

PROVINCIAL ADMINISTRATION OF KWAZULU-NATAL DEPARTMENT OF PUBLIC WORKS & INFRASTRUCTURE



KWAZULU-NATAL PROVINCE
PUBLIC WORKS & INFRASTRUCTURE
REPUBLIC OF SOUTH AFRICA

BILLS OF QUANTITIES

with GCC for Construction Works - Second Edition 2010

CONTRACTUAL SECTION

ONE VOLUME APPROACH

SECTION 2 B

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME:
PHASE 16: ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

PRINCIPAL AGENT / ARCHITECT

LDM Quantity Surveyors DBN (Pty) Ltd.
P.O. Box 19233
Dormerton
Durban
4015
031 - 207 1340 - Tel Number
N/A - Fax Number
ssirputh@LDM.co.za

Employer:

Head: Public Works
KZN Department of Public Works
Private Bag X9041
PIETERMARITZBURG
3200

Tel Number: 033 - 8971300

Fax Number: 033 - 8971399

QUANTITY SURVEYORS

LDM Quantity Surveyors DBN (PTY) LTD
P.O. Box 19233
Dormerton
4015

031 - 207 1340 - Tel Number
031 - 209 9441 - Fax Number
ssirputh@LDM.co.za

Region:

Regional Manager
KZN Department of Public Works
X54336
Mayville
4091

Tel Number: 033-355 5569

Fax Number: N/A

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REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
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ANNEXURE 1
ASAQS GENERAL PREAMBLES FOR TRADES 2017

GENERAL PREAMBLES FOR TRADES 2017

ISBN: 978-0-620-74577-2



**The Association of
South African
Quantity Surveyors**

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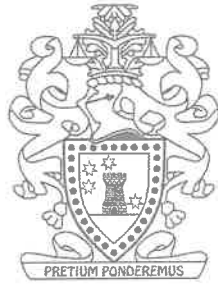
jhb@mwsqs.co.za | www.mbathawaltersandsimpson.com
+27 (0) 11 234 2696



MLC QUANTITY SURVEYORS

mlcjhb@mlc.co.za | www.mlc.co.za
+27 (0) 11 283 1500





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FOR TRADES
2017**

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MESSAGE FROM THE PRESIDENT

The publication of this General Preambles for Trades – 2017 bears testimony to the fact that the Association of South African Quantity Surveyors and its members are committed to the ongoing production of outstanding resources of enduring value to the quantity surveying profession and the built environment at large.

Significant documents such as these contribute to the body of knowledge so highly esteemed by our profession and those associated with us. They enhance the provision of professional services by providing the guidelines and standardization so critical to contractual documentation in the construction industry.

This document is another example of our profession rising to the challenge in the face of change and producing a leading resource that will guide its members for years to come. It sets a standard for the professional service we offer to our valued clients and communities, both within and beyond our borders.

I take this opportunity to thank Professors Hans Wegelin and Carl Klopper for their excellent work in producing this document, resulting in another outstanding contribution to the profession. Since it takes progress such as this to maintain our position of strength and keep us at the forefront of change, I wish to invite more of our members to assist us in this endeavour.

Please receive this document with my best wishes.

Dr Stephan Molusiwa Ramabodu

President

The Association of South African Quantity Surveyors

2016/2017

The document

This document is published by THE ASSOCIATION OF SOUTH AFRICAN QUANTITY SURVEYORS (ASAQS) and replaces an existing ASAQS publication titled "Model Preambles for Trades 2008". The contents of the last-mentioned publication have been augmented and updated and are presented in a different style in this document

It is intended that this document will be used by reference only in the text of bills of quantities or lump sum documents and will not be reproduced and bound therein

The basic philosophy

These preambles have been designed with the view of expediting the production of bills of quantities and, as a by-product, enhancing standardisation of documentation by facilitating and promoting the usage of abbreviated descriptions in the text of bills of quantities

Users' attention is drawn to the fact that the contents of this document cover materials and workmanship encountered in a significant majority of building projects (as indicated by the introduction of the word "general" in the revised title). It is by no manner of means exhaustive. It is therefore to be anticipated that some items in the bills of quantities will still require full descriptions and supplementary preambles in the text

Wherever possible, reference has been made in these preambles to South African National Standards (SANS) to describe materials and methods. This includes the third revision of SANS 10400 The Application of the National Building Regulations and the linked parts of SANS 2001 Construction Works which cover building and civil engineering work, replacing SANS 1200

It is incumbent on users of these preambles to have ready access to the relevant standards. Where applicable SANS do not exist, reference has been made to other accredited standards. SANS are available online at www.sabs.co.za

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SANS NUMBERING IN CONSTRUCTION STANDARDS

SANS specification: SANS and number, e.g.

SANS 227 burnt clay masonry units

SANS code of practice: 1 plus four digits, e.g.

SANS 10082 Timber buildings

SANS BS standard: SANS and number, e.g.

SANS 6927 Building construction - Jointing products - Sealants - Vocabulary

SANS EN standard: 5 plus four digits, slash EN plus number, e.g.

SANS 50197-1 / EN 197-1 Cement Part 1: Composition, specifications and conformity criteria for common cements

SANS ISO standard: SANS and number, slash ISO and number, e.g.

SANS 140 / ISO 140 Acoustics - Measurement of sound insulation in buildings

SANS SM (standard method): SANS and 5 or 6 plus three digits, e.g.

SANS 5900 Warpage and squareness of refractory bricks

SANS 6056 Sulphide content of water

There is no longer a distinction between a specification, a code of practice, or a standard method; they are now all referred to as *standards*

Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits

Units, symbols, meaning of terms

Units of measurement, symbols

The units of measurement are metric units as standardised by the “Système International d’Unités” (SI). Note that the comma is the decimal indicator in Europe and South Africa, formally adopted by the *ISO* and the *IEC* as well, and that numerals are grouped into groups of three for readability, separated by a space, e.g. 1 233,55

The following unit symbols (not abbreviations) and notations may appear in this document:

°C	degrees Celsius	L	litre
g	gram	m	metre
H _z	Hertz	m ²	square metre
h	hour	m ³	cubic metre
d	day		
kN	kilonewton	mm	millimetre
kPa	kilopascal	MPa	megapascal
kW	kilowatt	t	tonne
<	less than	>	greater than

Explanation of terms

The following terms and initialisms appear in italics in the text. Their meaning as to this document is hereby explained:

AAAMSA

Association of Architectural Aluminium Manufacturers of South Africa

applicable standard

a national or recognised standard applicable to the works, implying that the relevant standard is a contract document, a copy of which shall be kept in the site office for reference when requested

described / as described

described / as described in the bill of quantities, supplementary preambles, on *drawings* or in a project-specific specification

BS

British Standard

coastal region

area between the coastline and an imaginary line 30 km inland, including the entire area of jurisdiction of any local authority falling within this region

(colon) :

“shall be”; or “shall comply with”; or “shall comply with the requirements of”; e.g. “clay roof tiles: *SANS 632*” means “clay roof tiles shall comply with *SANS 632*”

competent person

person who is qualified by virtue of his education, training, experience and contextual knowledge to make a determination regarding the performance of a building or part thereof in relation to a functional regulation or to undertake such duties as may be assigned to him in terms of these regulations, as further defined in SANS 10400

comply

meet *described* standards

directed

as *directed* by the Employer's principal agent

drawings

the *drawings* forming part of the contract documents, and any modification thereof or additions thereto delivered to the contractor during the execution of the works; *drawings* include schedules

EN

European Norm

IEC

International Electrotechnical Commission

ISO

universal short name of the International Organization for Standardization, a worldwide federation of national standards bodies of which South Africa, Botswana and Zimbabwe are members and Namibia, Angola, Zambia and Mozambique are correspondent members

MOD AASHTO

an internationally accepted test to determine the density of compacted material such as soil filling, expressed as a percentage of the maximum compaction of the filling at various moisture contents as determined in a laboratory

NHBRC

National Home Builders Registration Council

SANS

South African National Standard

suitable

capable of fulfilling or having fulfilled the intended function, or fit for its intended purpose

to manufacturer's instructions

the manufacturer's instructions at the time of tender

A. GENERAL

A.1 Application of clauses

These General Preambles for Trades, where applicable, and any Supplementary Preambles contained in the bills of quantities, form part of the descriptions of items in the bills of quantities

Where descriptions or Supplementary Preambles contained in the text of the bills of quantities differ from these General Preambles for Trades, the descriptions and Supplementary Preambles shall take precedence

Except where otherwise *described*, all preambles contained in any individual Trade Preamble shall apply equally to any work of a similar nature in all other trades

A.2 Materials and workmanship

Materials and workmanship shall be to the approval of the Employer's principal agent and shall be executed in accordance with the relevant manufacturer's written recommendations and instructions where applicable. Materials destined for permanent installation into the works shall not be used for any temporary purposes

A.3 Proprietary products

For the purposes of submission of tenders, rates for items *described* in the bills of quantities by trade names, catalogue references, etc. are for the particular type and manufacture specified

Where products or materials etc. other than those specified are used, adjustments in the rates will be made if necessary

A.4 Assembling

Rates for manufactured items shall include assembling complete and handing over in proper working order

A.5 References in descriptions

Any references given in brackets at the end of certain descriptions refer to the relevant references on the *drawings* or schedules

A.6 Water

Water shall be clean and free from injurious amounts of acids, alkalis, organic matter and other substances and shall be *suitable* for its intended use

A.7 Application of the national building regulations

All work shall be executed in accordance with the requirements of SANS 10400

A.8 Accuracy in buildings

Dimensional and positional accuracy of the buildings and their component parts: SANS 10155 Grade II unless otherwise *described*

A.9 Reference to other documents

References in these General Preambles for Trades to other documents, including SANS and BS, pertain to the latest edition thereof including all amendments thereto at the date for submission of the tender

B. DEMOLITIONS

B.1 Demolitions and disposal of buildings and other structures, breaking up and removal of paving, etc.

Applicable standard: SANS 2001- Construction works Part BS1 Site clearance

Additional clause:

Unless otherwise *described*, materials salvaged from the demolitions shall become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials may not be re-used in any new work without written permission from the Employer's principal agent

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C. ALTERATIONS

C.1 Alterations

- a) ensure the stability of all structures during alteration work
- b) give notice when any electrical installations, water supply pipes, telephone and other services are to be disconnected or altered
- c) take all precautions necessary to prevent any nuisance from dust

C.2 Materials from the alterations, credit, etc.

- a) materials recovered from the alterations (except where *described* as to be re-used or to be handed over to the Employer) shall become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities
- b) materials *described* as "removed" shall be removed from the site immediately
- c) materials *described* as "handed over to the Employer" shall be dismantled where necessary, stored under cover on the site where *directed* and protected from damage, until required
- d) materials *described* as "set aside for re-use" shall be dismantled where necessary, cleaned, stored under cover and protected from damage until required for re-use. Allow for and make good any damage caused to such materials during removal, storage or reaffixing

C.3 Disposal of debris etc.

- a) remove from the site all materials, debris and rubbish resulting from the alterations

C.4 Making good damaged work

- a) make good in all trades to existing work where damaged or disturbed through alterations with all necessary new materials to match the existing

C.5 Forming new openings or altering openings in existing walls

- a) where new openings are formed or openings altered in existing walls, break out the wall above the opening and insert new brick, in situ concrete or prestressed concrete lintels, complete with all necessary reinforcement, formwork, turning pieces, etc. Build up the jambs and portions of the openings as described with new brickwork or blockwork properly toothed and bonded to existing. Close cavities of hollow walls where necessary and make good finishes all round and into reveals

C.6 Building up openings

- a) where existing openings are given in number as built-up, prepare the existing surfaces all round as necessary, properly tooth and bond brickwork or blockwork to existing, wedge-up to underside of existing lintel and make good finishes on both sides

D. Earthworks

D.1 Site clearance (removal and disposal of vegetation, trees, etc.)

Applicable standard: SANS 2001-Construction works Part BS1: Site clearance

D.2 Earthworks (general)

Applicable standard: SANS 2001-Construction works Part BE1: Earthworks (general)

D.3 Sinkholes and subsidence

Applicable standard: SANS 2001-Construction works Part BE3: Repair of sinkholes and subsidences in dolomite land

D.4 Classification of materials to be excavated

“Hard rock”: granite, quartzitic sandstone or rock of similar hardness, the removal of which requires drilling, wedging and splitting, or the use of explosives

“Soft rock”: hard material, the removal of which warrants the use of pneumatic tools and includes hard shale, ferricrete, compact outcrop and material of similar hardness

“Earth”: all ground other than that classified as “hard rock” or “soft rock”, including made-up ground and loose stones or concrete pieces not exceeding 0,03 m³ in volume

D.5 Filling

D.5.1 Filling generally

- a) filling over site: spread, levelled, watered and consolidated in layers not exceeding 300 mm thick
- b) filling under floors and backfill to trenches and holes: *suitable* inert material, free from clay, vegetable matter, large stones, etc. having a maximum plasticity index of 10, spread, levelled and compacted to a density of at least 90% MOD AASHTO

D.5.2 Hardcore

- a) hardcore: broken stone or other approved hard material graded from 25 mm to 75 mm with the finer material on top, spread, levelled and consolidated

D.6 Soil insecticides

Applicable standard: SANS 10124 The application of soil insecticides for the protection of buildings

E. Concrete, formwork and reinforcement

E.1 Structural works

Applicable standard: SANS 2001-Construction works Part CC1: Concrete works (structural)

E.2 Minor works

Applicable standard: SANS 2001-Construction works Part CC2: Concrete works (minor works)

E.3 Foundations

Applicable standard: SANS 2001-Construction works Part CM2: Strip footings, pad footings and slab-on-the-ground foundations for masonry walling

E.4 Strongrooms

Strongrooms: SANS 10052

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F. Precast concrete

F.1 Structural works

Applicable standard: SANS 2001-Construction works Part CC1: Concrete works (structural)

F.2 Minor works

Applicable standard: SANS 2001-Construction works Part CC2: Concrete works (minor works)

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G. Masonry

G.1 Masonry walling

Applicable standard: SANS 2001-Construction works Part CM1: Masonry Walling

G.1.1 Materials

burnt clay masonry units

- a) burnt clay masonry units: *SANS 227* unless otherwise described
- class of common units: NFP for general masonry above damp-proof level to be plastered; NFX for masonry exposed to damp or in contact with the ground (e.g. foundation walls, manholes), or for fair face work
 - nominal dimensions: 222 x 106 x 73 mm unless otherwise described
 - nominal compressive strength: to table 1 of *SANS 2001-Construction works Part CM1*
 - uniformity of colour and texture of face units: provide sample of 20 units
 - grade of efflorescence: normal for internal walls not exposed to damp; special for visible unplastered foundation walls, retaining walls and free-standing walls
 - limits of water absorption: 6–14%
 - limits of moisture expansion: 0,20%
 - required marking: designation on each dispatch or consignment note

concrete masonry units

- b) concrete masonry units: *SANS 1215*
- nominal compressive strength: *SANS 2001-Construction works Part CM1* table 1
 - average drying shrinkage: normal (0,06%)
 - required marking: designation on each dispatch or consignment note

mortar

- c) sand: to *SANS 1090* unless otherwise *described*
- d) mortar class: II unless otherwise *described*

reinforcement

- e) brick reinforcement in corrosive areas:
- in *coastal regions*: galvanised to *SANS 121*, or stainless steel
 - in tidal splash zones: stainless steel
 - non-metallic ties (engineered polymer) may be used instead of stainless steel ties
- f) metal tie type: butterfly or modified PWD

G.1.2 Work

- a) single-leaf bond: stretcher
- b) multileaf bond: stretcher bond with leaves connected with crimp wire ties at <450 mm horizontal and vertical spacing and staggered, unless otherwise described
- c) position of control and articulation joints: to SANS 10400-K unless otherwise *described*

G.1.3 Additional requirements

- a) wall ties in partial fill insulated cavity walls:
 - to have drip in centre of residual cavity
 - tie spacing: SANS 10164 (2,5/m² or 600 mm vertical, 660 mm horizontal and staggered)
 - tie spacing around openings and construction joints: <300 mm vertical
- b) tie mortar cover: 15 mm minimum to outside face of mortar joint
- c) ancillary fabricated components for masonry, e.g. ties, brackets, lintels, shelves, anchors, meshwork: galvanised to SANS 121 in *coastal regions*
- d) clay facing units (face bricks): manufacturer/supplier to provide the following in writing:
 - the required application e.g. type of building, finish etc.
 - the degree of exposure to weather conditions, proximity to the sea etc.
 - track record of the preferred brick in the area of the building
 - an undertaking or warranty that the bricks delivered will be suitable
 - colour expectations in the case of face bricks
 - acceptable levels of breakage during delivery to site
- e) common solid masonry mortar joints:
 - to be raked out to receive plaster finish
 - to be flushed off where walls are to be bagged or fair-faced
- f) hollow masonry mortar joints:
 - not to be raked out to receive plaster
- g) cramps for wood door frames: 500 x 32 x 1,6 mm hot dip galvanised steel lugs for building in, twice screwed to the outside of frames at 300 mm from bottom and top and intermediately at not exceeding 900 mm apart

G.2 Glass blockwork

G.2.1 Materials

- a) glass blocks: *BS EN 1051*
- b) mortar: class II

G.2.2 Laying

- a) bond: straight horizontal and vertical joints
- b) coating: surface on which first course is laid to be coated with bitumen emulsion or similar material to permit movement of blocks
- c) reinforcement: every fifth horizontal joint, and vertical joints at 1 m maximum centres, with 25 – 65 mm wide corrosion resistant metal strips or mesh, nailed to the adjacent walls or columns, or with 6 mm diameter hot dip galvanised reinforcing rod drilled 50 mm deep into surrounding structure
- d) isolation joint: 15 mm clear space to be allowed at sides and top of glass block panel; front of space to be filled with polyurethane backing strip and silicone sealant
- e) joints: 10 mm, struck back and smoothed
- f) waterproof grout: where wall is exposed to rain

G.3 Paving

tiles on screed

- a) screed to SANS 2001-Construction works Part EM2; fix tiles in tile adhesive with sealed isolation joints against fixed objects

tiles on waterproofing

- b) on bitumen systems: bed tiles in bitumen and stone chip key

paving slabs on insulation panels

- c) precast concrete paving slabs: SANS 541; laid loose on insulation panels as *described* elsewhere

paving slabs on adjustable pads

- d) precast concrete paving slabs: SANS 541; laid on patent adjustable underlay pads to keep tiles 20 – 40 mm clear of waterproofing; joints between slabs: 5 mm, left open; paving surface: level or to follow gradient as *described*

G.4 Natural stonework

Rubble walling

- a) natural irregular stone: local koppieklip
- b) size: between 150 and 600 mm in section
- c) mortar: class III (50L common cement:0 – 80L lime:300L sand)
- d) laying: stones are to be laid on their natural quarry beds
- e) joints: 25 – 50 mm wide cement mortar class II, finished 25 mm deep square recessed
- f) bond: mainly large stones to homogeneous random pattern
- g) levelling up: tops of walls are to be levelled up with selected long and flat stones; wall faces are to be kept even
- h) tying through stones every 1 m² in double-faced walls

- i) attachment devices where rubble walls are to be joined to brick-, block-, or concrete work: 20 x 3 mm L-shaped stainless steel bonding lugs shot-nailed to background at 1 m intervals and staggered
- j) reference panel: required

Ashlar walling and wall linings

- k) stone: natural stone with high compressive strength and good durability, sourced from an approved quarry, dimensioned for use in ashlar walls and wall linings
- l) joints: 3 mm
- m) pointing: exposed joints to be 12 mm deep, raked out and filled with suitable grout
- n) matching where relevant: slabs of natural stone shall match as to veining, colour and texture; each slab to be numbered and fixed in the same relative position
- o) ashlar work shall be cleaned down and covered up to prevent soiling during progress of the remaining work, removed upon completion and cleaned down again

G.5 Insulation

G.5.1 To wall cavities

- a) full fill cavity insulation:
 - cavity width: equal to the required insulation thickness
 - to be filled with rigid insulation board or fibre batts
- b) partial fill cavity insulation:
 - to be filled with rigid insulation board only
 - insulation to be held tightly against outer face of inner leaf with *suitable* retaining discs or extra wire ties
 - a residual cavity of >35 mm to be maintained to permit moisture drainage
- c) loose fill:
 - loose fill insulation to be pumped/blown in cavities of existing walls through holes drilled in outer leaf, by specialist installer; holes refilled after completion, and to match surrounding face brickwork when relevant
- d) insulation shall be butt joined tight against window/door frames

G.5.2 To external face of walls

- a) patent system of EPS external insulation bonded and mechanically fixed to dry, sound and flat surface, finished with reinforced polymeric plaster, unless otherwise *described*
- b) by registered specialist strictly to supplier instructions

G.5.3 Under precast concrete paving slabs

- a) high density polystyrene insulation panels of required thickness with tight butt joints, to SANS 204

G.6 Miscellaneous

Hoop iron ties between concrete and masonry work, roof ties, cramps and dowels to frames, etc.:
as described

Electronic Version

H. Waterproofing

H.1 Materials

reinforced bitumen membrane

- a) flexible polyester and/or fibreglass reinforced APP polymer modified bitumen membrane: *BS EN 13707* or the subject of an active Agrément Certificate
- b) anti-root: in all planted areas
- c) bonding: heat-fused on primed surfaces

reinforced liquid membrane

- d) in situ reinforced liquid membrane
- e) of light colour
- f) reinforcement: non-woven needle-punched polyester or polypropylene fibre fabric with a mass of 125–150 g/m² for roofs and 95–100 g/m² for parapet walls

slip/protection layer

- g) 0,25 mm polymer sheeting: *SANS 952* type C (green)

geomembranes

- h) thermoplastics sheeting: *SANS 1526*

H.2 Application

- a) waterproofing system: according to *manufacturer's instructions*, including priming procedures, to leave roof, internal wet areas like showers and plant rooms, and below-ground structures in a watertight condition
- b) slip/protection layers, blinding layers, metal lath, ventilators etc.: as *described*

H.3 Waterproofing surface finishes/protection

- a) slip/protection layer: single layer bituminous felt or double layer HDPE sheet as *described*
- b) tile, paving units or panel finish: neatly cut to fit tightly along perimeter

H.3.1 Exposed non-trafficable areas

paint

- a) on plain bituminous systems: heavy brush or two coats of bituminous based aluminium paint to *SANS 802*
- b) on other systems: *suitable* ultra-violet block as recommended by waterproofing manufacturer

crushed stone

- c) layer of light coloured non-absorbent crushed stone of 25 mm nominal size on slip/protection layer or on insulation of required thickness to *SANS 204*

H.4 Joint fillers/sealants

H.4.1 Materials

- a) building construction jointing and sealant products vocabulary: SANS 6927
- b) two-part gun grade polysulphide sealants: SANS 110
- c) one part low modulus silicone rubber sealant: SANS 1305, type 1 for building joints
- d) one part high modulus fungus proof silicone rubber sealant: SANS 1305, type 2 for glazing and sanitary ware
- e) two-part polurethane base sealant: SANS 1077, type 1 pouring grade, self-levelling
- f) two-part polurethane base sealant: SANS 1077, type 2 gun grade, non-sag
- g) preformed elastomeric compression joint seals: SANS 1023 type 1

H.4.2 Installation

preparation

- a) joints: clean and dry
- b) backing strip: inserted to ensure correct sealant thickness
- c) correct primer: applied to sides of joints
- d) bond-breaking material: where required
- e) edges: masked to ensure neat and clean edges

sealing

- f) *to manufacturer's instructions*
- g) thickness: not less than half the width of the joint
- h) joints to be sealed: around door and window frames, movement joints, joints between walls and columns, floor joints, and other joints where sealing is indicated or to the requirements of SANS 204

I. Roof coverings, claddings, etc.

I.1 General

underlays

- a) reflective foil laminate: SANS 1381-4 class B (reinforced, one surface reflective), and mark-bearing
- b) polymer undertile film: SANS 952 type E (white), mark-bearing

I.2 Slates, tiles and shingles

I.2.1 Materials

- a) concrete roof tiles and accessories: SANS 542 and mark-bearing
- b) clay roof tiles: SANS 632 and mark-bearing
- c) natural slate tiles: from an approved quarry, with two holes per tile, drilled (not punched)
- d) fibre-cement slates: SANS 803, and mark-bearing
- e) metal roofing tiles: SANS 1022, and mark-bearing
- f) accessories: to match roofing material
- g) fixing materials: hot dip galvanised steel SANS 121 in inland regions, or stainless steel grade 304 in coastal regions or corrosive atmospheres, except for clay tiles where all fixings shall be stainless steel
 - length of nails: to penetrate battens to a minimum depth of 25mm
 - steel wire: 1,6 mm diameter, galvanised
- h) mortar for bedding and pointing: 3 parts sand to 1 part cement, pigmented to match tiles
- i) sawn softwood timber battens: SANS 1783-4

I.2.2 Fixing of tiles

- a) Fixing of tiles: SANS 10062 Fixing of Interlocking Roof Tiles

I.3 Thatch roofing

- a) thatch type: *as described*
- b) thickness and minimum mass of thatching: SANS 10400-L
- c) lightning protection: required

I.4 Profiled sheeting of metal, fibre-cement, plastic, etc.

Installation: SANS 10237 Roof and side cladding

1.4.1 Metal sheeting

profile

- a) corrugated: 17,5 mm deep, 76 mm pitch, pierced-fix



- b) trapezoidal (box rib /IBR) 36 mm deep, 172 mm pitch, pierced-fix



- c) trapezoidal clip-on: >40 mm deep, <180 mm rib centres, with beading rolled into trough bottom, concealed-fix, or the subject of an active Agrément Certificate



- d) standing seam: 50 mm deep, 203 (x 2 for double trough = 406) or 445 mm (single trough) seam centres, with beading rolled into trough bottom, concealed-fix, or the subject of an active Agrément Certificate



steel

- e) hot dip zinc coated coil sheeting: SANS 3575/SANS 14713, coating grade Z275 for rural and urban inland regions or Z600 for *coastal regions* or aggressive atmospheric conditions
- f) aluminium/zinc coated sheet: SANS 9364/SANS 14788, coating grade AZ150 for rural and inland regions or AZ200 for *coastal regions* or aggressive atmospheric conditions
- g) required coating marking: thickness, material quality and coating thickness on the reverse side of each sheet at 1 m intervals

aluminium alloy

- h) natural mill finish aluminium alloy: SANS 903 type 3004- temper H14 or alloy A1-Mn1 or A1-Mg2
- i) required marking: thickness on each sheet

stainless steel

- j) stainless steel: grade 304

prepainted metal

- k) prepainted metal sheet: SANS 1845
- l) required prepainting marking: at 1m intervals on underside of sheet, or on delivery slip: trade name, type

1.4.2 Fibre-cement sheet

- a) fibre-cement sheet: SANS 685/9933
- b) thickness: 5 mm
- c) profile: corrugated 57 mm deep, 178 mm pitch (Big-six)

I.4.3 Glass-reinforced polyester sheet

- a) glass-reinforced polyester sheet: SANS 1150
- b) required marking: trade name, type, class, light-transmission grading, mass, weathering side in case of type 1, on each sheet

I.4.4 Polycarbonate sheet

- a) grade: sheeting grade with a co-extruded layer of UV stabilised polymer on the weathering side

I.4.5 Fasteners and washers

- a) fasteners and washers: SANS 1273

I.4.6 Installation

- a) installation: *to manufacturer's instructions* or to an active Agrément Certificate

trough ends on metal trough roofs with slopes less than 15°

- b) trough ends: downturned 15 mm at eaves to form drip; upturned 30 mm at high ends to form stop-end
- c) bend with *suitable* tool (not hammer) without tearing the sheet.

I.4.7 Miscellaneous

- a) finishing of roof: with necessary ridging, closers, upturns, downturns, drips and capillary interstices to provide a watertight and vermin and insect proof construction
- b) of similar material and fasteners as roofing

ridging

- c) on corrugated metal roof sheeting: 460 mm girth with roll-top, lapped 225 mm at heading joints and beaten into corrugations; close roll-top at bottom of hips and at gable ends
- d) on trapezoidal roof sheeting (lapped or interlock) and on standing seam roofing to fall >7°: 430 mm girth without roll-top, lapped 225 mm at heading joints and provided with serrated closers
- e) on narrow standing seam roofing to fall <7°: single-length over-ridge sheet with top 12 mm of seams sawn or snipped at ridge position and bent, cuts to be covered with rib caps set in *suitable* sealant
- f) on fibre-cement roofing: fibre-cement corrugated or plain adjustable or fixed ridges; corrugations to be filled under plain wings of fibre-cement ridging with 1:5 cement:sand mortar

movement joints

- g) watertightness and freedom of movement of structural movement joints shall be ensured under all conditions

I.5 Thermal insulation

I.5.1 Materials

- a) required R-value/thickness: SANS 204
- b) required fire performance classification of thermally insulated building envelope systems: SANS 428

rigid board

- c) expanded polystyrene (EPS) board: SANS 53163 type regular when covered, flame retardant when exposed
- d) extruded polystyrene (XPS) board: SANS 53164, density 32 kg/m³, compressive strength 160–310 kPa depending on thickness
- e) expanded polyurethane (EPU) board: SANS 53165

fibre mats/batts

- f) fibrous thermal insulation mats/batts: SANS 1381-1

reflective foil

- g) reflective foil: SANS 1381-4

metal faced insulation panels

- h) metal faced panels bonded to an insulation core: SANS 54509 and mark-bearing

I.5.2 Installation

- a) installation: SANS 204, to fit snugly between rafters
- b) insulation to be kept clear of incandescent and halogen downlighters/transformers
- c) electrical and other safety issues shall be observed, e.g. defective wiring, adequate lighting during installation

pitched roof insulation

- d) reflective foil under roof covering: with air space of >25 mm between foil and solid surfaces and with reflective surface facing down

flat roof insulation

- e) material: rigid EPS insulation density 32D

I.6 Flat sheet metal

I.6.1 Material

- a) copper sheeting: 0,6 mm x 600 mm wide high purity cold rolled copper SANS 404/405
- b) boarding: 20/22 mm thick solid tongue-and-groove softwood to SANS 629 of genus Pinus, flooring grade, light density group, non-end-matched
- c) roofing felt: range 111 containing 80% wool, density 333 g/m²
- d) fixing clips: 0,6 mm x 40 mm wide copper

- e) clout nails: hard drawn copper wire 2,8 mm diameter x 22 mm with barbed shank
- f) screws: brass, flat head

1.6.2 Laying

- a) softwood boarding: screw fixed onto battens with counter-sunk brass screws
- b) roofing felt: nailed onto boarding with copper clout nails with butt joints
- c) copper sheet: formed with both edges bent up 90 degrees to form troughs 510 mm wide
- d) standing seams: formed with double welts in direction of fall
- e) clips: formed of same material as roof and folded into seams at 300 mm centres and nailed to boarding with copper clout-head nails
- f) eaves: 100—120 mm wide sheet laid at eaves, nailed to boarding with copper nails and bent down with roof covering to form drip
- g) head wall (parapet walls, ventilation pipes and chimneys): sheet troughs bent up
- h) gutters and spouts: formed from copper sheet of 0,6 mm thickness, with movement joints in gutters every 10 m
- i) movement: all sheeting securely fixed without restricting thermal movement; nails and screws to be finished flush when covered by copper

1.7 Flashings

1.7.1 Material

- a) flashings and counter-flashings: sheet metal (reinforced liquid membrane is prohibited)
- b) fibre-cement roofs: 6 mm fibre-cement apron flashing finished off with metal counter-flashing against walls, or sill or U-flashing where required in vertical cladding, all according to *manufacturers instructions*
- c) on tiled roofs: steel sheet hot dip galvanised class Z275 for inland regions, or class Z600 or copper for coastal/corrosive regions, thickness 0,6 mm
- d) on sheet metal roofs: material similar to roofing sheets; side-wall flashings: >75 mm high, >200 mm wide or to cover at least two ribs of profiled metal sheeting; head-wall flashings: purpose made flashings incorporating serrated closers and poly closers to suit metal roof profile, manufactured to roof angle – do not bend on site; counter-flashings: >150 mm high, with anti-capillary fold; end laps: >150 mm for flashing; >75 mm for counter flashings; flashing nails: same material as flashing
- e) flashings to pipes >50 mm diameter: tapered sheet metal collar of diameter to fit around pipe, soldered or sealed to holed flange at same angle as pitch of roof; flashings to pipes <50 mm diameter: tapered sheet metal collar only

1.7.2 Fixing

- a) sheet metal flashings: cut, joined, lapped and formed to make a watertight finish
- b) fixing of flashings: to walls with 75 mm long flashing nails with a 20 mm hook
 - at ends and at 400 mm centres in between

- flashing nails: driven into wall above line of flashing turn-up, hook of flashing nail used to keep flashing in position (nails shall not be driven through flashing)
- c) fixing of flashings to roof sheets: at <600 mm centres or on each alternate rib
- d) undertile flashings: placed under roof tiles on battens at gable, parapet or chimney walls, to discharge onto roof covering or into eaves gutters
- e) chimney gutters: supported on high side of chimney on suitable boarding; turned up 100 mm against chimneys and > 225 mm up the roof slope; chimney gutters lapped onto side flashings or undertile flashings
- f) counter-flashings: fixed in 25 mm deep formed joints in masonry or pre-formed into concrete, kept in place with short rolls of cut-off sheet metal, and joints filled solid with 1:3 cement:sand mortar; counter-flashings shall not be punctured
- g) pipe flashing >50 mm diameter: flanges shall be fixed to roof sheets by means of roof screws similar to those used to fix the roof sheets, or by means of pop rivets; pipe flashings <50 mm: collars shall be soldered onto roof sheet; collars shall be sealed around pipe with suitable clamp and sealant
- h) valley linings:
 - to consist of ridging turned around, without roll for steep slopes, or with roll for low slopes
 - lapped 225 mm minimum
 - valley linings to discharge into eaves gutters
 - valley lining sides: folded back to form open beads in the case of slate and tile covered roofs
- i) exposed verges of corrugated steel roofs: finish with roll flashing

J. Carpentry and Joinery

J.1 Structural timberwork (flooring)

Applicable standard: SANS 2001- Construction works Part CT1: Structural Timberwork (flooring)

J.2 Structural timberwork (roofing)

Applicable standard: SANS 2001-Construction works Part CT2: Structural Timberwork (roofing)

J.3 Structural laminated timber

Structural laminated timber: SANS 1460

J.4 Timber buildings

Applicable standard: Timber buildings: SANS 10082

J.5 Fascias and barge boards

fibre-cement

- a) fibre-cement sheets: SANS 803

fixing

- b) drilled, countersunk and screwed at 750 mm maximum centres with 5 x 50 mm sherardized screws
- c) fixed to purlins, tilting battens or verge battens, and into ends of roof beams; in case of purlins, stub beams shall be built into gable walls between purlins to carry verge battens
- d) board joints: covered with 50 mm girth x 0,5 mm thick H-profile galvanised sheet metal cover strips

J.6 Joinery materials

J.6.1 Solid wood

hardwood

- a) hardwood: SANS 1099
- b) grade: clear and free of sapwood for visible faces; semi-clear for faces that will not be visible
- c) required marking: trade name, grade (clear grade—red, semi-clear grade—blue) on one piece in each bundle

softwood

- d) softwood: SANS 1783-3
- e) grade: clear and free of sapwood for visible faces; semi-clear for faces that will not be visible
- f) preservative treatment: required for exterior work
- g) required marking: trade name on one end, grade on other end (clear grade – black; semi-clear grade – red) on each piece

laminated timber

- h) laminated timber: SANS 1460
- i) type: furniture (F)
- j) appearance and finish: sanded and smoothed (G)
- k) preservative treatment: required for softwood exterior work
- l) required marking: application, exposure class, type, appearance and finish on each board

J.6.2 Wood board

plywood and composite board

- a) plywood and composite board: SANS 929
- b) required marking: trade name, exposure class, thickness, grade, preservative treatment on each board

decorative melamine-faced boards (MFB)

- c) decorative melamine-faced boards (MFB): SANS 1763
- d) required marking: SANS 1763 + 'MFB' + thickness + abrasion and lamina thickness + Z

fibreboard

- e) fibreboard: SANS 540
- f) required marking: type on each board

particle board

- g) particle board: SANS 50312
- h) required marking: SANS 50312 / EN 312

oriented strand board (OSB)

- i) oriented strand board (OSB): SANS 472

J.6.3 Polymer laminate and solid surfaces

high pressure decorative laminates (HPL)

- a) high pressure decorative laminates (HPL): SANS 4586
- b) required marking: SANS 4586 + type + resistance, e.g. HPDL—SANS ISO 4586—P333

continuous pressed laminates (CPL)

- c) continuous pressed laminates (CPL): SANS 1762/4586

polymer solid surfacing material

- d) synthetic work surfaces: consisting of acrylic and/or polyester resin and mineral fillers
- e) joints: seamless

J.6.4 Miscellaneous

adhesives

- a) terminology and classification: SANS 10183 part 1
- b) requirements for structural applications: SANS 10183 part 2
- c) requirements for non-structural applications: SANS 10183 part 3
- d) phenolic and aminoplastic resin SANS 1349

steel tubes for furniture

- e) steel tubes for furniture SANS 657 part 4, and mark-bearing

J.7 Joinery

general

- a) joinery fittings: manufactured in climate zone where it is to be installed
- b) joinery workshop: equipped with modern machinery, manned by skilled personnel
- c) wood sizes *as described* are exact finished sizes
- d) overall sizes: to be checked on site before starting any joinery
- e) storing of materials: in a safe and dry place
- f) proprietary materials: applied according to *manufacturer's instructions*
- g) wood member lengths: provided in single lengths whenever possible; unavoidable joints to be placed over supports
- h) joints: mechanical (grooved, doweled, feathered, screwed, proprietary plates) plus adhesive; angle joints: to conceal end grain of natural wood or the edge of laminated or particle board
- i) arrises in solid wood: slightly rounded; vulnerable or exposed arrises: pencil rounded (3 mm radius)
- j) fixings: not visible except inside cupboards or drawers; in open units, or where unavoidable, screws with matching caps shall be used; in natural solid wood surfaces with clear finishes: countersunk to 6 mm below surface and plugged with matching dowels glued in
- k) exposed panel pin heads: punched and filled with stopping; stopping to match wood in case of clear finishes
- l) exposed edges of decorative laminate board: post formed
- m) exposed edges of veneered composite board: solid wood edging to match veneer and to full thickness of board
- n) parts exposed to moisture (e.g. near sinks, wash basins, floors): moisture resistant or exterior grade board shall be used
- o) edges of raw board cutouts: seal to prevent moisture ingress

grain, pattern

- p) grain or pattern: grain of all fitted visible clear-finished timber, or pattern of laminates when relevant, to run vertically on vertical surfaces and parallel to walls on horizontal surfaces, wherever practicable
- q) veneer on any one fitting to match in grain and colour; veneer on pairs of doors to match

plinths

- r) plinths: to be formed with front and back members and full height cross members at <900 mm centres; plinths to be scribed to floor and secured to wall to provide a level platform for carcasses

tops

- s) solid hardwood tops: boards in single lengths or, if not possible, with staggered end joints, jointed with grooved, cross-tongued and glued joints or with grooved rebated and glued joints stopped 25 mm back from visible ends
- t) moisture resistant particle board tops: faced with high pressure decorative laminates with postformed exposed edges
- u) fixing: tops to be screwed to framework to allow for movement: with rebated hardwood clamps or metal cleats at 300 mm centres, screwed from underneath

backs

- v) backs to fittings: hardboard unless otherwise *described*
- w) bevelling: all exposed edges

drawers

- x) drawers: 12 mm softwood front, sides and back, grooved for 6 mm tempered hardboard bottom, screwed to 16 mm drawer face, unless otherwise *described*

shop painting

- y) joinery shall be delivered on site fully painted, unless otherwise *described*

fixing

- z) joinery shall be fixed only after the space is fully enclosed and secure, all wet work is complete and dry, and airconditioning, lighting, site and stormwater works are complete
- aa) joinery shall be fixed to masonry or concrete walls with *suitable* frame fixing anchors; the necessary blocking pieces and subframes shall be provided to take up inaccuracies of wall and floor faces; where exposed hardwood is to be anchor fixed, screw heads shall be sunk and pelleted
- bb) vermin proofing in all food handling areas: all carcass joints with walls and floors, and cable entries, to be sealed with silicone beads

J.8 wood skirtings, quadrant beads, rails, etc.

- a) skirtings of 68 mm and higher: with hollow-rounded backs
- b) fixing to walls:
 - in long lengths, with splayed heading joints and mitred corner joints

- with concealed fixings at not exceeding 600 mm centres
- quadrant beads in angle at junction with floor (where *so described*): fixing with panel pins to skirtings (not to floor boards)

J.9 Wood window/door frames

- mechanical performance: SANS 613
- hardwood: SANS 1099, clear grade, of species *as described*
- softwood: SANS 1783-3, clear grade, of species *as described*
- joints (structural): mortise and tenon
- rebated frames: shaped out of solid wood (lay-on door or casement stops are prohibited)
- haunches: top rails of door frames to be provided with bevelled haunches for building in
- glazing beads: with mitred corners, tacked lightly in place before delivery

J.10 PVC-U window/door frames

- PVC-U window and door frames for external use: SANS 1553.

J.11 Polymer compound window/door frames

- polymer material: unsaturated polyester (UP) resin: SANS 713
- to *comply* with minimum safety, heat distortion and compressive strength requirements

J.12 Wood doors

- wood doors: SANS 545 and mark bearing
- required marking on edge or top of each door: manufacturer, exposure class, performance class; in case of flush doors, position of coat rails ('CR') and closer blocks ('CB')

flush panel doors

- edge finish: concealed

additional clauses

- batten doors for external use, or framed panel and glass doors for external or internal use: 44 mm thick, of hardwood (including doors to be painted), mortise and wedge tenoned, with the tenon showing on the outside edge of styles; middle rails in such a position that a mortice lock will not destruct the tenon joint
- single swing double doors: with rebated meeting stiles
- veneer on pairs of doors: to match in grain and colour
- performance rating stamp on door: not to be removed until inspected in the hung position

sealing

- if not prefinished, doors shall be sealed, or knotted and primed, on all four edges immediately after delivery on site

K. Ceilings, partitions and access flooring

K.1 Ceilings

K.1.1 Nailed-up ceilings

timber brandering

Applicable standard: SANS 2001-Construction works Part CT2: Structural Timberwork (roofing)

additional requirements:

- a) size, and span (truss or beam spacing):

Truss or beam spacing	Dimensions, mm	
	Soft wood	Eucalyptus
6.4 mm gypsum plaster ceiling board		
<1000	38 x 38	32 x 32
1000 – 1200	38 x 50	38 x 38
1200 – 1400	50 x 75	38 x 50
4 or 6 mm fibre-cement ceiling board		
<1050	38 x 38	32 x 32
1050 – 1500	38 x 50	38 x 38

- b) where roof trusses or beams are spaced at more than the required spacing for the intended brandering size, brandering size shall be increased, or support brandering by means of 38 x 114 mm sawn softwood ceiling joists shall be hung between and parallel to trusses or beams on 38 x 38 mm hangers from 38 x 76 mm runners fixed at 1 500 mm centres at right angles and on top of tie-beams of trusses or on top of beams, or at right angles in between tie beams/beams
- c) where heavy light fittings are to be suspended, supporting timber shall be installed
- d) patent steel brandering: hot dip galvanised steel sheet lipped channel brandering system including suspension brackets with adjusting slots
- size or span: 1 200 mm maximum or according to *manufacturer's instructions*
 - fixing: suspension bracket to be nailed or screwed to side of timber truss/beam
 - levelled out by means of adjusting slot
 - perimeter trim: standard or shadowline as *described*

gypsum plasterboard

- e) gypsum plasterboard: SANS 266
- f) hard wall gypsum plaster, where so *described*, to be applied to supplier's instructions with smooth polished surface
- g) spacing of brandering: 400 mm (300 mm when plastered)

fibre-cement board

- h) fibre-cement board: SANS 803
- i) spacing of brandering: 600 mm

cover strips

- j) cover strips to gypsum plaster and fibre-cement board joints:
 - H-profile prepainted galvanised steel, aluzinc or plastic; or
 - gypsum plaster board; or
 - hardwood: species, profile, etc. *as described*

tongue and groove wood boarding

- k) tongue and groove wood boarding: SANS 1039
- l) secret nailed with lost-head oval wire nails and with end joints staggered

plywood boarding

- m) 3-ply to SANS 929, of exposure class, veneer species, grade etc. *as described*

wood strip

- n) hardwood: species *as described*
- o) fixed with panel pins

cornices

- p) gypsum coved cornice: SANS 622; or
- q) polystyrene core coved cornice: paper covered; or
- r) hardwood: species, profile, etc. *as described*

timber brandered trap door

- s) 650 x 650 mm minimum clear opening in ceiling to be trimmed with 38 x 100 mm sawn softwood trimmers spiked to beams or trusses
- t) trap door: formed of brandering and ceiling board as for ceiling
- u) fillets to carry trap door in closed position: 50 x 13 mm hardwood nailed or screwed to ceiling around trap door opening; corners to be mitred
- v) trap door to be hinged with one pair 75 mm steel hinges screwed to frame, so that trap door opens 180 degrees on to top of ceiling brandering, unless otherwise *described*

pressed steel trap door

- w) 0,6 mm pressed steel ceiling trap door, hinged to open 180 degrees onto ceiling, in 25 x 25 x 3 mm T-profile steel frame
- x) clear opening: >650 x 650 mm
- y) frame: screw fixed to ceiling brandering

K.1.2 Suspended ceilings

performance

- a) fire resistance in minutes, tested to SANS 10177

- b) airborne sound insulation rating: SANS 717/10218
- c) deflection requirements: to South African Building Interior Systems Association (SABISA).
- d) structural performance requirements: all anticipated loads, e.g. luminaires, smoke detectors, air grilles, wind loads, point loads to be safely supported

board

- e) mineral fibre board: EN 13964 unless otherwise *described*

suspension fittings

- f) patent suspension fittings: cold-formed hot dip galvanised steel T's, hold down clips, suspension rods and hooks, suspension clips, T suspension plates, lipped wall angles, shadowline wall angles and wall channel trim

installation

- g) according to *manufacturer's instructions*

K.1.3 Thermal insulation

materials

- a) required R-value/thickness: SANS 204
- b) required fire performance classification of thermally insulated building envelope systems: SANS 428

fibre mats/batts

- c) fibrous thermal insulation mats/batts: SANS 1381-1

loose fill

- d) loose fill (granules, pellets): SANS 1381-2
- e) cellulose loose fill (wood based): SANS 1381-6

installation

- f) bulk insulation: neatly cut to fit snugly between rafters
- g) insulation to be kept clear of incandescent and halogen downlighters/transformers
- h) electrical and other safety issues (e.g. defective wiring, adequate lighting during installation): to be observed.

K.2 Partitions

performance

- a) structural requirements: SANS 10160
- b) wall deflection requirements: South African Building Interior Systems Association (SABISA)
- c) required fire resistance in minutes: SANS 10177
- d) required sound insulation grading: SANS 717/10218

boards

- e) gypsum plasterboard: SANS 266
- f) fibre-cement board: SANS 803

studs and tracks

- g) metal studs and tracks: hot dip galvanised steel with wall thickness and size *complying* with the structural requirements of the installed system
- h) timber studs: SANS 10082: for load-bearing or non-load-bearing walls *as described*

aluminium extrusions

- i) extruded aluminium sections: alloy 6063 or 6261 in temper T5 or T6, of wall thickness and strength to meet the structural requirements
- j) anodizing: SANS 1407

powder coating

- k) powder coating: SANS 1274
- l) by applicators approved by the powder manufacturer

glass

- m) glass: SANS 1263/50572
- n) required marking in case of safety glass: permanently on each pane, visible after installation.

drywall partitions, light weight internal walls

- o) framed system clad with gypsum or fibre-cement board, doors, glazing, trim, skirtings, etc.: *as described*

demountable partitions

- p) patent system complete with studs, braces, door and glazing frames, apertures, trims, skirtings, etc.: *as described*

cubicle partitions

- q) patent system complete with stiles, panels, doors and accessories, etc.: *as described*

operable partitions

- r) patent operable partitions consisting of full-height panels of 1200 mm wide 75mm thick, hung on tracks manually operated and stackable
- s) frames: aluminium alloy
- t) panels: medium density fibreboard backed with sound insulation materials
- u) hinges: recessed
- v) seals: all round each panel to achieve the required sound insulation

installation

w) according to *manufacturer's instructions*

K.3 Access flooring

a) raised access flooring: SANS 1549

b) fire resistance in minutes as tested to SANS 10177: *as described*

c) sound insulation single-number grading rated to SANS 717/10218: *as described*

d) class: *as described*

e) floorpanel covering: *as described*

installation

f) according to *manufacturer's instructions*

Electronic Version

L. Floor coverings, wall linings, etc.

L.1 Preparation

- a) all building operations that may damage the floor or lining to be completed before laying flooring or lining
- b) embedded pipes, conduit, cables, etc.: in position and tested
- c) substrate: dry and clean; in case of porous or dusty base, a primer shall be applied to improve bond between base and adhesive when relevant
- d) defects in base: levelling or smoothing compounds to be applied only to repair minor surface irregularities, and *to manufacturer's instructions*
- e) edge/dividing/feature strips, where *described*: to be in position before flooring is laid
- f) sufficient acclimatisation period for the material, when relevant, shall be allowed

L.2 Materials

primers and adhesives

- a) primers, adhesives, additives, patching and repair compounds and waterproofing compounds: low-VOC proprietary products supplied by one manufacturer, suitable for the work at hand, compatible with the floor covering and substrate and applied *to manufacturer's instructions*

L.3 Thermoplastic and similar flexible covering

materials

- a) semi-flexible vinyl tiles: SANS 581
- b) flexible vinyl flooring: SANS 786
- c) linoleum sheeting or tiles: *as described*
- d) rubber sheeting or tiles: recycled rubber of density between 800 to 1500 kg/m³, of light colour and of thickness, size, and texture *as described*
- e) accessories: skirtings, trim, nosings, etc.: *as described*

laying

- f) laying: SANS 10070 and *to manufacturer's instructions*
- g) pattern: *as described*, continued through door openings connecting rooms with similar flooring
- h) joints in sheet flooring: welded

finishing

- i) cleaned and polished with two coats polymer floor dressing to SANS 1042

L.4 Wood flooring (solid and laminate) on solid substrates

materials

- a) solid wood panels: unpacked, stored dry and under cover, allowed free air circulation to bring panels to equilibrium moisture content

solid wood strip, block, parquet, mosaic, etc.

- b) density: >640 kg/m³ at moisture content of 12%
- c) strip: tongued, grooved and end-matched
- d) block dimensions: face width 57—90 mm, length 200—500 mm, thickness >20 mm
- e) parquet flooring: >6 mm thick

faced plywood or fibreboard

- f) factory assembled in panels of random lengths, and in widths up to 300 mm depending on species
- g) thickness: not less than 18 mm when laid on battens
- h) edges: tongued and grooved to produce a tight sliding fit and a flush joint on face side of strip, and end-matched

decorative melamine laminate

- i) decorative melamine laminate flooring: EN 13329
- j) thickness: 8 mm
- k) *suitable* for floating application to a fully supporting substrate
- l) provided with patent interlocking system
- m) built-in insulating underlay: where *described*

battens

- n) battens: sawn softwood timber to SANS 1783-4
- o) battens for sprung floors: laminated softwood

damp proof membrane

- p) over-slab damp proof membranes: polymer film to SANS 952 class C (green) or an Agrément certificated polyethylene sheet

movement joints

- q) movement joint strip: *suitable* patent

L.4.1 Installation

preparation

- a) partitions: to be in place before floating floors are laid

installation in general

- b) not to be laid over underfloor heating without written approval of the flooring manufacturer and/or the installer
- c) panels or strips to be laid in same direction as angle of light incidence; where this is of no consequence, panels or strips are to be laid parallel to longest side of room

- d) pattern to be continued through door openings connecting rooms with similar flooring
- e) movement joints: 20 mm clear space against all fixed objects including door frames, and every 10 m in both directions; plaster finish on walls shall be stopped or cut back short of finished floor level to ensure skirting covers the joint

nail down

- f) damp-proof membrane to be laid over concrete substrates on the ground; sheets to be lapped by 300 mm
- g) battens to be fixed at 400 mm centres to substrate except in cases of sprung floors where battens are to be laid floating on *suitable* resilient pads
- h) space between battens to be filled with cement-sand mix where underfloor heating is installed
- i) flooring strips to be secret-nailed to battens through the tongue at an angle of 45°; header joints may occur in the spaces between battens, provided that each length of flooring is nailed to at least two supports; header joints to be random staggered

glue down

- j) adhesive to be spread evenly on substrate with a serrated trowel
- k) panels to be placed accurately on setting out lines
- l) panels to be firmly tapped in position within open time of adhesive

floating

- m) damp-proof membrane to be laid over concrete substrate on the ground; sheets to be lapped by 300 mm
- n) foam underlay to be laid as recommended by manufacturer over entire floor area
- o) joints: patent click jointing system with random staggered end joints
- p) manufacturer's accessories shall be used for intermediate joints, movement joints, skirtings, split-level treatments, nosings, and marrying to other flooring materials

finishing solid flooring

- q) sanding: when relevant, adhesive shall be completely cured before starting sanding operations
- r) sanding shall be done with a mechanical floor sander in one operation (fine only) to a smooth and even surface
- s) untreated wood floors: finished with one coat clear wax polish

finishing faced plywood or fibreboard panels

- t) prefinished panels: clean down
- u) panels having to be sanded: only after having made absolutely certain of the process before attempting this work, and only with prior permission

L.5 Textile flooring

L.5.1 Materials

textile flooring

- a) textile flooring (pile construction): SANS 1375
- b) textile flooring (needle punched construction): SANS 1415

carpet underlays

- c) carpet underlays: SANS 1419, with fire and location grade similar to floor covering grade

accessories and fixing materials

- d) as recommended by carpet manufacturer
- e) stair nosings to have distinct colour difference from carpet
- f) where fire ratings are critical: non-flammable contact adhesives to be used only

L.5.2 Installation

- a) according to *manufacturer's instructions*
- b) coverings from the same production run shall be used to ensure uniform colour and texture in one area
- c) direction of seams and pile: pile to lie down stairs; longitudinal seams to be placed away from traffic areas; cross seams to be placed in crotch of stairs
- d) full widths to be started on door side of room; carpets under doors to be finished within thickness of closed door
- e) to prevent bow-wave effects under wheels (for example in medical institutions), carpet shall be stuck to floor with *suitable* adhesive
- f) where no protective nosings occur, stair nosings to have a minimum radius of 12,5 mm
- g) covering shall be secured at each crotch between riser and tread by carpet gripper lengths or by means of adhesive
- h) continuity of level between covering and stair nosing shall be ensured by fixing nosing to suitable spacers, e.g. hardboard or plywood strips with adhesive and screws

M. Ironmongery

M.1 General

- a) sherardizing on ferrous products: SANS 53811
- b) electroplating: SANS 135/136/2081/2082
- c) powder coating: SANS 1274 type 6

M.2 Fasteners

- a) fasteners: SANS 1700
- b) metal screws for wood: SANS 1171
- c) masonry anchors: proprietary expansion or chemical type
- d) plugs: proprietary plastic
- e) mild steel nails: SANS 820
- f) required marking: protective coating on container

M.3 Locks, latches and associated furniture for doors

- a) locks, latches, etc. (domestic type): SANS 4

padlocks

- b) padlocks: SANS 1533

keys

- c) two keys to every lock; no key shall pass more than one lock unless *described* as "en suite"
- d) cylinder locks and locks *described* as "en suite": clearly marked with consecutive numbers and each key punched with the corresponding number of the relevant lock
- e) proprietary key control security systems: details to be submitted where required

M.4 Hinges

hinges for lightweight doors

- a) type (piano, pivot, flush, european-hidden, adjustable, strap): *as described*

hinges for medium to heavy doors

- b) type: butt hinges for doors opening 90°; projecting hinges for doors opening 180° when frames are set back from wall faces.
- c) aluminium hinges: high tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint
- d) doors fitted with closers shall be provided with low-friction bearing hinges
- e) exterior or security doors opening out shall be provided with fixed pin or security hinges

M.5 Door closers

- a) single action overhead door closers: SANS 1510
- b) manual action: with adjustable closing and latching speed
- c) floor spring sets, consisting of a floor spring unit let into the floor and with bottom and top door strap of size and finish as *described*

M.6 Blinds

- a) indoor venetian blinds: SANS 947
 - cross-straps: flutter-proof
 - screws: cadmium-plated.

M.7 Number/name plates**symbolic safety signs**

- a) symbolic safety signs: SANS 1186

installation

- b) signage shall be fixed level and plumb, securely mounted with concealed theft-resistant fixings
- c) self-adhesive signs shall be fixed free of bubbles and creases

M.8 Drawer runners/slides

- a) type, load capacity, extension: as *described*

M.9 Fixing

- a) ironmongery for doors shall be delivered in individual complete sets for each door, as follows:
 - clearly labelled to show its intended location
 - in a separate dust and moisture proof package
 - including the necessary templates, fixings and fixing instructions
- b) correct handing to be verified on site before supplying
- c) ironmongery to be fixed with matching screws
- d) locks to be eased and adjusted on completion; closers to be adjusted to suit
- e) keys to be handed over at completion; cylinders to which contractor had key access during construction to be replaced with new cylinders with other keys
- f) all keys to be labeled with coloured plastic tags
- g) curtain rail/rod brackets and tie-backs to be plugged and screwed to wall
- h) rails/rods to project 300 mm past reveals wherever possible, or continuous over windows occurring in series.
- i) safety signs to be fixed according to SANS 1186 in positions as shown in *drawings*

- j) ironmongery to be protected during construction

M.10 Proprietary kitchen cupboards

- a) proprietary kitchen cupboards: SANS 1385
- b) required marking on casing of every unit: trade name, production lot
- c) sizes: supplier/manufacturer is responsible for checking sizes on site and for providing detail layout drawings before any work is started
- d) cupboards to be fixed according to *manufacturer's instructions*
- e) all joints between work tops and walls shall be sealed
- f) all cupboard components shall be inspected and left in perfect working order after fixing
- g) cupboards shall be protected from damage

M.11 Proprietary steel furniture

- a) proprietary steel furniture: SANS 757
- b) powder coated finishes: SANS 1274

Electronic Version

N. Structural steelwork

N.1 Structural steelwork

Applicable standard: SANS 2001-Construction works Part CS1: Structural steelwork

Additional clauses:

- a) steel wire rope (cables): SANS 2408
- b) structural steel tubes: SANS 657 part 1, and mark-bearing
- c) shackles: SANS 2415
- d) thimbles: SANS 2262

welding

- e) visible welds: continuous, ground smooth

N.2 Coating

- a) type: *as described*
- b) preparation of steel surfaces: SANS 10064

hot dip galvanizing

- c) hot dip galvanised coatings on prefabricated iron and steel products: SANS 121 / ISO1461
- steel composition: for industrial/mining purposes: Si 0,125 — 0,30% with P <0,02%; for architectural purposes: Si 0,03 with P <0,01% or Si 0,15 — 0,25% with P <0,02%

paint or varnish

- d) corrosion protection of structural steel of not less than 3 mm thickness by paint or varnish: SANS 12944
- all paint shall be sourced from one manufacturer
- paint system testing: laboratory tests to SANS 12944-6

N.3 Light steel frame building

- a) Light steel frame building: SANS 517, or a rational design by a *competent person*

O. Metalwork

O.1 Metals

O.1.1 Steel

- a) steel: commercial quality mild steel
- b) corrosion protection of manufactured work before delivery to site:
 - preparation of surfaces: SANS 10064
 - coating: zinc phosphate primer or, where so *described*, hot dip galvanizing to SANS 121 / ISO 1461
- c) welding: visible welds continuous and ground smooth
- d) dressing: cut edges to be dressed to remove dross, burrs and irregularities; holes to be dressed where required to remove burrs and protruding and/or sharp edges

O.1.2 Stainless steel

- a) stainless steel: austenitic (300 series) stainless steel grade 304, or grade 316 in coastal areas
- b) finishes: annealed and pickled mill finish/polished/coloured/etched/mirrored/electropolished as *described*

O.1.3 Aluminium

- a) extrusions: 6063-T6 alloy and temper; sheets and strips: 1200-H4 alloy and temper
- b) construction:
 - joints to be formed in an approved manner to be practically invisible
 - screw heads, pins, rivets, etc. to be concealed as far as possible
 - 300 series stainless steel screws and bolts to be used for jointing and fixing
- c) finishes: mill finish/anodising to SANS 999/powder coating to SANS 1274/1578/1796 // matt/satin/high-gloss/hammertone/textured as described
- d) protection:
 - surfaces of aluminium work in contact with other materials when fixed to be suitably insulated with non-absorbent insulating material to prevent corrosion
 - all aluminium work to be protected against damage, deterioration or discoloration caused by mortar droppings, paint, etc. by taping with removable tape, covering with temporary casings or with motor oil

O.2 Doors, windows, curtain walling, shopfronts, etc.

