forward		R
5	Clause 5.0 - Contract documents F:..... V:..... T:.....	Item	
6	Clause 6.0 - Employer's agents F:..... V:..... T:.....	Item	
7	Clause 7.0 - Design responsibility F:..... V:..... T:.....	Item	
	<u>Insurance and security (A8-A11)</u>		
8	Clause 8.0 - Works risk F:..... V:..... T:.....	Item	
9	Clause 9.0 - Indemnities F:..... V:..... T:.....	Item	
10	Clause 10.0 - Insurances F:..... V:..... T:.....	Item	
11	Clause 11.0 - Security F:..... V:..... T:.....	Item	
	<u>Execution (A12 - A17)</u>		
12	Clause 12.0 - Duties of the parties F:..... V:..... T:.....	Item	
	Carried Forward		R
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	Brought Forward		R	
13	Clause 13.0 - Setting out F:..... V:..... T:.....	Item		
14	Clause 14.0 - Nominated subcontractors F:..... V:..... T:.....	Item		
15	Clause 15.0 - Selected subcontractors F:..... V:..... T:.....	Item		
16	Clause 16.0 - Direct contractors Attendance on direct contractors In respect of direct contractors the contractor shall: F:..... V:..... T:.....	Item		
17	Clause 17.0 - Contract instructions Site instructions Instructions issued on site are to be recorded in a site instruction book which is to be supplied and maintained on site by the contractor F:..... V:..... T:..... <u>Completion (A18 - A24)</u>	Item		
18	Clause 18.0 - Interim completion F:..... V:..... T:.....	Item		
19	Clause 19.0 - Practical completion F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
20	Clause 20.0 - Sectional completion			
	F:..... V:..... T:.....	Item		
21	Clause 21.0 - Defects liability period and final completion			
	F:..... V:..... T:.....	Item		
22	Clause 22.0 - Latent defects liability period			
	F:..... V:..... T:.....	Item		
23	Clause 23.0 - Revision of date for practical completion			
	Substitution of materials and goods			
	The removal or substitution of any materials and goods which do not conform to the specification or the contract drawings shall not constitute grounds for the extension of the construction period nor for the adjustment of the contract value [17.1.8, 23.1 & 2]			
	F:..... V:..... T:.....	Item		
24	Clause 24.0 - Penalty for late or non-completion			
	F:..... V:..... T:.....	Item		
	<u>Payment (A25 - A27)</u>			
25	Clause 25.0 - Payment			
	F:..... V:..... T:.....	Item		
26	Clause 26.0 - Adjustment of the contract value and final account			
	Carried Forward		R	
	Section No. 1			
	Bill No. 1			
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Brought Forward		R	
<u>42.1 CONTRACTING AND OTHER PARTIES</u>			
42.1.1			
Employer:			
Passenger Rail Agency of South Africa			
Postal address:			
PO Box 51324			
Durban			
4062			
Tel.: (031) 813 0376			
Physical Address:			
65 Masabalala Yengwa Avenue			
Durban Station			
Durban			
4000			
<u>42.2 CONTRACT DETAILS</u>			
42.2.1 Works Description:			
Refurbishment, Alterations and Additions at			
Winkelspruit Station for a period of six (6) months			
42.2.2 Site Description:			
Winkilspruit Train Station			
42.2.3 Work or installations by direct contractors:			
N/A			
42.2.4 This agreement is for a government contract			
where there are specific options that are			
applicable to a State organ only			
Yes			
Carried Forward			
Section No. 1			
Bill No. 1			
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Brought Forward 42.2.5 Date on which possession of the site is intended to be given: TBC 42.2.6 Period for the commencement of the works after the contractor takes possession: TBC 42.2.7 For the works as a whole. Intended date of practical completion and the penalty per calendar day Six (6) Months after contractual commencement date 0.04% of contract amount per calendar day Penalty Amount 42.2.8 For the works in sections: Intended date of practical completion and the penalty per calendar day: N/A 42.2.9 The law applicable to this agreement shall be that of <i>South Africa (country)</i> <u>42.3 INSURANCES</u> 42.3.1 Contract works insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R Contract Amount + 30.00 %</i> <i>With a deductible of - to be determined by the contractor</i> 42.3.2 Supplementary insurance is required <i>No</i> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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Brought Forward 42.3.3 Public liability insurance to be effected by: <i>Contractor:</i> <i>For the Sum of R 1 000 000-00</i> <i>With a deductible of - to be determined by the contractor</i> <u>42.4 DOCUMENTS</u> 42.4.1 Waivers of contractors lien or right of continuing possession is required Yes 42.4.2 Number of construction document copies to be supplied to the contractor free of charge: 3 Number of 42.4.3 Bills of Quantities/Lump sum document schedule of rates drawn up in accordance with: “Standard System of Measuring Builders’ Work” 42.4.4 On acceptance of the tender the bills of quantities/lump sum document is to be submitted within: <i>The priced bills of quantities must be handed in with the tender</i> 42.4.5 JBCC Engineering General Conditions are to be included in the contract documents: No 42.4.6 The contract value is to be adjusted using escalation adjustment indices N/A Where JBCC CPAP is to be used <i>Base Month</i> N/A 42.4.7 Details of changes made to the provision of JBCC standard documentation: <u>SECTION B: PRELIMINARIES</u> Carried Forward Section No. 1 Bill No. 1 Preliminaries	R R

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	Brought Forward		R
	<u>Interpretation (B1)</u>		
31	Clause 1.1 - Definitions F:..... V:..... T:.....	Item	
32	Clause 1.2 - Interpretation F:..... V:..... T:.....	Item	
	<u>Documents (B2)</u>		
33	Clause 2.1 - Checking of documents F:..... V:..... T:.....	Item	
34	Clause 2.2 - Provisional bills of quantities F:..... V:..... T:.....	Item	
35	Clause 2.3 - Availability of construction information F:..... V:..... T:.....	Item	
36	Clause 2.4 - Ordering of materials and goods F:..... V:..... T:.....	Item	
	<u>Previous work and adjoining properties (B3)</u>		
37	Clause 3.1 - Previous work - dimensional accuracy F:..... V:..... T:.....	Item	
38	Clause 3.2 - Previous work - defects F:..... V:..... T:.....	Item	
	Carried Forward		R
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	Brought Forward		R
39	Clause 3.3 - Inspection of adjoining properties F:..... V:..... T:..... <u>The site (B4)</u>	Item	
40	Clause 4.1 - Defined works area F:..... V:..... T:.....	Item	
41	Clause 4.2 - Handover of site in stages F:..... V:..... T:.....	Item	
42	Clause 4.3 - Enclosure of the works F:..... V:..... T:.....	Item	
43	Clause 4.4 - Geotechnical investigation F:..... V:..... T:.....	Item	
44	Clause 4.5 - Encroachments F:..... V:..... T:.....	Item	
45	Clause 4.6 - Existing premises occupied F:..... V:..... T:.....	Item	
46	Clause 4.7 - Services - known F:..... V:..... T:.....	Item	
47	Clause 4.8 - Protection of trees and/or relevant natural features F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R	
	<u>Management of contract (B5)</u>			
48	Clause 5.1 - Management of the works F:..... V:..... T:.....	Item		
49	Clause 5.2 - Progress meetings F:..... V:..... T:.....	Item		
50	Clause 5.3 - Technical meetings F:..... V:..... T:.....	Item		
	<u>Samples, shop drawings and manufacturer's instructions (B6)</u>			
51	Clause 6.1 - Samples of materials F:..... V:..... T:.....	Item		
52	Clause 6.2 - Workmanship samples F:..... V:..... T:.....	Item		
53	Clause 6.3 - Shop drawings F:..... V:..... T:.....	Item		
54	Clause 6.4 - Compliance with manufacturer's instructions F:..... V:..... T:.....	Item		
	<u>Deposits and fees (B7)</u>			
55	Clause 7.1 - Deposits and fees F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R	
	<u>Temporary services (B8)</u>			
56	Clause 8.1 - Water F:..... V:..... T:.....	Item		
57	Clause 8.2 - Electricity F:..... V:..... T:.....	Item		
58	Clause 8.3 - Ablution and welfare facilities F:..... V:..... T:.....	Item		
59	Clause 8.4 - Communication facilities F:..... V:..... T:.....	Item		
	<u>Prime cost amounts (B9)</u>			
60	Clause 9.1 - Responsibility for prime cost amounts F:..... V:..... T:.....	Item		
	<u>Attendance on subcontractors (B10)</u>			
61	Clause 10.1 - General attendance F:..... V:..... T:.....	Item		
62	Clause 10.2 - Special attendance F:..... V:..... T:.....	Item		
	Carried Forward		R	
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	Brought Forward		R	
	<u>General (B11)</u>			
63	Clause 11.1 - Protection of the works F:..... V:..... T:.....	Item		
64	Clause 11.2 - Protection/isolation of existing/sectionally occupied works F:..... V:..... T:.....	Item		
65	Clause 11.3 - Security of the works F:..... V:..... T:.....	Item		
66	Clause 11.4 - Notice before covering work F:..... V:..... T:.....	Item		
67	Clause 11.5 - Disturbance F:..... V:..... T:.....	Item		
	Clause 11.6 - Environmental disturbance F:..... V:..... T:.....	Item		
68	Clause 11.7 - Works cleaning and clearing F:..... V:..... T:.....	Item		
69	Clause 11.8 - Vermin F:..... V:..... T:.....	Item		
70	Clause 11.9 - Overhand work F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
71	Clause 11.11 - Advertising F:..... V:..... T:..... <u>Preliminaries schedule (B12)</u>	Item	
72	Information for completion of the preliminaries schedule Information necessary for elections and completion of those clauses contained in the preliminaries schedule which are necessary for tender purposes is given hereunder. Where no information is given it shall mean that no specific requirements are expected or that the clause is not relevant to this specific contract 12.1 - Provisional bills of quantities [2.2] The quantities are provisional - <u>Yes</u> 12.2 - Availability of construction information [2.3] Construction documentation is complete - <u>Yes</u> 12.3 - Previous work - dimensional accuracy [3.1] 12.4 - Previous work - defects [3.2] 12.5 - Inspection of adjoining properties [3.3] 12.6 - Defined works area [4.1] 12.7 - Handover of site in stages [4.2] 12.8 - Enclosure of the works [4.3] 12.9 - Geotechnical investigation [4.4] 12.10 - Existing premises occupied [4.6] 12.11 - Services - known [4.7] 12.12 - Protection of trees and/or relevant natural features [4.8]		
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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Brought Forward	R
12.13 - Water [8.1] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.14 - Electricity [8.2] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> Option C (by employer - metered) - <u>No</u> 12.15 - Ablution and welfare facilities [8.3] Option A (by contractor) - <u>Yes</u> Option B (by employer - free of charge) - <u>No</u> 12.16 - Communication facilities [8.4] 12.17 - Protection of the works [11.1] 12.18 - Protection/isolation of existing/sectionally occupied works [11.2] Protection/isolation is required - <u>Yes</u> 12.19 - Disturbance [11.5] 12.20 - Environmental disturbance [11.6] Controlling all forms of pollution The contractor shall be responsible for and take all precautions in controlling by whatever means necessary all forms of pollution emanating from the site during the construction period due <i>inter alia</i> to noise, artificial light, wind-blown sand, dust, deposits of mud, etc The contractor is to ensure that all roads which border the site and is used by the contractor during the execution of the works are kept clean and free of any dirt or debris caused by the execution of the works	
Carried Forward	R
Section No. 1 Bill No. 1 Preliminaries	

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	Brought Forward		R
75	Overloading The contractor shall take all necessary steps to ensure that no damage occurs due to overloading of any portion of the works or temporary works eg scaffolding, etc. The contractor shall submit details of his proposed loading, storage, plant erection, etc to the principal agent for approval prior to proceeding with such loading, storing or erecting and shall comply with and pay for the principal agent's requirements in connection with the provision of temporary support work, etc. Any damage caused to the works by overloading shall be made good by the contractor at his sole expense F:..... V:..... T:.....	Item	
76	Propping of floors below The contractor is advised that propping of floors below may be required if he wishes to use any areas of completed suspended reinforced concrete slabs for vehicle access, storage of materials and goods and location of plant, scaffolding, etc. The location of these areas and any necessary propping shall be approved by the principal agent and the cost thereof shall be borne by the contractor F:..... V:..... T:.....	Item	
77	Testing of flat roof waterproofing for water tightness Flat roof waterproof areas shall be prepared with small sand dykes around them of a size and enclosing an area approved by the principal agent, flooded with water and kept "ponded" for at least forty (40) hours as a test to ensure the water tightness of the waterproofing and before any further construction work is carried out above the waterproofing F:..... V:..... T:.....	Item	
	Carried Forward		R
	Section No. 1 Bill No. 1 Preliminaries		

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	Brought Forward		R	
	The contractor is to submit to the principal agent on an annual basis a schedule of spend, split into vendors engaged as subcontractors and suppliers indicating their BBBEE rating including proof of the said rating F:..... V:..... T:.....	Item		
78	Advertising rights The employer may elect to contract with advertising agencies for the erection of advertising hoardings, banners, wraps or the like for the duration of the contract. The contractor shall not prevent such an arrangement and will assist in the facilitation of same. Position and type of advertising structure to be agreed with the principal agent so as not to hinder the contractor in meeting the obligations under this agreement F:..... V:..... T:.....	Item		
79	Confidentiality The contractor undertakes to maintain in confidence any and all information regarding this project and shall obtain appropriate similar undertakings from all subcontractors and suppliers. Such information shall not be used in any way except in connection with the execution of the works No information regarding this project shall be published or disclosed without the prior written consent of the employer F:..... V:..... T:.....	Item		
	Carried Forward		R	
	Section No. 1 Bill No. 1 Preliminaries			

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	Brought Forward		R
80	Media releases All rights of publication of articles in the media, together with any advertising relating thereto or in any way connected with this project, shall vest with the employer The contractor together with his subcontractors shall not, without the prior written consent of the employer, cause any statement or advertisement connected with this project to be printed, screened or aired by the media F:..... V:..... T:..... <u>SUMMARY OF CATEGORIES</u> Category : Fixed R..... Category : Value R..... Category : Time R.....	Item	
	Carried to Final Summary		R
	Section No. 1 Bill No. 1 Preliminaries		

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO.1</u>			
<u>ALTERATIONS (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 102 - Alterations			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition), as published by the Association of South African Quantity Surveyors, shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items, fully described in the said General Preambles, will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>View site:</u>			
Before submitting his tender, the Contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished.			
No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained			
<u>Old materials to become property of the Contractor:</u>			
Old materials from alterations, except where described as to be re-used or handed over, become the property of the Contractor, who must allow credit for same in the last item of the "Alterations" trade			
Carried Forward		R	
Section No. 2 Bill No. 1 Alterations			

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Brought Forward <u>Old materials to be carted away:</u> Old materials from the alterations, except where described as to be re-used or handed over, as well as all rubbish, etc must be regularly carted from the site and not be allowed to accumulate on or around the site <u>Old materials to be re-used:</u> None of the old materials are to be used for new work, except where specifically described as being set aside for re-use <u>Handing over of materials:</u> Where certain materials or articles from demolitions or alterations are described as to be "handed over to the Employer", it shall be taken to mean "handed over by the Contractor to the Principal Agent" and such materials or articles shall be properly stored by the Contractor until handing over thereof and shall include all necessary transport The Contractor must obtain an official receipt from the Principal Agent listing the materials or articles and dates of handing over Should the Contractor fail to submit the receipt when requested to do so, it shall be deemed that the materials or articles are still in his possession and he will be held liable to the Employer for the full replacement value thereof, which amount will be deducted from any monies due to the Contractor <u>Explosives:</u> No explosives whatsoever may be used for demolition purposes, unless otherwise stated	R
Carried Forward Section No. 2 Bill No. 1 Alterations	R

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Brought Forward	R
<u>GENERAL</u> <u>The contractor shall carry out the whole of the work with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide and erect any temporary tarpaulins and temporary plumbing that may be necessary during the progress of the works, all to the satisfaction of the Architect, and remove when directed.</u> <u>Any water supplies pipes and other piping that may be met with and found necessary to disconnect or cut, shall be effectually stopped or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the Architect.</u> <u>Doors, fanlights, fittings, frames, linings, etc shall be thoroughly overhauled before re-fixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc and easing, oiling, adjusting and repairing ironmongery if necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted wood to match timber.</u> <u>Where doors, windows, etc are described as taken out this shall be understood to include for removal of all beads, architraves, ironmongery, etc and doors which are re-fixed are to be provided with new architraves (elsewhere measured).</u> <u>Prices for taking out and removing doors and frames shall include for removing door stops, cabin locks, etc and making good to match existing.</u> <u>With regard to building up openings in existing walls, cement screeds and pavings, granolithic, etc, shall be levelled and prepared for raising of brickwork.</u> <u>Allow for making good all existing plastered walls where damaged by furniture, etc, and stopping up all screw and holes before painting.</u> <u>Making good finishes shall be deemed to include making good of the brick and concrete surfaces onto which new finishes are applied, where necessary.</u>	
Carried Forward	R
Section No. 2 Bill No. 1 Alterations	

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Brought Forward				R
<u>The contractor will be required to take all dimensions affecting existing building on the site and he will be held solely responsible for the accuracy of all such dimensions.</u> <u>Hazardous materials:</u> Demolitions of buildings, services, external works, site services, etc are to include for the safe removal and disposal of <u>asbestos or asbestos products or other hazardous materials</u> by approved Registered Specialists ----- <u>TEMPORARY BARRIERS, SCREENS, ETC</u> <u>Temporary barriers, screens, etc including removal:</u>				
1	Dust screen 2100mm high formed of suitable timber framing with 250 micron polyethylene sheeting stapled on including corners, ends, etc. to be used on all the phases of the construction project and in accordance to the Health and Safety specifications and regulations	m	527	
<u>REMOVAL OF EXISTING WORK</u> <u>Demolishing and removing:</u>				
2	Storage shed, 3360 x 1400 x 2530mm high overall comprising one brick walls and steel roof construction	No	1	
<u>Breaking down and removing brickwork, etc:</u>				
3	One brickwalls	m2	11	
<u>Taking out and removing doors, windows, etc including thresholds, sills, etc from brickwork (altering openings and making good finishes elsewhere):</u>				
4	Timber single door and frame not exceeding 2,5m ²	No	15	
Carried Forward				R
Section No. 2 Bill No. 1 Alterations				

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Brought Forward			R
<u>Carefully taking out and handing over to the Employer doors, windows, etc including taking out and removing thresholds, sills, etc from brickwork and preparing openings to receive new similar doors, windows, etc (elsewhere measured) and making good cement plaster on both sides and into reveals:</u>			
5	Roller shutter door approximately 5000mm wide x 2100mm high overall (TP-09)	No	1
6	Roller shutter door approximately 1890mm wide x 2100mm high overall (TP-10)	No	2
7	Roller shutter door approximately 1500mm wide x 2100mm high overall (TP-11)	No	1
<u>Taking down and removing roof coverings, accessories, etc.:</u>			
8	Profiled sheet metal roof covering including timber purlins	m2	663
<u>Taking down and removing rainwater goods, etc:</u>			
9	Metal box gutters not exceeding 250mm girth including ends, bends, outlets, brackets, etc. complete	m	323
<u>Taking down and removing ceilings, partitions, etc:</u>			
10	Gypsum plasterboard ceilings, including cornices, timber bandering, etc.	m2	195
<u>Taking up and removing floor coverings, etc from screeded floors:</u>			
11	Carpet	m2	11
<u>Taking out/off and removing ironmongery:</u>			
12	Toilet paper holder from wall	No	12
Carried Forward			R
Section No. 2 Bill No. 1 Alterations			

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	Brought Forward			R
	<u>Taking out/off and removing sundry, metalwork, etc</u>			
13	Steel security gate approximately 1500mm wide x 2100mm high overall (TP-03)	No	1	
	<u>Hacking up/off and removing ceramic and porcelain tiles, including removing mortar bed or adhesive from concrete or brickwork and preparing surfaces for new screed, plaster, tile finishes, etc:</u>			
14	Tiles to floors	m2	223	
15	Tiles to walls	m2	161	
16	Tile skirtings 100mm high	m	75	
	<u>Taking out and removing piping, sanitary fittings, etc including cutting off as necessary, disconnecting piping from fittings and blocking off and making good damaged plasterwork to walls and screeds to floors (all redecoration work elsewhere):</u>			
17	Vitreous china wash hand basin, including short lengths of piping, etc.	No	9	
18	Vitreous china WC pan with flush valve, including short lengths of piping, etc.	No	9	
19	150 Litre hot water geyser mounted in roof space including drip tray, valves, connecting pipework, etc.	No	1	
	<u>Taking out/off and removing glass and mirrors:</u>			
20	Mirror 600 x 600mm high from wall	No	10	
	<u>MAKING GOOD OF FINISHES, ETC</u>			
	<u>Making good concrete:</u>			
21	Floors in patches	m2	138	
	<u>Making good internal/external cement plaster:</u>			
22	Walls in patches	m2	1,604	
	Carried Forward			R
Section No. 2 Bill No. 1 Alterations				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward		R
	<u>Making good platform surfaces:</u>		
23	Surfaces in patches	m2	3,720
	<u>GENERAL REPAIRWORK</u>		
	<u>Repairwork to existing brick walls:</u>		
24	Waterjetting surfaces of existing facebrick walls with high pressure low-volume water jetting lance to remove all dirt, brushing down and washing to remove surface contamination, mould, fungus, damp and treating with two coats of antifungal wash and leaving perfectly clean on completion	m2	1,033
	<u>ALTERATIONS, SERVICING AND REPAIRWORK TO EXISTING DOORS, FRAMES AND WINDOWS</u>		
	<u>Notes:</u>		
	The removal and reinstatement of doors, frames, windows, etc for the purpose of altering, servicing and/or repairing are measured elsewhere		
	<u>Supplementary Preambles:</u>		
	Repairwork to timber to include for the following, unless otherwise described:		
	1. Timber used in repairs is to match existing in type, moisture content, colour and grain as closely as possible		
	2. Approved modern, high-strength waterproof glues which can accommodate any timber movement should be used together with sawdust filler of matching timber		
	3. Only non-corrosive fixings are to be used		
	4. All clamping and pinning as necessary		
	<u>EXISTING WINDOWS</u>		
	Carried Forward		R
	Section No. 2 Bill No. 1 Alterations		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Servicing of existing windows including thoroughly cleaning down of all dirt, scale and general contamination from all surfaces, pulleys, handles, rods, fanlight openers, catches, etc. and servicing and lubricating all moving parts, carefully removing all paint from and polishing all brassware and replacing of damaged or missing screws, nuts, etc. (repairing or replacement of existing ironmongery, removal of glass, putty, etc. re-glazing and preparing for and redecorating of existing frames, sashes, etc. all elsewhere measured):</u>			
25	Aluminium extrusions window, size 540mm wide x 900mm high overall with burglar bars and bullet-proof glass (WT-03)	No	1
26	Ditto, but size 860 x 1175mm high overall with burglar bars (WT-05)	No	4
27	Steel extrusions window, size 1100mm wide x 1570mm high overall with burglar bars (WT-06)	No	1
28	Aluminium extrusions window, size 1150mm wide x 1190mm high overall with burglar bars and bullet-proof glass (WT-08)	No	1
29	Ditto, but size 590 x 900mm high overall with burglar bars (WT-14)	No	6
30	Ditto, but size 900 x 1245mm high overall with burglar bars (WT-15)	No	2
<u>BUDGETARY ALLOWANCE</u>			
31	Provide a budgetary allowance of Fifty Thousand Rand for sundry alterations to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 1			
Alterations			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 2</u>			
	<u>MASONRY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 116 - Brick and Blockwork			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>BRICKWORK</u>			
	<u>General:</u>			
	Non-load bearing brickwork is to be built to full height less 20mm gap next to the ceiling and is to be left for 14 days before grouting up in 1:3 cement mortar.			
	<u>Sizes in descriptions:</u>			
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick			
	<u>Hollow walls:</u>			
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole			
	Carried Forward		R	
	Section No. 2 Bill No. 2 Masonry			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward <u>Bagged and sealed walls:</u> Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats bitumen emulsion waterproofing coating <u>Face bricks :</u> Bricks shall be ordered timeously to obtain uniformity in size and colour All face brickwork shall be regularly cleaned down as the work proceeds and shall be protected as necessary by an approved method <u>Pointing:</u> Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include smooth floated square recessed, hollow recessed, weathered pointing, etc <u>BLOCKWORK</u> <u>Concrete masonry units:</u> Blocks are to be either solid or hollow modular dense concrete masonry units having a compressive strength of 7MPa <u>Wall ties for blockwork:</u> Wall ties shall be polypropylene ties complying with BS 76377. Ties for hollow walls shall be of sufficient length to allow not less than 75mm of each end to be built into the blockwork. Ties are to be spaced at intervals of not more than 1m in the horizontal direction and not more than 400mm staggered in the vertical direction except at openings, vertical joints or ends of walls where they are to be placed vertically above each other <u>Blockwork:</u> Blockwork shall comply with SANS 10145 "Concrete Masonry Construction"	R
Carried Forward Section No. 2 Bill No. 2 Masonry	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
Surfaces to be plastered shall have joints raked out to a depth of at least 10mm to provide a key. Cavities of hollow walls shall be kept free of mortar droppings or other undesirable matter. Every second perpend of the bottom course of the external skin of hollow walls shall be left open as a weep hole <u>Standard complementary blocks:</u> Descriptions of blockwork shall be deemed to include standard complementary blocks such as corner, three-quarter, half and quarter blocks required in the construction of corners, reveals, jambs, ends, etc to solid and hollow walls and for bonding as necessary <u>DECORATIVE BLOCKS</u> Blocks shall be of approved manufacture, sound, well burnt or cured and uniform and true in size, shape and colour <u>SUPERSTRUCTURE</u> <u>Brickwork of NFP bricks in class II mortar</u>			
1	Half brick walls	m2	13
<u>Brickwork of NFX bricks (14 MPa nominal compressive strength) in class II mortar in loadbearing walls etc:</u>			
2	One brick walls	m2	15
3	One brick walls in beamfilling	m2	2
<u>BRICKWORK SUNDRIES</u>			
	Cutting toothings and bonding new brickwork to existing	m2	
<u>Joint forming material in movement joints:</u>			
4	12mm Fibre board built in vertically through brick walls	m	13
<u>2,5mm Brickwork reinforcement:</u>			
5	75mm Wide reinforcement built in horizontally	m	4
Carried Forward			R
Section No. 2 Bill No. 2 Masonry			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
6	150mm Wide reinforcement built in horizontally	m	5
	<u>Prestressed fabricated concrete lintels, including necessary temporary supports:</u>		
7	75 x 110mm Lintels in lengths not exceeding 3m long	m	5
	<u>Turning pieces to lintels, etc:</u>		
8	220mm Wide turning pieces	m	5
	<u>Cavity closers, etc :</u>		
9	1,6mm Galvanised flat section drip plate 220mm girth, three times bent along length to form drip and built horizontally into hollow wall	m	5
	<u>Galvanised hoop iron cramps, ties, etc:</u>		
10	30 x 1,6mm Wall tie 500mm long with one end cast into concrete and other end built into brickwork	No	20
Carried Forward			R
Section No. 2 Bill No. 2 Masonry			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

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PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 3</u>			
<u>WATERPROOFING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 120 - Waterproofing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Waterproofing:</u>			
Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee. Waterproofing to roofs shall be laid to even falls to outlets, etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs			
Carried Forward		R	
Section No. 2 Bill No. 3 Waterproofing			

[illegible]

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 4</u>			
<u>ROOF COVERINGS</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the ends of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
Profiled metal roof sheeting and accessories shall be supplied with a 10 year guarantee and be installed by an approved installer			
All fixing holes shall be drilled and not punched			
Roof covering accessories shall be manufactured from the same material as used for roof covering			
<u>TILES</u>			
<u>User note:</u>			
The fixing recommendations of the manufacturer of the tiles used for the specific region and/or situation are to be incorporated as supplementary preambles			
Carried Forward		R	
Section No. 2 Bill No. 4 Roof Coverings			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

[illegible]

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

Brought Forward					R
<u>ROOF AND WALL INSULATION (WORK GROUP 122)</u> <u>Heavy industrial grade aluminium foil based insulation:</u>					
6	Two sided bubble insulation membrane	m2	663		
Carried Forward to Summary of Section No. 2 Section No. 2 Bill No. 4 Roof Coverings					R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 5</u>			
	<u>CARPENTRY AND JOINERY</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 126 - Carpentry & Joinery			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Fixing:</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
	<u>Joinery:</u>			
	Descriptions of frames shall be deemed to include frames, transomes, rails, etc			
	Descriptions of hardwood joinery shall be deemed to include sinking and pelleting heads and nuts of bolts			
	Carried Forward		R	
	Section No. 2 Bill No. 5 Carpentry and Joinery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward <u>Particle board</u> All particle board shall comply with SANS 50312 having the required marking as per SANS 50312/EN 312 <u>Decorative thermosetting plastic laminate covering:</u> Laminate covering shall be glued under pressure and edge strips of same shall be butt jointed at junctions with adjacent similar finish <u>Sizes:</u> Sizes are nominal and the Contractor shall make allowance in his prices for minor variances in stated finished sizes of timber doors, door members, door frames, architraves, etc <u>Prices</u> Prices for all joinery work are to include for general framing, housing and notching, arris rounded angles, glueing, blocking, planting on, screwing, adhesives, dowels, pellets, cross tongues, screws and nails and setting up complete and also for all square cutting and waste. Tops shall be secured with metal or hardwood buttons.		R	
Section No. 2 Bill No. 5 Carpentry and Joinery	Carried Forward	R	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>ROOFS, ETC</u>			
<u>EAVES, VERGES, ETC</u>			
<u>Medium density plain fibre-cement fascias and barge boards:</u>			
1	19 x 235mm Fascias and barge boards, including aluminium H-profile jointing strips	m	323
<u>FLOORS, ETC</u>			
<u>SKIRTINGS</u>			
<u>Wrought meranti:</u>			
2	19 x 76mm Skirtings including 19mm quadrant bead, nailed	m	181
<u>DOORS, ETC</u>			
<u>Solid hardwood with slated panels with sides and counselled edges to suit opening, hung to steel frames:</u>			
3	44mm Door 900 x 2400mm high, including 390 x 300mm high framed openings (TP-02)	No	1
4	44mm Door 890 x 2125mm high (TP-03)	No	2
5	44mm Door 813 x 2125mm high (TP-04)	No	1
6	44mm Door 813 x 2125mm high (TP-06)	No	1
<u>Semi-solid timber, hung to steel frames:</u>			
7	44mm Door 820 x 2100mm high with concealed edges to suit opening (TP-08)	No	5
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fire doors:</u>			
Fire doors are to be in accordance with SANS 1253			
Section No. 2 Bill No. 5 Carpentry and Joinery			
Carried Forward			R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward		R
<u>BUDGETARY ALLOWANCE</u>		
8	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry carpentry and joinery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item
Carried Forward to Summary of Section No. 2		R
Section No. 2		
Bill No. 5		
Carpentry and Joinery		

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 6</u>			
<u>CEILINGS, PARTITIONS AND ACCESS FLOORING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 129 - Ceilings			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins, or to be shot-pinned, to brickwork or concrete			
Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 500mm centres, and where described as "bolted", the bolts have been given separately elsewhere			
<u>Ceilings:</u>			
Unless otherwise described, ceilings shall be deemed to be horizontal			
Carried Forward		R	
Section No. 2 Bill No. 6 Ceilings, Partitions and Access Flooring			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward			R
	<u>Bulkheads:</u> Bulkheads are defined as those portions of ceilings which are stepped down from the general ceiling level in a particular room or area and which generally occur along the perimeter. Their purpose is either to conceal services or to create architectural features Bulkheads have only been described as such where they conform to the above definition and where the horizontal, vertical or sloping dimensions do not exceed 1200mm. Where these dimensions are more than 1200mm such portions of ceilings have been included in the appropriate general items of ceilings Unless otherwise described, bulkheads shall be deemed to be horizontal along the length <u>Openings:</u> Prices for openings for light fittings, ventilation grilles, air conditioning diffusers, etc. are to include for any necessary additional support, trimming around, etc. <u>Steel components:</u> All steel components for ceilings, partitions, etc are to be galvanised in accordance with SANS 121 <u>INSULATION</u> <u>Non-combustible fibreglass insulation of a density of not less than 10kg/m3 bonded with an inert thermo-setting resin:</u>			
1	120mm Insulation in blanket form, closely fitted and laid on top of branderling between roof timbers, etc.	m2	154	
	Carried Forward			R
	Section No. 2 Bill No. 6 Ceilings, Partitions and Access Flooring			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward			R
<u>NAILED UP CEILINGS</u>			
<u>12mm Fibre-cement plain ceiling boards with H-profile galvanised steel jointing strips:</u>			
2	Ceilings including 38 x 38mm sawn softwood bandering at 400mm centres and cross bandering at 400mm centres	m2	183
3	Extra over ceiling for 600 x 600mm trap door of 38 x 38mm wrought softwood rebated framing with one cross brander, covered with ceiling board and fitted flush in opening, including necessary trimmers around	No	9
<u>Gypsum plasterboard cornices:</u>			
4	75mm Coved cornices	m	324
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 6			
Ceilings, Partitions and Access Flooring			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 7</u> <u>FLOOR COVERINGS, WALL LININGS, ETC</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 130 - Resilient floor and wall coverings <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration			
Carried Forward		R	
Section No. 2 Bill No. 7 Floor Coverings			

Section No. 2
Bill No. 7
Floor Coverings

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 8</u> <u>IRONMONGERY</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 132 - Ironmongery <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration			
Carried Forward		R	
Section No. 2 Bill No. 8 Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Locks:</u> Notwithstanding Clause 2, Item 3 of the "Ironmongery" trade of the "Standard System of Measuring Building Work, Seventh Edition", descriptions of locks shall be deemed to include two keys per lock <u>Finishes to ironmongery:</u> Where applicable, finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin bronze lacquered CH Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AN Anodised natural AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded BBS Brushed stainless steel <u>HINGES, BOLTS, ETC</u> <u>"Union" or similar approved:</u>			
1	"Ref. CZ80941SCR" or similar approved sliding indicator bolt set	No	4
<u>LOCKS</u>			
2	Commercial cylinder sash lock	No	2
3	75mm Three lever upright mortice rebated lockset with satin chrome furniture (TP-01)	No	4
<u>"Calini" or similar approved:</u>			
4	"Ref. IW2051" or similar approved double cylinder suitable for master key	No	1
<u>HANDLES</u>			
Carried Forward			R
Section No. 2 Bill No. 8 Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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	Brought Forward		R
	<u>"Union Assa Abloy" or similar approved:</u>		
5	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle with back plates	No	8
6	"Ref.AL6D67-05A5" or similar approved anodised aluminium pull handle	No	1
7	100mm Chromium plated bow handle bolted through door with the bolt ends hammered to prevent the nuts being removed	No	8
	<u>PUSH PLATES AND KICK PLATES</u>		
	<u>1,2mm Thick satin finished stainless steel plates countersunk screwed along edges at not exceeding 200mm centres:</u>		
8	300 x 150mm Kick plate	No	1
	<u>DOOR CLOSERS</u>		
	<u>"Union Assa Abloy" or similar approved:</u>		
9	"Ref. 7770" door closer	No	8
	<u>SUNDRIES</u>		
	<u>"Union Assa Abloy"or similar approved:</u>		
10	"Ref. 99022SS" door stop, plugged	No	11
	Carried Forward		R
	Section No. 2 Bill No. 8 Ironmongery		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>BATHROOM FITTINGS</u>			
<u>"Franke" or similar approved:</u>			
11	"Ref. EXOS618X" soap dispenser, plugged	No 4	
12	"Ref. BS646" stainless steel soap dish, plugged	No 4	
13	"Ref. STRX672" stainless steel lockable toilet roll holder, plugged	No 4	
14	"Ref. RODX602 " paper towel dispenser and waste bin combination, plugged	No 4	
15	"Ref. BS611V" stainless steel sanitary towel disposal bin, plugged	No 4	
16	32mm "Ref. CNTX750" stainless steel back grab rail 750mm long, plugged	No 1	
17	32mm "Ref. CNTX700A" stainless steel side grab rail 874mm girth, plugged	No 1	
18	"Ref. CNTX400A" fold down shower seat, plugged	No 1	
<u>BUDGETARY ALLOWANCE</u>			
19	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry ironmongery to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 8			
Ironmongery			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Item No		Quantity	Rate	Amount
	<u>SECTION 2</u>			
	<u>BILL NO. 9</u>			
	<u>STRUCTURAL STEELWORK</u>			
	<u>WORK GROUP ALLOCATION</u>			
	Unless otherwise stated, all items in this Bill will be allocated to Work Group 134 - Structural Steelwork in Buildings			
	<u>PREAMBLES</u>			
	The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Specification:</u>			
	All structural steel must comply with SANS 1200H (Degree of Accuracy II)			
	All hot rolled structural steel sections must comply with SANS 1431 grade 300W, unless otherwise specified on the drawings			
	Unless otherwise designated, all bolts and nuts will be grade 4.6 to SANS 135 and BS 916. Descriptions of bolts shall be deemed to include nuts and washers. Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete			
	Carried Forward		R	
	Section No. 2 Bill No. 9 Structural Steelwork			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward All connections must be welded all round with a 6mm fillet weld, unless otherwise specified on the drawings <u>Drawings and shop details:</u> The Contractor shall be responsible for preparing shop drawings and details which must be submitted to the Principal Agent for approval prior to commencement of fabrication. Before commencing any fabrication, the steel fabricator must check the accessibility of the site and design the sizes of individual parts accordingly <u>Hot-dipped galvanizing:</u> After fabrication and prior to delivery to site, all steelwork described as hot-dipped galvanized, is to be descaled and thoroughly cleaned by pickling, after which it is to be hot dip galvanized in accordance with the requirements of SANS 121/1501461 <u>Descriptions:</u> Descriptions of bolts shall be deemed to include nuts and washers Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete <u>BUDGETARY ALLOWANCE</u> 1 Provide a budgetary allowance of One Hundred and Fifty Thousand Rand for sundry alterations to structural steelworks be used as directed by the Principal Agent and to be deducted in whole or in part if not required. <u>Paint testing:</u> 2 Subcontract amount of Twenty Five Thousand Rand for quality control inspection by an authorised independent authority Carried Forward Section No. 2 Bill No. 9 Structural Steelwork	Item	R SUM R	

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Brought Forward		R
3	Profit	%
4	Attendance	%
Carried Forward to Summary of Section No. 2		R
Section No. 2		
Bill No. 9		
Structural Steelwork		

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Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 10</u> <u>METALWORK</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 136 - Metalwork <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>Descriptions of bolts, anchors, etc:</u> Descriptions of bolts shall be deemed to include nuts and washers Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete Items described as "holed for bolt(s)" shall be deemed to exclude the bolts, unless otherwise described Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres			
Carried Forward		R	
Section No. 2 Bill No. 10 Metalwork			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward <u>Fixing:</u> Unless otherwise described, descriptions of items shall be deemed to include for fixing to brickwork or concrete Where items are described as "bolted", the bolts are measured elsewhere as stated in clause N.7 of the Model Preambles			R
Section No. 2 Bill No. 10 Metalwork			R

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>STEEL GATES, SCREENS, ETC</u>			
<u>Epoxy coated welded screens and gates, to brickwork:</u>			
1	Steel security gate approximately 1500mm wide x 2100mm high overall (TP-03)	No	1
<u>PRESSED STEEL DOOR FRAMES</u>			
<u>1,6mm Rebated frames suitable for half brick walls:</u>			
2	Frame for door 820 x 2100mm high (TP-08)	No	6
<u>1,6mm Rebated frames suitable for one brick walls:</u>			
3	Frame for door 820 x 2400mm high with three hinges per leaf (TP-02)	No	1
4	Frame for door 810 x 2125mm high with three hinges per leaf (TP-03)	No	1
5	Frame for door 813 x 2125mm high with three hinges per leaf (TP-04)	No	1
6	Frame for door 813 x 2125mm high with three hinges per leaf (TP-06)	No	1
<u>PRESSED STEEL COMBINATION DOORS AND FRAMES</u>			
<u>Flush both sides doors:</u>			
7	835 x 2070mm High anti-corrosive galvanised and epoxy coated mild steel door with concealed sides and edges (TP-01)	No	4
<u>ALUMINIUM WINDOWS, DOORS, ETC</u>			
<u>Aluminium windows, doors, etc:</u>			
The successful tenderer shall be responsible for the complete design work including determining required section sizes and fixing details, all subject to the Principal Agent's approval			
Carried Forward			R
Section No. 2 Bill No. 10 Metalwork			

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Brought Forward Doors, windows, etc shall be designed and constructed to withstand wind pressures of 1,1kn/m2 (unfactored) and 1,5kn/m2 (factored) All calculations shall be submitted to the Principal Agent's for approval Doors and windows shall comply with AAAMSA design criteria Glazing shall comply with SAGGA regulations. Glass thicknesses shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings Doors and windows shall be supplied with protective tape and plastic which shall be removed only once surrounding trades have been completed The following certificates shall be provided prior to commencement of site work: 1 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product 2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively 3 A copy of the relevant Performance Compliance Report from the system suppliers 4 A copy of the relevant Safiera Energy Rating Certification 5 A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process		R	
Carried Forward Section No. 2 Bill No. 10 Metalwork		R	

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	Brought Forward			R
6	A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 10400-N, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked			
7	A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degradation for a period of not less than five years			
	All windows and door joints must be sealed to the inside with "Dow Corning" or similar approved silicone during manufacturing			
	All dimensions shall be verified on site before commencing the work and a full set of shop drawings showing all relevant details shall be submitted to the Architect for his approval, prior to the manufacture of the units			
	<u>Sizes</u>			
	Where sizes are given these are nominal sizes			
	<u>Ironmongery</u>			
	The tenderer must allow in his pricing for supply and fixing of ALL ironmongery			
	Heavy duty high quality fittings must be allowed for and samples will be required for approval by the Project Manager			
	<u>ALUMINIUM CASEMENT WINDOWS</u>			
	<u>Powder coated aluminium windows with and including 12 x 12mm solid square aluminium burglar bars fixed to window over opening sashes, 6,38mm clear float safety glass, glazing beads, ironmongery, woolpile weather seals, packing pieces, friction stays, coverstrips and sealing all round on both sides with polysulphide or similar approved sealant:</u>			
8	Standard window size 900 x 1200mm high (TP-10)	No	1	
	Carried Forward			R
	Section No. 2 Bill No. 10 Metalwork			

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PASSENGER RAIL AGENCY OF SOUTH AFRICA
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Brought Forward			R
<u>STEEL ROLLER SHUTTERS, ETC</u>			
<u>Natural anodised zincalume roller shutters:</u>			
10	Steel security gate approximately 1190mm wide x 2100mm high overall (TP-01)	No 1	
11	Steel security gate approximately 1610mm wide x 2100mm high overall (TP-02)	No 2	
12	Steel security gate approximately 1500mm wide x 2100mm high overall (TP-03)	No 1	
<u>BUDGETARY ALLOWANCE</u>			
13	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry metalwork to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 10			
Metalwork			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 11</u>			
<u>PLASTERING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 142 - In situ finishes			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Moisture tests:</u>			
Before any finishes, coverings, etc are applied to screeds, plastering, etc or any other in-situ finish, moisture tests are to be carried out to the complete satisfaction of the Project Manager to ensure that these surfaces have the correct moisture content for the finish to be applied			
<u>Labours, etc</u>			
Labours such as fair, rounded and chamfered edges, trowel cuts, throats, V-joints, angles, etc shall be deemed to be included in the descriptions			
Carried Forward		R	
Section No. 2 Bill No. 11 Plastering			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward <u>Sample Panels</u> A sample panel size 1m x1m, of each of the various plaster type wall and floor finishes in this contract, shall be prepared for the approval of the Project Manager and the cost of the sample panel(s) shall be deemed to be included in the overall costs of the <u>relevant</u> wall and floor finishes <u>GRANOLITHIC</u> <u>Method:</u> The method to be used shall be either the monolithic method or the bonded method <u>Preparation:</u> For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic applied immediately thereafter. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slab shall then be wetted and kept damp for at least six hours before applying the granolithic <u>Mix:</u> Unless otherwise described, granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SANS 1083 and shall generally be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregate shall be increased to the maximum size compatible with the thickness of the granolithic	R
Carried Forward Section No. 2 Bill No. 11 Plastering	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward <u>Panels:</u> Granolithic shall be laid in panels not exceeding 14m² for monolithic finishes, not exceeding 9,5m² for bonded finishes and not exceeding 6m² for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width Where possible joints between panels shall be positioned over joints in the floor slab and shall be at least 3mm wide through the full thickness of the finish, separated by strips of wood or fibreboard and finished with V-joints <u>Laying:</u> Monolithic granolithic shall be applied to the partially set slab and thoroughly compacted and lightly wood floated to the required levels Bonded granolithic shall be applied to the slab after applying a 1:1 sand-and-cement slurry brushed over the surface and allowed to partially set before applying the granolithic. The granolithic shall be thoroughly compacted and lightly wood floated to the required levels After wood floating, the monolithic and bonded granolithic shall remain undisturbed until bleeding has ceased and the surface has stiffened. Any remaining bleed water and laitance shall then be removed and the surface steel trowelled or power floated <u>Curing, seasoning and protection:</u> Granolithic shall be covered with clean hessian with waterproof building foil over and kept wet for at least seven days after laying <u>Colour:</u> Coloured granolithic shall be tinted with an approved colouring pigment mixed into a true and even colour	R
Carried Forward Section No. 2 Bill No. 11 Plastering	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
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Brought Forward			R
<u>TINTED WHITE CEMENT SCREEDS</u>			
Tinted screed shall be composed of one bag White Portland Cement or similar approved and two wheelbarrows "Malmesbury" or similar approved sand. Surfaces shall be finished with a steel trowel to leave a smooth finish and coated with two coats "Earthcote S.I. Floorcote" or similar approved two-pack polyurethane floor sealer applied as per the manufacturer's recommendations			
NOTE: Tinted screeds are to be strengthened with "Primal Eccos" acrylic polymer (15% of the water volume is to be substituted with the acrylic polymer during the mixing process)			
Coarse sand is to be used for these screeds			
All tinting, finishing, strengthening, etc are to be mixed, applied, etc strictly in accordance with the manufacturer's instructions			
<u>CEMENT PLASTER</u>			
Unless otherwise described, cement plaster shall be taken to mean Class 1 cement plaster i.e. 1:4 cement:sand plaster (common cement)			
<u>INTERNAL PLASTER</u>			
<u>Cement plaster wood floated for tiles, on brickwork:</u>			
1	On walls	m2	24
2	On narrow widths	m2	3
<u>EXTERNAL PLASTER</u>			
<u>Cement plaster wood floated on brickwork:</u>			
3	On walls	m2	15
4	On narrow widths	m2	5
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 11			
Plastering			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 12</u>			
<u>TILING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 144 - Tiling			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Fixing:</u>			
Unless described as "fixed with adhesive to plaster (plaster elsewhere)", descriptions of tiling on brick or concrete walls, columns, etc shall be deemed to include 1:4 cement plaster backing and descriptions of tiling on concrete floors, etc shall be deemed to include 1:3 cement plaster bedding			
Tiling described as "fixed with adhesive on power floated concrete" shall be deemed to include for approved tiling key-coat			
Ceramic, porcelain, marble and granite tiles are to be fixed and grouted with suitable adhesives and grouts from the "Tal Goldstar" or similar approved range of products as recommended by the manufacturer of the tiles			
Carried Forward		R	
Section No. 2			
Bill No. 12			
Tiling			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Preparatory work to existing painted plastered surfaces:</u>			
Preparation of all existing painted plastered surfaces is to include for removing all loose and flaking material by wire brushing, thoroughly washing down and allowing to dry completely and applying one coat masonry bonding agent			
<u>WALL TILING</u>			
<u>350 x 350mm Ceramic tiles (Allow a Prime Cost Amount of R 250/m2 delivered to site) fixed with adhesive to plaster (plaster elsewhere) and flush pointing with and including waterproof grout:</u>			
1	On walls	m2	408
2	On narrow widths	m2	19
3	On walls in isolated panels, splashbacks, etc.	m2	3
<u>FLOOR TILING</u>			
<u>600 x 600mm Porcelain floor tiles (Allow a Prime Cost Amount of R 350/m2 delivered to site) fixed with adhesive to screed (screed elsewhere) and flush pointing with and including waterproof grout:</u>			
4	On floors	m2	191
5	Skirting 100mm high (of fair cut tiles)	m	128
<u>SUNDRIES</u>			
<u>Stainless steel dividing strips:</u>			
6	28 x 10 x 2,5mm L-section dividing strips between tiles	m	128
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 12			
Tiling			

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 13</u>			
<u>PLUMBING AND DRAINAGE</u>			
<u>(PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Wire gratings:</u>			
Descriptions of gutter outlets, etc shall be deemed to include wire balloon gratings			
<u>Stormwater channels:</u>			
Descriptions of channels shall be deemed to include necessary excavation, surface preparation, compaction, etc and disposal of surplus material on site			
Carried Forward		R	
Section No. 2 Bill No. 13 Plumbing and Drainage			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward	R
<u>French drains:</u> Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site <u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>Stainless steel basins, sinks, wash troughs, urinals, etc:</u> Stainless steel for economy basins, domestic sinks and worktops shall be Type 430 (17/0) Stainless steel for urinals, basins, quality sinks, wash troughs, institutional equipment, etc shall be Type 304 (18/8) Stainless steel for laboratory sinks, photographic equipment, etc shall be Type 316 (18/8) Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable <u>Sealing of edges:</u> Outer edges of sinks, basins, baths, urinals, etc are to be sealed against adjacent surfaces with approved mildew resistant silicone sealant and prices must include therefor <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings	
Carried Forward	R
Section No. 2 Bill No. 13 Plumbing and Drainage	

Brought Forward	R
<u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground	
Carried Forward	R
Section No. 2 Bill No. 13 Plumbing and Drainage	

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

Brought Forward	R
Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claims for extra bushes, reducers, etc will be entertained <u>Fixing of pipes:</u> Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc casting in, building in or suspending not exceeding 1m below suspension level <u>Paper wrapping to pipes:</u> Pipes chased into brickwork must be wrapped with two layers of stout brown paper tied with wire. Rates are to include for wrapping around joints and fittings <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SANS 1200L (provision for disinfection elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 13 Plumbing and Drainage	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward	R
<u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SANS 1200L : Medium-pressure pipelines SANS 1200LD : Sewers SANS 1200LE : Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SANS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SANS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding	
Carried Forward	R
Section No. 2 Bill No. 13 Plumbing and Drainage	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward	R
<u>General:</u> Descriptions of cast iron roof outlets shall be deemed to include joints to pipes and casting into concrete (adaptors for joints to PVC pipes, etc are given separately) Descriptions of overflow pipes where measured in number, shall be deemed to include joints to cisterns and splay cut ends Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) Descriptions of WC pans, slop hoppers, etc shall be deemed to include for joints to soil pipes (pan connectors are separately measured) and shall have straight or side outlets and "P" or "S" traps as necessary Description of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings. <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere)	
Carried Forward	R
Section No. 2 Bill No. 13 Plumbing and Drainage	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Proprietary items:</u> Where applicable, the manufacturers' names or product catalogue titles are given in sub-headings preceding the items Note that the manufacturers names specified in this trade are for the purposes of competitive pricing. Prices are to be based on the specific products/articles specified. On request, returnable samples are to be provided to the Project Manager for consideration -----			
<u>SANITARY FITTINGS (WORK GROUP 148)</u> <u>"Franke" or similar approved stainless steel:</u>			
1	1050 x 535mm "Trendline 711 Code: 1030006" sink with 350 x 460mm end bowl, on cupboard (cupboard elsewhere)	No	1
<u>"Vaal" or similar approved:</u>			
2	455 x 290mm "Hibiscus" 7050 wash hand basin bolted to wall	No	4
3	"Hibiscus" 772402 close-coupled WC suite comprising pan with double flap heavy duty thermoset seat (Code: 8531Z0) and matching 9 litre cistern	No	4
<u>WASTE UNIONS, ETC</u> <u>"Cobra Watertech" or similar approved:</u>			
4	40mm Code 317 CP basin waste union and code 309CP anti-theft plug	No	4
<u>TRAPS, ETC</u> <u>uPVC:</u>			
5	40mm "P" or "S" trap	No	4
Carried Forward			R
Section No. 2 Bill No. 13 Plumbing and Drainage			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>TAPS, VALVES, ETC</u>			
<u>"Cobra Watertech" or similar approved:</u>			
6	15mm Code1065-15CP fullway isolating ball valve	No 4	
7	15mm Code 902CP "Focus" basin mixer with waste union, etc and angle flow regulating valves	No 4	
<u>AS-BUILT DRAWINGS</u>			
8	Provision of as-built drawings	Item	
<u>BUDGETARY ALLOWANCE</u>			
9	Provide a budgetary allowance of Fifty Thousand Rand for sundry plumbing works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 13			
Plumbing and Drainage			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION 2</u>			
<u>BILL NO. 14</u>			
<u>GLAZING</u>			
<u>WORK GROUP ALLOCATION</u>			
Unless otherwise stated, all items in this Bill will be allocated to Work Group 150 - Glazing			
<u>PREAMBLES</u>			
The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Float glass:</u>			
The term "float glass" is used for monolithic annealed glass			
<u>Laminated glass:</u>			
Laminated glass to have polyvinyl butyral (PVB) interlayer(s)			
Carried Forward		R	
Section No. 2 Bill No. 14 Glazing			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>GLAZING TO STEEL WITH PUTTY</u>			
<u>6,38mm Normal strength (NS) clear laminated safety glass:</u>			
1	Panes exceeding 0,5m2 and not exceeding 2,0m2	m2	4
<u>33mm Bulletproof glass (SANS 10400):</u>			
2	Panes exceeding 0,1m2 and not exceeding 0,5m2	m2	1
<u>TOPS, SHELVES, DOORS, MIRRORS, ETC</u>			
<u>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges fixed with double sided adhesive tape:</u>			
3	Mirror 600 x 1200mm high	No	12
Carried Forward to Summary of Section No. 2			R
Section No. 2			
Bill No. 14			
Glazing			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION 2</u> <u>BILL NO. 15</u> <u>PAINTWORK</u> <u>WORK GROUP ALLOCATION</u> Unless otherwise stated, all items in this Bill will be allocated to Work Group 152 - Painting <u>PREAMBLES</u> The General Preambles for Trades (2017 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles <u>SUPPLEMENTARY PREAMBLES</u> <u>PREPARATORY WORK TO EXISTING WORK</u> <u>Previously painted plastered surfaces:</u> Surfaces shall be thoroughly washed down and allowed to dry completely before any paint is applied. Blistered or peeling paint shall be completely removed and minor cracks shall be opened, filled with a suitable filler and finished smooth <u>Previously painted metal surfaces:</u> Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal			
Carried Forward		R	
Section No. 2 Bill No. 15 Paintwork			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Previously painted wood surfaces:</u>			
Surfaces shall be thoroughly cleaned down. Blistered or peeling paint shall be completely removed and cracks and crevices shall be primed, filled with suitable filler and finished smooth			
<u>PAINT SPECIFICATIONS</u>			
All painting shall be done in accordance with "Plascon" or similar approved, etc specifications, unless otherwise described			
<u>COLOURS</u>			
When staining timber, the resultant colour or shade must be to the complete satisfaction of the Project Manager before any overcoating or preservative is applied			
Paintwork is classified in the following different colour groups: "White", "Pastel", "Deep" and "Transparent" in accordance with the "Natural Colour System" (NCS) adopted by the SA National Standards			
Unless otherwise described, all paintwork shall be deemed to be classified in the "White" colour group			
<u>PAINTWORK, ETC TO PREVIOUSLY PAINTED WORK</u>			
<u>ON EXTERNAL FLOATED PLASTER SURFACES</u>			
<u>One coat alkali resistant plaster primer and two coats PVA acrylic emulsion paint on</u>			
1	Walls	m2	478
<u>ON INTERNAL FLOATED PLASTER SURFACES</u>			
<u>One coat superior quality acrylic emulsion paint for interior and exterior use, on work in sound condition:</u>			
2	Walls	m2	705
<u>ON FIBRE-CEMENT BOARD SURFACES</u>			
Carried Forward			R
Section No. 2 Bill No. 15 Paintwork			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward			R
	<u>One coat alkali resistant primer and two coats superior quality acrylic emulsion paint for interior and exterior use, on:</u>			
3	Ceilings and cornices, including priming metal cover strips and nailheads	m2	195	
	<u>METAL SURFACES WITH</u>			
	<u>One coat alkyd based zinc phosphate primer and two coats premium quality polyurethane enamel paint, on steel:</u>			
4	Doors	m2	5	
5	Windows with burglar bars	m2	31	
	<u>ON WOOD SURFACES</u>			
	<u>One coat primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on:</u>			
6	Doors	m2	37	
7	Skirtings, rails, etc. not exceeding 300mm girth	m	181	
Carried Forward to Summary of Section No. 2				R
Section No. 2				
Bill No. 15				
Paintwork				

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

Bill No	SECTION SUMMARY - Building Works	Page No	Amount
1	Alterations	30	
2	Masonry	35	
3	Waterproofing	37	
4	Roof Coverings	40	
5	Carpentry and Joinery	44	
6	Ceilings, Partitions and Access Flooring	47	
7	Floor Coverings	49	
8	Ironmongery	53	
9	Structural Steelwork	56	
10	Metalwork	63	
11	Plastering	67	
12	Tiling	69	
13	Plumbing and Drainage	77	
14	Glazing	79	
15	Paintwork	82	
Carried to Final Summary			R
Section No. 2			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No		Quantity	Rate	Amount
	<u>SECTION 3</u>			
	<u>BILL NO. 1</u>			
	<u>EXTERNAL WORK (PROVISIONAL)</u>			
	<u>(ALL TRADES)</u>			
	<u>WORK GROUP ALLOCATION</u>			
	The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
	<u>PREAMBLES</u>			
	The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
	The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Nature of ground:</u>			
	The nature of the ground is assumed to be loose sandy material, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be gravel, therefore "earth", but possibly interspersed with "soft rock" or "hard rock"			
	The nature of the ground is assumed to be silty clay with loose river boulders varying in size up to approximately 450mm diameter, all of which will be deemed as "earth", but possibly interspersed with "hard rock"			
	Carried Forward		R	
	Section No. 3			
	Bill No. 1			
	External Works (Provisional)			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

Brought Forward	R
Trial holes indicate that the nature of the ground is silty clay to a depth of approximately 500mm with fine to medium loose sandy material below, therefore "earth" A soils investigation has been carried out on the site by the Engineer and the report is annexed to these bills of quantities. The soils report indicates that the ground varies between transported soils at surface comprising gravel layers of varying thickness and interspersed with clay, and weathered shales varying from very soft rock to medium hard rock consistency, all of which will be deemed as "earth". All very hard unweathered shale, ironstone, etc the removal of which necessitates the use of explosives or heavy duty hydraulic percussion hammers (peckers), will be classified as "hard rock" Should the Contractor encounter any "soft" or "hard" rock in the excavations, he shall immediately notify the Engineer who shall be the sole arbiter as to what constitutes "soft" or "hard" rock for final account purposes <u>Subterranean water:</u> No subterranean water is expected <u>Excavation for working space in rock:</u> Notwithstanding clause 11 of the Standard System of Measuring Building Work, excavation for working space in rock will be measured in cubic metres to the extent executed and given as "extra over" bulk excavation or trench and hole excavation as the case may be <u>Carting away of excavated material:</u> Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site <u>Filling:</u> Notwithstanding the reference to prescribed multiple handling in Clause 1 of the Standard System of Measuring Building Work, prices for filling and backfilling shall include for all selection and any necessary multiple handling of material	
Carried Forward	R
Section No. 3 Bill No. 1 External Works (Provisional)	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Testing:</u>			
<i>Prices for backfilling to trenches and holes only are to include for all necessary density tests in accordance with SANS 1200D</i>			
<u>Maintenance period:</u>			
The maintenance period to civil works such as roads, parking and related earthworks shall be twelve calendar months			
<u>DEMOLITIONS, ETC (WORK GROUP 104)</u>			
<u>Breaking up and removing:</u>			
1	Existing tar surfaces and replace with 30mm tar (Tar measured elsewhere)	m2	160
<u>Taking down and removing:</u>			
2	2100mm High precast concrete panel fence	m	50
<u>SITE CLEARANCE, ETC (WORK GROUP 104)</u>			
<u>Site clearance:</u>			
3	Stripping average 150mm thick layer of top soil and depositing material in prescribed stock piles on site	m2	160
<u>ROADS, PAVINGS, ETC.</u>			
<u>ROADWORK</u>			
<u>Site clearance</u>			
4	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	160
<u>Excavation not exceeding 2m deep</u>			
5	Over site between buildings, retaining walls, etc. to reduce levels and depositing excavated material in prescribed stock piles on site	m3	53
Carried Forward			R
Section No. 3 Bill No. 1 External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward				R
<u>Extra over bulk excavation in earth for excavation in</u>				
6	Soft rock	m3	5	
7	Hard rock	m3	3	
<u>Extra over bulk excavation in earth for breaking up and removing</u>				
8	30mm Asphalt	m3	5	
<u>Extra over all excavations for carting away</u>				
9	Surplus material from stock piles on site to a dumping site to be located by the contractor	m3	53	
<u>Keeping excavations free of water</u>				
10	Keeping excavations free of all water other than subterranean water		Item	
<u>Earth filling supplied by the contractor under pavings etc</u>				
11	Over site of G7 material in accordance with SABS 1200 DM compacted to 93% Mod AASHTO density	m3	24	
12	Over site of G5 material in accordance with SABS 1200 DM compacted to 95% Mod AASHTO density	m3	24	
<u>Compaction of surfaces</u>				
13	Compaction of ground surface under roads, pavings, etc. including scarifying for a depth of 75mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m2	160	
<u>Prescribed density tests on filling</u>				
14	In-situ dry density (sand replacement) test in accordance with method A10 (a) of TMH 1	No	8	
15	Maximum dry density and optimum moisture content test in accordance with method A7 of TMH 1	No	8	
Carried Forward				R
Section No. 3 Bill No. 1 External Works (Provisional)				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward			R
	<u>Bituminous premix road surfacing:</u>			
16	35mm Thick paving to parking areas, roadways, etc. including bitumen spray to base course	m2	160	
	<u>Bituminous surface treatment with aggregate and slurry seal 13.2mm aggregate</u>			
17	Bitumen rubber binder in the tack coat and 60%net bitumen emulsion in the penetration spray	m2	160	
	<u>Variations in quantities of prime and bituminous binders</u>			
18	RTH 3/12P or RTL 3/12P tar prime		147	
	<u>Paintwork:</u>			
	<u>Prepare and apply one coat white reflective road marking paint on bituminous road surfacing, precast concrete paving blocks, etc:</u>			
19	100mm Wide line	m	527	
	<u>FENCING (WORK GROUP 136)</u>			
	<u>Precast concrete fencing</u>			
20	Precast concrete palisade fencing 2.40m high	m	50	
	<u>New gates:</u>			
21	Double leaf Sliding Gate 6.2 x 1.8m to suit palisade fence	No	1	
	<u>BUDGETARY ALLOWANCE</u>			
22	Provide a budgetary allowance of Twenty Five Thousand Rand for sundry external works to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.		Item	
	Carried Forward to Summary of Section No. 3			R
	Section No. 3			
	Bill No. 1			
	External Works (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION 3</u>			
<u>BILL NO. 2</u>			
<u>SITE SERVICES (PROVISIONAL)</u>			
<u>WORK GROUP ALLOCATION</u>			
The items in this Bill will be allocated to Work Groups as indicated in brackets at the end of headings or descriptions			
<u>PREAMBLES</u>			
The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said General Preambles will be entertained			
The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said General Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Stormwater channels:</u>			
Descriptions of channels shall be deemed to include necessary excavation, surface preparation, compaction, etc and disposal of surplus material on site			
<u>French drains:</u>			
Descriptions of french drains shall be deemed to include excavation, stone filling graded from 300mm diameter at bottom to 75mm diameter at top, approved geofabric filter blanket over stone, 300mm earthfilling over and disposal of surplus material on site			
Carried Forward		R	
Section No. 3 Bill No. 2 Site Services (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward	R
<u>Septic tanks:</u> Descriptions of proprietary type septic tanks shall be deemed to include excavation, bedding and jointing, concrete base slabs, jointing to drains and backfilling, compaction, etc all in accordance with the manufacturer's instructions and disposal of surplus material on site <u>uPVC pipes and fittings:</u> Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings <u>uPVC pressure pipes and fittings:</u> Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints <u>High density polyethylene (HDPE) pipes and fittings:</u> Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" or similar approved compression fittings <u>Polycop polypropylene pipes:</u> Polypropylene pipes 54mm diameter and smaller shall be seamless copper coloured Class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or where so described "Polylock" or similar approved compression fittings Pipes shall be firmly fixed to walls, etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer's instructions	
Carried Forward	R
Section No. 3 Bill No. 2 Site Services (Provisional)	

Brought Forward <u>Copper pipes:</u> Pipes shall be hard drawn and half-hard "Maksal" or similar approved pipes of the class described. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), Class 2 (half-hard) and Class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" or similar approved type. Capillary solder fittings shall comply with ISO 2016 Copper pipes are to be installed in accordance with the latest revision of the Code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copper flux composition <u>Reducing fittings:</u> Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm, only the largest end or branch size is given. Should the Contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm, all sizes are given and no claim for extra bushes, reducers, etc will be entertained <u>Disinfection of water pipework:</u> Water pipework is to be disinfected at completion in accordance with SABS 1200L (provision for disinfection elsewhere)	R
Carried Forward Section No. 3 Bill No. 2 Site Services (Provisional)	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward <u>"Densyl" or similar approved petrolatum anti-corrosion tape</u> Pipes to be taped shall be coated with the appropriate primer and the tape shall be applied in the appropriate widths and with suitable overlaps Couplings and fittings to pipes shall be taped in strict accordance with the manufacturer's instructions including mastic, tape, "Layflat" or similar approved sheeting, securing of same, etc Prices for wrapping of pipes shall include for all work as described to couplings in the length <u>Laying, backfilling, bedding, etc of pipes:</u> Pipes shall be laid and bedded in accordance with manufacturers' instructions and trenches shall be carefully backfilled Where no manufacturers' instructions exist, pipes shall be laid in accordance with Clauses 5.1 and 5.2 of each of the following: SABS 1200L : Medium-pressure pipelines SABS 1200LD : Sewers SABS 1200LE: Stormwater drainage Pipe trenches, etc shall be backfilled in accordance with Clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches) Pipes shall be bedded in accordance with Clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB : Bedding (Pipes) Unless otherwise described, bedding of rigid pipes shall be Class B bedding <u>General:</u> Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 98% Mod AASHTO density and disposal of surplus material on site	R
Carried Forward Section No. 3 Bill No. 2 Site Services (Provisional)	R

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
Descriptions of service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes (adaptors for connections to copper pipes, etc are given separately) <u>As-built drawings:</u> Where required, the Contractor shall prepare an updated set of as-built drawings. At completion of the contract the Contractor shall hand these drawings to the Project Manager for reproducing onto the originals for handing over to the Employer (provision for allowance of as-built drawings elsewhere) ----- <u>SOIL DRAINAGE (WORK GROUP 146)</u>			
1	Excavation in earth not exceeding 1m deep for pipe trenches	m3	30
2	Excavation in earth exceeding 1m and not exceeding 2m deep for pipe trenches	m3	61
3	Excavation in earth exceeding 2m and not exceeding 3m deep for pipe trenches	m3	76
4	Backfilling to pipe trenches	m3	1
5	Selected granular filling in bedding under and filling around pipes	m3	47
<u>Heavy duty (Class 34) uPVC sewer and drain pipes:</u>			
6	110mm Pipes laid in trenches (trenches elsewhere)	m	120
7	160mm Pipes laid in trenches (trenches elsewhere)	m	10
<u>Extra over heavy duty (Class 34) uPVC sewer and drain pipes for fittings:</u>			
8	110mm Bend	No	12
9	110mm Junction	No	5
10	110mm Rodding eye	No	3
Carried Forward			R
Section No. 3 Bill No. 2 Site Services (Provisional)			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

	Brought Forward			R
11	110mm Reducing junction	No	3	
12	160mm Overflow gulley head	No	2	
13	160mm Access reducing junction	No	2	
14	160mm Access junction	No	12	
	<u>Cast iron covers, etc:</u>			
15	1000mm Diameter manhole cover and frame	No	12	
16	Lifting-key for manhole cover (handed to Employer)	No	12	
	<u>Precast Concrete Manhole</u>			
	<u>Manhole formed of precast concrete manhole rings, components all bedded and jointed with approved water tight jointing, 260mm thick 20MPa/19mm mass concrete base projecting 75mm beyond external face of chamber ring and sealed to ring with 75mm wide x 125mm high 20MPa/19mm mass concrete triangular fillet, complete with precast concrete medium duty cover and frame, with and including neccessary step iron, 20MPa/19mm mass concrete benching in bottom with top surfaces to falls and including 160mm vitrified clay channels, channel bends, channel junctions, etc., additional excavation and backfilling compacted to 93% modified AASHTO density</u>			
17	1000mm Diameter manhole not exceeding 1m deep	No	4	
18	1000mm Diameter manhole exceeding 1m but not exceeding 2m deep	No	4	
19	1000mm Diameter manhole exceeding 2m but not exceeding 3m deep	No	4	
20	Cutting into existing 160mm drain pipe for and forming junction with 110mm pipe	No	1	
	<u>Alterations:</u>			
21	Excavate for and locate existing 160mm diameter uPVC soil drain pipe approximately 2000mm deep and connect to 160mm diameter uPVC pipe including all necessary fittings, backfilling, etc	No	3	
	Carried Forward			R
	Section No. 3			
	Bill No. 2			
	Site Services (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Testing:</u>			
22	Testing soil drainage system	Item	
<u>AS-BUILT DRAWINGS</u>			
23	Provision of as-built drawings	Item	
<u>BUDGETARY ALLOWANCE</u>			
24	Provide a budgetary allowance of One Hundred and Fifty Thousand Rand for the decommissioning of an old and construction of a new septic tank to be used as directed by the Principal Agent and to be deducted in whole or in part if not required.	Item	
Carried Forward to Summary of Section No. 3			
Section No. 3			
Bill No. 2			
Site Services (Provisional)			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Bill No	SECTION SUMMARY - External Works	Page No	Amount
1	External Works (Provisional)	88	
2	Site Services (Provisional)	95	
Carried to Final Summary			R
Section No. 3			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION NO. 4</u>			
<u>BILL NO. 1</u>			
<u>ELECTRICAL INSTALLATION</u>			
<u>LOW VOLTAGE</u>			
<u>DISCONNECTION/ REMOVAL OF REDUNDANT ELECTRICAL EQUIPMENT</u>			
<u>The following equipment shall be isolated, disconnected, removed and handed over to the Employer's</u>			
1	Decommissioning and stripping of existing electrical installations including cables, conductors, luminaires, control devices, DB's, etc in the existing building.		SUM
<u>LV SWITCHGEAR</u>			
<u>DBs and LV Switchgear</u>			
<u>Manufacture, deliver to site, install, commission, test kiosks, distribution boards as per specification and single line diagram, to be housed in electrical. All electrical panels shall be stainless steel material, rates to include powder coated, busbars and drilling, busbar connections internal wiring etc. Refer to single line diagram for electrical panel colour</u>			
2	Distribution board - Ticket Office	No 1	
3	Kiosk	No 1	
4	UTA4 IP65 Box surface mounted with 32A 1-pole isolator, 3x circuit breakers with complete busbar.	No 4	
<u>CABLES AND CONDUCTORS</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Supply, deliver to site cables and conductors as specified. Install, rack, strap and testing of cables as per specification including clamps, ties and cable numbering system</u>			
5	2,5mm conductors (mixed colours - live, neutral and earth)	m	2,000
6	4,0mm conductors (mixed colours - live, neutral and earth)	m	250
7	2.5 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	300
8	4,0 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	150
9	10 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	100
10	25mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	m	100
<u>CABLES TERMINATIONS</u>			
<u>Termination of cables shall include supply installation and testing of the glands with corrosion guard , making-off the cable, lugs, and fitting the gland to the board gland plate, switchgear or equipment and final connection of cable tails into board or terminals. Include for Reducing Glands and shrouds where applicable. NB: IP65 Glands are to be used where applicable.</u>			
11	2.5 mm ² 2c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	6
12	10 mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	8
13	20mm PVC Conduit including all necessary accessories. Rate to include chasing wall for conduit in the wall, close wall and make good.	m	400
14	1.5mm ² draw wire (not insulated)	m	100
15	25mm ² 4c 600/1000V PVC/SWA/PVC ECC Cu Cable	No	2
<u>LUMINARIES AND CONTROL DEVICES</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>Supply, deliver, accept and store the following luminaires, complete with lamps and control gear as per specification. See and refer to the specification document for details of each luminaire.</u>			
16	Type A5 - IP65 Rated, 30W / +/-4440 lm LED - 4000k vapour-proof Surface-mounted weather-proof luminaire, GRP body and acrylic diffuser, with 50000 hours lifespan.	No	20
17	Type A13 - IP65 Rated, 30W / +/-4440 lm LED - 4000k Rough-guard Surface-mounted weather-proof luminaire, GRP body and acrylic diffuser, with 50000 hours lifespan.	No	18
18	Type B1 - IP65 Rated high-pressure die cast aluminium base and trim ring 20W/ +/- 2600lm LED - 4000k bulkhead luminaire with an opal high-impact acrylic diffuser, with 50000 hours lifespan.	No	30
19	Type FL1 - 180W / +/-27000lm LED (4000k) Streetlight rated IP66 with powder coating as per specification	No	20
20	Photo electric cell as per specification	No	8
21	Replace existing steel cage for lighting. Cage shall be hot dip galvanised	No	5
22	New steel cage for lighting. Cage shall be hot dip galvanised	No	12
<u>EXCAVATIONS</u>			
<u>For all low voltage cables from existing Municipality Substation to meter room and buildings through manholes as per drawings.</u>			
<u>Trenching shall be calculated using the formula below: (700mm deep * 0.4m wide * length)</u>			
23	Excavate in concrete/tar and hard soil, backfilling and compaction to 93% MOD AASHTO	m3	16
24	Re-instate tar for above item	m3	16
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

	Brought Forward		R
	<u>SUNDRIES</u>		
25	LV reticulation - Preparation of 'As-Built' drawings and manuals as per this specification.	No	1
26	Supply of hard bound spiral folders containing commissioning/COC certificates, test results & operating & maintenance manuals for the LV equipment, cabling, light fittings, etc.	No	3
	<u>LIGHT SWITCHES, SOCKET OUTLET, WELDING ISOLATORS AND ACCESSORIES</u>		
	<u>Supply, deliver and installation of the following control devices and accessories as per specification. Rate must allow for the termination and connecting of the PVC conductor to the accessory, fixing to the conduit box and the fitting of the cover plate. (PVC coverer)</u>		
27	Supply and installation of 20Amp, 1-Pole surface mounted isolator, complete with all necessary accessories	No	6
28	Supply and installation of 20Amp IP66, 1-Pole isolator mounted on the security steel cage, complete with all necessary accessories	No	1
	<u>GENERATOR SET</u>		
	<u>Manufacture, deliver to site, install, test and commission of a generator set 400 volts at 50Hz as per specification and single line diagram. The generator shall be enclosed or containerised on a stainless steel Gr1316. Rates to include for steelwork and powder coated, busbars and drilling, busbar connections internal wiring, earthing for the generator set, etc. Refer to attached single line diagram.◆</u>		
29	60kVA, 400V, 3phase silent Diesel Engine Alternator Set including automatic change-over panel and weatherproof 3CR12-steel canopy.		SUM
30	Stainless steel Metal clad thermal insulation of exhaust pipe and silencer within the enclosure.		SUM
	Carried Forward		R
	Section No. 4		
	Bill No. 1		
	Electrical Installation		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward		R
31	Water Trap/Fuel Filter cartridge	SUM
	<u>Electrical reticulation</u>	
32	Interconnecting control & power cabling between genset and alternator and AMF panel	SUM
33	Support & protection of exposed cabling between genset & AMF panel	SUM
34	Electronic hooter & red flashing general alarm light mounted on the AMF panel.	SUM
35	Remote alarm indicator panel complete the red indicator lamp and label - GENERATOR FAULT	SUM
36	External emergency stop push button and cabling	SUM
37	Earthing of the generator set	SUM
	<u>Commissioning</u>	
38	Test & commission on site with load	SUM
39	Resistance testing of earth system	SUM
40	Balancing of the essential loads	SUM
41	Electrical Certification of Compliance	SUM
	<u>Signage</u>	
42	As per OHS Act - fire & resussitation etc.	SUM
43	Generator "Manual Start/Test Procedure"	SUM
44	Electricity logo on door to AMF panel	SUM
45	Contractors & PRASA's details - laminated plastic	SUM
	<u>General</u>	
46	Diesel fuel for full tank	SUM
Carried Forward		R
Section No. 4 Bill No. 1 Electrical Installation		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
47	Laminated plastic framed schematic wiring diagram fixed to the inside of the enclosure adjacent the AMF panel	No	1
48	A4 size log book on chain in metal envelope in door	No	1
49	Operational training of Employer's staff		SUM
50	Manuals - 3 sets		SUM
51	Drawings		SUM
<u>Service</u>			
52	Monthly Inspection every quarter + new fuel filters for 1st year	No	4
53	Full annual service + new battery for 1st year	No	1
54	Removal of existing generator set off site to Durban depot		SUM
<u>TEST AND COMMISSIONING</u>			
<u>Test and commission the complete electrical installation including completion of quality check sheets, Compliance Certificates & test results and submitting them to the Employer's Representative.</u>			
55	Test and commission the complete electrical installation including Certificates of Compliance and test results to the Engineer.		SUM
<u>EARTHING & BONDING & LIGHTNING PROTECTION</u>			
<u>Soil Resistivity Test</u>			
<u>Allow for the execution of a soil resistivity survey. (This installation must be undertaken by a specialist Sub-contractor). A 10 Ohm Final Earth Resistance is required.</u>			
Carried Forward			R
Section No. 4 Bill No. 1 Electrical Installation			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward		R
Electrical Earthing Conductors <u>Supply, deliver to site 1000/600 volt PVC insulated (green/yellow) cables with stranded copper conductors. Install, rack, strap and testing of cables as per specification including clamps, ties and cable numbering system as specified. Note: Cable supports measured elsewhere)</u> <u>Supply, install, test and commissioning of the Lightning protection of the buildings on all corners of the buildings, complete with all necessary required material, accessories for a complete installation. Contractor to use copper earth spike, aluminium or copper conductors as per specification, and have testing points for the building. Rates to include all necessary required accessories for a complete installation. The installation must comply with SANS 10313.</u>		
56	Platform Ablution & Shelter	SUM
57	Waiting Area (external)	SUM
58	Waiting Area (internal)	SUM
59	Shelter	SUM
60	Test and commission the complete electrical earthing and lightning protection installation including Certificates & test results to the Engineer for all buildings indicated above.	SUM
Carried to Final Summary		R
Section No. 4 Bill No. 1 Electrical Installation		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No			Quantity	Rate	Amount
	<u>SECTION 5</u>				
	<u>BILL NO. 1</u>				
	<u>HVAC INSTALLATIONS</u>				
	<u>Design, manufacture, works testing, supply and deliver to site, moving into position, Installation, connecting up, site testing, witness testing, providing to insurance inspectors, demonstrating to the Employer, commissioning and maintenance of the complete mechanical systems and equipment as shown on the drawings.</u>				
	<u>Supply, deliver and install the following HVAC units as per specification:</u>				
1	2.5 kW cooling midwall split indoor unit	No	2		
2	2.5 kW inverter type outdoor condensing unit	No	2		
3	3.5 kW cooling midwall split indoor unit	No	3		
4	3.5 kW inverter type outdoor condensing unit	No	3		
5	Refrigeration copper piping with thermal insulation and all associated fittings	m	20		
6	PVC condensate drain piping with insulation	m	25		
7	Wired controller	No	5		
8	Fabricate, supply, and install lockable security cages around each outdoor condensing unit	No	5		
9	Application of approved coastal treatment for the outdoor condensing units	No	5		
	Carried Forward to Summary of Section No. 5				R
	Section No. 5				
	Bill No. 1				
	HVAC Installations				