O.2.1 Performance

Unless otherwise *described*, the following performance standards are required to be met:

mechanical performance

- a) mechanical performance of doors, windows, curtain walling, shopfronts, etc. in respect of wind action (deflection and structural strength), water penetration, air penetration and operation within the confines of the perimeter of the main frame, irrespective of the framing material: SANS 613
- b) design wind pressure: SANS 10160
- c) atmospheric temperature range: between -10°C and 35°C
- d) plastic, shrinkage and creep deflection of floor slabs: *as described*

thermal performance

- e) U-value and Solar Heat Gain Factor, including permissible air leakage: SANS 204, or as supplied by the glazing manufacturer as verified according to the test method ASTM C 1199 and ISO 9050 for U-values, and given in NFRC / SAFIERA 100-2004 for SHGC values, or be custom product assessed from suppliers, manufacturers, industry associations (including their online resources), and from competent assessors, who must have assessed the products in the manner prescribed by SAFIERA, or be the subject of a rational design by a *competent person*

fire resistance

- f) fire resistance: *as described*

sound insulation

- g) sound insulation: *as described*

O.2.2 General requirements

- a) fittings to be removable after windows have been glazed

burglar bars

- b) solid mild steel or aluminium alloy, of pattern as described
- c) bars at peg stays or latches to be kinked where required

insect screens

- d) metal gauze screen frames: pressed steel with baked enamel finish, or extruded aluminium with natural anodised finish, filled with 1,5 x 1,5 mm mesh fibreglass gauze, *as described*

installation

- e) install to *manufacturer's instructions* where applicable
- f) service units at completion and leave in perfect working order

O.2.3 Steel frame units

- a) factory finish: prepared to SANS 10064 and primed with zinc phosphate to SANS 1319 inland, or hot dip galvanised to SANS 121 / SANS 14713 in the *coastal region* or corrosive atmospheres

hot-rolled steel framed units

- b) hot-rolled mild steel framed units: SANS 727

pressed steel clisco type window frames

c)* pressed steel clisco type window frames: SANS 1311

pressed steel door frames

d) pressed steel door frames: SANS 1129

- frames for continuous power floated floors without screeds or toppings to be *suitable* for surface placing without damage to the floor and without compromising proper building in of the frame or the fitment of standard doors
- steel thickness: *as described*
- frames for double swing doors: jambs with V-shaped centres to fit rounded edges of doors, and plain heads or transoms, holed and prepared to receive top centres of spring hinges
- buffers: two rubber buffers on lock side rebate of every frame

pressed steel door and frame combination

- e) doors: 1,2 mm thick pressed steel with 40 mm edge, > two V-shaped vertical ribs over full door height, and three horizontal rails
- f) frame: single rebate pressed metal door frame to SANS 1129
- g) lock box: 1,6 mm pressed steel
- h) hinges: 1 pair 100 mm steel

cold-rolled steel frame units

- i) patent cold-rolled tubular steel profile frame with integrated fittings and gaskets
- j) galvanised to 200 g/m² and prepainted to ASTM D3663 for PVDF fluorocarbon, or AAMA 605.2.92 for baked organic coating

O.2.4 Aluminium framed units

- a) AAAMSA certified as to performance, glazing, surface finishing, ironmongery, fasteners, product certification and, where *described*, energy rating
- b) anodising: SANS 999.
- c) powder coating: SANS 1796, minimum thickness for all areas: 0,06 mm

O.2.5 Skylights and curtain walling

- a) a *competent person's* certificate on design loading compliance shall be obtained
- b) sloping glazing to have an overhang where it sheds rainwater on significant vertical surfaces
- c) glazing bars to allow for water penetration and effective drainage to outside
- d) condensation: to be removed through guttered weep system
- e) screws and fixing bolts: covered with plastic head caps

O.2.6 Adjustable glass louvre units

- a) *suitable* for hand or longarm operation

- b) glass: with polished edges
- c) louvre units shall be fixed
 - after window frame has been painted, when relevant
 - with stainless steel or chromium plated brass dome-head screws
- d) louvres shall be serviced at completion and left in perfect working order

O.2.7 Fire doors and fire shutters

- a) fire doors and fire shutters: SANS 1253
- b) installation: SANS 1253 Annex E

O.2.8 Garage doors

up-and-over garage doors

- a) solid door panel of steel or wooden framework clad in weather boarding, tipping upward into horizontal open position and balanced by springs

sectional overhead doors

- b) curtain of hinged panels sliding upwards and inwards in channel guides and balanced by springs

O.2.9 Roller shutter doors

- a) curtain of interlocking slats or grilles running in channel guides from a spring loaded barrel, mounted overhead on steel support brackets
- b) assembly bolted or welded to the building structure
- c) automatic operation to be supplied with light, safety reverse, manual override, and remote control
- d) electrical operation to include remote push button starter, limit switch assembly, emergency hand operator in event of power failure, and electromagnetic brake

O.2.10 Strongroom/record room doors, ventilators

strongroom and vault doors

- a) strongroom and vault doors: SANS 949
- b) required marking: manufacturer's name on outside of door; door category on inside of door

fire-resisting record room doors

- c) fire-resisting record room doors: SANS 1015
- d) required marking: "FIRE RESISTANT ONLY" , manufacturer's door number

ventilators for strongrooms

- e) double ended steel telescopic ventilator sleeves of 127×127 mm internally and suitable for wall thickness, fitted with baffle plates and flame proof wire gauze screen; face plates 225×225 mm on both sides, the outer face plate fitted with drop shutter mechanism operating from a fusible metal plug; sleeves and baffle plates not less than 2 mm thick

installation

- f) bolted to walls with lugs provided
- g) in openings formed in walls after plastering has been completed
- h) *to manufacturer's instructions*
- i) grouted solid in class I mortar
- j) door to clear finished floor by 25 mm
- k) ventilator(s) built into openings formed in the walls in class I mortar, grouted in solid

Electronic Version

P. Plastering

P.1 Screeds, toppings, terrazzo

P.1.1 Materials

cement and aggregate

- a) cement for screeds: SANS 50197-1 type CEM I or CEM II
- b) cement for toppings: SANS 50197-1
- c) cement extenders: SANS 1491
- d) aggregate for screeds: concrete sand (not a plaster sand) passing through a 5 mm sieve; where a smooth surface is required, concrete sand may be blended with plaster sand in the proportion of 4:1
- e) aggregate for toppings: aggregate from natural sources: SANS 1083

Nominal aggregate size, mm	Minimum thickness of topping, mm
6,7	25
13	40
¼ thickness of topping, maximum 19	>40

- f) aggregate for terrazzo: marble aggregate consisting of equal parts of sizes ranging from 3 to 4 mm and 4 to 6 mm

proprietary surface treatments

- g) form: dry shakes, coatings or screeds as described
- h) colouring pigment: BS 1014 or BS EN 12878

mesh reinforcement

- i) welded steel fabric for reinforcement of topping when so described: SANS 1024, of fabric reference number 193 or 245

P.1.2 Mix

screed

- a) 1 part cement to 3½ parts sand, or 50 kg (one bag) cement to 130 L sand (two wheelbarrows)
- b) mixing: by hand or preferably by forced-action mechanical mixer for 3 minutes
- c) use within 45 min.

topping

- d) mix proportions of *described* grade may be arrived at by a process of mix design or by the use of recognised tables of trial mixes with South African aggregates

terrazzo

- e) 1 part cement to 2 parts marble aggregate

consistency

- f) slump: 40 – 50 mm as measured by the standard slump test to SANS 5862

colouring pigment

- g) application: mix with dry cement, or add to freshly laid surface as a dry shake

P.1.3 Preparation

- a) all piped services shall be in position in base; services shall not be buried in toppings or screeds
- b) base concrete shall be hard and strong, free of cracks and reasonably accurate to required level; clean, hard concrete shall be exposed by chipping if necessary and all dust removed, preferably using an industrial vacuum cleaner
- c) surface shall be wetted for four hours before laying only if concrete is absorptive; free water shall be removed before grouting (concrete can be tested for absorptiveness by pouring a cupful of water onto the surface; if water is absorbed within a few minutes, suction warrants that the surface should be wetted; if not, do not wet)
- d) bay forms for toppings shall be prepared to coincide with joints in base
- e) edge/dividing/feature strips shall be in position before casting

P.1.4 Laying

- a) grout: a mix of about ½ L water per kg cement, or a proprietary bonding agent, shall be brushed over the surface 10 to 20 minutes before applying screed or topping; bonding agents shall be applied to *manufacturer's instructions*; to be used within 30 minutes of mixing
- b) screed or topping mix to be spread, compacted, and lightly wood-floated to required thickness

screeds

- c) guide strips of screed mix to be laid to establish levels
- d) screeds to be laid in panels as large as possible in one operation without intermediate joints
- e) screeds not to be covered with a floor finish shall be laid in panels not exceeding 9 m² or to acceptable pattern
- f) screed thickness: 25 – 50 mm
- on stair treads: 20 mm
 - on stair risers and skirtings: 10 mm
 - on flat concrete roofs to receive waterproofing: minimum thickness 40 mm and to fall
- g) exposed salient angles: round to 20 mm radius

toppings

- h) levels shall be established by means of bay forms
- i) bays shall be cast in chequerboard fashion in panels not exceeding 9 m² or cast continuously with sawn contraction joints as *described* hereinafter
- j) topping thickness: 25 – 40 mm

- k) mesh reinforcement: placed as close to the upper surface as is permissible

terrazzo

- l) screed mix to be spread, compacted and lightly wood floated to 25 mm thickness as *described* hereinbefore; edge/feature/dividing strips shall be set into screed to form panels not exceeding 1 m², or to pattern as *described*; while screed is still plastic, terrazzo mix shall be spread and compacted in bays to thickness of 15 mm and trowelled to level surface

P.1.5 Finishing

screeds and toppings

- a) ordinary finish: surface left as finished by wood floats to smooth or non-slip finish
- b) hard finish:
- surface bull-floated immediately after levelling before any excess moisture or bleed water appears on the surface
 - finish shall be left undisturbed for two to four hours (longer in cold weather), bleed water and laitance on surface shall be removed
 - surface floated again, and steel trowelled until desired texture is obtained
 - power trowels shall be used if areas are large
 - surface finished with carpet-faced floats or soft brushes or broom to desired texture
- c) water or dry cement shall not be added at any stage; premature and overtrowelling shall be avoided

pigmentation

- d) integral application: mix shall be laid in two thicknesses in one operation, the lower unpigmented thickness brought up to 6 mm of the finished level, and the upper pigmented thickness laid with the required amount of pigment mixed with the dry cement before adding water
- e) dry shake application: added to the final surface and trowelled in to an acceptable finish and pattern

grinding and polishing

- f) surface shall be ground after four days by wet mechanical process until aggregate is fully exposed and surface is even and smooth or non-slip as required
- g) small or awkward surfaces shall be ground by hand with carborundum stone
- h) surface shall be washed clean

P.1.6 Joints

isolation joints

- a) against walls, columns or other fixed objects
- b) 20 mm wide through full thickness of topping, screed or terrazzo
- c) to coincide with isolation joints in base

intermediate sawn contraction joints

- d) in continuously cast unreinforced topping only
- e) halfway through topping thickness with concrete saw
- f) panels shall not exceed 9 m², or shall be to pattern *as described*
- g) top edges of joints: arris-rounded with a radius of 3 – 5 mm

patent movement joint systems

- h) patent movement joint system with flexible inserts shall be used where so *described*
- i) fixed through pre-drilled holes using cross-head stainless steel screws and plugs at 300 mm centres on both sides of joint

joint sealing

- j) joints subjected to heavy traffic: filled with a *suitable* semi-rigid epoxy
- k) joints shall be sealed with a *suitable* elastomeric material where so described

P.1.7 Surface regularity

- a) degree of surface regularity: II (SANS 10155) 5 mm along a 3 m straight-edge in any direction, and gradual, unless otherwise *described*
- b) deviation of floor finish from datum level: ± 15 mm and gradual; less near door openings or other defined areas where levels are required to be accurate.

P.1.8 Skirtings

- a) 75 mm high, unless otherwise *described*, and of same material as floor finish and in same operation
- b) hollow rounded at junction between floor and skirting, top edge level with slightly rounded edge
- c) to project 10 mm from face brick and bagged wall surfaces, 5 mm from face of plastered walls, and flush with tiled wall surfaces

P.1.9 Curing

- a) surface shall be cured for at least seven days by
 - uniform application of a liquid membrane-forming compound *complying* with AASHTO M148 type 1-D or type 2 *to manufacturer's instructions*, or
 - ponding water on surface, or
 - covering with sand which is kept moist, or
 - covering with plastic sheeting
- b) curing time shall be extended in cold weather when ambient temperature falls below 10°C

P.1.10 Inspection, testing and repair

- a) screeds or toppings shall be inspected as late as possible in the construction programme
- b) adhesion of screeds or toppings to base shall be tested by tapping surface with a hammer or end of a rod; hollow sound indicates lack of adhesion

- c) rejected panels shall be isolated by sawing with a mechanical concrete saw in an acceptable pattern, removed and relaid, using the same procedure as above, starting with preparation of the base

P.2 Epoxy flooring

- a) type: seamless epoxy mortar floor
- b) epoxy mortar: epoxy resin mixed with *suitable* aggregate of *described* colour and size

application

- c) *to manufacturer's instructions*
- d) on scabbled or sandblasted surface to provide necessary grip
- e) surface to be primed with low-viscosity epoxy
- f) final epoxy finish to be applied by trowel or by self-levelling, to thickness and finish *as described*
- g) sample panel: required
- h) movement joints: defined by separate metal strips on both sides of joint

P.3 Plaster

P.3.1 Cement plaster

Applicable standard: SANS 2001-Construction works Part EM1: Cement plaster

- a) sand: SANS 1090
- b) admixtures: not permitted

additional items

- c) full width structural joints shall be maintained through plaster
- d) plaster surfaces to be tiled shall be scored

P.3.2 Gypsum plaster

- a) hardwall gypsum skimming plaster: proprietary retarded hemi-hydrate finishing plaster
- b) application: to supplier's instructions

P.3.3 Lime plaster

- a) lime: SANS 523
- b) mix: SANS 523 Annex C

P.3.4 Insulating plaster

- a) aggregate of low density: SANS 794, density 800 – 960 kg/m³ (clinker), unless otherwise *described*
- b) mix: 1:9 or according to supplier's instructions
- c) low-density foamed mixes by specialist suppliers: prohibited without permission by Employer's principal agent

P.3.5 Barite plaster

- a) plaster grade barium sulphate (BaSO₄)
- b) sand: SANS 1090
- c) mix: one part cement to two parts sand to three parts barite by mass
- d) thickness: 15 – 30 mm

P.3.6 Dividing strips, edge trims, etc.

- a) *as described*

P.3.7 Metal lathing

- a) expanded metal, unless otherwise *described*: SANS 190, hot dip galvanised in external plaster, stainless steel in corrosive atmospheres

Electronic Version

Q. Tiling

Q.1 Materials

ceramic and porcelain wall and floor tiles

- a) ceramic wall and floor tiles: SANS 1449
- b) porcelain wall and floor tiles, fully vitrified: SANS 13006 group B1a, water absorption $\leq 0,5\%$
- c) moisture expansion limit: $< 0,06\%$ for external floors, and for internal floors in wet and/or cold areas
- d) scratch hardness on the MOHS scale: > 4 for walls; > 7 for floors
- e) required marking on tile and/or packaging: trade name, country of origin, group, dimensions, class of resistance of glazed tiles to acids and alkalis, surface abrasion resistance of glazed tiles

stone tiles

- f) natural stone: from an approved quarry
- g) cast stone: BS 1217

concrete tiles

- h) precast concrete tiles: SANS 541
- i) terrazzo tiles: precast concrete with a terrazzo facing: BS EN 13748

mosaic

- j) tesserae glued to brown paper or water resistant synthetic mesh fabric in squares of approximately 300 x 300 mm

profiled and decorative tiles

- k) skirting, dado, bullnose and other profiled or decorative tiles: *as described*

accessories

- l) movement joint strip: of depth that allows fixing to the substrate or background: *as described*
- m) stair nosing and movement joint strip: with polyurethane or PVC infills: *as described*

adhesive

- n) proprietary adhesive BS EN 13007, of *suitable* type
- o) adhesive and associated systems: from one manufacturer

grout

- p) proprietary grout: BS EN 13007 of *suitable* type and colour

Q.2 Tiling work

preparation

- a) all adjacent rough construction work shall be complete and all services in background shall be installed and tested before commencing tiling work

- b) backgrounds shall be examined, defects shall be rectified and allowed to dry to equilibrium moisture content; dust, loose matter, efflorescence and laitance shall be removed
- c) in the case of smooth and dense concrete: surfaces shall be keyed with a priming agent as recommended by the adhesive manufacturer prior to application of the adhesive
- d) fields, borders and patterns shall be set out, where relevant

bedding

- e) tiling units shall be bedded in adhesive according to tile and/or adhesive *manufacturer's instructions*
- f) white tile adhesive shall be used for white marble or marble with a delicate colour
- g) field tiles shall be bedded with straight joints in both directions, unless otherwise described
- h) wall field tiles shall be cut only along edges and bottom of field
- i) floor patterns shall be continued through openings connecting areas with similar tiling
- j) internal sills where walls are tiled: joints to coincide with wall tile joints when of similar material
- k) external sills to be
 - symmetrical about opening, with cut tiles at sill ends
 - to slope and projection as described
 - tucked under and behind drip in wood or aluminium window frames, and under leg of steel window frame without removing or bending window lugs
- l) shower thresholds to slope towards shower

Q.3 Jointing

joint width

- a) consistent throughout
- b) pressed ceramic and porcelain tiles:
 - internal: 2 mm
 - internal for large format wall tiles: >3mm, regardless of any instruction from the tile manufacturer
 - external: >3 mm
- c) extruded floor tiles: 6 – 10 mm
- d) terrazzo tiles: 1,5 – 3 mm
- e) stone tiles: butt-jointed

joint depth

- f) at least equal to thickness of tile but >6 mm

grouting and pointing

- g) grout joints of width <3 mm; point wider joints

- h) proprietary grout mixes: applied *to manufacturer's instructions*
- i) epoxy compound or acid-proof cement mortar shall be used if tiles are *described* as acid-proof
- j) grout shall be worked into joints with a squeegee until joints are filled flush with surface
- k) joints: to be tooled to level surface slightly below tile edge

Q.4 Movement joints

in situ movement joints

- a) formed by a temporary filler strip that is removed when tiling is sufficiently firm, leaving a clean and straight open joint
- b) sealed with an elastomeric material where so *described*

preformed compression joint strip

- c) PVC or metal profile with *suitable* flexible infill
- d) extended to substrate and keyed into adhesive bed or fixed through pre-drilled holes using *suitable* fixers as tiling proceeds
- e) level with, or slightly below, floor surface

isolation (perimeter) joints

- f) isolation joint width: 10 mm
- g) formed around perimeter of floor, columns, kerbs, steps and plant bases
- h) joint formed adjacent to skirting in areas where hygiene is important
- i) sealed with an elastomeric material where so *described*

intermediate joints

- j) open to same width as grouted tile joint
- k) position:
 - at 3 m centres maximum externally, or internally in wet areas or in areas where large thermal movement or vibration is expected
 - at 10 m centres maximum internally in areas of up to 500 m² of floor
 - at 5 m centres maximum internally in areas exceeding 500 m² of floor
 - over supporting walls or beams on suspended concrete or timber floors
 - where different background materials meet
- l) adjust spacing to coincide with structural features like columns
- m) left open or sealed with an elastomeric material where so *described*

structural joints

- n) joint width: same as structural joint width in substrate

- o) to align with structural joints in the substrate or background
- p) in the case of structural joints in substrates or backgrounds being irregular, not straight, or not coinciding with that of the tiling: a decision as to its treatment is to be obtained
- q) seal with an elastomeric material where so *described*

Q.5 Cleaning

- a) tiled surface to be sponged with water and polished with clean, dry cloth
- b) acid cleaners, scouring powder or abrasive cleaning materials are not to be used
- c) absorbent floor finishes: to be protected with an application of non-slip wax polish or suitable proprietary sealer where so *described*

Electronic Version

R. Plumbing and drainage

R.1 Rainwater disposal

R.1.1 Eaves gutters and down pipes

Materials

galvanised steel

- a) hot dip zinc-coated steel sheet: SANS 3575/4998 Z275 or AZ150 for inland regions, Z600 or AZ200 for *coastal regions*
- b) nails, bolts and screws: zinc-plated or sherardized steel
- c) brackets: mild steel strip hot dip galvanised SANS 121 after manufacture

copper

- d) copper sheet: high purity cold rolled copper SANS 404/405
- e) brackets, nails, bolts and screws: copper or stainless steel

aluminium

- f) aluminium sheet: aluminium alloy: SANS 903 type 304-temper H14 or ally A1-Mn1 or A1-Mg2
- g) brackets, nails, bolts and screws: aluminium alloy or stainless steel

PVC

- h) PVC-U gutters and downpipes: SANS 11
- i) brackets: aluminium alloy

Installation

- j) *to manufacturer's instructions* where relevant
- k) sheet metal gutter lengths to be lapped >20 mm; sealed with suitable sealant over full lap before riveting
- l) gutters to be laid in brackets to slight fall to outlets, nailed/screwed to roof timber at 2 m maximum centres in the case of sheet metal gutters, at 1 m in the case of PVC-U gutters, and at angles and outlets
- m) sheet metal gutters to be bolted to brackets close to underside of gutter bead with 6 mm diameter gutter bolts
- n) overflow (to be formed on site in one stop-end in every sheet metal gutter run): a 20 mm lipped weir overflow over full gutter width
- o) gutters shall fall to outlets without ponding
- p) downpipes shall be fixed to walls, 25 mm clear of finished wall face, seam towards wall when relevant, with 25 x 1,6 mm hot dip galvanised mild steel holderbats, bolted around pipe in two halves, and with 6 mm diameter hot dip galvanised steel spiral nail driven into wall, at least twice per downpipe length and at 2 m maximum centres

R.1.2 Flat roof, balcony and floor drainage

roof and balcony outlets

- a) type: patent outlet with grating, or pipe without grating, as described
- b) patent outlet type:
 - ductile iron consisting of flanged funnel-shaped head with outlet threaded to take standard mild steel hot dip galvanised pipes, and with removable domical gratings for roofs or flat gratings for car parks, secured by centre hook bolt
 - outlet heads to be cast with necessary pipework into concrete, at such a level that ponding does not occur after waterproofing

floor outlets

- c) with removable grating
- d) grease and solids trap: easy-clean
- e) with tapered bottom for installation on 100 mm diameter pipe or clamp coupling
- f) set at such a level that ponding does not occur after flooring is installed

outlet downpipes

- g) PVC-U pipes: SANS 967
- h) hot dip galvanised steel pipes with screwed ends: SANS 62
- i) hot dip galvanised malleable cast iron fittings: SANS 14

R.2 Stormwater drainage

R.2.1 Earthworks

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.2.2 Pipes and culverts

Applicable standard: SANS 2001 Construction works Part DP5: Stormwater drainage

pipes

- a) concrete pipes and associated fittings: SANS 677
- b) fibre-cement pipes and associated fittings: SANS 819
- c) PVC-U pipes and associated fittings: SANS 791/1601
- d) GRP pipes and associated fittings: SANS 1748-1
- e) PP pipes and associated fittings: SANS 8773
- f) PE pipes and associated fittings: SANS 4427

culverts

- g) precast concrete culverts SANS 986 type portal

R.2.3 In situ concrete stormwater channels

- a) concrete: grade 30
- b) rainwater channels and spill basins to be cast on well rammed earth filling
- c) channel floors to be laid to even fall of 1:250 minimum or *as described*
- d) angles and sweeps around gulleys to be neatly formed without changing channel profile
- e) stop-ends to be formed at tops of gradients
- f) channels to be finished on exposed surfaces with 2:1 sand:cement plaster, trowelled smooth with rounded salient angles
- g) rainwater channels to be cast with isolation joints against walls and with keyed or doweled construction joints at 1,8 m maximum centres along its length
- h) concrete spill basins to be cast to shape, size and finish *as described*

R.2.4 Agricultural drains

- a) pipes: 100 mm diameter agricultural drain pipes
- b) pattern: main drain with branch spreader drains to pattern and lengths as shown in *drawings*
- c) trenches: 600 mm wide x >700 mm deep at >2 m apart
- d) laying:
 - on 150 mm thick bed of clean, hard, durable stone graded from 35—75 mm, and covered after laying with same to 280 mm above tops of pipes
 - pipes with open joints
 - each joint covered with a flat stone to prevent infiltration of soil
 - lower end of main drain plugged with 2:1 cement mortar
- e) filling: stone filling in trenches to be covered with *suitable* plastic sheeting and trenches filled with earth filling, lightly rammed

R.3 Sewerage

R.3.1 Earthworks

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.3.2 Sewers (>160 mm)

Applicable standard: SANS 2001- Construction works Part DP4: Sewers

- a) types of pipe, diameter, gradient, etc.: *as described*

R.3.3 Sewers for buildings

Applicable standard: SANS 2001-Construction works Part DP7: Sewers for Buildings

- a) type of pipe, diameter, gradient etc.: *as described*

R.3.4 Surface boxes, manhole covers, gully gratings, frames

- a) polymer concrete surface boxes, manhole and inspection covers, gully gratings and frames: SANS 1882, and mark-bearing
- b) cast iron, cast steel, rolled steel combined with concrete gully tops and manhole tops for vehicular and pedestrian areas: SANS 50124 / EN 124, and mark-bearing
- c) installation: top of dished gullies >150 mm above finished ground level or 50 mm above permanent paving

R.3.5 Grease interceptors

- a) material, type, capacity and size: to approval of the local authority unless otherwise *described*

R.3.6 Pit latrines

- a) masonry type: *as described* in NHBRC Home Building Manual Part 11 and relevant details, internal size of pit 750 x 1 500 x 2 000 mm minimum deep; exposed end of floor slab covered with precast concrete panels
- b) waterless ventilated improved pit (VIP) latrine: consisting of a structurally lined and ventilated underground pit, floor slab, ventilated wall enclosure with roof and door, toilet pedestal, toilet seat and lid
- c) patent type: installed *to manufacturer's instructions* or to the requirements of an active Agrément Certificate
- d) to the approval of the local authority

R.3.7 Conservancy tanks, septic tanks and french drains

- a) conservancy tanks, septic tanks and french drains: SANS 10400-P, of type, construction and capacity *as described*
- b) patent type: installed *to manufacturer's instructions* or to the requirements of an active Agrément Certificate

R.4 Water supply

R.4.1 Earthworks

Applicable standard: SANS 2001-Construction works Part DP1: Earthworks for buried pipelines and prefabricated culverts

R.4.2 Below ground medium pressure pipelines

Applicable standard: SANS 2001-Construction works Part DP2: Medium pressure pipelines

- a) type of pipe, size, etc.: *as described*

R.4.3 Below ground water installation for buildings

Applicable standard: SANS 2001-Construction works Part DP6: Below ground water installations for buildings

- a) type of pipe, size, etc.: *as described*

R.4.4 Above ground water installation**materials**

- a) pipes, and associated fittings recommended by pipe manufacturer: material as *described*, supplied from one source
- b) water supply and distribution system components: SANS 1808
- c) float valves: SANS 752

installation

- d) pipes: according to *manufacturer's instructions*
- e) measures to avoid unsightly pipework before any chasing or cutting for pipework is started: to be agreed upon
- f) fixing of pipes <20 mm: chased or surface fixed as *described*
- g) fixing of pipes >20 mm: surface fixed or run in ducts
- h) surface fixing on internal walls: in neat straight horizontal and vertical runs to internal walls only, after plastering, with hot dip galvanised cast iron holderbats to SANS 1209, or plastic holderbats for copper or polypropylene pipes, at centres according to *manufacturer's instructions*; clear space of 15 mm to be left between pipe and finished wall
- i) surface fixing on external walls: prohibited except for short runs of vertical rising main from ground level to floor level
- j) chasing:
 - not in wall faces that are to receive roof flashing
 - in solid masonry only, not deeper than one third of wall thickness vertically and not more than one sixth of wall thickness horizontally; avoid horizontal chasing where possible
 - in walls constructed of structural masonry and hollow blocks: only with permission, or locate pipes in cavities during construction
 - chases, holes and recesses: not to impair strength or stability of walls, or reduce fire resistant properties of walls
 - chases in masonry walls to be filled with class II mortar once pipes are in position
- k) fastening of pipes to roof timber
 - with hot dip galvanised mild steel or copper pipe clips screwed on
 - polypropylene hot water pipes: supported continuously
 - polypropylene cold water pipes: not closer than one metre from hot water geysers
- l) bends to be used in preference to elbows if practicable; if a reduction in size of pipe takes place at an angle, the bend or elbow shall be the size of the larger pipe
- m) no air may lodge in pipes; a proper fall shall be maintained
- n) expansion shall be provided for in long lengths of pipes

- o) long- screws or *suitable* couplings shall be inserted at convenient points to provide for alterations and repairs
- p) unions to be provided at inlets and outlets to geysers

testing

- q) entire water reticulation system shall be filled with water
- r) air shall be evacuated
- s) water in system shall be pressurised to one-and-a-half times the expected design working pressure by means of a pump, maintained for four hours
- t) system to be inspected for leakages and repair
- u) after connecting to mains system shall be inspected again

R.4.5 Water storage tanks

- a) accessories: inlet, outlet, overflow pipe connections, float valve of same bore as supply pipe
- b) drip tray in roof space: SANS 1848

R.5 Electric geysers and solar water heaters

R.5.1 Electric geysers

- a) geysers: SANS 151
- b) required marking: capacity, working pressure, mounting position, design, standing loss per 24h in kWh, moisture resistance class, colour coding (yellow—50 kPa, blue—100 kPa, black—200 kPa, brown—300 kPa, red—400 kPa, green—600 kPa)
- c) installation: to SANS 10254 and to *manufacturer's instructions*, including drip trays
- d) preset geyser thermostat to 50°C

R.5.2 Solar water heaters

- a) domestic solar water heaters: SANS 1307, mark-bearing

R.6 Pipe insulation

- a) bonded preformed mineral fibre pipe sections: SANS 1445-3, mark-bearing with expected maximum service temperature and exposure conditions; an adequate vapour barrier to pipe sections intended for use in temperatures below ambient shall be provided
- b) insulation exposed to weather and sunlight to be covered with protective material as recommended by insulation manufacturer/supplier
- c) bends and tees shall be tightly mitred

R.7 Gas supply

Gas installation: SANS 10087

R.8 Fire equipment

- a) all fire equipment to approval of local authority

fire hydrants

- b) fire hydrants: SANS 1128 part 1

fire hose reels

- c) fire hose reels: 30 m long x 20 mm diameter light duty rubber fire hose, fixed base, couplings, connections, branch pipes and nozzles: SANS 543 and SANS 1128 part 2
- d) reels fixed against walls with *suitable* frame anchors or expansion bolts at a height of 2 100 mm from floor to spindle, or to height as *described*
- e) enclosed in security cupboards with clear acrylic cover and suitable closer where so *described*

portable fire extinguishers

- f) general purpose, non-refillable fire extinguishers: SANS 1322 and mark-bearing
- g) water, foam or dry powder rechargeable extinguishers: SANS 1910
- h) CO₂ type extinguishers: portable rechargeable carbon dioxide extinguishers: SANS 1567 and mark-bearing
- i) BCF type extinguishers: halogenated hydrocarbon fire extinguishers: SANS 1151 and mark-bearing
- j) extinguishers shall be hung on wall hooks screwed and plugged to wall
- k) enclosed in security cupboard with clear acrylic cover and suitable closer where so *described*

R.9 Sanitary plumbing

R.9.1 Sanitary appliances

- a) fitted with waste, plug and chain as required

baths

- b) acrylic baths: SANS 1402/50198
- c) handles: where so *described*

basins

- d) glazed ceramic wash-hand basins: SANS 497
- e) stainless steel wash-hand basins: SANS 906

wash troughs

- f) stainless steel wash troughs: SANS 906
- g) concrete wash troughs:
- of reinforced concrete, with reeded front
 - drainers to be of reinforced concrete with lip to fit over side of trough and fixed to trough with copper dowels and to wall with bracket supplied by manufacturer
 - pedestals to be of reinforced concrete

- pedestals to be bedded on floor, and trough on pedestals, with 1:2 cement-sand mortar

water closets

- h) glazed ceramic water closets: SANS 497

flushing cisterns

- i) glazed ceramic flushing cisterns: SANS 497
- j) plastic flushing cisterns: SANS 821
- k) cistern flush valves: SANS 1509

urinals

- l) glazed ceramic urinals: SANS 497
- m) stainless steel urinals: SANS 924

sinks

- n) glazed ceramic sinks: SANS 497
- o) stainless steel sinks with draining boards for domestic use: SANS 242
- p) stainless steel sinks for institutions: SANS 907

shower enclosures

- q) shower enclosures
- shower enclosures for domestic purposes: SANS 549
- glass: SANS 1263
- anodizing: SANS 999
- powder coating: SANS 1274/1578/1796

bains marie

- r) bains marie and hot cupboards: SANS 1174

R.9.2 Taps, valves, showerheads

- a) water taps (metallic): SANS 226, class as *suitable* to dynamic supply pressure
- b) water taps (plastic bodies): SANS 1021, class as *suitable* to dynamic supply pressure
- c) taps for cold and hot water: mark-bearing blue and red respectively
- d) aerators: where so *described*
- e) wall type taps: with sliding flange
- f) single control mixer taps: SANS 1480
- g) flush valves: SANS 1240, type as *described*
- h) showerhead: type: as *described*

R.9.3 Traps

- a) plastic waste traps: SANS 1321, part 1
- b) rubber waste traps: SANS 1321 part 2

R.9.4 Miscellaneous

- a) holders, shelves, cabinets: *as described*

R.9.5 Installation of sanitary fittings generally

- a) protective wrappings to be left in position for as long as possible
- b) fixing shall be in a manner that will facilitate future removal
- c) installation shall be *to manufacturer's instructions*
- d) fixed securely; using manufacturer's brackets and fixing methods wherever possible; using frame anchors for fixing brackets –not screwed and plugged
- e) water closet pans bedded in 1:3 cement-sand mortar; squat pans in grade 10 concrete
- f) open sides of build-in type baths bricked up
- g) acrylic baths bedded in 1:5 cement-sand mortar on masonry, or bedded solidly on dry river sand or concrete
- h) shower heads at 2 100 mm above shower floor level
- i) urinals at 610 mm from floor to front lip of urinal bowl
- j) all joints sealed

S. Electrical works

S.1 Earthworks

Applicable standard: SANS 2001-Construction Works Part DP1: Earthworks for buried pipelines and prefabricated culverts

S.2 Cable ducts (underground)

Applicable standard: SANS 2001-Construction Works Part DP3: Cable ducts

S.3 Materials and installation

S.3.1 Wiring

Electrical wiring: *SANS 10142-The wiring of premises*

conduits

- a) conduits: *SANS 950/61386*
- b) embedded in wall chases with cement mortar and clamps
- c) not chased in wall faces that are to receive roof flashing
- d) fixed on wall surfaces and in roof spaces with clamps
- e) embedded in concrete surface beds
- f) surface fixing level, plumb, and in straight lines

conductors

- g) PVC isolated copper conductors: *SANS 150*

electric cables

- h) PVC armoured copper cable: *SANS 1574/1411*

distribution board and meter cabinets

- i) prepainted pressed steel with door and latch: *SANS 1973*, with isolator, earth leakage protection unit: *SANS 767*, and circuit breakers where required
- j) cabinets on walls: built in or surface mounted, *as described*
- k) all functions in distribution board labelled with legend card provided

switches and sockets

- l) switches: *SANS 60669*, including dimmer, remote-control, isolating and time-delay switches *as described*

plug and socket systems

- m) 3 pin 16 Amp wall switch sockets: *SANS 164*
- n) boxes and enclosures with covers: *SANS 1085/60670*
- o) boxes for switches: built in at 1 500 mm above floor level or *as described*

- p) boxes for sockets: built in at 300 mm above floor level except above work tops where these shall be 1 200 mm above floor level or as *described*
- q) telephone or television points: boxes built in at 300 mm above floor level or as described, connected by conduit to roof space and through roof overhang to nearest telephone connection or television antenna; conduit to be provided with draw wire

S.3.2 Fittings

luminaires

- a) type: *as described*
- b) luminaires: SANS 60598, complete with lamps, ballasts, control gear and earth terminals; control gear within luminaires to be mark-bearing
- c) luminaires fixed at as late a stage as possible, and protected from damage
- d) all luminaires earthed

stove, hob, oven, cooker hood

- e) stoves: SANS 153
- f) commercial kitchen extraction systems: SANS 1850

S.4 Testing

- a) local authority to be informed at completion of electrical installation for inspection
- b) a copy of the electrical test certificate to be provided before handing over

S.5 Lightning protection

To SANS 10313/SANS 61024

T. Mechanical works

T.1 Installation

- a) equipment and services shall
 - be installed level and plumb; securely fixed; reticulated services neatly organised
 - be fixed directly to structure wherever possible, independently of suspended ceilings; trimmed around holes or penetrations through non-structural elements
- b) fire and acoustic rating integrity of suspended ceilings etc. shall be maintained
- c) movement in both structure and services shall be allowed for
- d) cables, ducts, trays, pipes etc. shall be concealed unless installed in plant spaces, ceilings, riser cupboards, etc.
- e) heavy items of equipment shall be provided with permanent fixtures for lifting as recommended by the manufacturer

T.2 Building penetrations

- a) pipes that operate under pressure shall not be embedded in concrete or surfacing material
- b) penetrations through fire rated elements shall be sealed according to fire regulations
- c) penetrations through non-fire rated elements around conduits and sleeves, and around cables within sleeves shall be sealed; if the building element is acoustically rated, the rating shall be maintained
- d) roof penetrations shall be sealed with metal upstand flashings and counter flashings –the use of fabric reinforced paint or bitumen is prohibited
- e) primed metal or PVC sleeves shall have a diameter sufficient to allow 12 mm space around interior pipe (or pipe insulation) or cable

T.3 Location and access

All services and equipment shall be located and arranged so that:

- a) inspection and maintenance operations can be carried out with minimum inconvenience and disruption to building occupants or damage to the building structure or finishes
- b) services and equipment are readily accessible for inspection and maintenance and arranged so that inspection and maintenance can be carried out in a safe and efficient manner

T.4 Vibration suppression

Transmission of vibration from rotating equipment to building elements shall be minimised by means of:

- flexible connections,
- inertia bases,
- restricting of maximum rotation speed to 1500 r/min,
- isolation mountings or spring mountings

U. Glazing

U.1 Materials

glass

- a) float glass (basic soda lime silicate glass): SANS 50572
- b) safety and security glass: SANS 1263
 - symbol 1 (impact), 2 (burglar/vandal) or 3 (bullet) to be engraved permanently and visible after glazing on each sheet
- c) pattern glass: where relevant, direction of pattern shall be established before cutting
- d) low-emissivity glass (low-e): spectrally selective coated glass to BS EN 1096
- e) glass louvres: 6,5 mm NS safety glass, regardless of length or width, with polished edges
- f) frameless doors: 10 mm thick safety glass for internal use and 12 mm thick safety glass for external use, unless otherwise *described*
- g) insulated glass (double glazing): factory-prepared sealed insulated glazing units (SIGU), consisting of two panes of clear float glass separated by a sealed spacer to entrap a dehydrated air gap, indelibly mark-bearing with the trade name of the assembler/manufacturer visible after installation
- h) work on glass: SANS 1817

U.2 Glazing

U.2.1 Glazing in frames

Applicable standard: SANS 2001-Construction works Part CG1: Installation of glazing

U.2.2 polymer glazing

- a) polymer glazing: *as described*

U.2.3 Patent glazing

gaskets and sealants

- a) elastomeric structural glazing and panel gaskets: SANS 635
- b) sealants: compatible with extrusion surface, glazing tape and glass, backed by regular test reports regarding adhesion of sealant to aluminium frame in accordance with ASTM/C 794-80 (standard test for adhesion-peel of elastomeric joint sealants)
- c) adhesion of sealant to aluminium, whether anodised or organic coated:
 - capable of maintaining an ultimate adhesive bond strength between aluminium and sealant of 0,828 MPa
 - design stress not to exceed 0,138 MPa
 - glazing contractor to test adhesion of cured sealant on representative test joints on site before proceeding with installation
 - tests to be carried out periodically throughout installation period

- d) only freshly manufactured sealant shall be used
- e) only compatible accessory materials shall be used as recommended by the sealant manufacturer, for example degreasing solvents, primers, back-up material with integral bond breaker, spacer and setting blocks
- f) sealant cavities shall be completely filled

quality assurance

- g) disciplined quality assurance during all stages of fabrication and installation shall be ensured
- h) factory glazing is preferred over site glazing

U.2.4 Protection and cleaning

- a) glass shall be protected against harmful splashes and weld splatter
- b) glass shall be cleaned as soon as practicable after installation with mild soap and water
- c) cleaning materials shall not be harmful to plastic glazing materials and glazing compounds

U.3 Mirrors

- a) silvered float glass mirrors: SANS 1236, class A with chamfered and/or polished edges as described
- b) privacy mirrors: clear glass with mirrored venetian strips for visual privacy and/or security
- c) stainless steel mirrors: 0,9 mm thick bright annealed mirrored stainless steel
- d) glass mirrors shall be fastened with chromium plated mirror screws to wall, allowing 3 mm air space at back for ventilation, or with vertical strips of double sided tape; mirrors larger than 1 m² shall be supported with additional clips, anchors or beads
- e) stainless steel mirrors shall be fastened with screws and/or glue in an *acceptable* manner

V. Paintwork

V.1 Materials

- a) materials shall be *suitable* for their intended purpose and for the surface to which they are to be applied
- b) all paint shall be restricted to one manufacturer where possible; complete paint systems – primer, undercoat and finishing coat – to be as recommended by the same manufacturer
- c) containers to reach site unopened, bearing SANS -mark and specification number when relevant
- d) exterior quality paint shall be used for exterior work

primers

- e) alkali-resistant plaster primers: SANS 1416
- f) primers for interior and exterior wood: SANS 678.
- g) zinc phosphate primers for steel: SANS 1319.
- h) pretreatment, wash or etching primers (one- or two-pack) for metals: of *suitable* type
- i) primer-sealers, penetrating primers, masonry sealers, bonding liquid and universal primers for plaster, concrete, brick, block and stone: of *suitable* quality or the subject of an active Agrément Certificate

undercoats

- j) universal undercoats: SANS 681

finishing paints

- k) alkyd high gloss finishing paint: SANS 630
- l) decorative paint for interior use: SANS 515
- m) emulsion paint: SANS 1586
- n) textured emulsion wall coating: SANS 1227
- o) aluminium paint, general purpose: SANS 682
- p) micaceous iron oxide paint, masonry paint, cement paint and lime-wash: of *suitable* quality or the subject of an active Agrément Certificate

varnishes, varnish stains, stains and sealers

- q) varnish or varnish stains for interior use: SANS 887
- r) stains: water-borne or solvent-borne as described
- s) sealers: water-borne acrylic exterior quality, *suitable* for application on the material to be coated; sealers for wood to contain fungicides that inhibit the development of blue-stain fungi

bituminous and tar-based coatings

- t) bituminous aluminium paint: SANS 802
- u) other bitumen-based coatings: of *suitable* quality (preferably the subject of an active Agrément Certificate)

specialized coatings

- v) two-pack epoxy primers, two-pack coal-tar epoxy coatings, one- and two-pack epoxy and polyurethane coatings, cellulose coatings, and vinyl primers, undercoats and finishes: of *suitable* quality (preferably the subject of an active Agrément Certificate)

knotting, stopping, fillers

- w) knotting for the treatment of knots in wood: quick-drying resin solution or an aluminium primer
- x) stopping and fillers: *suitable* to fill holes and imperfections in the material to be painted
- y) fillers: oil-based, emulsion-based or supplied in powdered form

stirring

- z) paint materials to be stirred before use and at intervals during use unless the manufacturer's instructions state otherwise

thinning

- aa) paint to be thinned only to improve penetration or facilitate application, for example on surfaces of high or variable porosity, or for spray application; thinner type and proportion: as recommended by the manufacturer

two-pack materials

- bb) manufacturer's instructions regarding mixing proportions, induction period (standing time), pot life and the possible extension of pot life shall be observed

V.2 Preparation of surfaces

- a) time shall be allowed for the drying of surface moisture
- b) work by others that might affect painting shall be completed
- c) factory-primed components: the primer shall be in a satisfactory condition; if not, remedial action shall be taken
- d) excess pipe jointing material shall be removed
- e) ironmongery, light fittings and other removable fittings that can be contaminated shall be removed, marked, stored and refixed after completion
- f) fittings that cannot be removed shall be masked
- g) cracks between frames, skirtings, cornices etc. and walls shall be sealed with paintable acrylic sealant
- h) surfaces not to be painted shall be protected

cleaning

- i) all surfaces shall be cleaned of dirt, grease, soot, mould and marks
- j) cleaning shall be limited to dry abrading and dusting wherever possible
- by means of stiff brush (not wire), abrasive paper, emery cloth, steel wire wool or nylon fibre pads as required

- always sandpaper wood in direction of grain
 - pencil marks and other surface discolouration shall be removed
 - in the case of window frames, care shall be taken not to scratch the glass, especially with abrasive paper
 - dusting: after dusting down, floors shall be swept or vacuumed; sweeping or dusting whilst painting is in progress is prohibited
- k) superficial dirt may be removed by washing:
- with a solution of sugar soap, household detergent, cleaning powder or mild soap
 - using proprietary cleaning materials strictly in accordance with the manufacturer's instructions
 - rinsing surfaces with clean water before the solution dries
 - allowing to dry before coating
 - proprietary emulsion cleaners or degreasing solutions may be used for removing heavy deposits of oil or grease

existing coatings

- l) existing coatings shall be kept only when in a sound condition and compatible with the coating to be applied
- m) complete or partial removal of any coating shall be done under condition of poor adhesion, flaking, peeling, blistering, cracking, crazing and severe chalking or powdering, and when adhesion is generally sound but with a rough surface
- n) complete removal shall be done if the coating to be applied is not compatible with the existing one; seek specialist information from the manufacturer in case of doubt
- o) removal shall be by burning off or by the use of paint removers, washing, scraping, abrading, steam, abrasive blast cleaning or other suitable method

burning off

- p) burning off shall be done using a blowtorch or hot-air gun
- q) care shall be taken not to burn or crack the background
- r) all flammable materials shall be removed from the work area while burning off is in progress
- s) other methods shall be used on wood that is to be refinished with a clear coating system, on carved or heavily moulded woodwork, or for removal of highly flammable coatings
- t) means of extinguishing fires shall be readily available when burning off

paint removers

- u) type: *suitable* for the removal of the coating at hand
- v) alkaline (or caustic) type paint removers shall not be used on zinc or aluminium
- w) solvent type paint removers: use under conditions of proper ventilation and the removal of possible sources of ignition

- x) paint removers shall be applied liberally and in sufficient applications to enable easy removal
- y) surfaces shall be cleaned *to manufacturer's instructions* when removal is complete

abrasive blast cleaning

- z) abrasive blast cleaning: SANS 10064
- aa) care shall be taken not to damage the background
- bb) surrounding surfaces shall be masked

treatment of organic growth

- cc) mould (mildew) and algae (green and black stains) shall be removed before painting by scraping or brushing, blast-cleaning or high-pressure water cleaning, followed by the application of a *suitable* fungicidal wash such as a solution of 1 part bleach to 4 parts water or, in the case of proprietary materials, *as directed* by the manufacturer
- dd) washes shall be applied in dry weather
- ee) a further application of fungicidal wash shall be applied after removal of the dead organisms to delay re-establishment of the growth
- ff) allow to dry before overcoating

V.3 Colours

- a) colours of undercoats to match finishing coat but with enough difference to be able to distinguish between coats
- b) colour samples of finishing coats shall be prepared before any bulk paint is purchased
- c) identification colour marking (e.g. pipes transporting different fluids/gases): SANS 10140

V.4 Preparation for painting

- a) paint systems: most suited to the environment, compatible with substrate and other components of the system
- b) manufacturer's instructions shall be followed and manufacturer's recommendations in respect of temperature and its relation to curing time and pot life shall be observed
- c) all coats of paint and varnish shall be sandpapered and left to dry before the next coat is applied
- d) no painting shall be done when conditions are unsuitable, for example dust, insufficient light, direct sunlight or inclement weather; paint shall not be applied if the ambient temperature is <10>35°C, or if the relative humidity is <10>85%
- e) all surrounding surfaces shall be masked when spray-painting; spray painting in windy weather is prohibited

V.5 Knotting, stopping, filling and priming

- a) knotting: to cover wood knots
- b) stopping: for stopping up holes, wide cracks, open joints and similar imperfections, including the repair or removal and replacement of defective glazing putties

- c) cement plaster or a proprietary plaster repair product shall be used for stopping holes in plaster;
- d) all plaster repairs, fillers etc. on walls shall be spot primed with a masonry primer once fully cured
- e) fillers: for filling and levelling, for example shallow depressions, open grain, surface roughnesses, nail and screw heads, fine cracks and restoration of the original film thickness where this was locally damaged
- f) stopping and fillers shall be applied by flexible putty knife on broad surfaces, and by brush on mouldings; surfaces shall be allowed to dry and shall be rubbed down to a smooth surface
- g) woodwork to be built in shall be primed or sealed before building in or fixing; this applies to structural timber, all frames, all six sides of a door, and to rebates and backs of beads in glazing apertures

V.6 On-site pre-treatment and priming of non-ferrous metals and stainless steel

aluminium

- a) smooth aluminium surfaces (sheets, extrusions and aluminized steel): degrease, and lightly abrade or pretreat with a twin-pack vinyl wash primer, followed by one coat zinc phosphate primer
- b) rough aluminium surfaces (castings and sprayed metal coatings): lightly abrade, remove dust and dirt; sprayed metal coatings might require washing; pretreat sprayed metal coatings with a wash primer or etching primer immediately after application of the coating, followed by one coat zinc phosphate primer

zinc, zinc aluminium alloy and sprayed coatings

- c) zinc sheet, zinc-coated steel (hot dip galvanised, sherardized or electroplated), and zinc aluminium alloy coated steel (hot dip): degrease, and lightly abrade or pretreat with a wash or etching primer, followed by one coat zinc phosphate primer
- d) sprayed zinc and zinc aluminium alloy coatings: wash if required, and pretreat with a wash or etching primer, preferably immediately after application of the coating, followed by one coat zinc phosphate primer
- e) where hot dip galvanised steel was unavoidably welded on site: clean joint and repair coating using a zinc rich paint or epoxy

copper, brass and bronze

- f) copper, brass and bronze coatings: degrease, and lightly abrade or pretreat with a wash or etching primer

lead

- g) lead: wet abrade and pretreat with a wash or etching primer

cadmium coatings

- h) cadmium coatings: degrease and lightly abrade or pretreat with a wash or etching primer

tin coatings

- i) tin coatings: degrease and lightly abrade

chromium and nickel coatings

- j) chromium and nickel coatings (if corroded): abrade and pretreat with a wash or etching primer

stainless steel

- k) stainless steel: degrease and lightly abrade or pretreat with a wash or etching primer

V.7 Application of paint

- a) paint shall be applied by brush, roller or spray-gun as required

brush or roller

- b) wood surfaces shall be primed by brush only, well worked in
- c) brushes and rollers shall be cleaned after use and hung to dry

spray gun

- d) spray painting is allowed only where this is the accepted method of application
- e) spray painting shall be by air spray, airless spray or electrostatic spray of appropriate type, suitable to the material and type of work
- f) adjacent surfaces not to be sprayed are to be masked or otherwise protected
- g) conventional primers shall not be spray-applied
- h) spraying equipment shall be cleaned every time after use, or when changing the paint colour, by spraying copious amounts of thinner or solvent through the spray gun

general

- i) paint coats are to be applied *to manufacturer's instructions*
- j) paint coats shall be allowed to dry before applying subsequent coats
- k) colours: to sample
- l) tints of undercoats: distinguishable from succeeding coats.

V.8 Paint systems for on-site application

Paint system and colours: *as described*

V.8.1 Cement-based surfaces, brick and stone

(cement plaster, concrete, brick, block and stone; fibre-cement goods; cement-based boards, tiles and panels; glass-fibre reinforced cement (GRC) cladding)

alkyd paint

- a) one coat alkali-resistant primer; or, for plaster only,
- b) a water-thinned primer, followed by, for interior work only,
- c) one universal undercoat and one coat alkyd gloss finish; or
- d) two coats alkyd semi-gloss or matt finish; or, for exterior work,

- e) one universal undercoat and one or two coats alkyd gloss finish

emulsion paint

- f) a water-thinned first coat of emulsion paint on surfaces of high or variable porosity; and, for interior work only,
- g) two coats matt, high-opacity finish "contract" emulsion paint to SANS 1586 grade 4; or
- h) one coat matt, high-opacity finish "contract" emulsion paint to SANS 1586 grade 4, spray applied; or, for exterior work,
- i) two or three coats matt or semi-gloss finish general purpose emulsion paint, or
- j) for fibre-cement roofs in *coastal areas*, an anti-fungicidal paint

textured emulsion paint

- k) *suitable* primer; and, for interior work only,
- l) one coat sand-textured paint, over-painted if required

masonry paint

- m) *suitable* primer; and
- n) mineral type masonry paint for interior or exterior work; or, for exterior work only,
- o) two coats smooth or fine-textured solvent-borne or emulsion-based masonry paint; or
- p) one or two coats heavy-textured solvent-borne masonry paint; or
- q) one coat heavy-textured emulsion-based masonry paint.

cement paint

- r) two coats cement paint for interior or exterior work (not on gypsum plaster)

masonry sealers

- s) one or two coats according to *manufacturer's instructions*

lime wash

- t) two coats lime wash, applied with a block brush.

V.8.2 Ferrous metals

- a) clean iron and steel; total film thickness shall be 115 to 145 µm

alkyd paint on blast-cleaned surfaces

- b) two coats solvent-borne primer; and
- c) one coat solvent-borne undercoat; and
- d) two coats alkyd gloss finish

alkyd paint on manually cleaned surfaces

- e) two coats etching primer (one-pack or two-pack) or zinc phosphate primer; and

- f) one coat solvent-borne undercoat; and
- g) two coats alkyd gloss finish

alkyd paint on factory primed surfaces

- h) inspect primer for soundness and touch up where required, and
- i) one coat solvent-borne undercoat; and
- j) two coats alkyd gloss finish

alkyd paint on cast iron

- k) remove bitumen until clean, sound substrate is achieved
- l) paint one coat metal primer, and one coat high gloss alkyd paint, or
- m) two coats general purpose semi-gloss emulsion paint

micaceous iron oxide paint on blast-cleaned or manually cleaned surfaces

- n) two coats micaceous iron oxide paint, high-build type

aluminium paint on blast-cleaned or manually cleaned surfaces

(fencing material)

- o) two coats aluminium paint

heat-resistant paint

- p) heat-resistant paint system on steel: of *suitable* type, applied according to *manufacturer's instructions*

V.8.3 Wood

alkyd paint on interior wood

- a) wood primer; and
- b) one coat universal undercoat and one coat alkyd gloss finish; or
- c) two coats alkyd gloss finish

alkyd paint on interior plywood doors

- d) water-borne primer (check compatibility with water-repellant organic solvent preservatives); and
- e) one coat universal undercoat and one coat alkyd gloss finish; or
- f) two coats alkyd gloss finish

alkyd paint on exterior softwood and plywood

- g) one coat solvent or water-borne semi-transparent primer (base coat); followed by
- h) one or two coats universal undercoat; and
- i) one or two coats alkyd gloss finish

textured coatings on exterior softwood and plywood

- j) one coat solvent-borne or aluminium textured primer; and
- k) one or two coats emulsion or solvent-borne textured coating

alkyd paint on exterior hardwood

- l) one coat aluminium primer; and
- m) one or two coats universal undercoat; and
- n) two coats alkyd gloss finish

paint on exterior plywood doors

- o) transparent preservative primer/base coat; and
- p) multi-coat paints formulated for improved performance according to manufacturer's recommendations, gloss finish

alkyd paint on wood fibre and particle board

(hardboard, mediumboard, medium density fibreboard (MDF) and softboard not factory-primed or sealed)

- q) one coat primer-sealer or water-thinned primer or aluminium primer; or
- r) one coat alkali-resistant primer for flame-retardant treated board; or
- s) one coat aluminium wood primer for bitumen-impregnated softboard; or
- t) one coat resin-based wood primer or primer-sealer or water-thinned primer or aluminium primer for particle board; and
- u) one coat universal undercoat and one coat alkyd gloss finish; or
- v) two coats alkyd semi-gloss finish

emulsion paint on wood fibre and particle board

(hardboard, mediumboard, medium density fibreboard (MDF) and softboard not factory-primed or sealed)

- w) no primer, except for absorbent board in which case first coats shall be thinned; or
- x) one coat alkali-resistant primer for flame-retardant treated board; or
- y) no primer for bitumen-impregnated softboard; or
- z) no primer for particle board, except for single layer board in which case a resin-based primer shall be applied; and
- aa) two or three coats semi-gloss finish general purpose emulsion paint

alkyd paint on softwood or hardwood gates and fences

- bb) one coat solvent-borne or aluminium primer; and
- cc) one or two coats universal undercoat; and

dd) two coats alkyd gloss finish

transparent finish systems for wood (interior)

ee) decorative wood stain, as required; and

ff) one or two coats interior alkyd, urethane or urethane/alkyd resin varnish, on worktops, or

gg) one or two coats urethane varnish, two-pack or moisture-curing, for surfaces requiring exceptional abrasion resistance, or

hh) one or two coats wood sealer suitable for interior use

transparent finish systems for wood (exterior)

ii) two or three coats exterior wood sealer

V.8.4 Plaster board

(ceilings, bulkheads, partitions)

alkyd paint

a) a primer-sealer or water-thinned primer; and

b) one coat universal undercoat; and

c) one coat alkyd semi-gloss finish; or

d) two coats alkyd semi-gloss finish

emulsion paint

e) two coats matt, high hiding, scrub resistant emulsion paint on walls

f) two coats matt utility grade emulsion paint on ceilings and bulkheads

V.8.5 Plastics

paint on unplasticized polyvinyl chloride (PVC-U)

a) two-pack wash primer followed by conventional alkyd gloss or emulsion paint finish system; or

b) a long-life coating of a specialized type, such as two-pack polyurethane or epoxy

paint on glass-reinforced polyester (GRP)

c) remove wax coating; and

d) one coat two-pack epoxy primer; and

e) one coat two-pack polyurethane

paint on plastic coatings on metals

f) paint systems on plastic coatings on metals shall be of a *suitable* type

paint on polystyrene

g) two coats matt utility grade emulsion paint

paint on glass

(glass, glazed brick, terracotta, faience, ceramic tiles and vitreous enamel)

- h) a conventional alkyd gloss or emulsion paint finish system; or
- i) a long-life coating of a specialized type, such as two-pack polyurethane or epoxy.