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No		Quantity	Rate	Amount
	<u>SECTION 5</u>			
	<u>BILL NO. 2</u>			
	<u>WET SERVICES</u>			
	<u>COLD WATER INSTALLATION</u>			
	<u>Supply, install, and commission the water reticulation systems per specification</u>			
	<u>Class 12 HDPE piping laid and buried trenches not exceeding 800mm deep</u>			
1	25mm diameter HDPE CI 12 underground water pipe	m	65	
2	32mm diameter HDPE CI 12 underground water pipe	m	70	
	<u>Fittings for HDPE class 12 piping</u>			
3	25mm diameter Adaptor to pex piping	m	4	
4	32mm diameter Equal tee	m	3	
5	32mm diameter - 25mm diameter Reducer	m	4	
	<u>PEX piping</u>			
6	15mm diameter pipe	m	70	
7	22mm diameter pipe	m	40	
	<u>PEX piping fittings</u>			
8	15mm diameter Elbow	No	25	
9	22mm diameter Elbow	No	4	
10	22mm diameter Equal tee	No	14	
11	22-15mm diameter Reducer	No	15	
	Carried Forward		R	
	Section No. 5 Bill No. 2 Wet Services			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward		R
	<u>Plastic pipe compression fittings and valves</u>		
12	15mm Female elbow	No	20
13	15mm diameter - 15mm diameter Female tee	No	16
14	22mm diameter Isolation valve	No	4
15	22mm diameter strainer valve	No	4
	<u>Pipe hangers - anchor, treaded rod & hilti hanger</u>		
16	15mm diameter	No	10
17	22mm diameter	No	20
	<u>Heavy brown paper loosely wrapped around pipe as sheath for expansion</u>		
18	15-22mm diameter	m	50
	<u>Potable water system</u>		
19	10 000 l PVC Potable water tank with all associated isolation valves and strainers	No	1
20	Variable speed potable water booster pump capable of delivering 2.3 l/s at 45m of H ₂ O with all associated valves, fitting, PVC pipework, and auto start/stop control circuit.	No	2
21	Fabricate, supply, and install lockable security cages around the duty/standby potable water pumps	No	1
	<u>DRAINAGE, ETC</u>		
	<u>Sewer and drainage pipes and fittings shall be through solid wall Class 34 uPVC socketed soil piping in according to SABS 791, jointed and sealed with butyl rubber rings soil, waste and vent pipes and fittings shall be according to SABS 967 and solvent jointed cold water supply pressure pipes fittings shall be according SABS 966 and jointed by means of the "Lyng" type jointing system. Pipes shall be fixed and jointed according to SABS 0112</u>		
	Carried Forward		R
	Section No. 5 Bill No. 2 Wet Services		

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

	Brought Forward			R
	<u>Class 34 uPVC pipe</u>			
22	50mm diameter pipe	m	30	
23	110mm diameter pipe	m	40	
	<u>Class 34 uPVC fittings</u>			
24	50mm diameter 90 Deg bend	No	9	
25	110mm diameter 90 Deg bend	No	4	
26	110mm diameter 90 Deg access bend	No	9	
27	50mm diameter 45 Deg bend	No	12	
28	110mm diameter 45 Deg bend	No	9	
29	110mm diameter Pan connector	No	9	
30	50mm diameter Equal access junction	No	4	
31	110mm diameter - 50mm diameter junction	No	7	
32	110mm diameter Equal access junction	No	9	
Carried Forward to Summary of Section No. 5				R
Section No. 5				
Bill No. 2				
Wet Services				

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

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PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Item No	Quantity	Rate	Amount
<u>SECTION 6</u>			
<u>BILL NO. 1</u>			
<u>PROVISIONAL AMOUNTS</u>			
<u>PREAMBLES</u>			
The Model Preambles for Trades (2008 edition) as published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these bills of quantities and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained The following "Supplementary Preambles" are incorporated in this bill to satisfy the requirements of the project and shall take precedence over the provisions of the said Model Preambles			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>General:</u>			
Subcontract amounts are net.			
Subcontract amounts are for material and equipment supplied and installed complete by firms of specialists			
Each subcontract amount may comprise more than one element of work. Therefore, each subcontract amount may include for work to be carried out by more than one subcontractor			
<u>Profit:</u>			
Where stated, the contractor may allow for profit if required			
Carried Forward			R
Section No. 6 Bill No. 1 Provisional Sums, ETC			

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward	R
<u>General attendance on nominated/selected subcontractors:</u> The item "General Attendance" which follows each subcontract amount for nominated/selected subcontractors' work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the nominated/selected subcontractors, the following: 1. Access to the site and places where the subcontract work is to be carried out, including the reasonable use of any temporary personnel hoists erected by the contractor 2. The provision of water and lighting and of single phase electric power to a position within 50 metres of the place where the subcontract work is to be carried out but excluding water, fuel and power for commissioning of any installation 3. The provision of an area for the subcontractor to establish temporary office accommodation and workshops and for the storage of plant and materials 4. The use of erected scaffolding belonging to the contractor, in common with others having the like right, while it remains erected on the site 5. The use, at reasonable times by arrangement of the contractor's erected hoisting equipment 6. Making good in all trades and cleaning down and removal of rubbish on completion <u>Special attendance on nominated/selected subcontractors:</u> Where stated, special attendance as set out in clause 8.1 of section B of the Preliminaries will be described in detail in this bill <u>Builder's work:</u> Builder's work in connection with specialist services is given elsewhere in these bills of quantities	
Carried Forward	R
Section No. 6 Bill No. 1 Provisional Sums, ETC	

PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION

Brought Forward			R
<u>PROTECTION SERVICES</u>			
1	Sub-contract amount of Four Hundred Thousand Rand for the provision of protection services to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	400,000.00
2	Profit	%	
3	General attendance	%	
<u>STATION FIXED FURNITURE</u>			
4	Subcontract amount of One Hundred and Seventy Five Thousand Rand for the provision and installation of fixed station furniture to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	175,000.00
5	Profit	%	
6	General Attendance	%	
<u>STATION SIGNAGE</u>			
7	Subcontract amount of Two Hundred and Fifty Thousand Rand for the provision and installation of station signage to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	250,000.00
8	Profit	%	
9	General attendance	%	
<u>BUILT-IN CUPBOARDS</u>			
10	Subcontract amount of Twenty Five Thousand Rand for the provision and installation of Built-In Cupboards to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required	Item	25,000.00
11	Profit	%	
12	General attendance	%	
Carried Forward			
Section No. 6 Bill No. 1 Provisional Sums, ETC			

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

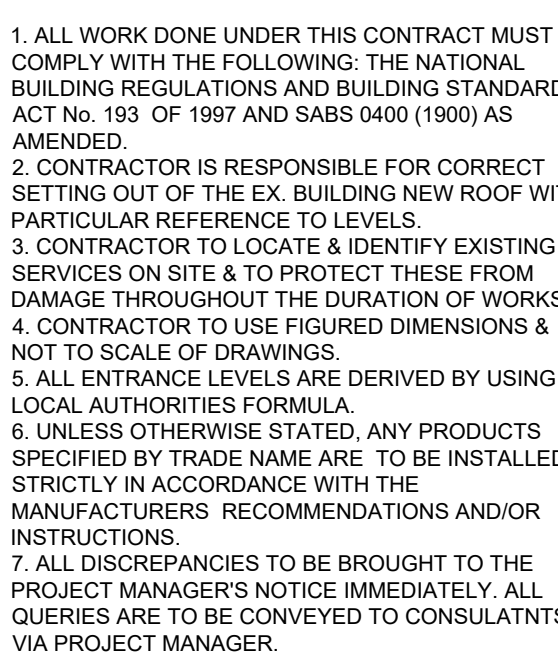
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**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
WINKELSPRUIT STATION**

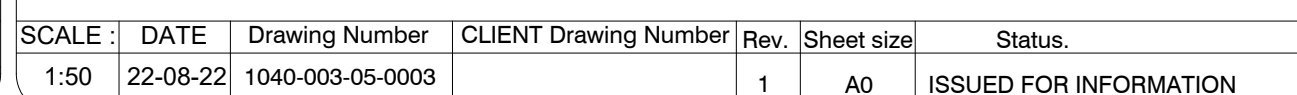
Section No	<u>FINAL SUMMARY</u>	Page No	Amount	
1	Preliminaries and General	22	-----	
2	Building Works	83	-----	
3	External Works	96	-----	
4	Electrical Installations	103	-----	
5	Mechanical Installations	108	-----	
6	Provisional Sums	112	-----	
SUB TOTAL (EXCLUDING CONTINGENCIES)			R	
<u>CONTRACT CONTINGENCIES</u>				
Allow the sum of 10% for Contingencies to be spent as the Principal Agent may direct and to be deducted in whole or in part if not required			R	
TOTAL (INCLUDING CONTINGENCIES)			R	
<u>VALUE ADDED TAX</u>				
Value Added Tax [15%]			R	
Carried to Form of Tender			R	

**PASSENGER RAIL AGENCY OF SOUTH AFRICA
SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME
CLUSTER 2 - EXECUTIVE SUMMARY**

Section No	Page No	Amount
1	1	
2	2	
3	3	
4	4	
SUB TOTAL		R
VALUE ADDED TAX		
Value Added Tax [15%]		R
Carried to Form of Tender		R

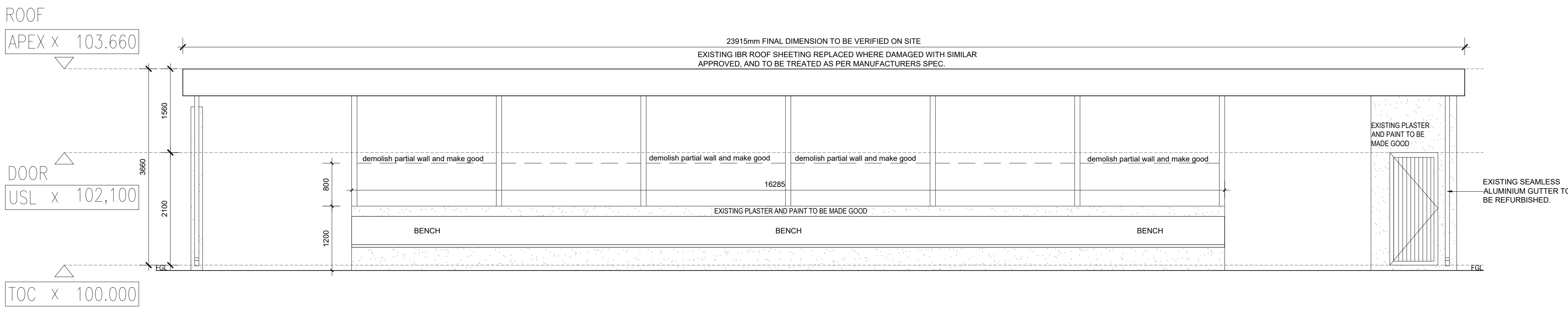


ISSUED FOR INFORMATION



1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
2. ALL DIMENSIONS AND HEIGHTS ARE TO BE CHECK ON SITE BEFORE WORK PUT ON HAND
3. REPORT DISCREPANCIES TO ARCHITECT OR ENGINEER.
4. THIS DRAWING MUST NOT BE USED TO SCALE OFF. USE ONLY WRITTEN DIMENSIONS. CONTACT THE ENGINEER OR ARCHITECT WHERE CLARITY IS SOUGHT.
5. FOR SETTING OUT DATA, SETTING OUT POINTS AND DATUM LEVELS REFER TO SURVEY INFORMATION AND ARCHITECT'S DRAWINGS.
6. STRUCTURAL WORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND THE RELEVANT S.A.N.S SPECIFICATIONS. ALL CONCRETE WORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH S.A.S 1200G AND EARTHWORKS IS ACCORDANCE WITH S.A.S 1200D.
7. CONSULT RELEVANT ARCHITECT'S, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWPODS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

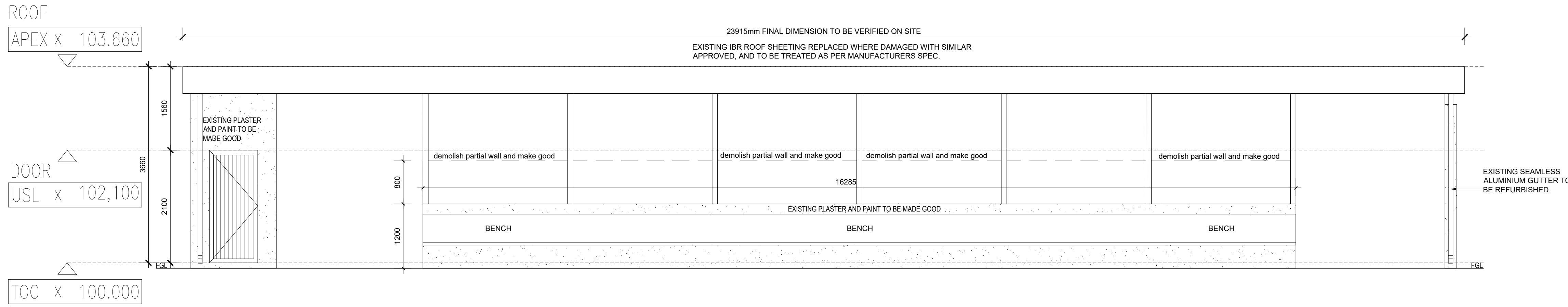
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WEST ELEVATION

SCALE 1:50

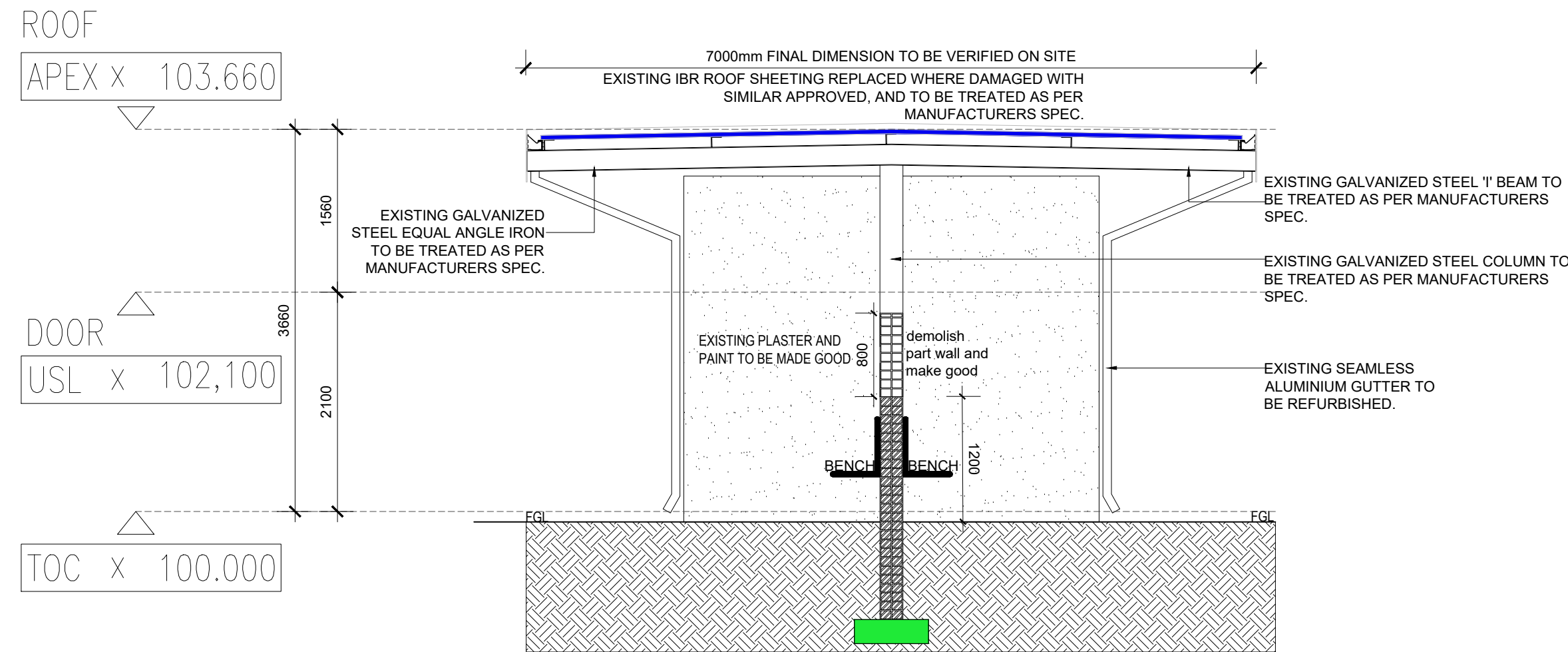
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



EAST ELEVATION

SCALE 1:50

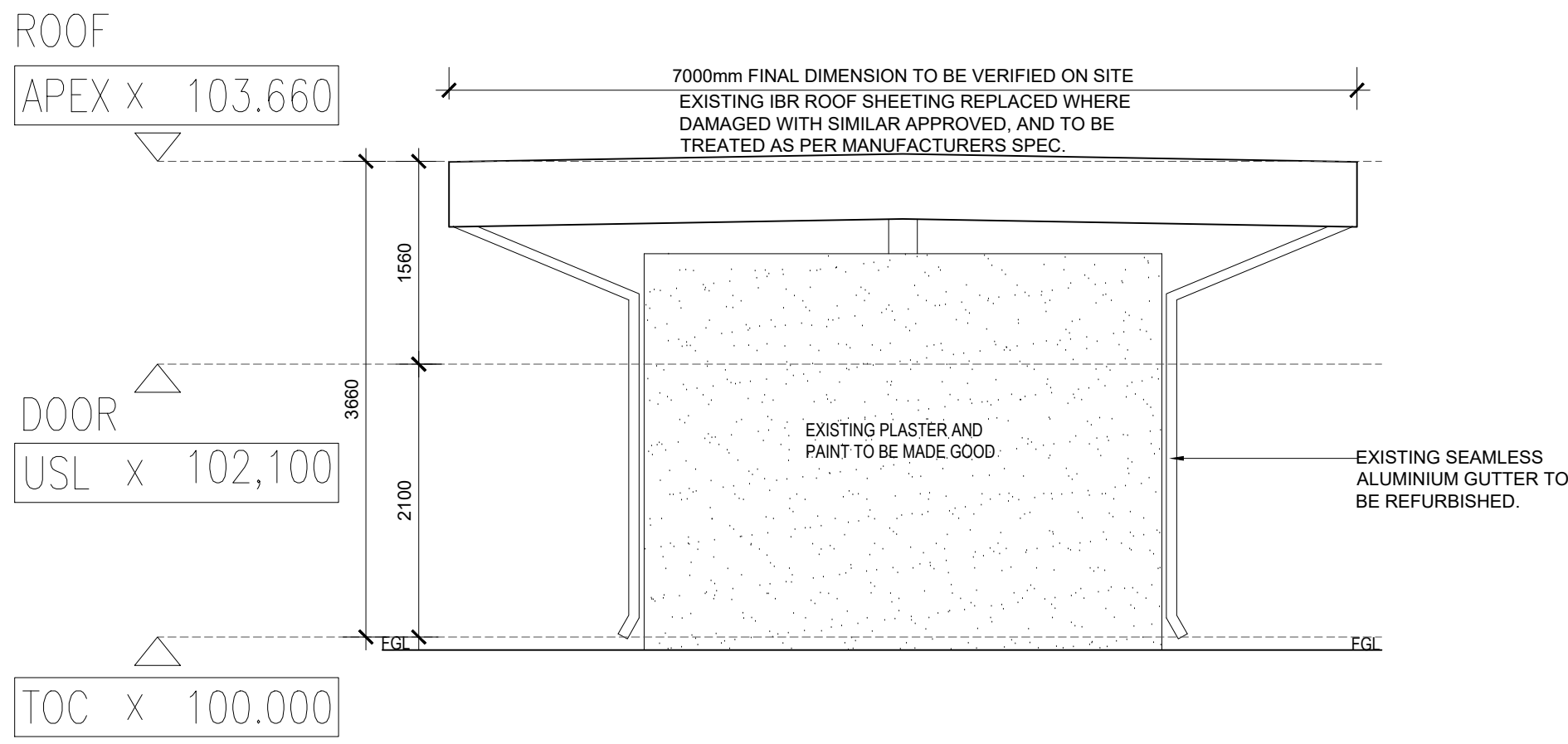
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



SECTION A - A

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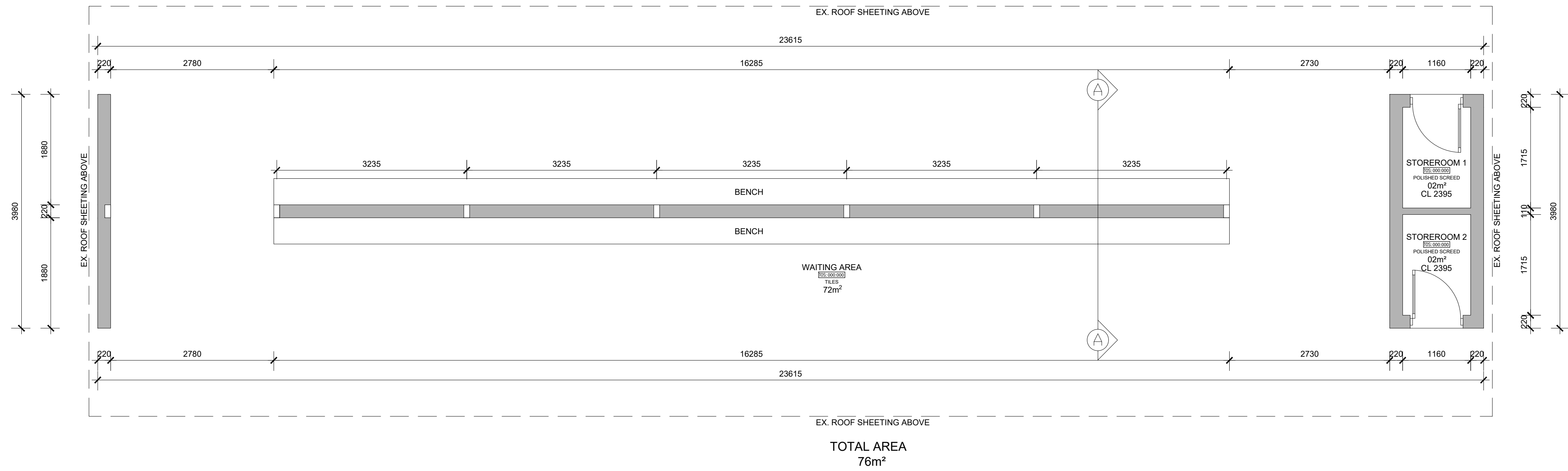
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NORTH ELEVATION

SCALE 1:50

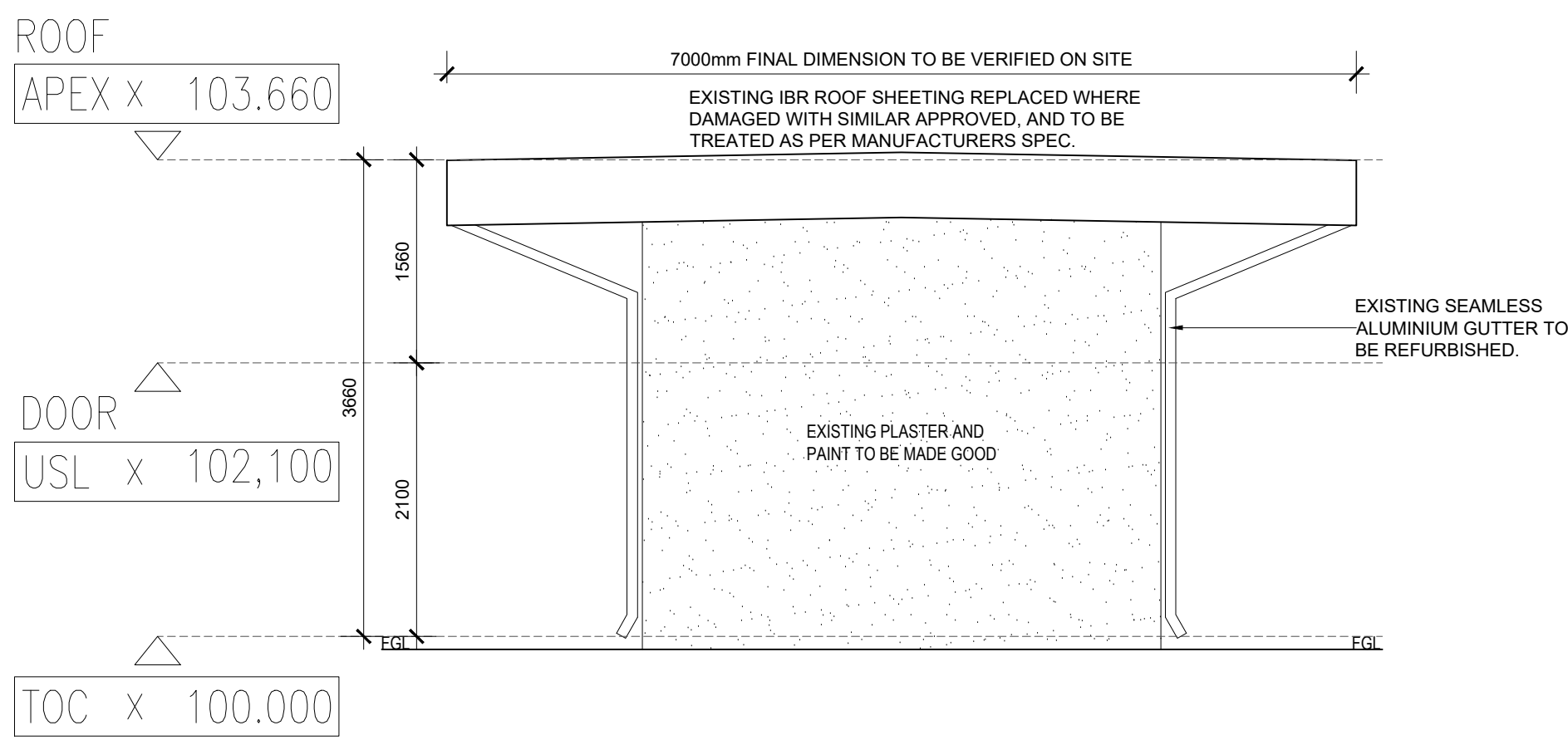
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



WAITING AREA FLOOR PLAN

SCALE 1:50

NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



SOUTH ELEVATION

SCALE 1:50

NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400

KEY LEGEND

- PROPOSED PARTITION WALL TO UNDERSIDE OF CEILING
- EXISTING WALLS TO BE MADE GOOD
- EXISTING DOORS TO BE DEMOLISHED
- EXISTING WALLS TO BE DEMOLISHED
- 115mm BRICK WALL TO 3 BRICK COURSES ABOVE CEILING LEVEL

GENERAL NOTES:

- ALL WORK DONE UNDER THIS CONTRACT MUST COMPLY WITH THE FOLLOWING: THE NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT No. 103 OF 1997 AND SABS 0400 (1990) AS AMENDED
- CONTRACTOR IS RESPONSIBLE FOR CORRECT SETTING OUT OF THE EX. BUILDING NEW ROOF WITH PARTICULAR REFERENCE TO LEVELS
- CONTRACTOR TO LOCATE & IDENTIFY EXISTING SERVICES ON SITE & TO PROTECT THESE FROM DAMAGE THROUGHOUT THE DURATION OF WORKS
- CONTRACTOR TO USE FIGURED DIMENSIONS & NOT TO SCALE OF DRAWINGS
- ALL ENTRANCE LEVELS ARE DERIVED BY USING LOCAL AUTHORITIES FORMULA
- UNLESS OTHERWISE STATED, ANY PRODUCTS SPECIFIED BY TRADE NAME ARE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS AND/OR INSTRUCTIONS
- ALL DISCREPANCIES TO BE BROUGHT TO THE PROJECT MANAGER'S NOTICE IMMEDIATELY. ALL QUERIES ARE TO BE CONVEYED TO CONSULTANTS VIA PROJECT MANAGER

RESTORATION NOTES

- EXISTING IBR ROOF SHEETING REPLACED WHERE DAMAGED WITH SIMILAR APPROVED, AND TO BE TREATED AS PER MANUFACTURES SPEC. ANTI-CORROSIVE COATING TO BE APPLIED.
- ALL DAMAGED ROOF FIXINGS TO BE REPLACED WITH SIMILAR APPROVED FIXINGS AND TO BE TREATED AS PER MANUFACTURERS SPEC. ALL ROOF FIXINGS TO BE INSPECTED BY STRUCTURAL ENGINEER AND ROOF SPECIALIST PRIOR TO ANY INSTALLATIONS, ANTI-CORROSIVE COATING TO BE APPLIED.
- REPLACE MISSING/DAMAGED FASCIA/BARGE BOARDS WITH NEW FIBRE CEMENT BOARDS, TO BE PAINTED AND MATCH EXISTING.
- REPLACE DAMAGED RAINWATER GUTTERS & DOWNPIPES WITH NEW PVC GOODS.
- REPLACE DAMAGED CEILING PANELS WITH NEW TO MATCH EXISTING /SIMILAR APPROVED.REFER TO CEILING LAYOUT.
- SCRAPE OFF DAMAGED EXISTING WALL FINISHES AND APPLY NEW PLASTER WHERE AFFECTED. NEW PAINT TO BE APPLIED IN ACCORDANCE TO TECHNICAL SPECIFICATIONS & PRASA BLUE PRINT. ALL STRUCTURAL AND NON-STRUCTURAL CRACKS TO BE DEEMED TO SATISFY ENGINEERS' RECOMMENDATION.
- REFURBISH / REPAIR CONCRETE FLOOR WHERE DAMAGED WITH SIMILAR APPROVED. POWER FLOATED SURFACE BED AS PER ENGINEERS SPECIFICATION. CONCRETE FLOORS TO BE PRESSURE WASHED.
- REPLACE DAMAGED FLOOR FINISHES WITH NEW TO MATCH EXISTING IN ACCORDANCE TO TECHNICAL SPECIFICATIONS & PRASA BLUE PRINT. REFER TO FLOOR FINISH LAYOUT.
- REPAIR/REPLACE ALL DAMAGED DOORS/ROLLER SHUTTERS AND SUPPORTING IRONMONGERY WITH NEW TO MATCH EXISTING. ANTI-CORROSIVE COATING TO BE APPLIED.
- REPAIR/REPLACE ALL DAMAGED WINDOWS AND SUPPORTING IRONMONGERY WITH NEW TO MATCH EXISTING. GLAZING TO COMPLY WITH SANS 10400 PART N.
- DAMAGED GATE, CHAIRS/FURNITURE TO BE REPLACED WITH NEW TO MATCH EXISTING.
- REMOVE ALL DAMAGED/DETERIORATED FITTINGS & FIXTURES. REPLACE WITH NEW SABS APPROVED GOODS IN RELATION TO TECHNICAL SPECIFICATIONS & PRASA BLUE PRINT.
- REPLACE DAMAGED CARPENTRY WORKS WITH NEW, IN ACCORDANCE TO PRASA BLUE PRINT.
- NEW SIGNAGES, BINS AND BENCHES AS PER TECHNICAL SPECIFICATIONS & PRASA BLUE PRINT.

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS. ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS
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ISSUED FOR INFORMATION

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- CONSULT RELEVANT ARCHITECT'S, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RDWPS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

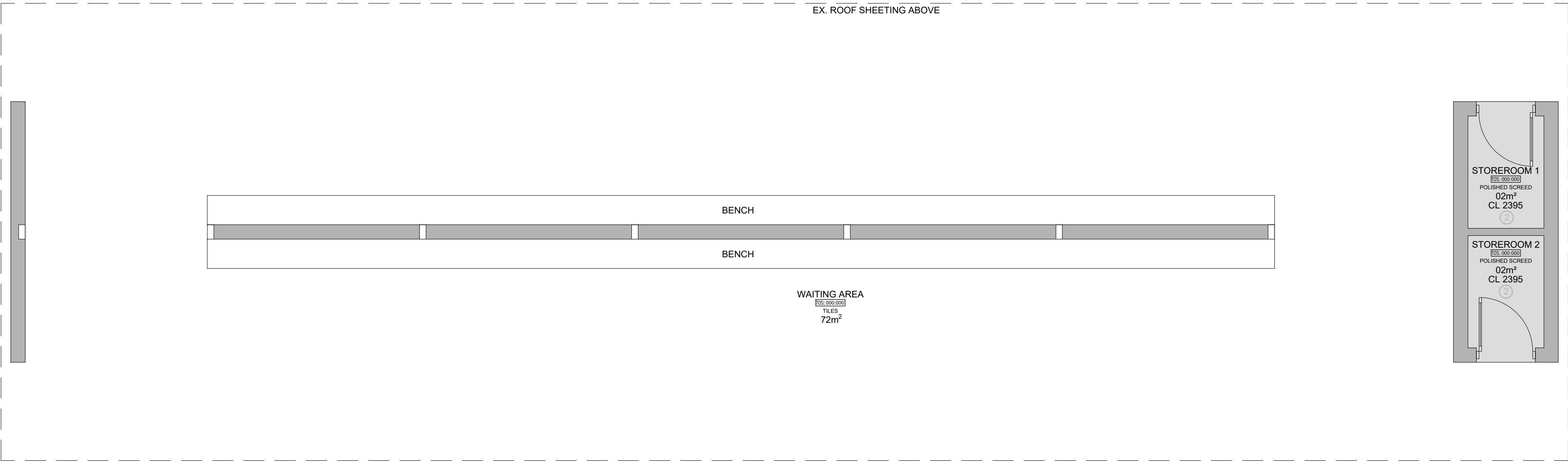
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
1040-003-05-0002	AS BUILT PLANS				
1040-003-05-0001	SITE DEVELOPMENT PLAN				
DRAWING NO.	REFERENCE				
REFERENCE DRAWINGS					

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	WAITING AREA 2 SECTIONS & ELEVATIONS	MB	MM	MM	28-11-2022
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
REVISIONS / ISSUE AUTHORIZATION					
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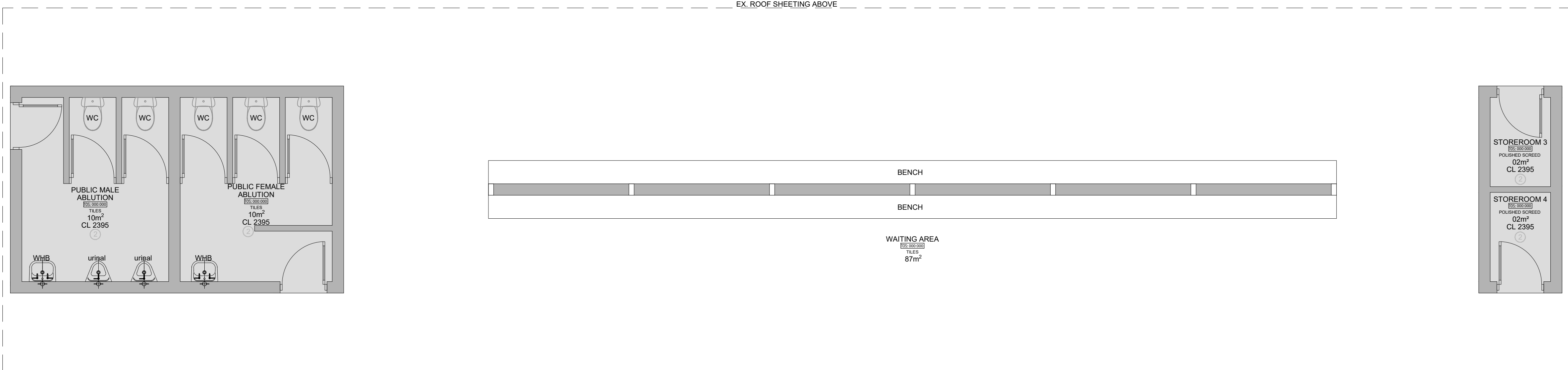
CLIENT		
TITLE	NAME	DATE

MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	M. BHENGU	19/12/2022
CHECKED		
ENG. COORD		
ARCHITECT	M. MADIBA	19/12/2022
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL ENG.		
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME		DATE
SIGNATURE		
REG. NUMBER		

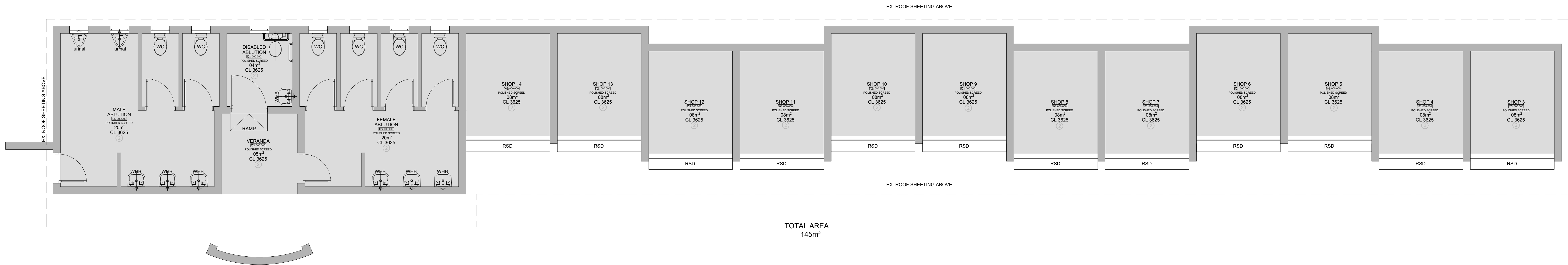
 EST. 2015					
SOUTH COAST CORRIDOR STATION IMPROVEMENT PROGRAMME					
AMANZIMTOTI STATION WAITING AREA 2 SECTION & ELEVATIONS					
SCALE	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size
1:50	22-08-22	1040-003-05-0005		1	A0
ISSUED FOR INFORMATION					



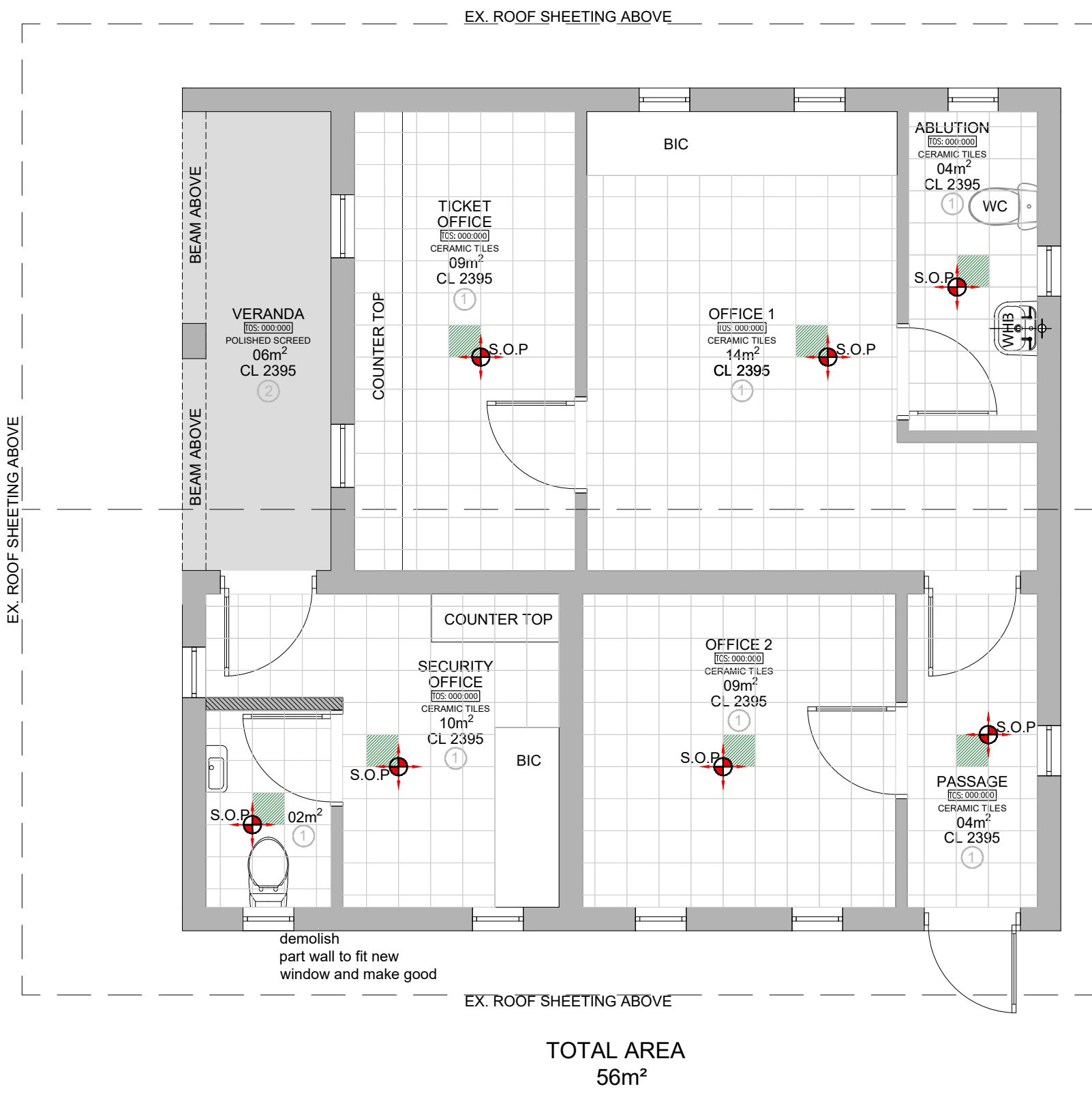
WAITING AREA 2
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



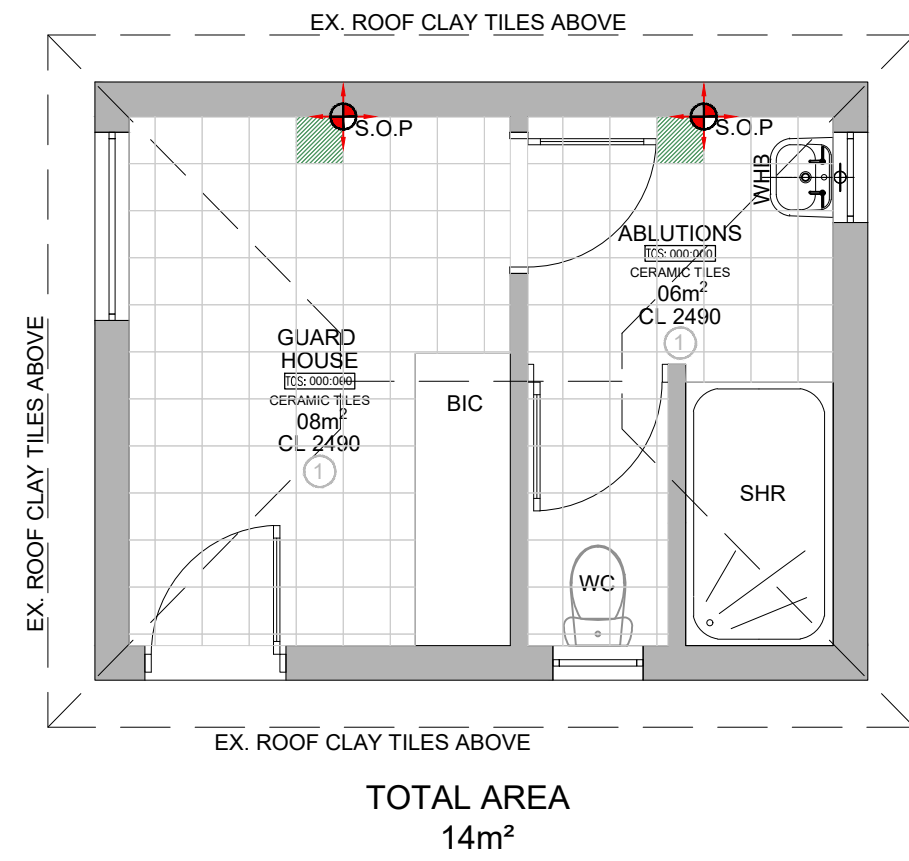
WAITING AREA 1 + ABLUTIONS
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



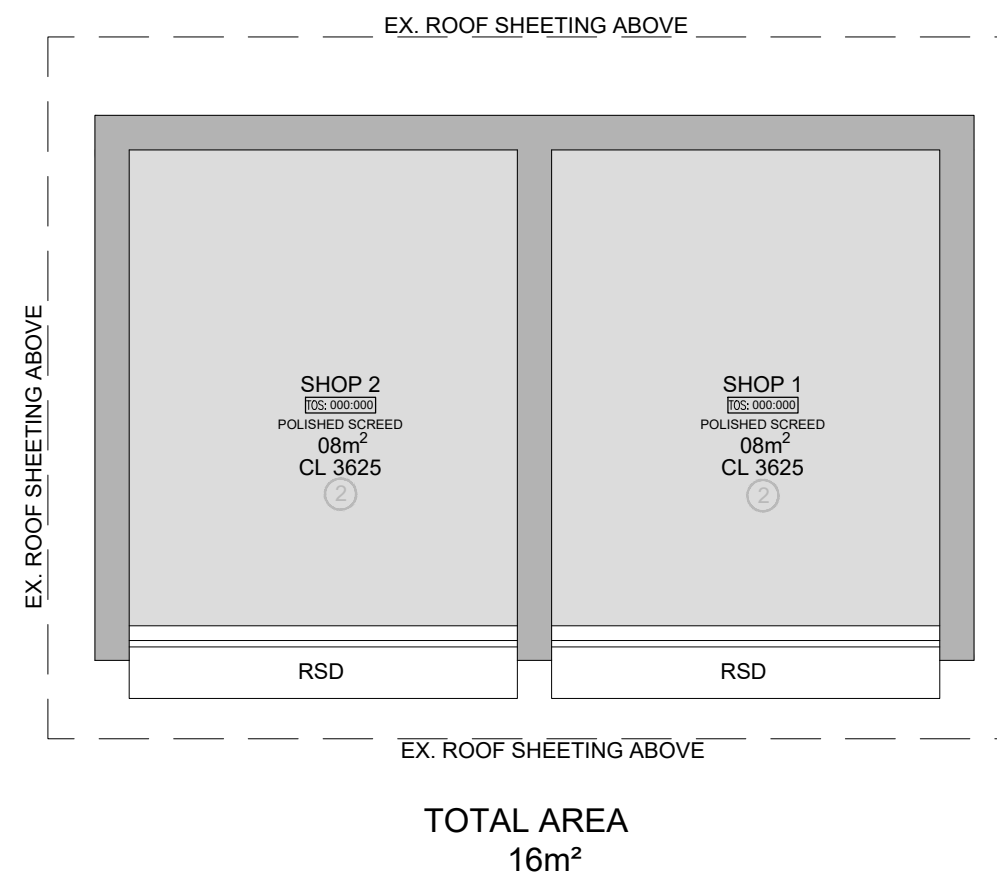
VENDOR STALLS + ABLUTIONS
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



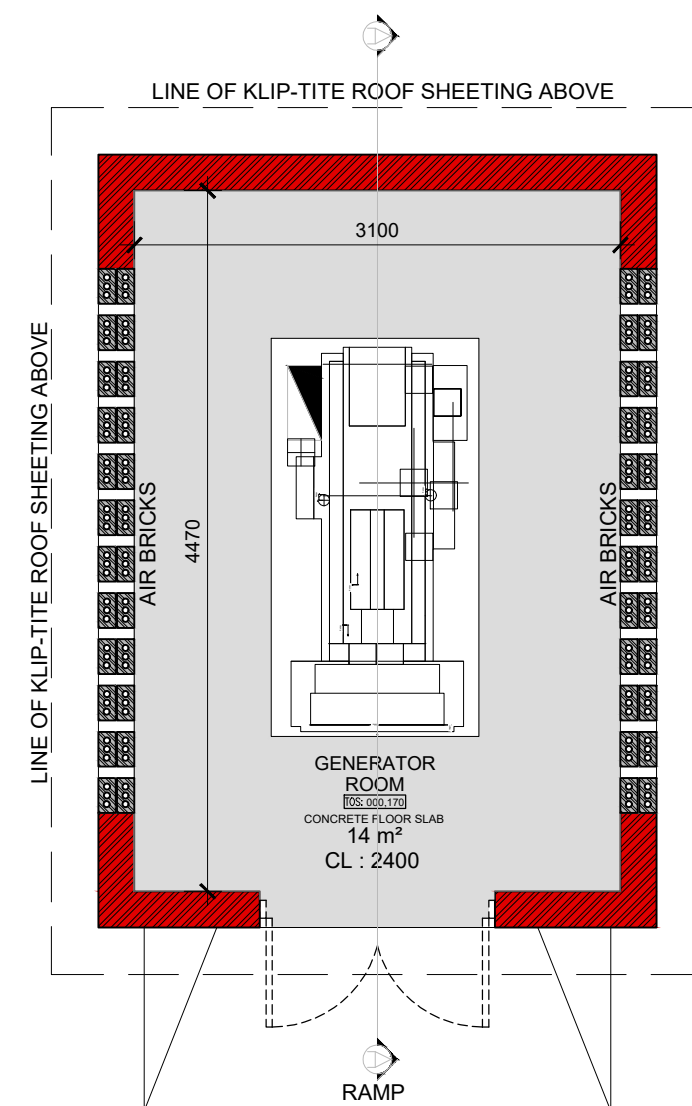
TICKET OFFICE
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



GUARD HOUSE
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



VENDORS STALLS
FLOOR FINISH PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



GENERATOR ROOM
FLOOR FINISH PLAN
SCALE : 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400

FLOOR LEGEND	
FINISHES SCHEDULE	DESCRIPTION
① 300x300 CERAMIC floor tile to match existing	300x300 CERAMIC floor tile to match existing
② 25mm Polished Stone	25mm Polished Stone

FLOOR FINISH NOTE
ALLOW DIMENSIONS OF 30% OF THE TOTAL AREA FOR DAMAGED FLOOR FINISH.

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS. ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS
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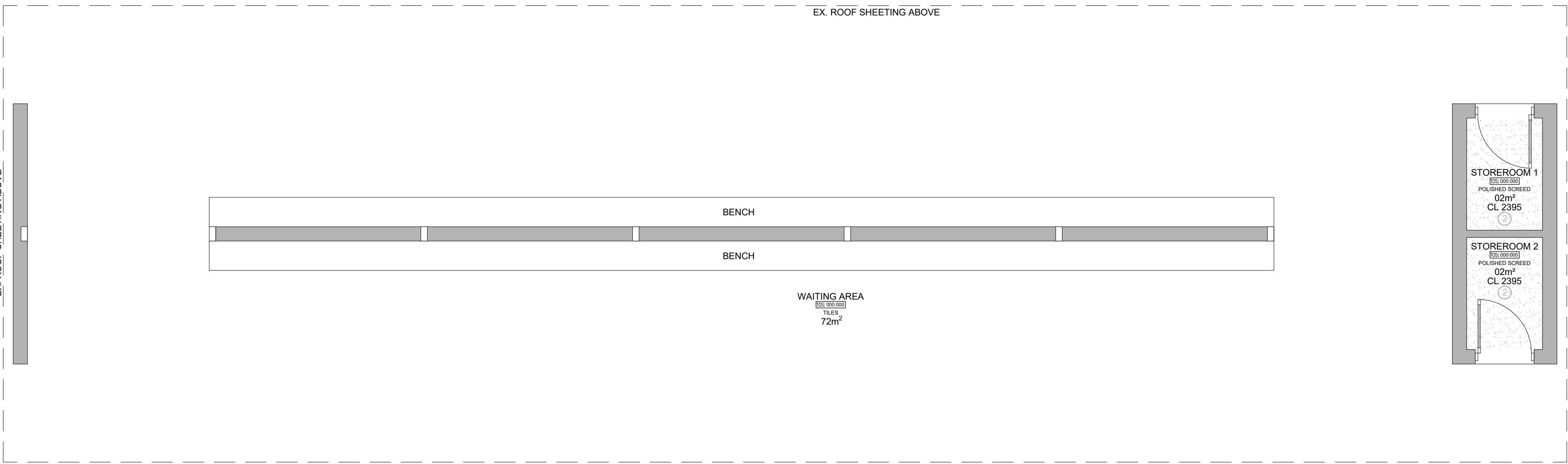
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REFERENCE DRAWINGS	
1040-003-05-0012	PROPOSED : GENERATOR ROOM
1040-003-05-0002	AS BUILT PLANS
1040-003-05-0001	SDP ADDITION OF GENERATOR ROOM
DRAWING NO.	REFERENCE
REVISIONS / ISSUE AUTHORIZATION	
02	FLOOR FINISHES PLANS - ADDITION OF GENERATOR RM
01	FLOOR FINISHES PLANS
NO	DESCRIPTION
BY	CHKD / APPD
DATE	DATE
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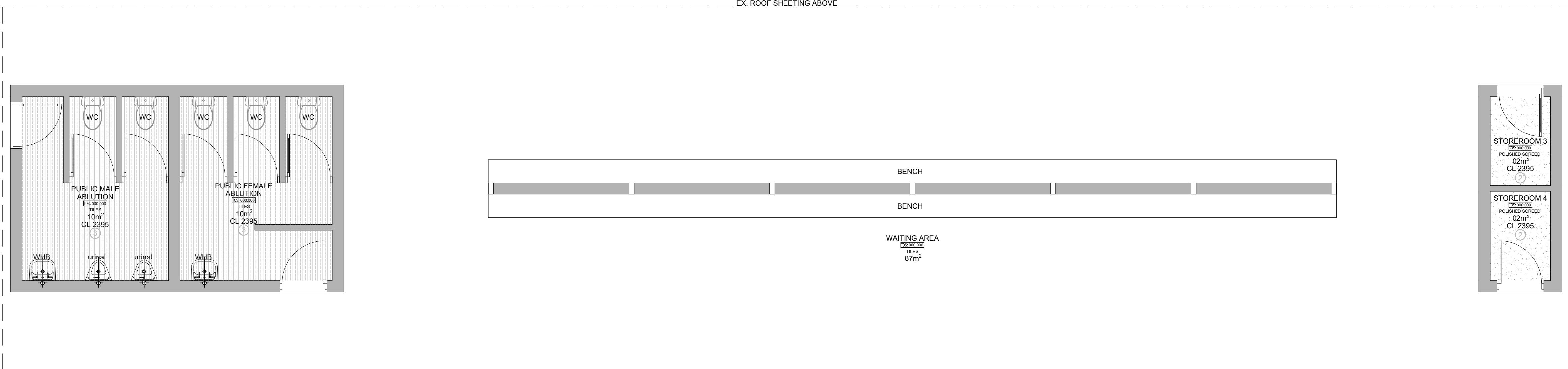
CLIENT	
TITLE	NAME
PRASA	08-07-2022
CLIENT LOGO	
prasa PASSENGER RAIL AGENCY OF SOUTH AFRICA	

MAIN CONSULTANT	
TITLE	NAME
DRAWN	K. KHOZA
DATE	21/04/2023
CHECKED	ENG. COORD
ARCHITECT	M. MADIBA
ELEC. ENG.	
MECH. ENG.	
STRUCT. ENG.	
CIVIL. ENG.	
INSTRU. ENG.	
PROC. ENG.	
APPROVED BY	
NAME	M. MADIBA
SIGNATURE	DATE
REG. NUMBER	PSAT24714667

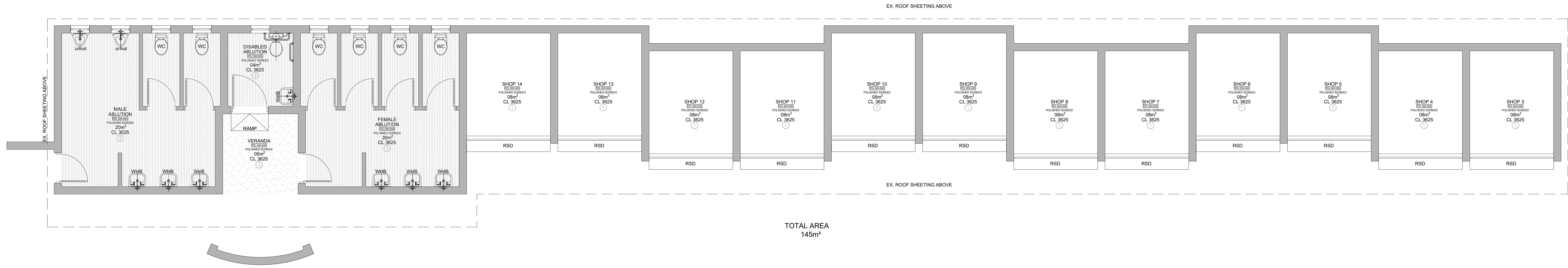
EST. 2015	
LODEMANN	
SOUTH COAST CORRIDOR STATION IMPROVEMENT PROGRAMME	
AMANZIMTOTI STATION FLOOR FINISHES PLANS	
SCALE	DATE
1:50	22-08-22
Drawing Number	1040-003-05-0007
CLIENT Drawing Number	Rev.
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Sheet size	ISSUED FOR INFORMATION
Status	



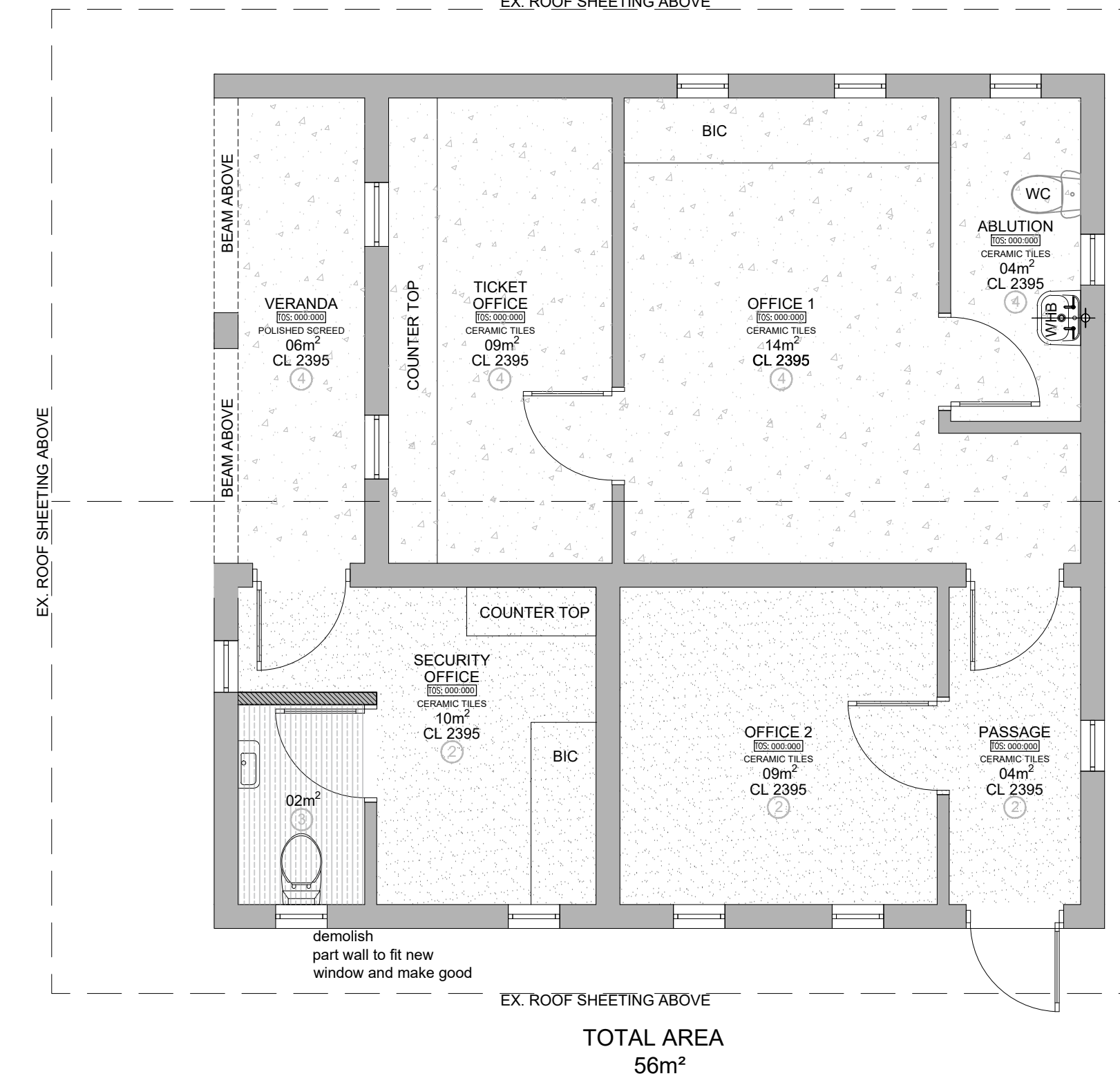
WAITING AREA 2
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



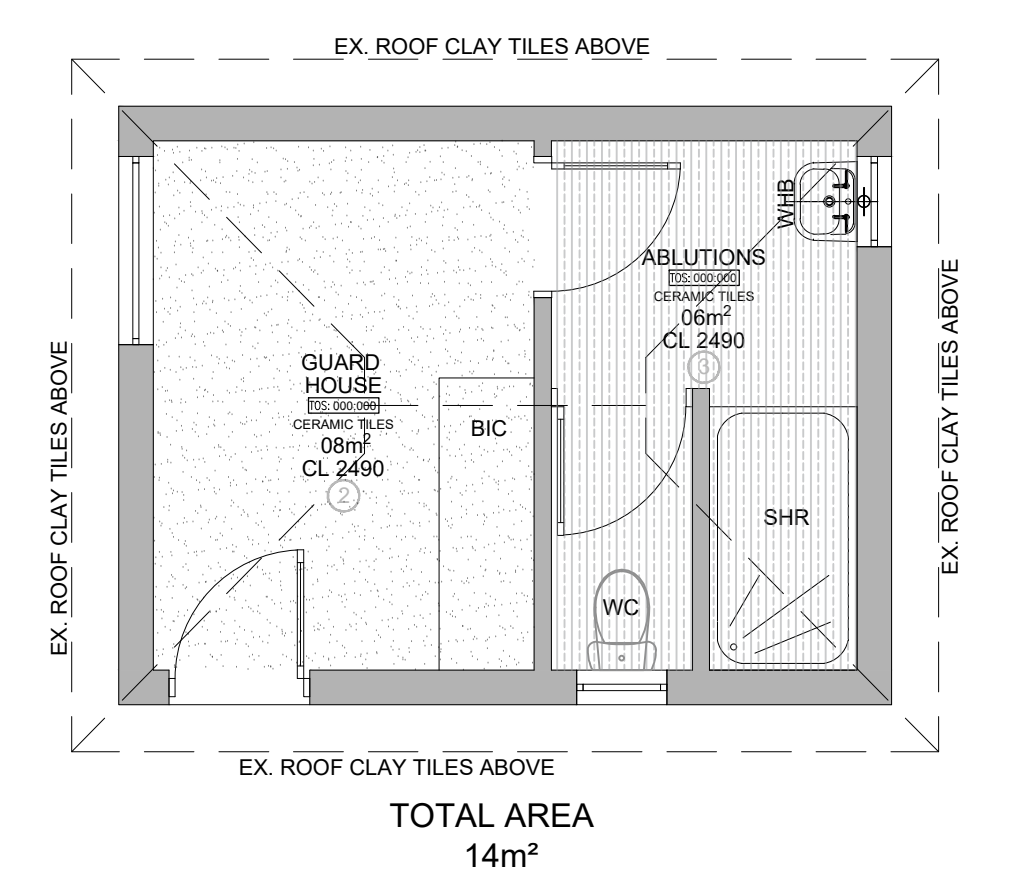
WAITING AREA 1 + ABLUTIONS
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



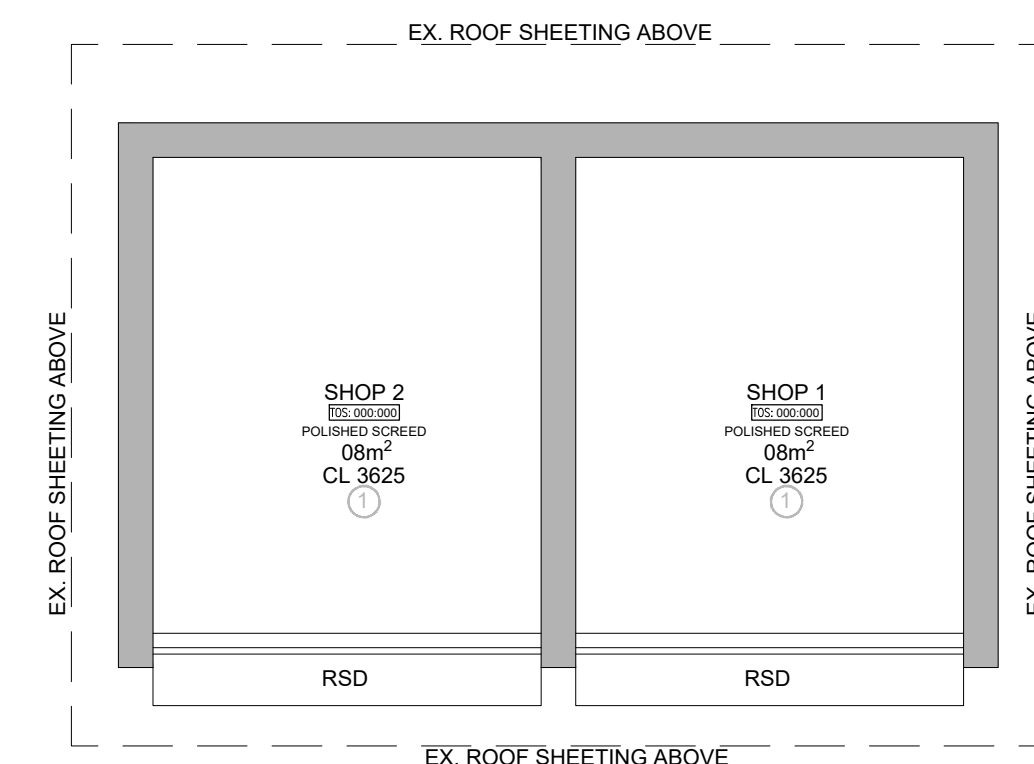
VENDOR STALLS + ABLUTIONS
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



TICKET OFFICE
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



GUARD HOUSE
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



VENDORS STALLS
CEILING PLAN
SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400

CEILING LEGEND		
CEILING TYPE	QTY	DESCRIPTION
① NO CEILING	-	NO CEILING. EXISTING STEEL ROOF SUPPORTING MEMBERS TO BE REINFORCED AND CEILING TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
② SKIMMED CEILING	-	ONE LAYER OF 12mm PLASTER OR GYPSONUM OVER EXISTING OR NEW CONCRETE SLAB. FINISH TO BE SMOOTH. COLOUR: WHITE OR MATCH EXISTING.
③ SKIMMED CEILING	-	ONE LAYER OF 12mm PLASTER OR GYPSONUM OVER EXISTING OR NEW CONCRETE SLAB. FINISH TO BE SMOOTH. COLOUR: WHITE OR MATCH EXISTING.
④ CONCRETE SLAB	-	REINFORCE ALL CONCRETE SLAB. FINISH TO BE SMOOTH. COLOUR: WHITE OR MATCH EXISTING.

NOTE:
T.V. POSITIONS, LIGHT FITTING POSITIONS, ACTION AND OCCUPANCY POSITIONS, AND OCCUPANCY POSITIONS SHALL BE CONFIRMED BY THE RELEVANT CONSULTANTS.
ALL ELECTRICAL AND MECHANICAL SERVICES BY OTHERS.

CEILING NOTE:
ALLOW REINFORCEMENTS OF 50% OF THE TOTAL AREA FOR DAMAGED CEILING.

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS. ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS
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NO	DESCRIPTION	MB	MM	MM	12-01-2023
01	CEILING LAYOUTS				
NO	DESCRIPTION	BY	CHKD	APPD	DATE
1040-003-05-0002	AS BUILT PLANS				
1040-003-05-0001	SITE DEVELOPMENT PLAN				
DRAWING NO.	REFERENCE				
REFERENCE DRAWINGS					
REVISIONS / ISSUE AUTHORIZATION					
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TITLE	NAME	DATE

MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	M. BIENGU	12/01/2023
CHECKED		
ENG. COORD		
ARCHITECT	M. MADIBA	12/01/2023
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME		DATE
SIGNATURE		
REG. NUMBER		



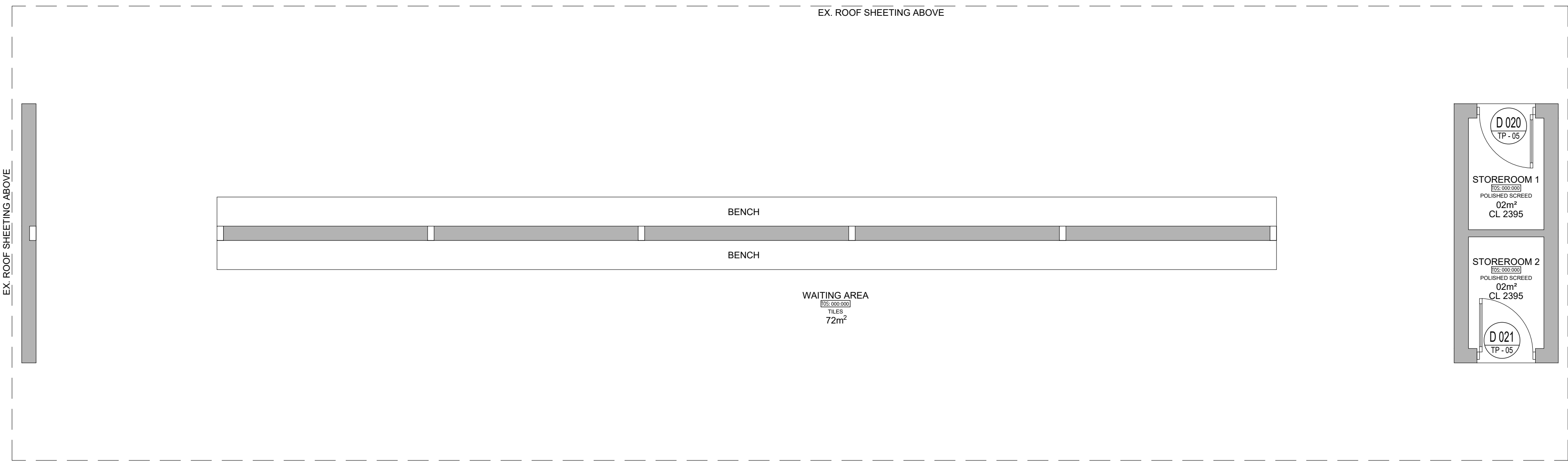
EST. 2015

LODEMANN

SOUTH COAST CORRIDOR STATION IMPROVEMENT PROGRAMME

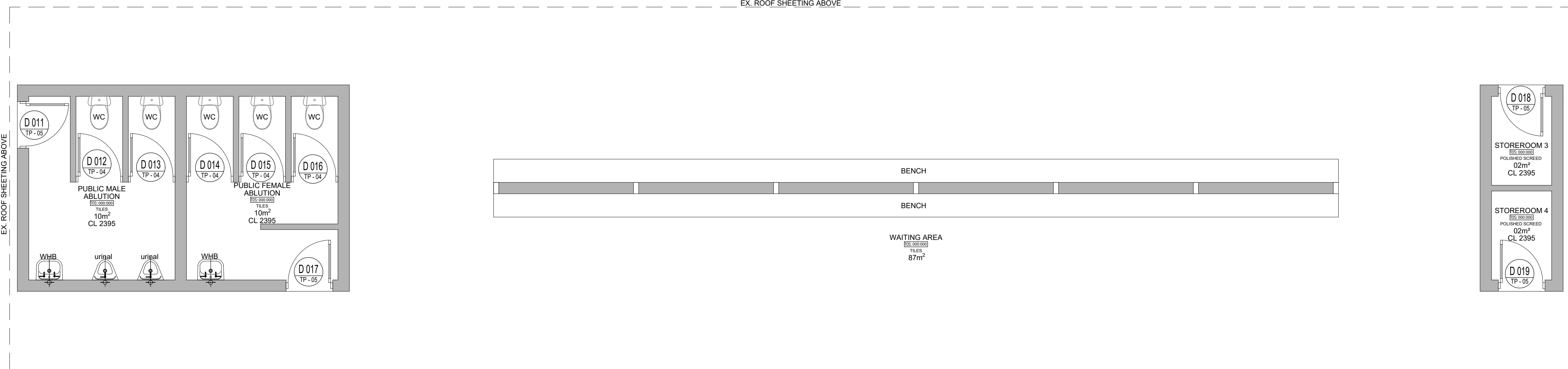
AMANZIMTOTI STATION CEILING LAYOUTS

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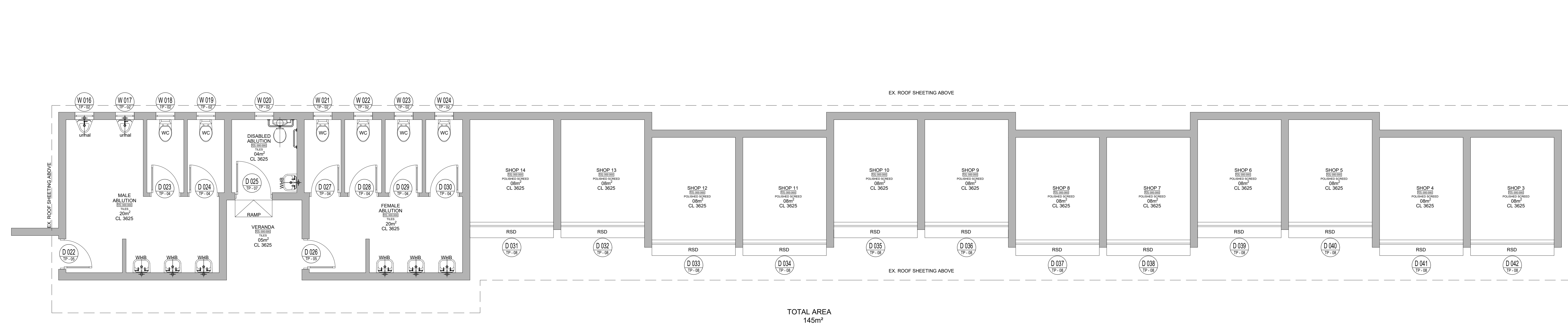
WAITING AREA 2 REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400