V.8.6 Intumescent paint

- a) *suitable* intumescent paint on structural steelwork, electrical cables, PVC pipes, wood and thatch by brush, roller or spray where *described*, to achieve the required fire resistance

V.9 Signwriting and gilding

To be executed by *competent persons*

Electronic Version

W. Paperhanging

wallpaper

- a) type, pattern, colour: *as described*

preparation

- b) plaster surfaces shall be mature and dry
- c) a primer coat shall be applied on very porous plaster only
- d) loose or blistering paint on previously painted surfaces shall be removed
- e) surfaces shall be cleaned down and filled with *suitable* filler to a smooth surface
- f) wood surfaces are to be knotted, primed, stopped and sanded down

hanging

- g) wallpaper: hung vertically with close-fitted and plumb vertical joints; no horizontal joints are allowed; adjacent sheets shall match in pattern
- h) tightly fitting against skirtings, ceilings, door frames and windows
- i) patent wallpaper adhesive shall be applied to the back of the wallpaper using a brush
- j) wallpaper shall be hung while adhesive is still wet
- k) lightly rolled to remove air bubbles
- l) spills to be wiped with damp cloth

X. External work

X.1 Landscaping

X.1.1 Definition of terms

- a) topsoil: soil composed of 15–25% clay, 10% silt and 65–75% sand with a minimum of 2% organic material, or red soil mixed with kraal manure in the ratio of 1 m³ kraal manure to 6 m³ red soil; topsoil to be free from deleterious matter and weed seeds
- b) compost: properly decomposed organic material, free from deleterious salts, waste products and impurities and with a pH-value between 4 and 7
- c) mulch: mixture of organic material such as leaves, straw, small particles of bark, etc., free from fungus, disease, etc.
- d) lime: agricultural lime of approved manufacture
- e) fertilizer: mixture of material complying with the specification under Law 36 of 1947; order and store in plastic bags

X.1.2 Contouring

Applicable standard: SANS 2001 – Construction works Part BE1: Earthworks (general)

X.1.3 Cleaning of site

- a) site shall be cleaned for planting by removing existing grasses, weeds, foreign material and stones larger than 50 mm diameter before commencement of soil preparation
- b) site shall be cleaned for hydroseeding by clearing out existing natural grasses without damage to the latter; remove loose foreign material from bare patches

X.1.4 Preparation

soil for grass sods

- a) existing topsoil: loosened throughout to a depth of 100 mm and thoroughly mixed with 2:3:2 fertiliser in the ratio of 20 kg fertiliser to 150 m² of topsoil
- b) wetted, leveled off and compacted slightly on flat surfaces and mildly on inclined surfaces

soil for ground cover and shrub beds

- c) existing topsoil: loosened throughout to a depth of 200 mm and thoroughly mixed with 2:3:2 fertiliser in the ratio of 30 kg fertiliser to 150 m² of topsoil and with compost in the ratio of 6 m³ compost to 100 m² of topsoil
- d) wetted, leveled off and compacted slightly on flat surfaces and mildly on inclined surfaces

soil for shrubs

- e) holes: 450 x 450 x 450 mm deep for shrubs in bags 10 kg or larger; excavated material placed aside
- f) holes shall be filled with a mix of two parts excavated soil and one part compost
- g) fertiliser: 500 g 2:3:2 and 200 g bone phosphate added and mixed throughout per shrub hole
- h) soil shall be compacted slightly with due allowance for decrease in volume

soil for trees

- i) holes: 900 x 900 x 900 mm deep for trees; excavated material placed aside
- j) base of hole shall be finished with fall in general direction of slope of site
- k) holes shall be filled with a mix of two parts excavated soil and one part compost
- l) fertiliser: one kg 2:3:2 and 300 g of bone phosphate added and mixed throughout
- m) soil shall be compacted slightly with due allowance for decrease in volume

soil for hydroseeding

- n) all visible bare patches of existing soil shall be scarified 100 mm deep in both directions at 500 mm centres
- o) clods larger than 50 mm diameter shall be broken up, raked and leveled off

X.1.5 Plant quality

- a) all plant material shall be from a registered nursery
- b) plants shall be typical of their species or variety with normal densely developed branches and vigorous and healthy root system
- c) plants shall be free from damaged parts, parasites, fungus, disfiguring knots, insects, pests and infestation
- d) grass sods: approximately 1000 mm long and 500 mm wide and of uniform thickness; sods shall be clipped short and soil base shall be free from stones and clods
- e) ground covers: well bushed with high leaf density and height of 300 mm above ground level, delivered ex nursery in minimum 4 kg bag containers
- f) shrubs: multi-stemmed with generous side branches and well bushed to ground; shrubs shall be >500 mm high as measured from crown of roots to outer leaf circumference, delivered ex nursery in minimum 4 kg bag containers except where specifically *described* otherwise
- g) trees: >1,5 metre in height as measured from crown of roots to average top of tree (not to highest branch) and stem diameter >25 mm at ground level except where *described* otherwise
- h) pruning wounds shall be limited to 25 mm in size, showing vigorous bark growth all round
- i) all dead plants shall be replaced free of charge
- j) plants shall be stored under nursery conditions

X.1.6 Planting**grass sods**

- a) grass sods shall be laid close together on wet prepared topsoil; joints and hollows shall be filled with topsoil
- b) area reduction shall be allowed for
- c) surface shall be rolled to keep surface tolerance to a minimum and to allow a gradual change in slope at berms and embankments

- d) planted area shall be thoroughly irrigated after laying and rolling

ground covers

- e) ground covers: planted in prepared topsoil and in holes somewhat larger than the plant bulb and at least 200 mm deep so that top of bulb coincides with finished level
- f) edges of ground cover beds shall be worked upwards to a height of 100 mm and compacted
- g) planted area shall be thoroughly irrigated after planting

shrubs

- h) shrubs shall be removed from containers and planted in backfilled holes so that top of soil originally in the containers is level with the finished ground level
- i) compacted around shrubs including 500 mm diameter x 150 mm deep soil dams formed around each shrub
- j) plants shall be thoroughly wetted after planting with 25 L of water per shrub

trees

- k) at distances from buildings, drains and freestanding walls that take into account the type of soil, especially expansive soils, and species and mature height of tree (see tree distance guidelines in SANS 10400-H Annex E)
- l) trees shall be removed from containers and planted in backfilled holes so that top of soil originally in containers is level with finished ground level
- m) compacted around trees including 1000 mm diameter x 150 mm deep soil dams around each tree
- n) plants shall be thoroughly wetted after planting with 40 L of water per tree

X.1.7 Hydroseeding

- a) shall take place on prepared soil
- b) watering: 10 000 L per hectare
- c) fertiliser: lime at 4 t per hectare worked into the soil
- d) superphosphate: 0,3 t per hectare worked into the soil
- e) 2:3:2 shall be applied at 0,5 t per hectare with seed mix
- f) LAN: 0,5 t per hectare worked into soil after 6 and 12 weeks
- g) anti-erosion compound: 200 kg per hectare with seed mix
- h) mulch: 400 kg per hectare with seed mix
- i) germinating agent: as per specialist's instruction
- j) seed mix: *as described*

X.1.8 Tree supports

- a) every tree shall be supported with a 2,5 m long x 50 mm diameter treated eucalyptus stake driven 500 mm into soil

- b) trees shall be tied to stakes with two steel wires sleeved in 300 mm long plastic hose-pipe section

X.1.9 Precast concrete tree rings

- a) rings shall be in two halves, of size as described
- b) halves shall be placed firmly and horizontally in soil dams around trees
- c) grass sods shall be trimmed around tree rings where applicable

X.1.10 Maintenance

- a) plant material: maintained for the *described* period including at least three months of the growing season namely the September to March period:
- b) all planted areas shall be kept free from weeds, soil loosened around ground covers, shrubs and trees, once every two weeks
- c) shrubs and trees shall be pruned regularly according to accepted horticultural practice
- d) sick or dead plants shall be replaced immediately
- e) grass sod areas shall be mown weekly and cut grass removed
- f) all hydroseeded veld grass areas shall be mown once every 3 months and cut grass removed
- g) 2:3:2 fertiliser shall be applied at a rate of 5 kg per 100 m² of grass sod area once monthly
- h) planted areas shall be watered once per week during September to March and once every fortnight during April to August as follows: shrubs 25 L at a time; trees 40 L at a time

X.2 Retaining structures

X.2.1 Gabions

Applicable standard: SANS 1200 Standardized specification for civil engineering construction Section DK: Gabions and pitching

materials

- a) hexagonal woven steel wire mesh gabions and revet mattresses: SANS 1580

laying

- b) bases shall be prepared
- c) cages shall be assembled on site and filled with clean, hard, unweathered boulders or rock fragments with minimum size two-thirds of basket thickness or 300 mm, whichever is smallest

X.2.2 Concrete retaining blocks

blocks

- a) concrete retaining blocks: SANS 508

geomembranes

- b) thermoplastic geomembranes: SANS 1526

preparation

- c) position and depth of existing buried services shall be ascertained before excavating; damage to existing services shall be avoided
- d) level and compacted earth foundation trench shall be prepared, of depth as *described*
- e) compacted granular base material such as crushed rock or gravel shall be laid where so *described*
- f) concrete strip foundations shall be laid where so *described*
- g) behind wall when so *described*, provision shall be made for:
 - perforated drain pipe with positive gravity flow to outlets
 - aggregate blanket drain
 - geofabric covering

placing

- h) units shall be stacked by hand, without mortar, true to line, level and in pattern as *described*
- i) *suitable* granular backfill shall be placed and compacted
- j) geofabric reinforcement shall be laid when so *described*
- k) walls shall be cleaned, debris and pockets cleared, ready to accept planting

X.3 Roadwork**X.3.1 Materials**

- a) bituminous premix road surfacing:
 - prime coat of cutback bitumen to SANS 308
 - semi-gap graded crushed stone having the following grading:

Sieve size (mm)	% By mass passing sieve
13,2	100
4,75	45-60
2,36	42-55
1,18	40-52
0,3	25-45
0,075	5-12

- bituminous road tar binder: SANS 748
- clean, dry quartzite sand
- b) precast concrete segmental paving blocks: SANS 1058
- c) burnt clay paving units: SANS 1575
- d) precast concrete paving slabs: SANS 541

- e) in-situ concrete: see E Concrete, formwork and reinforcement
- f) sand for bedding and jointing of flexible paving
 - free of soluble salts or contaminants likely to cause efflorescence or staining
 - moisture content: 5 – 8%
 - grading limits:

Sieve size (mm)	% passing
9,25	100
4,75	95-100
2,36	80-100
1,18	50-85
0,60	25-60
0,30	10-30
0,15	5-15

- g) jointing sand: to pass a 1,18 mm sieve, containing 10 – 50% material passing a 0,075 mm sieve
- h) mortar for rigid paving:
 - sand with fineness modulus in the region of 2,2 – 4,0 to minimize permeability
 - mortar: SANS 2001-Construction works Part CM1, class I external, class II internal
 - use minimum water
- i) infill concrete: grade 25/10

X.3.2 Preparation

site clearance

Applicable standard: SANS 2001-Construction Works Part BS1: Site clearance

earth works

Applicable standard: SANS 2001-Construction Works Part BE1: Earthworks (general)

subgrade

- a) excavation: to achieve finished levels and falls as described
- b) soft spots and biodegradable material shall be removed and replaced with *suitable* filling material
- c) installation of all sub-soil drainage pipes shall be complete
- d) compaction: to 90% *MOD AASHTO*; taking special care to compact trenches and around manholes – stabilised with 5% cement prior to compaction if so *directed*

sub-base for flexible paving

- e) sub-base material and construction: *as described*

- f) paving surface profile shall be formed on finished surface of sub-base (irregularities in surface are not to be made up with bedding sand)

concrete sub-base for rigid paving

- g) sub-base concrete: grade 10 to SANS 2001-Construction Works Part CC2: Concrete works (minor works) to thickness and with reinforcement as *described*

weed killer

- h) area to be paved shall be treated with suitable weed killer where so *described* (taking care that trees or shrubs that have to be retained are not affected)

levels, falls, pattern

- i) kerbs and edge restraints shall be complete and levels and falls correct
- j) pattern, edges, cutting of units etc. shall be confirmed before laying

X.3.3 Laying

flexible block/brick paving

Applicable standard: SANS 1200 MJ Standardized specification for civil engineering construction: Segmental paving long axis square to line of traffic flow

- a) Pavers shall be laid true to line and level on loose and evenly spread sand bedding of compacted thickness 25 ± 10 mm
- b) full units shall be laid first
- c) joints: 2 – 6 mm wide
- d) areas in which a full unit will not fit shall be filled with clean-cut units or, if less than 25% of a full unit, with concrete left for at least 24 h before compacting
- e) surface shall be compacted as soon as practicable, not closer than 1 m from free edges or working faces, with high frequency, low amplitude mechanical flat plate vibrator capable of producing a centrifugal force of 7 – 16 kN at a frequency of approximately 75 – 100 Hz on a plate size of 0,35 – 0,5 m²; sufficient passes to compact sand bedding to 15 – 35 mm thickness; at least two passes
- f) joint filling sand: brushed into joints after first pass and excess sand removed on completion
- g) concrete anchor beams: cast across steeply inclined roads where so *described* or *directed*

flexible slabs

- h) bedding: clean river sand
- i) joints: filled with class I cement mortar and strike off with jointer, or left open where so *described* or *directed*

rigid block/brick paving

- j) base concrete shall be clean
- k) pavers shall be set out with string, templates or gauge rods, or entire area dry laid
- l) 1:1 cement:fine sand slurry shall be brushed over the surface

- m) clay pavers with high absorption rate shall be dipped in water before laying; otherwise not wetted
- n) each paver shall be buttered, bedded solid in mortar, and joint filled in one operation
- o) joints shall be tooled flush or bucket handle
- p) 10 mm movement joints shall be provided at 4,5 m intervals at right angles in both directions, and against edge restraints such as buildings, manholes and columns
- q) movement joints shall be filled with *suitable* sealant where so *described* or *directed*

in situ concrete paving

- r) see E Concrete, formwork and reinforcement as hereinbefore

cutting

- s) pavers shall be cut with a masonry disc cutter

accuracy

- t) gradual allowed deviation under 3 m straight edge: 10 mm maximum
- u) allowed difference in level between adjacent units: 3 mm maximum
- v) allowed deviation of line of pattern: 15 mm in 3 m maximum

cleaning

- w) paving shall be left clean and free from stains

X.4 Concrete culverts, kerbs and channels

X.4.1 Materials

- a) precast concrete culverts: SANS 986, portal type
- b) kerbs, edgings and channels: SANS 927
- c) mortar: SANS 2001-Construction works Part CM1, class I
- d) bedding material: crushed stone, sinter, slag, sand or suitable porous material with a particle size of 13 mm maximum
- e) backing concrete: grade 15
- f) sealant: *as described*

X.4.2 Laying

- a) trenches for kerbs and channels shall be excavated to below required level and backfilled with >70 mm of bedding material, compacted to required level and slope to density of >90% MOD AASHTO
- b) kerbs and channels shall be bedded on 50 mm thick bedding material with 10 mm joints filled in with mortar (joints shall be well wetted before jointing)
- c) kerbs and channels shall be laid in 1 000 mm maximum lengths for straight, or curved kerbs with a radius of >20 m, in 500 mm maximum lengths for curved kerbs with a radius between 4 and 20 m, or 300 mm maximum for radii up to 4 m

- d) 12 mm wide movement joints shall be provided in channels at intervals not exceeding 20 m and left open, or filled with polysulphide when dry where so *described* or *directed*
- e) backs of kerbs shall be supported with well-compacted backing concrete
- f) filling in behind kerbs shall be with *suitable* material in layers not exceeding 150 mm, and wetted and compacted to 90% *MOD AASHTO* density
- g) concrete units shall be protected against damage and discolouration

accuracy

- h) maximum deviation of any edge, centre line or vertical surface from *described* position: 25 mm
- i) maximum allowed deviation of any invert level: 10 mm

X.5 Fencing

X.5.1 Line wire and chain-link mesh fencing

- a) zinc-coated fencing line wire (plain and barbed): *SANS 675*, of zinc coating class "light" for inland areas and "heavy" for coastal or corrosive regions
- b) chain-link (diamond) mesh fencing and wire accessories: *SANS 1373/675/10244*

straining eye bolts

- c) straining eye bolts: 10 mm diameter x 300 mm threaded mild steel bolt with eye, washer and nut, hot dip galvanised to *SANS 121 / SANS 14713* (permanent wire pullers are prohibited)

posts, stays, standards and droppers

- d) precast concrete posts: prestressed alkali aggregate reactive concrete
- e) wood posts, stays and droppers: preservative treated to *SANS 1288* hazard class H4: hardwood *SANS 457-3*, 145—174 mm diameter posts and stays, 32—50 mm droppers
- f) posts shall be provided with necessary holes for hinges, straining bolts, binding wire etc.

erection

- g) fence route: cleared, roughly leveled to obtain uniform gradient
- h) holes: excavated 400 x 400 x 800 mm deep for posts and 300 x 300 x 600 mm deep for stays
- i) posts and stays: planted in grade 15 concrete to 50 mm above ground level with chamfered top surface: at gates, ends, corners, intersections and at intermediate distances not exceeding 90 m, or at acute changes in level
- j) stays: provided to all straining posts in direction of line of fence
- k) standards: driven 450 mm deep into ground at 3 m centres
- l) straining wire: threaded through holes in standards at bottom, top and intermediate centres not exceeding 300 mm for wire fencing, or at intermediate centres not exceeding 600 mm for wire mesh fencing; bound around posts or straining eye bolts, and strained
- m) droppers: bound to straining wire with binding wire

- n) wire mesh cover: where *described*, tensioned and bound securely to straining wire at every third mesh; roll ends joined with a spiral to form a continuous fence; welded mesh tied or clipped to straining wire at 300 mm centres; roll ends trimmed by overlapping 100 mm
- o) in the case of PVC-coated wire, care shall be taken not to crack or puncture the coating
- p) any damaged protective coatings shall be made good
- q) preservative treated timber shall not be cut where it will be below ground
- r) fence shall be checked on completion; hinges greased; projecting bolt threads cut off; bolt ends burred over to prevent nut removal and coated with bitumen paint

fencing gates

- s) steel gates: with tubular frames and wire or mesh filling
- t) gates shall be hung on adjustable hinges
- u) gates shall be supplied with steel spring or U-shaped catches, drop bolts and locking devices, as *described*
- v) drop bolts to drop in *suitable* length of pipe set in concrete to 30 mm above ground level

finish

- w) finish to gates and accessories: two coats bituminous aluminium paint to SANS 682 grade 1 inland; hot dip galvanised to SANS 121/14713 in the *coastal region* or corrosive atmospheres

X.5.2 Weld mesh fencing

- a) material, mesh size, finish: *as described*
- b) erection: according to *manufacturer's instructions*

X.5.3 Barbed tape fencing

- a) barbed tape security barriers: SANS 1620, of material and form *as described*
- b) erection: according to *manufacturer's instructions*

X.5.4 Palisade fencing

steel

- a) steel palisade fences and gates: SANS 301-12
- b) pale points: forked or spiked
- c) panels: 3 m length, safety bolted to steel posts
- d) pale height: *as described*
- e) posts planted in grade 15 concrete bases in accordance with the manufacturer's instructions

concrete

- f) posts, rails and pales: steel reinforced precast concrete grade 30
- g) bolts: galvanised carriage bolts

- h) posts: planted in 600 x 600 x 600 mm concrete base at approximately 2 m centres
- i) rails: bolted to posts (two per bay)
- j) pales: bolted to rails (nine per bay)
- k) bolts: countersunk on both sides with holes grouted solid
- l) erection: according to *manufacturer's instructions*

X.5.5 Electric fencing

- a) electric fencing system: stranded wire on plastic or porcelain isolators on brackets, complete with energizer, batteries etc. as required
- b) wire: galvanised A grade high-tensile steel inland, or stainless steel for *coastal areas* or corrosive atmospheres
- c) electric fencing safety: SANS 10222-3/60335-2

X.5.6 Gate automation

- a) electric gate motor: with battery backup, crush protection, fine position control and remote control
- b) theft-resistant cages: with padlock where *so described*

X.5.7 Private swimming pool fencing

- a) private swimming pool fencing: SANS 1390, of height and protective coating as *described*

X.6 Precast concrete panel walling

- a) precast concrete posts and panels: SANS 1372
- b) posts: planted 500 mm deep in grade 15 concrete at approximately 1,6 m centres
- c) panels: slipped in between posts, and leveled

X.7 Timber decking

X.7.1 Materials

poles

- a) softwood: SANS 457-2
- b) hardwood: SANS 457-3
- c) preservative treated to SANS 1288 hazard class H3 when above ground, class H4 when in ground contact
- d) top diameter: colour marked
- e) required marking: metal tag with hazard class on each pole or bundle

sawn structural softwood

- f) sawn softwood SANS 1783-2 grade 5

sawn structural hardwood

- g) sawn hardwood (Eucalyptus) SANS 1707-1 grade 5

structural laminated timber

- h) structural laminated timber: SANS 1460
- i) exposure class: 1 (exterior)
- j) type: G (stocklam)
- k) stress grade: 5
- l) preservative treatment of softwood: SANS 1288 hazard class H3
- m) fire retardant treatment: where so *described*
- n) required marking: on each piece a combination of code letters: application, exposure class, type, appearance and finish, stress grade, e.g. S2GP5.

deck boarding

- o) softwood: industrial planed wood: SANS 1783-3
- p) hardwood: planed strip flooring: SANS 281
- q) shape: rectangular (not tongue and groove) with arris rounded edges
- r) in long lengths
- s) preservative treatment: SANS 1288 hazard class H3

fixings

- t) brackets, shoes, threaded rod, etc.: mild steel, hot dip galvanised to SANS 121 / SANS 14713
- u) nails, bolts, nuts, washers: SANS 1700, hot dip galvanised to SANS 121 / SANS 14713
- v) screws: countersunk head to SANS 1171, of material *as described*

balustrades

- w) material, construction, etc.: *as described*

X.7.2 Installation

- a) poles: plant in ground, or fix on brackets cast into concrete footings as described
- b) poles planted in 300 mm diameter holes in ground on a bed of gravel or concrete; holes backfilled with gravel, tamped and topped up with a collar of 200 mm concrete, shaped sloping away from pole
- c) structure of poles, beams, joists, cross bracing and strutting: bolted to comply with SANS 10082; bolt heads, washers and nuts: recessed
- d) joists: spaced at centres less than 20 x deck plank thickness
- e) decking boards: fixed at right angles to joists with a space of 7 mm between boards

- f) boards: fixed with screws with countersunk heads; plugged with matching wood where so described
- g) holes: pre-drilled to prevent splitting
- h) board header joints: supported on double joists; space shall be left for ventilation between board heads
- i) end grain: protect with metal caps where so described
- j) top surfaces of rails: chamfered or rounded to assist the shedding of rainwater; round all sharp edges

X.7.3 Wood finish

- a) wood: sealed with one coat of *suitable* sealant or oil before installation
- b) end-grain: sealed as the work proceeds after sawing to length
- c) finish: three coats sealant or oil after installation

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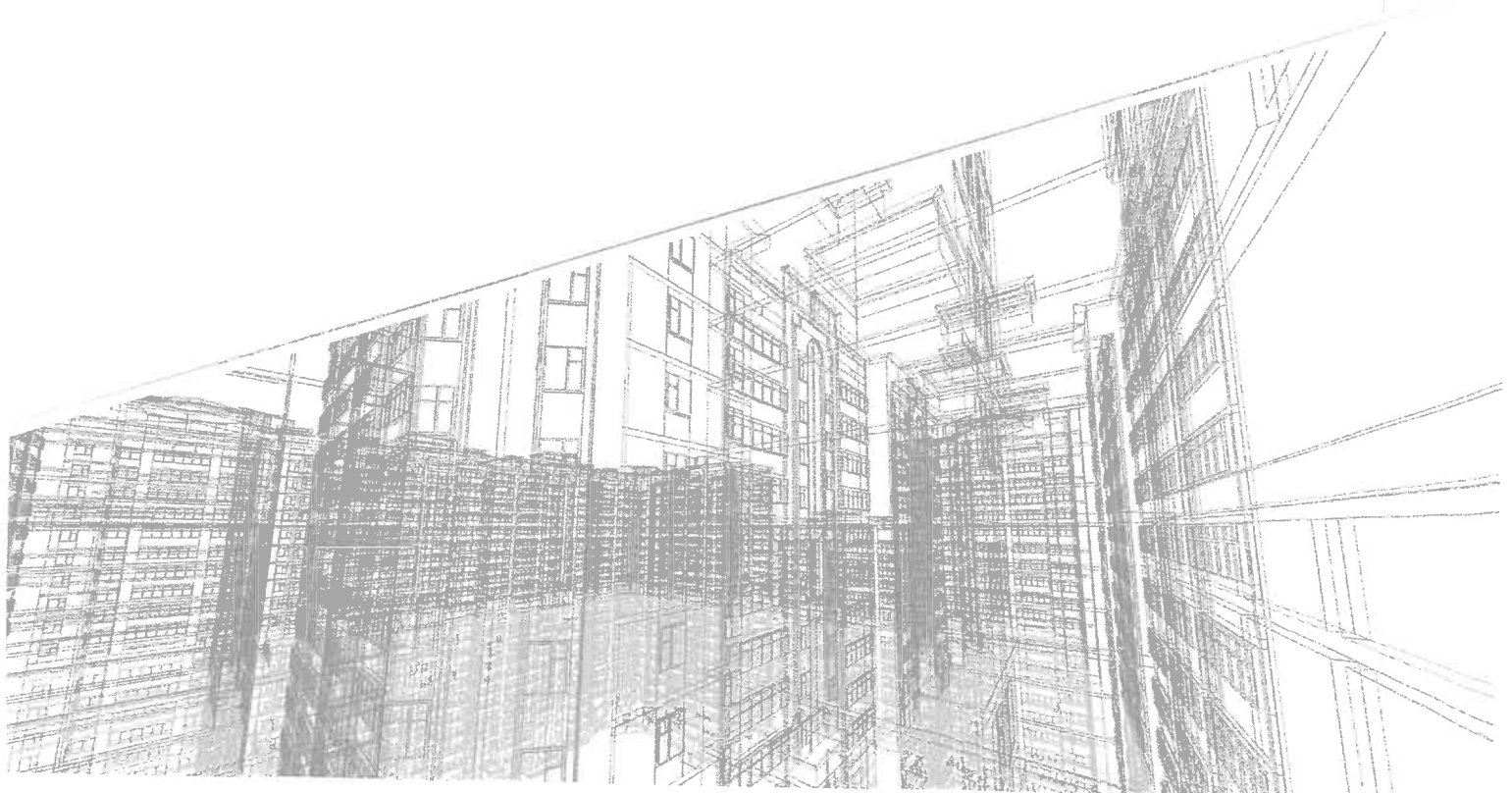
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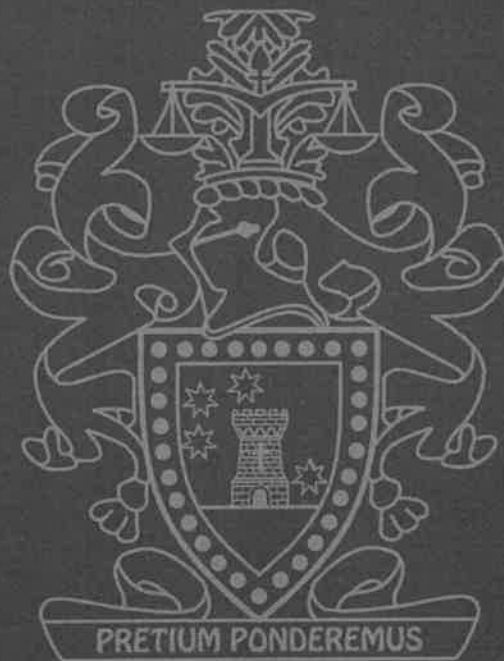


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KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 2
GENERAL ELECTRICAL SPECIFICATION

GENERAL ELECTRICAL SPECIFICATION

(ALL IN CONTRACTS)

1. CONDUIT AND CONDUIT ACCESSORIES

1.1 Conduit

Conduit shall be of steel galvanised internally and externally, either solid drawn, or welded and not less than 20 mm diameter, with all rough edges removed. All tube ends removed. All tube ends are to be reamed. With screwed conduit one threaded end is to be fitted with a coupling and the other end is to be protected against damage.

UPVC conduit may only be used if permitted by the Head : Works and only in those areas which he may specify. In this case this conduit shall be according to SABS 950.

Conduit accessories, which are secured to the conduit by means of lugs, screws or setscrews, are not acceptable.

General requirements of conduiting to SABS IEC 60614 (1).

Metal conduits shall be fully in accordance with SABS 1065 PART I.

1.2 Conduit Accessories

All conduit accessories shall be galvanised both internally and externally and comply with SABS 1065 – PART II.

All screwed conduit fittings shall be of malleable cast iron.

Where fittings are fitted with covers, the covers shall be of galvanised pressed steel secured with brass screws.

1.3 Flexible Conduit

Flexible conduit shall be of the plastic covered metal type complete with brass connectors to the approval of the Head : Works.

2. INSTALLATION OF CONDUIT

2.1 General

Except where cables are specified for certain circuits, the installation(s) shall be tubed throughout in steel conduit. Split conduit is not permitted. All conduits shall, wherever possible, or unless otherwise specified or agreed, be concealed in the structural work.

Except where agreed or otherwise specified or indicated on the drawings, all conduit to points shall run via the ceiling and floor slabs or roof space. In damp situations and where exposed to the weather, the conduits shall be so installed as to avoid, as far as possible, the condensation of moisture within them. All running joints are to be painted with an approved metal primer.

Mechanical and Electrical continuity must be maintained throughout the installation. Each length of conduit and every conduit fitting must be inspected for defects and all sharp edges or burrs must be removed before it is installed. All joints are to be tightly fitted together.

Running joints with long threads, where used, are to be fitted with a lock nut and the running thread shall not be longer in length than a coupling and lock unit.

In conduits smaller than 32 mm elbows and normal bends are not to be used but conduits are to be set to the required angles.

Flexible connections between conduit and appliance or other equipment shall be by means of flexible tubing (see Par 1.3).

No wiring shall be drawn into conduits until the conduits have been installed.

Where more than one socket outlet is connected on a circuit, the conduit shall be looped from the one outlet box to the following outlet box.

All switch-boxes, socket outlet boxes and any other purpose made metal box including distribution board trays shall be suitable treated against corrosion before installation with "Rustodian" or other approved metal primer.

All conduits shall be securely fixed into chases, and all flush switch and socket outlet boxes must be firmly embedded in cement mortar.

The Contractor shall make himself familiar with the positions of all fittings, such as blackboards, pinning boards, cupboards, shelving, worktops, etc, before commencing the conduit installation. The position of switches and socket outlets as indicated on the drawings are approximate only. The Contractor must verify that the final position of these will not be covered by the installation of the fittings referred to above, or come midway between the junction of any dados and upper wall finishes.

No extras will be entertained for moving switches or socket outlets as a result of the Contractor's failure to verify the final positions of the fittings or type of wall finish.

2.2 **In Roof Spaces**

The conduit in roof spaces shall be installed parallel or at right angles to the roof truss members and shall be secured at centers not exceeding 1,2 m by means of galvanised saddles nailed to the timbers with galvanised clout nails. Crampets will not be allowed.

Crossing of conduits is to be avoided wherever possible. Where unavoidable, one conduit must be neatly set over the other. Where a number of conduits have to run back to the distribution board or switchboard, they shall run parallel to the distribution board or switchboard, and at saddle distance to each other wherever possible.

Conduit runs from distribution boards shall terminate in fabricated sheet steel draw boxes installed in the roof above the distribution boards. Each draw box shall be fabricated from 1,6 mm galvanised sheet steel with welded corners and

suitably treated against corrosion with "Rustodian" or other approved primer and finished in aluminium paint.

Each draw box is to be fitted with slip-on lid with a 13 mm skirt. The box shall be 75 mm deep, shall be rectangular in shape and the size of conduits entering or leaving the box. Conduits shall be fixed to the box by means of couplings and brass male bushes or lock nuts and brass bush-nuts.

Conduit droppers shall be neatly cut into timber wall plates and set to face the right direction. All sets must be uniform. Conduits may be set at angles only where droppers or ceiling points are within 230 mm of roof members.

No conduits are to be run over the top of gangplanks or trapdoors.

Draw-in boxes with metal covers shall be provided where required and shall be installed near the gangplanks, if any. All inspection conduit fittings in open roof spaces shall face upwards to facilitate wiring and to permit easy inspection. Three-way conduit boxes shall be used for tee-off purposed in open roof spaces. Inspection tees are not to be used except where otherwise agreed or specified.

All conduits extended into a roof space with a roof clearance of more than 900 mm shall be set onto the beam and extended into the roof for a distance where there is sufficient clearance. Under flat roofs or where there is less than 900 mm clearance, the conduit shall be installed as specified for tubing in concrete slabs, right angle bends should be kept to a minimum and the shortest route taken.

Where false ceilings occur they shall be tubed as called for in the detailed specification. Conduits in restricted spaces and run as for concrete slabs must however, be installed in a neat and orderly manner.

Conduits to ceiling points for all types of fittings must be firmly supported and shall terminate in a back entry conduit box. The conduit box shall be taken through to the face of the ceiling and finish flush. Where the ceiling brandering interferes with the installation of the ceiling point specified, the Contractor must trim the brandering to allow the conduit box to be taken through to the face of the ceiling as specified. Luminaires must be bonded to the conduit box by means of metal threaded screws.

2.3 **In Concrete Slabs**

In order not to delay building operations, the Contractor must ensure that all conduits and conduit fittings, which are to be cast in concrete, are laid in good time. The Contractor shall have a competent Electrical Artisan standing by during casting of concrete, etc, to ensure that the conduit boxes are not damaged during casting of concrete.

Draw boxes, expansion joints boxes and round conduit boxes are to be provided where necessary.

Deep type conduit boxes shall be used for side entering conduits and normal shallow boxes may be used for back entry conduits. No elbows, bends or sharp sets will be allowed in concrete slabs except in cases of conduits of 40 mm diameter or when larger sweeping bends will be permitted.

Common drawn and/or inspection boxes shall be used where there is more than one circuit involved. They shall be installed in lavatories, storerooms, or other inconspicuous places. Covers shall be of hardboard neatly finished to match the finished ceiling or wall surface, and shall be fitted parallel to the wall or ceiling.

All boxes, etc. are to be securely fixed to the shuttering to prevent displacement when concrete is cast. All conduits must be laid off the deck, supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete beams and slabs.

Expansion joints shall be shown on layout drawings and shall consist of a metal box in which one conduit is fixed and the other capable of movement with the building's expansion and contraction. Earth continuity of these joints shall be maintained by means of stranded copper conductors bonded to the conduits in the box as shown on the drawing.

Earth conductors and clamps buried in concrete are not permitted.

Conduits must be spaced sufficiently apart to allow for proper concreting. All joints shall be painted with an approved metal primer after completion of the tubing installation, prior to the concreting. All exposed parts of the conduit installation shall be suitably, protected against corrosion at the discretion of the Head : Works.

Before any concrete slab is cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

2.4 **Surface Work**

All conduit must be plumbed and leveled and only straight lengths shall be used.

In cases where doorframes are out of plumb, or fittings, beams etc, are out of level, the conduit shall be run parallel with the doorframes, fittings, beams etc.

No threads shall be visible when the conduit installation is complete, except on running couplings.

Running couplings shall only be used where unavoidable and shall be fitted with a sliced coupling as a lock nut.

No inspection or normal bends are to be used on surface work, except with the approval of the Works Inspector and where conduits of 32 mm diameter or larger are used. Conduits shall be set uniformly and inspection couplings shall be used where necessary.

Fittings, tees, boxes, couplings, etc, are to be cut into the surface to allow the conduit to fit flush against the surface or alternatively spacer bar saddles may be used. Conduit is to be bedded into any irregularities to avoid gaps between the surface and the conduit.

Double sets, where used, shall be parallel with no twists and shall be as short as possible. All conduits, which terminate at metal trays, boxes, industrial switches and plugs shall do so by means of couplings and male bushes. No couplings will be permitted in droppers of lengths less than 3.6 m.

Where crossings of conduits is unavoidable, purpose made metal boxes shall be used. The length of the box is to be 8 times the diameter of the largest conduit, the width one and half times the sum of the diameter of all the conduits, and the depth one and half times the diameter of the largest conduit with a minimum depth of 50 mm. The box shall be fitted with a neatly fitting cover and the finish shall be in keeping with the general layout.

Where a number of conduits are to be installed in parallel they shall be evenly spaced and grouped under one purpose made saddle. Conduit spacing shall not exceed 10 mm. The purpose made saddle shall be made of 25 x 2 mm galvanised steel strip or other approved material, formed to suit the curvature of the various conduits and shall be drilled and fixed by means of screws between. Saddles shall be spaced at intervals not exceeding 1.8 m, except for conduit droppers, which shall be saddled centrally between ceiling and accessory box. All saddles are to be secured to the wall by means of black japan or brass rounded head screws. Distribution boards, draw boxes, industrial switches and plugs, etc, shall be neatly recessed into the surface of plastered walls to avoid double sets or alternatively spacer bar saddles may be used. On face brick walls the conduit shall be tightly set into the switch or plug.

In situations where there are not ceilings, the conduits are to be run along the wall plates and tie beams.

No wiring is to be carried out until the tubing has been inspected and approved.

Where spacer bar saddles are used, these shall be installed at centers of 1 m for horizontal and 1.5 m for vertical runs.

All conduits shall be painted with an approved enamel paint to match the background colour.

2.5 **Future Extensions**

In roof spaces with a minimum clearance of 900 mm, switch and plug drips for future use are to be set 300 mm in the correct direction and shall be threaded and fitted with plugged couplings. Where the roof over a slab is to be removed for future expansions, conduits for future use are to terminate 40 mm above tie beams and shall be threaded and fitted with plugged couplings.

Where future extensions are to be below slabs, all switch, socket outlet and other conduit droppers are to terminate 130 mm below slabs or beams with conduit ends threaded and fitted with plugged couplings.

Where provision is made for future extensions to a concrete slab, all conduits required for future use are to project 130 mm from the slab. Conduit projections are to be painted with an approved anti-corrosive paint and must be fitted with plugged couplings.

All switch, plug and other outlet boxes required for future use shall be fitted with approved blank cover plates.

Unused lighting outlet boxes are to be fitted with round hardboard or plastic covers with brass cover screws, which shall fit flat on the finished ceiling.

2.6 **Fixing of Conduits**

Conduits shall be fixed to switch and socket outlet boxes by means of couplings and brass male bushes or lock nuts and brass bush nuts. Couplings and male bushes to be used on all surface work.

2.7 **Chases and Building Work**

Except where otherwise specified conduits, switch boxes, plug boxes and distribution boards are to be built into the brick walls by the Contractor. It will, however, remain the responsibility of the Contractor to ensure that the above-mentioned boxes and distribution boards are correctly built in and are firmly bedded and cemented into the walls, plumb and square.

The Contractor shall, unless otherwise specified, do all necessary chasing and cutting of bricks. All electrical materials (e.g. conduits up to 40 mm for UG cables, conduits, conduit boxes, distribution boards etc) must be supplied by the Contractor who must arrange to have these on site, and positioned when required for the building work. A competent Electrical Artisan must be in attendance and ensure that the conduits etc are correctly installed and positioned.

The Contractor is to ensure that tubing installed in chases is securely nailed and covered by a layer of 5:1 mixture of coarse sand and cement, finished flush with brickwork and that switch and plug boxes finish flush with the finished wall surface.

The Contractor is to ensure that below distribution boards connected by means of under-ground cables, a 230 mm wide by 115 mm deep cavity in the wall from the cable pipe to the distribution board is to be provided by the Contractor, or alternatively, cable sleeves as specified.

3. **PLUGGING OF WALLS**

Only approved plastic plugs shall be used to secure conduit or equipment up to 5kg mass. The use of round-headed screws only will be permitted.

Heavier equipment shall be secured by means of approved expansion bolts.

Wood plugs and any plugs in the joints in brick walls are not permitted.

4. **FIXING TO CONCRETE CEILINGS**

Ceilings mounted equipment other than luminaires shall be secured to concrete ceilings by means of expansion bolts, shot bolts or "Robot" tools bolts or as expressly specified for the service.

5. **WIRING**

5.1 **PVC Insulated Single Core Medium Voltage Conductor**

The conductor is to be of high conductivity copper wire insulated with Polyvinyl Chloride. The cable shall be finished in the required colours and shall be in accordance with SABS 1507 and 1574.

Circuit wiring shall be of the Loop-in system and no wiring joints in the conduit or conduit fittings will be permitted. Not more than two conductors of a kind will be allowed at any outlet point. The end strands of cables, whether single or looped which have to be connected to terminals of switches, plugs, lamp-holders, fittings and distribution boards, etc, are to be tightly twisted together. Cutting away of wire strands of any cable will not be allowed. Only one circuit in any one conduit will be permitted unless otherwise specified.

Conductor sizes shall be as follows except where otherwise specified:

Lighting circuits	1,5 mm ²	
Bells circuits	1,5 mm ²	
Clock circuits	1,5 mm ²	
Incinerator circuits	2,5 mm ²	
Ironing circuits	2,5 mm ²	with 2,5 mm ² insulated earth wire
Plug circuits	4,0 mm ²	with 2,5 mm ² insulated earth wire
Geyser circuits	4,0 mm ²	with 2,5 mm ² insulated earth wire
Heater circuits	4,0 mm ²	with 2,5 mm ² insulated earth wire
Stove	10 mm ²	with 6,0 mm ² insulated earth wire
Motor circuits		
Up to 4kW single phase	4,0 mm ²	with 2,5 mm ² insulated earth wire
Up to 11kW three phase	4,0 mm ²	with 2,5 mm ² insulated earth wire

To avoid deformation of PVC insulated cables at temperatures in excess of 57° C, they shall not be brought directly on to the terminals of appliances such as electric heaters, or any other electrical appliances or apparatus (including luminaires) which have a temperature in excess of 57° C. They shall terminate in a suitable terminal box as near to the appliance or fittings as possible and connect up from thereon, with heat resistant conductor.

6. **MOUNTING AND POSITIONING OF LUMINAIRES**

Luminaires and installation to comply with SABS 1464 Parts 1 to 22 and IEC 598-1 and IEC 60598 as applicable.

The contractor shall, in the case of board and acoustic tile ceilings (i.e. as opposed to concrete slabs), ensure that the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings shall be adhered to as far as possible. The exact positions must be confirmed on site with the Head : Works.

Except where otherwise specified, pendant luminaires are to be mounted with the bottom of the fittings 2,5 m above finished floor level, mounted on either metal discs or wood blocks.

Under no circumstances shall cover strips be cut to accommodate wood blocks. Wood blocks must be neatly slotted to fit over cover strips and are to be secured by a minimum of two screws, which shall penetrate at least 25 mm into solid wood. Ceiling cover strips shall be neatly cut to accommodate fluorescent luminaires.

Where ceilings are raked, all incandescent luminaires are to be mounted on shaped leveling wood blocks securely fixed to the ceiling. Batten holders shall be secured to woodblocks by suitable brass screws. Fluorescent luminaires are to be mounted direct on raked ceiling without leveling blocks.

Fluorescent luminaires to be mounted on concrete ceilings shall be screwed to the outlet boxes and additionally supported by means of 50 x 6 mm expansion bolts. The bolts are to be $\frac{3}{4}$ of the length of luminaires apart.

Where a number of luminaires are installed end to end, outlet points must be provided after every second luminaire unless otherwise indicated on the drawing.

The luminaires are to be joined together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

The luminaires are to be jointed together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

Incandescent luminaires are to be screwed directly to outlet boxes in concrete slabs and in board ceilings. In board ceilings the conduit box and the conduit shall be secured to the timberwork of the ceiling in such a manner that it shall support any incandescent luminaire, which is designed to be fixed to a normal conduit box.

Fluorescent luminaires shall be secured to board ceilings by means of the conduit box and 6 mm bolts passing through the boards and brandering.

7. **BATTEN HOLDERS**

B.C. batten holders shall be of brass or moulded plastic reinforced type complete with shade ring. The batten holders shall comply with SABS IEC 60238 and SABS IEC 61184. All lamp holders are to have brass terminals with screw type connection.

8. **LAMP HOLDERS**

Edison screw lamp holders	:	SABS IEC 60238
Bayonet lamp holders	:	SABS IEC 61184
Lamp holders for tubular fluorescent lamps	:	SABS IEC 60400

B.C. screwed lamp holders shall be of brass 20 mm E.T. complete with shade ring and shall comply with SABS IEC 60238 and SABS IEC 61184 with screw type connection terminals.

9. **SWITCHES AND SOCKET OUTLETS**

Switches SABS IEC 60669 as applicable and socket outlets SABS IEC 60884 as applicable shall be of the most modern manufacture and bear the SABS mark.

Flush switch and plug cover plates shall, unless otherwise specified, be of anodized aluminium of thickness not less than 0,9 mm, satin or other approved finish as directed and otherwise to be fully in accordance with SABS IEC 1084 for cover plates and SABS 1085 for wall boxes.

10. **POSITIONS OF SWITCHES AND SOCKET OUTLETS**

Except where otherwise specified, lighting switches and socket outlets are to be installed 1,4 m above finished floor level.

All mounting heights specified are to be measured from finished floor level to the bottom of the outlet box.

Where the lower portion of the wall consists of face brickwork and the upper portion of plastered finish, switches and socket outlets are to be mounted in the plastered surface, provided that the lower edge of the plasterwork does not exceed a height of 1,5 m above finished floor level in which case the switches or socket outlets are to be installed in the face brick dado.

Where socket outlet and switch boxes have been installed with fixing lugs below finished wall surface, only approved distance pieces required to compensate for the recess shall be used. The lengths of distance pieces are not to exceed 15 mm.

Unless otherwise approved, light switches adjacent to doors are to be installed at the lock side of the door. Where the lock position is not indicated on the drawings, its position shall be ascertained before the switch box is installed. Switches are to be installed 150 mm from the reveal, or centrally if there is a fitting near the door.

All switch and socket outlet boxes shall be installed plumb, and built into the wall with a 1:1 mixture of cement and sand.

Industrial type switches and socket outlets shall be neatly recessed into the surface of plastered walls to avoid sets or alternatively spacer bar saddles may be used.

Deep type boxes may be used where switches or socket outlets are back to back, but where one side only is to be utilized at the time and the other is for future use, the side for future use shall be suitably covered with a metal cover plate.

11. LOW TENSION SWITCHBOARDS

Low Voltage switch gear and control gear to comply with SABS 1473 and SABS IEC 60947 and SABS 60349.

Where switchboards are to be installed in switch rooms or switch cupboards, the Contractor must ensure that the boards are manufactured to suit the dimensions of the rooms or cupboards.

Low tension switchboards shall be specified in detail for each service, but shall generally conform to the following:

They are to be of strong and rigid construction, with suitable angle, channel or folded steel framework. They are to be flush fronted and totally enclosed with sheet steel panels suitably formed at the edges and reinforced to prevent distortion. Unless otherwise directed, all front panels must be at least 2 mm thick and all other panels at least 1.6 mm thick. Panels are to be secured to the framework with studs and chromium plated dome nuts (self-tapping and similar screws are not permitted).

Switches, etc, are to be mounted on metal frames within the boards to give flush front panels. Equipment of normally surface mounted types such as energy meters, time switches and contractors, are to be mounted on inner metal trays behind hinged front panels. In the case of supply authority meters the hinged front panels must have transparent inserts.

All metal work of the boards must be thoroughly degreased, primed with PA 10 self etching primer and finished with one coat of undercoat and two coats of electrical orange high gloss enamel, unless otherwise specified.

All accessible current carrying parts, bus-bars, connecting strips, collector bars, etc, are to be adequately insulated in phase colours and suitably braced to withstand projected fault currents.

Connecting strips and collector bars must be of sufficient cross sectional area to carry full rated current of the switches served, irrespective of the fuse or trip rating.

The complete distribution board including bus-bars must be suitably constructed to withstand fault currents specified.

Connections to bus-bars are to be made by means of lugs suitably bolted and locked with high tensile bolts and connections to lugs must be effected by means of a crimping tools.

Incoming and outgoing bus-bar studs, where required, must be suitably insulated where they pass through panels of the board, and firmly supported within the board.

Where applicable, incoming and outgoing collector bars for cables in parallel must so arrange that the multiple cable ends can be connected to the bars with reasonably short tails which do not have to cross.

Cable supports must be placed at suitable heights having regard to the bending radius of the cables concerned and convenience in making off.

Wall-mounting and floor-standing back to wall type boards must be provided with full easy access to all equipment and wiring without any necessity of disconnecting or removing of any of the equipment mounted in the board.

Clear visible indication of all switch positions must be provided and the switches must be clearly labeled as directed by the Head : Works.

The details of construction proposed, and the Head : Works must approve all equipment of switchboards: Works before manufacture is commenced.

12. **DISTRIBUTION BOARDS**

12.1 **Approval**

The Head : Works must approve the details of construction proposed and all equipment within distribution boards: Works before manufacture is commenced.

12.2 **Flush Mounting Distribution Boards**

These shall be generally manufactured in accordance with SABS 1765. The board shall consist of two panels fitted side by side with common bonding tray and attached to a common architrave. One panel shall accommodate all single phase MCB's and the second panel shall accommodate the main isolator, main bus-bars and the triple pole MCB's. Chassis shall be of rigid channel section rust proofed steel with clip-on trays for the single pole MCB's. The main isolator is to be mounted at the bottom of the second panel with the triple pole circuit breakers above.

12.3 **Surface Mounting Distribution Boards**

These shall be generally manufactured in accordance with SABS 1765, with two panels as for flush boards.

12.4 **Single Phase Distribution Boards**

Single Phased boards shall be generally constructed as three phase boards except they shall have a single panel. Single phase boards shall be mounted with the bottom of the architrave 1,5 m above finished floor level unless specifically directed otherwise.

12.5 **Distribution Board – In Roof Spaces**

Where distribution boards are installed below a roof space, a minimum of 2 x 20 mm and 1 x 25 mm spare conduits are to be run from the distribution board into the roof space.

13. **METER BOXES**

The meter box shall be mounted with the top 1,7 m above finished ground level. Surface mounted meter boxes shall be secured by at least 4 x 10 mm expansion bolts.

Service cables entering the meter box shall be protected by means of a suitably sized galvanised pipe extended 450 mm below the ground surface and securely saddled to the wall and bonded to the meter box.

14. **CONNECTIONS TO OUTLETS**

14.1 **General**

Where connectors are used to connect to the wiring of luminaires and other appliances, the connectors shall comply with SABS Specification 1239.

14.2 **Connection to Stoves**

14.2.1 **General**

The connection to an electric stove, unless otherwise specified shall consist of 2 x 10 mm² conductors and a 6 mm² insulated earth wire in 25 mm conduit. The stove shall be controlled by a 60 Amp micro gap switch of approved make and the connection shall be by means of a 45 Amp 3 pin stove plug of the "Cape Town" type. Cable ends, which are to be connected to the stove, shall be equipped with suitable soldered or crimped lugs. The connection between the stove plug and stove shall be by means of flexible conduit.

Except for high school domestic science unit kitchens (see Clause 14.2.2), the conduit shall be chased into the wall and fitted with a switchbox for housing the micro gap switch and a 25 mm circular conduit box over which the stove plug will be mounted. The stove plug shall be fitted with an adaptor plate and shall be screwed directly to the conduit box by means of round head metal screws. The plug outlet shall face downward.

The stove plug and switch shall be mounted 430 mm and 1,4 m respectively above finished floor level unless otherwise specified or indicated on the drawings.

14.2.2 **Stove Connections in High School Domestic Science Unit Kitchens**

Connections to stoves in High School Domestic Science Unit Kitchens, where the stoves are situated in front of a fitting, shall be generally as specified in Clause 14.2.1 except that the 25 mm diameter conduit shall be run in the floor slab, from the distribution board to a position to the right of the stove. A pedestal, which is complete with a 45 Amp 3 pin "Cape Town" type cooker plug, mounted on the back, shall be fitted over the conduit and securely bolted to the floor by means of expansion bolts. The plug circuit, which passes through the pedestal, is to be on a separate circuit.

14.3 **Connections to Hot-water Cylinders**

The connections to hot-water cylinders not exceeding 3kW loading shall consist of 2 x 4 mm² PVC conductors and 1 x 2,5 mm² earth wire in a 20 mm diameter conduit from the distribution board. The conduits shall be chased in the wall and shall terminate at the side of the cylinder in a box over which is to be mounted a double pole isolator with pilot light.

The final connection between the isolator and cylinder shall be by means of silicone heat resistant conductors in 20 mm diameter flexible conduit.

Connections to roof mounted hot-water cylinders shall generally be as specified above with an isolator with pilot light mounted adjacent.

14.4 **Connections to Power Points**

Connections to electric motors and fixed apparatus to vibration shall, unless otherwise specified or indicated on the drawings, have final connections consisting of conduit and flexible tubing or reinforced hose in accordance with Clause 1.3 of this specification and PVC cables and earth wire of the required size.

An isolator shall protect all fixed apparatus and where necessary a starter fitted with a no-volt coil and overload protection adjacent to such apparatus.

Power points for connection of fixed apparatus to be installed by others, shall terminate in an approved type wall mounted switch unless otherwise specified.

The minimum conductor size for all power points shall be 4 mm² unless otherwise specified.

14.5 **Underground Service Connection**

This clause refers to underground service connections not provided by the Supply Authority.

The service cable and earth wire to be connected at the supply point in accordance with Clause 15.8 of this specification, and unless otherwise specified, shall be laid 600 mm below ground level throughout and otherwise fully in accordance with Clause 15 and all applicable sub-clauses thereof. Cable entries to meter boxes shall be in accordance with Clause 13 and other entries shall be by pipe or duct as directed.

14.6 **Connections to Outbuildings**

Connections to outbuildings shall be made by means of underground cable only, laid in accordance with Clause 15 and all applicable sub-clauses.

Where the cable is run from the roof space of the main building, it shall be enclosed in suitably sized galvanised pipe built into the wall or run surface as directed. Surface run pipes shall be securely saddled at 1,8 m centers. Where the cable connects to the conduit in the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space with fixings at regular intervals, and down to the main board. At the outbuildings, the cable shall be enclosed in a suitably sized galvanised sleeve pipe built into the wall or run surface and terminated in the distribution board tray.

14.7 **Connection and Mounting of Cable Fed Street/Site Lighting**

Street/site lights shall in all cases, except where otherwise specified, be fed by underground cable. Unless otherwise directed, a suitable terminal board shall be provided in the base of the lighting pole for the connection of the incoming and outgoing cables, the feeds from the terminal board to the fitting shall be as specified.

"Surfix" cable and compression glands shall be installed between terminal board and cross arm/bracket mounted luminaires. The terminal board shall also accommodate a miniature circuit-breaker in the phase connection to the fitting. Poles intended for mounting directly in ground are to be provided with a 300 x 300 mm base plate.

15. **UNDERGROUND CABLES**

1000 volt PVC SWA and 110 Volt PILCA cable and accessories shall be in accordance with the relevant SABS specifications to SABS 1507.

The storage, transportation, handling and laying of underground cables shall be according to the manufacturer's requirements and the Contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operation. All cable pipes and ducts entering buildings are to be sealed against the ingress of vermin, water, etc.

15.1 **Trenching**

Cables, unless otherwise specifically directed, shall be laid at a depth of 600 mm below ground level. Trenches shall not be less than 300 mm wide for one to three cables, and the width shall be increased where more than three cables are to be laid together so that the cables may be placed at least 75 mm throughout the run.

The Contractor shall take all necessary precautions to prevent trenching work being in any way a hazard to the public and to safeguard all structures, roads, sewer works, or other property from risk of subsidence and damage.

15.2 **Cable Joints**

Joints in underground cable runs will not be permitted unless unavoidable and at the discretion of the Head : Works. Where cable joints are unavoidable, the cable jointer is to work efficiently and cleanly and so that each end of the cables to be joined may have a minimum of 0,9 m of slack disposed in a loop without stress. Back-filling under joints must be firmly tamped to prevent any subsequent settling.

15.3 **Bedding**

In trenches made in intermediate, hard rock, or boulder material, the cables shall be laid on a 75 mm thick bed of earth and be covered with a 150 mm layer of earth before the trench is filled in. The Contractor to supply all earth required for trench filling.

15.4 **Laying**

Cables shall be removed from the cable drum in such a way that no twisting, tension or mechanical damage is caused, and must be adequately supported at short intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts, to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after the drawing in of the cables.

15.5 **Back Filling**

Back filling after bedding (see Clause 15.3) is to be carried out with a proper grading of the material to ensure settling without voids, and the material is to be tamped down after the addition of every 150 mm. The surface is to be made good as required.

Back filling of cable trenches must not be commenced until after the cable trenches and laid cable(s) have been inspected by the Head : Works. Where a Contractor fails to observe this requirement he may, at the discretion of the Head : Works, be required to re-open such cable trenches for inspection at his own expense.

15.6 **Protection of Cables**

Where so directed by the Head : Works, concrete or other warning covers shall be placed over cables above the top bedding layer. Cable pipes when directed are to be installed at road and other crossings.

15.7 **Marking of Cables**

Cable marking tape is to be supplied by the Contractor and is to be laid 150 mm below ground over a cable run and as may be directed by the Head : Works to give early indication of underground cable runs.

15.8 **Joints and Termination of Cables**

Joints in underground cables and terminations shall be made by means of "Scotch Cast" or other approved epoxy-resin pressure type jointing kits. Low tension PVC cables are to be made off with sealing glands and materials designed for this purpose, which must be of approved make.

15.9 **Sealing of Paper Insulated Cable Ends**

Where cables are cut and not immediately made off, the ends must be sealed without delay. If cables are cut and the ends not immediately made off or sealed, the cable may be rejected and the Contractor will be required to replace it at his own expense.

15.10 **Earth Wires**

Except where specifically directed otherwise, earth continuity conductors are to be run with all underground cables constituting part of a low tension distribution system. Such earth continuity conductors shall be bare copper wire of a cross sectional area in accordance with the Code of Practice 0142 but shall not be less than 4 mm² nor more than 70 mm². The earth continuity conductor is to be bonded to the cable armouring, and to the lead sheath if any, at each termination, as well as to the local earth bard. The earth wire must be secured to the cable at 1,8 m centers.

15.11 Opening Up of Existing Cables

Where it is necessary to expose existing buried cables for any purpose, or to excavate in the vicinity of existing buried cables, pipes, etc, every care is to be exercised and only labourers experienced in such work, and duly warned by the Contractor, shall be employed thereon.