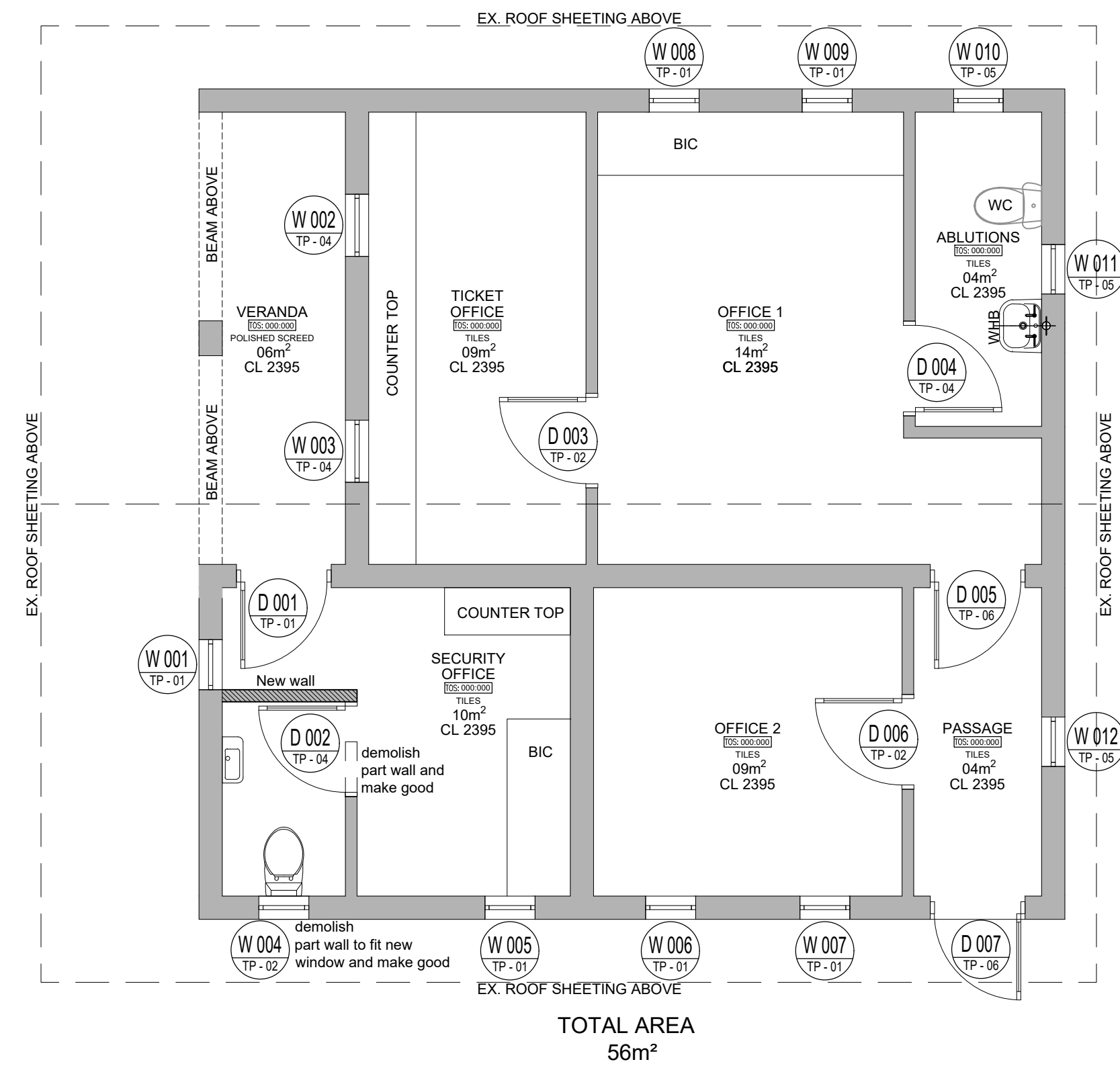
WAITING AREA 1 + ABLUTIONS REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400



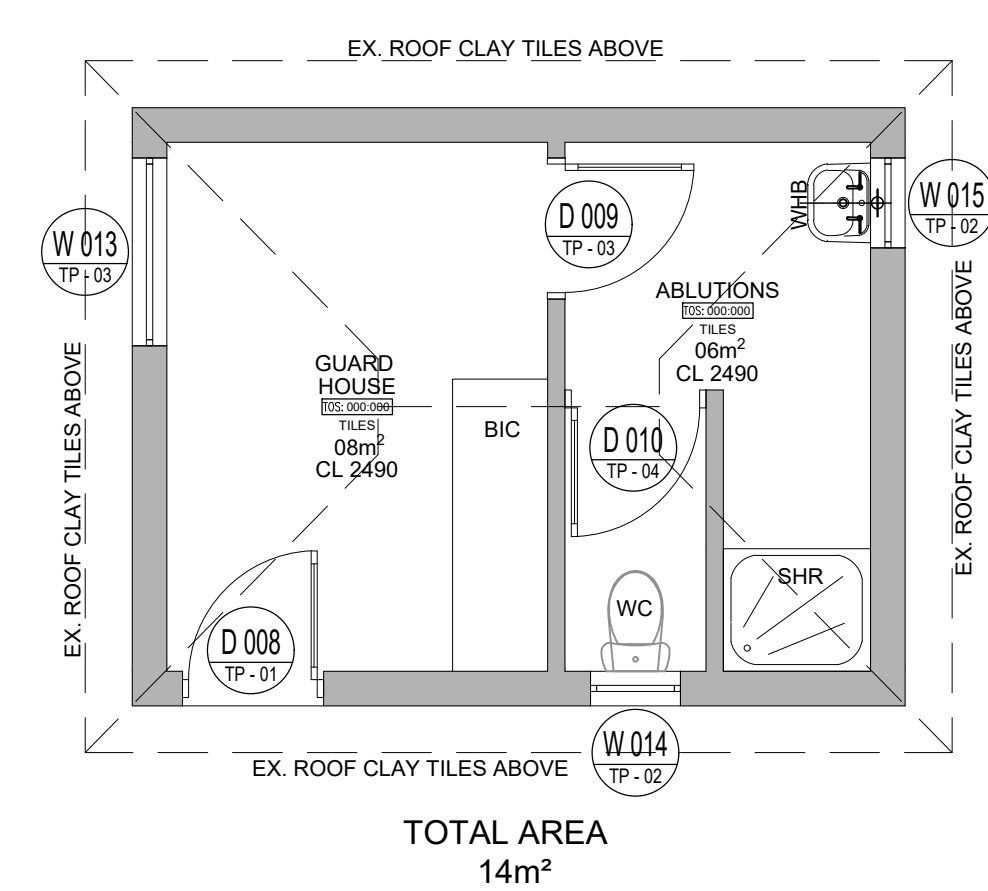
VENDOR STALLS + ABLUTIONS REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400



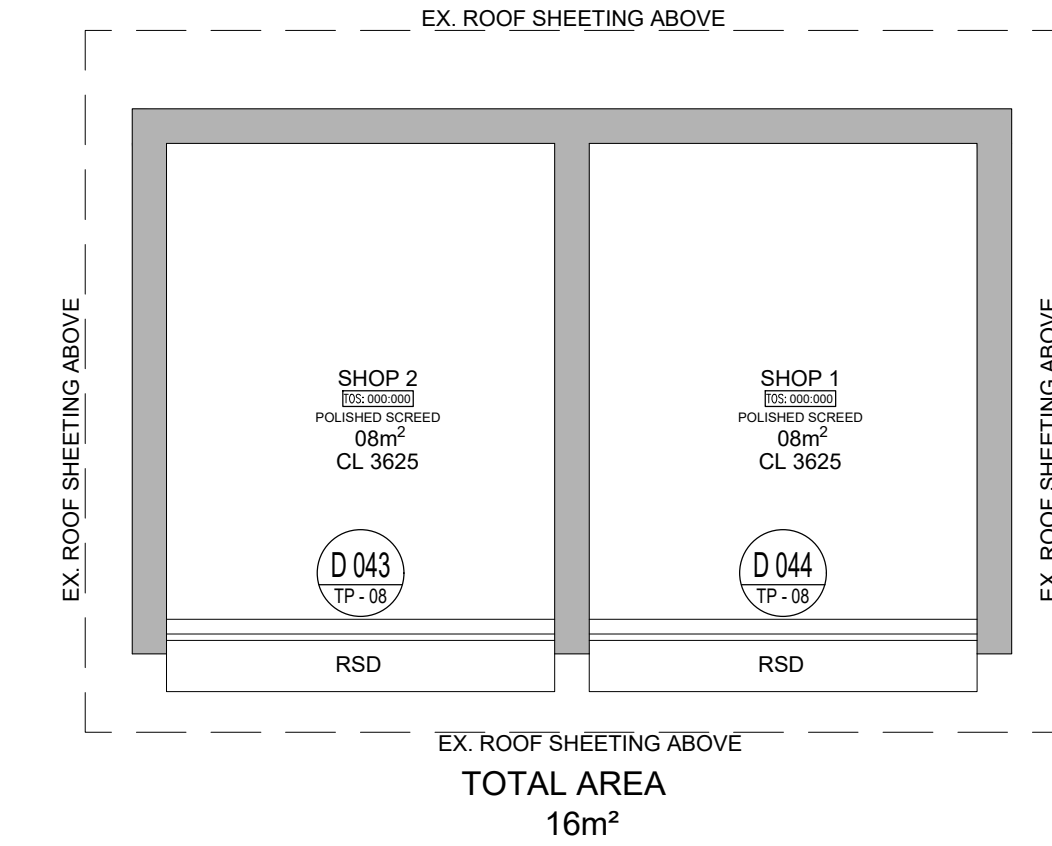
TICKET OFFICE REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400



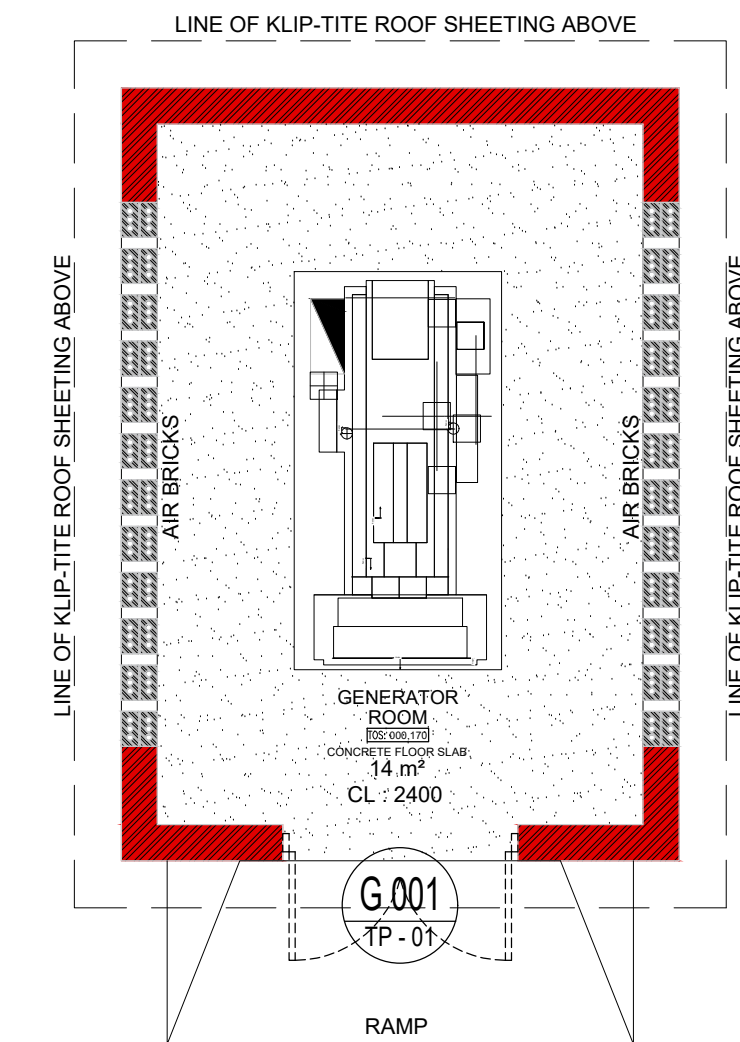
GUARD HOUSE REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400



VENDORS STALLS REFERENCE PLAN

SCALE 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400

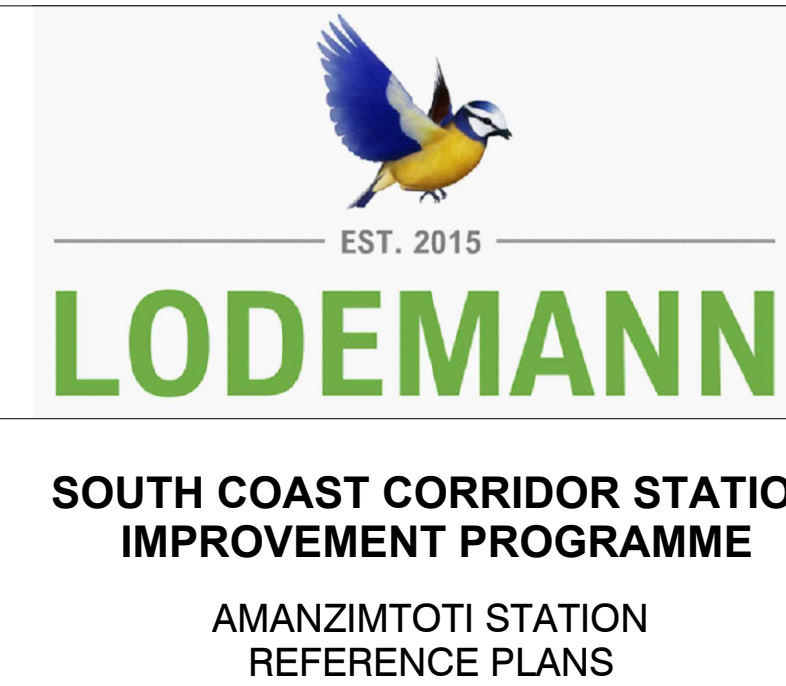


FLOOR PLAN: GENERATOR ROOM

SCALE : 1:50
NOTES IN RESPECT OF S.A. STANDARD CODE OF
PRACTICE FOR THE APPLICATION OF THE NATIONAL
BUILDING REGULATIONS, SANS 10400

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ORDERS. ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH
MANUFACTURERS SPECIFICATIONS
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ANY DISCREPANCIES FOUND TO BE REPORTED TO THE OFFICE OF THE ARCHITECT
IMMEDIATELY AND PRIOR TO PLACING OF ORDERS / MANUFACTURE.

ISSUED FOR INFORMATION



SCALE | DATE | Drawing Number | CLIENT Drawing Number | Rev. | Sheet size | Status
1:50 | 22-08-22 | 1040-003-05-0009 | 1040-003-05-0009 | 2 | A0 | ISSUED FOR INFORMATION

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REFERENCE DRAWINGS

1040-003-05-0011	WINDOW SCHEDULE
1040-003-05-0010	DOOR SCHEDULE
1040-003-05-0002	AS BUILT PLANS
1040-003-05-0001	SDP - ADDITION OF GENERATOR ROOM
DRAWING NO.	REFERENCE

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CLIENT LOGO



CLIENT

TITLE	NAME	DATE
	PRASA	08-07-2022

MAIN CONSULTANT

TITLE	NAME	DATE
DRAWN	K. KHOZA	21/04/2023
CHECKED		
ENG. COORD		
ARCHITECT	M. MADIBA	12/01/2023
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		

APPROVED BY

NAME	M. MADIBA	DATE
SIGNATURE		
REG. NUMBER	PSAT24714667	

TP-01

ISSUE FOR INFORMATION

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DOOR NOTES

- ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED
- REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND
- BRICK OPENING TO BE CONFIRMED ON SITE
- BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS
- ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR
- ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND RINSED THOROUGHLY.
- ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.
- ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME, TO BE SHOT FIXED TO CONCRETE SLAB.

LOCATION	EXTERNAL DOORS	TYPE	DOOR 900MM WIDE 2100MM HIGH ALUMINIUM FRAME
QUANTITY	02		
FINISH	WOOD TO BE SEALED WITH LINSEED OIL OR OTHER RECOMMENDED FINISHES BY MANUFACTURE AND TO BE PAINTED TO ARCHITECT SPEC. APPROVED BY CLIENT.		
GLAZING	N/A		
IRON MONGERY	IRONMONGERY SCHEDULE BY SPECIALIST.		
	LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURERS SPECIFICATIONS.		
DOOR & FRAME DESCRIPTION	2100 mm x 900mm SOLID HARDWOOD DOOR WITH SLATED PANELS BOTH SIDES AND COUGLED EDGES TO SUIT OPENING DOOR TO BE FITTED WITH 5 x HINGES PER LEAF. ALL TO SPECIALIST. COLOUR TO ARCHITECT.		

TP-02		ISSUE FOR INFORMATION	
DOOR NOTES - ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED. - REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND. - BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS. - ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR. - ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY. - ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB. - ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME, TO BE SHOT FIXED TO CONCRETE SLAB.			
		The diagram shows a cross-section of a door frame installed in a concrete slab. The total height of the opening is 2100 mm. The door leaf has a height of 2052 mm. The width of the opening is 900 mm, with 80 mm margins on each side. Annotations include 'UNTEL HEIGHT' pointing to the top edge of the door leaf, 'FFL' (Finished Floor Level) at the base of the concrete slab, and 'D.P.' (Door Panel) indicating the central part of the door leaf.	
LOCATION	INTERNAL DOORS		
QUANTITY	Q2	TYPE	DOOR 900XMM HIGH 2100XMM HIGH ALUMINIUM FRAME
FINISH	WOOD TO BE SEALED WITH LINSEED OIL OR OTHER RECOMMENDED SEALANTS BY MANUFACTURE AND TO BE PAINTED TO ARCHITECT SPEC. APPROVED BY CLIENT.		
GLAZING	N/A		
IRON MONGERY	IRONMONGERY SCHEDULE BY SPECIALIST.		
	LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURER'S SPECIFICATIONS.		
DOOR & FRAME DESCRIPTION	2100 mm x 900mm SEMI-SOLID-HARDWOOD DOOR WITH SLATTED PANELS BOTH SIDES AND COUNSELLED EDGES TO BUT OPENING. DOOR TO BE FITTED WITH 3 X HINGES PER LEAF ALL TO SPECIALIST. COLOUR TO ARCHITECT		

TP-03

DORMA DOOR CLOSER

ISSUE FOR INFORMATION

DOOR NOTES

ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED

REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND

BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.

ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.

ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY.

ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.

ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME. TO BE SHOT FIXED TO CONCRETE SLAB.

LOCATION	STAFF ABILITIES
QUANTITY	01

TYPE	DOOR: 900mm Wide x 2100mm HIGH ALUMINIUM FRAME.
FINISH	WOOD TO BE SEALED WITH LINSEED OIL OR OTHER RECOMMENDED SEALANTS BY MANUFACTURE AND TO BE PAINTED TO ARCHITECT SPEC. APPROVED BY CLIENT.
GLAZING	N/A
IRON MONGERY	IRONMONGERY SCHEDULE BY SPECIALIST.
DOOR & DESCRIPTION	1 No. DORMA DOOR CLOSER LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURERS SPECIFICATIONS. 900mm x 2100mm SEM SOLID TEAR DOOR SIDES AND CONCEALED EDGES TO BUT OPENING. DOOR TO BE FITTED WITH 3 x HINGES FOR LEAF ALL TO SPECIALIST DETAILS. COLOUR OF THE DOOR AND FRAME TO ARCHITECT'S SPECIALIST.

LOCATION	STAFF ABILITIES
QUANTITY	01

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DOOR NOTES

- ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED.
- REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND.
- BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.
- ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.
- ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND BRUSH THOROUGHLY.
- ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.
- ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME, TO BE SHOT FIXED TO CONCRETE SLAB.

LOCATION MALE AND FEMALE CURBLES

QUANTITY 14

TYPE DOOR: 900mm Wide x 2100mm HIGH ALUMINIUM FRAME.

FINISH WOOD TO BE SEALED WITH LINSEED OIL OR OTHER RECOMMENDED SEALANTS BY MANUFACTURE AND TO BE PAINTED TO ARCHITECT SPEC. APPROVED BY CLIENT.

GLAZING N/A

IRON MONGERY HOMOGENEOUS SCHEDULE BY SPECIALIST.
LOCK KNOB AND INDICATOR
LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURERS SPECIFICATIONS.

DOOR & WINDOW 900mm x 2100mm SEMI SOLID THICK DOOR SIDES AND CONCEALED EDGES TO SUIT OPENING DOOR TO BE FITTED WITH 3x HINGES PER LEAF ALL TO SPECIALIST DETAILS. COLOUR OF THE DOOR AND FRAME TO ARCHITECT'S SPECIALIST.

TP-01		ISSUE FOR INFORMATION	
DOOR NOTES ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED. REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND. BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS. ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR. ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND RINSED THOROUGHLY. ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB. ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME, TO BE SHOT FIXED TO CONCRETE SLAB.			
		UNTEL HEIGHT 2100 2070 900 835 90 90 F.F.L.	
LOCATION	PUBLIC PLATFORM ABUTLIONS, STOREROOM, STAFF ROOM, AND SECURITY CHECK		
QUANTITY	08	TYPE	DOOR: 900mm WIDE x 2100mm HIGH STEEL FRAME
FINISH	75mm, 1.2mm GALVANIZED SLAT MATERIAL, OR OTHER RECOMMENDED STEEL BY MANUFACTURER.		
GLAZING	N/A		
IRON MONGERY	IRONMONGERY SCHEDULE BY SPECIALIST.		
	LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURERS SPECIFICATIONS.		
DOOR & FRAME DESCRIPTION	900mm x 2100mm ANTI CORROSIVE GALVANIZED AND EPOXY COATED MS STEEL DOOR SIZES AND CONSIGLED EDGES TO SUIT OPENING. DOOR TO BE FITTED WITH 3 x HINGES PER LEAF ALL TO SPECIALIST DETAILS.		

[illegible]

TP-07

ISSUE FOR INFORMATION

DATE: 11/01/2018
DRAWN BY: [Redacted]
CHECKED BY: [Redacted]
APPROVED BY: [Redacted]
ARCHITECTS

DOOR NOTES

ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED.

REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND TO AVOID WORK BEING PUT IN CONFLICT WITH ANY OTHER WORK TO BE CONFORMED ON SITE.

BEFORE ANY WORK AND/OR SHOP DRAWINGS ARE PUT IN HANDS.

ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.

ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY.

ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.

ALL DOOR FRAMES FOR POWER FLOATED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME, TO BE SHOT FIXED TO CONCRETE SLAB.

LOCATION	PLATFORM DISABLED PUBLIC ABUTLIONS	
QUANTITY	G1	TYPE
		DOOR: 1100MM WIDE X 2100MM HIGH ALUMINIUM FRAME
FINISH	75mm, 1.2mm GALVANIZED SLAT MATERIAL. OR OTHER RECOMMENDED SLAT BY MANUFACTURE.	
GLAZING	N/A	
IRON WORKERY	IRONMONGERY SCHEDULE BY SPECIALIST.	
	LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURE SPECIFICATIONS.	
DOOR & FRAME SIZES	900mm x 2100mm ANTI CORROSION GALVANIZED AND EPOXY COATED M/S STEEL	
DOOR SIZES AND HINGES	DOOR TO BE FITTED WITH 3 x HINGES PER LEAF ALL TO SPECIALIST DETAILS.	

TP-08		ISSUE FOR INFORMATION			
				2485	
		LINTEL HEIGHT		2405	
DOOR NOTES		The diagram shows a side elevation of a door frame. The total height is labeled as 2500mm. The lintel height is indicated at the top. The door opening height is 2485mm. The bottom of the door frame is labeled FFL (Finished Floor Level). The door itself has a height of 2405mm. To the right of the door, there are vertical dimension lines indicating heights of 2485mm and 2405mm.			
ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXED.					
REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND ON SITE					
BRICK OPENING TO BE CONFIRMED BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.					
ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.					
ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY.					
ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.					
ALL DOOR FRAMES FOR POWER FLAOTED DOORS TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME TO BE SHOT FIXED TO CONCRETE SLAB.					
LOCATION	PLATFORM DISABLED PUBLIC ABUTIONS				
QUANTITY	14	TYPE	DOOR-2485MM WIDE,2500MM HIGH ALUMINIUM FRAME:		
FINISH	75mm, 1.2mm GALVANIZED SLAT MATERIAL OR OTHER RECOMMENDED SLAT BY MANUFACTURER.				
GLAZING	N/A				
IRON MONKEYRY	IRONMONGERY SCHEDULE BY SPECIALIST.				
	LOCK SET, OPENING LEAF, DOOR HANDLE, AND HINGES AS PER MANUFACTURERS SPECIFICATIONS				
DOOR & NAME DESCRIPTION	2485mm x 2160mm ANTI CORROSIVE GALVANIZED AND EPOXY COATED M/S STEEL DOOR SIDES AND CONCEALED EDGES TO SUIT OPENING. DOOR TO BE FITTED WITH 3 x X HINGES PER LEAF ALL TO SPECIALIST DETAILS.				

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TP-01

ISSUE FOR INFORMATION

Technical drawing of a double door assembly. The drawing shows two doors with a central mullion. Dimensions are indicated: overall width is 1500 mm (divided into 50, 650, 50, 650, 50 mm segments), and overall height is 2100 mm (divided into 50, 2050, 50 mm segments). The drawing includes a section line 'F-F' and a section line 'A-A'. The drawing is labeled 'LINTEL HEIGHT' and 'DOOR HEIGHT'. The drawing is labeled 'FPL' at the bottom left.

DOOR NOTES

ALL DOOR SIZES ARE DESIGN, SUPPLY AND FIXES.

REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND

BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.

ARCHITECT APPROVES DRAWINGS ON AESTHETIC AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.

ANY CEMENT SPLASHES TO BE WASHED IMMEDIATELY WITH CLEAR WATER AND GROUT THOROUGHLY.

ALL DOORS MUST BE INSTALLED SQUARE, TRUE AND PLUMB.

ALL DOOR FRAMES FOR POWER FLOATED TO BE PROVIDED WITH ADDITIONAL LUGS AT BOTTOM OF FRAME TO BE SHOT FIXED TO CONCRETE SLAB.

DOOR NOT BEARING. DOOR LAMP IN SIZE OF THE SCHEDULE WITHOUT THE PERSONS WRITTEN CONSENT OF THE MANUFACTURE OR HIS SHARING GROUP ARCHITECTS.

LOCATION	GENERATOR ROOM		
QUANTITY	01	TYPE	DOOR 1013MM WIDE 2100MM HIGH STEEL FRAME
FINISH	NEW STEEL GATE TO MANUFACTURE'S DETAIL, ANTI-CORROSIVE COATING TO BE APPLIED.		
GLAZING	NA		
IRON MONGERY	IRONMONGERY SCHEDULE BY SPECIMAT		
	LOCK SET, OPENING LEAF DOOR HANDLE, AND HINGES AS PER MANUFACTURER'S SPECIFICATIONS.		
DOOR & FRAME DESCRIPTION	2100 mm x 1013mm SOLD STEEL DOOR TO SUIT OPENING. DOOR TO BE FITTED WITH 4 x HINGES PER LEAF ALL TO SPECIALIST. COLOUR TO ORIGINAL.		

DOOR NOTE:

- ALL EXISTING INTERNAL AND EXTERNAL DAMAGED STEEL, TIMBER DOORS AND FRAMES TO BE REMOVED AND REPLACED WITH NEW WHERE NECESSARY, TO MATCH EXISTING, STRICTLY REFER TO ARCHITECTS BEFORE ANY REMOVAL, OF WORK.
- ALL NEW INTERNAL AND EXTERNAL STEEL DOOR FRAMES TO BE Sanded DOWN, TREATED AND PAINTED IN ACCORDANCE TO THE PROJECT SPECIFICATIONS.
- ALL NEW ALUMINUM DOOR FRAMES TO BE NATURAL, ANODIZED ALUMINUM IN ACCORDANCE TO PRAISA BLUE PRINT SPECIFICATIONS.
- ALL EXISTING INTERNAL AND EXTERNAL ALUMINUM DOOR FRAMES TO BE Sanded DOWN, TREATED, FINISHED OR REPAINTED WITH TWO COATS OF QUALITY VARNISH AS PER HERITAGE REQUIREMENTS.
- DOOR LEAFS TO BE PAINTED IN ACCORDANCE TO THE PROJECT SPECIFICATIONS TO PRAISA BLUE PRINT.
- PAINT ALL EXTERNAL DOOR LEAFS TO BE PAINTED IN ACCORDANCE TO PRAISA BLUE PRINT.
- EXISTING SECURITY SANIT GATES TO BE CLEANED AND REPAIRED. PROPOSE NEW GALVANIZED STEEL SECURITY GATES TO BE SUPPLIED AND INSTALLED ACCORDING TO THE CLIENT REQUIREMENTS.

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS . ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS

THIS DRAWING TO BE READ IN CONJUNCTION WITH FITTING / FINISHES SCHEDULE AND ANY DISCREPANCIES FOUND TO BE REPORTED TO THE OFFICE OF THE ARCHITECT IMMEDIATELY AND PRIOR TO PLACING OF ORDERS / MANUFACTURE .

ISSUED FOR INFORMATION

GENERAL NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
2. ALL DIMENSIONS AND HEIGHTS ARE TO BE CHECK ON SITE BEFORE WORK PUT ON HAND.
3. REPORT DISCREPANCIES TO ARCHITECT OR ENGINEER.
4. THIS DRAWING MUST NOT BE USED TO SCALE OFF. USE ONLY WRITTEN DIMENSIONS. CONTACT THE ENGINEER OR ARCHITECT WHERE CLARITY IS SOUGHT.
5. FOR SETTING OUT DATA, SETTING OUT POINTS AND DATUM LEVELS REFER TO SURVEY INFORMATION AND ARCHITECT'S DRAWINGS.
6. STRUCTURAL WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND THE RELEVANT S.A.N.S. SPECIFICATIONS. ALL CONCRETE WORK IS TO BE DONE IN ACCORDANCE WITH S.A.N.S 1200G AND EARTHWORKS IS ACCORDANCE WITH S.A.N.S 1200D.
7. CONSULT RELEVANT ARCHITECT'S, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWOPS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

[illegible]

CLIENT LOGO		
 		
CLIENT		
TITLE	NAME	DATE
	PRASA	08-07-2022

MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	K. KHOZA	21/04/2023
CHECKED		
ENG. COORD		
ARCHITECT	M. MADIBA	12/01/2023
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	M. MADIBA	DATE
SIGNATURE		
REG. NUMBER	PSAT24714667	

WINDOW SCHEDULE	WINDOW TYPE 02
	QUANTITY 12

WINDOW NOTES

ALL WINDOW SIZES ARE DESIGN, SUPPLY AND FIXED

REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND

BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.

ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUB-CONTRACTOR

ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY.

DESCRIPTION :	NATURAL ANODISED ALUMINIUM WINDOW CONSISTING OF 1 TOP HUNG OPENING OUT CASEMENT TO BE SUPPLIED WITH ALL BUILDING IN LUGS. PERIMETER OF WINDOW TO BE SEALED WITH SILICONE.
GLASS :	6mm CLEAR SAFETY GLAZING THROUGHOUT AS PER PART N. GLAZING OF SANS 10400.
GLAZING :	REFER TO GLAZING / MANUFACTURER'S SPECIFICATIONS
FRAMING/MONERY :	AS PER MANUFACTURERS SPECIFICATIONS
FURNITURE :	BLACK NYLON HANDLES. SAMPLE TO BE SHOWN TO THE ARCHITECT FOR APPROVAL.
LOCKSET :	ALL OPENING SECTIONS TO BE FITTED WITH APPROVED LOCKING MECHANISM
HINGES :	PROJECTION HINGES.
OTHER :	ALL GLAZING TO COMPLY WITH PART N° OF THE SANS 10400
POSITION :	GUARD HOUSE CUBICLE AND VENDORS STALL CUBICLES

GLAZING AND SIGNAGE PANELS ARE TO BE DETERMINED PER STATION

WINDOW SCHEDULE

		QUANTITY	04
			02

WINDOW NOTES

- ALL WINDOW SIZES ARE DESIGN, SUPPLY AND FIXED.
- REFER ALL DISCREPANCIES TO ARCHITECT PRIOR TO ANY WORK BEING PUT IN HAND
- BRICK OPENING TO BE CONFIRMED ON SITE BEFORE ANY WORK AND OR SHOP DRAWINGS ARE PUT IN HANDS.
- ARCHITECT APPROVES DRAWINGS ON AESTHETIC BASIS ONLY AND DESIGN RESPONSIBILITY REMAINS WITH SUBCONTRACTOR.
- ANY CEMENT SPLASHES TO BE WASHED OFF IMMEDIATELY WITH CLEAR WATER AND DRIED THOROUGHLY.

FINISHED FLOOR LEVEL

590
49 510 49
735 524
2100
FG
6MM SAFETY GLAZING
SHOP DRAWINGS TO BE SUBMITTED TO ARCHITECT FOR APPROVAL PRIOR TO MANUFACTURE

WINDOW SCHEDULE

DESCRIPTION :	
GLASS :	NATURAL ANODOISED ALUMINIUM WINDOW CONSISTING OF 1 FIXED CASEMENT TO BE SUPPLIED WITH ALL BUILDING-IN LOGS. PERIMETER OF WINDOW TO BE SEALED WITH SILICONE.
GLAZING :	6mm CLEAR SAFETY GLAZING THROUGHOUT AS PER PART N-GLAZING OF SANS 10400.
IRONMONGERY :	REFER TO GLAZING / MANUFACTURERS' SPECIFICATIONS
IRONMONGERY :	AS PER MANUFACTURERS SPECIFICATIONS
FURNITURE :	BLACK NYLON HANDLES. SAMPLE TO BE SHOWN TO THE ARCHITECT FOR APPROVAL.
LOCKSET :	ALL OPENING SECTIONS TO BE FITTED WITH APPROVED LOCKING MECHANISM
HINGES :	PROJECTION HINGES.
OTHER :	ALL GLAZING TO COMPLY WITH PART 'N' OF THE SANS 10400
POSITION :	TICKET OFFICE

GLAZING AND SIGNAGE PANELS ARE TO BE DETERMINED PER STATION

WINDOW NOTE:

ALL EXISTING DAMAGED STEEL, TIMBER WINDOWS AND FRAMES TO BE REMOVED AND REPLACED WITH NEW WHERE NECESSARY TO MATCH EXISTING. STRICTLY REFER TO ARCHITECTS BEFORE ANY REMOVAL OF GOODS.

ALL EXISTING BRICK AND CONCRETE FRAMES RETAINED TO BE SANDED DOWN, TREATED AND PAINTED IN ACCORDANCE TO PRASA BLUE PAINT.

ALL EXISTING ALUMINUM WINDOW FRAMES TO BE NATURAL, ANODIZED ALUMINUM. IN ACCORDANCE TO PRASA BLUE PAINT.

ALL EXISTING TIMBER WINDOW FRAMES TO BE SANDED DOWN & VARNISHED OR REPAINTED WITH TWO COATS OF VARNISH. TO BE USED AS PER SPECIFICATIONS AND REQUIREMENTS OF THE CONTRACT.

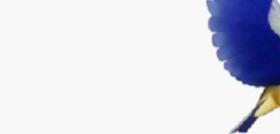
ROLLING BUILT INSTALLED INTO THE TICKET SALES WINDOW, LOWERED DOWN INDICATES TICKET COUNTER NOT IN USE.

BULLET RESISTANT PAV. TRANSACTION WINDOWS INCLUDING SALES WINDOWS & INFORMATION DESKS.

ALL EXISTING INTERIOR WINDOW SECURITY BARRIERS BURGLAR GLASSING TO BE REFURISHED. ALL DAMAGED TO BE REMOVED AND REPLACED WITH SIMILAR APPROVED.