15.12 Definitions for Classifying of Excavation

- (a) Soft Excavation – shall be excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0,10kW per millimeter of tinned-bucket width, without the assistance of pneumatic tools such as paving breakers, or that can be efficiently loaded without prior ripping or stockpiling by a rubber tyred front-end loader approximately 15T mass and a flywheel power of approximately 100kW.
- (b) Intermediate Excavation – shall be excavation in material that requires a back-acting excavator of flywheel power exceeding 0,10kW per millimeter of tinned-bucket width and the assistance of pneumatic tools prior to removal by equipment equivalent to that specified in (a) above.
- (c) Hard Rock Excavation – shall be excavation in material that cannot be efficiently removed without blasting or without wedging and splitting prior to removal.
- (d) Class A Boulder Excavation – shall be excavation in materials containing more than 40% by volume of boulders of sizes between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: (1) Excavation of solid boulders or lumps of size exceeding 20 cubic meter will be classified as hard rock excavation.

(2) Excavation of fissured or fractured rock will not be classed as boulder excavation but as hard rock intermediate excavation according to the nature of the material.

- (e) Class B Boulder Excavation – shall be excavation of boulders only in a material containing 40% or less by volume of boulders of size between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: Those boulders that required individual drilling and blasting in order to be loaded by a back-acting excavator as specified in (a) above, or by a track type front-end loader, will each be separately classed as Class B Boulder Excavation.

16. **EARTHING**

16.1 **Main Earthing**

The type of main earthing shall be as required by the Supply Authority, if other than the Head : Works and in any case as directed by the Head : Works who may require additional earthing to meet test standards.

Where required, an earth mat is to be provided, the minimum size, unless otherwise specified, being constructed from copper straps 950 x 25 x 3 mm at 230 mm centers and braced at all intersections. Alternatively or additionally earth rods or trench earths may be required, as the Head : Works may direct, and installed according to his instructions.

All earth electrodes and connections thereto must be approved "in-situ" by the Head : Works before back-filling.

The electrical installation shall not be earthed by means of the lightning arrester earth electrode, if such is included in the installation, but may be bonded thereto.

16.2 **Earthing in Installations**

The installation shall be effectively earthed in accordance with the relevant sections of the Code of Practice 0142 and the requirements of the Supply Authority.

All hot and cold water and waste pipes are to be effectively bonded by means of 12 x 1,5 mm solid copper tape (perforated tape or wire will not be permitted), clamped by means of brass bolts and nuts. Bonding tapes exceeding 75 mm in length must be fixed to the wall by means of No. 6 x 20 mm brass screws and plastic plugs not exceeding 150 mm centers. Main earth copper tapes where installed less than 2,5 m from ground level, must be run in 20 mm diameter conduit securely saddled to the wall.

Gutters and down pipes are to be bonded by means of 6 mm round headed brass bolts, with nuts and washers. Self-tapping screws are not permitted.

Connections from the earth bar or terminal on the main board must be made to a visible cold water main, the incoming service conductor, if any, and the earth mat or plate (where such is required) by means of either 12 x 1,5 mm solid copper tape or bare 25 mm² copper wire, or such larger conductor as the Head : Works may direct. From each distribution board separate earth conductors are to be taken to the main earth bar or terminal on the main board. Each conductor shall consist to stranded copper conductors drawn into the conduit together with the distribution board feeders. The size of the earth conductors to be in accordance with the requirements of the Code of Practice 0142 or as specified.

Earthing clips shall be made of not less than 0,9 mm thick copper strips not less than 12 mm wide. They are to be complete with 25 x 7,7 mm brass bolts, washers and nuts and must be constructed so that the clips will fit firmly to the conduit without any additional packing.

Adjustable earth clips are not permitted.

17. **EXISTING BUILDINGS**

17.1 **Occupied Buildings**

Where work is to be carried out in occupied buildings the Contractor must arrange to carry out the installation with as little interruption to services and discomfort to the occupants as possible.

17.2 **Temporary Connections**

Temporary connections shall be provided where necessary for continuity of services, and as directed by the Head : Works. The contractor must ensure that such connections are both electrically safe and free from physical hazard.

17.3 **Old Materials**

Unless otherwise specified all existing materials removed by the Contractor shall remain the property of the Head : Works and are to be handed to the Head : Works.

17.4 **Making Good**

Any damage which may be done to the plaster work, floors, ceilings, wood and paint work, furniture and other equipment in the building, etc, during the progress of the electrical installation shall be repaired and made good by the Contractor to the satisfaction of the Head : Works.

18. **COMPLETION**

18.1 **Balancing of Load**

The Contractor is required to balance the load as equally as possible over multi-phase supplies.

18.2 **Tests**

The installation shall be tested by the Contractor as the service progresses or as required by the Head : Works and upon completion, for earth continuity and insulation. The final test before the taking over of the installation shall be made in the presence of the Head : Works.

The mandatory "Certificate of Compliance" shall be issued by the Contractor to the Supply Authority, with a copy to the Head : Works prior to first delivery being taken.

18.3 **Labelling**

All circuits and apparatus on switchboards shall be suitably correctly labeled by means of engraved plastic labels (white lettering on black), which are to be either bolted or screwed to the equipment panel, or fitted in channeling provided below the switch gear.

Sub-circuits are to be numbered and a legend detailing the circuits is to be framed and fitted to the door of the distribution board.

All other equipment is to be individually labeled to indicate the function.

All switchboards are to be fitted with a label on which the designation of the board is clearly indicated.

A separate engraved label depicting the origin and cable/conductor size shall be fixed below the main switch.

18.4 **Finishes**

Covers for all boxes, expansion boxes, etc, shall be finished to match the paint work of the ceiling or wall surface or as specified.

18.5 **Site Drawing**

On all completed new work or where specifically called for in the Tender Document, the Contractor shall, on completion of the works, submit to the Head : Works, a marked up site plan indicating the exact underground cable reticulation.

19. **POWER DUCTING FOR SCHOOL SCIENCE LABORATORIES**

The ducting shall be "Ductline 3" supplied by Messrs. Lascon Lighting, 102 Malbourne Road, P.O. Box 2479, Durban 4000: Telephone 031-2075081 or other approved.

20. **SPEAKER AND MICROPHONE OUTLETS**

Speaker and microphone outlets are to conform to the following details:

1. Speaker outlet – To have one flat and one round pin.
2. Microphone outlet – To have one round pin only.

Both female and male parts to be supplied and installed by the Contractor.

21. **BELLS AND BUZZERS**

21.1 **Bells**

Bells for schools and hostels shall be 220 Volt AC or 24 Volt DC as specified for the service. They are to be of robust construction encased in a sturdy cast metal weather-proof case. They are to operate on the frequency of the supply. They shall have an adjustable stabilizing spring, gold-silver contact points and 150 mm gongs.

21.2 **Doorbells, Buzzers and Bell Transformers**

These will be as specified for each service.

21.3 **Bell Pushes**

Except where otherwise specified, bell pushes shall be of the flush type suitable for mounting in a standard 100 x 50 mm box. They shall be clearly marked as a bell push and shall be fitted with satin finished anodized aluminium cover plates.

22. **SIGNAL TIMERS**

22.1 **Primary Schools**

The timer shall be designed to automatically signal the start and finish of school periods by the switching of a bell circuit and is to comply with the following specification:

1. The mechanism may be synchronous motor or quartz movement driven with a 24 hour dial or digital time read-out suitable for operation on a 220V 50Hz supply and is to be provided with a spring or battery reserve of a least 24 (twenty four) hours.
2. The unit is preferably to have minute to minute timing for a 24 (twenty four) hour period although 5 (five) minute intervals are acceptable, and is to be provided with Weekend lockout. Signal periods shall be adjustable from 5 – 45 seconds.
3. The unit shall be housed in a metal or plastic case with detachable front cover suitable for wall mounting.
4. Timers with punch tape programming are not acceptable.

22.2 **High Schools and Colleges**

Timers for these institutions shall generally be as for Primary Schools but are to have at least 3 (three) separate programmes and be fitted with three push buttons for independent manual operations for testing of each programme, plus an on/off switch for each programme, which does not affect the running of the clock.

23. **CLOCKS**

Electric clocks shall be of the quartz electronic battery operated type, with a dial of 250 mm diameter. The dial shall be white, with distinctive minute markings and chapters shall be black Arabic figures. Time adjustment shall be simple. Where mains operated electronic clocks are specified, these shall be of the synchronous self starting type, suitable for a 200 – 250 V 50 Hz AC supply

24. **TIME SWITCHES**

The time switch shall consist of a single pole switch with silver to silver or other approved contacts operated by a quartz movement with a 24 hour reserve.

A suitable 24 hour, night and day dial, with hour indicator and two adjustable strikers, one OFF and one ON must be provided. The whole mechanism is to be totally enclosed in a dust proof case.

The current rating shall be required and the switch is to be suitable for operation on 220 volt 50 Hertz AC supply. Time switches used for under floor heating are to be fitted with weekend cut-out.

25. **MOULDED CASE CIRCUIT BREAKERS (INCLUDING MINIATURE)**

Circuit breakers shall be of the size and type as directed and specified for the service. They shall comply with SABS Specification 156 and SABS IEC 60947-2.

26. **SWITCHES: ON-LOAD FAULT MAKING (CIRCUIT BREAKER TYPE) WITHOUT TRIPS**

The switches shall be triple pole, hand operated, panel mounting air break type, having continuous current rating as specified and suitable for operation of 380 – 440 Volt 50 Hz AC system.

The contacts are to be of silver alloy and the switch mechanism shall be of the quick-make, quick-break type.

27. **SWITCHBOARD EQUIPMENT**

Switchboard equipment such as switches, circuit breakers, etc, shall be as directed and specified in the detail specification for the service.

Circuit breaker equipment of SABS IEC 60934.

28. **FUSE-SWITCH UNITS (WITH HRC FUSES)**

The fuse-switch unit is to be of the double pole, or triple pole or triple pole with neutral link type, and of the required current rating, as specified for the service and must be in accordance with BS EN 60947-3.

The fuse links must be fully isolated when the switch is in the open position, and interlocks must be provided to prevent the switch being operated with the cover open.

The fuse links shall comply with SABS Specification 172 and SABS IEC 60269-1 to 4.

29. **BUS-BAR COPPER**

Bus-bar copper must be fully in accordance with Tables A1 and A2 of SABS 1473-2 and SABS IEC 60439-2.

30. **SPECIFICATION COMPLIANCE**

The complete installation shall comply with the requirements of this specification. Should any differences or contradictions exist between this Specification and the detailed requirements for a specific installation, then the detailed requirements shall take precedence.



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ANNEXURE 3
LIGHTNING PROTECTION SPECIFICATION

LIGHTNING PROTECTION INSTALLATION

GENERAL SPECIFICATION

1. SATISFACTORY INSTALLATION

The whole of the installation shall be carried out in accordance with:

- (a) The latest S.A.B.S. Code of Practice for the Protection of Structures against Lightning - S.A.B.S. 03 ; SABS IEC 61024 (1) , 61024 (1 -1); SABS IEC 61312 (1) ; SABS IEC 61662 & NRS 042.
- (b) The KwaZulu-Natal Department of Works General Electrical Specification.
- (c) The Municipal By-Laws and any other special requirements as deemed necessary by the Local Supply Authority;
- (d) Local Fire Regulations.

2. S.A.B.S. APPROVED DRAWINGS

SABS Approved drawings are not required for this project.

3. TEST ON COMPLETION

Upon completion of the lightning protection system, the following tests shall be witnessed by an appointed representative of the Employer. The results shall be recorded on suitable test certificates which must be signed by both the Contractor and the Employers representative. A sketch must be included on each test certificate indicating the positions of each earth electrode in relation to some permanent reference point. It must also indicate the positions at which tests were carried out, the type of test and the results of these tests.

3.1 Earth Resistance Test

The Earth Resistance Test shall involve measuring the resistance to earth of each rod-type electrode, or group of rod-type electrodes, or trench earth which would normally be connected to one down-conductor or earth terminal. This test must be made with the electrodes completely disconnected from any part of the structure or lightning protection system.

3.2 Electrical Continuity Tests

(a) External Down-Conductors

Electrical continuity between the lower ends of external down-conductors which must all be disconnected from the earthing system during the test shall not exceed 1 (one) ohm.

(b) Metallic Services

Electrical continuity between any metallic structures of services (e.g. rainwater pipes) which form an integral part of the lightning protection system shall not exceed 1 (one) ohm. These tests should be carried out with all other components of the lightning protection system disconnected from the component being tested.

4. DESCRIPTION OF MATERIAL

4.1 Air Terminals and Down-conductors

All conductors must be in accordance with the requirements of BSS 1474 or American Standards Specification 6063. All aluminium conductors shall have a cross-section area of not less than 30 mm² (domestic dwelling only) or 50 mm² for all other applications. The dimensions of flat section conductors to be 20 mm x 3 mm. Where conductors are mounted in stand-off guides, the cross-section area of the conductor must be not less than 70 mm² to give adequate mechanical strength.

4.2 Conductor Guides

The conductor must be mounted in aluminium alloy guides conforming with the material specification given in 4.1 above. The guides must allow for free longitudinal movement of the conductor to cater for expansion and contraction of the system caused by temperature variation. The minimum thickness of any part of the guide shall not be less than 3 mm. The guides must be securely attached to the structure using two stainless steel screws and plugs, the use of plated screws is not permitted.

The conductor system shall be supported in guides so that an air gap exists at all times between the aluminium and the surface of the structure, the guides being seated upon plastic or other similar insulating material. Should conductors be installed directly upon the surface of concrete or cement plaster, an insulating strip is to be installed over its whole length to prevent contact between the two surfaces. Guides shall be installed to support the conductor at intervals not exceeding 1,2 metres horizontally or 1,5 metres vertically.

N.B. No part of an aluminium conductor system must be allowed to come into direct contact with concrete or cement plaster as this may cause the aluminium to corrode.

4.3 Expansion Loops

Where conductors are installed horizontally without deviation from a straight line over long distances, expansion loops must be provided at distances not exceeding 30 metres. These expansion loops must have a cross-sectional area which is at least equal to that of the conductor.

4.4 Protection of Down-conductors

Where external down-conductors are installed in areas which are readily accessible to the public, the lower ends of the conductors shall be enclosed in a semi-rigid insulating material. In the case of a circular section conductor this shall comprise a 2 metre length of 20 mm diameter P.V.C. conduit. This conduit shall be securely attached to the wall by means of galvanized steel saddles fixed with stainless steel screws and plugs, spaced at intervals not exceeding 1 m. Where a flat section conductor is used this shall be covered by a similar length of 25 mm P.V.C. conduit. The lower end of the conduit shall be positioned as close as practicable to ground level, i.e. immediately above an aluminium to copper joint. The ends of the conduit shall not be sealed.

4.5 Earthing Electrodes

Earthing electrodes must consist of either copper-clad steel rods not less than 12 mm in diameter and having a minimum copper thickness of 0,20 mm driven into the ground, or a 50 mm² (35 mm² for domestic dwellings) bare copper conductor buried in a trench, or a combination thereof. Where copper clad steel electrodes are used they must have a suitable bond between the steel core and copper exterior to prevent moisture ingress between the two metals. Where it is necessary to extend earth rods, an electrolytically compatible corrosion resistant, coupling device, which prevents ingress or moisture into the joint shall be used. The copper conductor below the down-conductor joint shall be covered by a semi-rigid P.V.C. conduit for a distance of approximately 200 mm above ground and 400 mm below ground.

4.6 Joints Above Ground

Circular section aluminium conductors shall be jointed by aluminium ferrules or lugs which are securely crimped into place. Aluminium lugs must be bolted together using 10 mm diameter aluminium bolts and washers. The material specification for these components must conform with that laid down in paragraph 4.1. Alternatively heavily tinned copper lugs and ferrules may be used. The lugs should be joined together by means of 10 mm diameter copper, brass or bronze bolts and washers. Care should be taken to inhibit corrosion where dissimilar metals are used by thoroughly cleaning the surfaces of the metal before assembly and subsequently sealing the joint with an inert tenacious compound or tape.

Flat section aluminium conductors shall be joined by double riveting, using aluminium rivets which comply with the material specification laid down in 4.1. Alternatively 2 x 6 mm diameter stainless steel bolts, nuts and washers may be used. Fold over type bends will not be permitted.

Down-conductors are to be terminated approximately 200 mm above finished ground level. Circular section aluminium is to be jointed to a 50 mm² (35 mm² in the case of domestic dwellings) stranded copper conductor by securely crimping in place two heavily tinned lugs and bolting these together using 10 mm diameter copper, brass or bronze nuts, bolts and washers.

N.B. : Under no circumstances shall aluminium conductors be buried in the ground.

4.7 Joints Below Ground

A joint in the stranded copper conductor which forms part of the earthing system must be made by using a crimped copper ferrule clamping (not lugs) using two copper line taps of suitable dimensions, or exothermic welding. The copper earth conductor must be joined to an earth rod by either clamping, using a standard earth rod clamp or copper line tap or by exothermic welding. Joints which are made between dissimilar metals (i.e. copper conductor to galvanized steel water main), must be thoroughly cleaned before assembly. They shall be rendered watertight using waterproof adhesive tape on a suitable compound for a minimum distance of 200 mm in all directions from the joint.

4.8 Bonds

Where it is necessary to bond the aluminium conductor to any other metallic surface, this must be done by bolting or riveting. When attaching aluminium to a dissimilar metal the joints are to be thoroughly cleaned and sealed to prevent corrosion.

5. GENERAL INSTALLATION PROCEDURE

5.1 Air Terminals for Non-metallic Pitched Roofs

Aluminium conductors are to be installed along all ridges of roofs and projections such as dormer windows, etc., terminating at the ends with conductors running downwards over the surface of the roof and the eaves. Non-metallic chimneys must be protected by means of a finial of sufficient length to cover the chimney within a 45° angle struck downwards from its point. Alternatively it should have a conductor installed in the form of a closed loop upon the upper surface. The conductors are to follow the outer contour of the stack and must be bonded at a convenient point to the nearest component of the air terminal system.

N.B. : This bond may run in a horizontal or downward direction, but under no circumstances must any part of it run above horizontal.

Conductors may be dead-ended (i.e. have one end free and unbonded), providing that the length of such a conductor does not exceed 10 metres and that the unbonded end is either at the same level or higher than the bonded end. This technique may be used where ridge conductors are installed over dormer windows, etc.

In all cases where metallic gutters have been installed along the eaves of a pitched roof, these must be bonded to the air terminal system. Where metallic gutters do not exist, however, a conductor must be installed over the surface of the roof at eaves level to which the remainder of the air terminal system is to be bonded, with the following exceptions :

- (a) Where the maximum distance from the ground level to the eaves of the building is less than 4 metres and the pitch of the roof is more than 1 in 2 (27° from the horizontal).
- (b) Where the maximum distances from ground level to the eaves is less than 7 metres and the pitch of the roof is more than 1 in 1,5 (34° from the horizontal).
- (c) Where the distance from the ground level to the eaves is more than 7 metres and the pitch of the roof is more than 1 in 1 (i.e. the included angle at the apex of the roof is less than 90°).

Under these circumstances eaves conductors need not be installed.

Any non-metallic objects which protrude above the general roof lines, such as Cape Dutch gable ends, must be protected as described above with a suitable air terminal system. Any metallic objects which protrude above the general roof line, such as hot water expansion pipes must be bonded as directly as possible to the nearest eaves conductor, gutter or other part of the lightning system.

N.B. : These bonding conductors must run in a horizontal or preferably a downward direction, from the vent pipe, etc., to the lightning protection system.

5.2 **Air Terminals for Metallic Pitched Roofs**

Buildings with roofs covered with electrically continuous metal sheets do not require separate air terminals but must be earthed via down conductors generally as described in 5.6 and 5.7. Any non-metallic objects projecting above the general roof line must be separately protected as described in 5.1 and bonded to the metal roof covering.

5.3 **Air Terminals for Non-metallic flat or Mono-pitched Roofs**

For flat or mono pitched roofs of non-metallic construction the air terminal system must consist of aluminium alloy conductors installed around the outer perimeter of each section of the roof structure. These conductors must be installed on top of parapet walls if these exist. Lift motor rooms, tank rooms, penthouses, etc., which protrude above the general roof line must have air terminal conductors installed around the outer perimeter of each roof slab or parapet wall. Any metallic objects which protrude above the roof line, such as expansion pipes, signs, flag poles, handrails, etc., must be bonded directly to the nearest component of the lightning protection system as described in 5.1.

N.B. : It is not permissible for the ends of conductors to be bonded directly to the perimeter air terminal system if the latter is installed upon a parapet wall having a height exceeding 500 mm above roof slab level. In these circumstances the conductors are to be bonded directly to the down conductors.

5.4 **Air Terminals for Metallic flat or Mono Pitched Roofs**

Metallic flat or mono pitched roofs do not require separate air terminal conductors, providing that there is electrical continuity between the metallic roofing sheets, (see 5.2). A metallic roof surrounded by a non-metallic parapet wall shall have conductors installed at the top of the parapet wall and these must be bonded to the metallic roof at intervals not exceeding 20 metres. If the parapet wall is clad with metal over its upper surface or a handrail is installed which affords good electrical continuity, separate air terminal conductors need not be installed. Under these circumstances the metal handrail or cladding must be bonded to the metal roof covering at intervals not exceeding 20 metres.

All non-metallic covering such as slates, tiles, asbestos cement sheeting, etc., supported by a steel structure being electrically continuous throughout may be treated as being of a complete metal construction. In these circumstances no separate air terminal system need be installed providing the steel roof structure is bonded to earth at intervals given in 5.5.

5.5 Down Conductors for Non-metallic Structures

Down conductors must be installed at regular intervals around structures and to run as directly as possible between the air terminal and earthing system. They must, where practicable, be positioned at the external corners of the structure. The maximum separating distance between down conductors around the perimeter of the structure must not exceed 30 metres. In the case of very tall buildings having a slender base (i.e. chimney stacks, water towers, etc.), a minimum of two down conductors must be installed.

The lower ends of down conductors are to be terminated and bonded to the earthing system approximately 200 mm above finished ground level. Under no circumstances must aluminium conductors be buried underground. Test joints must be provided between the down conductors and earthing system. Down conductors must run vertically between the air terminal and earthing systems. Where this is impracticable, their course may be deviated to run at any angle up to and including horizontal.

Where it is necessary to run conductors horizontally over the upper surface of a structural protrusion, such as an exposed concrete slab, the conductor may run down vertically over the edge of the slab and return to the main structure, so that the distance between the upper and lower conductors exceeds one third of the length of the horizontal run. Looped down conductors are not permitted. Down conductors must not run over the underside of large overhangs which are less than 6 metres above ground level, or other areas where people are likely to be present during a thunderstorm.

External or internal metallic rainwater pipes may be used as down conductors providing these are of substantial section and are jointed by screwing one length into another or welding. Thin gauge galvanized steel pipes whose sections are held together by friction, rivets or screws must not form part of a lightning protection system.

5.6 Down conductors for reinforced concrete framed structures

The steel reinforcement of this type of structure may be used in place of down conductors. Where the reinforcing system is used, the air terminal system must be bonded to it at a maximum of 30 metre intervals using steel clamps. This bond may be achieved by clamping, with a steel clamp, a steel conductor to a selected reinforcing bar, the opposite end of this conductor must terminate at a corrosion resistant metallic terminal such as Grade 316 stainless steel.

The reinforcing system of prefabricated concrete buildings must not be used unless special provision is made for bonding the various prefabricated sections together.

The terminals should be mounted flush with the face of the concrete. An aluminium alloy bond must then be taken from the air terminal system and be connected to the stainless steel terminal by means of a heavily tinned crimp lug for circular section aluminium, or a suitable bi-metallic joint in the case of flat section aluminium. A similar system must be used to bond the reinforcing system at ground level to the earthing system at points directly below the air terminal bonds. Here copper conductors must be used as the external bonding material.

Under no circumstances must copper, or other non-ferrous material be allowed to come into contact with steel reinforcing bars, as this may cause severe corrosion and subsequent structural damage. The lightning protection system must not be bonded to any part of the structure which is electrically isolated from the remainder of the building, i.e. cantilevered sections. In these circumstances, or where it is otherwise impracticable to use the reinforcing system, external down conductors must be installed as described in 5.5.

5.7 **Down conductors for steel framed structures**

Where the framework of a building is constructed of structural steel columns, these may be used in place of down conductors providing the separating distance between them does not exceed 30 metres. The upper ends of the columns must be bonded to the air terminal systems and the lower ends to the earthing system.

5.8 **Earthing by means of vertically installed rod type electrodes**

Rod-type electrodes must be driven into the ground at a position directly below each down connector. The maximum earthing resistance of each electrode or number of electrodes bonded to any one down conductor shall not exceed $N \times 30$ ohms, where N equals the total number of down conductors which are bonded to a common air terminal system, or 200 ohms whichever is the lower value.

The minimum horizontal separating distance between rod-type electrodes bonded together must not be less than their installed depth. The upper ends of installed rod-type electrodes are to be terminated approximately 500 mm below finished surface level. A 50 mm² copper bonding conductor must be installed to run between each earthing electrode system and the lower ends of the adjacent down conductors. A joint is to be made between each of these bonding conductors and the down conductors at a position approximately 200 mm above finished ground level. These bonding conductors must be installed in P.V.C. conduit securely affixed to the wall (see 3.4). The length of this P.V.C. conduit must be approximately 600 mm and must be installed so that approximately 200 mm protrudes above ground level, the remainder being buried into the soil.

5.9 **Earthing by means of metallic water mains**

Where two or three down conductors are installed the water mains may serve as an earth terminal for one of these. Where three or more down conductors are installed the water mains may serve as an earth terminal for two of these. Regardless of whether the water mains are used as an earth terminal or not, the incoming metal water pipe must be bonded to the lightning protection earthing system underground.

5.10 **Earthing by means of trench type electrodes**

Where the soil conditions prevent the satisfactory installation of rod-type electrodes, a trench earth system must be installed. This method is to comprise a 50 mm² stranded copper conductor installed horizontally into a trench at a depth of 500 mm below finished ground level. The conductor is to follow the general outline of the structure to be protected and be installed 1 metre away from the outside walls. Where the building stands on rocky ground, the trench earth may be attached to the lower part of the wall in areas where rock protrudes through the soil. The conductor must, however, be buried wherever possible as described above.

Each down conductor must be bonded to the trench earth system as directly as possible by means of a copper conductor.

Trench earth systems must have a maximum earth resistance of 30 ohms. An isolated length of trench earth mat must be bonded to the down conductor system in such a way as to reduce the length of dead-ends to the minimum.

Should trench earths be installed beneath pathways where people are likely to be present during a thunderstorm, a plastic, bitumastic or ceramic pipe must be installed having a length similar to the width of the pathway and the trench earth conductor run inside it.

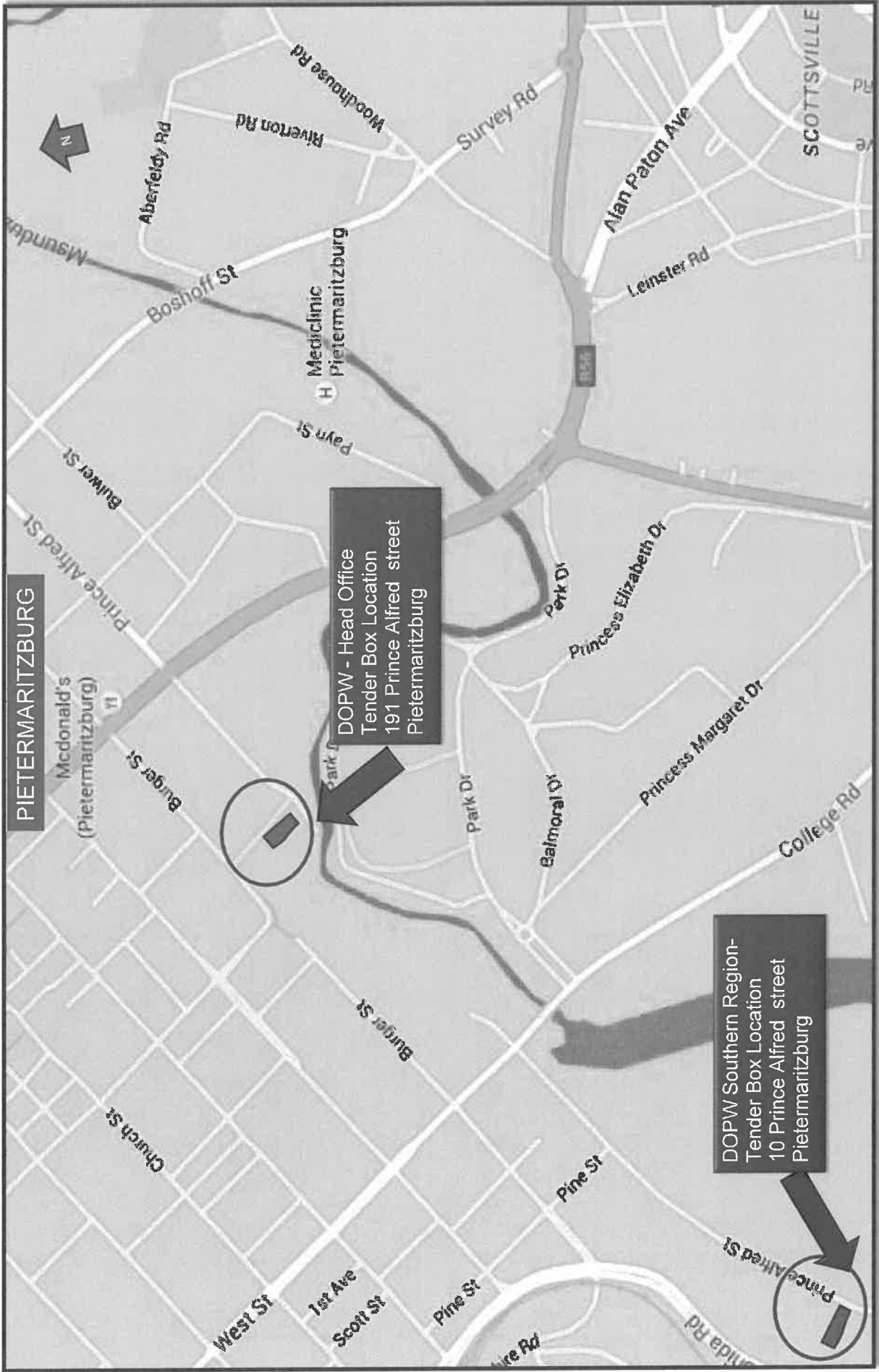
N.B. : The maximum useful length of a dead-ended trench earth is 80 metres.



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ANNEXURE 4
MAP OF BID SUBMISSION LOCATION





KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

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ANNEXURE 5
JOINT VENTURE AGREEMENT

Joint Venture Agreement
(March 2004)
(First Edition of CIDB document 1017)



KWAZULU-NATAL PROVINCE
PUBLIC WORKS & INFRASTRUCTURE
REPUBLIC OF SOUTH AFRICA

1. **PREAMBLE**

This agreement is made and entered into by and between

of the first part and

of the second part and

of the third part.

(allow for additional parties as necessary).

Whereas the foregoing parties have resolved to form a Joint Venture under the title of

for the exclusive purposes of securing and/or executing the Contract to be awarded by
(name of Employer)

to the KZN Department of Public Works in respect of the following project:

for *(brief description of Contract)*

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16: ETHEKWINI REGION:
MANDENI PS COMPLETION CONTRACT**

Now it is hereby agreed as follows :

2. **DEFINITIONS AND INTERPRETATION**

2.1 Definitions

The following words and expressions shall have the meanings indicated, except where the context otherwise requires. Defined terms and words are, in general, signified in the text of the Agreement by the use of capital initial letters, but the absence of such letters does not necessarily signify that a term, or word, is not defined.

'Agreement' means the agreement between the Members of the Joint Venture and includes this model form of agreement together with the Preamble, Specific Provisions, if any, Schedules 'A', 'B' and 'C' and any relevant Documents prepared prior to the signing of the Agreement and appended thereto.

'Contract' means the contract with the Employer for the supply of the Deliverables, for the purposes of securing and executing which, the Joint Venture has been formed.

'Deliverables' means the works and/or services, equipment, materials, goods, etc. to be furnished by the Joint Venture to the Employer in terms of the Contract.

'Document' means any written, drawn, typed, printed, or photographic material, which relates to the Agreement.

'Employer' means the person, or body, which is to award the Contract and will employ the Joint Venture if it is awarded the Contract.

'Joint Venture' means the joint venture formed by the Members in accordance with the Agreement.

'Management Committee' means the body established in terms of the Agreement to manage all aspects of the work of the Joint Venture in securing and executing the Contract and in meeting the provisions for the Agreement.

'Member' means a person, or body which, being a party to the Agreement, is a member of the Joint Venture.

'Member's Interest' means the proportion expressed as a percentage, which the total monetary value of all resources provided and contributions made by a Member towards the execution by the Joint Venture of the Contract bears to the total of such values by all Members and, unless otherwise indicated in the Agreement, represents the extent to which the Member participates in the fortunes of the Joint Venture.

'Representative' means the person representing a Member on the Management Committee.

'Schedules' means Schedules 'A', 'B' and 'C' which set out general, financial and other information relating to the Members and the obligations, duties, rights, risks and benefits arising from their participation in the Joint Venture.

'Specific Provisions' means the variations, if any, required to this standard form of agreement for the specific purposes of the Agreement.

2.2 Interpretation

Unless inconsistent with the context, an expression in the Agreement which denotes:

- any gender shall include the other genders
- a natural person shall include a juristic person and vice versa
- the singular shall include the plural and vice versa

2.3 Headings

The headings to clauses of the Agreement shall not be considered part thereof, nor shall the words they contain be taken into account in the interpretation of any clause.

2.4 Law

The Agreement shall be construed in accordance with and governed by the laws of the Republic of South Africa and the English language versions shall prevail.

2.5 Language

English shall be exclusively used by the Members in the preparation of Documents unless otherwise indicated.

2.6 Conflict between Agreement and Contract

Should any provision of the Agreement be in conflict with the terms of the Contract, the Agreement shall be amended to the approval of the Management Committee so as to eliminate the conflict.

3. **JOINT VENTURE GENERAL**

3.1 Establishment and Purpose

The Joint Venture established by the Members in terms of the Agreement is an unincorporated association with the exclusive purposes of securing and executing the Contract for the benefit of the Members.

3.2 Termination

The operation of the Joint Venture and the validity of the Agreement shall terminate if and when it becomes evident that the Joint Venture will not be awarded the Contract, or, if the Joint Venture secures the Contract, when all obligations and rights of the Joint Venture and the Members in connection with the Contract and the Agreement have ceased and/or been satisfactorily discharged.

Unless otherwise decided by the Management Committee, the Agreement shall not terminate if a Member changes its name, or is taken over by, or merged with, another body.

This agreement will terminate when any one of the Members resigns, are liquidated or opts out of this agreement and the Joint Venture will be in breach of contract with the Employer and their contract could be cancelled.

3.3 Exclusivity

Unless otherwise agreed by the Management Committee, or provided for in the Contract no Member shall engage in any activity related to the Contract other than as a Member of the Joint Venture and Members shall ensure that their subsidiaries and other bodies over which they have control comply with this requirement.

3.4 Participation of Members

Except as may otherwise be stipulated in the Agreement, each Member shall be responsible for all costs incurred by it prior to the date of inception of the Agreement.

Subsequent to the date of inception of the Agreement, each Member shall, participate in the operations, risks, responsibilities and fortunes of the Joint Venture including, inter alia, the provision of funding, sureties, guarantees, insurances, human and other resources and participation in profits and losses to the extents indicated in the Schedules. Participation in any aspect not covered in the Schedules shall, if an agreement cannot be reached between the Members, be to the same extents as indicated by the Members Interests.

3.5 Management

The affairs of the Joint Venture shall be directed and controlled by the Management Committee, as set out in Section 4 hereof.

- 3.6 Confidentiality
All matters relating to the Agreement and the Contract shall be treated by the Members as confidential and no such matter shall be disclosed to any third party without the prior written approval of the Management Committee.

No Member shall be party to the dissemination of publicity relating to the Contract, or the Agreement, without the prior written approval of the Management Committee and the Employer.

- 3.7 Assignment
No Member shall cede, assign, or in any other way make over any of its rights, or obligations, under the Agreement without the prior written consent of the Management Committee.

- 3.8 Subcontracting
No Member shall subcontract any obligation, work or duty for which it is, itself, responsible in terms of the Agreement without the prior written consent of the Management Committee.

- 3.9 Variations to Agreement
No variation, modification, or waiver of any part of the Agreement shall be of any force, or effect, unless unanimously agreed by the Members and reduced to writing.

- 3.10 Liability
Each Member warrants that it will indemnify the other Members against all legal liabilities arising out of, or in connection with the performance of its obligations under the Agreement.
It is acknowledged by the Members that they may be held jointly and severally liable in respect of claims against the Joint Venture by the Employer or third parties.

4. **MANAGEMENT OF JOINT VENTURE**

- 4.1 General
The affairs of the Joint Venture shall be directed, controlled and managed by the Management Committee, which, within the terms of the Agreement and the Contract, shall have full authority to bind the Members in all matters relating to the affairs of the Joint Venture.

Communication between the Joint Venture and the Employer, or third parties, relating to the Contract shall be conducted exclusively by the Management Committee, or by such person as it may delegate to perform this function.

The Management Committee shall have the power to appoint a project manager and/or such other persons as it may see fit to appoint for the purpose of executing the Contract and may delegate such of its powers, responsibilities and duties as it may consider necessary, or desirable, to persons or bodies appointed or seconded for this purpose.

Such administrative functions as are necessary to ensure the effective operation of the Management Committee shall be performed by its chairman.

- 4.2 Management Committee

- 4.2.1 Composition
The Management Committee shall, unless otherwise agreed by all the Members, consist of one Representative of each Member and each Member shall be obliged, at all times, to maintain a Representative on the Management Committee.

Each member shall, not later than three working days after the signing of the Agreement, appoint its Representative and notify the other Members of the name and contact details of the Representative. Such Representative shall have the power to bind the Member that he represents in all matters relating to the execution of the Contract and the performance of the Agreement.

A Member shall be entitled, after giving the other Members not less than three working days written notice of his intention to do so, appoint, remove and/or replace, an alternate who shall, at any meeting of the Management Committee from which the Representative whom he represents is absent, be vested with all rights and powers and subjected to all the obligations of the absent Representative.

The chairman of the Management Committee shall be the Representative of the Member which has the largest Member's Interest. If two, or more, Members have the same, largest Member's Interest, the chairmanship shall rotate between the Representatives of such Members at three monthly intervals, the order of rotation to be determined by ballot.

Notwithstanding the foregoing, the chairmanship of the Management Committee may be determined, or changed, at any time by unanimous decision of the Management Committee.

4.2.2 Meetings

Meetings of the Management Committee shall take place at such times and places as the Management Committee may determine, provided that the chairman shall convene a meeting of the Management Committee to be held not later than ten working days after he has been requested, in writing, by a Member to do so. Not less than five working days written notice of any meeting of the Management Committee shall be given to all Representatives and their alternates.

The Management Committee may permit, or invite, persons other than Representatives or alternates to attend any of its meetings, but such persons shall not have voting rights.

4.2.3 Decisions

Each Representative shall have one vote on the Management Committee and where, in terms of this clause, a casting vote is required, this shall be exercised by the chairman.

All decisions of the Management Committee shall, desirably, be unanimous. Accordingly, if unanimity cannot, initially, be achieved in regard to a decision, the meeting at which that decision is sought shall be adjourned for a period of 48 hours to enable Representatives to consult with their principals. If, on resumption of the adjourned meeting, unanimity can still not be achieved, the decision, provided it is not one requiring unanimity of the Members, shall be taken by majority vote and, in the event of a tie, the chairman shall exercise a casting vote.

A Member not satisfied with a majority decision of the Management Committee may declare a dispute, to be dealt with in terms of Clause 8 hereof, but the majority decision shall, nevertheless, be implemented with immediate effect.

Decisions of the Management Committee, whether taken at a meeting, or otherwise, shall be recorded in written minutes, which shall be distributed by the chairman to reach the Representatives not later than five working days after those decisions were taken. Such minutes shall be deemed to have been affirmed by the Representatives unless written notice of dissent is received by the chairman not later than three working days after receipt of the minutes by the Representative.

4.2.4 Powers and duties

The functions, responsibilities and powers of the Management Committee shall include, inter alia, those listed below:

- 4.2.4.1 Formulating overall policy in regard to the achievement of the objectives of the Joint Venture.
- 4.2.4.2 Managing the day to day affairs of the Joint Venture.
- 4.2.4.3 Monitoring, directing and co-ordinating the activities of the Members to ensure that the objectives of the Joint Venture are achieved and that the obligations and responsibilities of the individual Members are met.
- 4.2.4.4 Monitoring and controlling the financial affairs of the Joint Venture and ensuring that proper books of account and financial records relating to affairs of the Joint Venture are maintained in an approved form and submitted to the Management Committee for approval at regular intervals, which shall not be longer than one month.
- 4.2.4.5 Determining the necessity for and the details of any changes in the duties and responsibilities of Members provided that any resulting changes in Members' Interests shall be unanimously approved by the Members.
- 4.2.4.6 Determining the terms and conditions of employment of personnel and the emoluments applicable to staff seconded to the Joint Venture by the Members.
- 4.2.4.7 Controlling and approving the appointment of all subcontractors.
- 4.2.4.8 Procuring, after the completion of the Contract and the release of all bonds, guarantees and sureties given in respect of the performances of the Joint Venture and the Members, the preparation and auditing of a final set of accounts, on the basis of which the final profits, or losses, attributable to the individual Members shall be determined and any necessary adjustments effected.

5 RESOURCES OF JOINT VENTURE

The resources to be utilised by the Joint Venture in securing and executing the Contract shall, insofar as these are to be provided directly by the Members, be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Member's Interests are not, except with the unanimous approval of the Members, affected thereby.

Similarly, specific areas of responsibility of the Members for the performance of work and the provision of facilities shall be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Members' Interest are not, except with the unanimous approval of the Members, affected thereby.

5.1 Schedule 'A' (General)

Schedule 'A' shall contain general information relating to the Joint Venture including, inter alia, the following :

1. The Employer's name and address.
 2. A brief description of the Contract and the Deliverables.
 3. The name, physical address, communications addresses and domicilium citandi et executandi of each Member and of the Joint Venture.
 4. The Members' Interests.
 5. A statement indicating whether, or not, Specific Provisions apply to the Agreement.
 6. A schedule of insurance policies which must be taken out by the Joint Venture and by the individual Members.
 7. A Schedule of sureties, indemnities and guarantees that must be furnished by the Joint Venture and by the individual Members.
8. Details of the persons, who, in the event of failure by the Members to reach agreement on the appointments of mediator and arbitrator, will nominate appointees to these positions in terms of Clauses 8.2 and 8.3.

5.2 Schedule 'B' (Financial)

Schedule 'B' shall contain information regarding the financial affairs of the Joint Venture including, inter alia, the following :

1. The working capital required by the Joint Venture and the extent to which and manner whereby this will be provided and/or guaranteed by the individual Members from time to time.
 2. The banking accounts that are to be opened in the name of the Joint Venture and the manner in which these are to be operated.
3. The rates of interest that will be applicable to amounts by which Members are in debit, or credit, to the Joint Venture.
4. The names of the auditors and others, if any, who will provide auditing and accounting services to the Joint Venture.
5. The intervals at which interim financial accounts and forecasts will be prepared for approval by the Management Committee.
6. Insofar as not covered in Schedule 'C', the basis on which contributions of various types by the Members towards the work of the Joint Venture in securing, executing, managing and satisfactorily completing the Contract, will be valued.
7. The basis on which profits and/or surplus cash will, if available from time to time, be distributed to Members.
8. The basis upon which losses, if any, are to be apportioned to Members.

5.3 Schedule 'C' (Contributions by Members)

Schedule 'C' shall set out the contributions of various types, other than cash, that will be made by the individual Members towards the work and obligations of the Joint Venture and shall, as far as possible, indicate the monetary values to be placed on such contributions, which may include, inter alia, the following :

1. Staff seconded to the Joint Venture.
2. Work carried out and services provided to, or on behalf of, the Joint Venture.
3. Plant, equipment, facilities etc. made available for use by the Joint Venture.
4. Materials and goods supplied to, or on behalf of, the Joint Venture.
5. Licences, sureties, guarantees and indemnities furnished to, or on behalf of, the Joint Venture.
6. Joint Venture Disclosure form required for the Contract.

6. **BREACH OF AGREEMENT**

If a Member breaches any material provision of the Agreement, or delays or fails to fulfil its obligations in whole, or in part, and does not remedy the situation within fourteen calendar days of receipt of notice from the Management Committee, or another Member, to do so, the other Members shall have the right, without prejudice to any other rights arising from the default, to summarily terminate the Agreement and re-assign the defaulting Member's rights and obligations in the Joint Venture as they see fit and withhold any moneys due to the defaulting member by the Joint Venture.

Each Member shall indemnify the other Members against all losses, costs and claims which may arise against them in the event of the Agreement being terminated as a result of breach of the Agreement by the said Member.

7. **INSOLVENCY OF MEMBER**

Should a Member be placed in liquidation, or under judicial management, whether provisionally or finally, or propose any compromise with its creditors, the other Members shall be entitled to proceed in terms of Clause 6, as if the Member had breached the Agreement.

8. DISPUTES

8.1 Settlement

The Members shall negotiate in good faith and make every effort to settle any dispute, or claim, that may arise out of, or relate to, the Agreement.

If agreement cannot be reached, an aggrieved Member shall, if he intends to proceed further in terms of Clause 8.2 hereof, advise all other Members in writing that negotiations have failed and that he intends to refer the matter to mediation in terms of Clause 8.2.

8.2 Mediation

Not earlier than ten working days after having advised the other Members, in terms of Clause 8.1, that negotiations in regard to a dispute have failed, an aggrieved Member may require that the dispute be referred, without legal representation, to mediation by a single mediator.

The mediator shall be selected by agreement between the Members, or, failing such agreement, by the person named for this purpose in Schedule 'A'. The costs of the mediation shall be borne equally by all Members.

The mediator shall convene a hearing of the Members and may hold separate discussions with any Member and shall assist the Members in reaching a mutually acceptable settlement of their differences through means of reconciliation, interpretation, clarification, suggestion and advice. The Members shall record such agreement in writing and thereafter they shall be bound by such agreement.

The mediator is authorised to end the mediation process whenever in his opinion further efforts at mediation would not contribute to a resolution of the dispute between the Members.

8.3 Arbitration

Where a dispute or claim is not resolved by mediation, it shall be referred to arbitration by a single arbitrator to be selected by agreement between the Members or, failing agreement, to be nominated by the person named for this purpose in Schedule 'A'.

The Member requiring referral to arbitration shall notify the other Members, in writing, thereof, not later than thirty calendar days after the mediator has expressed his opinion, failing which the mediator's opinion shall be deemed to have been accepted by all Members and shall be put into effect.

Arbitration shall be conducted in accordance with the provisions of the Arbitration Act No. 42 of 1965, as amended, and in accordance with such procedure as may be agreed by the Members or, failing such agreement, in accordance with the rules for the Conduct of Arbitrations published by the Association of Arbitrators and current at the date that the arbitrator is appointed.

The decisions of the arbitrator shall be final and binding on the Members, shall be carried into immediate effect and, if necessary, be made an order of any court of competent jurisdiction.

9. DOMICILIUM

The Members choose domicilium citandi et executandi for all purposes of and in connection with the Agreement as stated in Schedule 'A'. A Member shall be entitled to change his domicilium from time to time, but such change shall be effective only on receipt of written notice of the change by all other Members.

Member No. 1

Thus done and signed at _____ this _____ day of _____ 20____

For and on behalf of _____ [Company]

by [name] _____ who warrants his authority to do so.

As witnesses 1. _____

As witnesses 2. _____

Member No. 2

Thus done and signed at _____ this ____ day of _____ 20__

For and on behalf of _____ [Company]

by [name] _____ who warrants his authority to do so.

As witnesses 1. _____ As witnesses 2. _____

Member No. 3

Thus done and signed at _____ this ____ day of _____ 20__

For and on behalf of _____ [Company]

by [name] _____ who warrants his authority to do so.

As witnesses 1. _____ As witnesses 2. _____

[Allow for additional parties as necessary].



KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 6
PROJECT SPECIFIC HEALTH AND SAFETY SPECIFICATION

REFERENCE NR	033004
Revision	0
Date	16 February 2026



KWAZULU-NATAL PROVINCE
PUBLIC WORKS & INFRASTRUCTURE
REPUBLIC OF SOUTH AFRICA

Occupational Health, Safety and Environmental Specification (OHSE SPEC)

PROJECT NAME	Mandeni Primary School: Storm Damage Disaster Programme Phase 16
PROJECT ADDRESS	Mathonsi Reserve/ Masomonco area of Sundumbili, Mandeni.
WIMS NR:	033004
CLIENT	Department of Education
PREPARED BY	Mr S. Khoza

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1. Abbreviations	
AIA	Approved Inspection Authority
ALARP	As low As Reasonably Practicable
BRA	Baseline Risk Assessment
BOQ	Bill of Quantities
COIDA	Compensation for Occupational Injuries and Diseases Act.
CHSM	Construction Health and Safety Manager
CHSR	Client Health and Safety Representative
CR	Construction Regulations
DEL	Department of Employment and Labour
FEMA	Federated Employers Mutual Association
FPP	Fall Protection Plan
GAR	General Administration Regulations
GSR	General Safety Regulations
HCSR	Hazardous Chemical Substances Regulations
HIRA	Hazard Identification and Risk Assessment
H&S	Health and Safety
JSA	Job Safety Analysis
MSDS	Material Safety Data Sheet
OH	Occupational Health
OHSA	Occupational Health and Safety Act, Act 85 of 1993
PC	Principal Contractor
PPE	Personal Protective Equipment
RAMS	Risk Assessment and Method Statement
RTA	Road Traffic Safety Act, Act 93 of 1996
SABS	South African Bureau of Standards
SARTSM	South African Road Traffic Safety Manual, Chapter 2. Volume 13
SANS	South African National Standards
SSHSS	Site Specific Health and Safety Specification
SSHSP	Site Specific Health and Safety Plan
SWP	Safe Work Procedure

2. KEY REFERENCES

“Occupational Health Practitioner” Doctor or Nurse registered and in Good Standing with the Health Professions Council of South Africa and has a tertiary qualification in Occupational Health Nursing.

“Medical Surveillance” Planned program of periodic examination/medicals of Employees by an occupational health practitioner.

“Act” Means, unless the context indicates otherwise, the Occupational Health and Safety Act, 85 of 1993.

“Agent (Pr. CHSA)” means a competent person who acts as a representative for a client in terms of Regulation (5)5 of the Construction Regulations of 2014.

“Approved Plan of Work” means a written site-specific methodology as contemplated in regulation 15 that is at least co-signed by the asbestos client, registered asbestos contractor and approved inspection authority;

“Asbestos” means the following fibrous silicates:

- (a) Asbestos actinolite, CAS No. 77536-66-4;
- (b) asbestos grunerite (amosite), CAS No. 12172-73-5;
- (c) asbestos anthophyllite, CAS No. 77536-67-5;
- (d) chrysotile, CAS No. 12001-29-5 or CAS No. 132207-32-0;
- (e) crocidolite, CAS No. 12001-28-4;
- (f) asbestos tremolite, CAS No. 77536-68-6; and
- (g) any mixture containing these fibrous silicates;

“Asbestos Cement Products” means a range of building materials that were manufactured using moulding and compression techniques, consisting of a hardened mixture of asbestos fibres, cement and water;

“Asbestos Clearance Certificate” means a written document verifying that the regulated asbestos fibre concentration in the air meets the clearance indicator;

“Asbestos Client” means any person for whom asbestos work is performed;

“Asbestos-containing material” means asbestos as well as any material that contains asbestos and includes asbestos cement products, asbestos coating, asbestos insulation board, asbestos insulation, asbestos textured decorative coatings, asbestos contaminated soil and other asbestos-containing materials;

“Asbestos Disposal Site” means a site specifically designated for the purpose of asbestos disposal in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);

“Asbestos Dust” means airborne or settled dust, which contains or is likely to contain regulated asbestos fibres;

“Asbestos Removal Site” means a workplace where asbestos removal work is performed;

“Asbestos Removal Supervisor” means a competent person responsible for supervision of physical asbestos work processes and coordination of asbestos removal on an asbestos removal site;

“Asbestos Risk Assessment” means a risk assessment and risk categorisation of potential exposure to asbestos dust;

“Asbestos Work” means work that exposes or is likely to expose an employee to asbestos dust, including transporting, storing, removing, handling, treating, repairing and disposing of asbestos;

“Audit” Means a systematic examination of documents, equipment, physical on-site conditions etc. to evaluate the levels of compliance with clients OHS requirements, applicable legislative requirements, and the achievement of a safe working environment for Employees, as well as not posing a risk to other persons and the environment.

“Baseline Risk Assessment” (BRA) A wide encompassing risk assessment performed by the client of anticipated construction activities to execute the anticipated scope of work pertaining to the project.

“CR” refers to the Construction Regulations 2014.

“Client” in terms of this document means Department of Public Works, Kwazulu-Natal.

“CHSR” Means Client Health and Safety Representative, an in-house Employee appointed by the Client to oversee the Health and Safety Management of a project.

"CHSM" means Construction Health and Safety Manager.

"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), those qualifications and that training must be regarded as the required qualifications and training; and is familiar with the OHS Act, Act 85 of 1993 and with the applicable regulations made under the Act.

"Construction Health and Safety Officer" Means a person deemed competent by SACPCMP under the relevant category of registration appointed by the Principal Contractor to oversee the Safety, Health and Environmental Management on-site.

"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 Plant" Encompasses all types of plant including but not limiting to, cranes, piling equipment, boring machines, excavators, dewatering equipment, and road vehicles with or without lifting equipment.

"Construction Site" means a workplace where construction work is being performed.

"Construction Supervisor" 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.

"Construction Work Permit" means a document issued in terms of Regulation 3 of the Construction Regulations of 2014;

"Contractor" means an employer who performs construction work.

"Demolition Work" means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives.

"Designer" Means a competent person as defined by the Construction Regulations of 2014 appointed by the Client or the Principal Contractor as Agent to design and/or supervise and/or monitor construction work on their behalf.

"Environmental Air Monitoring" includes static air monitoring for regulated fibres conducted downwind from outdoor Type 2 Asbestos work or outside asbestos enclosures where Type 3 Asbestos work is performed or in any area where there is the potential for asbestos contamination;

"Exposed to Asbestos" means exposed or likely to be exposed to asbestos dust while at the workplace, and

"Exposure" has a corresponding meaning;

"Fall Protection Plan" (FPP) means a documented plan, which includes:

- (a) Identification of hazards and risks pertaining to the risk of falling taking the nature of the work and its environment in consideration;
- (b) The procedures and methods to be applied to eliminate the risk or to reduce it to a level which is as low as reasonably practicable; and
- (c) A rescue plan and procedures.

"Fall Prevention Equipment" Means equipment used to prevent persons, tools, equipment, machinery materials etc from falling from a "fall risk" position, including personal protective equipment, body harness, body belts, lanyards, lifelines or physical equipment, guardrails, screens, barricades, signage anchorages or similar equipment.

"Fall Risk" means any potential exposure to falling either from, off, over or into.

"Hazard" Means a source, situation, feature, activity, or anything else which has got the potential to cause harm, injury, death, environmental damage, business interruption etc.

"Hazard Identification and Risk Assessment (HIRA)" Means a document, which identifies hazards, assesses the risks and identifies the control measures, which are to be used to mitigate or reduce to a level which is as low as reasonably practicable the occurrence of hazards and risks during construction, use, operation and eventual demolition phases of a project.

"Hazardous Chemical Substance (HCS)" Means any toxic, harmful, corrosive, irritant or asphyxiating substance, or a mixture of substances, for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health and the environment.

"Incidental Asbestos Exposure" means unintentional exposure to airborne asbestos at a workplace where asbestos is present;

Induction Training: Means once off introductory training on general health and safety issues given to all Employees and Visitors to the site before commencement of work on site.

"Issue based Risk Assessment" Means a Risk Assessment based upon a specific issue/activity/item which could be instituted in response to the high priority risks identified in the Baseline Risk Assessment, Programme Risk Assessment or even after a near miss or actual loss event.

"Job Safety Analysis (JSA)" Means an analysis of a specific job or task according to a pre-determined procedure which helps to integrate accepted SHE principles and practises into a particular task or activity. Each step of the JSA is to identify potential hazards and to recommend the safest way to do the job.

"Medical Certificate of Fitness" means a certificate contemplated in regulation 7(8) of Construction Regulations of 2014.

"Method Statement (MS)" also known as a **Safe Work Method Statement (SWMS), or Safe Work Procedure (SWP)** is a document developed because of the outcome of a risk assessment by the Contractor, which contains details of how each task should be performed safely.

"Non-asbestos Related Work" includes work performed in the vicinity of asbestos containing materials or asbestos cement products, but excludes work performed on or with asbestos-containing materials or asbestos cement products;

"Principal Contractor (PC)" means an employer appointed by the client to perform construction work, but may also include the responsibility of designing or overseeing the design process.

"RAMS" Means Risk Assessments and Method Statement.

"Regulated Asbestos Area" means an area demarcated and controlled as contemplated in regulation 18;

"Regulated Asbestos Fibre" means a particle of asbestos with a length-to-diameter ratio greater than 3 to 1, a length greater than 5 micrometres and a diameter less than 3 micrometres;

"Removal of Asbestos" means all tasks included in the process of removing asbestos from the location specified in the inventory of asbestos in place to the final disposal site;

"Repair of Asbestos-containing Materials" means restoring asbestos-containing materials to a safe condition, after damage, using non-destructive methods in a manner that does not cause the release of asbestos fibres;

"Respiratory Protective Equipment" means a device which is worn over at least the mouth and nose to control the inhalation of air that is not safe;

"Risk Categorisation" means the grouping and ordering of potential asbestos exposure risks as contemplated in regulation 5(3);

"Risk" Means the probability or likelihood that the possible harm, injury, death etc potential of a hazard could be realized with a consequence attached.

"SHE" Means Safety, Health and Environmental.

"Site": Means the area handed over to the Principal Contractor for the purposes of construction work. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Principal Contractor and approved for such use by the Designer and/or the Client.

"Site Specific Health and Safety File (SSHSF)" Means a file specifically pertaining to a site containing all health and safety documentation relating to the project as per the requirements of the Construction Regulations of 2014 and/or the SSHSS.

"**Site Specific Health and Safety Plan (SSHSP)**" means a detailed site, activity, or project specific documented plan in accordance with the client's OHSE specification indicating how health and safety will be managed during the project.

"**Site Specific Health and Safety Specification (SSHSS)**" means a site, project specific document prepared by the client pertaining to all health and safety requirements related to construction work.

"**Type 1 Asbestos Work**" means—

- (a) painting of asbestos cement products in a manner that does not require surface preparation and does not cause the release of asbestos fibres; or
- (b) the removal of less than 10 square metres of asbestos cement products or equivalent gutters and piping or asbestos insulating board, where removal work may not be repeated on the same site within a period of six months; and, does not require registration as a **Registered Asbestos Contractor** with the Chief Inspector;

"**Type 2 Asbestos Work**" means—

- (a) the repair or encapsulation of asbestos cement products in a manner that does not require surface preparation; or
- (b) the removal of asbestos cement products or asbestos insulating board; and, requires registration as a **Type 2 Registered Asbestos Contractor** with the Chief Inspector;

"**Type 3 Asbestos Work**" means—

- (a) the removal, repair or encapsulation of any asbestos and asbestos-containing material; and, requires registration as a **Type 3 Registered Asbestos Contractor** with the chief Inspector;

3. KEY REFERENCES

- Occupational Health and Safety Act No. 85 of 1993 and Regulations (as amended)
- Compensation for Injury and Occupational Diseases Act No. 100 of 1993 (as amended)
- Asbestos Abatement Regulations 2020
- Building Code SANS 10400
- Wiring Code SANS 10142
- Scaffolding Code SANS 10085-1
- Green Building Guidelines

4. INTRODUCTION AND PURPOSE

The *KwaZulu Natal Department of Public Works & Infrastructure* is deemed as the "Client" in terms of the definitions of the Construction Regulations of 2014 as published in *Government Gazette No. 37305*. The Construction Regulations of 2014 in terms of *CR(5)(1)* stipulates that that the Client must prepare a suitable, sufficiently documented and coherent, SSHSS, for the intended construction work based on the Baseline Risk Assessment, (BRA) which in turn is based on the Scope of Work and several other related factors such as hazards and risks identified by the designer. It must be noted that for ease of reading the term "He/His" will be descriptive of both male and female gender throughout this document.

Purpose

The purpose of this SSHSS identifies the health and safety requirements the Contractor needs to comply with. It will be periodically reviewed and updated (if necessary) to address and / or include:

- ✓ Changes in legislation;
- ✓ Client requirements;
- ✓ Leading practices;
- ✓ Lessons learnt from incidents; and
- ✓ Unforeseen issues.

This SSHSS also forms an integral part of the contract between the Client and the PC. It identifies and encompasses the working environment, practises and behaviours expected of all parties who have roles to play in the successful completion of this project. The SSHSS provides guidelines to comply with the Occupational Health and Safety Act, Act 85 of 1993 (OHS Act) as amended, The Construction Regulations of 2014, other applicable legislative requirements, and applicable best practises. It aims to firstly ensure

compliance with applicable legislative requirements as indicated above and secondly to form the basis for the PC to develop his/her SSHSP.

As with any other plan for it to be implemented and managed effectively it requires the allocation of sufficient funds and resources, human and others, to achieve the objectives set out in the plan. In line with this requirement, Construction Regulation 5(1) (g) also requires the Client to ensure that the Principal Contractor has made adequate provisions for the cost of Health and Safety Measures in their tenders. The PC will be required to submit a Bills of Quantities (BOQ) with his SSHSP, which can be found under the Annexures section of this document which will be evaluated at the time of the evaluation of the SSHSP to satisfy the requirements of CR 5(1)(g).

This specification covers the requirements for eliminating and/or mitigating health and safety risks, injuries, accidents, and incidents on site to a level which is as low as reasonably practicable (ALARP). It addresses legal compliance, hazard identification, risk management and the promotion of a positive health and safety culture within the project. This specification also makes provision for the protection of persons other than those employed by the PC as stipulated by Sec 9 of the OHS Act, Act 85 of 1993.

It will also be noted that this document specifies certain recommendations, which should be followed so that the health and safety of all persons who may be potentially at risk and the potential risk to the environment may receive the same priority as other facets of the project such as Time, Cost and Quality. It must be noted that this SSHSS as much as it is detailed it is not exhaustive and the onus is on the PC to ensure that he complies with Section 8 of the OHS Act, Act 85 of 1993 which reads as follows:

Sec 8(2)(d) "Establishing as far as reasonably practicable what hazards to the Health and Safety of persons are attached to any work which is performed, and he shall as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work in order to protect the health and safety of persons, he shall provide the necessary means to apply such precautionary measures..", this means that Principal Contractors as an employer in his/her own right must at all times ensure continuous Hazard Identification and Risk Analysis (HIRA) and the implementation of appropriate risk reduction and/or elimination measures so as to strive towards the implementation and continued provision and maintenance of a healthy and safe working environment. The SSHSS is a performance specification aimed at ensuring that the Client and any persons it enters into an agreement with achieves an acceptable level of SHE performance.

5. SCOPE OF APPLICATION

This SHE Specification is exclusively applicable to the following project:

Mandeni Primary School, Mandeni: Storm Damage Disaster Programme (Phase 16).

5.1. SITE LOCATION

- Province - KwaZulu-Natal
- District Municipality - ILembe District
- Local Municipality - Mandeni Local Municipality
 - Ward - 17
- Latitude: - 29.1277° S
- Longitude: - 31.4055° E
- Street address (or directions) - Mathonsi Reserve, Sundumbili, Mandeni, 4490.

5.2. SUMMARY SCOPE OF WORK

The construction activities to be executed on this project for the provided duration/ period:

1. Site establishment
2. Alteration and Demolitions (*asbestos roof removal*)
3. Concrete, Formwork, Reinforcement
4. Masonry
5. Waterproofing

6. Roof Coverings
7. Carpentry and Joinery
8. Ceiling and Partitions
9. Floor Coverings
10. Ironmongery
11. Plastering
12. Plumbing and Drainage
13. Glazing
14. Paint Work
15. External Works
16. Electrical Installation
17. De-establishment and waste disposal.

5.3. THE PROJECT TEAM

The Project Team is as follows:

Initials & Surnames	Disciplines	Organisations	Contact Details	E-mail address
Mr. P. Ndlela	Project Manager	eThekwini Regional Office	083 215 8345	Phumlani.ndlela@kznworks.gov.za
Mr. S. Khoza	HSE Officer	eThekwini Regional Office	083 408 5056	Sibusiso.khoza@kznworks.gov.za

6. REQUIREMENTS PERTAINING TO SITE SPECIFIC HEALTH AND SAFETY PLAN SUBMISSION

The PC shall prepare a documented SSHSP as per CR 7(1) (a) based on the information / requirements contained in this specification, applicable legislative requirements and demonstrate how he is going to implement health and safety requirements during the construction process. It must cover all activities that will be carried out on the project site, from mobilisation and set-up through to Close-out. The SSHSP must include all documentation required in terms of The Act, Regulations, and this specification for the purpose of evaluation and approval.

The PC must refer to **Annexure C** of the SSHSS to familiarise himself with the requirements pertaining to the contents of his SSHSP to be submitted to the CHSR for approval. Failure to comply with the requirements of **Annexure C** may result in unnecessary delays in the SSHSP approval process. The PC must keep the original SSHSP and submit a copy for evaluation and approval purposes, which will be kept by the CHSR for filing and referencing purposes.

Upon approval of the PC's SSHSP, the CHSR will issue the final letter of SSHSP approval as required by CR 7(1)(a) and confirm his appointment as required by CR 5 1(k). The PC must file the letter on his SSHSF. It must be noted that Construction work may not commence until an official letter issued by the CHSR has been issued. The PC shall be responsible for ensuring that adequate information is submitted as supporting documentation with his completed documentation.

The approved SSHSP included in the SSHSF as well as this SSHSS must always be kept on site and include all documentation required in terms of The Act and this specification. It must be kept in mind that All Sub-Contractors must open their own SSHSP's and files. These health and safety files shall be approved in writing by the PC's CHSO, as required by CR 7. 1 (c)(x), a copy of which must be filed on the Sub-Contractors as well as the PC's Health and Safety File. The Sub-Contractor must also be appointed in terms of CR 7. (c)(v). The Sub-Contractor's Health and Safety Files will also be subjected to evaluation by the CHSR when conducting an Audit in addition to the evaluation by the CHSO.

It is of the utmost importance that the PC takes note of the following when submitting his SSHSP for approval in **addition the requirements of Annexure C**:

- Completion and submission of Annexure A “Health and Safety Declaration” to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Occupational Health and Safety Act and its Regulations.
- A valid Letter of Good Standing.
- Two detailed Risk Assessments and Method Statements (RAMS) of two priority hazards as identified by the Risk Profile of anticipated construction activities for review by the CHSR, with evidence of the CHSO input to enable the CHSR to evaluate the Risk Assessors competency in terms of being able to conduct sufficient Risks Assessments and subsequent Method Statements.
- Valid Proof of Competencies, including CV’s of Key Appointments.

7. PRINCIPAL CONTRACTORS RISK ASSESSMENTS

A detailed hazard identification and risk assessment processes must be followed for all work to be performed as well as for all associated equipment and facilities. The Contractor must ensure that effective procedures and assessment systems are in place to control hazards and to mitigate risks to levels that are as low as reasonably practicable (ALARP).

The risk assessment processes must be applied to:

- ✓ Routine and non-routine activities.
- ✓ Planned or unplanned changes.
- ✓ All Employees, Sub-Contractors, suppliers, and Visitors; and
- ✓ All infrastructure, equipment, and materials.

The risk assessment processes and methodologies must be appropriate for the nature and scale of the risks and must be implemented by competent persons.

The process of analysing and managing risk must include the following:

- ✓ Establishing the context of the risk assessment.
- ✓ Identifying hazards and determining possible risk scenarios (unwanted events).
- ✓ Evaluating risks and assigning ratings (classification).
- ✓ Recording the risk analysis in a risk register.
- ✓ Managing risks according to their classification (prioritising for action).
- ✓ Identifying and implementing control measures through the application of the
- ✓ Hierarchy of Risk Controls to ensure that risks are managed to levels that is as low as is reasonably practicable (ALARP).
- ✓ Developing action plans for reducing risk levels (where possible).
- ✓ Verifying the completion of actions.
- ✓ Re-evaluating the risks and classifications as appropriate; and
- ✓ Reviewing and updating the risk register.

The PC must refer to the BRA and summary of hazards and risks identified by designers when conducting his risk assessments.

Once the SSHSP of the PC has been approved where two detailed Issue Based Risk Assessments and Method Statements (SWP’s) of two priority hazards as identified by the BRA Risk Profile has been approved, such approval will only be granted in terms of approved RAMS up to and including site establishment.

During the site establishment period the PC will be required to submit his construction program. Health and safety management matters must be included in the program which will form the basis for the CHSR calling for RAMS for approval purposes. RAMS for future work must be supplied via e-mail to the CHSR at least 72 hours before the anticipated activity commencement date, unless otherwise agreed, followed by a WhatsApp informing the CHSR of such e-mail.

Work may not commence pertaining to RAMS submitted for approval until such RAMS have been approved. Should the CHSO continuously submit RAMS late, it will be for the PC’s account. Should the PC’s CHSO persistently submit poor quality RAMS, the situation will be brought to the Project Leaders attention for intervention and engagement with the PC.

The PC must ensure that the CHSO is included in production, planning, sessions/meetings to ensure that the appropriate RAMS as required are available and completed timeously. Under no circumstances may a CHSO perform a risk assessment in isolation. The active participation of all relevant role-players is mandatory.

A Risk Assessment must be followed by a Method Statement (SWMS/SWP) which describes in detail how the job or task is to be performed in a logical, sequential manner. RAMS must be a “Team” effort, Site Management Representatives, Supervisory Personnel, Technical Experts, and workers must be part of the RAMS process.

RAMS must be reviewed as a minimum on an annual basis, when changes are made to work methods statements and following an incident.

8. NOTIFICATION OF CONSTRUCTION WORK

The PC must submit in terms of Construction Regulation 4 in the format of Annexure 2, a Notification of Intention to Commence Construction Work to the closest Department of Employment and Labour. A stamped copy must be provided to the CHSR after submission. The SSHSP will not be approved until such Notification has been received by the CHSR. A copy of the approved notification to Commence Construction Work must be kept on the SSHSF.

9. SITE SPECIFIC OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT (IN ALPHABETICAL ORDER)

9.1.	Accident, Incident Investigation
9.2.	Alcohol and Drugs
9.3.	Appointments
9.4.	Asbestos
9.5.	Consultation, Communication and Liaison
9.6.	Close-out requirements
9.7.	COIDA
9.8.	Competence and Training
9.9.	Confined Space Work
9.10.	Construction Work Supervision
9.11.	Defects Reporting and Correction
9.12.	Delivery and Placement of Containers, Park Homes etc
9.13.	DSTI's
9.14.	Emergency Drills and Evacuation Procedures
9.15.	Environmental Management Plan
9.16.	Edge Protection
9.17.	Extreme Weather Conditions
9.18.	Fall Prevention Plan and Planning
9.19.	First Aid Boxes and Equipment
9.20.	Fire Extinguishers, Precautions and Fighting
9.21.	Fuel and Flammable Liquids
9.22.	General Record Keeping
9.23.	Hand Tools
9.24.	Hazardous Chemical Substances
9.25.	Hazard Identification and Risk Analysis (HIRA)
9.26.	Hazards and Potentially Hazardous Situations
9.27.	Health and Safety Audits, Monitoring, Reporting and Statistics
9.28.	Health and Safety Disciplinary Procedure
9.29.	Health and Safety Management Notice Board
9.30.	Health and Safety Organogram
9.31.	Health and Safety Plan Submission
9.32.	Health and Safety Policy

9.33.	Health and Safety Training
9.34.	Heat Stress and Sun Protection
9.35.	Housekeeping
9.36.	Incident and Injury Management
9.37.	Induction Training
9.38.	Ladders, Portable
9.39.	Lighting
9.40.	Manual Handling of Materials
9.41.	Maintenance
9.42.	Medical Fitness / Fitness to work
9.43.	Method Statements, Safety (SMS)(SWP'S)
9.44.	Noise
9.45.	Notices
9.46.	Notification of Construction Work
9.47.	Occupational Hygiene (Personal Hygiene and Infectious Diseases)
9.48.	Personal Protective Equipment (PPE)
9.49.	Planned Task Observations
9.50.	Pneumatically Powered Tools and Equipment
9.51.	Portable Electrical Tools
9.52.	Public Safety and Security
9.53.	Risk Assessment of Plant and Equipment
9.54.	Safety Meetings: Pre- Start, Review etc
9.55.	Safety, Health and Environmental Representatives and Committee's
9.56.	Safety Officer (CHSO), Roles and Responsibilities
9.57.	Signage
9.58.	Site Clearance
9.59.	Site Establishment
9.60.	Site Layout Plan
9.61.	Site Specific Safety Rules
9.62.	Smoking on Site
9.63.	Speed restrictions and Protections
9.64.	Stacking and Storage of materials
9.65.	Sub-Contractors
9.66.	Transportation of Workers
9.67.	Trespassing
9.68.	Toolbox Talks
9.69.	Vehicles and Traffic Management
9.70.	Ventilation
9.71.	Visitors to Site
9.72.	Waste Management
9.73.	Water Management
9.74.	Welfare Facilities
9.75.	Working at Heights

LISTED BELOW PLEASE FIND SITE SPECIFIC OCCUPATIONAL HEALTH AND SAFETY STIPULATIONS IN ALPHABETICAL ORDER. IT MUST BE NOTED THAT SOME ITEMS MAY BE OF MORE DETAIL THAN OTHERS, THE REASON BEING THAT DUE TO THE LEVEL OF RISK ASSOCIATED WITH THESE ITEMS THAT MORE DETAILED INFORMATION IS NEEDED TO BE BROUGHT TO THE PC'S ATTENTION, BUT THIS MUST NOT BE SEEN AS AN INDICATOR THAT OTHER ITEMS ARE OF LESS IMPORTANCE.

9.1.	Accident, Incident Investigations
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All Injuries sustained on the site are to be categorized into the following categories:

- first aid

- medical attendance (Doctor)
- disabling; and
- fatal injuries

The PC must manage Accident/ Incidents. A procedure for the management of all health and safety accidents/ Incidents must be drawn up and implemented. This procedure must define the responsibilities, methodologies and processes that must be followed for:

- Reporting an incident/accident.
- Investigating an incident/accident.
- Analysing an incident/accident 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.

A documented, detailed investigation report must be submitted with 7 days to the Project Leader which and as a minimum include the following:

- The date, time, and location of the accident.
- Witness statements, including residential and contact details.
- A detailed description of the accident, including photographs.
- The Initials, Surnames, residential and contact details of any injured person/s.
- Injury details (if applicable).
- A summary of the first aid and / or medical treatment provided (if applicable).
- The status of any injured persons (if applicable).
- The root causes of the incident; and
- Detailed corrective actions, including responsible persons and target dates for implementation.

A Near Hit/Mis is an incident which may have the potential to cause harm, injury or damage and need therefore to be reported and investigated to prevent the potential negative effect it may have been realised.

The Contractor/ Supervisor/Employee must report each incident that occurs (including Near Hits/Miss) to the CHSO without delay. Preliminary details must be recorded on the same workday or shift on which an incident occurs. In the event of a significant incident, with the potential to cause serious injury, harm or damage taking place, work must cease and may only resume once the necessary actions, including the re-evaluation of any relevant risk assessments have been taken to reduce the risk of recurrence. Work may only be permitted to recommence once formal authorisation has been granted by the CHSO after consultation with the CR 8(1).

In the event of a person requiring First aid such cases must also be recorded in the First Aid Dressing Register. All accidents /Incident investigation reports and related documentation must be recorded on the safety file. All disabling and fatal accidents must immediately be reported to the CHSR telephonically after they occur followed by and e-mail notifying the CHSR of accident.

All incidents as described in Section 24 of the OHS Act must be reported in the prescribed period and manner to the Department of Employment and Labour. Copies of Section 24 reports, including WCL 2 forms must be forwarded to the CHSR.

The PC must on a monthly basis include in his Self-Audit Report all injuries sustained on site with the required remedial measures taken. Accident/ Incidents and the identified Root Causes with the recommended corrective measures must be included on the agenda of Safety Committee Meetings for discussion and reported back on at the next progress meeting.

9.2.	Alcohol and Drugs
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A fit-for-work policy must be in place, incorporating zero tolerance for any drugs (including prescribed medication with an intoxicating effect) or alcohol in the system of a driver or operator. Drug and alcohol testing must be part of all medical fitness assessments for the issue of medical fitness certificates.

No alcohol and other drugs will be allowed on site. No person may be under the influence of alcohol or any other drugs while on the construction site. Any person on site who is on prescription medication must inform the CHSO officer or the safety representative accordingly. A register must be kept of all persons on prescription medication with the contact details of the medical practitioner prescribing such medication.

Any person on the construction site who is suffering from any illness/condition that may have a negative effect on his/her safety performance must report this to the CHSO or Safety Representative.

Any person on the construction site who is suspected of being under the influence of alcohol or other intoxicating drugs must be removed from site. He must be instructed at the time of being removed from site to report the next day for a preliminary inquiry. A full disciplinary process must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the PC for his records.

9.3.

Appointments

The PC shall make appointments as per the Act and its Regulations; structured and guided by the scope of works and its associated risks. The PC must refer to Annexure C for a list of appointments which may be applicable to his Safety Management Structure.

All health and safety appointments must be done in writing and kept on the SSHSF. Where appointments have lapsed or new appointments have been made, such previous appointments and the new appointments must be kept in the SSHSF. Expired appointment may not be discarded or destroyed.

All SHE Appointments must be reflected on the Site SHE Organogram, which must be kept up to date, filed in the SSHSF and displayed in the Site Office.

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 would not be negatively affected, with the CHSR reserving the right to specify otherwise if deemed that it may affect health and safety standards.

9.4.

Asbestos

The PC must ensure that Asbestos demolition and removal complies with Asbestos Abatement Regulations of 2022. Note must be taken of the following:

- Only a **Registered Asbestos Contractor** shall strip and remove asbestos.
- Asbestos must be removed using a suitable, sufficient Wet Method, to ensure effective suppression of dust preventing it from becoming airborne. No grinding or intentional breaking of asbestos containing material permitted.
- The Asbestos Contractor must submit a plan of works sufficiently early enough prior to commencement of that work to the appointed Approved Asbestos Inspection Authority (AIA) for approval as per Asbestos Regulations.
- The approved and signed plan must be submitted to DEL prior to asbestos removal being conducted.
- During the asbestos removal process, the approved plan must be fully implemented and adhered to on site.
- Asbestos removal may only start after notification has been done to the AIA and the CHSA/CHSR of the intended asbestos removal date at least 72 hours before stripping starts.
- The CHSO must complete the Asbestos Removal Checklist, Annexure F, item 12.6.2 sign it, have it signed by the CR8(1) or CR 8 (7) appointee and forward it to the CHSA and CHSR within 24 hours should the CHSA/CHSR not be present at the time of asbestos removal starting.
- Normal construction work may only proceed after asbestos removal in the previously designated asbestos zone upon written permission being obtained from the AIA.
- Stripped asbestos must be placed in an enclosed skip or container, no storage on the ground or other areas permitted.
- Disposal certificates must be obtained with 14 days of disposal and kept on the SSHSF.

9.5.**Consultation, Communication and Liaison**

The PC must establish and maintain effective communication and consultative processes, allowing for a two-way dialogue for the duration of the project to ensure that:

- All personnel are kept up to date regarding health and safety matters e.g., Hazards and risks, incidents and lessons learnt, leading practices, performance against objectives, etc.
- General health and safety awareness levels are kept high.
- Prompt feedback is given to personnel about health and safety issues or concerns that they raise; and
- Relevant, and often critical, health and safety related information e.g., design changes, instructions, reporting of hazardous conditions or situations, etc. is effectively disseminated.

This can be achieved by Toolbox Talks, Project Safety Meetings, Health and Safety Awareness Programs etc.

9.6.**Close-out Requirements**

In terms of CR7(1)(e) and CR7(2)(b) the Principal Contractor must hand over a consolidated SHE File to the Client when Construction work ceases, and the Principal Contractor hands the site back to the Client. The Sub-Contractors appointed by the Principal Contractor are required to do the same for the Principal Contractor when exiting the site after completion of their work. The onus is on the Principal Contractor to allow adequate time to ensure the correctness and approval by the Client Health & Safety Representative of the files prior to exiting the Site.

The following list is an example of what should be included in the Close –out files but is not exhaustive. The CHSR may require further information at the time of completion of the project and the Principal Contractor will have to ensure that all instructions are met. All records from the start of the project must be included. Daily or monthly inspection records are not required unless they are related to an accident. All records must be in electronic format and submitted to the Client Health & Safety Representative for approval in adequately formatted lists and folders. The Layout should be logical and in the same order as in the site files. Upon Final Approval of the files by the Client Health & Safety Representative, two hard copies of the electronic files must be handed over to the CHSR unless otherwise indicated by the CHSR.

Health and Safety Close-out File requirements

Principal Contractor File to include the following:

- Copy of Notification of Construction Work/Construction Permit, stamped by DOL
- Client SHE Specification
- Principal Contractor's SHE Plan
- Client Letter of SHE Plan Approval
- Organograms (Original and amended)
- List of SHE Legal Appointments (Originals and amended)
- List of all Employees employed on a permanent or contractual basis over the duration of the contract, PPE receipt records
- Medical Fitness Certificates for all Employees
- Letters of Good Standing for the Project
- Incident/ Accident Records
- NCR's
- Client Health & Safety Representative Health and Safety Audits
- Risk Assessments
- Method Statements
- Safe Work Procedures etc.
- List of all Sub-Contractors

Sub-Contractor Files to include the following:

- SHE Plan
- SHE Plan Approval letter issued by the PC
- Organogram/s (*Original and amended*)

- List of SHE Appointments (*Original and Amended*)
- All Employees employed on a permanent or contractual basis over the duration of the contract receipt records
- Medical Certificates of Fitness for all Employees
- PC and own audits
- Mandatory Agreements (*if applicable*)
- Risk Assessments
- Method Statements
- Safe Work Procedures
- Letters of Good Standing
- Incident Records
- Non-Conformance records

Principal Contractor to include in its SHE File the following documentation if not being attended to by other discipline of PSP Team:

- All drawings for temporary structures (*suspended beams etc.*).
- All operating manuals for any systems that require on-going maintenance, and
- Copies of test results, policies, and procedures for environmental monitoring (*silica, noise, dusts etc.*).

Defect and Liability Period

The H&S files must be kept 'live' for the defect and liability period by the Principal Contractor, including those of their Sub-contractors. Any work required during the defect and liability period will require an assessment of the H&S file by the Principal Contractor's CHSO prior to any work commencing.

9.7.	COIDA
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The PC must ensure that all Employees are fully covered in terms of the COID Act, either through the Workmen's Compensation Commissioner or another registered approved institution and that such cover will remain valid for the duration of the project. Failure to keep his/her cover valid will result in instructions to cease construction work being issued.

The PC must ensure that all Sub-Contractors appointed by him are fully covered in terms of the COID Act, or another institution as indicated above, and that such cover must remain valid for the duration of their contractual relationship with the PC.

The PC must have Public Liability Cover, which must adequately make provisions for any losses because of his and/or his Employee's acts and/or omissions, which must remain valid for the duration of the project.

9.8.	Competence and Training
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The CEO (*OHSA S16.1*) of the PC will be overall responsible for the appointment of competent Construction Managers and site staff for the duration of the project unless it has been delegated to the Section 16.2 Appointee. All legal appointments are to be made with relevance to the type of work to be performed and kept current with the project programme. The PC, all contract Employees, and their supervision must be in possession of the required qualifications or licences where the activities they must perform require such qualifications or licences.

The following Health and Safety competencies are applicable to certain appointments:

Sec 16.2 and CR 8.1: Supervisors Safety Course (IRCON) or equivalent and Legal Liability Course.

Safety Officer: SAMTRAC/ Lex Nexis 3 week SHE Management Course / NEBOSH, or equivalent.
SACPCMP CHSO Registration and Relevant Experience.

Safety Representatives: SAQA Accredited SHE Representative Training Course.

Risk Assessor: SAMTRAC / Lex Nexis 3 week SHE Management Course / NEBOSH or SAQA accredited Risk Assessors Course

First Aider: SAQA accredited Level 2 First Aid Course

Where operations are being performed such as Scaffold Erectors, and Inspectors all such operators must be in possession of proof of qualifications, which is in compliance with Legislation, National qualifications Framework, Act 2000: Act No 67 of 2000, or similar industry standard where legislation does not prescribe such training. It must be noted that course providers used for training purposes must be accredited course providers.

Training must be given to each Employee, including Sub-Contractor Employees, to equip them with the knowledge and skills, understanding of the hazards and the risks as well as mitigating measures to enable such Employee as far as is reasonably practicable to perform his duties in a safe manner.

Specific competency profiles and selection criteria (fitness for work) must be developed for all roles where significant health or safety risk exists.

A formal training needs analysis must be carried out based on the competency profiles and a training matrix must be developed for the project. Competency-based training must be provided and include operational controls (procedures and work instructions), management of change, and emergency response. All Employees must hold and maintain the required competencies (including appropriate qualifications, certificates, and licences) and are under competent supervision.

A site-specific induction and orientation programme that highlights health and safety requirements, procedures, and significant hazards, risks and associated control measures must be in place for all new Employees and Visitors. Personnel must be trained on new or amended standards, rules, SWMS/SWP's, Risk Assessments etc. Refresher training must be conducted where required e.g., where Employees are found disregarding rules etc. Records must be kept of training, qualifications, experience etc. Whenever training is given follow ups must be conducted to evaluate the efficiency of the training.

9.9.

Confined Space Work

The PC must comply with the OHS Act, General Safety Regulation 5.

Detailed RAMS must be conducted, SWMS /SWP's must be developed and communicated in writing to persons designated to perform work in confined spaces. Confined space entry work requires the issue of a Confined Space Entry Permit which has been issued by an authorized competent person.

Responsibility for safe work procedures from entering, whilst working in the confined space, and including exiting the confined space is the responsibility of the Contractor. The Contractor must ensure that all measures have been implemented to address hazards and their associated risks to a level which is ALARP.

The Contractor is responsible for the provision and correct use of all of all required tools and equipment required to conduct the work in the confined spaces, e.g. Tripods, Testing Equipment, Signage, Communication Equipment etc.

9.10.

Construction Supervision

As indicated in the previous paragraphs the CEO (*OHS Act 85, 1993: Section 16.1*) of the PC will be overall responsible for the appointment of competent Construction Managers and site Staff for the duration of the project. These appointments will be tasked with different supervisory responsibilities to ensure the provision of a safe working environment. The PC is again reminded to refer to Annexure C to determine what Supervisory Appointments need to be made taking into consideration the scope of work, Legislative requirements etc. Note must also be taken of at which stage certain appointments need to be made. The construction team is to ensure the appointed CHSO is kept up to date with all planned activities, to ensure all H&S requirements are met.

9.11.

Defects Reporting and Correction

The purpose of any inspection is to determine deviations in need of remedial action. Where defects are identified during any routine inspection, pre-start check or during operation or use of any tools, equipment, motor vehicle, tools, or equipment, etc. it needs to be reported immediately.

Steps need to be taken to remedy such defects reported for the purpose of repairing such tools, equipment, etc. Where such remedial action cannot be actioned, immediate measures such as the fitting of Tags, taking out of service etc. needs to be applied to limit further use until repairs/replacements have been completed and re-inspection carried out. Such defect reports must be done in writing.

9.12.

Delivery and Placing of Containers. Park Homes, etc.

The PC must ensure compliance with OHS Act, Sec 8 and Cr 22. The items must be placed according to the predetermined positions indicated on the Site layout Diagram. Soil conditions, overhead hazards etc need to be taken into consideration when doing Risk Assessments and developing the required method statements. Only trained competent workers and supervisors may be used to execute and supervise the work operations.

9.13.

DSTI's

The Daily Safe Task Instruction, DSTI, forms a critical part of the Risk Management process No work may be conducted on site without a valid DSTI signed off by the relevant signatories. Supervisors must have the competency to be able to complete DSTI's correctly and the work area must be inspected at the end of the shift.

A 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 each day or shift, prior to the start of any work, each appointed supervisor must inspect the work area which he is responsible for 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 day or shift. The relevant SWMS/SWP 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 allowing team members to contribute to the discussion.

Any team member arriving late must first be taken through the information that was discussed prior to his arrival before being permitted to start working. If the work method changes or scope 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 CHSO.

Every member of the work team must sign the DSTI attendance register. The attendance records must be kept and maintained in the Contractor's SSHSF.

9.14.

Emergency Drills, Evacuations and Procedures

The PC must develop, implement, test, and maintain an Emergency Response Plan, incorporating emergency evacuation procedures 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 a medical emergency including first aid response, a fire, an explosion, a hazardous substance spill, rescue from height, rescue from a confined space, etc.

Consideration must be given to the procedures of other occupants on the premises and their emergency procedures to ensure that in the event of an emergency that the PC's Emergency procedure does not hinder or clash with their procedures. Details of any arrangements with external emergency response service providers must be included.

The plan must be adequately resourced to ensure effective implementation. These resources must include appropriate personnel, external emergency response service providers, emergency response equipment, and warning devices. All equipment and warning devices must be identified, maintained, and tested to always ensure availability.

An Emergency Response Team (ERT) 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.

At project work site:

- A suitable evacuation alarm (siren) must be provided. 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, and personnel must be trained in fire-fighting procedures and the use of fire-fighting equipment.
- Suitable first aid equipment and supplies must be provided and maintained, and an adequate number of appropriately trained First Aiders with kits must be in place.
- Emergency assembly points positioned in safe locations away from containers, plant and equipment must be designated and conspicuously signposted. In the event of an evacuation, all persons, 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 as part of their induction training.
- The emergency response procedures must be displayed on notice boards.
- A Site Layout 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 all offices, boardrooms, 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, and 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. Where appropriate, drills must include liaison with and the involvement of external emergency response service providers. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, and hazardous substance spills. 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.

9.15.

Environmental Management Plan

The PC must take all precautionary steps to prevent any pollution because of his activities. Matters such as waste disposal, cement run-off, not permitting vehicles leaking oil and fuel on site, not permitting disposal of water used for cleaning paintbrushes into normal wastewater disposal lines, not permitting the burning of materials etc must be addressed in his Environmental Management Plan.

Workers must be familiarised with the contents of the Environmental Management Plan as part of the Induction. The PC's Environmental Management Plan must be submitted with his SSHSP for approval.

9.16.

Edge Protection

Persons falling over open edges can result in severe injuries. The PC's responsible person must ensure that edge protection forms part of the Fall Protection Plan. Edge protection must be able to withstand the load imposed of an average worker's weight should the worker lean against such edge protection. All edges which pose a fall risk to persons must be protected. Barricading tape or snow netting is not deemed as suitable edge protection and may only be used to highlight such edges.

Activities, which may create temporary open edges such as the removal of drain covers must be always supervised whilst open or be cordoned off with temporary suitable barricading.

Reduction measures implemented such as digging of pilot holes, use of detection equipment and insulated tools.

All excavations must be on register, inspected daily before commencement of work, after inclement weather, certified safe, and recorded accordingly in the appropriate register. No loose material may be stored within 1 meter from the edge of the excavation and more than 45 degrees to the angle of repose.

9.17.

Extreme Weather Conditions

Adverse weather conditions can lead to loss of life and damage to structures and plant. The PC must develop an emergency plan which stipulates measures how to mitigate the impact such weather conditions can have. The Contractors' Emergency Plan must include procedures to be followed for adverse weather conditions such as high winds, Lightning, Flooding etc. Response measures must be communicated to the appropriate Supervisory Staff including materials required such as ropes, shutter board etc.

In the event of impending adverse weather or other conditions, Emergency response Staff and Supervisory Staff must be made aware of the impending weather conditions and the possible need to implement the required response measures.

9.18.

Fall Protection Plan and Planner

PC to comply with OHS Act, Sec 8 and CR10. When there is a risk of falling off, into or over a risk assessment must be carried out regardless of the potential fall distance. The PC shall appoint a competent Fall Protection Planner. The Fall Protection Planner shall have the following minimum qualifications:

- Fall Arrest Course (Accredited to SAQA Unit Standard 229998).
- Fall Protection Planner (Accredited to SAQA Unit Standard 229994).

An appropriate, project specific FPP, developed by the appointed competent appointed Fall Prevention Planner must be developed, and submitted as an annexure to the SSHSP when submitting the SSHSP for approval by the CHSR. The following aspects as a minimum must be included in the FPP:

- Risk Assessment identifying areas where a Fall Risk may exist as well as the required mitigating measures e.g., Signage, Edge Protection, Hard Barricading etc.
- Permit system for working at heights.
- Prevention measures for falling tools or equipment, and persons, and link to emergency plan regarding rescue.

9.19.

First Aid Boxes and Equipment

The PC to comply with GSR 3. The Contractor shall ensure that enough competent First Aiders is appointed and present on site. All First aiders must have a level 2 First Aid certificate. Where Sub-Contractors are appointed, they need to comply with GSR 3 and have trained, competent First Aiders on site. If they do not have trained competent First aiders, they may enter into a First Aid Agreement with the PC to provide such services, subject to the PC having enough First Aiders on site as well as First Aid Equipment. The written agreement entered with Sub-Contractors must be kept on the PC as well as the Sub-Contractors SSHSF.

Adequately maintained First Aid equipment compliant with Statutory Safety Regulations must be available on site. The contents of First Aider kit must always comply with minimum amount as per Annexure to GSR. Records of First Aid Treatment administered must be kept in an appropriate register.

The Location of the First Aid facilities must be indicated with the required SABS approved Symbolic Safety Signage posted at the entrances to such facilities. The name of the First Aider must be displayed in addition to Symbolic Safety Signage.

9.20.**Fire Extinguishers, Precautions and Fighting**

The PC must ensure that the location of fixed Fire Extinguishing Equipment is indicated on his Site Layout plan and in his Emergency Plan. The procedure to be followed in the event of a fire must be translated into the languages of all workers on site, posted on notice boards, communicated to workers and records kept of such communication.

All work involving the generation of a Fire Risk may only be executed upon the issue of a Hot Work permit, which include the presence of Fire Extinguishing equipment and checking for smouldering materials.

Fire precautions on construction sites in addition to the requirements of CR 29 must include Good Housekeeping, the keeping of minimum amounts of Flammable liquids etc. SABS compliant signage such as “No Smoking” “No Naked Flames” etc. posted where appropriate.

Sufficiently trained persons such as Supervisors need to be available on site to be able to perform fire-extinguishing exercises and use equipment correctly. Persons involved with activities such as welding, grinding etc. must be able to perform fire-extinguishing exercises when required.

All Fire extinguishing Equipment must be serviced annually, numbered, on register and inspected by a trained competent person at least every six months. All fire extinguishing equipment which has been discharged or damaged in any way must be sent off site and be attended to by a SABS accredited Service Agent.

9.21.**Fuel and Flammable Liquids**

The PC must ensure compliance with OH&S Act - General Safety Regulation 9 and Temporary Storage of Flammable liquids on Construction Sites, Construction Regulation Reg.25.

Storage areas must be provided with a bund wall to contain 110% of the maximum volume of the container/s stored in the area. Drip trays of sufficient size must be provided at tap off points.

Storage Containers must be clearly marked with a “Flammable Liquid, No Smoking & No naked Flame” signs, be clearly marked to indicate contents of the tank and bonded to prevent static electricity sparks being generated. An adequate numbers of dry chemical fire extinguishers, each with a min. capacity of 4.5kg, must be provided.

Before any fuel driven plant or equipment is refuelled, it must be switched off, and no refuelling may take place where machinery is kept running. Refuelling must take place at designated safe areas and appropriate warning signs installed.

The Contractor must ensure that storage areas must be designated at a safe distance from other buildings. It must be kept free from all combustible materials and must be constructed from brick/ mortar/steel, no timber or similar combustible materials may be used.

The following SABS compliant Symbolic Safety Signage need to be displayed: “No Smoking” and” No Naked Flames”, Fire extinguisher and Location signs.

9.22.**General Record Keeping**

The PC and Sub-Contractors must keep and maintain Health and Safety records to demonstrate compliance with the Clients SSHSS, OHS Act, Act 85 of 1993 and the Construction Regulations of 2014. The PC must ensure that records of all incidents/accidents, training, inspections, audits etc. are kept in the SSHSF held in the Site Office.

THE SSHSF must always be present on site. The PC must ensure that every Sub-Contractor opens and maintains his own SSHSF under the control of the PC’s responsible person.

9.23.

Hand Tools

Hand Tools and its use can contribute to accidents and incidents. The PC must ensure that all Hand Tools brought onto and used on site are safe for use. Hand tools must be inspected by an appointed competent person at least once a month and the results of such inspections to be recorded on an appropriate register. If hand tools are found to be unsafe, it needs to be removed, tagged unsafe for use and removed from site.

No Makeshift hand tools may be brought onto and used on site. If found such hand tools must be removed from site with immediate effect and/or disposed of.

9.24.

Hazardous Chemical Substances (HCS)

The PC must comply with the Hazardous Chemical Substances Regulations as published in Government Notice No. R. 1179 dated 25 August 1995 and amendments thereto. No HCS may be permitted to be brought on site without a MSDS. The PC must ensure that all the necessary use and storage precautions are taken and that the required safety equipment, first aid measures etc is available.

All Employees required to use HCS, or products containing Hazardous Chemical Substances must be adequately and comprehensively trained with regards to the requirements of the Hazardous Chemical Substances Regulations including the potential sources of exposure and the potential risks to their health caused by exposure.

MSDS's for all Hazardous Chemical Substances must be kept on site in the SSSSF and recorded in a HCS Register.

9.25.

Hazard Identification and Risk Assessment (HIRA)

The PC must comply with Sec 8 of the Act and CR 9 by allowing for and ensuring that Site-Specific HIRA's are conducted by an Appointed Competent Person. Supervisory staff must be equipped with the required skills to do HIRA's.

The purpose of a RA is to firstly identify main activities which form part of the construction process, then its sub activities, then the hazards associated with the sub-activities, the risks associated with the sub-activity hazards, then determining the Pure Risk level by using a risk matrix, propose risk reduction/control measures and then re-evaluating the effect such risk reduction/control measures have had on the risk level once again using a risk matrix to calculate the Residual Risk Rating, which must be as low as reasonably practicable (ALARP) and finally communicating the hazards, residual risks, risk reduction/control measures etc to the workforce. In the form of a SWMS/ SWP.

Please refer to item 9 at the beginning of this document for details regarding the submission of Risk Assessments and the approval process.

The PC and its appointed competent person will be responsible for the evaluation and approval of HIRA's developed by their appointed Sub-Contractors and must be as a minimum of the same standard as required by the CHSA. If at the time of an Audit or any other time being present on site, it is found that HIRA's and/or SWMS/SWP used by Sub-Contractors are of a sub-standard level the CHSR will issue instructions to cease work which is applicable to such sub- standard RA's and/or SWMS until amended to a satisfactory level.

The PC must ensure that all persons who could be negatively affected by hazards and risks associated with 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.

If the CHSR identifies alternative hazardous activities or risks for which a Risk Assessment was not performed or was not identified as part of a Risk Assessment Process, the PC will be required to implement corrective measures before being permitted to continue with work. **It must be noted that although the CHSR may approve RAMS, the responsibility rest with the PC as the employer in terms of Sec 8 of the Act to ensure the correctness of such RAMS and the required mitigation measures etc.**

9.26.

Hazards and Potentially Hazardous Situations

The PC must immediately notify other Sub-Contractors and/or occupants of the site where work is being conducted of any hazardous or potentially hazardous situations that may arise during performance of construction activities.

Should a hazardous situation require work stoppages, the work must be stopped, and corrective steps taken such as the conducting of new RA's, amending RA's the development of new SWMS, amendment of existing SWMS's, barricading, signage etc.

9.27.

Health and Safety Audits, Monitoring, Reporting and Statistics

The CHSR shall strive to at least once a month or at closer intervals as determined necessary for the duration of the contract conduct Health and Safety Audits of the work operations. The audit shall be consisting of a detailed audit of physical site activities and administration of Health and Safety. Copies of the audit reports will be forwarded to the Project Leader and the PC within seven working days. Copies of the Audit report must be kept in the SSHSF. The CHSR may at any time visit the site for an Audit without prior notification to the Contractor.

The CHSO must conduct monthly Self-Audits including all the Sub-Contractors on site at the time of the audit as approved at the time of the SSHSP approval. The results of the Self Audits must be made available to all members of the project team at least 7 days before the following progress meeting. At the progress meeting the CHSO must report on his finding and closing out of deviations.

Issues such as injury and incident records e.g., Near misses, First Aid, Medical Cases, and the Disabling Injury Frequency Rates must be included in the audit report. Copies of self-audit reports must be kept in the SSHSF.

9.28.

Health and Safety Disciplinary Procedure

The PC is responsible for maintaining discipline on site in terms of his Employees, Sub-Contractor Employees and Visitors. In line with this requirement, the PC will be required to have a documented Disciplinary Procedure, which must be communicated to all persons working on site. Where a breach of a Site Health & Safety Rule or The PC's Safety Procedure is identified, the Contractor must ensure that disciplinary action is initiated against such contravening Persons/s in accordance with the documented procedure. Dependent on the nature of the breach and the nature of such presence on site, the process as outlined below could be used:

- First breach – verbal warning/counselling
- Second breach – written warning/counselling
- Third breach - appropriate disciplinary action taken such as Suspension Without Pay/Termination of Service, penalties etc.

All disciplinary steps taken in terms of OHS such as NCR's issued must be included in the PC's monthly SHE Audit report submitted to the CHSR and other team members.

9.29.

Health and Safety Management Information Notice Board

The PC must provide a Safety Management Information Notice Boards (SMI boards) as a minimum near the site office and if possible, in other areas e.g., eating and changing areas, with the following information posted:

- Supervisors Photos and Contact details
- First Aider Photo and Contact detail
- Valid, completed DSTI/S for the day's activities
- Emergency Procedure
- Any other information as required by the CHSR

9.30.

Health and Safety Organogram

An organogram outlining the Health and Safety Management Structure as per appointments under the OHS Act and the Regulations must be included in the SSHSP and kept in the SSHSF. The Organogram must also be displayed in the Site Office.

Any changes to the appointments as per the approved Organogram must result in the Organogram being revised. All previous organograms must be kept in the SSHSF and not be discarded. The initials and Surname of appointees. Including the description of their appointment must be reflected on the Organogram.

9.31.	Health & Safety Plan and Submission
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The PC must submit a detailed SSHSP based on this document known as the SSHSS. The contents of the SSHSP can be found under Annexure C of this document. Note must be taken of the required documentation which needs to be submitted as part of the SSHSP.

Failure to submit the required documentation as required by Annexure C, may result in a delay of the SSHSP approval process. When submitting the SSHSP to the Client/or its duly appointed representative the PC's CHSO must contact the CHSR appointed to this project, who's contact details can be found under the heading "Item 5.3: The Project Team" to arrange a sit-down meeting to discuss the PC's SSHSP to work towards approving the SSHSP. **It must be noted that no evaluation or approval of the PC's SSHSP will take place without engaging with the CHSO.**

9.32.	Health and Safety Policy
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The Safety, Health and Environment Policy signed by the Chief Executive Officer must form a part of the SSHSP. The policy must outline Health and Safety objectives and set out how they will be achieved and implemented during construction.

The Policy must in addition to being part of the SSHSP and being kept on the SSHSF also be communicated to all Employees, copies of such communication must be kept on the SSHSF. A copy of the Health and Safety Policy but must also be displayed in the Site Office.

9.33.	Health and Safety Training
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The PC must ensure that all site personnel and Visitors attend a site-specific health and safety induction training session before starting work or being permitted entrance onto the site.

Employee Induction training must also include training on the risks associated with the works to be executed, method statements (SWP's) and emergency procedures. Visitor Induction training must include items such as site safety and health risks, steps to follow in the event of emergency, restricted areas and on the site and health and safety rules.

A record of attendance reflecting the signature of all training must be kept in the SSHSF. Employees and Visitors must carry proof of induction training whilst being on site, which may be a nametag or sticker, displayed on a hardhat. The PC must ensure that none of his Employees, or Sub-Contractor Employees, including transport and delivery Contractors entering the site delivering materials and/or equipment, may proceed to enter the Site or any operations area until they have received all training required under applicable laws and regulations, including, but not limited to, work activity inductions and Site-specific induction etc.

Induction Training is generally valid for 1 year but should the contents of the training previously rendered change then follow up training must be rendered irrespective of the fact that induction training may still be valid.

The PC must prepare and present to all its Employees its own Contractors Induction training, explaining the PC's SSHSP, Rules, the obligations imposed by the Occupational Health and Safety Act and Regulations, as well as a Site Specific Induction, which must as a minimum consist of an introductory briefing explaining the

nature of the work, the general hazards which may be encountered during the operation, and the particular hazards attached to their own function within the site.

9.34.

Heat Stress and Sun Protection

The PC must ensure compliance with the OHS Act- Environmental Regulations 2(4). Heat stress can form part of many work activities associated with construction work. Where work is of a physical nature, and/or is conducted in excessive ambient or radiant temperatures the PC must implement measures such as rest breaks, provision of adequate amounts of water, scheduling work to coincide with cooler times during the day such as in the mornings and late in the afternoons.

Workers who are exposed to excessive ambient or radiant temperatures can suffer from a lack of ability to concentrate with resultant injuries becoming a probability.

The PC must ensure that all personnel are protected from excessive sunlight exposure by means of the use of long sleeve shirts, long trousers, brims to safety helmets, UV factored sunscreen and shade structures etc.

9.35.

Housekeeping

The PC must implement and ensure compliance with the requirements of Construction Reg. 27.

The PC must ensure that all work areas are kept in a neat and tidy state, free of debris and rubbish, at all times. Unless otherwise directed, the PC must dispose of all debris, rubbish, spoil, and hazardous waste off site in a designated and authorised area or facility.

The PC must keep in mind that poor housekeeping does not only contribute to the creation of an unsafe working environment but also a poor image of the project and its management, as well as the department as the client. In the event where housekeeping standards are not maintained or implemented the CHSR may issue instructions to cease, work until housekeeping is of an acceptable standard without the Client entertaining any extension of time claims or costs claims by the PC. **Keeping the site in a neat and orderly condition at all times is the sole responsibility of the PC.**

Regular safety/housekeeping inspections on an at least a weekly basis to ensure maintenance of satisfactory housekeeping standards must be conducted by the PC and the results of each inspection documented and the recorded. Records of such inspections to be kept on the SSSF for viewing by the CHSR. The PC must ensure that all supervisory staff are made aware of their responsibility to monitor and manage housekeeping in their respective areas of responsibility.

DSTI's must make provisions for the checking that work areas are left in a neat and tidy fashion at the end of each shift. The CHSO must on a random basis after signing off on DSTI's at the end of shifts inspect such work areas to verify that such work areas are left in a neat and tidy condition. Should it be found that DSTI's are not a true reflection of the condition the work area was left in, the Supervisor must be engaged regarding the matter and if it is found to be a repeated situation, disciplinary measures must be implemented.

Waste disposal and general refuse disposal areas must be made available and barricaded off. The PC **MUST** ensure that refuse removal frequencies are in line with waste /refuse generation frequencies. If waste/refuse generation rates increase the removal frequencies must increase, no overflowing waste/refuse disposal areas will be tolerated.

Employees must, as part of the hazard communication process on DSTI's be made aware of the hazards and risks created due to poor housekeeping practises. Incidents of poor housekeeping practises and poor levels of supervisory enforcement of good housekeeping practises must be considered as part of offenses which may require steps to be followed as part of the PC's disciplinary process.

9.36.

Incident and Injury Management

The PC must implement and ensure compliance with OH&S Act - General Administrative Regulations 6 and 8. This section must be read in conjunction with item 10.1 Accident, Incident Investigation.

The PC must have in position prior to site establishment and have submitted with his SSHSP for approval by CHSR suitable /sufficiently documented accident/ incident reporting system/procedure that is following all applicable statutory requirements.

Any incident or “near miss” involving the PC or its Sub-contractor’s or any third party’s personnel, property, plant or equipment, must with immediate effect be verbally reported to the CHSR by the PC’s CHSO whether or not injury to personnel or damage to property or equipment resulted from such incident or “near miss”. The verbal reporting must be followed within 48 hours by a brief written report stating the known facts and conditions including a preliminary assessment of the most likely consequence potential of the incident in the circumstances, as well as the preventative measures to be implemented by the end of the shift. The abovementioned procedure does not exempt the PC from providing accident reports required by Statutory Authorities.

In the event of any serious incident resulting in a fatality, or permanent disability, the incident scene must be left untouched until witnessed by a representative of the SAP. This requirement does not mean that First Aid cannot be administered, or the scene be made safe. In the event where items or equipment have to be moved to assist in removing injured person/s photographs detailing the scene of the accident must be taken if possible before the scene is disturbed preclude immediate first aid being administered and the scene being made safe.

Names and contact details of witnesses to the accident must be taken by the CHSO or a SHE Representative delegated with such responsibility by the CHSO ASAP after arriving at the scene of the accident to assist in the accident investigation procedure.

Failure by the PC’s SHE Officer to provide the CHSR with the abovementioned report within the specified timeframe as required will result in the Construction Manager (CR 8.1) being required to submit to the CHSR with a letter indicating the reasons as to the required report not being submitted as well as when the report will be submitted which may not exceed 72 hours from the time of the incident. Failure to comply with the abovementioned requirements at the discretion of the CHSR may result in instructions to cease work being issued until the detailed report as required has been submitted.

In the event where an injury has taken place such injury must be managed by ensuring that appropriate medical treatment is provided to ensure that the injured person has the opportunity as far as is reasonably practicable taking the injuries sustained into consideration to return to a level of good medical fitness and be able to resume his normal day to day activities whatever they may be.

The PC must ensure that suitably qualified medical persons/practitioners must treat all injured persons.

9.37.	Induction Training
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Each Employee and person wishing to enter the site must attend all mandatory Health and Safety Induction Training applicable to the project. No Employee or visitor will be permitted to enter any project work site until he has attended this training. Each Employee and visitor must carry proof that he has completed the induction training and may be removed from site if such proof cannot be produced on request.

All Visitors must receive a visitor induction briefing before entering any project work site. However, this induction does not permit a visitor to enter a site unescorted. Visitors must be always accompanied by an appropriately senior Employee who has been fully inducted.

9.38.	Ladders, Portable
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The PC must comply with OH&S Act - General Safety Regulation 13A. PC to ensure that:

- All ladders used on the site is constructed and used in compliance with the OH&S Act and Regulations.
- Ladders, which provide access to a working platform, must extend at least one meter above the platform where it provides access, and is secured to prevent slipping.
- Timber ladders must not be painted other than with clear preserving oils, clear varnishes etc.
- Damaged ladders must be removed from the work area, tagged unsafe and removed from site.

- All ladders must be tagged with a clearly visible tag or numbered which is recommended to be positioned below the second rung from the top, logged in a register and inspected by a competent person.
- All portable ladders when in use must be held by an assistant or properly tied down.
- All persons using ladders must be trained in the correct, safe use of ladders.

9.39.

Lighting

The PC must implement and comply with OH&S Act – Environmental Regulations, Schedule E of the Regulation.

The PC must ensure where natural lighting is inadequate to provide workers with a safe working environment. Lighting issues must be addressed by providing artificial lighting in all work areas and walkways.

Portable lights must be of a robust construction have adequate stability and be fitted with a mechanical guard to protect the lamp. No makeshift lights such as overhead florescent tube type of lighting may be positioned on floors or leaned against walls. Cables and plugs must be in a good condition and properly routed, preferably overhead to prevent tripping hazards.

Where work activities include wet processes cables and lights must be suitable to be used in such in wet environments. All lighting must be electrically safe for use in terms of their construction, cables etc.

It must be kept in mind that where lighting is of the “plug in” and “Plug out” type it is classified as Portable Electrical Equipment and must be accordingly numbered, inspected, and recorded on a Portable Electrical Equipment Register.

In the event where night work will be conducted Illumination checks must be performed to ensure conformance to minimum lighting requirements and the provision of emergency lighting must be addressed in the event of power failures.

9.40.

Manual Handling of Materials

The PC must ensure that no Employees are required or permitted to lift or move by hand any object that is likely to create a risk of injuries being sustained by such Employees. The shape weight etc of the items to be lifted must be considered and where required issues such as training in correct lifting methods, use of PPE use of alternative lifting methodologies must be considered.

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done. 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.

As a guideline 25 kg is 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.

When mechanical lifting aids are provided, they should be used.

Extra care should be taken when lifting awkwardly shaped objects.

Position the feet correctly. The feet should be placed hip-width apart to provide a large base. One foot should be put forward and to the side of the object, which gives better balance.

Bend or ‘unlock’ the knees and crouch to the load. The weight will then be safely taken down the spine and the strong leg muscles will do the work.

Get a firm grip. The roots of the fingers and the palm of the hand should grip the load. This keeps the load under control and permits it to be distributed more evenly.

The following should be considered with conducting the Risk Assessment with regards Manual Handling and 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.
- Obstacles in route the load must be carried.

Team Manual Handling:

- Load weight.
- Hand distance from lower back.
- Vertical lift region.
- Trunk twisting / sideways bending.
- Postural constraints.
- Grip on the load.
- Floor surface.
- Environmental factors.
- Communication, co-ordination, and control.

9.41.	Maintenance
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All equipment and structures on site, whether it is fixed or temporary must be maintained at intervals no longer than that recommended by the manufacturer, under a planned maintenance system to ensure the safety of personnel who are responsible for operating or using the equipment. Proof of all current tests and maintenance certificates relating to cranes, lifting beams, pulley blocks, lifting gear and slings must be kept on site in the SSHSF and be available for inspection by any person authorized to do so.

9.42.	Medical Fitness/ Fitness for Work
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The PC must ensure compliance with CR 7(1) (g) and that all his personnel as well as those of Sub-Contractors appointed by him are healthy and medically fit for their respective assignments and keep proof of such medical fitness on the SSHSF. The PC must ensure that all persons required to have a certificate of medical fitness must be in possession of such certificates prior to being permitted to assume their duties on site. Should Employees be found on site without a valid medical fitness certificate at the time of the CHSR conducting an audit, such Employee must be removed from site and the CHSR may at his discretion issue instructions to cease work.

All medicals to include the Annexure 3 form as per the Construction Regulations 2014 signed and stamped by the occupational medical practitioner. The PC must ensure that only suitably qualified occupational health practitioners' issue medical certificates.

Should a worker's scope of work change, or he be required to work outside the scope of work for which his medical certificate has been issued, he may not be permitted to do such work until an updated medical fitness certificate has been issued.

The PC must develop and implement a programme to manage Employee fitness for work for all Employees working on the project. Working hours must be managed in compliance with applicable legislation. An exit medical from a previous project or site must not be deemed as a valid medical.

The medical examinations carried out for all drivers and operators must include testing and assessment for medical conditions that could affect the safe operation of vehicles or equipment. Specific testing and 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.

- Has poor day or night vision.

The medical examinations carried out for Employees that are required to work at height must include testing and questioning to determine if an individual suffers from epilepsy, hypertension (high blood pressure) or any other medical condition deemed to be a risk by the occupational medical practitioner.

9.43.	Method Statements, Safety (SMS)/ Safe Work Procedures (SWP)
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SMS's/SWP must be in line with the associated Risk Assessments. The SMS's/SWP's must detail in a step-by-step and methodical manner on how the task is to be done from beginning to the end and must indicate what tools/equipment will be used at each stage and/or how the work area is to be accessed. The Task Items listed in the SMS's/SWP must tie up exactly with the task items being assessed in the Risk Assessment document.

Acceptance of a SMS by the CHSR does not relieve the PC of his responsibility for ensuring full compliance with SSHSS and any applicable legislation.

9.44.	Noise
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The PC must implement and comply with OH&S Act - Environmental Regulation 7 and the Noise Induced Hearing Loss (NIHL) 2003 Regulations.

The PC must meet statutory requirements on limitation of noise emitted by machines and equipment. When personnel are required to operate such equipment, noise level exposure at the operator position must not exceed an equivalent level of 85-dB (A) or more during normal working conditions without the required mitigating measures being implemented.

Employees working in the vicinity must not be subjected to an equivalent continuous level of 85-dB (A) during normal operating conditions. The PC must comply with time periods and PPE requirements where applicable.

Consideration must be taken of the fact that the sound level at any works/site boundary caused by mobile equipment must not exceed the night-time background level pre-existing the operation of the equipment. **At no time must the noise emission of the equipment or activities cause the sound level at the nearest residence, hospital ward or adjacent structure to exceed 40-dB (A).**

Sound levels must be measured in accordance with SANS 10083, with due allowance being made for tonal or impulsive components. A plot plan of project or plant must be drawn up to identify the measuring points with date, time, and frequency duration of measurement.

Symbolic safety signs, warning Employees and Visitors regarding the hazard of noise in the area, shall be erected at all entrances to the area and in a position where it must be clearly visible.

9.45.	Notices
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If the PC receives any notice issued by any relevant Government Authority concerning Health and Safety, he must immediately upon receipt of such notice comply with the requirements of such notice. The PC must provide the CHSR with copies of any such notices, correspondence or directions of whatsoever nature issued by the abovementioned Government Authority concerning Health and Safety within 2 hours of the dispatch and/or receipt of such notice, correspondence, or direction.

9.46.	Notification of Construction Work
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The PC must submit an Annexure 2, "Notification of Intention to Commence Construction Work" to the closest Department of Labour office, have it stamped provide the CHSR with a copy. A copy must be kept on the SSHSF for inspection purposes. Submitting a copy to the CHSR does not constitute permission to proceed with construction work.

Should construction work extend past the completion date reflected on the submitted Annexure A the PC must inform Department of Labour accordingly and file the amended Annexure A on the SSHSF.

It must be noted that no work of any nature may take place on site until permission to proceed with site Handover has been received from the Project Leader after receipt of letter from CHSR.

9.47.

Occupational Hygiene (*Personal Hygiene and infectious Disease Management*)

The PC must ensure that its personnel and Sub-contractor's personnel is able to maintain and maintains high standards of hygiene, personal and in connection with the performance of the work. All work areas must be kept in a clean and tidy state. Waste disposal must be facilitated by providing sufficient waste collection receptacles and the correct disposal frequencies to prevent waste build up.

Employees must be trained on the contents of the Personal Hygiene and Infectious Disease Management Plan which must identify any anticipated hazardous biological agents which may be present in the work environment, trained in measures to protect themselves in terms of personal hygiene and provided with the necessary means to minimise the risk of contracting the harmful effects associated with such hazardous biological agents.