ISSUED FOR INFORMATION

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
2. ALL DIMENSIONS AND HEIGHTS ARE TO BE CHECK ON SITE BEFORE WORK PUT ON HAND.
3. REPORT DISCREPANCIES TO ARCHITECT OR ENGINEER.
4. THIS DRAWING MUST NOT BE USED TO SCALE OFF. USE ONLY WRITTEN DIMENSIONS. CONTACT THE ENGINEER OR ARCHITECT WHERE CLARITY IS SOUGHT.
5. FOR SETTING OUT DATA, SETTING OUT POINTS AND DATUM LEVELS REFER TO SURVEY INFORMATION AND ARCHITECT'S DRAWINGS.
6. STRUCTURAL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND THE RELEVANT CODES AND SPECIFICATIONS. ALL CONCRETE WORKS IS TO BE DONE IN ACCORDANCE WITH S.A.N.S 1200G AND EARTHWORKS IS ACCORDANCE WITH S.A.N.S 1200D.
7. CONSULT RELEVANT ARCHITECTS, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWOPS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

[illegible]

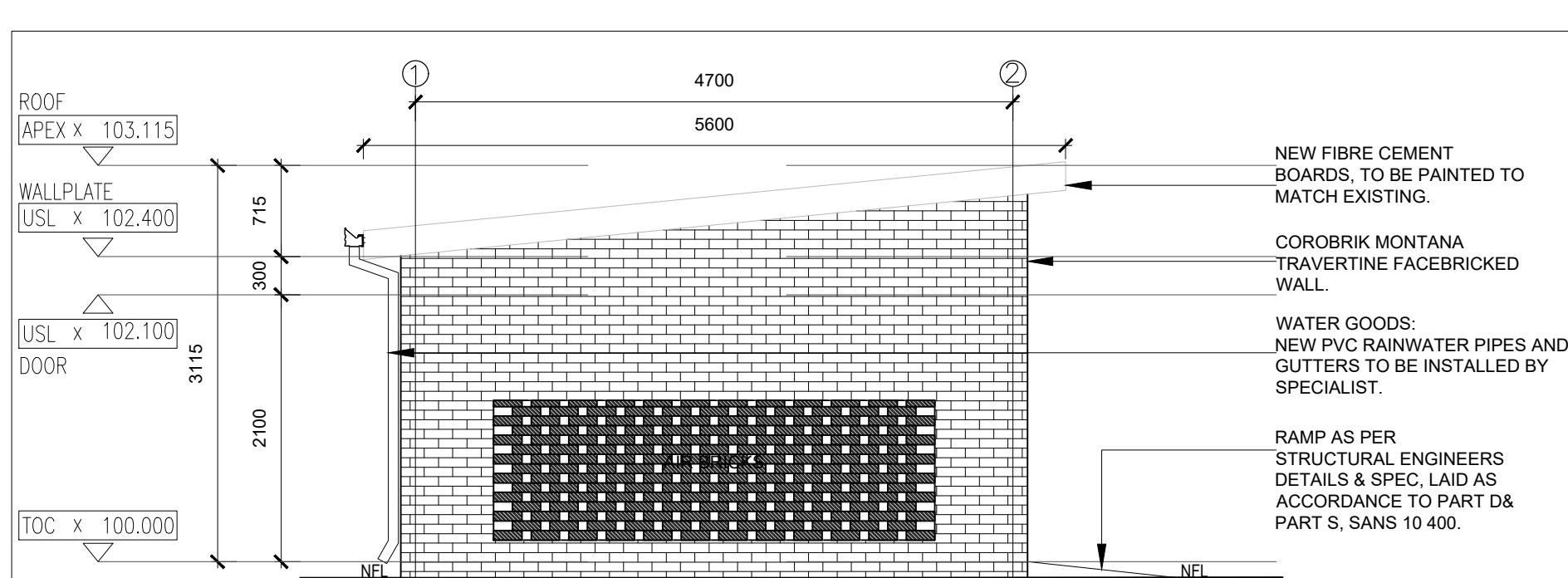
EST. 2015

LODEMANN

SOUTH COAST CORRIDOR STATION IMPROVEMENT PROGRAMME

AMANZIMTOTI STATION WINDOW SCHEDULE

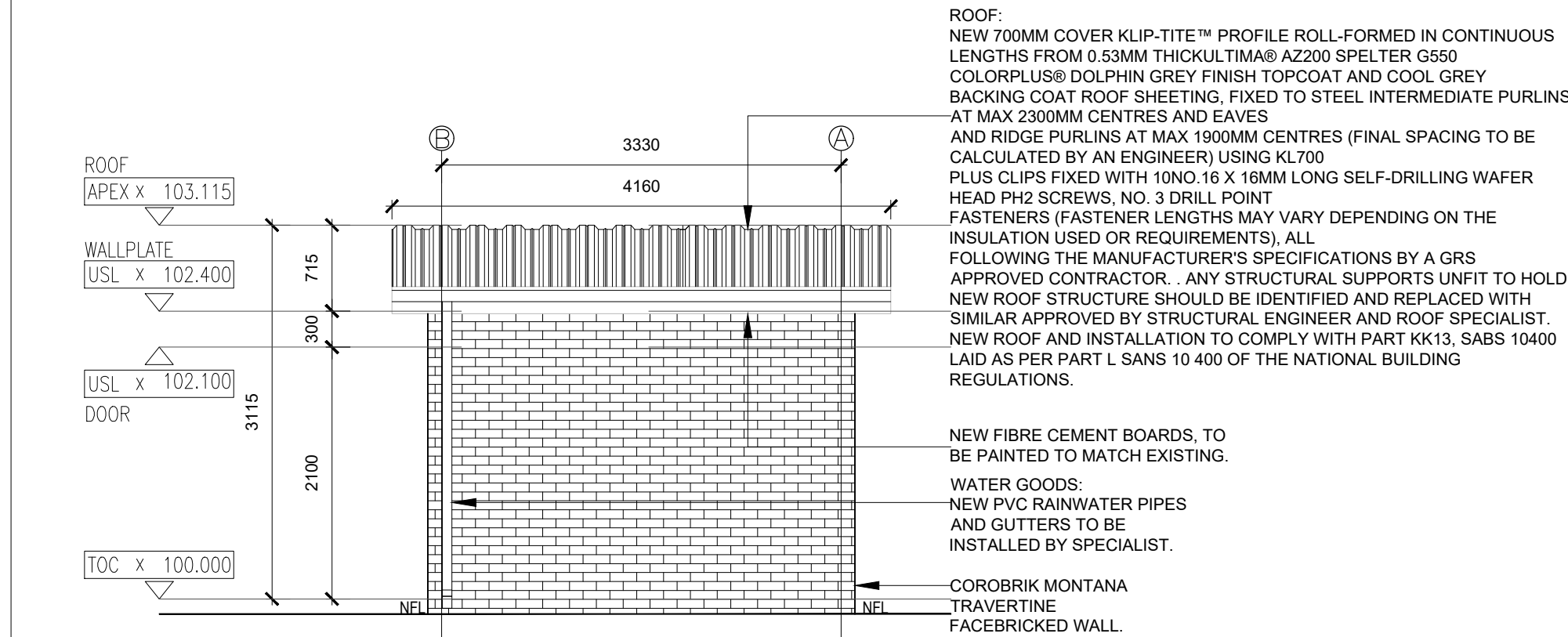
SCALE:	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status
1:20	22-08-22	1040-003-05-0011		1	A0	ISSUED FOR INFORMATION



EAST ELEVATION: GENERATOR ROOM

SCALE : 1:50

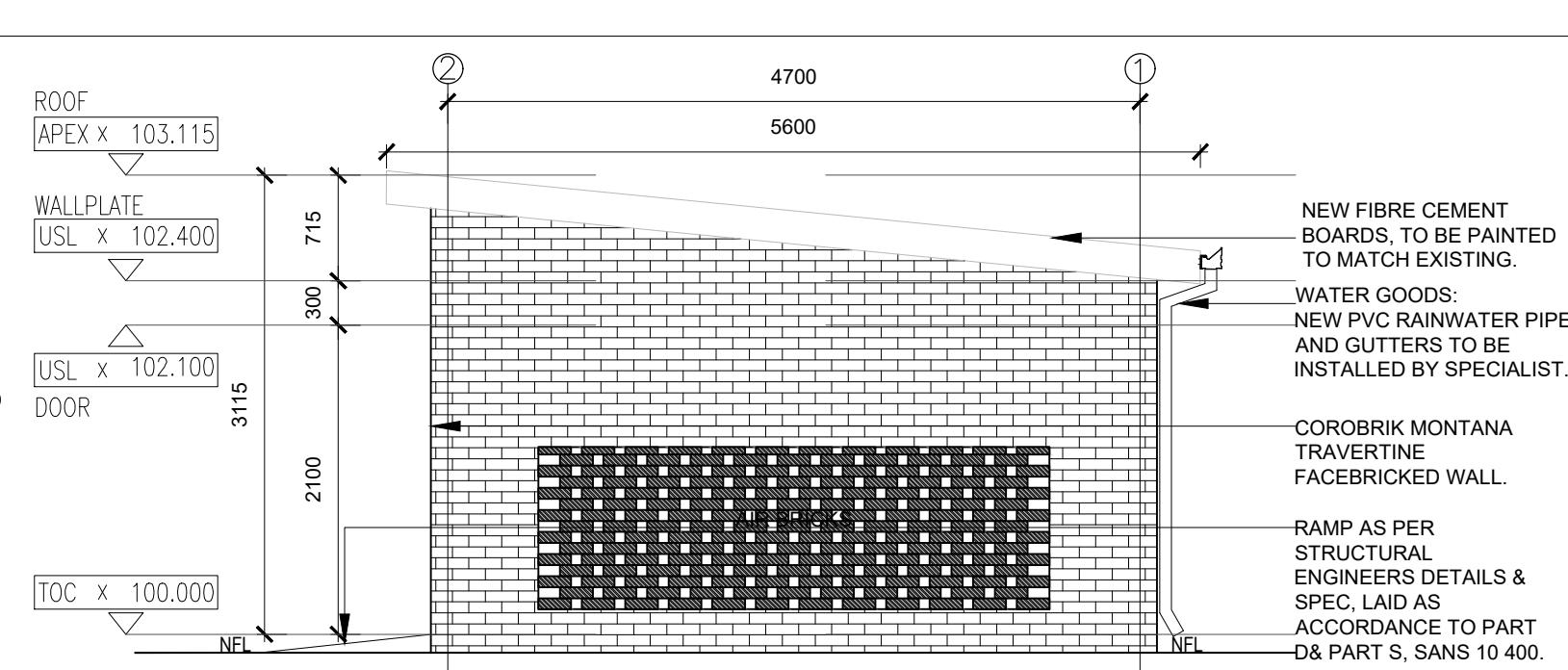
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



SOUTH ELEVATION: GENERATOR ROOM

SCALE : 1:50

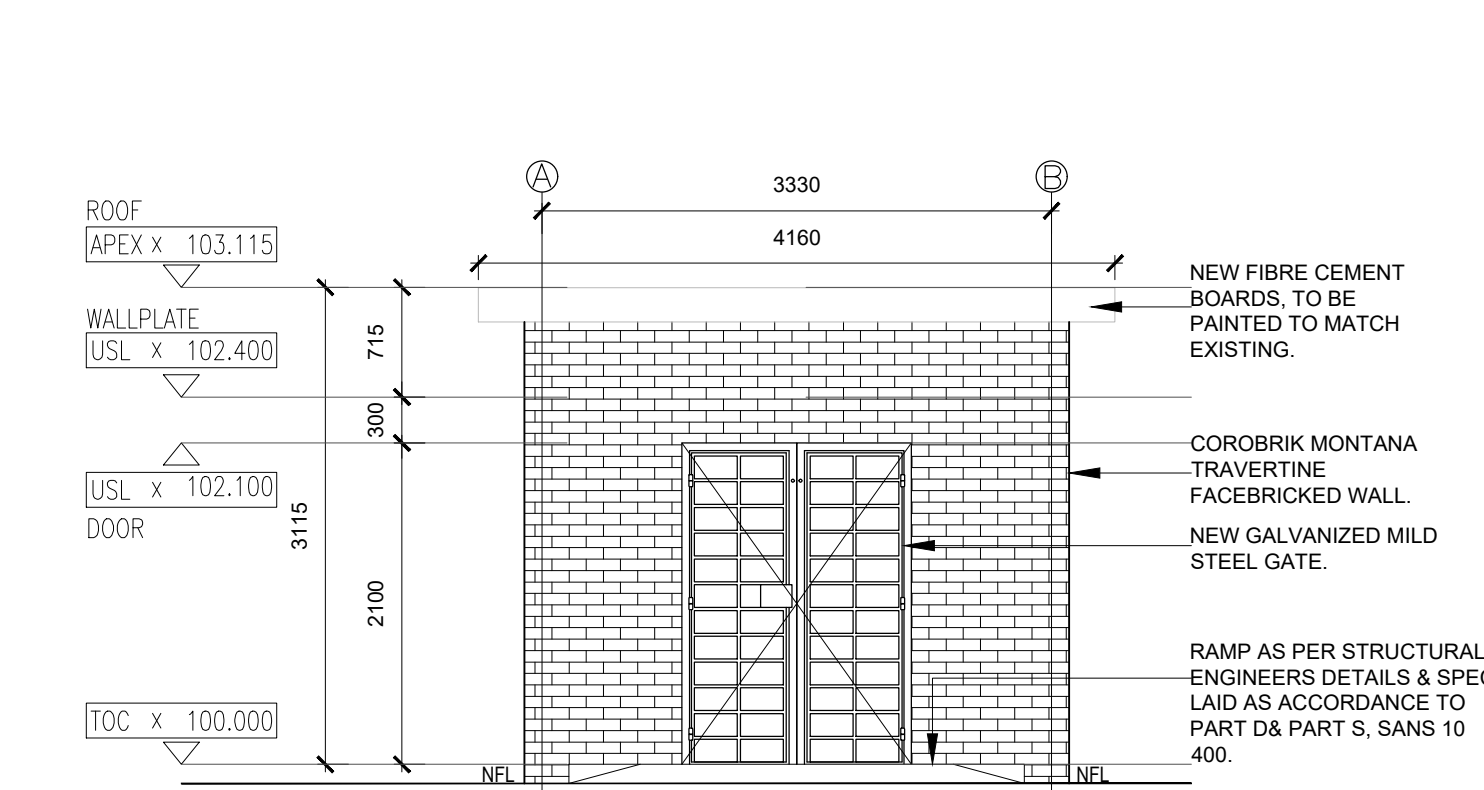
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



WEST ELEVATION: GENERATOR ROOM

SCALE : 1:50

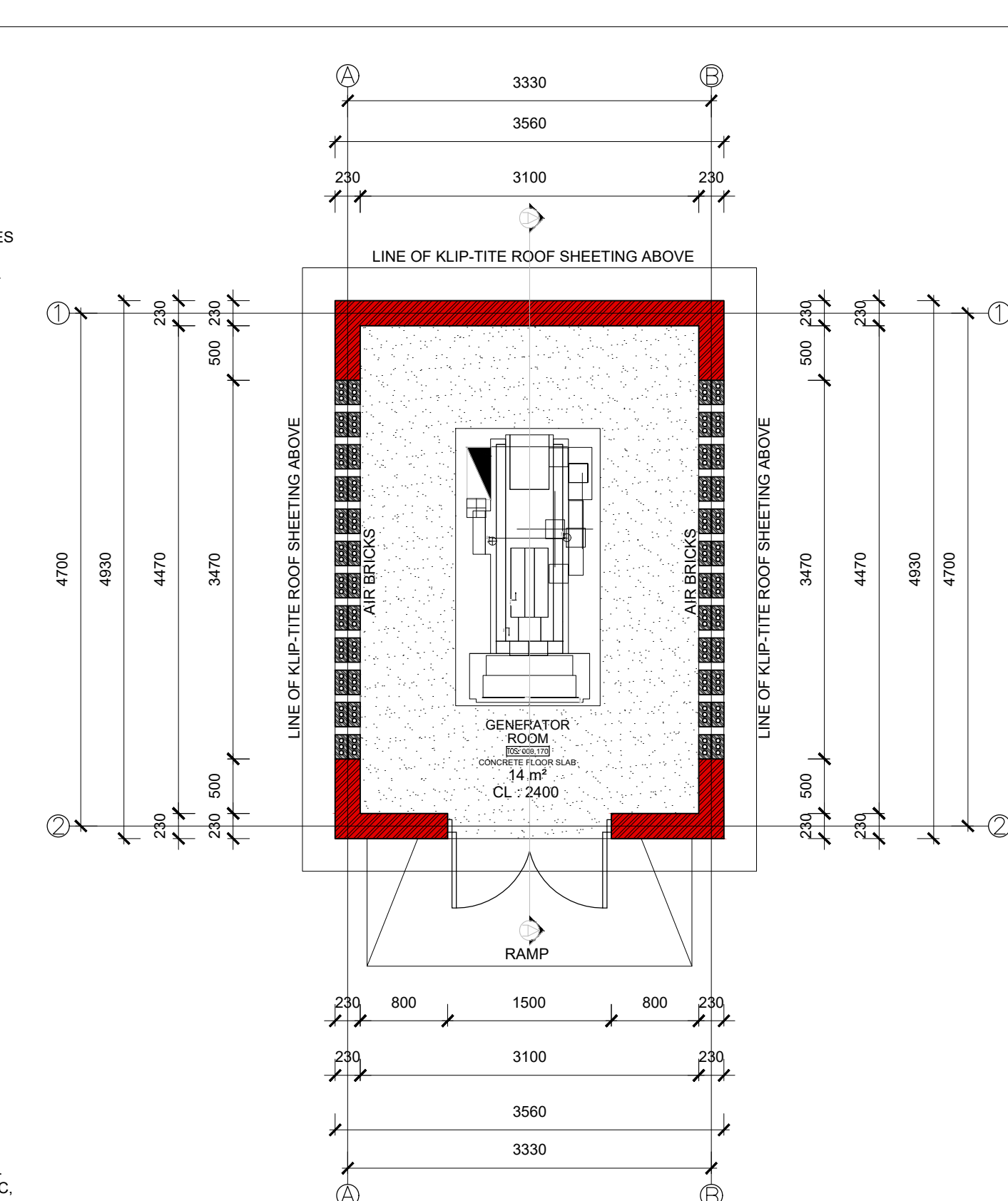
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



NORTH ELEVATION: GENERATOR ROOM

SCALE : 1:50

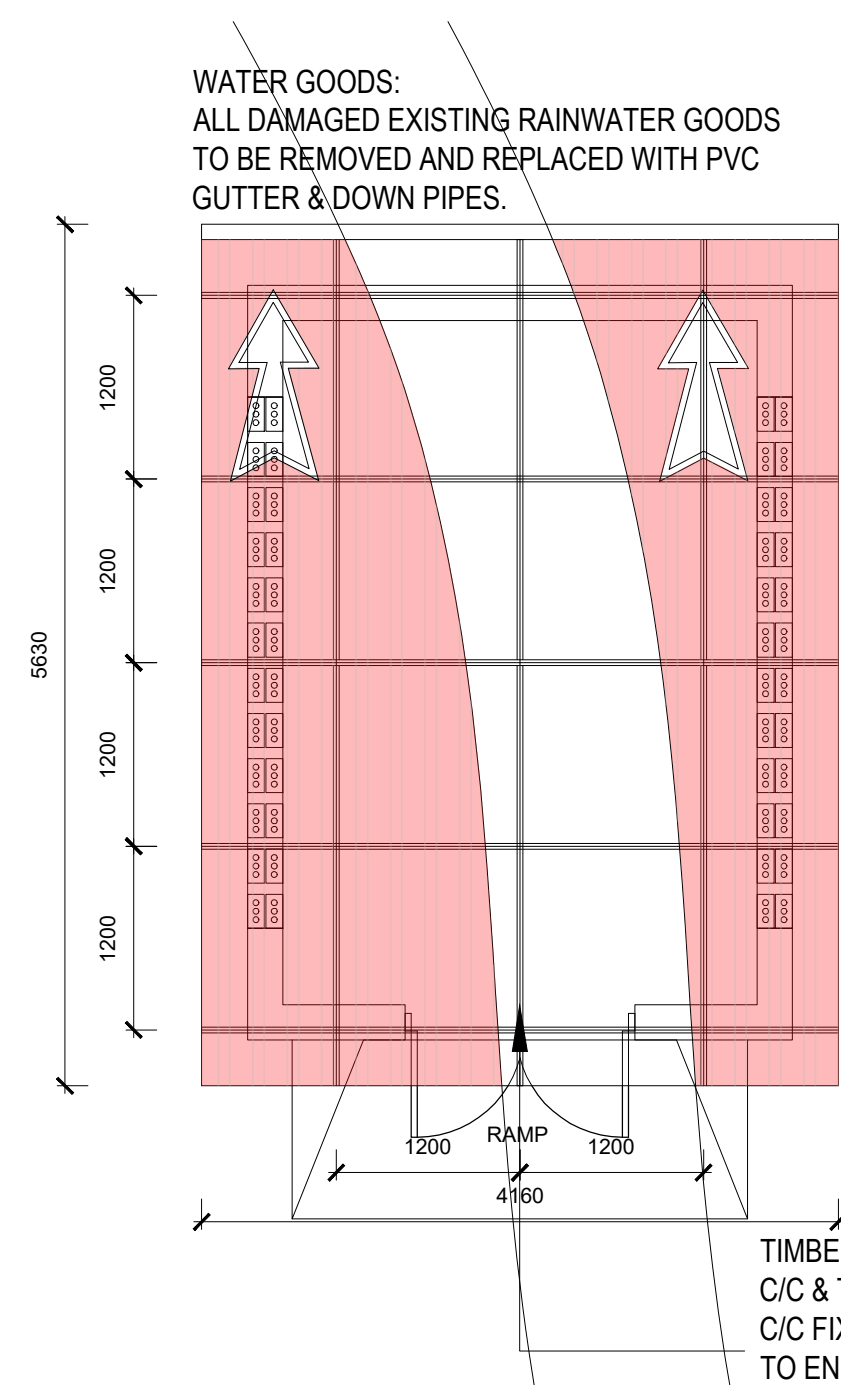
NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



FLOOR PLAN: GENERATOR ROOM

SCALE : 1:50

NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400



ROOF PLAN: GENERATOR ROOM

SCALE : 1:50

NOTES IN RESPECT OF S.A. STANDARD CODE OF PRACTICE FOR THE APPLICATION OF THE NATIONAL BUILDING REGULATIONS, SANS 10400

ROOF:
700mm COVER KLIP-TITE™ PROFILE ROLL-FORMED IN CONTINUOUS LENGTHS FROM 0.53mm THICKULTIMA® AZ200 SPELTER G550 COLORPLUS THUNDERSTORM FINISH TOPCOAT AND COOL GREY BACKING COAT ROOF SHEETING, FIXED TO STEEL INTERMEDIATE PURLINS AT MAX 2300mm CENTRES AND EAVES AND RIDGE PURLINS AT MAX 1900mm CENTRE (FINAL SPACING TO BE CALCULATED BY ENGINEER) USING KL700 PLUS CLIPS FIXED WITH 10No.16 x 16mm LONG SELF-DRILLING WATER HEAD PH2 SCREWS, No. 3 DRILL POINT FASTENERS (FASTENER LENGTHS MAY VARY DEPENDING ON THE INSULATION USED OR REQUIREMENTS, ALL FOLLOWING THE MANUFACTURE'S SPECIFICATIONS BY A GRS APPROVED CONTRACTOR.

GENERAL NOTES:

1. ALL WORK DONE UNDER THIS CONTRACT MUST COMPLY WITH THE FOLLOWING: THE NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT No. 193 OF 1997 AND SANS 10400 AS AMENDED.
2. CONTRACTOR IS RESPONSIBLE FOR CORRECT SETTING OUT OF THE NEW BUILDING ADDITIONS, ALL EXTERNAL & INTERNAL WALLS WITH PARTICULAR REFERENCE TO BOUNDARIES.
3. CONTRACTOR TO LOCATE & IDENTIFY EXISTING SERVICES ON SITE & TO PROTECT THESE FROM DAMAGE THROUGHOUT THE DURATION OF WORKS.
4. CONTRACTOR TO USE FIGURED DIMENSIONS & NOT TO SCALE OF DRAWINGS.
5. ALL ENTRANCE LEVELS ARE DERIVED BY USING LOCAL AUTHORITIES FORMULA.
6. UNLESS OTHERWISE STATED, ANY PRODUCTS SPECIFIED BY TRADE NAME ARE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND/OR INSTRUCTIONS.
7. ALL DISCREPANCIES TO BE BROUGHT TO THE PROJECT MANAGER'S NOTICE IMMEDIATELY. ALL QUERIES ARE TO BE CONVEYED TO CONSULTANTS VIA PROJECT MANAGER.

GENERAL:

1. ALL SLABS, FOUNDATIONS AND STRUCTURAL STEEL TO BE TO ENGINEER'S DETAILS.
2. PREMISES TO BE RENDERED RODENT PROOF IN ACCORDANCE WITH THE N.B.R. REGULATIONS.
3. 300mm SPLASHBACKS TO BE PROVIDED TO ALL WHB'S AND SINKS.
4. NO FOOD PREPARATION TO TAKE PLACE IN TEA KITCHENS.
5. REFUSE AREA TO BE USED FOR PUTRESABLE REFUSE ONLY.
6. ALL BANKS TO BE CUT AT MAX. 70° & TO ENGINEER'S SPEC.
7. ALL WORK TO BE IN ACCORDANCE WITH THE NATIONAL BUILDING REGULATIONS SANS 10400. ALL LEVELS AND DIMENSIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

ALL GLAZING TO COMPLY WITH PART NN2 AND NN3 OF SANS 10400.

BALUSTRADES, HANDRAILS, HEIGHTS AND OPENINGS TO COMPLY WITH PARTS MM3 AND DD2.4 OF SANS 10400. STAIRS TO BE MAX 200mm RISER MIN 250mm TREAD

BALUSTRADES 1.0m HIGH WITH NO GAP MORE THAN 100mm

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS

ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS

THIS DRAWING TO BE READ IN CONJUNCTION WITH FITTING / FINISHES SCHEDULE AND ANY DISCREPANCIES FOUND TO BE REPORTED TO THE OFFICE OF THE ARCHITECT IMMEDIATELY AND PRIOR TO PLACING OF ORDERS / MANUFACTURE .

EXCAVATIONS:

1. ALL LEVELS ARE AS SHOWN ON THE DRAWINGS. GENERAL EXCAVATION WORK INCLUDING CUT AND FILL TO BE CARRIED OUT TO ENGINEER'S DETAIL.
2. TRENCHES FOR FOUNDATIONS SHALL BE EXCAVATED TO FIRM NATURAL GROUND AND SHALL BE TO ENGINEER'S APPROVAL.
3. THE FULL EXTENT OF THE AREA OF NEW BUILDING WORK, REMOVE TOP SOIL TO A MAXIMUM DEPTH OF 300mm AS REQUIRED AND SET ASIDE FOR LATER USE.
4. TRENCHES FOR ALL PIPES, DRAINS, CABLES, ETC. SHALL BE EXCAVATED TO A MINIMUM DEPTH OF 450mm BELOW FINISHED GROUND LEVEL.

FLOOR:

1. FILLING UNDER CONCRETE SURFACE BEDS, WHERE APPLICABLE, AND/OR PAVING SHALL CONSIST OF EARTH, SAND OR OTHER ACCEPTABLE MATERIAL FREE OF ORGANIC MATTER, WELL RAMMED AND WATERED IN LAYERS TO ENGINEER'S SPECIFICATIONS.
2. ANT POISONING OF SUB-SURFACE BED FILL SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY AND SHALL BE GUARANTEED FOR 10 YEARS AND IS TO BE PROVIDED PRIOR TO APPLICATION FOR LOCAL AUTHORITY APPROVAL.
3. CONCRETE TOP SURFACE BED AND SLABS SHALL BE TO ENG. DETAIL AND SHALL BE WOODFLOATED/POWERFLOATED WHERE APPLICABLE TO TAKE SPECIFIED FINISH, STEPPED DOWN AT THRESHOLDS AND LAID ON 250micron BLACK POLYTHENE SHEETING LAID IN THE WIDEST PRACTICAL WIDTHS TURNED UP AND DRESSED INTO EXTERNAL WALLS UNDER BRICKGRIP DPC.

PART U (REFUSE DISPOSAL):

1. REFUSE ARE TO BE CONSTRUCTED AND PROVIDED WITH HOSE BIBTAP AND GULLEY / UNIT.

WALLS:

1. RETAINING WALLS AND ASSOCIATED WATERPROOFING SHALL BE ENGINEER'S DETAIL.
2. EMBOSSED 375micron BRICKGRIP DPC SHALL BE PLACED IN ALL WALLS AT A MINIMUM HEIGHT OF 150mm ABOVE GROUND LEVEL AND UNDER CILLS LAID TO FULL WIDTH AND LAPPED AT ENDS, ANGLES AND JUNCTIONS BY A MINIMUM 100mm.
3. ALL BRICKWORK TO BE PLUMB AND TRUE, CORRECTLY BONDED AT LEAST 200mm EXTERNAL AND 100mm INTERNAL.
4. ROOF MEMBERS TO BE SECURELY ANCHORED TO RC/STEEL COLUMNS TO ENGINEER'S DETAIL.
5. EXTERNAL WALLS TO BE FACEBRICK
6. WINDOW SILLS TO MATCH EXISTING

ROOFS:

1. NEW ROOF SHEETING ON NEW TIMBER TRUSSES / RAFTERS TO ENGINEERS DESIGN

PLASTERING:

1. INTERNAL PLASTER SHALL BE 4 PARTS SAND AND 1 PART CEMENT, STEEL FLOATED

WINDOWS / DOORS:

1. WINDOWS TO BE POWDERCOATED ALUMINIUM AND SHALL BE OTHERWISE IN ACCORDANCE WITH THE WINDOW SCHEDULE
2. ALL GLASS TO BE FREE FROM DEFECTS, WHERE APPLICABLE SET IN PUTTY, AND SPRIGGED WHERE NECESSARY, OR FIXED IN ACCORDANCE WITH THE SUB-CONTRACTORS APPROVED FIXING SYSTEM.
3. THE MINIMUM GLASS THICKNESS SHALL BE AS FOLLOWS:
DOORS: 6.5mm LAMINATED SAFETY GLASS, 6.0mm FOR LESS THAN 1m WINDOWS, 3mm FOR AREAS LESS THAN 0.75m, 4mm FOR AREAS LESS THAN 1.5m AND 6mm FOR AREAS MORE THAN 1.5m. NOTE: UNLESS PROTECTED, WINDOWS LOWER THAN 300mm ABOVE FFL SHALL BE GLAZED AS DOORS ABOVE ALL GLAZING TO COMPLY WITH PART N

PART S (FACILITIES FOR DISABLED PERSONS):

1. RAMPS TO COMPLY WITH SS2.
2. ALL PARKING BAYS/ TO BE PROVIDED IN COMPLIANCE WITH SS8.
3. ALL SIGNAGE TO COMPLY WITH SS9.

ALL QUANTITIES TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PLACING ORDERS. ALL FITTINGS TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS

THIS DRAWING TO BE READ IN CONJUNCTION WITH FITTING / FINISHES SCHEDULE AND ANY DISCREPANCIES FOUND TO BE REPORTED TO THE OFFICE OF THE ARCHITECT IMMEDIATELY AND PRIOR TO PLACING OF ORDERS / MANUFACTURE .

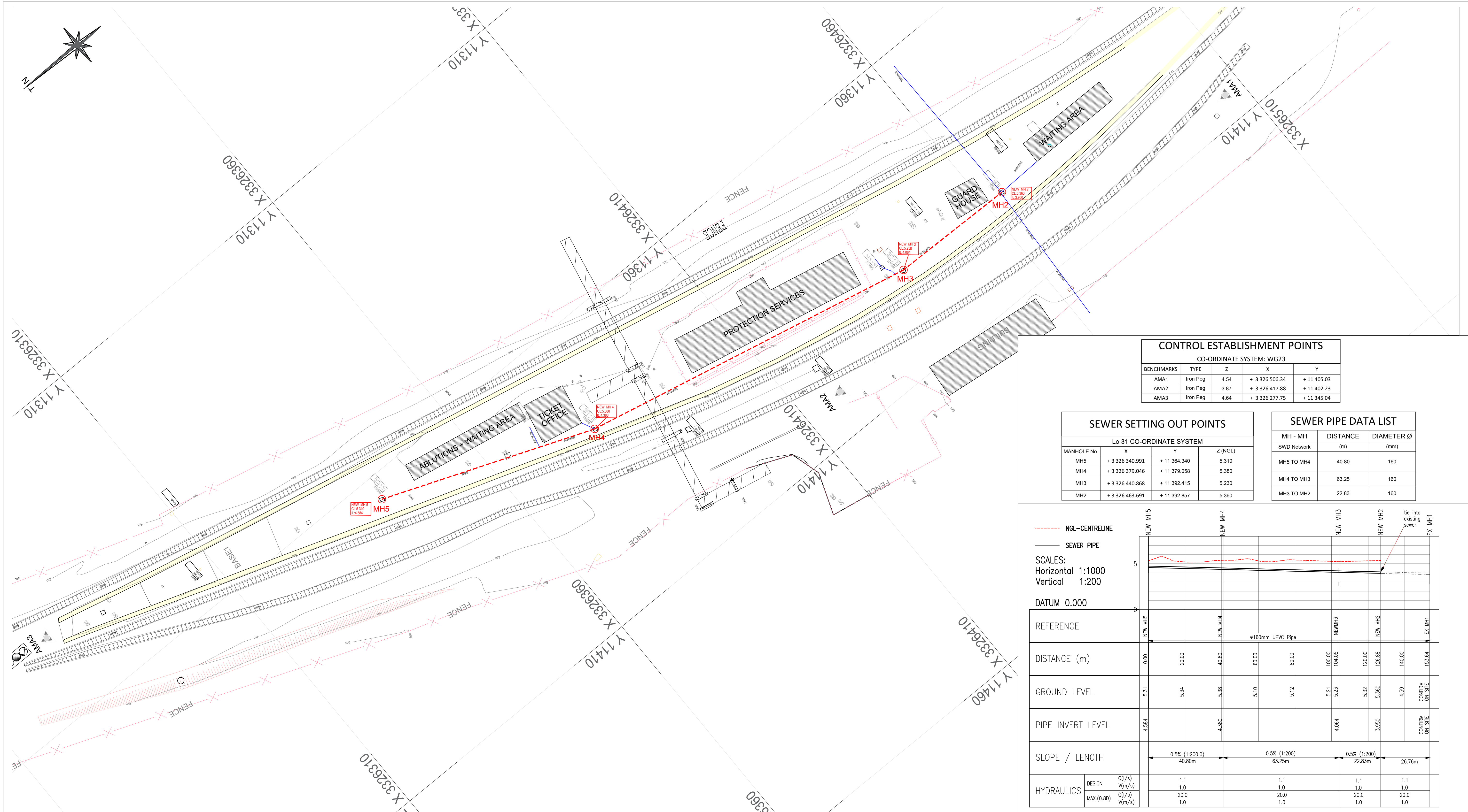
ISSUED FOR INFORMATION

GENERAL NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
2. ALL DIMENSIONS AND HEIGHTS ARE TO BE CHECK ON SITE BEFORE WORK PUT ON HAND.
3. REPORT DISCREPANCIES TO ARCHITECT OR ENGINEER.
4. THIS DRAWING MUST NOT BE USED TO SCALE OFF. USE ONLY WRITTEN DIMENSIONS. CONTACT THE ENGINEER OR ARCHITECT WHERE CLARITY IS SOUGHT.
5. FOR SETTING OUT DATA, SETTING OUT POINTS AND DATUM LEVELS REFER TO SURVEY INFORMATION AND ARCHITECT'S DRAWINGS.
6. STRUCTURAL WORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND THE RELEVANT S.A.N.S. SPECIFICATIONS. ALL CONCRETE WORKS IS TO BE DONE IN ACCORDANCE WITH S.A.N.S 1200G AND EARTHWORKS IS ACCORDANCE WITH S.A.N.S 1200D.
7. CONSULT RELEVANT ARCHITECTS', MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWDPs AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

DRAWING NO.	REFERENCE
1040-003-05-0001	SITE DEVELOPMENT PLAN
1040-003-05-0002	STRUCTURAL WORKS
1040-003-05-0003	ELECTRICAL WORKS
1040-003-05-0004	MECHANICAL WORKS
1040-003-05-0005	PLUMBING WORKS
1040-003-05-0006	LANDSCAPE ARCHITECTURE
1040-003-05-0007	ENVIRONMENTAL ENGINEERING
1040-003-05-0008	ARCHITECTURAL WORKS
1040-003-05-0009	CONSTRUCTION WORKS
1040-003-05-0010	FINISHES WORKS
1040-003-05-0011	PAVING WORKS
1040-003-05-0012	ROOFING WORKS
1040-003-05-0013	WATERWORKS
1040-003-05-0014	SEWERAGE WORKS
1040-003-05-0015	STORMWATER WORKS
1040-003-05-0016	LANDSCAPE LIGHTING
1040-003-05-0017	LANDSCAPE FURNITURE
1040-003-05-0018	LANDSCAPE PLANTING
1040-003-05-0019	LANDSCAPE MAINTENANCE
1040-003-05-0020	LANDSCAPE DESIGN
1040-003-05-0021	LANDSCAPE CONSTRUCTION
1040-003-05-0022	LANDSCAPE FINISHES
1040-003-05-0023	LANDSCAPE PAVING
1040-003-05-0024	LANDSCAPE ROOFING
1040-003-05-0025	LANDSCAPE WATERWORKS
1040-003-05-0026	LANDSCAPE SEWERAGE
1040-003-05-0027	LANDSCAPE STORMWATER
1040-003-05-0028	LANDSCAPE LIGHTING
1040-003-05-0029	LANDSCAPE FURNITURE
1040-003-05-0030	LANDSCAPE PLANTING
1040-003-05-0031	LANDSCAPE MAINTENANCE
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1040-003-05-0034	LANDSCAPE FINISHES
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1040-003-05-0036	LANDSCAPE ROOFING
1040-003-05-0037	LANDSCAPE WATERWORKS
1040-003-05-0038	LANDSCAPE SEWERAGE
1040-003-05-0039	LANDSCAPE STORMWATER
1040-003-05-0040	LANDSCAPE LIGHTING
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1040-003-05-0042	LANDSCAPE PLANTING
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1040-003-05-0171	LANDSCAPE STORMWATER
1040-003-05-0172	LANDSCAPE LIGHTING
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1040-003-05-0174	LANDSCAPE PLANTING
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1040-003-05-0200	LANDSCAPE DESIGN

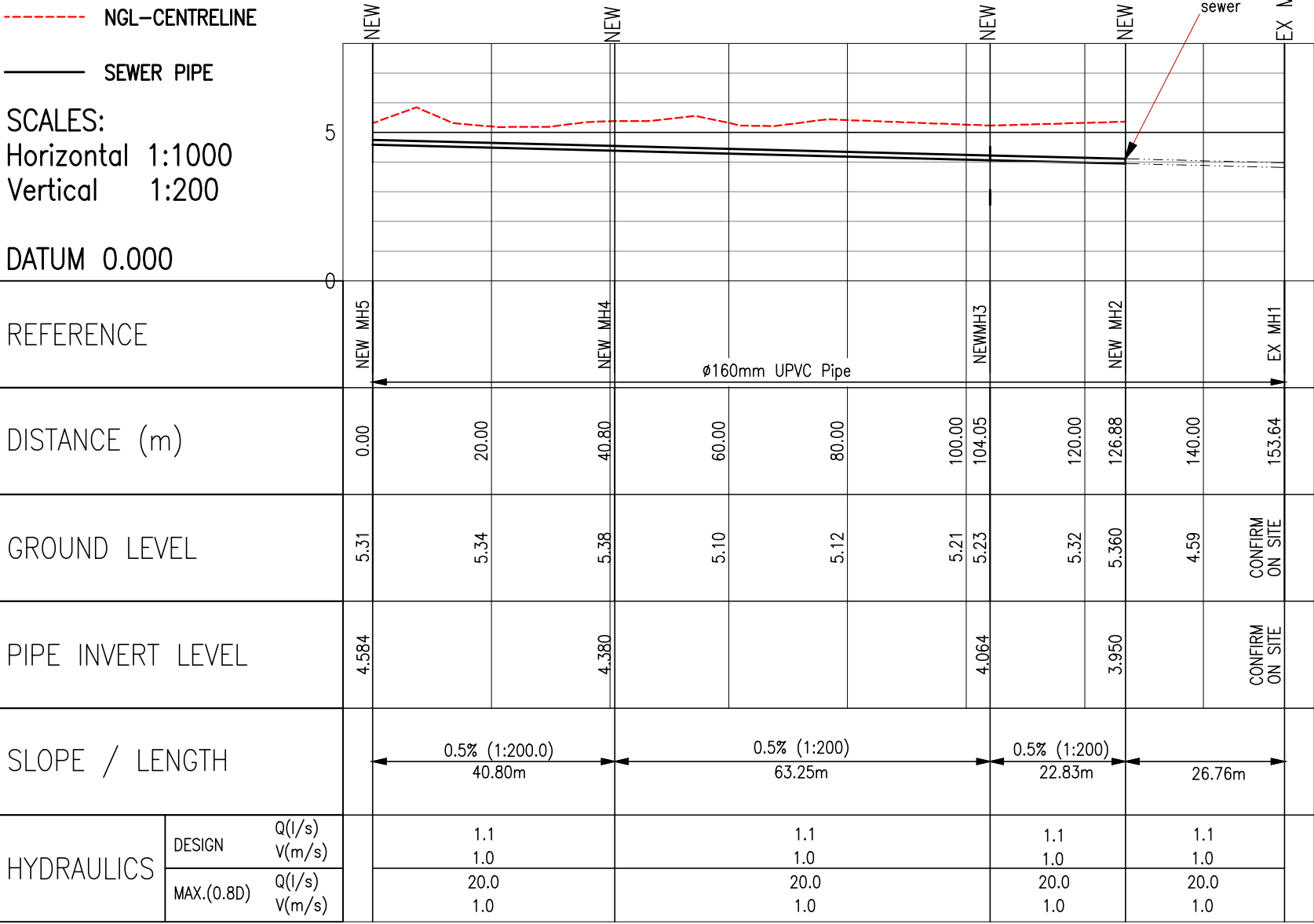
REFERENCE DRAWINGS



CONTROL ESTABLISHMENT POINTS				
CO-ORDINATE SYSTEM: WG23				
BENCHMARKS	TYPE	Z	X	Y
AMA1	Iron Peg	4.54	+ 3 326 506.34	+ 11 405.03
AMA2	Iron Peg	3.87	+ 3 326 417.88	+ 11 402.23
AMA3	Iron Peg	4.64	+ 3 326 277.75	+ 11 345.04