All Resting and Eating areas must be kept in a clean, tidy condition as well as being positioned away from contaminants and hazards. No eating and drinking may take place outside the designated eating or in office areas. Facilities for hand washing must be made easily accessible for persons to wash hands when leaving the construction area and entering the construction site offices.

9.48.

Personal Protective Equipment (PPE)

The PC must implement and comply with OH&S Act – General Safety Regulation 2. It must be kept in mind that PPE must only be the last resort in addressing risks. All Contractors' personnel on site and Visitors, must always use the following minimum personal safety equipment which must be compliant with relevant SABS codes. Each item of PPE supplied for use on the project site(s) must be designed and manufactured in accordance with the relevant South African National Standard, ISO standard, or other recognised international standard.

Visitors (minimum PPE)

- Hard Hat,
- Reflective vest and
- Safety Boots.

If required due to on-site risks,

- Eye Protection,
- Hearing Protection,
- Respiratory Protection

No Visitor, regardless of title or position may be permitted to enter the construction site without the minimum PPE which is a Hardhat, Reflective Vest and Safety Boots. Should the CHSR when present on site find any person without the minimum PPE he may issue instructions to cease construction work.

On site Workers.

- Suitable protective clothing (Overalls for all Employees working on-site)
- Personnel exposed to noise levels exceeding 85dB (A), SANS 11451 approved hearing protection.
- Gloves, (Type appropriate to risks, or recommended by product manufacturers).
- Eye Protection/Face shields, (Appropriate to risks, or recommended by product/equipment manufacturers).
- Leather spats, (Appropriate to risks, or recommended by product/equipment manufacturers).
- Safety harnesses, (Where work is conducted from a Fall Risk Position).

Additional PPE requirements must be determined through hazard identification and risk assessment. This hazard-specific PPE (such as hand protection, hearing protection and respiratory protection) must be worn as required (e.g., when in a certain area, when performing a certain task, or when working with a certain substance).

The correct PPE must always be worn:

- In accordance with site requirements (as indicated at the entrances to a project site and at the entrances to buildings and/ or designated areas on the premises).
- In zoned areas (e.g., noise zones and respirator zones).
- As required by a Safe Work Procedure, a risk assessment, or a Material Safety Data Sheet (MSDS).

PPE must be provided to the Employees by the PC and Contractor at no cost to the Employee. Due to hygiene risks associated with interchanging PPE Site Visitors wishing to gain access to the site must have their own personal PPE.

Should a Worker not have the required PPE, he may not be permitted to work on site. Employees must be trained in the correct use and how to take care of PPE. Supervisors need to as part of the Pre-Shift inspections when conducting DSTI's check that Employees have the required PPE and that it is in a good condition.

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. Employees must be provided with facilities which enable them to store their PPE e.g., lockers.

Employees who wear prescription spectacles (i.e., require corrective lenses) must make use of either:

- Prescription safety glasses (with permanent fixed side shields) that conform to the requirements of a recognised national or international standard (e.g., CSA, ANSI, or equivalent), or
- Over-spec safety glasses or goggles.

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 to a project site and at the entrances to buildings and / or designated areas on the premises where additional PPE is required. These signs must comply with SANS 1186.

The PC must ensure the:

- Control the issuing and replacement of PPE.
- Maintenance of a register as proof that items of PPE have been issued to Individuals with signatures of receipt of PPE.
- Keeping of adequate quantities of replacement PPE on site.
- Carrying out of 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.

9.49.

Planned Task Observations

All Contractor and Sub-Contractor supervisors must perform Planned Task Observations (PTO's) to verify that the control measures that have been identified in SWMS's (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 SWMS/SWP and Risk Assessment are updated to reflect the current practice.

9.50.**Pneumatically Powered Tools and Equipment**

Compressed air and associated tools may only be used when compliant with the OHS Act, DMR 14. Air to operate pneumatic tools may only be supplied from compressors or compressed air lines. No homemade compressors may be used on site. All airlines must be in a good working condition and fitted with suitable clamps to prevent accidental connection. Compressed air may not be used for general cleaning including the cleaning of overalls.

Pneumatic powered tools must only be driven by filtered compressed air with an in-line lubrication system or be lubricated prior to use if there is no in-line lubrication system. When using pneumatic powered tools, the designated tool pressure must be attained using a regulator.

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 PPE.

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 by manufacturers 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.

All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 kPa pressure at the tool, must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

If an impact wrench is used, the sockets must be impact rated.

Compressed air must not be used for cleaning purposes except where reduced to less than 30 kPa, and then only with effective chip guarding and personal protective equipment in place. The 30 kPa requirement does not apply to concrete form, mill scale and similar cleaning purposes. Compressed air must not be pointed at any part of the body or used for cleaning clothing.

Airless spray guns of the type which atomize paints and fluids at high pressures must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. A diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection must be provided in lieu of the above.

Abrasive cleaning nozzles must be equipped with an operating valve, which must be held open manually to enable operation. A support must be provided on which the nozzle may be mounted when it is not in use.

9.51.**Portable Electrical Tools**

The PC to ensure compliance with EMR 10. PC to ensure safe Portable Electrical Equipment is used on site. The PC is required to inspect/have inspected by an appropriately qualified person all portable electrical equipment as follows:

- Supply cabling distribution boards, fixed lighting, and portable appliances on a monthly basis or more frequently if required by frequency of use.
- Extension leads, welding machines, compressors, pumps, and portable hand- tools on a weekly basis.

All Sub-Contractor equipment must be inspected and tested at the same intervals as indicated above. The PC must implement a management system to ensure effective inspection and control over equipment such as a monthly colour coding tagging system. Tagging must be durable and be able to withstand the stressors associated with working in a construction environment.

A record book/register must be kept reflecting the following:

- Item unique number.
- Items inspected.
- Deviations identified.
- Signature Of Inspector.
- Date of inspection.

In addition to the abovementioned, the PC must ensure the following:

- That only trained authorized persons use the Tools.
- That equipment is inspected at the start and end of each shift and included in the DSTI.
- That damaged, unsafe equipment is removed from service, tagged unsafe for use until repaired and returned to service.

9.52.	Public Safety and Security
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Hoarding/Fencing

The PC must hoard/enclose the construction site to prevent unauthorised entry and disruption to the site where required. The hoarding must be as follows:

- The hoarding/ enclosure must be at least **1.8-meter-high** and must enclose the entire parameter of the site.
- It must be constructed of a material, which must be able to prevent unauthorised persons from entering the site such as welded mesh/ diamond mesh and 80% shade cloth.
- A Lockable gate must be at least 1.8 meters in height as well a security staff member to control access.
- Hoarding parameters must be as per project's decanting plan.

Warning / informative signs

The entrance of the site must have easily visible construction safety warning signs posted which must contain as a minimum of the following information:

- Construction activities ahead/ Construction Site.
- No unauthorised entry.
- Different Types of Personal Protective Equipment required for the site as per risk assessments.
- Speed limit (10 km/h), unless otherwise stipulated.
- Visitors to report to the site office.
- Where applicable the Construction Permit Number issued by DEL.

Appropriate warning signs must also be posted in different locations of the site to create awareness of danger e.g., demolition in progress sign, required PPE and deep excavations signs etc.

Informative signs indicating the Emergency Assembly Point/s, location of fire extinguishing equipment and first aid equipment must be displayed where required.

Location of site office

The location of the site office should be in an area that will not require Visitors to pass through or enter areas where construction work is active and will not require the re-location of the office as the project progresses. The location of the site office must be included in the Site Layout Plan submitted with the SSHSP.

9.53.	Risk Assessment of Plant and Equipment
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The PC must ensure that Risk assessments of plant and equipment is undertaken and documented before arrival at site, after major service, after modification, and before use in an unusual operating mode or conditions. The RA's must be undertaken by a suitably qualified and experienced person.

RA's for equipment mobilising to Site must be conducted prior to the equipment arriving on Site, and must consider, where applicable, potential for entanglement in moving parts, crushing or striking by moving or falling objects, cutting by sharp objects, high pressure fluids, electrical shock or burns, burns from hot or cold surfaces, slips, trips, falls, ergonomic design of access and egress, seating, vibration, noise, exhaust fumes, etc.

The identification of hazards should consider normal operations, abnormal or unusual operations, breakdowns, and servicing operations. Particular attention must be given to fall protection attachment points when there is a requirement to work where a fall risk exists for activities such as repairs to equipment due to breakdowns. Where repairs to earthmoving equipment must take place on site the risk assessments must include provisions to deal with oil, diesel, and coolant spillages.

The PC must maintain all Plant and Equipment in good order and condition. Where equipment becomes inoperable due to breakdowns or other reasons and is being replaced by other equipment the same RA' requirements will be applicable to such replacement equipment.

The CHSR may inspect items of plant or equipment brought to site by the PC for use on site. Should the CHSR deem it is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, he must advise the Contractor in writing and the Contractor must forthwith remove or have repaired the item from site and replace it with a safe and adequate substitute which does not entitle the PC to any additional claims or extension of time in respect of delays caused by the CHSR's instructions.

9.54.

Safety Meetings: Pre-start, Review, etc.

The PC must ensure compliance with OH&S Act, Section 19. Weekly Toolbox meetings must be conducted with Employees. Topics for Toolbox Meetings must be pertinent to the site, equipment used, activities performed, SHE committee resolutions. Records of contents of Toolbox Meetings as well as attendance records must be kept on the SSSSF.

The PC must conduct at least one formal Health and Safety Meeting per month or at shorter intervals if required by the CHSR. Safety Representative Inspection reports contents must be discussed in addition to items such as Safety Statistics for the Month, PPE Issues, training requirements, CHSR Audit reports and results etc.

Daily Safe Task Instructions (DSTI) briefings must take place with each work team before the start of each shift. Hazards and risks as well as the required risk reduction measures must be communicated to workers. The Supervisor, CHSO and workers must sign the DSTI before work commences. At the end of the shift after the required close out check and signing, the DSTI's must be signed off and filed.

Weekly Safety Review Meetings of all safety related aspects of the week must be conducted. OHS must be a standing item on Planning and Progress Meeting Agenda's and attended by the CHSO.

9.55.

SHE Representatives and Committees

The PC and Sub-Contractors to comply with Section 16 and 17 of the Act by allowing for and ensuring that Health and Safety Representative(s) whom, after consultation, have been appointed and trained to carry out their functions.

The appointments must be in writing and the Health and Safety Representative must carry out regular inspections, keep records and report all findings to the CHSO. The CHSO must co-ordinate at least monthly H&S Committee meetings and attend all H&S committee meetings held by the Contractors. The CHSO shall further ensure that H&S is discussed at all internal production or progress meetings. Issues arising from the H&S committee meetings are to be discussed at internal meetings, as well as all H&S related issues, incidents, non-conformances, and penalties issued (if applicable).

Feedback to the CHS committee and close out of findings is imperative. Minutes of meetings must be kept for all H&S interventions and meetings. Minutes of meetings must be filed on the SSSSF.

9.56.**CHSO Roles and Responsibilities**

The PC must ensure that the CHSO performs the following duties:

- Assist and co-ordinate the development of the SSHSP.
- Attend Project Planning Meetings.
- Assessment and approval of Sub-Contractors SSHSP's.
- Facilitation of Site HS Meetings.
- Identification of Hazards and risks relevant to the construction project through regular co-ordinated site inspections.
- Establish and maintain HS communication structures, systems, and distribution of HS specific documents to Sub-Contractors, compiling of project specific emergency preparedness documentation and supervising testing and evaluation of emergency preparedness plans.
- Conducting of induction training sessions.
- Evaluation of compliance by Sub-Contractors to project specific HS Plans and Client specification through inspections and audits.
- Overseeing the reporting and investigation of project related incidents.
- Overseeing the maintenance of all HS related records.
- Participation in management reviews of HS Systems.
- Draft and analysis of trend analysis to identify system deficiencies and incident trends, outline relevant improvements and incorporate changes into the HS management system.
- Reviewing and updating the SHE Plan.
- Ensuring that all staff, Visitors, Sub-Contractors etc comply with the site rules and procedures.
- Ensure that no new workers or Contractors commences work without prior approval of their SSHSP or any other documentation as per required applicable legislative documentation.
- Ensuring that no work will be permitted to be performed without a valid RA and where required Method Statement as agreed with CHSR until such documentation has been approved by the CHSR.
- Any other duties as agreed between Construction Manager and/or CHSR.

The CHSO may not be removed or replaced without the approval of the CHSR, nor may the site be left unattended for more than 1 day without adequate, competent cover.

9.57.**Signage**

The PC must ensure signage is posted on site as per site risks, legislative requirements e.g., General Safety Regulations or SANS, prohibiting entrance, specifying PPE requirements, location of First Aid Station, Fire Fighting Equipment etc. Signage must be noted on site layout plan indicating where fixed/temporary signage is required.

Temporary electrical signage is to be included for the temporary electrical supplies. All rules or signage provided by the PC must to be adhered to. Where possible wording on signage must be in English and isiZulu.

9.58.**Site Clearance**

Site Clearance activities will vary depending on the condition of the site in terms of it being overgrown, if trees must be removed if redundant materials must be removed from site etc. All site clearance activities irrespective of what it entails must be conducted under supervision and subjected to the Risk Assessment Process as well as the development of SMS's (SWP's).

Where the site is overgrown with vegetation, RA's must make provisions for the presence of snakes, poisonous vegetation, sharp objects, open trenches and excavations and insects. All tools, equipment vehicles and machinery must be in a safe working condition and operated by trained competent persons. Employees must be provided with the required PPE.

9.59.**Site Establishment**

Site establishment can only be deemed complete when the site is enclosed, signage is posted, welfare facilities have been provided, containers have been placed etc. Upon site establishment being deemed as complete the PC must refer to the "Site Establishment Checklist" under item 12.6.1 which can be found under Annexures at the end of this document. Only once all items have been ticked as being present/completed can the PC proceed with other construction activities.

The checklist as indicated above must be signed by the CHSO and the CR8.1/CR8.7 and submitted to the CHSR. Should the CHSR upon conducting a site visit/audit and find that site establishment was not completed before commencing with other construction activities the CHSR may issue instructions to cease construction work until all outstanding items have been attended to.

9.60.

Site Layout Plan

The PC must ensure that a Site Layout Plan is developed and submitted with the SSHSP as indicated in Annexure C of this document. This document must indicate items such as Location of the Site Office, Laydown areas, Location of welfare facilities, Traffic routes, location of first aid and emergency equipment etc. After Site establishment and as the project progresses the plan must be updated if required and a copy provided to the CHSR. The Location Plan must be displayed at the entrance to the site as well as at the site office.

9.61.

Site Specific Health and Safety Rules

The PC must provide and ensure implementation and compliance with the following Site-Specific Health and Safety Rules and requirements:

- Safe Access and Egress to be provided to and from work areas.
- Good Housekeeping and Stacking Practices to be implemented and always maintained.
- Continuous cleaning to take place especially at the end of the shift and be recorded in DSTI "close out" Section.
- Safe and orderly routing of electrical cables and air hoses to prevent tripping of persons must be always enforced.
- Rigging Studies must be conducted for all heavy and/or difficult lifts.
- No lifting of loads in windy conditions exceeding 30 km/h depending on RA, Rigging Study, dimensions and weight of the load and lifting capability of the crane.
- Prohibition of certain activities in wet conditions e.g. un-shored excavations, use of portable electrical equipment, elevated work, roof work etc.
- Employees may not be transported on the back of a bakkie and or truck, unless fitted with a canopy and separated by means of a barrier from tools and equipment.
- All elevated work must include compulsory use of Lifelines (unless secured to an approved fixing point), Safety Harnesses & Fall Arrestors including a height rescue system and training of rescuers. To comply with SABS-EN –353-355,358,360-365,795,813&SABS033, 1833, 341,564-567,892,1891,12277 and 4878 - Fall Right SA standards or equivalent - always attached in elevated positions and use of double lanyards.
- Scaffolding must comply with SANS 10085 standards. Scaffold inspectors and Erectors may not be the same person. Access ladders must be erected on the inside of frames, staggered every 2 meters with a safe landing platform. Trapdoors must be provided on working platform. Scaffold must remain tagged "Unsafe for use" until certified "Safe for use". If modified to be re-tagged "Unsafe for use: until certified 'Safe for use'".
- Where required workbenches must be provided for onsite work.
- Barricading must be able to sustain loads imposed on it, should a fully grown person fall against it or lean against it, solid frame covered with orange netting to highlight presence.
- Tools and equipment used in working at heights to be secured by use of lanyards/Tool belts.
- Minimum PPE required to permit entry onto site: Safety boots, Hard Hat and Reflective Vest.
- When grinding, welding and gas cutting operations take place Shields and extinguishers must be used to contain sparks and control fire spread. Fire watchers to be posted whenever Hot Work is conducted.
- Guide ropes must be used whenever lifting operations are conducted.
- Flagmen must wear reflective vests.

- Heavy mobile plant and earth moving equipment must be fitted with rotating lights and operated with lights on and functional reverse hooters and/back up alarms.
- Concrete buckets to be fitted with safety Chains and opening wheels.
- All portable generators and welding machines with electrical outlet sockets must be fitted with earth leakage switches.
- All electrical items used in wet conditions must be fitted with waterproof caravan type plug fittings.
- No machinery e.g. grinder designed with guards may be operated without guards unless approved by CHSR.
- All Self- Propelled mobile machines must be fitted with Fire Extinguishers, Revolving Lights and Back-up and Reverse Hooters.
- All oxygen –acetylene cylinders must be fitted with Flashback Arrestors and proper, good condition hoses and clamps in a trolley equipped with a fire extinguisher.
- Supervision ratios between Foreman and workers not to exceed 1:15 ratio.
- Staff to always wear appropriate PPE with sufficient replacements to being available.
- All Employees on site to carry identification e.g. ID card reflecting the following information:
 - Initials and surname.
 - Designation.
 - Company number.
 - Name of Employer,
 - and proof of induction, sticker on hardhat unless otherwise agreed with CHSR.

Welfare Facilities to:

- Be protected from environmental conditions such as rain, sun, and wind.
- Tables and Chairs to be provided in eating areas.
- Refuse bins for disposal of food containers and food scraps.
- Hand washing facilities.
- Portable toilets 1:10 ratio.
- Separate male and female toilets with doors that can be locked from the inside.
- Running water, soap, and toilet paper to be always available at toilets.
- All facilities to be always kept in neat hygienic condition.

9.62.	Smoking on Site
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The PC may not permit any person to smoke on site unless in designated area, which has clearly been identified by means of signage being posted indicating it as the designated smoking area which has been selected in accordance with applicable legislative requirements. Applicable receptacles must be provided for disposal of cigarettes butts to ensure good housekeeping standards are maintained and prevent accidental fires.

9.63.	Speed Restrictions and Protections
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The maximum speed limit on site shall be limited to 10 km/h unless otherwise agreed upon with the CHSR. Vehicle movement routes on site must be clearly indicated where applicable and indicated on the Site Layout Plan.

Signage to ensure the safe movement of vehicles on site, as well as to ensure the health and safety of all Employees and Visitors on site, must be displayed in strategic locations.

9.64.	Stacking and Storage of Materials
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The PC must ensure compliance with CR 28 and General Safety Regulations 8. Stacking and Storage must take place under the supervision of an appointed competent person.

Storage areas must be designated, kept neat and under control. Inspections of stacking and storage areas must be done and recorded on a register which must be kept on the SSSSF. Adequate stacking, storage and lay down areas must be provided on site. If unauthorized persons can enter an area where materials are

stacked, such area must be barricaded off to prevent access to such area. Stacks should not exceed the height to width ratio of 3:1.

Hazardous chemical substances must be stored in dry storeroom as per the specifications of their material safety data sheets.

No materials may be stored outside the site perimeter, unless agreed in writing with the CHSR and PA.

9.65.	Sub-Contractors
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All Sub – Contractors shall be responsible for their own Health and Safety on site. The PC shall sign Section 37(2) mandatory agreements with the Sub – Contractors for the works, which stipulate the arrangements and procedures to ensure compliance by the Sub-Contractor and his/her Employees with the requirements of the OHS Act, Act 85 of 1993, CR and the SSHSS.

All Sub-contractors must have their own SSHSP applicable to the scope of work they will be performing on site, which has been approved in writing by the PC's CHSO. Records of such approval letters must be kept on the PC's as well as the Sub-Contractors SSHSF.

The PC **may not** permit any Sub-Contractor to start working on site without his SSHSP being approved. The PC's failure to ensure compliance with any of the abovementioned and to monitor Sub – Contractor's compliance on site may be seen as failure by the PC to enforce good SHE Practises, Compliance with the Act, CR and this SSHSS and may result in the CHSR issuing instructions to cease work.

9.66.	Transportation of Workers
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The PC and Sub-Contractors shall not:

- Transport persons together with goods or tools unless there is an appropriate area or section of the vehicle separated/partitioned off from the area where workers are seated in which to store such goods or tools.
- Transport persons on the back of trucks except if a proper canopy (properly covering the sides and top) has been provided with suitable seating areas.
- Permit workers to stand or sit on the edge of the transporting vehicle.
- Transport workers in light duty vehicle (LDV) unless they are closed / covered and have the correct number of seats for the passengers.
- No driver may transport more than six people on the back of a 1-Ton LDV and more than four passengers on the back of a ½-Ton LDV.
- The driver of any LDV may not permit more than two passengers to occupy the cab of any LDV. Drivers of such vehicles must have a valid driver's license for the code of vehicle being driven by them.

9.67.	Trespassing
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The PC and his Employees may not trespass on any wards or passages outside the limits of the site, as indicated at the time of Site Handover, and must communicate such requirement to his Sub-Contractors. The PC must ensure that all fences and hoardings are maintained during the Contract.

The PC and his Employees are required to work only in the specified construction areas and access to these areas is only by specified routes. Should access routes change due to work related issues on site such routes with applicable restrictions must be communicated to the Employees. Changes in routes must go with the required barricading and signage to prevent unauthorised persons from using such routes to access the site where such routes may enable unauthorised persons from entering the site,

9.68.	Toolbox Talks
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The Contractor must prepare a Toolbox Talk on a weekly basis and must share it with all personnel for which the Contractor is responsible (including all Sub-Contractors). Toolbox Talks must address health and safety issues that are relevant to the work performed on the project site and must include information and / or

knowledge sharing, lessons learnt from incidents that have occurred, information concerning specific hazards and / or risks and control measures to prevent injury, etc.

Attendance records must be kept and maintained in the Contractor's SSHSF.

9.69.

Vehicles and Traffic Management

The PC must ensure compliance with OHS Act- Construction Regulations 23 and that all vehicles entering the site, moving around on the site, parked on site, and exiting the site does so in a safe manner. In addition to the abovementioned, the following must be adhered to:

- Vehicles parked outside the site area must be parked in such a way as to not obstruct the movement of public vehicles nor put the public in danger in any way.
- Contractor's vehicle drivers must comply with all safety direction and speed signs.
- Drivers must ensure that vehicle loads are properly secured before setting the vehicle in motion.
- The Contractor must only permit the authorized, necessary number of vehicles on site.
- Traffic rules and signs such as speed signs; stop signs must be always obeyed.
- No vehicles may be left with the engine running or the keys in the ignition.
- Warning signage must be posted on the outside of site entrances of the site to make road users aware of vehicles entering or exiting the site.

9.70.

Ventilation

The PC must implement and comply with OH&S Act - Environmental Regulation 5. Any activity/task, which generates excessive dust such floor sanding, or fumes, such as welding where natural ventilation is not sufficient to ensure the provision of a safe working environment must include the use of an exhaust extraction system. Care must be taken to ensure that outlets of exhaust extraction system do not pose a risk to the health and safety of other persons on or outside the site or contaminate other ventilation system intakes.

Temporary ventilation should be provided where existing ventilation measures are removed.

9.71.

Visitors to Site

The PC must ensure that all Visitors to the site are subjected to a site-specific safety induction training session prior to being allowed access to site. Visitors are required to conform to the Site PPE requirements and should arrive at site with the appropriate PPE, with the minimum being safety boots/shoes, hard hat and a vest.

Visitors must not be permitted to roam around on site without being accompanied by a representative of the PC, so as to make them aware of on-site hazards, risks, No-Go areas etc.

9.72.

Waste Management

The PC must ensure that a Waste Management Plan must be developed which must be submitted with the SSHSP as indicated in Annexure C. It must be kept in mind that a site with areas overflowing with waste creates health hazards, attracts rodents and a poor image of the company.

Sufficient receptacles and designated stored areas must be provided which must be cleared frequently. Consideration must be taken of the types of waste generated and where required waste separation must form part of the Waste Management Plan. Environmentally hazardous waste such as empty paint tins, fluorescent light fittings, asbestos etc must be disposed of in line with applicable legislative requirements.

9.73.

Water Management

The PC must keep in mind that South Africa is a country with limited water resources. Water may only be obtained on site, as per contract stipulations. The PC may not make unauthorised water connections. Where

water is brought onto site by means of water tankers the PC must ensure that the water is suitable for its intended use.

The PC must communicate to all workers the importance of water conservation and management. Run-off water from washing and cleaning activities must be managed in a controlled manner to not create areas where water becomes stagnant contributing to the creation of areas for mosquitos to breed. Run-off water must also not contribute to the creation of slippery surfaces. It is recommended that taps are of the press-button type to reduce water wastage.

No hazardous substances such as paints, oils etc may be disposed of into drains, and sewers.

9.74.	Welfare Facilities
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The PC must implement and comply with Construction Regulation 30. PC to ensure:

- Sufficient chemical ablution facilities on site where connection to existing sewer system is not possible.
- Separate facilities must be provided for males and females with gender signs posted at entrance or on door.
- Ablutions must be serviced weekly as a minimum.
- Safe drinking water must be provided to Employees.
- Safe, clean storage areas for workers personal belongings and clothing to be provided.

9.75.	Working at Heights
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The PC must implement and comply with OH&S Act - General Safety Regulation 6 & Construction Regulation 10. Note: The following must be implemented in conjunction with the requirements for Elevated Work and the Fall Protection Plan as covered earlier in this document:

- If personnel are required to work in any area, which is not guarded, which has a fall risk, either above or below ground, fall protection equipment must be provided and utilised by the personnel. Fall protection includes Safety harnesses and double lanyards with the correct hooks, approved lifelines, or other approved means.
- All harnesses must comply with SABS/EN/EC Standards and must be in a "good state", inspected using a comprehensive inspection checklist, and "in-date" as per manufacturing guideline.
- All persons working in a fall risk position, e.g., scaffolding, formwork/false work, support work, roof work, etc. must be trained for working at heights with a minimum of an Accredited Fall Arrest Course compliant to applicable SAQA Unit Standards.
- The supervisor of the work relating to the fall risk area must be trained at a minimum level of a SAQA Accredited Fall Arrest and Basic Rescue Course.
- A Rescue Kit (Contents of the Rescue Kit as per the Fall Protection Plan, and as determined by the type of working from a fall risk position that is being conducted on site) must be always available on site.
- The site must have at least one Accredited Fall Arrest Rescue Co-Coordinator on site who will co-ordinate the rescue operation.

10. Annexure D

Baseline Risk Assessment

Please note that this is a Baseline Risk Assessment and not a detailed Risk Assessment. Activities as listed below may not be in the sequence preferred by the Contractor or may be conducted at the same time

Project:		Department of Education: Mandeni Primary School - Storm Damage Disaster Programme Phase 16.							
REF NO	WIMS No:- 033004	RISK ASSESSOR		S. Khoza	REVISION	0	DATE	16/02/2026	
Likelihood	Consequence	RISK VALUE= LIKELIHOOD X CONSEQUENCE			RISK RANKING				
		SCORE	RANKING						
1 Rare	Negligible	1			1				
2 Unlikely	Minor	2			2				
3 Possible	Moderate	3			3				
4 Likely	Major	4			4				
5 Almost certain	Severe	5			5				
MAIN ACTIVITY									
REF NO	SUB ACTIVITY	POTENTIAL SHE HAZARDS	POTENTIAL SHE RISKS	SHE RISK	PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	Risk Prioritisation Number
				S H E					

MAIN ACTIVITY	1. SITE ESTABLISHMENT										RISK PRIORITISATION NUMBER	
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE		RESIDUAL RISK
					S	H	E					
1.1	Fencing/ Hoarding site.	<ul style="list-style-type: none"> ▪ Heavy material; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Sharp edges; ▪ Physical exertion; ▪ Tripping hazards; ▪ Dug & uncovered holes. ▪ Hidden services; etc. 	<ul style="list-style-type: none"> o Muscular strain; o Bruising; o Fractures; o Cuts & abrasion; o Chest congestion; o Fractures ; o Heat exhaustion; etc. 	X	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Puncture wound, on foot due to stepping on nails; ➢ Noise; etc. 	3x2=6	Task specific HIRA; Competent Management; Competent Supervision; Safe systems of work; Medical certificates of fitness; Solidly barricade, post safety signage & awareness symbols; HSE trainings; Wear required PPE; Visible supervision; etc.	1x2=2	1
1.2	Off-loading construction materials and equipment.	<ul style="list-style-type: none"> ▪ Rolling back truck; ▪ Heavy material; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Sharp edges; ▪ Physical exertion; ▪ Tripping hazards; ▪ Dug & uncovered holes. ▪ Hidden services; etc. 	<ul style="list-style-type: none"> o Muscular strain; o Bruising; o Fractures; o Cuts & abrasion; o Chest congestion; o Fractures ; o Heat exhaustion; etc. 	X	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Puncture wound, on foot due to stepping on nails; ➢ Noise; etc. 	4x3=12	HIRA, Competent Management, Competent Supervision, safe systems of work, competent operators, Flagmen, Medical Fitness Certificates ,Vehicle maintenance records, signage and barricading, training. PPE etc.	2x2=4	1

1.3	Positioning & placement of construction welfare facilities (i.e. site office, sheltered eating area, temporal toilets, storeroom, etc.) on site (mechanical)	<ul style="list-style-type: none"> ▪ Uncontrolled movement of loads; ▪ Limbs caught between surfaces; ▪ Heated surfaces; ▪ HCS; ▪ Sharp edges; ▪ Moving vehicles. 	<ul style="list-style-type: none"> ○ Fractures, death, damage; ○ Abrasions. ○ Fractures, Cuts. ○ Dermatitis; ○ Vehicle/ property equipment damage; ○ Fractures, Death; etc. 	X	X	X	<ul style="list-style-type: none"> ➢ Death; ➢ Fractures; ➢ Damage; etc. 	4x3=12	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade where construction activities are taking place; Post safety signage & awareness symbols; HSE trainings; Wear required PPE; Visible supervision; etc.	2x2=4	1
1.8	Hoarding off work areas and post safety signage & awareness symbols (Awareness sign outside the main entrance to site; and lots within construction site); etc.	<ul style="list-style-type: none"> ▪ Manual Handling; ▪ Incorrect lifting; ▪ Struck by tools; ▪ Sharp edges; ▪ Physical exertion; ▪ Tripping hazards; ▪ Hidden services; etc. 	<ul style="list-style-type: none"> ○ Muscular strain; ○ Lower back injuries; ○ Cuts; ○ Falling resulting in various injuries; ○ Accidental contact with hidden services resulting in electrical shock; etc. 	X	X	X	1.Noise 2.Tripping and falling due material left haphazardly	3x2=6	Housekeeping, HIRA, Method Statements, Safe Work Procedures, Competent Management, Competent Supervision, safe systems of work, competent operators, Cable Detection Equipment usage, Medical Fitness Certificates, signage and barricading, housekeeping practises, training. PPE etc.	1x2=2	1
TOTAL VALUE OF ACTIVITY											
								36	12	4	

MAIN ACTIVITY	2. ALTERATIONS							RISK PRIORITISATION NUMBER			
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK				PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE
					S	H	E				
2.1	REMOVAL OF EXISTING ROOF COVERING: i. Profiled or corrugated asbestos roof sheeting; ii. Removal of existing old metal roof sheeting in other School block. iii. Timber purlins. iv. Breaking up and removing blockwork, etc. v. Breaking up and removing damaged glass; vi. Taking out and removing ironmongery; vii. Hacking up/off and removing granolithic, screeds, plaster, etc. from concrete or brickwork and preparing surfaces for new screeds, plaster, etc.	<ul style="list-style-type: none"> ▪ Asbestos sheet; ▪ Roof/ Heights; ▪ Asbestos dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unstable roof; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Heights; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unstable timber purlins; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; conditions; etc. 	<ul style="list-style-type: none"> o Serious body injury from falling through roof & timber purlins; o Asbestosis from inhaling asbestos dust; o Hand & finger injuries by being strike by hand tools; o Back pains caused by lifting heavy material; o Arm muscular aching due to work continuous without resting; o Knee bruising due to trip & fall; o Chest congestion from inhaling dust; o Heat exhaustion; etc. 	X	X	X	<p>➤ Asbestos dust inhalation that causes Asbestosis & chest congestion.</p> <p>➤ Head injury due to collapsing roof;</p> <p>➤ Construction noise exceeding 85 dBA (decibels) that cause temporal/permanent hearing damage depending to exposure duration; etc.</p>	4x5=20	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Registered Asbestos Contractor to only remove asbestos roof sheeting; AAIA to supervise removal of asbestos roof material; Asbestos handling Employees to be in possession of Asbestos certificates & Working at heights certificates; Inspect tools before use; Adhere to approved Plan of Work; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant asbestos awareness signage & symbols where asbestos works are taking place; Wear required asbestos PPE (Including safety harnesses); Visible supervision; Removed asbestos material to be place in a skip; etc.	3x2=6	2

2.2	<p>MAKING GOOD OF FINISHES, ETC.</p> <ul style="list-style-type: none"> - Scrape out existing putty to steel windows including cleaning out rebates and replace with new putty. 	<ul style="list-style-type: none"> • Manual removing steel windows without hand protection. • Cracked & broken window glasses. • Working at heights. • Flying debris and small particles of old putty. • Dust inhalation. • Use of ladders improperly or on unstable surfaces. • Incorrect installation or structural failure. • Working in exposed weather conditions (heat/sun/wind). • Use of hand and power tools (saws, drills, nail guns). • Big gaps between roof framing/trusses. <ul style="list-style-type: none"> ▪ Wood dust all over site. 	<ul style="list-style-type: none"> ○ Back injuries, sprains, strains, & musculoskeletal disorders caused by lifting & pushing heavy roof trusses from ground to roof. ○ Severe head injury/ death due to falling from height/ roof. ○ Fingers & hand injuries from using unsafe hand tools. ○ Body injuries from falling from unsafe ladder. ○ Chest congestion & respiratory conditions due to inhaling generated cement dust. ○ Serious body injury falling from incomplete & unsafe/ collapsing scaffolding. ○ Knee bruises & twisted ankle injuries from tripping & falls. ○ Airborne pollutant (<i>i.e. fine wood dust</i>) generated during cutting/ sanding of timber frames/ doors on site 	X	X	X	<p>➤ Construction noise exceeding 85 dBA (decibels) that cause temporal hearing damage depending to exposure duration; etc.</p>	<p>3x3=9</p>	<p>Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Adhere to SWP; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant safety & awareness signage & symbols where construction work is taking place; Use safe access/ ladder to reach high areas; Wear required PPE; Visible supervision; etc.</p>	2X2=4	1
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2.3	STRUCTURAL REPAIRS - Repairs to structural cracks, etc.	<ul style="list-style-type: none"> • Working at heights. • Flying debris and small particles of old cement & bricks particles. • Dust inhalation. • Use of ladders improperly or on unstable surfaces. • Using unsafe/home-made hand tools (<i>Chisel, hammer, etc.</i>). • Tripping hazards caused by objects/equipment left unattended on walk-ways; • Working in exposed weather conditions (<i>heat/sun/wind</i>); etc.. 	<ul style="list-style-type: none"> ○ Severe body injuries due to falling from height/ladder. ○ Eye injury due to cement & brick particles (<i>generated during wall chipping</i>) flying and hit the eyes; ○ Chest congestion & respiratory conditions due to inhaling generated cement dust. ○ Fingers & hand injuries from using unsafe/home-made hand tools; ○ Knee bruises & twisted ankle injuries from tripping & falls. ○ Back injuries, sprains, strains, & musculoskeletal disorders caused by lifting & pushing heavy roof trusses from ground to roof. ○ Body injuries from falling from unsafe ladder. ○ Serious body injury falling from incomplete & unsafe/ collapsing scaffolding; etc. 	X	X	X	Construction noise exceeding 85 dBA (decibels) that cause temporal hearing damage depending to exposure duration; Dust inhalation that cause chest congestion to Public exposed to construction dust generated; etc.	3x3=9	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Adhere to SWP; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant safety & awareness signage & symbols where construction work is taking place; Alternative walkway to be created to protect Public from construction hazards & risks generated from site; Use safe access/ladder to reach high areas; Wear required PPE; Visible supervision; etc.	2X2=4	1	
TOTAL VALUE OF ACTIVITY												
										38	14	4

MAIN ACTIVITY	3. CONCRETE, FORMWORK AND REINFORCEMENT										RISK PRIORITISATION NUMBER	
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE		RESIDUAL RISK
					S	H	E					
3.1	<p>CONCRETE WORK:</p> <ul style="list-style-type: none"> - Steel reinforcement erection. - Mixing of cement, soil & water. - Construction of concrete foundation. 	<ul style="list-style-type: none"> • Unprotected excavation. • Heavy reinforcement material. • Cement dust generated. • Uncovered excavations. • Unsafe/ home-made hand tools. • Exposure to sharp objects protruding out from ground. • Heavy & sharp steel reinforcement. ▪ Wet concrete mixture. 	<ul style="list-style-type: none"> o Back injuries, sprains, strains, & musculoskeletal disorders caused by lifting heavy material & repetitive work that demand excessive body bending. o Chest congestion & respiratory conditions due to inhaling generated cement dust. o Fingers & hand injuries from using unsafe hand tools. o Feet injuries caused by stepping on protruding steel. o skin irritation due to skin contact with wet concrete mixture. o Severe eye irritation & chemical burns due to contact with cement dust & wet concrete. 	X	X	X	X	<ul style="list-style-type: none"> ➤ Chest congestion from cement dust inhalation; ➤ Ankle & knee twisting due to wet & slippery surface; etc. 	4x3=12	<ul style="list-style-type: none"> ➤ Contractor to create task-specific DSTI's + SWPs & communicate it to all Employees, and keep attendance records. ➤ Communicate the safe handling of HCS (<i>i.e. cement, etc.</i>). ➤ Practise good housekeeping to avoid slip trip and falling hazards. ➤ All Workers to have valid medicals with annexure 3. ➤ Hand tools to be inspected before use and recorded. ➤ Awareness trainings to be conducted. ➤ Practise SWP & safe lifting technique when lifting heavy equipment/ material. ➤ Provide PPE: Safety Boots/Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, etc. 	1x2=2	1
	TOTAL VALUE OF ACTIVITY										2	2

MAIN ACTIVITY REF. NO.	4. MASONRY SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
				S	H	E					
4.1	<p>SUPERSTRUCTURE BLOCK WORK:</p> <ul style="list-style-type: none"> - Taking Blockwork of M190 cement blocks in class II mortar. - 150mm Wide reinforcement built in horizontally. - Air vents approximate size 220 x 150mm. - Brickwork repairs. 	<ul style="list-style-type: none"> • Heavy wheelbarrow fully of bricks. • Falling bricks from heights. • Unsafe hand tools & ladders. • Unsafe & incomplete scaffolding for Bricklayers. • Brick roughness. • Dust generated. • Wet concrete mixture. • Material & equipment left unattended in walkways. ▪ Cement mixed on bare ground. 	<ul style="list-style-type: none"> ○ Back injuries, sprains, strains, & musculoskeletal disorders caused by lifting & pushing heavy wheelbarrow full of bricks. ○ Severe/ Fatal head injury due to being strike by falling brick(s). ○ Fingers & hand injuries from using unsafe hand tools. ○ Chest congestion & respiratory conditions due to inhaling generated cement dust. ○ Serious body injury falling from incomplete & unsafe scaffolding. ○ Skin irritation due to skin contact with wet concrete mixture. ○ Severe eye irritation & chemical burns due to contact with cement dust & wet concrete. ○ Knee bruises & twisted ankle injuries from tripping & falls. ○ Ground contamination/ pollution caused by mixing cement mixture direct on the bare ground. 	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Noise; etc. 	4x3=12	<ul style="list-style-type: none"> ➢ Contractor to create task-specific DSTI's & communicate it to all Employees, and keep attendance records. ➢ Only competent persons to erect complete, inspect & declared safe scaffolding for bricklayers. ➢ Use scaffolding/ safe work platforms with safe access & guardrails. ➢ Only competent Bricklayers to execute brick works. ➢ Communicate the safe handling of HCS (i.e. cement, etc.). ➢ Practise good housekeeping to avoid slip trip and falling hazards. ➢ All Workers to have valid medical certificate of fitness. ➢ Inspect tools before use ➢ Practise SWP & safe lifting technique when lifting heavy equipment/ material. ➢ Provide PPE: Safety Boots/Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, etc. 	1x2=2	1
TOTAL VALUE OF ACTIVITY								12	2	1	

MAIN ACTIVITY	5. WATERPROOFING										RISK PRIORITISATION NUMBER		
	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK			
REF. NO.				S	H	E							
5.1	On fibre cement sheeting in patches including ridge and over screw heads.	<ul style="list-style-type: none"> ▪ Heights; ▪ Home-made & unsafe hand tools; ▪ Heavy waterproofing sheeting roll; ▪ Unsafe ladder; ▪ Unsafe manual handling of heavy waterproofing roll; ▪ Struck by tools; ▪ Tripping hazards; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from timber purlins; ○ Chest congestion from inhaling dust; ○ Back pains caused by lifting heavy waterproofing sheet roll; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X	> Chest congestion from dust inhalation;	4x4=16	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1		
	TOTAL VALUE OF ACTIVITY										16	2	1

6. ROOF COVERINGS												
MAIN ACTIVITY	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
					S	H	E					
	6.1	Installation of new 0.58mm Colorbond IBR profile sheeting, colour one side fixed to timber purlins.	<ul style="list-style-type: none"> ▪ Sharp edges & heavy metal roof sheeting; ▪ Roof/ Heights; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unstable timber purlins; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling through timber purlins; ○ Chest congestion due to dust inhalation; ○ Hand & finger cuts by sharp edges of metal roofing; ○ Hand & finger injuries due to being strike by hand tools; ○ Back pains caused by lifting heavy metal roof sheeting; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion; etc. 	X	X	X	> Noise; etc.	4x5=20	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Employees working on roof to be in possession of Working at heights certificates; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant awareness signage & symbols where roof works is taking place; Wear required PPE (Including safety harnesses); Visible supervision; etc.	3x2=6	2

7. CAPENTRY AND JOINERY											
MAIN ACTIVITY	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
				S	H	E					
7.1	<p>PREFABRICATED TIMBER ROOF TRUSSES, ETC.: - supply and install roof truss system complete in accordance with the Standard Building Regulations, including cross battens at hips, valleys, etc.</p> <p>Sawn softwood: - Installation of 38 x 114mm Bolted wall plates, 38 x 114mm Timber bearers, 38 x 114mm Timber rafter, 76 x 50mm Cross bracing.</p> <p>EAVES, VERGES, ETC.: - 10 x 225mm Fascia boards including joiners.</p>	<ul style="list-style-type: none"> ▪ Heavy & long timber purlins & trusses; ▪ Heights; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unstable timber purlins & trusses; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling through timber purlins; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by hand tools; ○ Back pains caused by lifting long & heavy purlins; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion; etc. 	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Head injury due to collapsing timber purlins; ➢ Noise; etc. 	4x4=16	<p>Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect ladder & tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.</p>	1x2=2	1

7.2	Installation of Pressed Nutec cement boards 10 x 225mm Fascia boards including joiners; 10 x 225mm Barge boards including H profile jointing strips.	<ul style="list-style-type: none"> ▪ Long & heavy fascia & barge boards; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling fascia & barge boards & hand tools; ○ Back pains caused by lifting long & heavy fascia & barge boards; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; etc. 	X X X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Head injury due to falling fascia & barge boards; ➢ Noise; etc. 	3x3=9	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect ladders & tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1
7.3	DOORS, ETC.: 40mm Framed, ledged and braced battened door size 813 x 2032mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces.	<ul style="list-style-type: none"> ▪ Long & heavy door frames; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling door frames & hand tools; ○ Back pains caused by lifting long & heavy door frames; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; etc. 	X X X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Head injury due to falling doorframes; ➢ Noise; etc. 	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect ladders & tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1
TOTAL VALUE OF ACTIVITY							31	6	3

8. PLASTERING.											
MAIN ACTIVITY	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
				S	H	E					
8.1	<p>Internal Plaster: - On beamfilling.</p> <p>External Plaster: - Cement plaster on blockwork.</p>	<ul style="list-style-type: none"> • Unsafely lifted heavy cement bags. • Cement dust created. • Unsafe hand tools used. • Work demanding body bending & squatting position. • Wet cement mixture. • Wet & slippery surface. • Plasters using unsafe & incomplete safe work platform. • Wet cement dropping from high point of the wall. 	<ul style="list-style-type: none"> o Back injuries, sprains, strains, & musculoskeletal disorders caused by lifting heavy cement bags. o Chest congestion & respiratory conditions due to inhaling generated cement dust. o Fingers & hand abrasion & cuts due to use of home-made/ unsafe tools. o Back injuries, sprains, strains, & musculoskeletal disorders caused by work demands repetitive body bending & standing in awkward positions. o Skin dryness due to contact with wet cement. o Twisted knee & ankle due to slip & fall caused by wet surface/ cement. o Serious body injury due to falling from unsafe and incomplete ladder/ work platform collapses. o Knee bruises due to trip & fall. o Ergonomic injuries due to manual handling 	x	x	x	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Head injury due to falling ceiling boards; ➢ Noise; etc. 	3x2=6	<ul style="list-style-type: none"> ➢ Contractor to create task-specific DSTI's & communicate it to all Employees, and keep attendance records. ➢ Practise good housekeeping to avoid slip trip and falling hazards. ➢ All Workers to have valid medicals with annexure 3. ➢ Hand tools to be inspected before use and recorded. ➢ Adhere to SWP & practise safe lifting technique. ➢ Training Employees on handling cement as HCS; and cement to be mixed on top of wooden board/ sail to avoid ground pollution. ➢ Provide required PPE: Safety Boots/ Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, etc. ➢ Visible supervision 	2x2=4	2

MAIN ACTIVITY REF. NO.	9. PAINTWORK SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
				S	H	E					
9.1	<p>Prepare & brush surface to remove all loose contaminants, apply one undercoat & two coats PVA emulsion paint for interior use:</p> <ul style="list-style-type: none"> - On beamfilling. - On plastered walls & in patches. - On ceilings and cornices. <p>Prepare & brush surface to remove all loose contaminants, apply one undercoat & two coats superior acrylic emulsion paint for exterior use:</p> <ul style="list-style-type: none"> - On fascia and barge boards, including priming metal jointing strips. <p>Prepare & sand down surface to remove all loose contaminants & apply two coats superior polyurethane varnish:</p> <ul style="list-style-type: none"> - On doors 	<ul style="list-style-type: none"> ▪ Heavy paint container; ▪ Paint vapours/ odour; ▪ Unsafe manual handling of paint container; ▪ Tripping hazards; ▪ Slippery surface due to paint spillage; etc. 	<ul style="list-style-type: none"> ○ Eye injury due to small paint droplets; ○ Chest congestion & respirator condition due to inhalation of paint vapours; ○ Arm muscular pain due to continuous hand movement; ○ Heat exhaustion; etc. 	X	X	X	<p>➤ Chest congestion due to paint vapour inhalation; Paint odour; etc.</p>	4x3=12	<p>Task specific HIRA; Create & communicate task-based DSTI, SWP & Handling of HCS; Practise SWP & Safe lifting technique; Inspect tools before use; Competent Supervision; Medical certificates of fitness; Solidly barricade where construction activities are taking place; Post safety signage & awareness symbols; HSE trainings; Wear required PPE (<i>Incl. respirators</i>); Visible supervision; etc.</p>	1x2=2	1
TOTAL VALUE OF ACTIVITY											
								12		2	1

10. CEILINGS, PARTITIONS AND ACCESS FLOORING												
MAIN ACTIVITY	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
					S	H	E					
	10.1	<p>NAILED-UP CEILINGS:</p> <ul style="list-style-type: none"> - Installation of new 9,5mm 'Rhinoboard' or equal and approved M-Strip ceiling fixed print side up including brandering with 32mm galvanised clout nails or 32mm grabber screws at 150mm centres with plastic 'M-Strip' cover strips over joints with all nail or screw heads stopped and sanded level. - Ceilings including 38 x 38mm sawn softwood brandering at 500mm centres in one direction to trusses. - Extra over ceiling for 600 x 600mm trap door including rebated framing cross branders covered with ceiling board and fitted flush in opening 	<ul style="list-style-type: none"> ▪ Long & heavy ceilings; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling hand tools; ○ Back pains caused by lifting long & heavy ceiling boards; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Head injury due to falling ceiling boards; ➢ Noise; etc. 	3x2=6	<p>Task specific HIRA;</p> <p>Communicate task-based DSTI & SWP;</p> <p>Practise SWP & Safe lifting technique;</p> <p>Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness;</p> <p>Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.</p>	1x2=2	1

10.2	75 mm Coved cornices mitred at corners.	<ul style="list-style-type: none"> ▪ Long & heavy cornice; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling hand tools; ○ Back pains caused by lifting long cornice; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X X X	➤ Chest congestion from dust inhalation; ➤ Noise; etc.	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1	
10.3	Extra over ceiling for 900 x 900mm trap door of 32 x 44mm wrought hardwood rebated framing and 38 x 114mm sawn softwood kerb spiked to rafters, etc.	<ul style="list-style-type: none"> ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious head injury from falling trap door; ○ Chest congestion from inhaling dust; ○ Eyes injuries from dust falling down; ○ Hand & finger injuries by being strike by falling hand tools; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X X X	➤ Chest congestion from dust inhalation; ➤ Noise; etc.	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1	
TOTAL VALUE OF ACTIVITY							18		6	3

11. FLOOR COVERINGS, WALL LININGS, ETC.												
MAIN ACTIVITY	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
					S	H	E					
	11.1	POLISH, SEALERS, ETC.: Wax polish to floors.	<ul style="list-style-type: none"> ▪ Slippery floors; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Knee bruising ankle twisting due to slippery floors; ○ Back pains caused by continuous body squatting executing work on the floor; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Noise; etc. 	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1
TOTAL VALUE OF ACTIVITY									6		2	1

MAIN ACTIVITY	12. IRONMONGERY							RISK PRIORITISATION NUMBER				
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK	PUBLIC RISK	PURE RISK		RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK		
					S	H	E					
12.1	<p>HINGES, BOLTS, ETC.:</p> <ul style="list-style-type: none"> Stainless steel two ball bearing butt hinge, size 100 x 75 x 3mm 095/76 with satin stainless steel finish. <p>New Window Mechanisms:</p> <ul style="list-style-type: none"> Howick Metals or equal and approved 132mm brass window handle R/H & L/H, including brackets, etc. <p>"Union" or equal and approved:</p> <ul style="list-style-type: none"> 152 x 41 x 7mm "CZ682-24-52" chromium plated 3 lever lockset. <p>PINNING BOARDS, WRITING BOARDS, PROJECTION SCREENS, ETC.:</p> <ul style="list-style-type: none"> 2400 x 1200mm high green chalkboard to comply with CK-38-1980 complete with chalk rails as one unit. 	<ul style="list-style-type: none"> Use of unsafe hand tools/ home-made tools. Wooden dust generated. Use of unsafe/ home-made ladders. Material & equipment left unattended in walkways. Sharp edges & point front part of screws. Repetitive bending of body works. Using hand tool (i.e. <i>hammer, etc.</i>) carelessly. 	<ul style="list-style-type: none"> Fingers & hand injuries from using unsafe hand tools. Chest congestion & respiratory conditions due to inhaling generated wooden dust. Knee bruises & twisted ankle injuries from tripping & falls. Finger & hand cuts from sharp edges of lever locks and point screws. Back injuries, sprains, strains, & musculoskeletal disorders caused by work demands repetitive body bending & standing in awkward positions. Serious body injury due to falling from unsafe ladder, incomplete & unsafe/ collapsing scaffolding, etc. Serious finger injury due to being strike by hammer on fingers after missing screw. 	X	X	X		<p>> Chest congestion from dust inhalation;</p> <p>> Noise; etc.</p>	3x2=6	<ul style="list-style-type: none"> Contractor to create task-specific DSTI's & communicate it to all Employees, and keep attendance records. Practise good housekeeping to avoid slip trip and falling hazards. All Workers to have valid medicals with annexure 3. Hand & electrical tools to be inspected before use and recorded. Electrical tools with exposed electrical wires to be removed from site. Safe Work Procedures to be communicated & adhered to. Provide required PPE: Safety Boots/ Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, safety harness where needed, etc. Visible supervision. 	1x2=2	1
	TOTAL VALUE OF ACTIVITY							6		2	1	

MAIN ACTIVITY	13. PLUMBING AND DRAINAGE										RISK PRIORITISATION NUMBER		
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE		RESIDUAL RISK	
					S	H	E						
13.1	RAINWATER DISPOSAL: Installation of Everite aluminium eaves gutter (with spigot and socket joints sealed with approved bitumastic sealer) and 0.7mm Baked enamel aluminium downpipe (including holderbats).	<ul style="list-style-type: none"> ▪ Long & heavy gutters; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling gutters & hand tools; ○ Back pains caused by lifting long & heavy gutters; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X		> Chest congestion from dust inhalation; > Noise; etc.	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1	
	TOTAL VALUE OF ACTIVITY										6	2	1

14. GLAZING											
MAIN ACTIVITY	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
				S	H	E					
14.1	GLAZING TO STEEL WITH PUTTY: 6mm Thick safety glass- Panels exceeding 0,1m2 and not exceeding 0,5m2.	<ul style="list-style-type: none"> ▪ Heavy 6mm safety glass; ▪ Safety glass sharp edges; ▪ Dust; ▪ Home-made & unsafe hand tools; ▪ Unsafe ladder; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Serious body injury from falling from ladder; ○ Chest congestion from inhaling dust; ○ Hand & finger injuries by being strike by falling gutters & hand tools; ○ Back pains caused by lifting long & heavy gutters; ○ Arm muscular aching due to work continuous without resting; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X	> Noise; etc.	3x2=6	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade & display relevant construction work awareness signage & symbols where construction works are taking place; Wear required PPE; Visible supervision; etc.	1x2=2	1
TOTAL VALUE OF ACTIVITY								6		2	1

15. EXTERNAL WORKS												
MAIN ACTIVITY	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK	RISK PRIORITISATION NUMBER
					S	H	E					
15.1		<p>EXTERNAL WORKS: Aprons & V-Drains- Site clearance (Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.).</p> <p>EARTHWORKS: Clear all tree and shrubs etc. not exceeding 200mm girth. Excavate for surface trenches exceeding 2m & not exceeding 2m deep. Surface beds, slabs, etc. to falls and currents. Concrete channel to fall. Apron slabs, paving and ramps not exceeding 300mm. Installation of water tank.</p>	<ul style="list-style-type: none"> • Undetected existing underground services. • Dust generated. • Uncovered excavations. • Unsafe/ home-made hand tools. • Exposure to sharp objects protruding out from ground. ▪ Heavy roll of waterproofing sheeting. ▪ Tripping hazards; ▪ Extreme weather conditions; etc. 	<ul style="list-style-type: none"> ○ Electrocutation due to stepping on live electrical cable underground. ○ Chest congestion & respiratory conditions due to inhaling generated dust. ○ Fingers & hand injuries from using unsafe hand tools. ○ Feet injuries caused by stepping on protruding steel. ○ Back injuries, sprains, strains, & musculoskeletal disorders caused by repetitive work that demand body bending & pushing heavy wheelbarrow; ○ Knee bruising due to trip & fall; ○ Heat exhaustion ; etc. 	X	X	X	> Chest congestion from dust inhalation; > Noise; etc.	3x3=9	<ul style="list-style-type: none"> • Contractor to create task-specific DSTI's + SWPs & communicate it to all Employees, and keep attendance records. • Only competent person to operate mobile plant on site. • Excavation Work Supervisor to inspect (using inspection checklist) ground to be excavated before excavation commences. • Practise good housekeeping to avoid slip trip and falling hazards. • All Workers to have valid medicals with annexeure 3. • Mobile plant & Hand tools to be inspected before use and recorded. • Awareness trainings to be conducted. • Provide PPE: Safety Boots/Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, etc.. 	1x2=2	1
TOTAL VALUE OF ACTIVITY								9		2	1	

MAIN ACTIVITY	16. ELECTRICAL INSTALLATION							RISK PRIORITISATION NUMBER			
	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK		PURE RISK	RECOMMENDED RISK CONTROL MEASURE	RESIDUAL RISK
REF. NO.				S	H	E					
16.1	<ul style="list-style-type: none"> - Installation of 24 000 Btu/h V, 50Hz cooling/heating capacity ± 8kw, R410a refrigerant (SABS approved). - 1800mm Aircurtain 230V, 50Hz ± 9m/s the velocity . - Wired remote control panel (LCD) with appropriate mountings.. - Prepare and apply one coat alkali resistant primer, one undercoat and one finishing coat PVA emulsion paint on roof tiles.. - Weather proof isolator, . - 100X 40mm white PVC trunking. Refrigerant piping for air-conditioning unit (per pipe size for liquid line and gas line). 	<ul style="list-style-type: none"> • Unsafely carrying heavy load of aircon units. • Dust generated. • Unsafe ladders used when installing aircon units. • Use of unsafe ladder & hand tools. • Boxes of aircon units left unattended in walkways/ Tripping hazards. ▪ Live electrical wires. 	<ul style="list-style-type: none"> o Back injury due to lifting heavy aircon unit boxes. o Chest congestion & respiratory conditions due to inhaling dust generated. o Knee & hand bruises from falling due to collapsing of unsafe ladders. o Fingers & hand abrasion & cuts due to trip & fall caused by tripping hazards. o Dust getting in eyes causing eye injuries. o Falling objects (tools, material) causing serious head injury to persons below. o Heat exhaustion, dehydration, wind-related hazards. o Electrocutation and skin burn by live electricity. 	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Noise; etc. 	4x5=20	<ul style="list-style-type: none"> ➢ Contractor to create task-specific DSTI's & communicate it to all Employees, and keep attendance records. ➢ Only competent & registered aircon unit Installer as an Authorised Refrigeration Gas Practitioner with SAGCC Gas to install aircon units. ➢ Practise good housekeeping to avoid slip trip and falling hazards. ➢ All Workers to have valid medicals with annexure 3. ➢ Inspect/ check ladders & hand tools before use & keep recorded. ➢ Awareness trainings (i.e. Toolbox talks, etc.) to be conducted weekly. ➢ Communicate & practise SVWP procedures & adhered to it. ➢ Provide required PPE: Safety Boots/ Shoes, Hard Hat, Dust Mask, Eye Protection, Reflective Vest, 2 Piece Long Sleeve Overall, Gloves, etc. ➢ Visible supervision. 	3x2=6	2
	TOTAL VALUE OF ACTIVITY							20	6	2	

MAIN ACTIVITY	17. DE-ESTABLISHMENT AND WASTE DISPOSAL										RISK PRIORITISATION NUMBER	
	REF. NO.	SUB-ACTIVITY	POTENTIAL HSE HAZARDS	POTENTIAL HSE RISKS	HSE RISK			PUBLIC RISK	PURE RISK	RECOMMENDED RISK CONTROL MEASURE		RESIDUAL RISK
					S	H	E					
17.1	Removal of all construction welfare facilities (i.e. site office, sheltered eating area, temporal toilets, store room, etc.) on site (mechanical)	<ul style="list-style-type: none"> ▪ Uncontrolled movement of loads; ▪ Limbs caught between surfaces; ▪ Heated surfaces; ▪ HCS; ▪ Sharp edges; ▪ Moving vehicles. 	<ul style="list-style-type: none"> o Fractures, death, damage; o Abrasions. o Fractures, Cuts. o Dermatitis; o Vehicle/ property equipment damage; o Fractures, Death; etc. 	X	X	X	X	<ul style="list-style-type: none"> ➢ Death; ➢ Fractures; ➢ Damage; etc. 	4x3=12	Task specific HIRA; Communicate task-based DSTI & SWP; Practise SWP & Safe lifting technique; Inspect tools before use; Prohibit home-made tools; Competent Supervision; Medical certificates of fitness; Solidly barricade where construction activities are taking place; Post safety signage & awareness symbols; HSE trainings; Wear required PPE; Visible supervision; etc.	2x2=4	1
17.2	Removal of fencing/ Hoarding and signage & awareness symbols on site.	<ul style="list-style-type: none"> ▪ Heavy material; ▪ Unsafe manual handling; ▪ Struck by tools; ▪ Sharp edges; ▪ Physical exertion; ▪ Tripping hazards; ▪ Dug & uncovered holes. ▪ Hidden services; etc. 	<ul style="list-style-type: none"> o Muscular strain; o Bruising; o Fractures; o Cuts & abrasion; o Chest congestion; o Fractures ; o Heat exhaustion; etc. 	X	X	X	X	<ul style="list-style-type: none"> ➢ Chest congestion from dust inhalation; ➢ Puncture wound on foot due to stepping on nails; ➢ Noise; etc. 	3x2=6	Task specific HIRA; Competent Management; Competent Supervision; Safe systems of work; Medical certificates of fitness; Solidly barricade, post safety signage & awareness symbols; HSE trainings; Wear required PPE; Visible supervision; etc.	1x2=2	1

11.	Annexures
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11.1.	Annexure A: Contractors Health and Safety Declaration
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CONTRACTORS HEALTH AND SAFETY DECLARATION FOR TENDERS

PROJECT NAME: Department of Education: Mandeni Primary School - Storm Damage Disaster Programme Phase 16.

WIMS NUMBER:- 054839

CLIENT: KwaZulu-Natal Province: Public Works & Infrastructure

INTRODUCTION

In terms of Construction Regulation 5(1) (h) of the Construction Regulations of February 2014 a Contractor may only be appointed to perform construction work if the Client is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of February 2014. In line with this requirement the Contractor is required to read through this document carefully, sign it and submit it with his/her Tender.

DECLARATION

I, the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act, Act 85 of 1993, Construction Regulations of February 2014 and Client's Site-specific Health and Safety Specification attached in the tender document.

1. I, hereby declare that my Company and its Employees has the necessary competency and resources to safely carry out the construction work under this contract in compliance with the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification.
2. I, hereby confirm that adequate provisions has been made in my tender to cover the cost of all Safety, Health and Environmental duties and responsibilities imposed on me by the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Site-specific Health and Safety Specification.
3. I, confirm that I may not commence with any part of construction work under the contract until the Client has approved my OH&S Plan in writing.
4. I, hereby confirm that copies of the following documentation will be kept on site for viewing and inspection purposes for the duration of the construction work:
 - a) Client's Site-Specific Health and Safety Specification,
 - b) Approved Construction Occupational Health and Safety Plan,
 - c) Occupational Health and Safety Act, Act 85 of 1993,
 - d) Construction Regulations of February 2014,
 - e) Asbestos Abatement Regulations 2020, and
 - f) Any other documentation as specified in the SSHSS or as required by the CHSR.
5. I, agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 and Construction Regulations 2014, and accept that my tender will be rejected.

Signature: _____
 (Person duly authorised to sign on behalf of Tenderer)

Date: _____

11.2

ANNEXURE B: Risk Profile

ITEM
PURE RISK
RESIDUAL RISK

Item	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	+
1. Site Establishment	█																				
2. Alteration and Demolitions (<i>asbestos roof removal</i>)	█	█	█	█	█	█	█	█													
3. Concrete, Formwork, Reinforcement	█	█	█																		
4. Masonry	█	█																			
5. Waterproofing	█	█	█	█																	
6. Roof Coverings	█	█	█	█	█	█	█	█													
7. Carpentry and Joinery	█	█	█	█	█																
8. Plastering	█	█																			
9. Paint Work Floor Coverings	█	█	█																		
10. Ceilings and Partitions	█	█	█	█																	
11. Flooring	█	█																			
12. Ironmongery	█	█																			
13. Plumbing	█	█	█																		
14. Glazing	█	█																			
15. External Works	█	█																			
16. Electrical Installation	█	█	█	█																	
17. De-establishment and waste disposal.	█	█	█	█	█																
18. Total =																					

11.3. Annexure C: Structure of SSHSP submitted for approval and SSHSF layout requirement.

<u>Number</u>	<u>Item</u>	<u>To be submitted with SSHSP for approval</u>	<u>Comments</u>
1.	INDEX	Yes	None
2.	SSHSP Approval Letter and Appointment letter	No	To be filled in SSHSF after issuing by CHSR
3.	Letter of Good Standing	YES	To be kept up to date and filled in SSHSF
4.	Notification of Construction Work	No	To be submitted to DEL for recording, stamped copy forwarded to Client before SHE Plan Approval Letter will be issued. No work will be able to commence until letter has been issued including Site Establishment work. To be filled in the SSHSF
5.	Signed and dated SHE Management Plan	Yes	To be filled in SSHSF
6.	Organogram	Yes	To be placed on the SSHSF, kept updated
7.	Signed and dated Health and Safety Policies	Yes	To include communication Register and filled in SSHSF
8.	Site Layout Plan	Yes	To be kept updated and filled in SSHSF
9.	Signed and dated Emergency Plan	Yes	To be kept updated and filled in SSHSF
10.	Signed and dated Environmental Management Plan	Yes	To be kept updated and filled in SSHSF
11.	Signed and dated Personal Hygiene and Infectious Disease Management Plan.		To be kept updated and filled in SSHSF.
12.	Signed and dated Fall Prevention Plan	Yes	To be reviewed prior to work being conducted and filled in SSHSF with communication record.
13.	Demolition Plan	N/A	To be submitted to CHSR and Structural Engineer for approval before work commences and filled in SSHSF with communication record.
14.	Two signed and dated risk assessments of priority risks as per the risk profile	Yes	To be submitted with SSHSP for evaluation. To filed in SSHSF and reviewed prior to work being conducted.
15.	Two signed and dated Method Statements/ Safe Work Method Statements for the two priority risk assessments as per item 11.	Yes	To be submitted with SSHSP for evaluation. To filed in SSHSF and reviewed prior to work being conducted.
16.	Risk assessments and Method Statements.	No	To be kept on SSHSF with communication records
17.	Daily Safe Task Instruction (DSTI)	No	To be signed off at the start and end of shift with communication record, to be kept in SSHSF.
18.	Induction Course	No	To be reviewed, kept updated and include communication record register. Filled in SSHSF.

19.	Toolbox talks	No	To include communication register and filled in SSHSF.
20.	PPE Issue Record	No	To include training in correct use etc and filled in SSHSF.
21.	Sub – Contractor Monthly Audit records	No	To be discussed at SHE Committee meeting, closed out and kept on SSHSF.
22.	External Audit Reports	No	To be discussed at SHE Com Meetings, Internal Meetings etc and filed in SSHSF.
23.	Self-Audit Format	yes	To be completed on a monthly basis, forwarded to team members at least 7 days before progress meeting, to report on close out at the meeting. Filed on the SSHSF.
24.	Sub- Contractor Appointments and scope and list	No	To be kept on SSHSF
25.	Section 37(2) Agreements	No	To be kept on SSHSF.
26.	Copy of Construction Regulations 2014	No	To be kept on SSHSF.
27.	Construction Work Manager [CR 8(1)]	Yes	Including CV / Proof of Competency. To be kept in the SSHSF.
28.	Assistant Construction Manager [CR 8(2)]	Yes, if applicable	Including CV / Proof of Competency. To be kept in the SSHSF.
29.	CSHE Officer [CR 8(5)]	Yes	Including CV / Proof of Competency and SACPCMP Registration. To be kept in SSHSF.
30.	Construction Work Supervisor [CR 8(7)]	Yes	Including CV / Proof of Competency. To be kept in SSHSF.
31.	Assistant Construction Work Supervisor [CR 8(8)]	Yes, if applicable.	Including CV / Proof of Competency. To be kept in SSHSF.
32.	Risk Assessor [CR 9 (1)]	Yes	Including CV / Proof of Competency. To be kept in SSHSF.
33.	Fall Prevention Planner/ Developer [10 (1)(a)]	Yes	Including CV / Proof of Competency. To be kept in SSHSF.
34.	Temporary Works Designer (CR 12(1))	N/A	Including CV / Proof of Competency. To be kept in SSHSF.
35.	Temporary Works Supervisor (CR 12(2))	N/A	Including CV / Proof of Competency. To be kept in SSHSF
36.	Excavation Supervisor [CR 13(1)(a)]	No	Including CV / Proof of Competency. To be kept in SSHSF
37.	Demolition work Supervisor [14(1)]	N/A	Including CV / Proof of Competency. To be submitted with Demolition Plan. To be kept in SSHSF
38.	Scaffold Supervisor [CR 16(1)]	No	Proof of Competency. To be kept in SSHSF
39.	Scaffold Erector [CR 16 (2)]	No	Proof of Competency. To be kept in SSHSF
40.	Scaffold Inspector [CR 16(2)]	No	Proof of Competency. To be kept in SSHSF
41.	Suspended Platform Supervisor [CR 17(1)]	N/A	Proof of Competency. To be kept in SSHSF
42.	Material Hoist Inspector [CR 19(8)(a)]	N/A	Proof of Competency. To be kept in SSHSF
43.	Bulk Mixing Plant Supervisor [CR 20(1)]	N/A	Proof of Competency. To be kept in SSHSF
44.	Construction vehicle and Mobile Plant Operator [CR 23(1)(d)]	No	Proof of Competency, medical fitness etc. To be kept in SSHSF

45.	Crane Supervisor [CR 22(a)]	N/A	Proof of Competency, medical fitness. To be kept in SSHSF
46.	Temporary Electrical Installation Inspector [CR 24(d)]	No	Proof of Competency. To be kept in SSHSF
47.	Stacking and storage Inspector [CR 28 (a)]	No	Appointment, to be kept in SSHSF
48.	Fire Equipment Inspector [CR 29(h)]	No	Including basic Fire Fighting Training proof of competency
49.	Fire Team Member [CR 29 (i)]	No	Including basic Fire Fighting Training proof of competency
50.	Portable Electrical Equipment Inspector (EMR 9)	No	Appointment to be kept in the SSHSF
51.	Accident Incident Investigator [GAR 9(2)]	Yes	Including CV / Proof of Competency. To be kept in SSHSF
52.	First Aider [GSR 3(4)]	No	Including at least Level 2 First Aid Competency. To be kept in the SSHSF
53.	Welding/Flame cutting equipment Inspector (GSR 9)	N/A	Appointment to be kept in the SSHSF
54.	Ladder Inspector [GSR 13 (a)]	No	Appointment to be kept in the SSHSF.
55.	Hazardous Chemical Substances Supervisor [HCSR 3(3)]	No	Appointment to be kept in the SSHSF.
56.	Hand Tool Inspector [Sec 8(2)(a)]	No	Appointment to be kept in the SSHSF.
57.	SHE Representative (Sec 17)	No	Including proof of Competency. To be filled in SSHSF
58.	Sub-Contractor [CR 7(1)(c)]	No	As per applicable legislative requirements
59.	Electrical Contractor (EIR 6)	No	Including proof of Professional Registration
60.	Registered Asbestos Removal Contractor [AR 21(1)(i)]	N/A	Proof of registration with DOL, SHE Plan to be submitted to DEL with Notification. Signed off by AIA and CHSR.
Registers as required by scope of work, equipment, facilities etc.			

By virtue of the appointee's signature, he /she acknowledges that they have received a copy of this document and understands the contents thereof. They also acknowledge that should there be any part of this document which needs clarification the onus lies with the appointee to engage with the appointed CHSR to obtain such clarification.

Organisation	Designation	Initials and Surname	Signature	Date

PLEASE NOTE THAT THESE CHECKLISTS ARE ONLY APPLICABLE FOR THE CONSTRUCTION PHASE OF THIS PROJECT AND MUST BE INSERTED WHEN THE SHE SPECIFICATION AND BASELINE RISK ASSESSMENT IS FINALISED AND HANDED TO THE PRINCIPAL CONTRACTOR FOR THE DEVELOPMENT OF HIS SITE-SPECIFIC HEALTH AND SAFETY SPECIFICATION.



KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 7
HEALTH AND SAFETY BILL OF QUANTITIES

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p><u>PRELIMINARIES</u></p> <p><u>OCCUPATIONAL SAFETY & HEALTH</u></p> <p>Part 1 General</p> <p>1.1 Preparation and submission of safety and health</p> <p>The preparation and submission of the Safety and Health Plan comprising with but not limited to;</p> <p>a. Description of project b. Site project Organisation structure c. Arrangements for controlling significant site risks</p> <p>1.2 The Safety and Health Committee</p> <p>Conduct HSE meetings and inspections during the duration of the contract as below;</p> <p>a) HSE Safety committee meetings monthly for the duration of the contract. b) Site Safety and Health inspection for the workplace (once a month) for the duration of the contract.</p> <p>To Collection</p>	Item			
		No.			
		No.			

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>1.3 Construction Health and Safety Officer</p> <p>Full time competent Construction Health and Safety Officer for the entire duration of the contract</p> <p>1.4 Medical Examinations (Annexure 3)</p> <p>Conduct health fitness by a medical officer at least on yearly basis to ensure their operator/workers are in good health before and during their engagement in the period of contract.</p>	Item			
	To Collection				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>1.5 Personal Protective Equipment</p> <p>Provide, maintain and replace any damage personal protective equipment as per specification to all employees.</p> <p>Provide, maintain and replace any damaged items of the following personal protective equipment during the construction period.</p> <p>a) Eye and face protection b) Fall protection (Harnesses, lanyards, lifeline, safety belt) c) Foot protection (Safety shoes/boots) d) Hand protection (suitable glove - pair) e) Head protection (safety helmet) f) Hearing protection g) Respiratory protection h) Protective clothing (minimum 2 per person) i) Protection against radiant energy (filter lenses) j) Others (please specify)</p> <p>1.6 Safety and Health Training & Briefing</p> <p>Conducting briefings and induction course to each worker and any related courses that required for the entire project.</p> <p>Plan and conduct relevant safety and health training plan as per site requirement.</p> <p>a) Site safety and health induction course for site personnel. b) Site health and safety induction for approved visitors. c) Firefighting. d) Emergency preparedness, respond and evacuation. e) Tool box meetings/briefing (once a week at site). f) Others (please specify)</p> <p>To Collection</p>	<p>Item</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>No.</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p>			

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>1.7 Hazards Identification Risk Assessment And Risk Control (HIRARC)</p> <p>Prepare and undertake Hazards Identification, Risk Assessment and Risk controls (HIRARC) for all construction activities.</p> <p>1.8 Monthly Report</p> <p>Printing/copying, papers, inks, binding or related cost in providing the monthly report within the contract period inclusive of any investigation expertise.</p> <p>1.9 Notification of Accidents, Dangerous Occurrences, Occupational Diseases</p> <p>Provision for Accident / Incident Investigation Report inclusive for the cost to engage if there is any third parties involve (competent person) to investigate any accident at workplace.</p> <p>1.10 General Signage</p> <p>Safety signage in the workplace to ensure the workers and the public are aware about safety within the environment of the project.</p> <p>Provide, install and maintain the following standard signage</p> <p>a) Keep Site Clean b) No Open Fires / Burning c) Emergency exit routes d) Any other safety signs as instructed and approved by the S.O. (please specify)</p> <p>1.11 Site Safety and Health Information Board</p> <p>Provide at least one (1) information board to update any HSE information to the employee at worksite.</p> <p>Provision and maintenance of Safety and Health information board including regular updating of safety and health information.</p> <p>To Collection</p>	<p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p> <p>Item</p>			

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>1.12 First Aid Facilities</p> <p>A trained first-aider for any minor accident and first aid arrangement in case of any accidents at the workplace. This includes providing complete set of first aid kit for office within the period of contract. Requirement to be as set out in the OHS Act One qualified First Aider appointed where more than 10 persons are employed. One additional First Aider for every 50 persons employed</p> <p>a) To provide suitable trained person to attend first-aid treatment.</p> <p>b) To provide and maintain first aid kit.</p> <p>1.13 Portable Fire Extinguisher</p> <p>Provide enough fire extinguishers at the workplace. The locations of the fire extinguishers include the site office, quarters and standby for any not works activities within the contract period. The cost also includes the maintenance and training of the use of equipment. At least one unit for office, two units for each quarters and one unit standby for hot work area.</p> <p>Provision and maintenance of approved fire extinguisher to be provided for around each 200m² of floor space with a minimum of one per floor at designated area.</p>	<p>Item</p> <p>No.</p> <p>Item</p>			
	<p>To Collection</p>				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<u>Part 1 General - Collection</u>				
	From Page 1				
	From Page 2				
	From Page 3				
	From Page 4				
	From Page 5				
	To Summary				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	Part 2 Amenities and Facilities (Construction Site)				
	2.1 Toilets				
	Provide, maintain and the dislodging of toilets for workers. Toilet shall be connected to a sewer / temporary septic tank with the approval of the relevant competent authority. Contractor shall estimate the number of workers for entire project and at least 1 toilet per every 30 workers. For every 100 workers, there should be 4 numbers of toilet.	Item			
	2.2 Temporary Structures and Sanitary conveniences at construction worksites				
	Temporary site office with adequate lighting and ventilation.	Item			
	Sanitary facilities in the ratio of 1 water closet, 1 shower and 1 wash basin for every 25 workers or less shall be provided. The toilet facilities shall be connected to a sewer/temporary septic tank.	Item			
	2.3 Temporary rest area				
	Provide and maintain rest area for the workers and site staff with safe area, ventilated and lighted.	Item			
	2.4 Lighting				
	Provide adequate lighting in dark environment at work areas, access and egress. Note: Dark environment with inadequate lighting (access to upper floor, tanks, any confined space, etc.).	Item			
	2.5 Ventilation				
	Provide mechanical ventilator in areas where natural ventilation is not possible and in accordance to the specification. Areas which requires constant air circulation which involves fumes and smoke e.g. generator, welding activities, confine space, etc.	Item			
	To Summary				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
Part 3 Prevention of fall at Workplace					
3.1 Unprotected Sides and Edges					
A	Supply, install and erect guardrail, barricade and toe board (where required) to exposed edges / openings but not limited to: a) Bridge work b) Working platform c) Loading platform	Item			
B	Provide, install and maintain temporary hand railings to the stairs use as an access and egress.	Item			
C	Provision of providing temporary closure by using sufficient thick and strong material for any floor openings where when erecting guardrail / barricade are not suitable.	Item			
3.2 Safety nets					
D	Install and maintain safety net as close as possible to the working level. Should it be on the outside of the structure, the outer edges should be higher that the inner edge. Contractor to calculate the area to be close/cover base on the proposed design of the bridge.(if applicable)	Item			
3.3 Individual fall arrest systems					
Fall arrest systems must be provided for every workers working at height above 1.8m. Double lanyards to be equipped on the safety harness.					
E	Provide, anchor /install and maintain individual fall arrest systems that includes : a) Inertia reel systems; b) Safety harness; c) Lanyards; and d) Static lines	Item			
To Collection					

Item	Description	Unit	Qty	Rate (R)	Amount (R)
A	<p>3.6 Ladders</p> <p>Supply, install and maintain suitable lockable step ladder spreader bars on both sides connected to the front and rear stiles. All ladders must be specified with its certification standards.</p> <p>3.7 Scaffolding for Temporary Working Platform, Access and Egress</p> <p>Scaffold board should not be less than 225mm wide. Working platforms for men without materials or only for passage of materials must be 500mm width. For men and materials provided there is 800mm width, provided there is 430mm left clear for the passage of men or 600mm if barrows are used. Toe-board must be fitted in conjunction with all guard rails, a minimum height of 150mm.</p>	Item			
B	<p>Erect, maintain and dismantle suitable scaffolding for temporary working platform including access and egress.</p>	Item			
C	<p>3.9 Safety Signage</p> <p>Provide safety signage for all the above items.</p> <p>Provision for the following but not limited to:</p> <ul style="list-style-type: none"> a) Beware of falling objects b) Safety harness c) Safe access or egress d) Openings and apertures e) Rubbish chute operation and limitations f) Others (please specify) <p>To Collection</p>	Item			

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>Part 4 Electrical</p> <p>4.1 Reports</p> <p>A Submission of regular safety inspection and maintenance reports on electrical distribution box, switch box, temporarily wiring and generator set both indoors and outdoors on weekly basis.</p> <p>4.2 Electrical Safety Signage</p> <p>Provide electrical safety signs at workplace to ensure workers and public aware about electrical safety within the contract period.</p> <p>Provide, install and maintain the following approved 300mm x 400mm safety warning signs but not limited to :</p> <p>B a) BEWARE ELECTRICITY C b) USE ELECTRICITY SAFELY D c) USE SAFE ELETRICAL TOOLS E d) BEWARE OF OVERHEAD CABLE F e) Others (please specify)</p> <p>4.3 Inspection of equipment</p> <p>G Inspection of all electrical tools and equipment prior to their first use at site and throughout the contract period.</p>	Item			
	To Summary				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	Part 5 Hazardous Chemicals and Materials				
	5.1 Chemical Health Risk Assessment				
A	a) Prepare a Chemical Register for all hazardous chemical to health used in the place of work inclusive of updating during the contract period.	Item			
B	b) Carry out Chemical Health Risk Assessment by a registered assessor.	Item			
C	c) Develop control measures and policies to ensure the hazardous chemical to health are handled and used safely inclusive of updating during the contract period but not limited to : i. Handling ii. Correct and safe storage iii. Transportation procedure iv. Disposal procedure include schedule waste	Item			
	5.2 Labeling and Storage				
D	Provision of labeling, control and safe storage area for hazardous material at site to the requirement of the authority.	Item			
	5.3 Personal Protective Equipment				
E	Suitable PPE for handling hazardous chemical at workplace as per OHS Act	Item			
F	Provide the following PPE for visitors/inspectors and other personnel working with hazardous chemical but not limited to:				
E	i. Goggles	No.			
F	ii. Mask	No.			
G	iii. Gloves	No.			
H	iv. Suitable full face mask (where necessary)	No.			
I	v. Protective clothing (where necessary)	No.			
	5.4 Waste Disposal				
	The cost for handling any chemical waste as required including proper arrangement by the approved contractor (third party).				
J	Handle, transport and disposal of schedule waste by licensed / approved contractor to the requirement of the authority.	Item			
	To Collection				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>5.5 Chemical Safety Signage</p> <p>A All related safety signage in handling hazardous chemicals at the workplace as per OHS Act. Safety signage needs to be installed at the designated chemical area.</p> <p>Provide, install and maintain the following approved 300mm x 400mm safety warning signs but not limited to :</p> <p>a) USE SUITABLE FACE MASK b) USE SUITABLE GLOVES c) WARE SUITABLE CLOTHINGS d) BEWARE OF HADZADOUS MATERIAL e) USE SUITABLE GOGGLES f) Any other signs related to chemical safety</p> <p>5.6 Hazardous chemical training and handling</p> <p>B Provisions to provide the following:</p> <p>a) Training of hazardous chemicals on site b) Monitoring of exposure hazardous chemical on site c) Health surveillance for workers expose to the hazardous chemical on site</p>	Item			
	To Collection				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<u>Part 5 Hazardous Chemicals and Materials - Collection</u>				
	From Page 12				
	From Page 13				
	To Summary				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p>Part 6 Plants</p> <p>A 6.1 Compile and maintain on a monthly basis all inspection records for plants but not limited to :</p> <p>a) Mobile and rigging equipment b) Pilling equipment c) Portable mechanical powered fastening tools d) Scaffold e) Compressor and Pressure Vessel f) Dozer, motor grader, etc.</p> <p>Note: The cost for printing/copying, papers, inks, binding, files or related cost in providing and maintaining all inspection records during the contract period.</p> <p>B 6.2 Provision of designated personnel</p> <p>a) Provide for trained and appointed personnel to operate the equipment in allowed for in 6.1</p> <p>C 6.3 Communication</p> <p>a) Provide for all radio equipment to safely operate all plant and machinery on site where required</p> <p>6.4 Inspection</p> <p>D Inspection by authorised inspector (third party) at least once (1) per year</p> <p>Arrange inspection and approval of special plants, tools and before use at site for :</p> <p>a) Air compressor b) Pilling equipment c) Mobile crane d) Any others</p>	Item			
	To Summary				

7.2 Traffic movement within site				
The cost to ensure safety and proper traffic management at workplace by providing all the following items within the contract period.				
E	a) Provision for planning of safe traffic movement within the site.	Item		
F	b) Provision of flagman to control and regulate the movement of site traffic / vehicle within, going out and coming into the site.	Item		
To Collection				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	7.2 Traffic movement within site				
A	c) Provision of the following to be used by the worker and flagman but not limited to : i. Reflective safety vest. ii. Dust mask iii. Traffic control baton light iv. Flags (Both Green and Red flags) v. Any other suitable PPE	Item			
B	Provide all road traffic signage	Item			
	Accommodating traffic and maintaining temporary deviations	Item			
	Provision of other traffic control measures, as instructed by the Engineer	Prov sum			
	7.3 Excavations (more than 1.5m deep)				
	The cost to ensure safety and proper arrangement for any excavation activities at workplace by providing all the following items within the contract period. Minimum one (1) no. per item when the excavation is more than 1.5m deep.				
C	a) Provision for the designing of safe strutting for deep excavation work by professional.	Item			
D	b) Provision for the competent / designated person to supervise the excavation work.	Item			
E	c) Provision for the protection and barricading the excavated work.	Item			
F	d) Provide, install and maintain an approved hazard warning lights for the excavated area during the night.	Item			
G	e) Provide, install and maintain approved warning signage	Item			
	To Collection				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
Note : Applicable for demolition works only					
7.4 General Demolition Works					
Ensure safety and proper arrangement of the demolition activities by providing all the following items within the contract period or for the demolition works. Minimum one (1) no per item is required.					
A	a) Provision of planning for safe demolition work, stage by stage, including the safety of adjoining structure for the approval of the local authority.	Item			
B	b) Provision of inspection and supervision of demolition work by competent person.	Item			
C	c) Provision of adequate notice before demolition work as required by the local authority.	Item			
D	d) Provision for the suppression of dust to the approval limit of the local authority.	Item			
E	e) Provide, install and maintain all safety warning signage	Item			
F	f) Provision of approved netting for prevention of uncontrolled fall of demolishing material.	Item			
G	g) Provide, install and maintain approved barricade / fencing for preventing unauthorised entry for the whole duration of the demolition work.	Item			
H	h) Provision of security personnel at strategic locations during the demolition operation.	Item			
I	i) Provision of noise monitoring and testing.	Item			
To Collection					

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<u>Part 7 Special Work Situations - Collection</u>				
	From Page 16				
	From Page 17				
	From Page 18				
	From Page 19				
	To Summary				

Item	Description	Unit	Qty	Rate (R)	Amount (R)
	<p><u>OCCUPATIONAL SAFETY & HEALTH Summary</u></p> <p>From Page 6 - Part 1 General</p> <p>From Page 7 - Part 2 Amenities and Facilities</p> <p>From Page 10 - Part 3 Prevention of fall at Workplace</p> <p>From Page 11 - Part 4 Electrical</p> <p>From Page 14 - Part 5 Hazardous Chemicals and Materials</p> <p>From Page 15 - Part 6 Plants</p> <p>From Page 20 - Part 7 Special Work Situations</p>				
	<p>To Bill No. 1 Summary</p>				



KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 8
BUILDERS LIEN AGREEMENT

WAIVER OF CONTRACTOR'S LIEN

DEFINITIONS

Contractor: _____

Employer: Head: Public Works (KZN Department of Public Works: Province of KwaZulu-Natal)

Agreement: GCC FOR CONSTRUCTION WORKS - SECOND EDITION 2010

Works (description): **DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16: ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

Site: **GPS CO-ORDINATES: 29°07'39"S 31°24'20"E (S29.1275; E31.40555)**

AGREEMENT

The Contractor waives, in favour of the Employer, any lien or right of retention that is or may be held in respect of the Works to be executed on the Site

Thus done and signed at _____ on _____
[Date]

Name of signatory

Capacity of signatory

As witness

For and on behalf of the contractor who by signature hereof warrants authorisation hereto



KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 9
EPWP EMPLOYMENT CONTRACT AND EPWP
SPECIFICATION/CHECKLIST



(Insert Your Company Logo)

(This shall serve as the cover page on employment contracts for local labour)

EMPLOYMENT AGREEMENT

BETWEEN

[CONTRACTOR NAME].....

AND

[WORKER NAME].....

1. PARTIES

The Parties to this Agreement are -

1.1. Contractor: _____
herein represented by: _____
duly authorised thereto

And

1.2. Mr / Me: _____
[worker's name]

2. DEFINITIONS AND INTERPRETATION

2.1. In this Agreement and any Annexure thereto, unless inconsistent with or otherwise indicated by the context-

“Agreement”	means the contents of this Agreement.
“Company”	means the company that employs the worker
“Department”	means the Department of Public Works
“Worker”	is a person that performs a specific or necessary task or who completes tasks in a certain way
“EPWP”	The Expanded Public Works Programme is a government programme aimed at the alleviation of poverty and unemployment. The programme ensures the full engagement on Labour Intensive Methods of Construction (LIC) to contractors for skills development. The EPWP focuses at reducing unemployment by increasing economic growth by means of improving skills levels through education and training and improving the enabling environment for the industry to flourish.

3. PURPOSE

The purpose of this agreement is to:-

Ensure that the agreement is binding to both the Worker and the Employer.

4. TERMS AND CONDITIONS

- The worker will have no entitlement to the benefits of a full time employee, namely;

- The worker should not have the expectation that this contract will be renewed or extended.
- The worker will be subject to all laws, rules, policies, codes and procedures applicable to the;

- The worker must meet the standards and requirements of the contractor
- The worker must render his/her services during normal working hours of minimum of forty to fifty five hours in any week; which comprise of an eight-hour working day in a five-day week.

5. REMUNERATION

The worker will receive compensation to the amount of R_____00 which must be paid by the 25th or on the last day of each month.

6. ROLES AND RESPONSIBILITIES

6.1 Employer / Worker

- Work for _____ in terms of the period as specified in the employment agreement contract.
- Be available for and participate in all learning and work experience required by the company.
- Comply with workplace policies and procedures.
- Complete any attendance or any written assessment tools supplied by the contractor to record relevant workplace experience.
- Demonstrate willingness to grow and learn through work experience.

Provide the following documentation to the employer,

- Certified identity document not longer than 3 months
- ID size photos
- Sign employment contract

6.2 Employer

- Employ the worker for a period specified in the agreement.
- Provide the worker with appropriate work based experience in the work environment.
- Facilitate payments of wages / stipends.
- Keep accurate records of workers.
- Where a worker/ learner is disabled, the employer will have to provide in the additional needs e.g. special materials, learning aids and in some cases physical or professional support (such aids remain the property of the employer).
- Keep up to date records of learning and discuss progress with the intern on a regular basis.
- Apply fair disciplinary, grievance and dispute resolution procedures to the worker.
- Prepare an orientation/ induction course to introduce worker/ learner to the workplace and specific workplace requirements.
- Ensure the daily attendance register is signed by the worker.

7. DURATION.

This agreement commences on:

and

expires on:

8. BREACH.

If either party commits any breach of the terms of this contract (and fails to rectify it within 30 days of receipt of a written notice calling it to do so, then) the other party shall be entitled to terminate the contract or to claim specific performance without prejudice to any of its other legal rights, including its rights to claim damages.

9. CONDITIONS OF EMPLOYMENT

9.1. Meal Breaks

9.1.1 A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.

9.1.2 An employer and worker may agree on longer meal breaks.

9.1.3 A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break.

9.1.4 A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.

9.2. Special Conditions for Security Guards (Only applicable to security Guards)

9.2.1 A security guard may work up to 55 hours per week and up to eleven hours per day.

9.2.2 A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.

9.3. Weekly Rest Period

Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work").

9.4. Work on Sundays and Public Holidays

9.4.1 A worker may only work on a Sunday or public holiday to perform emergency or security work.

9.4.2 Work on Sundays is paid at the ordinary rate of pay.

9.4.3 A task-rated worker who works on a public holiday must be paid;

- (a) the worker's daily task rate, if the worker works for less than four hours;
- (b) double the worker's daily task rate, if the worker works for more than four hours.

9.4.4 A time-rated worker who works on a public holiday must be paid

- (a) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday;
- (b) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.

9.5 Sick leave

9.5.1 Only workers who work more than 24 hours per month have the right to claim sick-pay in terms of this clause.

9.5.2 A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a contract.

9.5.3 A worker may accumulate a maximum of twelve days' sick leave in a year.

9.5.4 Accumulated sick-leave may not be transferred from one contract to another contract.

9.5.5 An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.

9.5.6 An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave.

9.5.7 An employer must pay a worker sick pay on the worker's usual payday.

9.5.8 Before paying sick-pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is

- (a) absent from work for more than two consecutive days; or
- (b) absent from work on more than two occasions in any eight-week period.

9.5.9 A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.

9.5.10 A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.

9.6. Maternity Leave

- 9.6.1 A worker may take up to four consecutive months' unpaid maternity leave.
- 9.6.2 A worker is not entitled to any payment or employment-related benefits during maternity leave.
- 9.6.3 A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work.
- 9.6.4 A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so.
- 9.6.5 A worker may begin maternity leave as follows;
- (a) four weeks before the expected date of birth; or
 - (b) on an earlier date
 - (i) if a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or
 - (ii) if agreed to between employer and worker; or
 - (c) on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health.
- 10.6 A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth.

9.7. Family responsibility leave

9.7.1 Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances;

- (a) when the employee's child is born;
- (b) when the employee's child is sick;
- (c) in the event of a death of
 - (i) the employee's spouse or life partner;
 - (ii) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.

9.8. Keeping Records

9.8.1 Every employer must keep a written record on site for the duration of the project and three (3) year after completion records should consists of at least the following;

- (a) the worker's name and position;
- (b) copy of an acceptable worker identification
- (c) in the case of a task-rated worker the number of tasks completed by the worker;
- (d) in the case of a time-rated worker, the time worked by the worker;
- (e) payments made to each worker in a form of Proof of Payment, Payroll registers and the acknowledgement of payment receipt signed by the worker.

9.8.2 The employer must keep this record for a period of at least three years after the completion of the EPWP.

9.9. Payment

9.9.1 An employer must pay all wages at least monthly in cash or by cheque or into a bank account.

9.9.2 A worker may not be paid less than the Ministerial Determination wage rate.

9.9.3 A task-rated worker will only be paid for tasks that have been completed.

9.9.4 An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer.

9.9.5 A time-rated worker will be paid at the end of each month.

9.9.6 Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.

9.9.7 Payment in cash or by cheque must take place

- (a) at the workplace or at a place agreed to by the worker;
- (b) during the worker's working hours or within fifteen minutes of the start or finish of work;
- (c) in a sealed envelope which becomes the property of the worker.

9.9.8 An employer must give a worker the following information in writing

- (a) the period for which payment is made;
- (b) the numbers of tasks completed or hours worked;
- (c) the worker's earnings;
- (d) any money deducted from the payment;
- (e) the actual amount paid to the worker.

9.9.9 If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.

9.9.10 If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

9.10. Inclement weather

If no work has begun on site, and if an employee has reported for work, the employee will be paid for four hours. Should work be stopped after the first four hours, the employee will be paid for the hours worked. Where the employer has given employees notice on the previous working day that no work will be available due to inclement weather, then no payment will be made.

9.11. Deductions

9.11.1 An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.

9.11.2 An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay.

9.11.3 An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement of Law; court order or arbitration

9.11.4 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Unemployment Insurance Fund Contributions Act, 2002 (Act No. 4 of 2002)

9.11.5 An employer may not require or allow a worker to

- (a) repay any payment except an overpayment previously made by the employer by mistake;

- (b) state that the worker received a greater amount of money than the employer actually paid to the worker; or
- (c) pay the employer or any other person for having been employed.

9.12. Health and Safety

9.12.1 Employers must take all reasonable steps to ensure that the working environment is healthy and safe.

9.12.2 A worker must;

- (a) work in a way that does not endanger his/her health and safety or that of any other person;
- (b) obey any health and safety instruction;
- (c) use any personal protective equipment or clothing issued by the employer;
- (d) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

9.13. Compensation for Injuries and Diseases

9.13.1 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993 as amended by COIDA Act 61, 1997.

9.13.2 A worker must report any work-related injury or occupational disease to their employer or manager.

9.13.3 The employer must report the accident or disease to the Compensation Commissioner.

9.13.4 An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

9.14. Termination

9.14.1 The employer may terminate the employment of a worker for good cause after following a fair procedure.

9.14.2 A worker will not receive severance pay on termination.

9.14.3 A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement.

Project name:

Project Employment Data Management and Reporting Requirements – to be included in the tender documents for the Department of Public Works

NB: All information, documents and files stated herein must be available for Auditor

No.	Information / Document	Comments
1	Monthly Reports	
1.1	<p>Monthly reports to be submitted in the specified Employment Data Collection Form</p> <ul style="list-style-type: none"> This is a monthly schedule where monthly attendance, training and other aspects of participants (labourers) is summarised. The Employment Data Collection Form must provide credible data that corresponds with the Payroll Register and Proof of payment. 	
1.2	<p>Payroll Register</p> <ul style="list-style-type: none"> Which is a list of each participant (labourer) who was paid for each month and which would include the amount of the wage paid. 	
1.3	<p>Proof of payment</p> <ul style="list-style-type: none"> Which is a download from the payment system or a bank statement reflecting all participants paid and the amounts paid 	
1.4	<p>Payment Register/Pay sheet signed by workers</p> <ul style="list-style-type: none"> Where proof of payment is not available, a payment register must be submitted. This is a schedule where participants sign as an acknowledgement of receipt of wages for the number of days worked at a stipulated daily rate. . 	
1.5	<p>ID size photos</p> <ul style="list-style-type: none"> Every participant must have an ID size photo taken within the first month of employment and photo to be supplied to the Department. 	
2	Records to be filed and updated monthly on site	



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Creating opportunities towards human fulfilment

No.	Information / Document	Comments
2.1	Identity Document (ID) copies <ul style="list-style-type: none">• Every new (at the beginning of employment) participant to provide a certified South African ID copy that is not older than 3 months	
2.2	Daily attendance register showing full name and gender (To correspond with Proof of payment and payroll register and monthly report in the Data Collection Form)	
2.3	Employment Contracts indicating date signed by both the employer and the employee and witnesses if applicable	
2.4	Payslips for all payments made to participants indicating the number of days worked	
2.5	Document where beneficiaries completed / provided their bank account details	
2.6	Completed Beneficiary/participants list-simplified form	
2.7	Project coordinates	
2.8	Project progress report	
3	Training	
3.1	Training attendance registers for ALL training attended by participants Number of training days and Training should be reported as follows; <ol style="list-style-type: none">1. Number of people trained2. Number of people that received accredited training3. Number of people that received non-accredited training4. Profile of the participants (Women, Disabled, Youth)5. Percentage of participants who worked on the project after receiving training.	As and when training is provided
4	UIF	
4.1	Evidence to confirm that UIF for participants has been paid for the employment duration	
5	COIDA	
	Evidence that the participants of the project are included in the Employers monthly provisions for COIDA.	

No.	Information / Document	Comments
	Evidence that the Employer paid the relevant contributions as required by the Compensation Commissioner.	
6	COMMUNITY LIASON OFFICER (CLO)	
	<p>UTILISATION OF A COMMUNITY LIAISON OFFICER</p> <p>The Contractor shall allow for and pay any and all costs necessary for the engagement of the services of a Community Liaison Officer (CLO) for the full duration of this contract</p> <p>A CLO will be identified by the local structures (Project Steering Committee) of the ward areas and appointed following fair and transparent interviewing process, to be conducted in the presence of local structures and the contractor representative, in order to assist the Contractor in the procurement of any local labour, etc. required for this project. The Contractor is to liaise with the CLO and afford him any assistance needed in ensuring sound working relations with the local community.</p> <p>Key Responsibilities of the CLO are envisaged to include and not necessary be limited to:</p> <ol style="list-style-type: none"> 1. Assisting local leadership in conducting skills and resources audit which facilitates sourcing labour from within the ward or targeted areas for employment, as required by contractor <hr/> 2. Assisting in sourcing labour-only domestic sub-contractors and the procurement of materials from local resources, as required by the contractor. 3. Assisting the contractor by identifying areas of potential conflict and or threats to the project or to stakeholders in the project and recommend appropriate action to the contractor. 4. Assisting contractor and stakeholders in the project in the resolution of any conflict which may arise. 5. Establishing and ensuring that sufficient and open communication channels between the contractor and the work force are maintained. 6. Establish and ensuring that efficient and open communication channels between the contractor and the community are maintained 7. Identifying and reporting to the Contractor regarding issues where communication between stakeholder is necessary, recommend courses of action and facilitate such communications 	



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No.	Information / Document	Comments
	<p>8. Assisting the Contractor and the work force in the establishment of grievance procedures and necessary recommendation to the Contractor regarding the grievances and solution thereto.</p> <p>9. Attending to site meetings and project implementation meetings as required by the Contractor and prepare and submit periodic reports as may be required by the Contractor from time to time.</p> <p>10. Attending to such other duties which are consistent with the functions of a CLO, as may be required by the Contractor from time to time.</p> <p>Tenderers are to price twice the rate of unskilled local labour rate for the Community Liaison Officer (CLO) against this item for any and all costs arising out of compliance with the foregoing and in the event of a Tenderer failing to price against this item or making inadequate financial provision against this item for compliance as aforesaid, then no claim for costs or additional cost incurred will be entertained by the Head: Public Works</p> <p>F:..... V:..... T:.....</p>	



**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

ANNEXURE 10

ATTENDANCE REGISTER - INFRASTRUCTURE & OTHER PROJECTS



EXPANDED PUBLIC WORKS PROGRAMME

The Attendance Register for on-site Workers

Reporting month: _____
 Surname: _____

Cell No: _____
 First Name: _____

Project Name: **DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
 ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT**

Project Code: **033004**

Tender No **ZNTD06321W**

IDENTITY NUMBER:

Day	Date	Time In	Signature	Time Out	Signature	Report On Any Formal Training Provided In The Reporting Month
WEEK 1						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 2						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 3						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 4						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 5						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
Total Days worked						



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ANNEXURE 11

EPWP DATA COLLECTION TOOL:

- **BUSINESS PLAN**
- **WORKER TRAINING CAPTURE FORM FOR LOCAL LABOUR**
- **MONTHLY DATA COLLECTION FOR LOCAL LABOUR**
- **LOCATION**

BUSINESS PLAN

Reference No	
Profile ID	
Project Name	
Project Details	
Project Name	
Project Reference Number	
Project description	
Project Start Date	
Project End Date	
Estimated Budget	
Project Location	
Province	
District/Metro Municipality	
Local Municipality/Metro Region	
Latitude (in decimal format)	
Longitude (in decimal format)	
Public Body Details	
Public body sphere	
Reporting public body that is the project owner (and will report on the project)	
Implementing public body type	
Public body that will implement the project	
IDP reference number allocated to the project	
EPWP Details	
EPWP Sector	
EPWP Program	
EPWP Sub programme	
Budget Amount	
April 2014/March 2015	
April 2015/March 2016	
Total Budget Amount	
Wages	

UIF	
COVIDA	
Training	
Administration	
Equipment and materials	
Other	
Describe other	
Outputs and Training	
Output	
Description	
Target Quantity	
Number of persons to be trained	
Contact person	
Title	
Initials	
First Name	
Surname	
Email	
Tel (Office)	
Fax Number	
Cell Number	
Physical Address 1	
Physical Address 2	
Physical Address 3	
Physical Address 4	
Postal Address 1	
Postal Address 2	
Postal Address 3	
Postal Address 4	

KZN PUBLIC WORKS
Monthly Data collection for LOCAL Labour



Name of Contractor: _____

Project Code: **033004**

Project location name (area): _____

DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
ETHEKWINI REGION: MANDENI PS COMPLETION CONTRACT

Name of Project: _____

Reporting month: _____ Project location (Ward No.): _____

No	First Name	Initial	Surname	Beneficiary Details			Disability Y/N	Total days worked	Job description	Registered on UIF (Y/N)	Registered with COVID-19 (Y/N)	Are you receiving any Gov grants? (Y/N)	1st Language	Other Language 1	Other Language 2	Education Level (See Codes below)	Location Details			Household Details				
				D.O.B	Gender F/M	ID number											Start Date on the current month	End Date on the current month	Address	Ward No.	Cell No.	Nationality	No. of people in Household	No. of Dependents in Household
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

• Education levels – use the codes (1-3) on the excel spreadsheet
 o (1) Unknown (3) Grade 1-3 (Sub A – Sub 1)
 o (2) No School (4) Grade 4 (Sub 2) ABET 1
 (5) Grade 5-6 (Sub 3-4) ABET 2 (7) Grade 9 (Sub 7) ABET 4 (8) Grade 12 (Sub 10)
 (6) Grade 7-8 (Sub 5-6) ABET 3 (8) Grade 10-11 (Sub 8-9) (10) Post Matric

Contractor sign: _____ DPW Official/Consultant sign: _____ EPWP Official sign: _____
 Designation: _____ Designation: _____ Designation: _____
 Date: _____ Date: _____ Date: _____
 Contact no: _____ Contact no: _____ Contact no: _____

KZN PUBLIC WORKS



Worker payment capture form for LOCAL Labour

Name of Contractor: _____

Project Code: **033004**

Name of Project: **DPW: DEPARTMENT OF EDUCATION: STORM
 DAMAGE DISASTER PROGRAMME: PHASE 16:
 ETHEKWINI REGION: MANDENI PS COMPLETION
 CONTRACT**

Reporting month: _____

Payment Upload										
No.	First Name	Initials	Surname	Identify No.	D.O.B	Job Description	Daily Wage Rate	Total Paid Days	Total Amount Paid	Total days Worked Days
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Contractor sign: _____
 Designation: _____
 Date: _____
 Contact no: _____

DPW Official/Consultant sign: _____
 Designation: _____
 Date: _____
 Contact no: _____

EPWP Official sign: _____
 Designation: _____
 Date: _____
 Contact no: _____

KZN PUBLIC WORKS
Worker Training capture form for LOCAL Labour



Name of Contractor: _____
Name of Project: _____

Project Code: **033004**

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE
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MANDENI PS COMPLETION CONTRACT**

Reporting month: _____

No.	Name	Surname	ID No.	Job description	Course Name	Was training Accredited or Non - accredited by a relevant SETA	Training					Name of Training Provider	
							Start date on current month	End date on current month	Training Days Paid	Training Days Not Paid	Total Number of Training Days		Cost per trainee
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													

Contractor sign: _____ DPW Official/Consultant sign: _____ EPWP Official sign: _____
 Designation: _____ Designation: _____ Designation: _____
 Date: _____ Date: _____ Date: _____
 Contact no: _____ Contact no: _____ Contact no: _____

Location	
Locality Name	
Municipality	
Subplace	
Ward	
Government Facility	
Latitude	
Longitude	
Physical Address/Location	



KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

**DPW: DEPARTMENT OF EDUCATION: STORM DAMAGE DISASTER PROGRAMME: PHASE 16:
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ANNEXURE 12
STRUCTURAL ENGINEERS PROJECT SPECIFICATION BOOKLET

**DEPARTMENT OF EDUCATION :
STORM DAMAGED DISASTER
PROGRAMME : PHASE 16**

**TYPICAL DETAILS AND
SPECIFICATIONS BOOKLET
REV.P3**

OCTOBER 2018

PRELIMINARY

Prepared For :

LDM QS Durban (Pty) Ltd

PO Box 19233, Dormerton, Durban, 4015

Tel : +27 (31) 207 1340

Fax : +27 (31) 209 9441

Prepared By :

MAP AFRICA CONSULTING ENGINEERS

PO Box 65610, Reservoir Hills, Durban, 4090

Tel : +27 (31) 3095831

Fax : +27 (31) 3092929

e-mail : priban@mapafrica.co.za



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SECTION 1 GENERAL SPECIFICATIONS



REPAIRS TO EXISTING ROOF SHEETING

1. PREPARE AND CLEAN EXISTING SURFACE WHERE THE ROOF APPEARS TO BE LEAKING.
2. APPLY A GENEROUS COAT OF 'SIKA RAIN TITE' (OR EQUALLY APPROVED) BY BRUSH OR ROLLER.
3. EMBED THE 'SIKA RAIN TITE' (OR EQUALLY APPROVED) MEMBRANE INTO THE BASE COAT WHILE IT IS STILL WET.
4. REMOVE AND SMOOTH OUT AIR POCKETS AND CREASES.
5. APPLY A SECOND COAT OF 'SIKA RAIN TITE' (OR EQUALLY APPROVED) ONTO THE MEMBRANE.
6. WHEN TOUCH DRY, APPLY AN ADDITIONAL COAT OF 'SIKA RAIN TITE' (OR EQUALLY APPROVED).
7. REPAIRED AREA OF ROOF SHEETING TO BE PAINTED WITH 2 COATS OF PAINT. COLOUR TO MATCH EXISTING ROOF SHEETING.

NOTE: REFER TO MANUFACTURER'S SPECIFICATIONS ON 'SIKA RAIN TITE ' (OR EQUALLY APPROVED)

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: GENERAL SPECIFICATIONS: REPAIRS TO EXISTING ROOF SHEETING	DATE 2018.10.18	REVISION P2
		PROJ. No. 474	SKETCH No. Sk 100



A. ASBESTOS ROOF SHEETING

1. ANY PERSON WHO ERECTS, MAINTAINS, ALTERS, RENOVATES, REPAIRS OR DISMANTLES ASBESTOS ROOF SHEETING, GUTTERS, FASCIA BOARDS AND BARGE BOARDS SHALL ENSURE THAT:
 - a) WRITTEN WORK PROCEDURES ARE LAID DOWN AND FOLLOWED TO PREVENT THE RELEASE OF ASBESTOS DUST INTO THE ENVIRONMENT.
 - b) ALL RUN-OFF WATER MUST BE FILTERED BEFORE ENTERING THE STORMWATER SYSTEM.
 - c) FULL COMPLIANCE WITH THE DEPARTMENT OF LABOUR REQUIREMENTS IN TERMS OF THE SAFE REMOVAL AND/OR THE SAFE REPAIR (PATCHING) OF THE ASBESTOS ROOF SHEETING.
 - d) NOTIFICATION IN TERMS OF AN 'ASBESTOS PLAN' MUST BE SUBMITTED TO AN APPROVED INSPECTION AUTHORITY AND THEN TO THE DEPARTMENT OF LABOUR FOR APPROVAL PRIOR TO WORKING ON ANY ASBESTOS ROOF SHEETING.
2. IF ANY HOLES ON THE SHEETING ARE LARGER THAN 75mm X 75mm OR OTHERWISE BADLY DAMAGED OR CRACKED IN MANY AREAS OF THE SHEET, THEN THE EXISTING ASBESTOS ROOF SHEET MUST BE REMOVED AND REPLACED WITH 'NUTEC' FIBRE CEMENT ROOF SHEETING (OR EQUALLY APPROVED), PROFILE AND COLOUR TO MATCH THE EXISTING ROOF SHEETING. REFER TO ITEM 1 ABOVE FOR THE DEPARTMENT OF LABOUR REQUIREMENTS FOR THE SAFE HANDLING OF ASBESTOS SHEETING.
3. WHEN REMOVING AND REPLACING THE ENTIRE ASBESTOS ROOF SHEETING WITH 'NUTEC' ROOF SHEETING (OR EQUALLY APPROVED), ENSURE THAT THE NEW TIMBER PURLINS ARE 76 X 50 GRADE 5 TYPE SA PINE TIMBER WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS.

B. STEEL ROOF SHEETING

1. SHEETING SPECIFICATION FOR A COMPLETE NEW ROOF: USE 0,53mm COLOUR BOND OR 0,55mm COLOUPLUS (AZ150) IBR PROFILE SHEETING, SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER) FIXED ONTO 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS. COLOUR OF THE NEW SHEETING TO MATCH THE ROOF SHEETING ON EXISTING CLASSROOM BLOCKS OR OTHERWISE DIRECTED BY PROJECT MANAGER.
2. MINOR DAMAGE TO EXISTING STEEL ROOF SHEETING: REMOVE AND REPLACE DAMAGE ROOF SHEETING WITH NEW STEEL SHEETING. NEW SHEETING TO MATCH THE EXISTING SHEETING PROFILE, TYPE, OVERALL THICKNESS AND COLOUR. SHEETING TO BE SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER).

C. CONCRETE ROOF TILES

1. ALL DAMAGED AND CRACKED CONCRETE ROOF TILES ARE TO BE REMOVED AND REPLACED WITH NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES. COLOUR OF THE NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES.

D. DAMAGED ROOF TRUSSES REPLACED WITH COMPLETE NEW 'GANG NAILED' ROOF STRUCTURE

1. EXISTING DAMAGED TIMBER ROOF TRUSSES TO BE REMOVE AND CARTED OF SITE.
2. THE INSTALLATION OF THE GANG-NAILED ROOF STRUCTURE BY THE MAIN CONTRACTOR IS TO BE : **A DESIGN, SUPPLY, INSTALL AND CERTIFY CONTRACT.**
3. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO SUBMIT THE REQUIRED TR1 AND TR2 CERTIFICATES TO US FOR OUR RECORDS AT THE RELEVANT STAGE OF THE PROJECT. THE TR1 AND TR2 CERTIFICATES CERTIFY THAT THE OVERALL ROOF STRUCTURE IS STRUCTURALLY STABLE.
4. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO ENSURE THAT THE APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) ISSUING THE TR1 CERTIFICATE HAS INSPECTED THE SITE, COMPLIED WITH ALL THE REQUIRED SPECIFICATIONS AS NOTED ABOVE, AND HAS PROVIDED HIS OWN SPECIFICATIONS / DRAWINGS FOR THE TRUSS TIE-DOWNS, BRACING, ETC.
5. THE TR1 CERTIFICATE CONFIRMS THAT THE GANG-NAILED ROOF TRUSSES HAVE BEEN DESIGNED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) AND THE TR2 CERTIFICATE CONFIRMS THAT THE INSTALLATION OF THE GANG-NAILED ROOF TRUSSES ON SITE HAS BEEN INSPECTED, CHECKED FOR COMPLIANCE WITH THE ROOF TRUSS SHOP DRAWINGS AND APPROVED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA).

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: GENERAL SPECIFICATIONS: REPLACEMENT OF DAMAGED ROOFS AND TRUSSES	DATE 2018.10.18	REVISION P2
		PROJ. No. 474	SKETCH No. Sk 101



DAMAGED CEILINGS AND CORNICES

1. REMOVE DAMAGED CEILING AND CART RUBBLE OFF SITE.
2. PREPARE SURFACE TO RECEIVE NEW CEILING.
3. CONSTRUCT NEW CEILING WITH 9.5mm THICK GYPSUM (OR EQUALLY APPROVED) BOARD. 44mm x 10mm TIMBER COVER STRIP OR 'PLASTIC M-STRIP' TO BE INSTALLED AT CEILING JOINTS. ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. CONSTRUCT CEILING CORNICES WITH NUTEC EVERITE (OR EQUALLY APPROVED) 75mm COVERED CORNICES. ALL TO BE INSTALLED ACCORDING TO MANUFACTURES SPECIFICATIONS.
5. ALL CEILING BOARDS TO BE FIXED ONTO NEW 38mm x 50mm (WITH 50mm DIMENSION PLACED VERTICALLY) GRADE 5 SA PINE TIMBER BATTENS. BATTENS SPACING TO BE MAX. 400mm C/C.
6. ALL MATERIALS TO BE SABS APPROVED.
7. ALL CEILINGS AND CORNICES TO BE PAINTED WITH 2 COATS 'PLASCON WHITE' CEILING PAINT (OR EQUALLY APPROVED).

RECOMMENDED TIMBER BATTEN SIZES FOR 9.5mm thk. GYPSUM (OR EQUALLY APPROVED) CEILING BOARDS

TIMBER JOIST / TRUSS SPACING	TIMBER BATTEN SIZE
< 1000mm	38mm x 38mm GRADE 5 SA PINE
1001mm to 1200mm	38mm x 50mm GRADE 5 SA PINE (WITH 50mm DIMENSION PLACED VERTICALLY)
1201mm to 1400mm	50mm x 76mm GRADE 5 SA PINE (WITH 76mm DIMENSION PLACED VERTICALLY)
> 1401mm	CONSULT WITH APPOINTED STRUCTURAL ENGINEER.

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
GENERAL SPECIFICATIONS:
REPLACE DAMAGED
CEILINGS AND CORNICES

DATE
2018.10.18

PROJ. No.
474

REVISION
P3

SKETCH No.
Sk 102



REPLACEMENT OF SISALATION :

1. REMOVE EXISTING ROOF SHEETING AND STORE FOR RE-USE OR TO BE ASSESSED (BY THE APPOINTED STRUCTURAL ENGINEER) ON SITE IF ROOF SHEETING NEEDS TO BE REPLACED.
2. INSTALL MULTIPURPOSE ROOF INSULATION. SPECIFICATION - SISALATION MULTIPURPOSE LIGHT DUTY 439 (OR EQUALLY APPROVED). ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATION.
3. RE-INSTALL OR REPLACE ROOF SHEETING AS REQUIRED / INSTRUCTED BY THE APPOINTED STRUCTURAL ENGINEER.
4. ALL MATERIAL TO BE SABS APPROVED.

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
GENERAL SPECIFICATIONS:
REPLACE DAMAGED ROOF
INSULATION

DATE
2018.10.18

PROJ. No.
474

REVISION
P2

SKETCH No.
Sk 103



NOTE: BATCHING AND MIXING MATERIAL :

- 1 BAG OF CEMENT HAS A VOLUME OF 33 LITRES.
- 1 BUILDERS WHEELBARROW HAS A VOLUME OF 65 LITRES WHICH IS EQUIVALENT TO 2 BAGS OF CEMENT.
- DO NOT SPLIT BAGS WHEN BATCHING EXCEPT FOR SMALL OR NO STRUCTURAL WORK.
- USE A CONCRETE MIXER OR HAND MIXER ON A DRY, CLEAN, NON-ABSORBENT SURFACE.
- WHEN MIXING CONCRETE BY HAND, FIRST MIX THE CEMENT, SAND AND WATER THOROUGHLY AND MIX THE STONE LAST - THIS SAVES A LOT OF EFFORT.
- MIX UNTIL COLOUR AND WORKABILITY IS UNIFORM.
- ALL CONCRETE TO BE VIBRATED WHEN PLACING.
- CONCRETE CUBE TEST RESULTS TO BE SUBMITTED TO THE ENGINEER AS PER BELOW:
 - > 3No. CUBES TESTS FOR 7 DAY RESULTS
 - > 3No. CUBES TESTS FOR 28 DAY RESULTS

CONCRETE STRENGTH	CEMENT (50KG BAGS)	SAND (WHEELBARROWS)	STONE (WHEELBARROWS)	WATER (LITRES)
20 MPa	2	4	4	55
25 MPa	2	3	3	55

TYPICAL CONCRETE MIX DESIGN

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
CONCRETE MIX DESIGN
FOR 20MPA CONCRETE
AND 25MPA CONCRETE

DATE
2018.09.06

REVISION
P1

PROJ. No.
474

SKETCH No.
Sk 104



GUTTERS AND DOWNPIPES

1. GUTTERS AND DOWNPIPES TO A COMPLETELY NEW ROOF :

ALL GUTTERS TO BE SEAMLESS 110mm HALF ROUND uPVC GUTTERS – ALL TO SUPPLIER'S SPECIFICATIONS.
DOWNPIPES TO BE 75mm DIAMETER uPVC DOWNPIPES, ALL FIXED AS PER SUPPLIER'S SPECIFICATIONS.
NOTE: GUTTER BRACKETS ARE TO BE FIXED AT A MAXIMUM OF 750mm CENTRES.