SEWER SETTING OUT POINTS			
Lo 31 CO-ORDINATE SYSTEM			
MANHOLE No.	X	Y	Z (NGL)
MH5	+ 3 326 340.991	+ 11 364.340	5.310
MH4	+ 3 326 379.046	+ 11 379.058	5.380
MH3	+ 3 326 440.868	+ 11 392.415	5.230
MH2	+ 3 326 463.691	+ 11 392.857	5.360

SEWER PIPE DATA LIST		
MH - MH	DISTANCE	DIAMETER Ø
SWD Network	(m)	(mm)
MH5 TO MH4	40.80	160
MH4 TO MH3	63.25	160
MH3 TO MH2	22.83	160



LEGEND:

- EXISTING SEWER LINE
- EXISTING SEWER MANHOLES
- SURVEYOR SETTING OUT BENCHMARKS
- EXISTING PALLISADE FENCE
- EXISTING RAILWAY
- PROPOSED SEWER LINE
- PROPOSED SEWER MANHOLE

REFERENCE DRAWINGS	
1040-002-05-1002	SEWER TRENCHING DETAIL
1040-002-05-1001	SEWER MANHOLE DETAILS
DRAWING NO.	REFERENCE

REVISIONS / ISSUE AUTHORIZATION					
1	ISSUED FOR TENDER	ZD	SH	SH	12-05-2023
NO.	DESCRIPTION	BY	CHKD	APPD	DATE

CLIENT		
TITLE	NAME	DATE

MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	Z. DLAMINI	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.	S. HERBSTEIN	
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	S. HERBSTEIN	DATE
SIGNATURE		
REG. NUMBER	Pr.Eng 20070285	



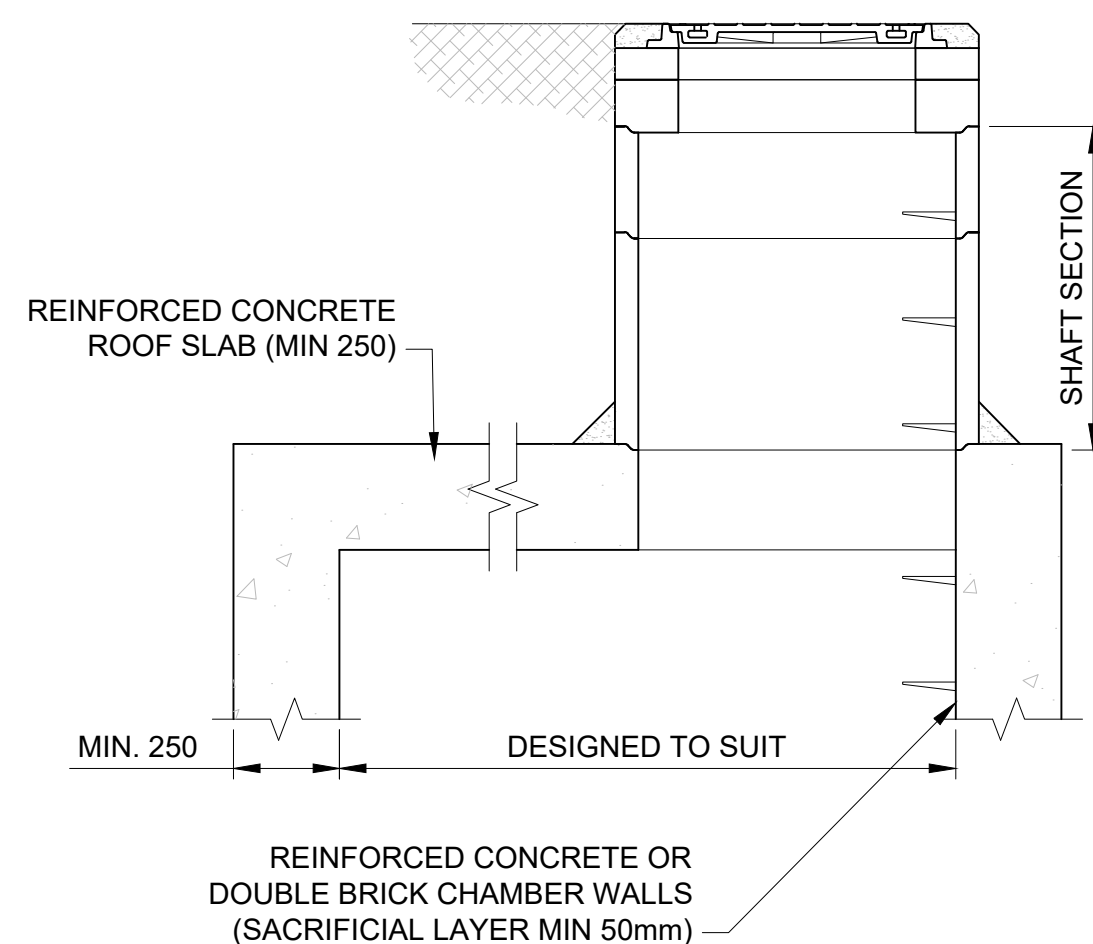
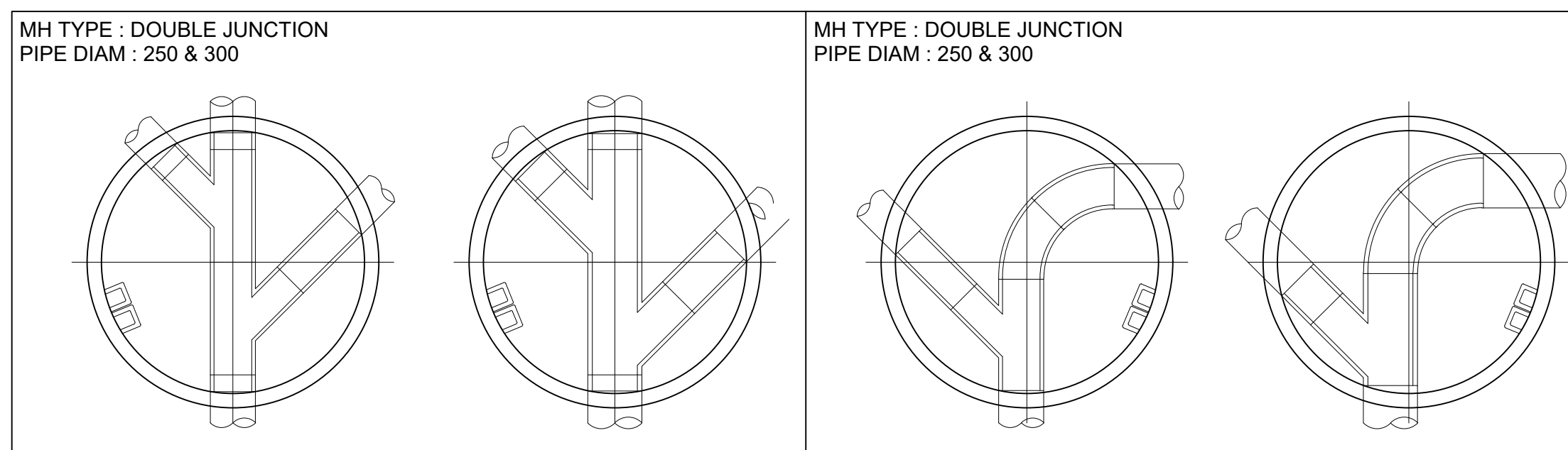
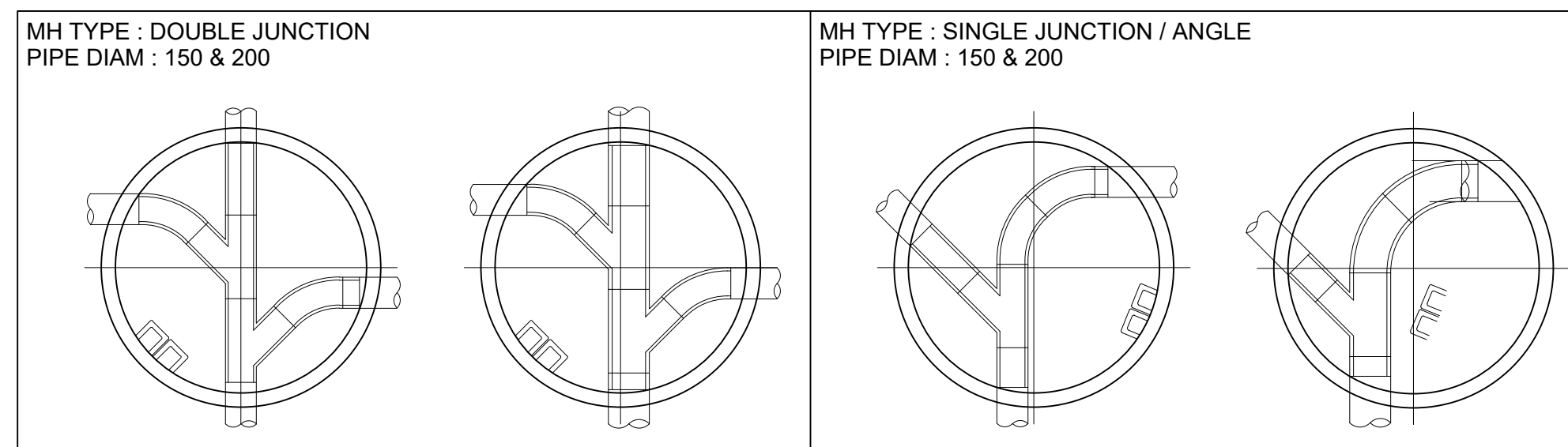
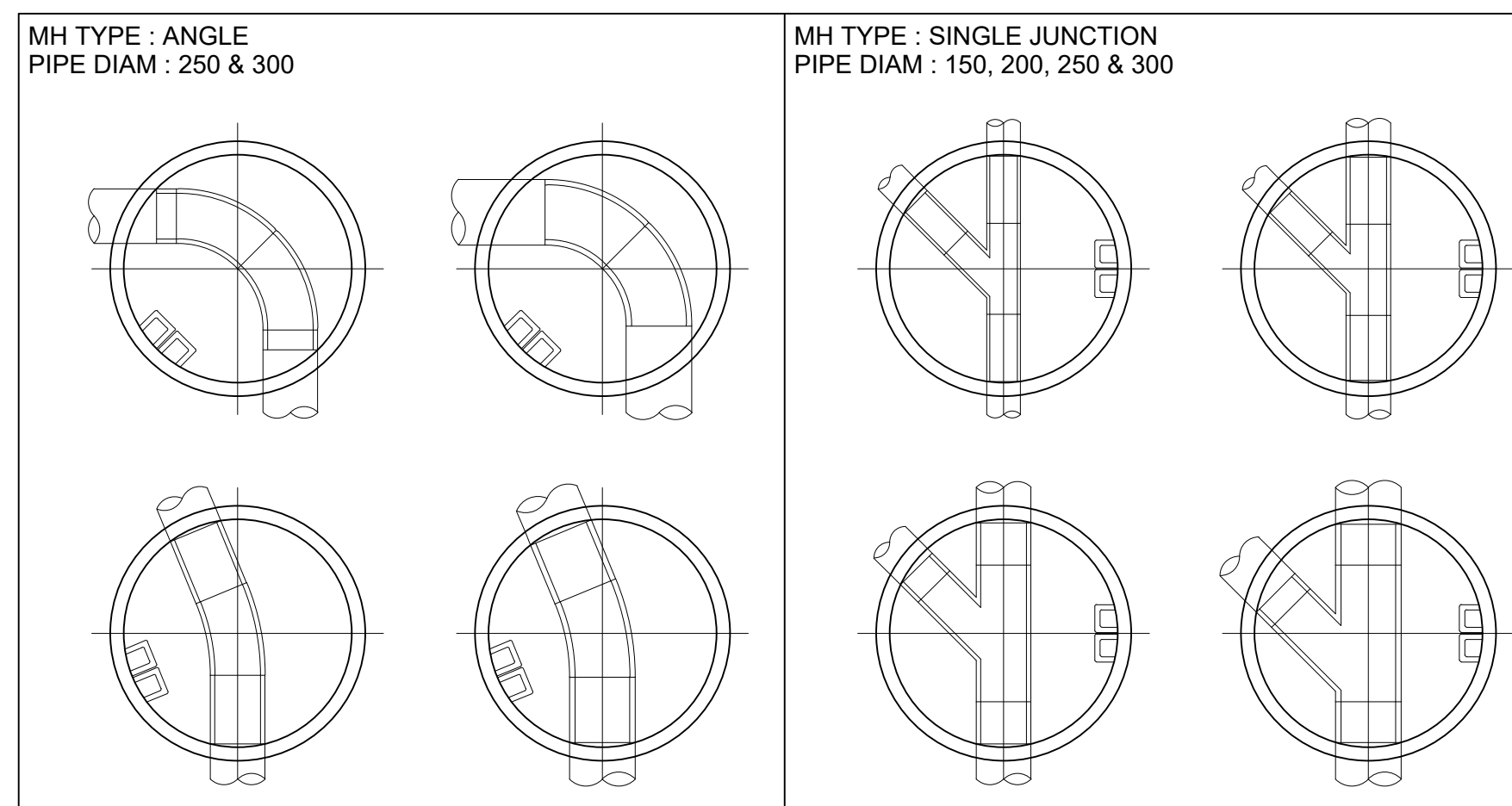
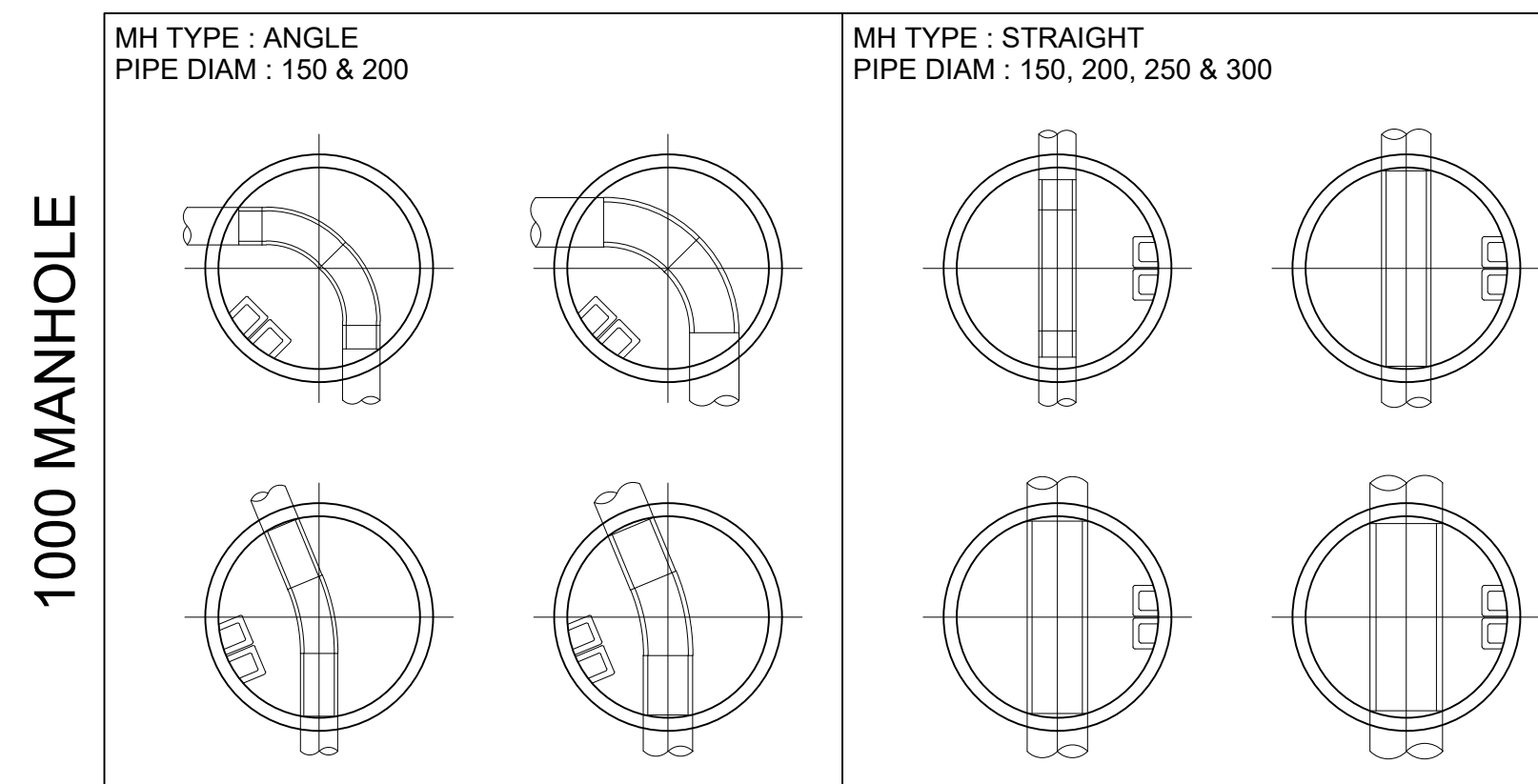
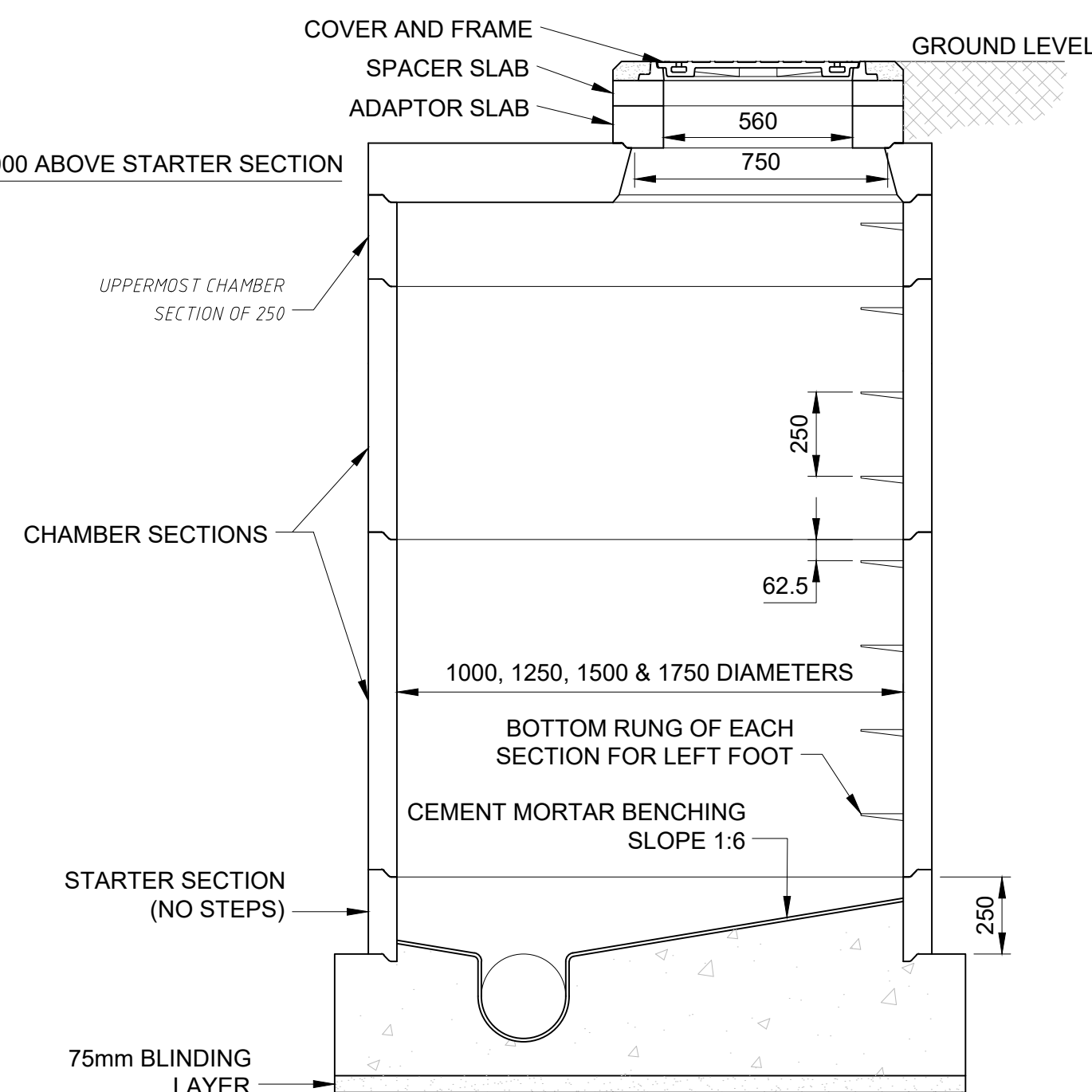
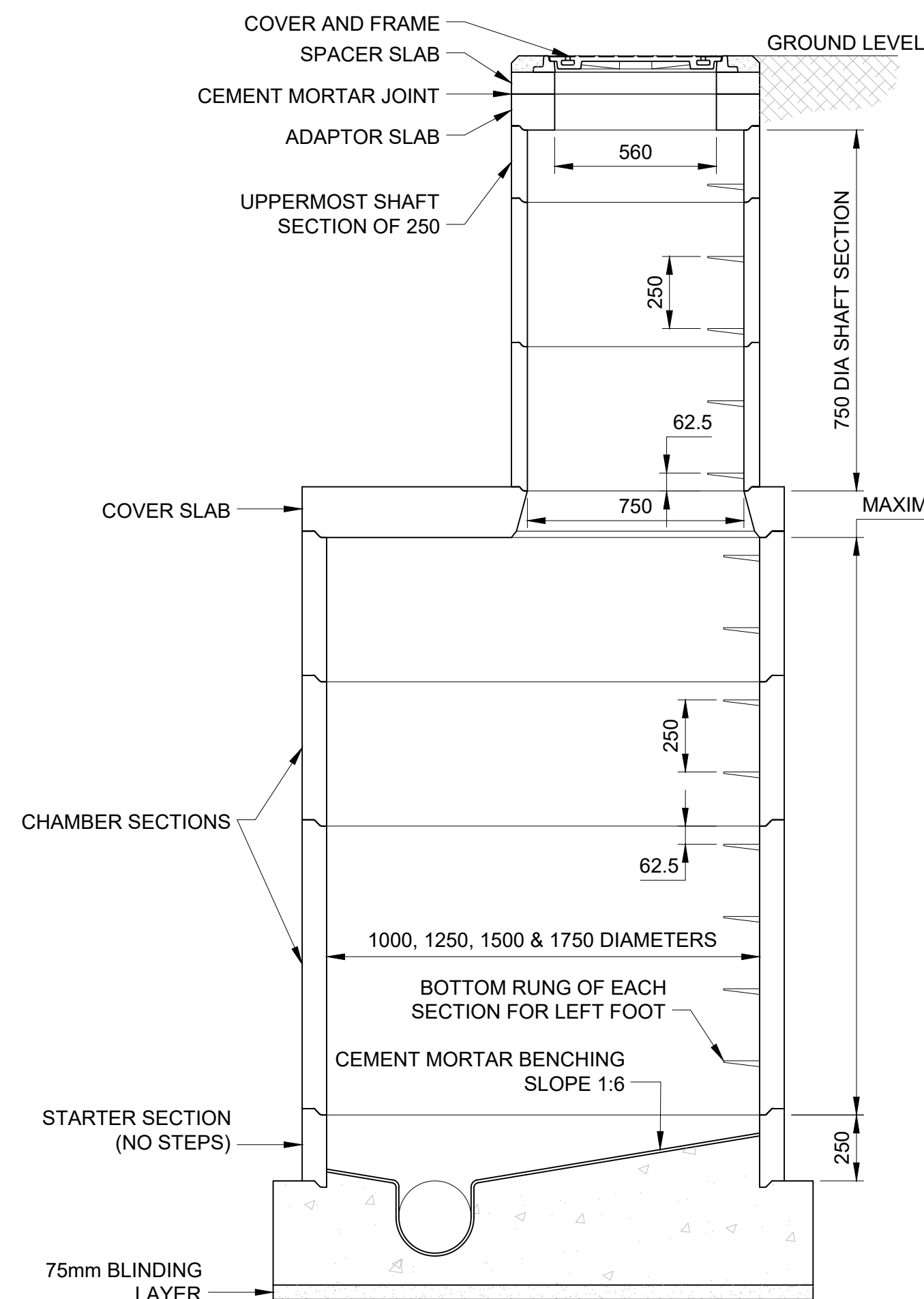
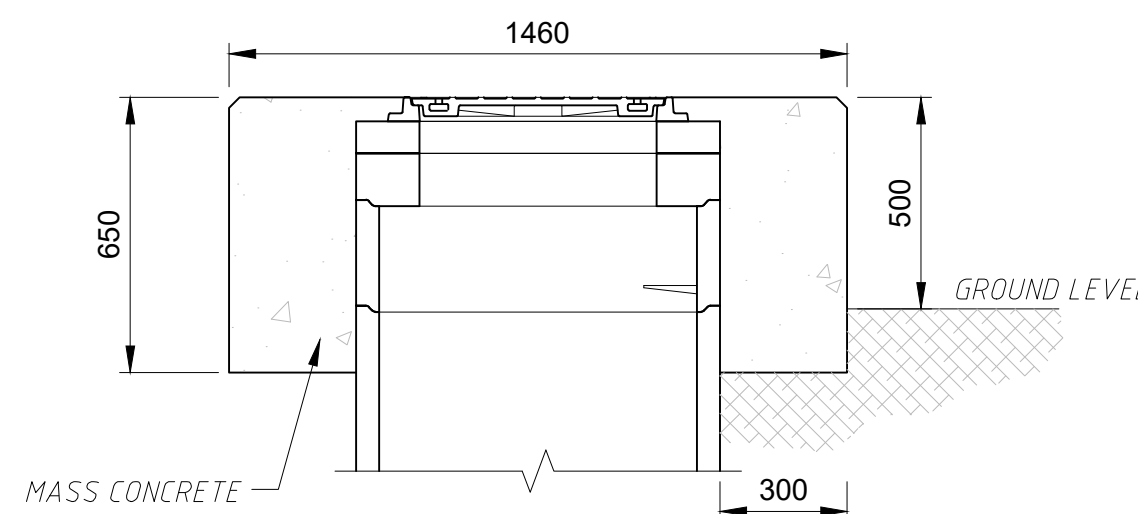
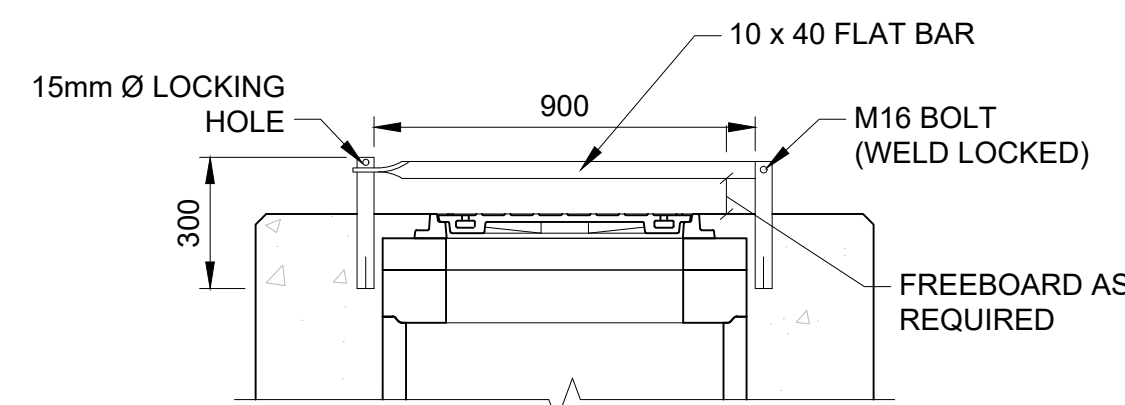
LODEMANN
EST. 2015

SOUTH COAST CORRIDOR - STATIONS IMPROVEMENT PROGRAMME
AMANZIMTOTI STATION

SITE AND SEWER LAYOUT

SCALE	DATE	Drawing number	CLIENT Drawing number	Rev.	Sheet size	Status
1:300	14-03-23	1040-003-05-1000		1	A1	ISSUED FOR TENDER

- 1) PRE-CAST CONCRETE MANHOLES AND SLABS, THE INSTALLATION AND CONSTRUCTION THEREOF TO COMPLY WITH SABS1294 AND SABS1200LD.
- 2) THE UPPERMOST SECTION OF THE CHAMBER OR SHAFT TO BE A 250mm SECTION.
- 3) MANHOLE SHAFTS AND STEP IRONS ARE TO BE PLACED OVER THE LARGEST LANDING ON THE DOWNSTREAM SIDE.
- 4) HORIZONTAL SPACING OF STEPS TO BE 150mm (+/- 12 mm).
- 5) PIPE SECTIONS AND SLABS TO BE BEDDED ON A 2:1 CEMENT MORTAR GROUT TO FORM A COMPACTED WATER-TIGHT JOINT OF APPROXIMATELY 5mm THICK.
- 6) MAXIMUM PROTRUSION OF PIPES INTO MANHOLES TO BE 50mm.
- 7) ALL CHANNELS TO BE VITRIFIED CLAY.
- 8) FOR LARGER PIPE DIAMETERS, DEEP SEWERS AND CHANNEL LAYOUTS NOT FITTING INSIDE STANDARD PRECAST MANHOLE SECTIONS, THE ENGINEER SHALL DESIGN A CHAMBER TO SUIT THE CONDITIONS.
- 9) COVERS AND FRAMES AS PER SABS558, OR SIMILAR APPROVED.
- 10) COVERS AND FRAMES TO BE INSTALLED (OR SIMILAR APPROVED) :
IN ROADS : TYPE 1A OR 2A.
OTHER AREAS : TYPES 1B, 4, 4A OR 6
- 11) IN ROADS, PAVED AREAS OR PEDESTRIAN WALKWAYS, THE TOP OF THE MANHOLE COVER SHALL BE AT THE SAME LEVEL AS THE FINISHED LEVEL OF THE SURROUNDING AREA.
- 12) THE COVER OF MANHOLES IN UNDEVELOPED AREAS OR MAHOLES ON OUTFALL SEWERS MUST BE +/- 500mm ABOVE NATURAL GROUND LEVEL.
- 13) CONCRETE OR HINGED DUCTILE IRON COVERS MAY BE USED WITH APPROVAL FROM THE CLIENT.

[illegible]

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
2. ALL DIMENSIONS AND HEIGHTS ARE TO BE CHECK ON SITE BEFORE WORK PUT ON HAND.
3. REPORT DISCREPANCIES TO ARCHITECT OR ENGINEER.
4. THIS DRAWING MUST NOT BE USED TO SCALE OFF. USE ONLY WRITTEN DIMENSIONS. CONTACT THE ENGINEER OR ARCHITECT WHERE CLARITY IS SOUGHT.
5. FOR SETTING OUT DATA, SETTING OUT POINTS AND DATUM LEVELS REFER TO SURVEY INFORMATION AND ARCHITECT'S DRAWINGS.
6. STRUCTURAL WORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND THE RELEVANT S.A.N.S SPECIFICATIONS.
7. CONSULT RELEVANT ARCHITECTS, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWDPDS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

[illegible][illegible]

CLIENT		
TITLE	NAME	DATE

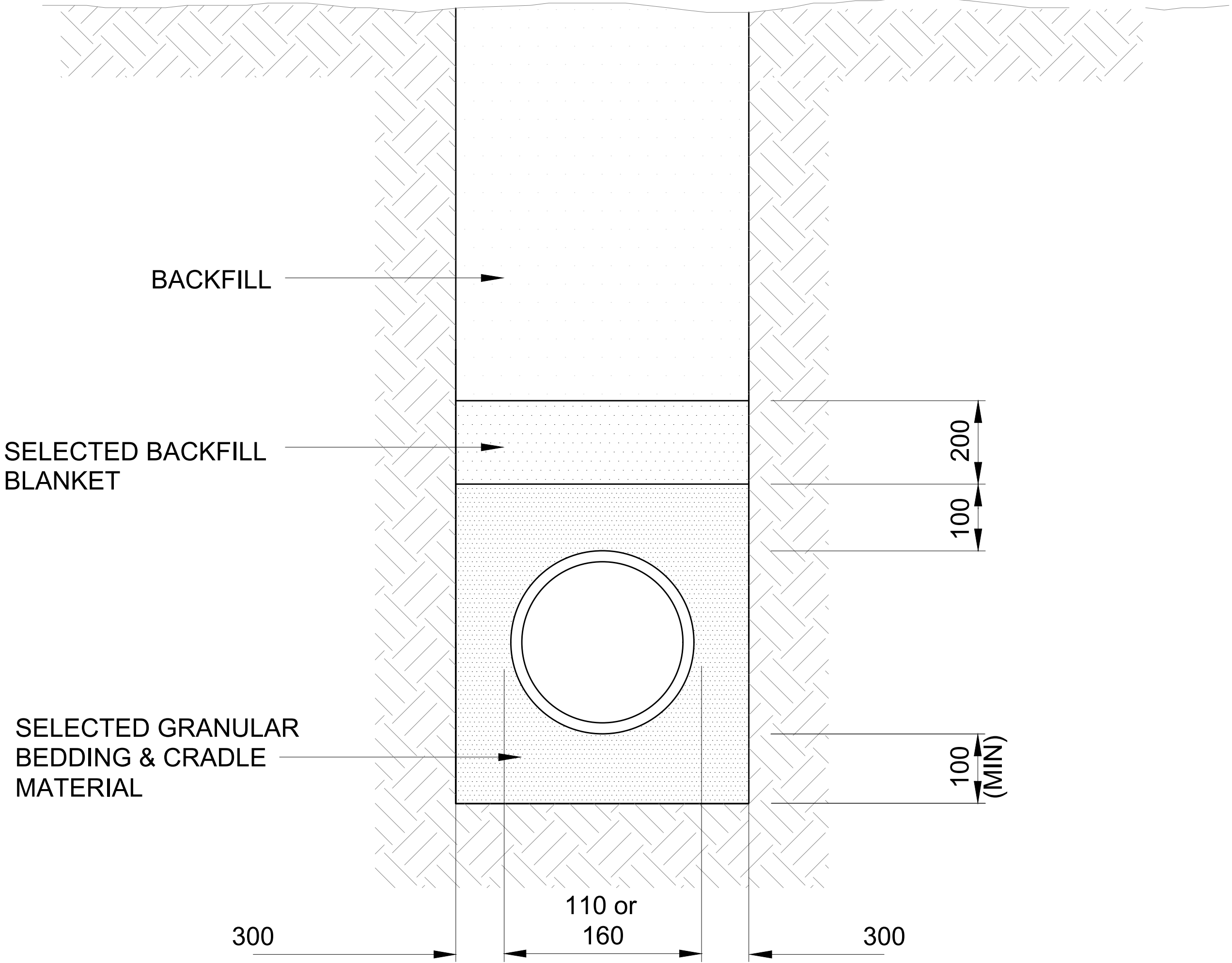
MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	Z. DLAMINI	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL ENG.	S. HERBSTSTEIN	
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	S. HERBSTSTEIN	DATE
SIGNATURE		
REG. NUMBER	Pr.Eng 20070285	



— EST. 201

LODEMAN

SCALE	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status.
N.T.S.	01-08-22	1040-003-05-1001		1	A1	ISSUED FOR TENDER



TYPICAL SECTION

BEDDING AND BACKFILL		
MATERIAL	DESCRIPTION	COMPACTION
BACKFILL	SABS 1200 DB CL 3.5	IN 150mm LAYERS 90% MOD AASHTO
SELECTED BACKFILL	SABS 1200 LB CL 5.3 b)	IN 150mm LAYERS 90% MOD AASHTO
SELECTED BEDDING	SABS 1200 LB CL 5.3 a)	90% MOD AASHTO DENSITY

- NOTES:
1. SOCKETS OF PIPES SHALL BE ACCOMMODATED WITHIN THE SELECTED GRANULAR BEDDING MATERIAL (SEE SABS 1200 CLAUSE 5.2.2)
 2. WHERE PIPE IS UNDER A ROAD BACKFILL BELOW ROAD FOUNDATION LAYERS SHALL COMPLY WITH-SABS 1200 DB CL 3.5 AND 5.7.2

SEWER PIPE BEDDING DETAILS

- GENERAL NOTES:
1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWINGS.
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 7. CONSULT RELEVANT ARCHITECT'S, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND DETAILS AS RELEVANT FOR DRAINAGE, STORMWATER OUTLET, RWDPS AND HOLES AND SLEEVES FOR THESE SERVICES. NO HOLES ARE TO BE CORED WITHOUT ENGINEERS WRITTEN APPROVAL.

1040-003-05-1001	SEWER MANHOLE DETAIL
1040-003-05-1000	SITE AND SEWER LAYOUT
DRAWING NO.	REFERENCE
REFERENCE DRAWINGS	

1	ISSUED FOR TENDER	ZD	SH	MM	12-05-2023		
NO.	DESCRIPTION	BY	CHKD	APPD	DATE		
REVISIONS / ISSUE AUTHORIZATION							
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CLIENT LOGO



CLIENT

TITLE	NAME	DATE

MAIN CONSULTANT

TITLE	NAME	DATE
DRAWN	Z. DLAMINI	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.		
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.	S. HERBSTEIN	
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	S. HERBSTEIN	DATE
SIGNATURE		
REG. NUMBER	Pr:Eng 20070285	

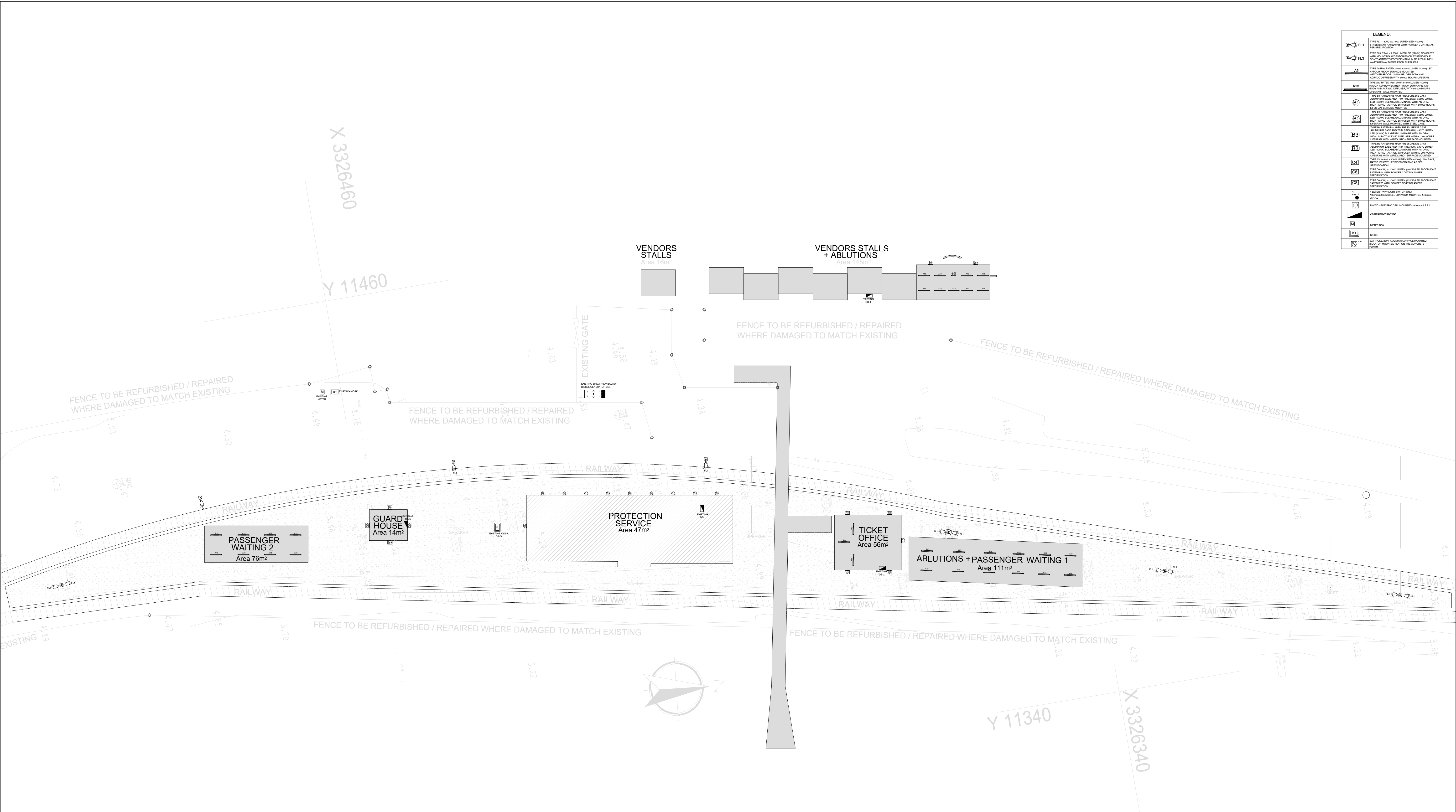


SOUTH COAST CORRIDOR - STATION IMPROVEMENT PROGRAMME

AMANZIMTOTI STATION

SEWER TRENCHING DETAILS

SCALE	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status.
N.T.S.	01-08-22	1040-003-05-1002		1	A1	ISSUED FOR TENDER



LEGEND:	
	TYPE FL1 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL2 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL3 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL4 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL5 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL6 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL7 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL8 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL9 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL10 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL11 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL12 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL13 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL14 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL15 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL16 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL17 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL18 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL19 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL20 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL21 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL22 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL23 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL24 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL25 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL26 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL27 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL28 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL29 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL30 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL31 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL32 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL33 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL34 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL35 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL36 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL37 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL38 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL39 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL40 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL41 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL42 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL43 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL44 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL45 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL46 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL47 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL48 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL49 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL50 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL51 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL52 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL53 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL54 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL55 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL56 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL57 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL58 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL59 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL60 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL61 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL62 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL63 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL64 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL65 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL66 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL67 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL68 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL69 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL70 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL71 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL72 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL73 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL74 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL75 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL76 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL77 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL78 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL79 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL80 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL81 - 100W - 127 DIM LUMEN LED HOBOD
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	TYPE FL83 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL84 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL85 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL86 - 100W - 127 DIM LUMEN LED HOBOD
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	TYPE FL88 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL89 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL90 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL91 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL92 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL93 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL94 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL95 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL96 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL97 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL98 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL99 - 100W - 127 DIM LUMEN LED HOBOD
	TYPE FL100 - 100W - 127 DIM LUMEN LED HOBOD

GENERAL NOTES:

- ELECTRICAL INSTALLATION TO COMPLY WITH SANS 10142-1 AS AMENDED.
- CONTRACTORS TO USE EXISTING CIRCUITING. CONTRACTORS TO RETAIN EXISTING CABLES AND CONDUCTORS WHERE APPLICABLE. NEW CABLE AND CONDUCTOR SHALL BE INSTALLED UPON ENGINEERS APPROVAL.
- CONTRACTORS TO REPLACE LIGHT FITTINGS AS PER SPECIFICATION.
- CONTRACTOR TO PROVIDE UNIVERSAL ELECTRICAL LOCK ON ALL KIOSK AND DB'S.

1040-003-05-3004	DB-4 SINGLE LINE DIAGRAM
1040-003-05-3001	KIOSK 1 SINGLE LINE DIAGRAM
1040-003-05-3001	ABLUTIONS & WAITING AREA LIGHTING LAYOUT
1040-003-05-3001	TICKET OFFICE & WAITING AREA LIGHTING LAYOUT
DRAWING NO.	REFERENCE
REFERENCE DRAWINGS	

1	ISSUED FOR TENDER	LM	TM	MM	10-03-2023
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
REVISIONS / ISSUE AUTHORIZATION					
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CLIENT LOGO

PASSENGER RAIL AGENCY OF SOUTH AFRICA

CLIENT		
TITLE	NAME	DATE

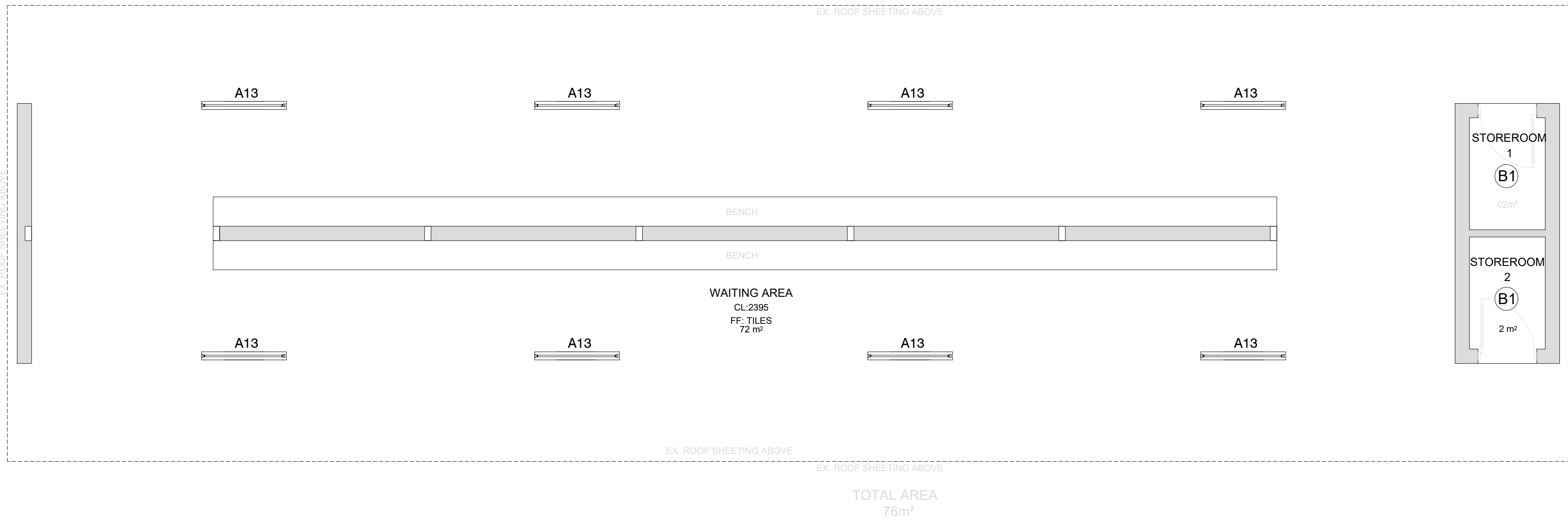
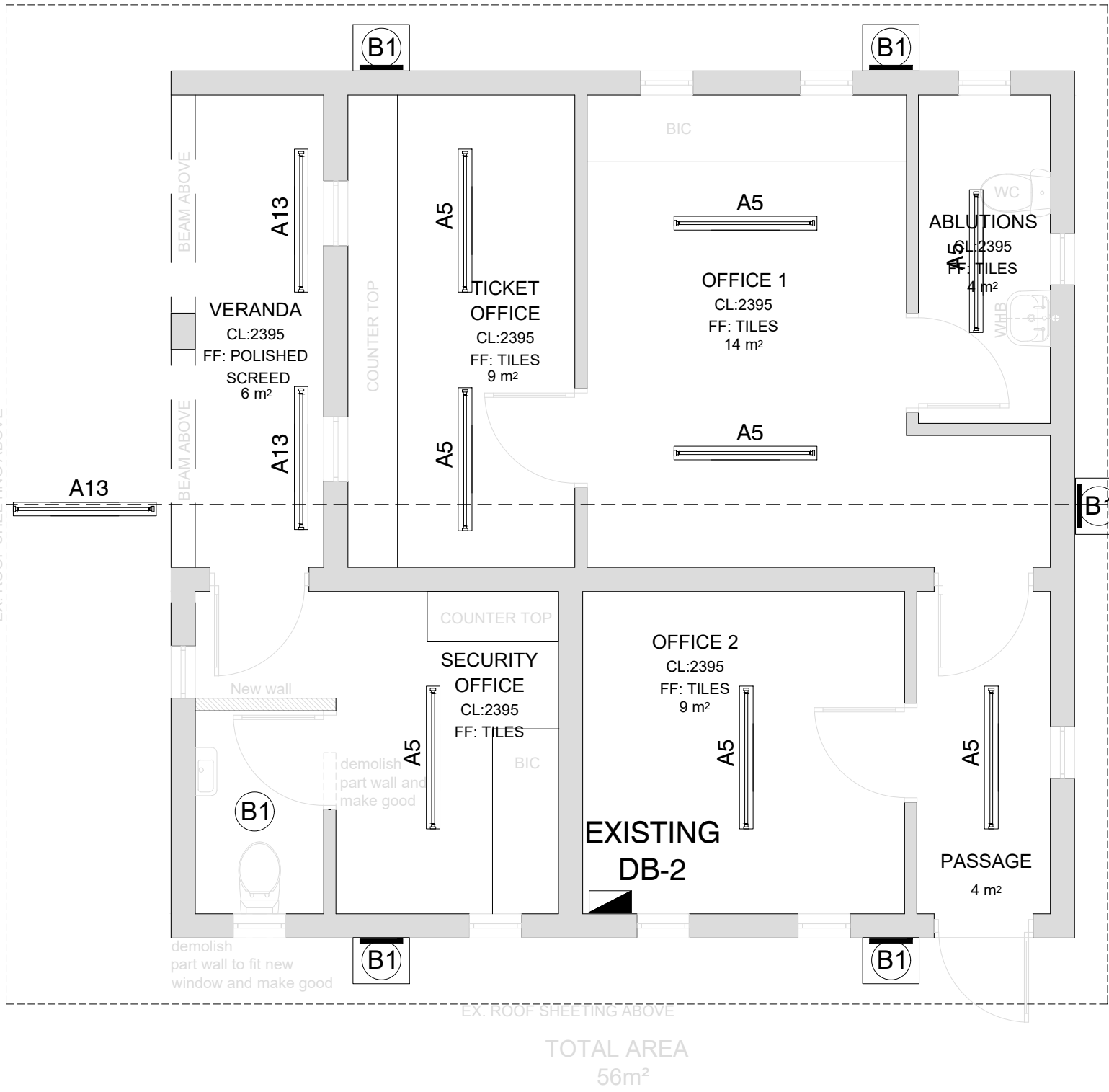
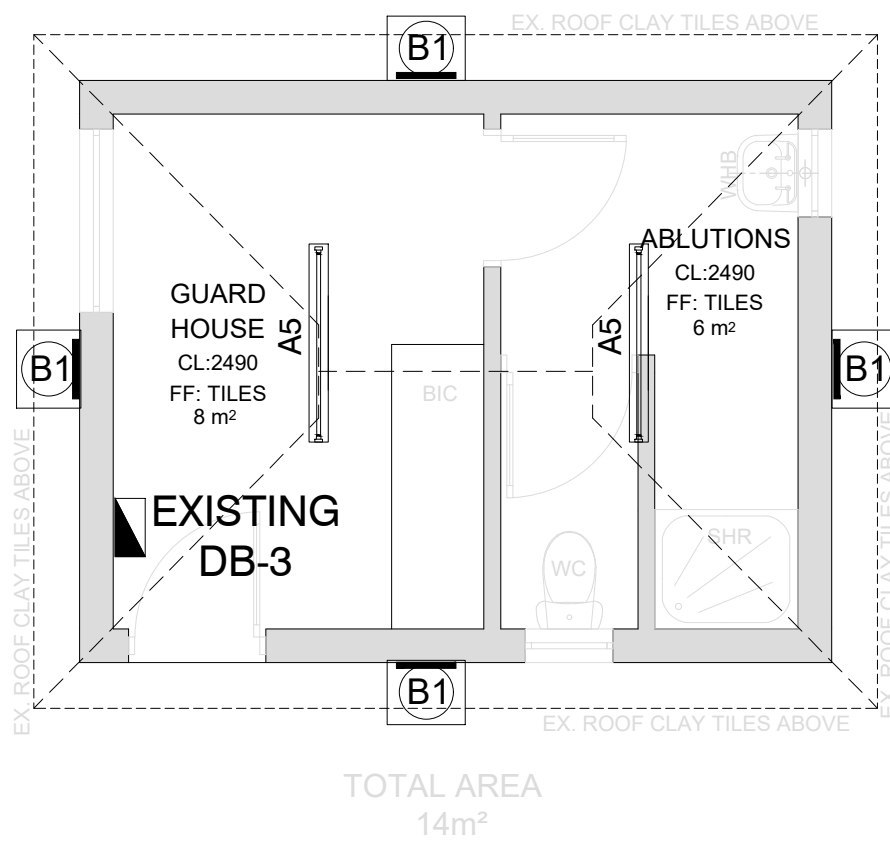
MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	L. MKHIZE	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.	M. MSOMI	
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	T. MBATHA	DATE
SIGNATURE		
REG. NUMBER	2019300645	

EST. 2015

SOUTH COAST CORRIDOR
STATION IMPROVEMENT PROGRAMME

AMAZIMTOTI STATION
GROUND STOREY PLANS: PLATFORMS LIGHTING LAYOUT

SCALE:	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status.
N.T.S	06-03-23	1040-003-05-3000		1	A1	ISSUED FOR TENDER



LEGEND:	
	TYPE FL1: 180W ±27 000 LUMEN LED (4000K) STREETLIGHT RATED IP66 WITH POWDER COATING AS PER SPECIFICATION
	TYPE FL3: 75W ±9 250 LUMEN LED (2700K) COMPLETE WITH MOUNTING ACCESSORIES ON EXISTING POLE. CONTRACTOR TO PROVIDE MINIMUM OF 8250 LUMEN. WATTAGE MAY DIFFER FROM SUPPLIERS.
	TYPE A5 IP65 RATED, 30W ±4440 LUMEN (4000K) LED VAPOUR PROOF SURFACE MOUNTED WEATHER-PROOF LUMINAIRE, GRP BODY AND ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN.
	TYPE A13 RATED IP65, 30W ±4440 LUMEN (4000K) ROUGH-GUARD WEATHER-PROOF LUMINAIRE, GRP BODY AND ACRYLIC DIFFUSER, WITH 50 000 HOURS LIFESPAN - WALL MOUNTED
	TYPE B1 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±2900 LUMEN LED (4000K) BULB-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN - SURFACE MOUNTED
	TYPE B1 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±2900 LUMEN LED (4000K) BULB-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN - WALL MOUNTED WITH STEEL CASE
	TYPE B3 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±4370 LUMEN LED (4000K) BULB-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN, WITH WINGGUARD - SURFACE MOUNTED
	TYPE B3 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±4370 LUMEN LED (4000K) BULB-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN, WITH WINGGUARD - SURFACE MOUNTED
	TYPE C4 144W ±20869 LUMEN LED (4000K) LOW BAYS, RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	TYPE C6 80W ±10000 LUMEN (4000K) LED FLOODLIGHT RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	TYPE C8 80W ±10000 LUMEN (2700K) LED FLOODLIGHT RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	1 LEVER 1 WAY LIGHT SWITCH ON A 100mmx50mm STEEL DRAW BOX MOUNTED 1400mm A.F.F.L
	PHOTO - ELECTRIC CELL MOUNTED 2400mm A.F.F.L
	DISTRIBUTION BOARD
	METER BOX
	KIOSK
	20A (POLE, 200V) ISOLATOR SURFACE MOUNTED. ISOLATOR MOUNTED FLAT ON THE CONCRETE PLINTH.

GENERAL NOTES:

- ELECTRICAL INSTALLATION TO COMPLY WITH SANS 10142-1 AS AMENDED.
- CONTRACTORS TO USE EXISTING CIRCUITING. CONTRACTORS TO RETAIN EXISTING CABLES AND CONDUCTORS WHERE APPLICABLE. NEW CABLE AND CONDUCTOR SHALL BE INSTALLED UPON ENGINEERS APPROVAL.
- CONTRACTORS TO REPLACE LIGHT FITTINGS AS PER SPECIFICATION.
- CONTRACTOR TO PROVIDE UNIVERSAL ELECTRICAL LOCK ON ALL KIOSK AND DB'S.

REFERENCE DRAWINGS

1040-003-05-3000	SITE PLAN LIGHTING LAYOUT
DRAWING NO.	REFERENCE

1	ISSUED FOR TENDER	LM	TM	MM	10-03-2023
NO.	DESCRIPTION	BY	CHKD	APPD	DATE

REVISIONS / ISSUE AUTHORIZATION

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CLIENT LOGO



CLIENT

TITLE	NAME	DATE

TITLE	NAME	DATE

TITLE	NAME	DATE

TITLE	NAME	DATE

MAIN CONSULTANT

TITLE	NAME	DATE

DRAWN	L. MKHIZE	

CHECKED		

ENG. COORD		

ARCHITECT		

ELEC. ENG.	M. MSOMI	

MECH. ENG.		

STRUCT. ENG.		

CIVIL. ENG.		

INSTRU. ENG.		

PROC. ENG.		

APPROVED BY

NAME	T. MBATHA	DATE

SIGNATURE		

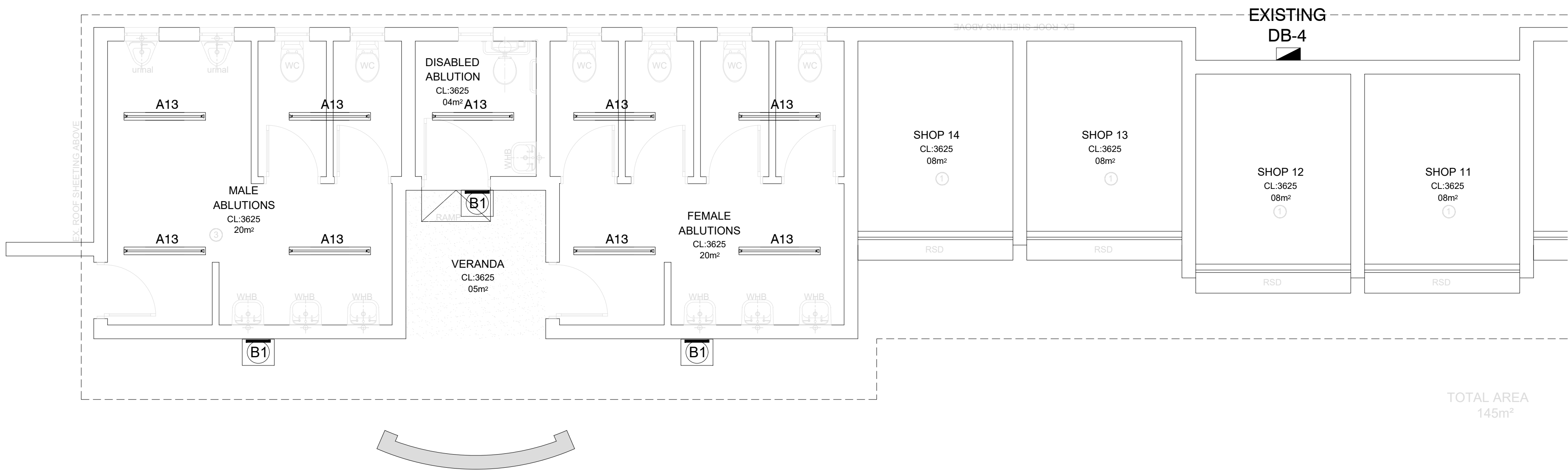
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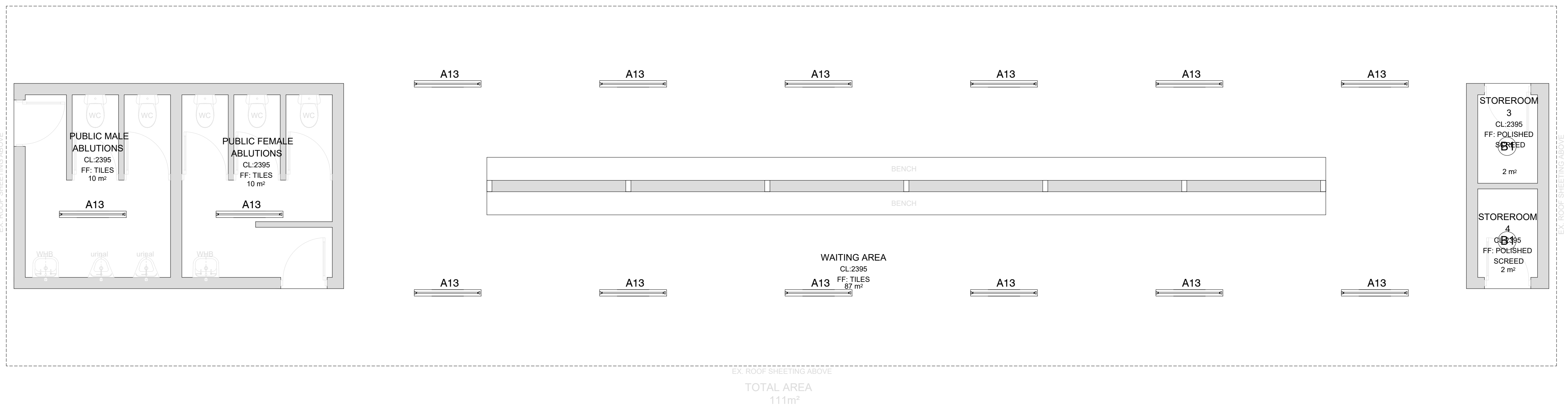
SOUTH COAST CORRIDOR
STATION IMPROVEMENT PROGRAMME

AMANZIMTOTI STATION
TICKET OFFICE, WAITING AREA & GUARD HOUSE
LIGHTING LAYOUT

SCALE:	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status.
1:50	06-03-23	1040-003-05-3001		1	A1	ISSUED FOR TENDER



LEGEND:	
	TYPE FL1: 180W ±27 000 LUMEN LED (4000K) STREETLIGHT RATED IP66 WITH POWDER COATING AS PER SPECIFICATION
	TYPE FL3: 75W ±9 250 LUMEN LED (2700K) COMPLETE WITH MOUNTING ACCESSORIES ON EXISTING POLE. CONTRACTOR TO PROVIDE MINIMUM OF 8250 LUMEN. WATTAGE MAY DIFFER FROM SUPPLIERS.
	TYPE A5 IP65 RATED, 30W ±4440 LUMEN (4000K) LED VAPOUR PROOF SURFACE MOUNTED WEATHER-PROOF LUMINAIRE, GRP BODY AND ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN.
	TYPE A13 RATED IP65, 30W ±4440 LUMEN (4000K) ROUGH-GUARD WEATHER-PROOF LUMINAIRE, GRP BODY AND ACRYLIC DIFFUSER, WITH 50 000 HOURS LIFESPAN - WALL MOUNTED
	TYPE B1 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 20W ±2900 LUMEN LED (4000K) BULK-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN - SURFACE MOUNTED
	TYPE B1 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 20W ±2900 LUMEN LED (4000K) BULK-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN - WALL MOUNTED WITH STEEL CASE
	TYPE B3 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±4370 LUMEN LED (4000K) BULK-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN, WITH WIREGUARD - SURFACE MOUNTED
	TYPE B3 RATED IP65 HIGH PRESSURE DIE CAST ALUMINUM BASE AND TRIM RING 30W ±4370 LUMEN LED (4000K) BULK-HEAD LUMINAIRE WITH AN OPAL HIGH-IMPACT ACRYLIC DIFFUSER WITH 50 000 HOURS LIFESPAN, WITH WIREGUARD - SURFACE MOUNTED
	TYPE C4 144W ±20869 LUMEN LED (4000K) LOW BAYS, RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	TYPE C6 80W ±10000 LUMEN (4000K) LED FLOODLIGHT RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	TYPE C8 80W ±10000 LUMEN (2700K) LED FLOODLIGHT RATED IP65 WITH POWDER COATING AS PER SPECIFICATION
	1 LEVER 1 WAY LIGHT SWITCH ON A 100mmx50mm STEEL DRAW BOX MOUNTED 1400mm A.F.F.L
	PHOTO - ELECTRIC CELL MOUNTED 2400mm A.F.F.L
	DISTRIBUTION BOARD
	METER BOX
	KIOSK
	20A (1POLE, 230V) ISOLATOR SURFACE MOUNTED. ISOLATOR MOUNTED FLAT ON THE CONCRETE PLINTH.



- GENERAL NOTES:
- ELECTRICAL INSTALLATION TO COMPLY WITH SANS 10142-1 AS AMENDED.
 - CONTRACTORS TO USE EXISTING CIRCUITING. CONTRACTORS TO RETAIN EXISTING CABLES AND CONDUCTORS WHERE APPLICABLE. NEW CABLE AND CONDUCTOR SHALL BE INSTALLED UPON ENGINEERS APPROVAL.
 - CONTRACTORS TO REPLACE LIGHT FITTINGS AS PER SPECIFICATION.
 - CONTRACTOR TO PROVIDE UNIVERSAL ELECTRICAL LOCK ON ALL KIOSK AND DB'S.

DRAWING NO.	REFERENCE
1040-003-05-3004	DB-4 SINGLE LINE DIAGRAM
1040-003-05-3000	SITE PLAN LIGHTING LAYOUT

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
1	ISSUED FOR TENDER	LM	TM	MM	10-03-2023

REVISIONS / ISSUE AUTHORIZATION

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CLIENT LOGO

PASSENGER RAIL AGENCY OF SOUTH AFRICA

CLIENT

TITLE	NAME	DATE

MAIN CONSULTANT		
TITLE	NAME	DATE
DRAWN	L. MKHIZE	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.	M. MSOMI	
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		
APPROVED BY		
NAME	T. MBATHA	DATE
SIGNATURE		
REG. NUMBER	2019300645	

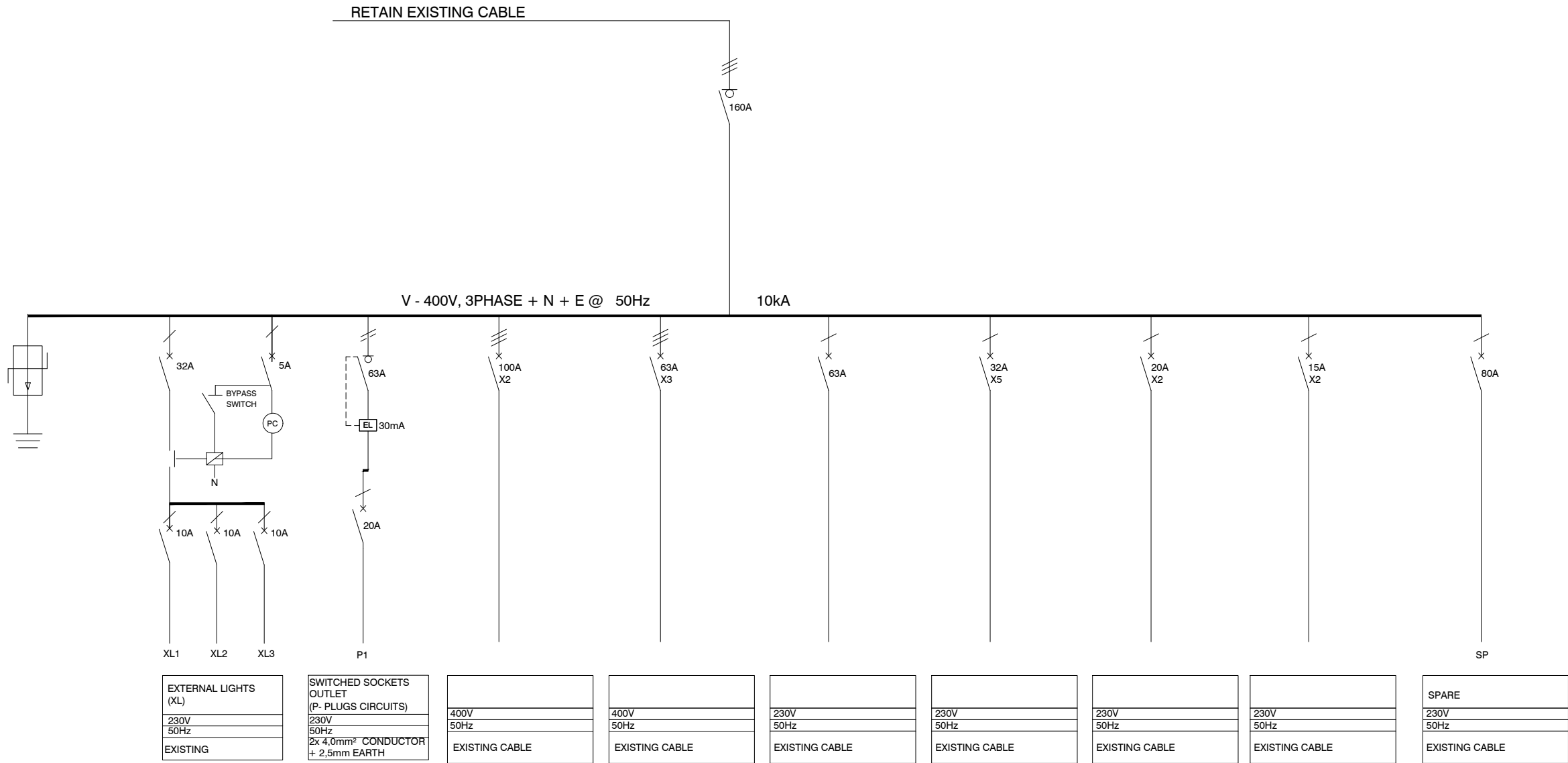
EST. 2015

SOUTH COAST CORRIDOR
STATION IMPROVEMENT PROGRAMME

AMANZIMTOTI STATION
ABLUTIONS AND WAITING AREA
LIGHTING LAYOUT

SCALE: DATE Drawing Number CLIENT Drawing Number Rev. Sheet size Status.

1:50 06-03-23 1040-003-05-3002 1 A1 ISSUED FOR TENDER



LEGEND	
	3 POLE CIRCUIT BREAKER
	1 POLE CIRCUIT BREAKER
	3 POLE ISOLATOR
	1 POLE ISOLATOR
	EARTHING
	1/ 3 PHASE CONTACTOR
	PHOTO ELECTRIC CELL
	kwh- POWER MASTER METER AS PER SPECIFICATION
	SURGE ARRESTER
	2 POLE (L+N) EARTH LEAKAGE UNIT

- NOTES:
- CONTRACTORS SHALL RE-INSTALL ALL CIRCUITS TO MATCH EXISTING.

ADDITIONAL NOTES	BOARD INFORMATION
1. THIS DB SHALL COMPLY WITH SANS 1973/61439 AND SHALL BE DESIGNED AND MANUFACTURED BY A SPECIALIST SWITCHBOARD MANUFACTURER. 2. ALL EQUIPMENT SHALL COMPLY TO THE RELEVANT SANS STANDARDS. 3. CASCADING CIRCUIT BREAKERS MUST BE USED. 4. PROVIDE 20% SPARE SPACE. 5. MATERIAL SHALL BE 2,0mm WHITE 3CR12 PAINTED ORANGE STEEL WITH POWDER COATED EPOXY. 6. NEUTRAL AND EARTH BAR MUST BE EQUAL TO PHASE BAR. 7. NO MIX OF BRANDS. 8. KIOSK MUST HAVE A DOUBLE SWITCH SOCKET OUTLET 9. MAIN BREAKER ON THE LEFT SIDE COMPARTMENT 10. PHOTO CELL TO BE MOUNTED ON TOP OF THE KIOSK.	NAME OF DB : KIOSK 1 LOCATION : BEHIND OLD SHISA NYAMA BUILDING MOUNTING : FLOOR STANDING IP CLASS : 65 CABLE ENTRY : BOTTOM FEEDERS DOOR REQUIRED : YES, DOUBLE DOOR

GENERAL NOTES:

- ELECTRICAL INSTALLATION TO COMPLY WITH SANS 10142-1 AS AMENDED.
- CONTRACTORS TO USE EXISTING CIRCUITING. CONTRACTORS TO RETAIN EXISTING CABLES AND CONDUCTORS WHERE APPLICABLE. NEW CABLE AND CONDUCTOR SHALL BE INSTALLED UPON ENGINEERS APPROVAL.
- CONTRACTOR TO PROVIDE UNIVERSAL ELECTRICAL LOCK ON ALL KIOSK AND DB'S.
- CONTRACTOR TO PROVE EXISTING CABLE AND/ OR EXISTING CIRCUITS

				</	

CLIENT LOGO



CLIENT

TITLE	NAME	DATE

MAIN CONSULTANT

TITLE	NAME	DATE
DRAWN	L. MKHIZE	
CHECKED		
ENG. COORD		
ARCHITECT		
ELEC. ENG.	M. MSOMI	
MECH. ENG.		
STRUCT. ENG.		
CIVIL. ENG.		
INSTRU. ENG.		
PROC. ENG.		

APPROVED BY

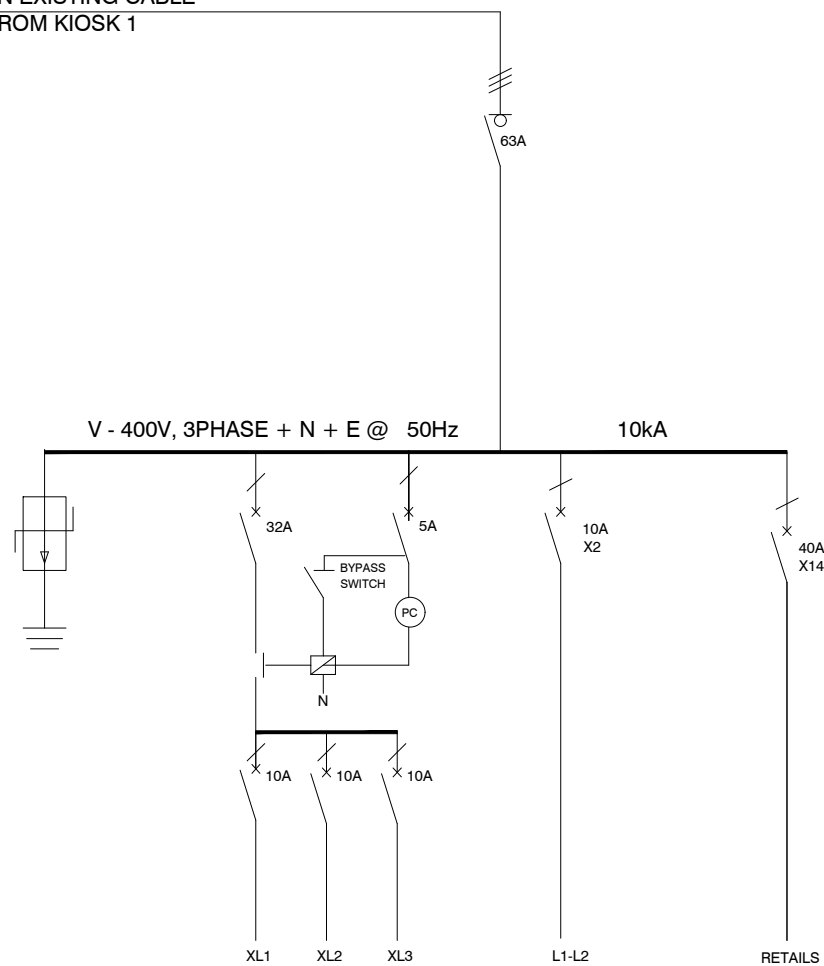
NAME	T. MBATHA	DATE
SIGNATURE		
REG. NUMBER	2019300645	



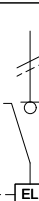
SOUTH COAST CORRIDOR
STATION IMPROVEMENT PROGRAMME

AMANZIMTOTI STATION
KIOSK 1 SINGLE LINE DIAGRAM

SCALE	DATE	Drawing Number	CLIENT Drawing Number	Rev.	Sheet size	Status
N.T.S	14-04-23	1040-003-05-3003		1	A3	ISSUED FOR TENDER



(RETAILS 1-14)
400V
50Hz
10mm ² 2CORE PVC/SWA, PVC ECC CU CABLE

LEGEND	
	3 POLE CIRCUIT BREAKER
	1 POLE CIRCUIT BREAKER
	3 POLE ISOLATOR
	1 POLE ISOLATOR
	EARTHING
	1/ 3 PHASE CONTACTOR
	PHOTO ELECTRIC CELL
	kwh- POWER MASTER METER AS PER SPECIFICATION
	SURGE ARRESTER
	2 POLE (L+N) EARTH LEAKAGE UNIT

GENERAL NOTES:

1. ELECTRICAL INSTALLATION TO COMPLY WITH SANS 10142-1 AS AMENDED.
2. CONTRACTORS TO USE EXISTING CIRCUITING. CONTRACTORS TO RETAIN EXISTING CABLES AND CONDUCTORS WHERE APPLICABLE. NEW CABLE AND CONDUCTOR SHALL BE INSTALLED UPON ENGINEERS APPROVAL.
3. CONTRACTOR TO PROVIDE UNIVERSAL ELECTRICAL LOCK ON ALL KIOSK AND DB'S.
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1	ISSUED FOR TENDER	LM	MM	TM	17-04-2023		
NO.	DESCRIPTION	BY	CHKD	APPD	DATE		
REVISIONS / ISSUE AUTHORIZATION							
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