2. GUTTER SUPPORT :

NUTEC FASCIA BOARDS (OR EQUALLY APPROVED) ARE TO BE FIXED (AT MAXIMUM 750mm CENTRES) TO A 114X38 (GRADE 5) SA PINE TIMBER CLOSURE PIECE OF WHICH IS FITTED AT THE GUTTER END OF THE VERANDAH OVERHANG AND BETWEEN ALL ROOF TRUSSES TO SUPPORT THE NEW FASCIA BOARD AND GUTTERS.

3. COMPLETE DAMAGE TO ALL EXISTING ALUMINIUM GUTTERS AND DOWNPIPES ONLY :

INSTALL NEW GUTTERS AND DOWNPIPES AS PER ITEM 1 ABOVE.

4. MINOR DAMAGE (IN SMALL SECTIONS) TO EXISTING GUTTERS AND DOWNPIPES (PVC, NUTEC, ALUMINIUM, ETC.):

REMOVE ONLY THE DAMAGED SECTIONS OF GUTTERS AND DOWNPIPES AND REPLACE WITH NEW GUTTERS AND DOWNPIPES TO MATCH EXISTING IN MATERIAL, PROFILE, TYPE AND COLOUR.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS REPLACEMENT OF GUTTER AND RAINWATER DOWNPIPES	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 105



REPLACING GLAZING

1. REMOVE EXISTING PUTTY.
2. RUB THE WINDOW FRAME WITH A WIRE BRUSH TO REMOVE ANY REMAINING GLAZING PUTTY OR OLD CAULK FROM THE GROOVES.
3. SAND THE WINDOW FRAME LIGHTLY WITH GRIT SANDPAPER TO REMOVE STUCK-ON CAULK, PUTTY OR WOOD SPLINTERS.
4. ALIGN THE GLAZING WITH THE GROOVE IN THE FRAME AND PUTTY INTO PLACE. USE 4mm thk. (SABS APPROVED) CLEAR GLAZING FOR ALL WINDOWS.
5. HOLD A METAL PUTTY KNIFE AT A LOW ANGLE TO THE WINDOW FRAME AND PUSH THE KNIFE ALONG THE WINDOW FRAME TO REMOVE THE EXCESS PUTTY.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS REPLACING GLAZING	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 106



ROOF SHEETING PAINT SPECIFICATION

1. EXISTING ASBESTOS ROOF AND EXISTING FIBRE CEMENT ROOF:
EXISTING ASBESTOS ROOF COVERING AND FIBRE CEMENT ROOF COVERING & ASSOCIATED RAINWATER PRODUCTS TO BE HIGH PRESSURE POWER CLEANED OR IN SOME CIRCUMSTANCES SCRUBBED CLEAN. APPLY 2 COATS 'DULUX ROOFGUARD' (OR EQUALLY APPROVED) EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
2. EXISTING GALVANISED STEEL ROOF:
PLEASE ENSURE SURFACES ARE SOUND, CLEAN AND HAVE BEEN CORRECTLY PREPARED USING APPROPRIATE PRIMERS WHERE RELEVANT. THEN APPLY 2 COATS OF 'DULUX ROOFGUARD' (OR EQUALLY APPROVED) EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
APPLICATION TO BE WITH A BRUSH OR ROLLER. RE-COAT AFTER 4 HOURS. TOUCH DRY AFTER 1 HOUR.
PLEASE NOTE COVERAGE MAY VARY ACCORDING TO SURFACE POROSITY.

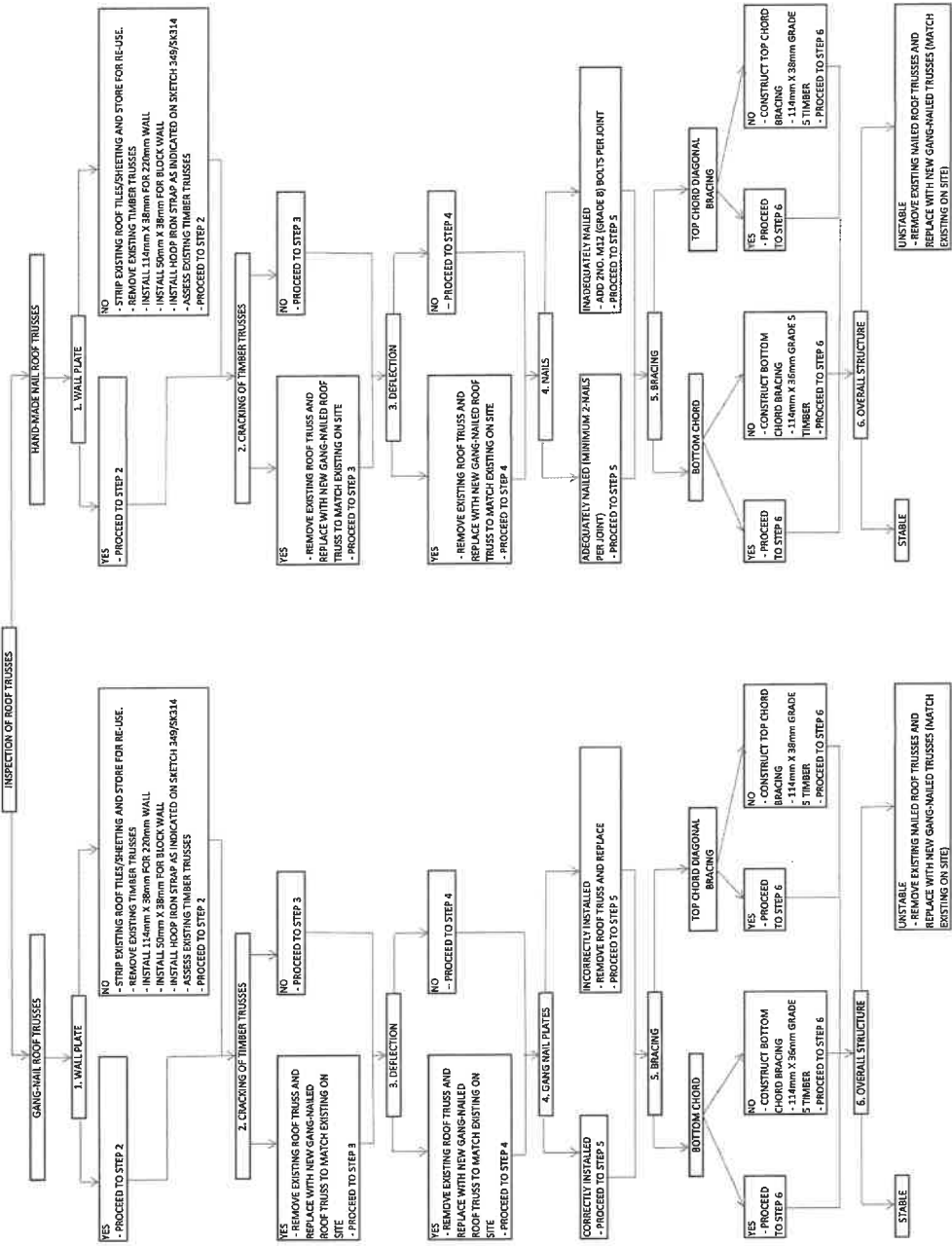
PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: GENERAL SPECIFICATIONS: ROOF SHEETING PAINT SPECIFICATIONS	DATE 2018.10.18	REVISION P2
		PROJ. No. 474	SKETCH No. Sk 107



NEW DOORS

1. DOOR FRAMES
GALVANISED STOCK STEEL DOUBLE REBATED DOOR FRAMES (1.2mm THICK) FOR 115mm AND 230mm WALLS - NOT PAINTED WITH 1 PAIR OF 100mm GALVANISED STEEL LOOSE-PIN HINGES WELDED IN POSITION
2. DOORS
MERANTI DOORS AS PER ARCHITECTS LAYOUT. ALL DOORS TO BE PRIMED, UNDERCOATED AND PAINTED WITH 2 COATS OF GLOSS ENAMEL PAINT.

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: GENERAL SPECIFICATIONS: NEW DOORS	DATE 2018.09.06	REVISION P1
		PROJ. No. 474	SKETCH No. Sk 108



DATE	2018.09.06	REVISION	P1
PROJ. No.	474	SKETCH No.	Sk 109

DETAILS:
ROOF TRUSS INSPECTION SPECIFICATIONS

PROJECT:
 DEPARTMENT OF EDUCATION
 STORM DAMAGED DISASTER PROGRAMME PHASE 16

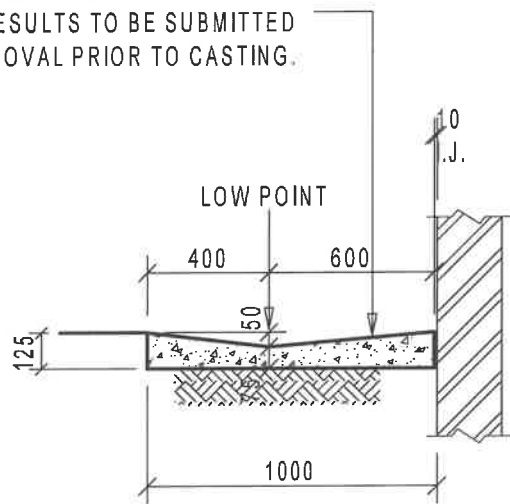




SECTION 2 STRUCTURAL TYPICAL DETAILS AND SPECIFICATIONS



CONCRETE CHANNELS/APRON:
125mm thk. X 20MPa CONCRETE APRONS
REINFORCED WITH MESH REF 193 PLACED 30mm
FROM BOTTOM LAID TO A FALL TO RELIEF POINTS
CAST IN ALTERNATE PANELS OF 2000mm ON
FILL COMPACTED TO 95% MOD AASHTO.
COMPACTION TEST RESULTS TO BE SUBMITTED
TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING.

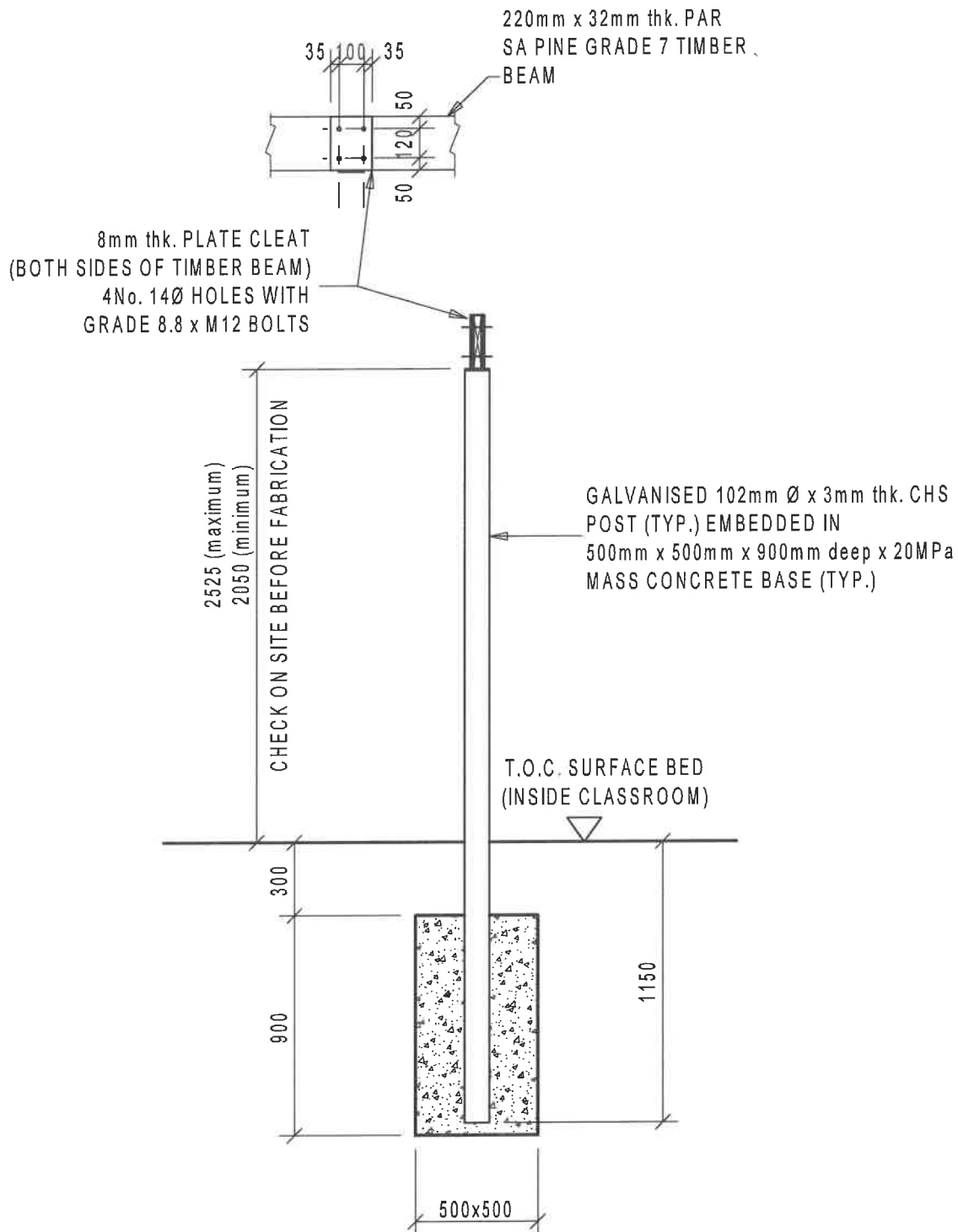


TYPICAL SECTION
THRU 'V' DRAIN APRON / CHANNEL

NOTE :

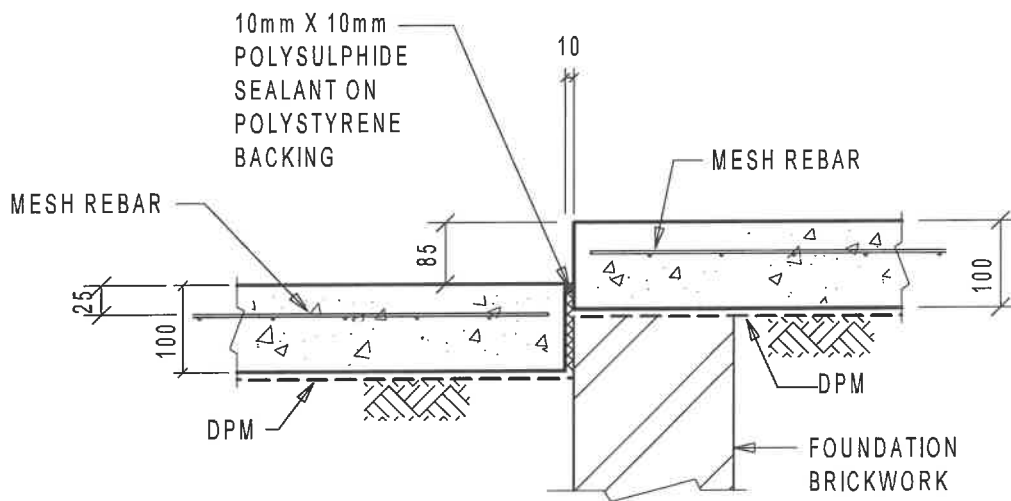
ALL 'V' DRAIN TEMPLATES ARE TO BE INSPECTED BY THE
ENGINEER PRIOR TO ANY WORK BEING PUT TO HAND.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS EXTERNAL CONCRETE 'V' DRAIN APRON CHANNEL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 300



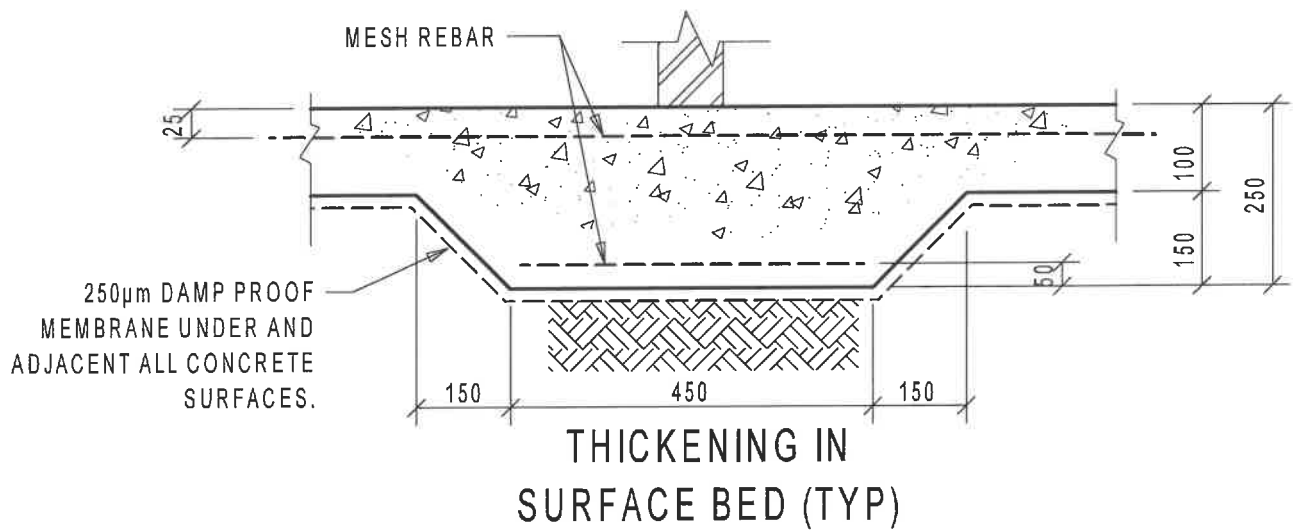
STEEL POST DETAIL

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS WALKWAY ROOF SUPPORT: STEEL POST DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 301

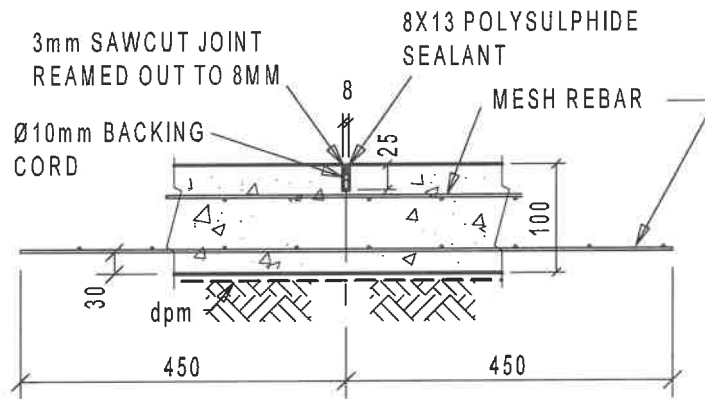


EXTERNAL DOOR THRESHOLD (E.D.T.)

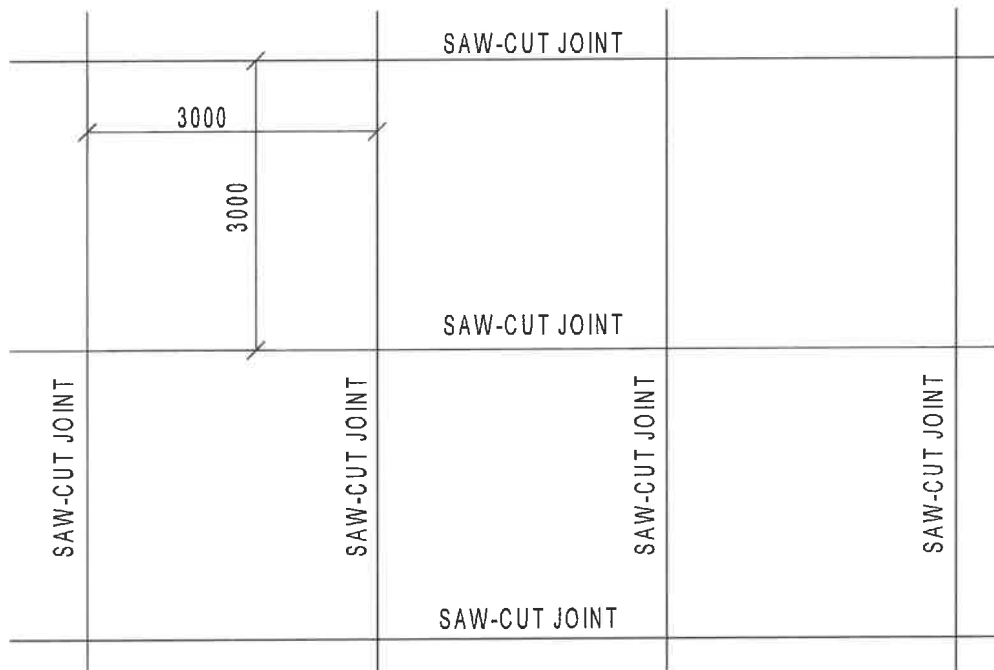
PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS EXTERNAL DOOR THRESHOLD DETAIL (E.D.T.)	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 302



PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS THICKENING IN SURFACE BED FOR 110mm WALL	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 303

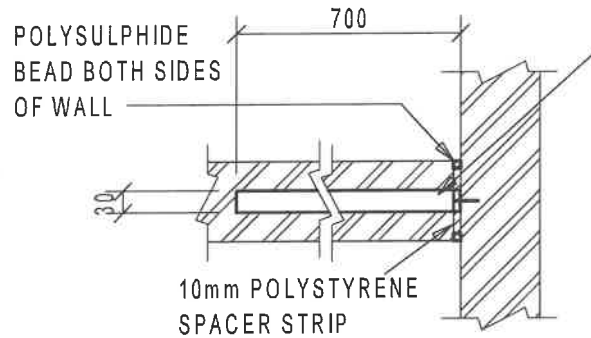


TYPICAL SAW-CUT JOINT DETAIL

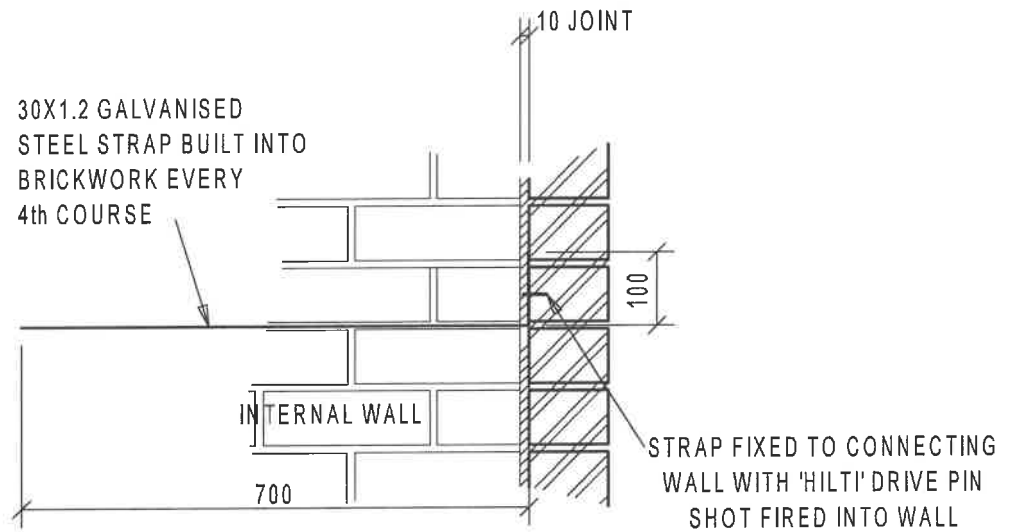


JOINTS ARE AT MAXIMUM 3m crs BOTH WAYS

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL SAW-CUT JOINT DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 304

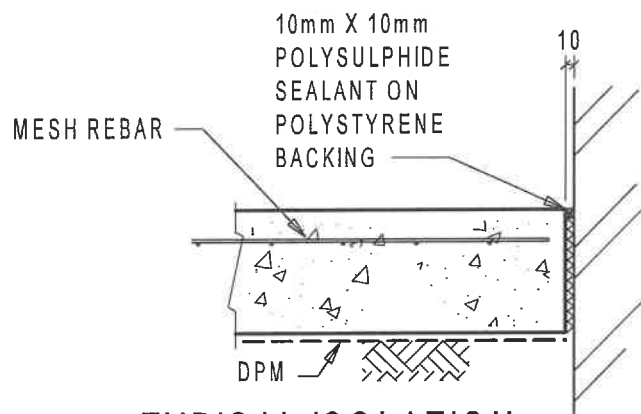


PLAN 110 WALL



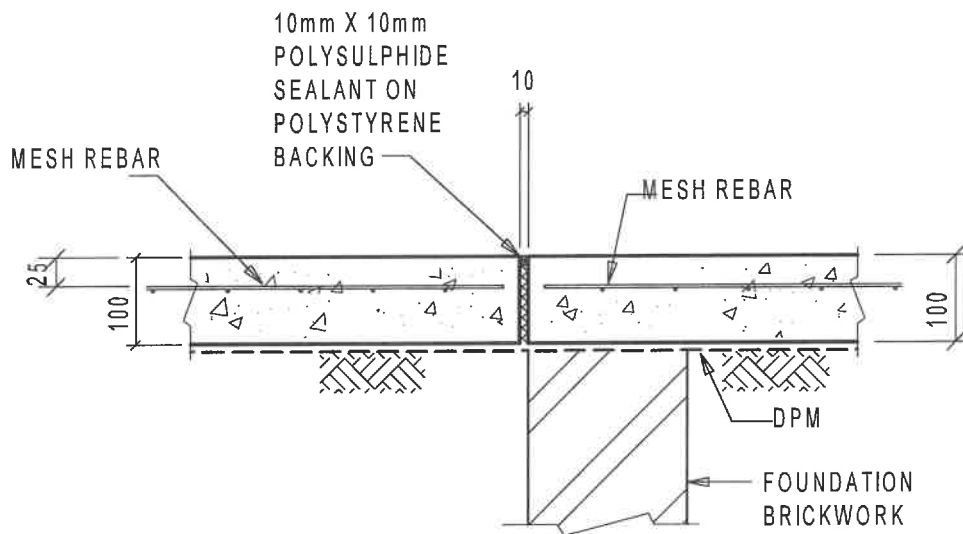
ELEVATION 110 WALL

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS INTERNAL WALL CONNECTION DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 305



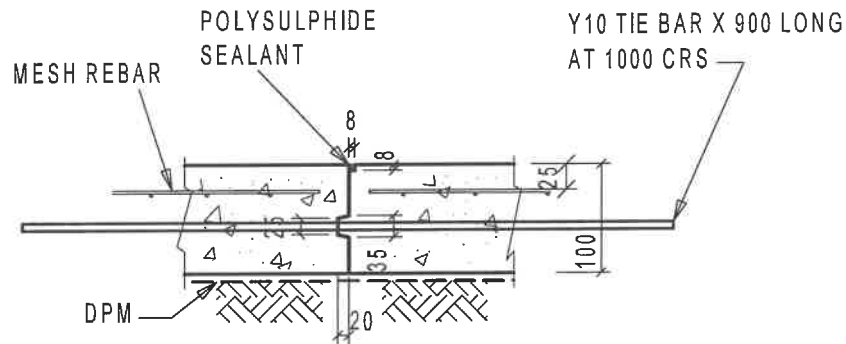
TYPICAL ISOLATION
JOINT DETAIL (I.J.)

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL ISOLATION JOINT DETAIL (I.J.)	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 306



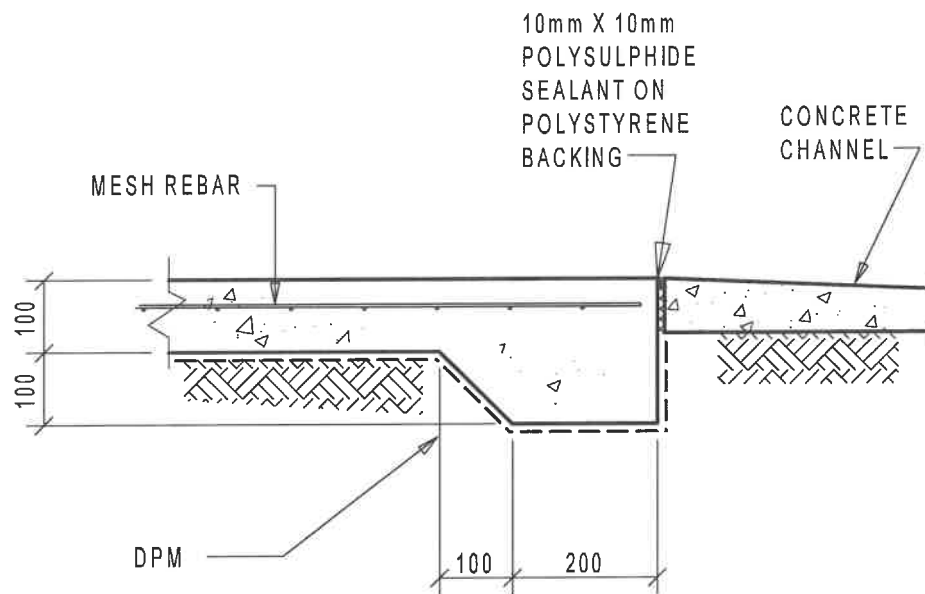
INTERNAL DOOR THRESHOLD (I.D.T.)

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS INTERNAL DOOR THRESHOLD (I.D.T.)	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 307



TYPICAL CONSTRUCTION
JOINT DETAIL

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL CONSTRUCTION JOINT DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 308

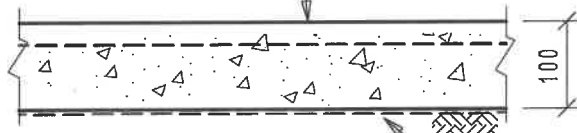


TYPICAL EDGE
THICKENING DETAIL

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL EDGE THICKENING DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 309



100mm thk. x 25MPa STEEL FLOATED
CONCRETE SLAB REINFORCED WITH MESH REF 193
PLACED 25mm FROM TOP ON 250µm DAMP PROOF MEMBRANE
ON 50mm TREATED & RAMMED RIVERSAND ON
WELL WATERED CLEAN EARTH FILL COMPACTED TO 90%
MOD AASHTO IN LAYERS NOT EXCEEDING 150mm.
SOIL TO BE POISONED IN ACCORDANCE WITH SABS 1165.
CERTIFICATE MUST BE PROVIDED. COMPACTION TEST
RESULTS TO BE SUBMITTED TO THE ENGINEER FOR
APPROVAL PRIOR TO CASTING OF CONCRETE.



IN-SITU SUBBASE COMPACTED TO
MIN. 90% MOD AASHTO. COMPACTION TEST
RESULTS TO BE SUBMITTED TO THE ENGINEER FOR
APPROVAL PRIOR TO CASTING OF CONCRETE.

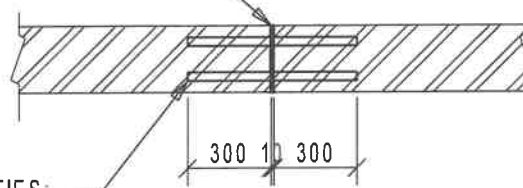
250µm DAMP PROOF
MEMBRANE UNDER AND
ADJACENT ALL CONCRETE
SURFACES.

**TYPICAL SECTION THRU'
SURFACE BED**

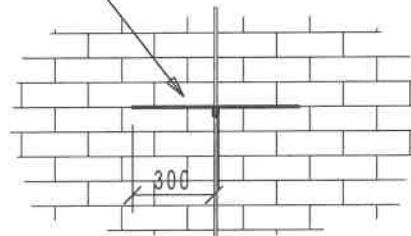
PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL SECTION THRU' SURFACE BED	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 310



10mm POLYSTYRENE CONTROL JOINT
SEALED WITH POLYSULPHIDE BEAD
BOTH SIDES.



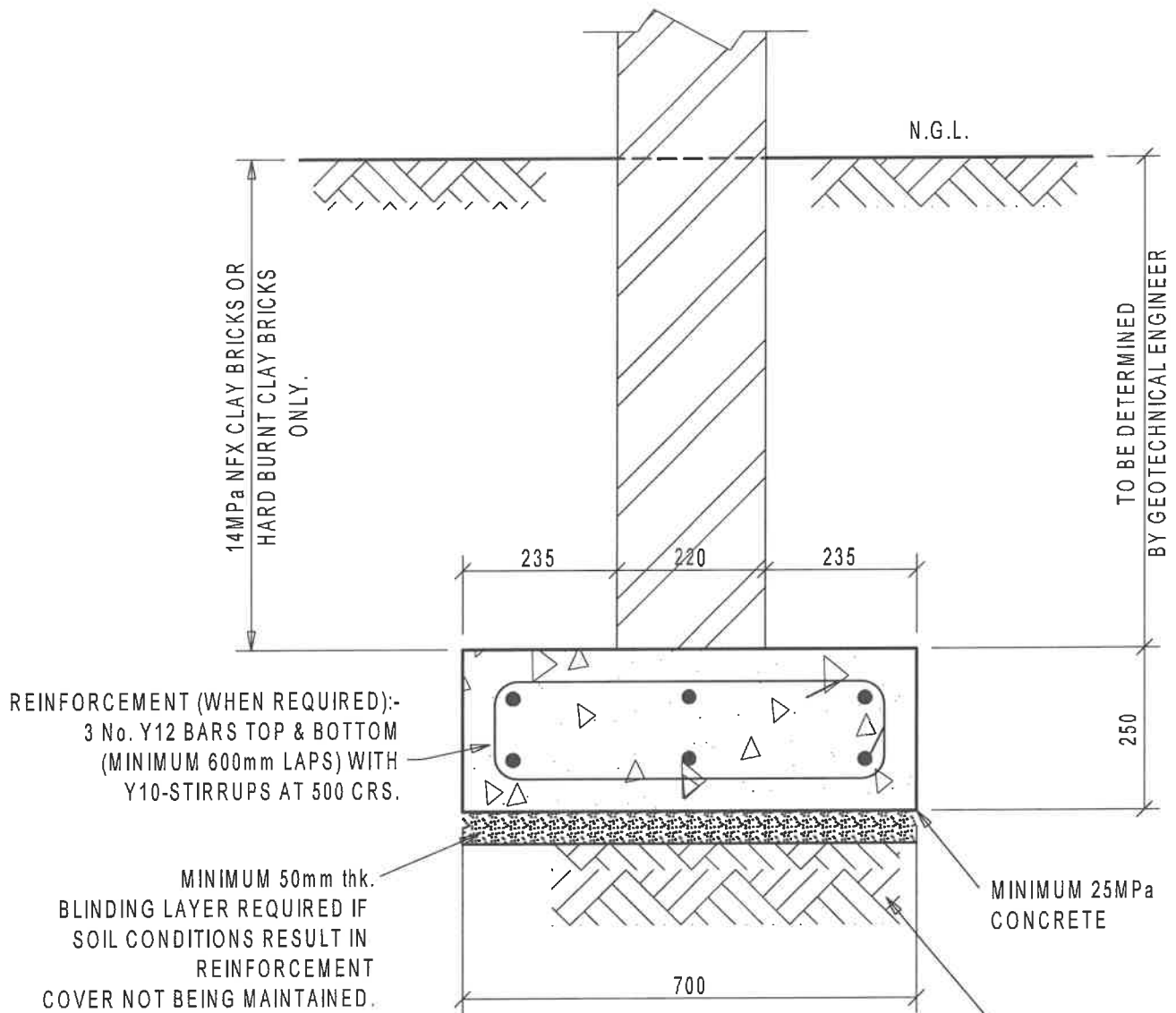
CONCERTINA TIES:
1.2X30 GALV. HOOP
IRON STRAP
EVERY 3rd COURSE.



ELEVATION

TYPICAL CONTROL
JOINT DETAIL FOR BRICKWORK

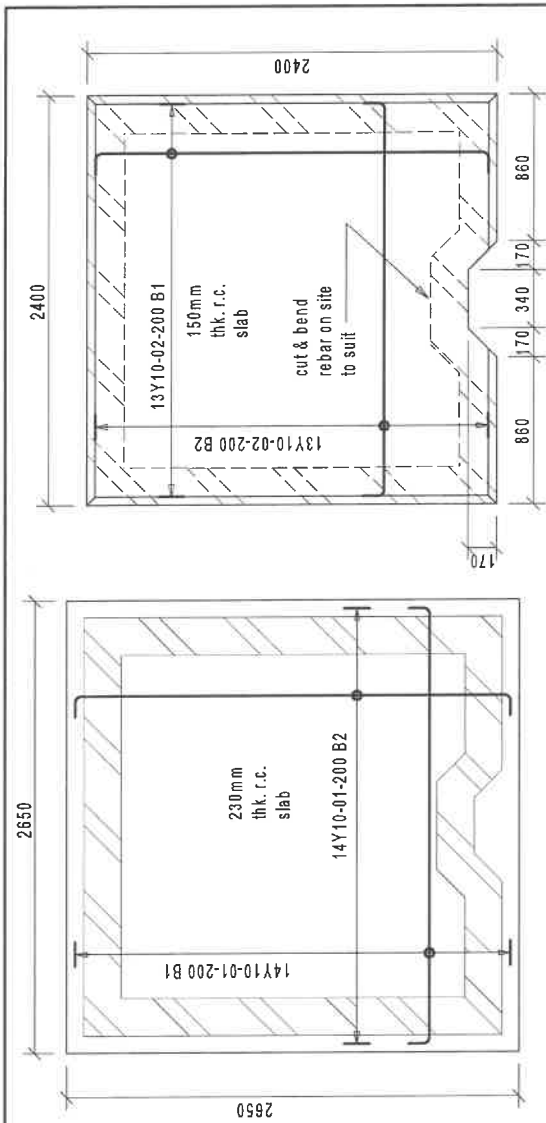
PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL CONTROL JOINT DETAIL FOR BRICKWORK	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 311



**220mm WALL FOUNDATION
DETAIL**

INSITU SUBBASE SOIL MATERIAL TO BE
COMPACTED TO MIN. 90% MOD AASHTO.
COMPACTION TEST RESULTS TO BE
SUBMITTED TO THE ENGINEER FOR
APPROVAL PRIOR TO CASTING OF CONCRETE

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS 220mm WALL FOUNDATION DETAIL	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 312



PLAN ON FOOTING
50mm cover to reinforcement all round

PLAN ON TANK SUPPORT SLAB
25mm cover to reinforcement all round

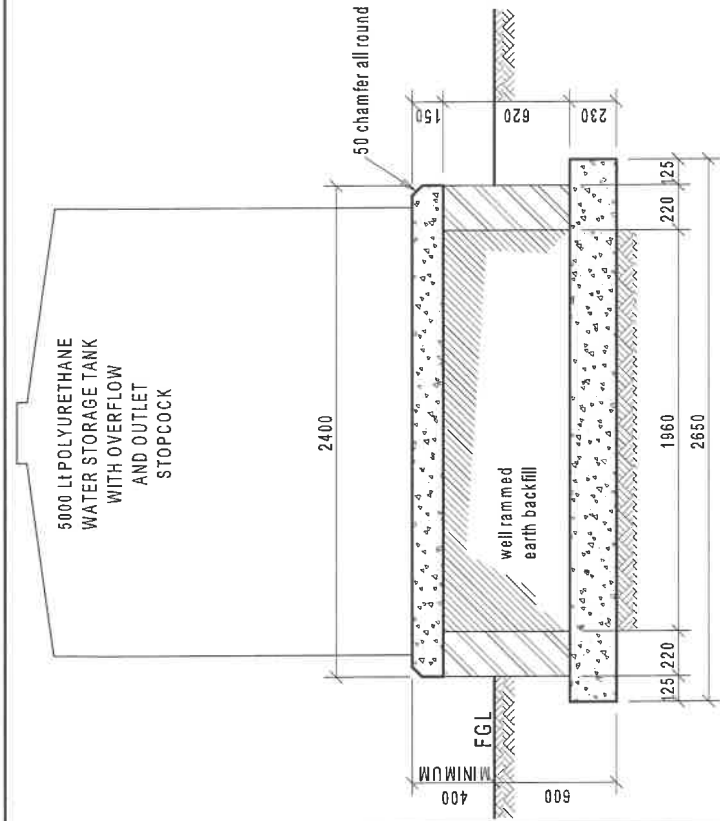
Polyurethane Water Storage Tank – ‘strapping’ down specifications

All water storage tanks are to be strapped down (at each of the 4 stubs on top of the tank) to the supporting concrete base with 2 no. off 4mm diameter fully galvanized stay wires (allow for ‘tumbuckles’ to tighten each of the ‘double strap’ stay wires). Each of the ‘double strap’ stay wires are to be tied to a M12 eye bolt of which is to be drilled and fixed to the 4 corners of the concrete supporting base. The specification for the eye bolt is as follows : galvanized mild steel - M12 eye bolt with 25mm eye inside diameter and with 80mm long shank.

MEMBER	No OF MEMB	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING
	1	28	Y10	2750	28 01	35		2550
		26	Y10	2500	26 02	35		2300

PROJECT	DATE
DEPARTMENT OF EDUCATION	2010.10.16
STORM DAMAGED DISASTER	REVISION
PROGRAMME PHASE 16	P2

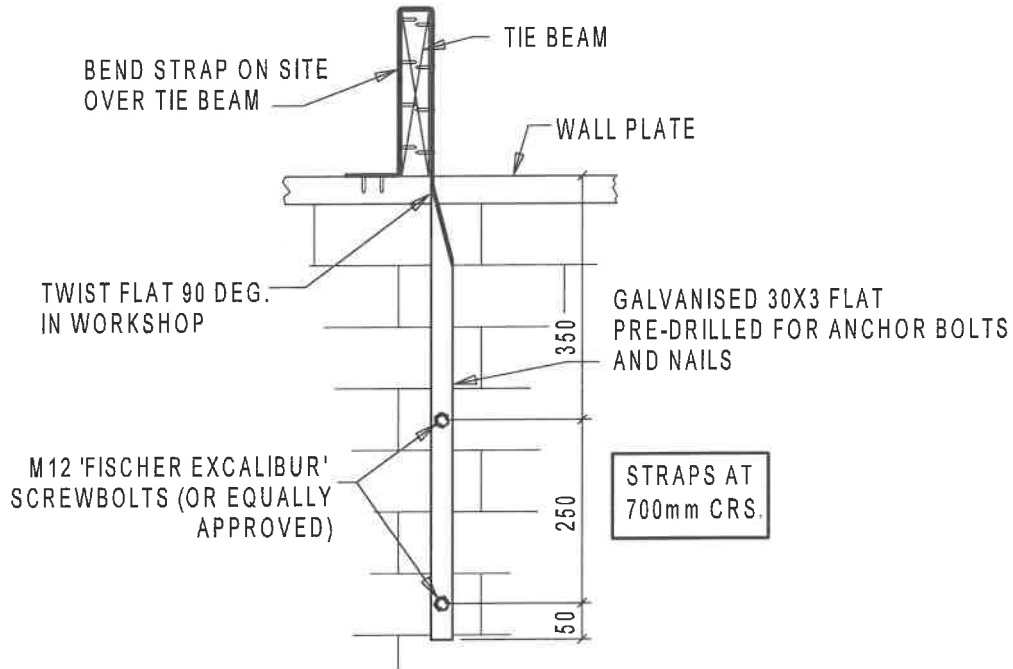
DETAILS	DRG. No.
TYPICAL WATER SUPPORT TANK SUPPORT CONCRETE & REINFORCEMENT LAYOUT & DETAILS	474 / Sk 313



TYPICAL SECTION

- NOTES:
1. SEE ARCHITECTS LAYOUT FOR LOCATION OF TANK.
 2. ALL FOUNDATION EXCAVATIONS TO BE COMPACTED TO A MINIMUM OF 93% MOD AASHTO PRIOR TO CONCRETE BEING CAST. COMPACTION TEST RESULTS ARE TO BE SUBMITTED TO THE ENGINEER PRIOR TO CASTING OF CONCRETE.
 3. MINIMUM 25MPa CONCRETE STRENGTH AT 28 DAYS
 4. MINIMUM 14MPa NFX BRICKWORK IN CLASS II MORTAR





REMOVE PLASTER TO ACCOMMODATE STRAP ANCHOR.
INSTALL ANCHOR.
RE-PLASTER OVER STRAP & ANCHOR BOLTS

SUGGESTED METHOD TO FIX NEW PRE-FABRICATED TIMBER ROOF TRUSSES TO EXISTING BRICKWORK

ALL DAMAGED ROOF TRUSSES TO BE REPLACED
WITH PRE-FABRICATED TIMBER ROOF TRUSSES
TO MATCH EXISTING.
ALL OTHER DAMAGED TIMBER BATTENS, WALL PLATES, ETC.
TO BE REMOVED AND REPLACED WITH NEW TIMBER
TO MATCH EXISTING.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TIMBER ROOF TRUSS ANCHOR DETAIL	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 314



GENERAL PLASTER REPAIRS &
BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS

GENERAL PLASTER 'CRACK' REPAIRS:

1. RECOMMENDATIONS & SPECIFICATIONS:

ALL PLASTER 'CRACKING' MUST BE REPAIRED AS SPECIFIED BELOW. THE CONTRACTOR IS ALSO REQUIRED TO DETERMINE IF ANY CRACKS IN THE PLASTER HAVE BEEN TRANSFERRED TO THE BLOCKWORK/BRICKWORK. (CONTRACTOR IS REQUIRED TO CUT 100mm LONG x 20mm WIDE INSPECTION SLOT). IF A CRACK HAS TRANSFERRED TO THE BLOCKWORK/BRICKWORK, THEN IT NEEDS TO BE REPAIRED AS SET OUT IN THE SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING'.

1.1 SPECIFICATION FOR GENERAL 'PLASTER' REPAIR:

BREAK OUT AND REMOVE DAMAGED PLASTER TO 50MM INTO SOUND PLASTER. CLEAN WALL AND APPLY 'SIKA PLASTERSTIK' (OR EQUALLY APPROVED) BONDING AGENT TO MANUFACTURER'S SPECIFICATIONS. RE-PLASTER WALL AND PAINT TO ARCHITECTS SPECIFICATIONS.

1.2 SPECIFICATION FOR PLASTER REPAIR 'CRACKING':

RAKE OUT CRACK 6mm x 6mm DEEP. CLEAN OUT ALL DEBRIS/LOOSE MATERIAL. FILL WITH ACRYLIC FILLER - 'SIKACRYL' (OR EQUALLY APPROVED) TO MANUFACTURERS SPECIFICATIONS. PAINT TO ARCHITECTS SPECIFICATIONS.

1.3 SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING' REPAIR:

- " RAKE OUT CRACK. REMOVE ALL DEBRIS/LOOSE MATERIAL.
- " STITCH CRACK IN BLOCKWORK/BRICKWORK WITH R8 REINFORCING RODS.
- " R8 REINFORCING RODS ARE TO BE 300mm LONG WITH 50mm BENDS AT BOTH ENDS - TOTAL LENGTH = 400mm.
- " R8 REINFORCING RODS ARE TO BE EPOXY GROUTED WITH 'PROSTRUCT 617' GENERAL PURPOSE EPOXY ADHESIVE (OR EQUALLY APPROVED) AT 250mm CENTRES, AND GROUTED INTO (10mm DEEP) SLOTS CUT INTO BLOCKWORK/BRICKWORK AND WITH (60mm DEEP) 10mm DIA. DRILL HOLES AT EACH END TO ACCOMMODATE THE BENDS OF THE REINFORCING RODS.
- " ALL SLOTS AND DRILL HOLES TO BE COMPLETELY FILLED WITH EPOXY ADHESIVE.
- " ALL SLOTS TO BE CUT PERPENDICULAR TO THE CRACK IN THE BLOCKWORK/BRICKWORK.
- " EPOXY ADHESIVE APPLICATION TO BE AS PER MANUFACTURERS' SPECIFICATIONS.
- " APPLY 'SIKA PLASTERSTIK' (OR EQUALLY APPROVED) AND RE-PLASTER WALL, HOWEVER IF LARGE AREAS OF PLASTER HAS BEEN REMOVED, 450mm WIDE 'CHICKEN WIRE MESH' MUST BE 'TACKED ON' OVER THE CRACKED AREA PRIOR TO RE-PLASTERING.
- " RE-PAINT PLASTER TO ARCHITECTS SPECIFICATIONS.

FOR CONSTRUCTION

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS GENERAL PLASTER REPAIRS & BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. Sk315



CONCRETE SPALLING REPAIRS FOR REPAIRS UP TO 30mm THICK :

SURFACE PREPARATION :

- " REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
- " CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
- " HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
- " ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
- " IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
- " ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF 'PRO-STRUCT 688' : ZINC RICH PRIMER (OR EQUALLY APPROVED) @ 4m²/LT.
- " REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT-ALL TO ENGINEERS INSTRUCTIONS ON SITE.

PRIMING :

- " PRE-DAMPEN PREPARED SURFACE WITH WATER.
- " DO NOT ALLOW TO DRY OUT PRIOR TO THE APPLICATION OF THE 'PRO-STRUCT 528' : STRUCTURAL CONCRETE (OR EQUALLY APPROVED) .

REPAIR MORTAR :

- " APPLY 'PRO-STRUCT 528' : STRUCTURAL CONCRETE (OR EQUALLY APPROVED) INTO THE PRE-SATURATED SURFACE.
- " COVERAGE WILL BE APPROXIMATELY 1.4m² @ 10mm THICK PER 25KG BAG OF REPAIR MORTAR.
- " ENSURE COMPLETE SUBSTRATE CONTACT AND MAXIMUM COMPACTION.
- " CURE THE REPAIRS BY KEEPING THEM DAMP FOR 24 HOURS AFTER THE INITIAL SET HAS TAKEN PLACE.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS CONCRETE SPALLING REPAIRS - FOR REPAIRS UP TO 30mm THICK	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 316



CONCRETE SPALLING REPAIRS FOR REPAIRS OVER 30mm THICK :

SURFACE PREPARATION :

- " REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
- " CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
- " HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
- " ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
- " IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
- " ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF 'PRO-STRUCT 688' : ZINC RICH PRIMER (OR EQUALLY APPROVED) @ 4m²/LT.
- " REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

PRIMING :

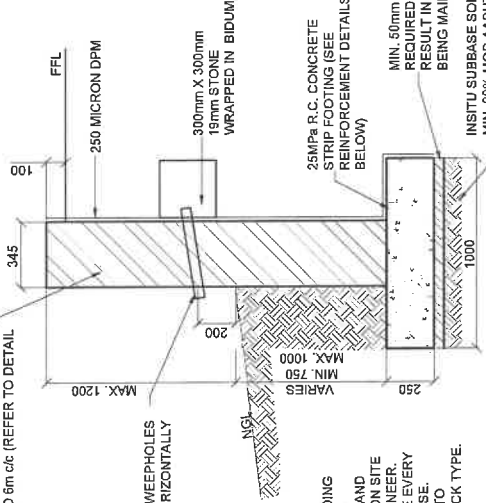
- " PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

- " SHUTTER UP SIDES AND/OR SOFFIT OF AREA TO BE REPAIRED.
- " THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
- " DRAIN EXCESS WATER.
- " MIX 'PRO-STRUCT 531M' (OR EQUALLY APPROVED) AS PER DETAILED INSTRUCTIONS AND POUR REPAIR GROUT INTO THE SHUTTERED AREA FROM ONE SIDE, ENSURING THAT THE GROUT FILLS THE ENTIRE SHUTTERED AREA WITH NO AIR POCKETS.
- " COVERAGE WILL BE APPROXIMATELY 1,4m² @ 10mm THICK PER 25KG BAG OF REPAIR GROUT.
- " LEAVE SHUTTER IN POSITION FOR AT LEAST 24HRS AND THEN STRIP AND CLEAN DOWN THE NEWLY REPAIRED SURFACE.
- " REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS CONCRETE SPALLING REPAIRS - FOR REPAIRS OVER 30mm THICK	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 317

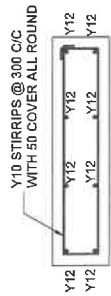
345mm FULLY CROSS BONDED WALL WITH MIN 14MPa BRICKS IN CLASS II MORTAR. SPACING OF VERTICAL JOINTS IN WALL NOT TO EXCEED 6m c/c (REFER TO DETAIL BELOW)



- NOTE:
- FINAL FOUNDING LEVEL TO BE CONFIRMED AND APPROVED ON SITE BY THE ENGINEER. BRICKFORCE EVERY THIRD COURSE. ARCHITECT TO SPECIFY BRICK TYPE.
 - MIN. 50mm THK. BLINDING LAYER REQUIRED IF SOIL CONDITIONS RESULT IN REINFORCEMENT NOT BEING MAINTAINED.
 - INSITU SUBBASE SOIL MATERIAL TO BE COMPACTED TO MIN. 90% MOD AASHTO. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.

TYPE A
TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH WEEP HOLES
N.T.S

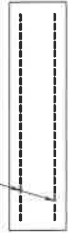
OPTION 1 OR OPTION 2 TO BE CONFIRMED BY ENGINEER ON SITE



OPTION 1

WALL FOUNDATION REINFORCEMENT DETAILS
N.T.S

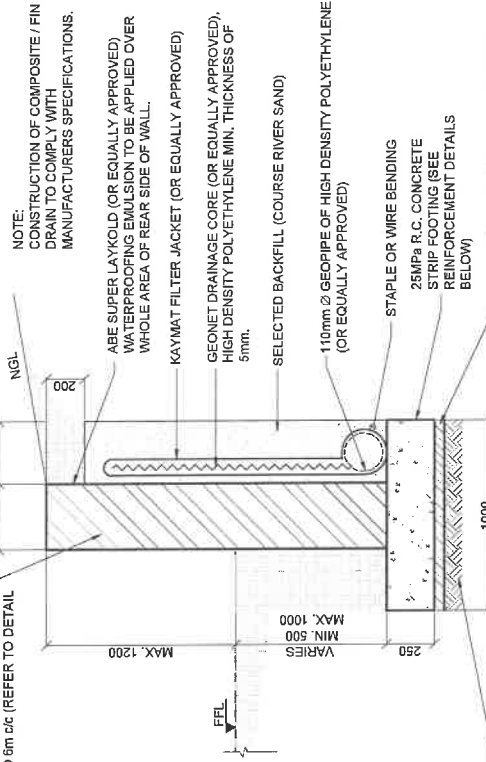
MESH REF. 395 TOP & BOTTOM WITH 50 COVER ALL ROUND



OPTION 2

WALL FOUNDATION REINFORCEMENT DETAILS
N.T.S

345mm FULLY CROSS BONDED WALL WITH 14MPa NFX BRICKS IN CLASS II MORTAR. SPACING OF VERTICAL JOINTS IN WALL NOT TO EXCEED 6m c/c (REFER TO DETAIL BELOW)



- NOTE:
- FINAL FOUNDING LEVEL TO BE CONFIRMED AND APPROVED ON SITE BY THE ENGINEER. BRICKFORCE EVERY THIRD COURSE. ARCHITECT TO SPECIFY BRICK TYPE.
 - MIN. 50mm THK. BLINDING LAYER REQUIRED IF SOIL CONDITIONS RESULT IN REINFORCEMENT NOT BEING MAINTAINED.
 - INSITU SUBBASE SOIL MATERIAL TO BE COMPACTED TO MIN. 90% MOD AASHTO. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.

TYPE B
TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH COMPOSITE/FIN DRAIN DETAILS
N.T.S

10mm THK POLYSTYRENE SPACER



NOTE: VERTICAL JOINTS TO BE CONSTRUCTED AT MAX. 6m c/c.

10mm x 10mm POLYSULPHIDE SEALANT

TYPICAL VERTICAL ISOLATION JOINT DETAIL
N.T.S



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CONSULTING ENGINEERS

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
TYPICAL 345mm FULLY
CROSS BONDED BRICK
RETAINING WALL DETAILS

DATE
2018.10.18

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P2

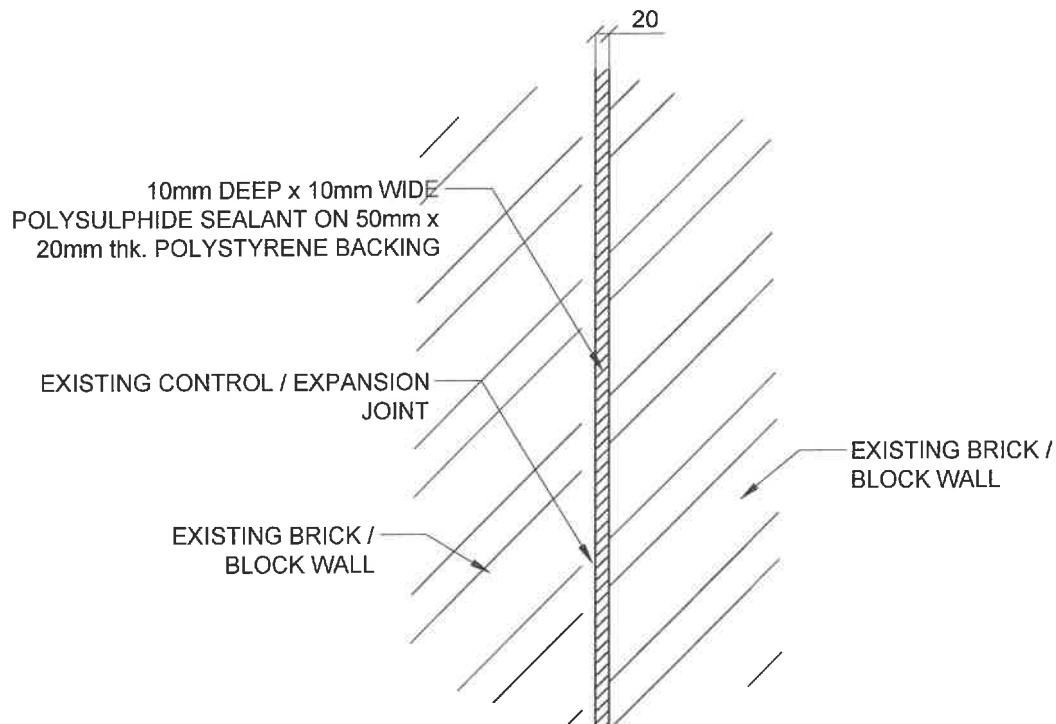
PROJ. No.
474

SKETCH No.
Sk 318



NOTES:

1. SCRAPE OUT AND REMOVE EXISTING MORTAR FILLER AT CONTROL / EXPANSION JOINT TO A MIN DEPTH OF 60mm.
2. INSERT 50mm x 20mm THICK POLYSTYRENE BACKING ALONG LENGTH OF JOINT.
3. APPLY 10mm DEEP x 20mm WIDE POLYSULPHIDE SEALANT TO COVER JOINT AND MAKE GOOD.



TYPICAL REPAIR DETAILS TO
EXISTING CONTROL / EXPANSION JOINTS

N.T.S

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

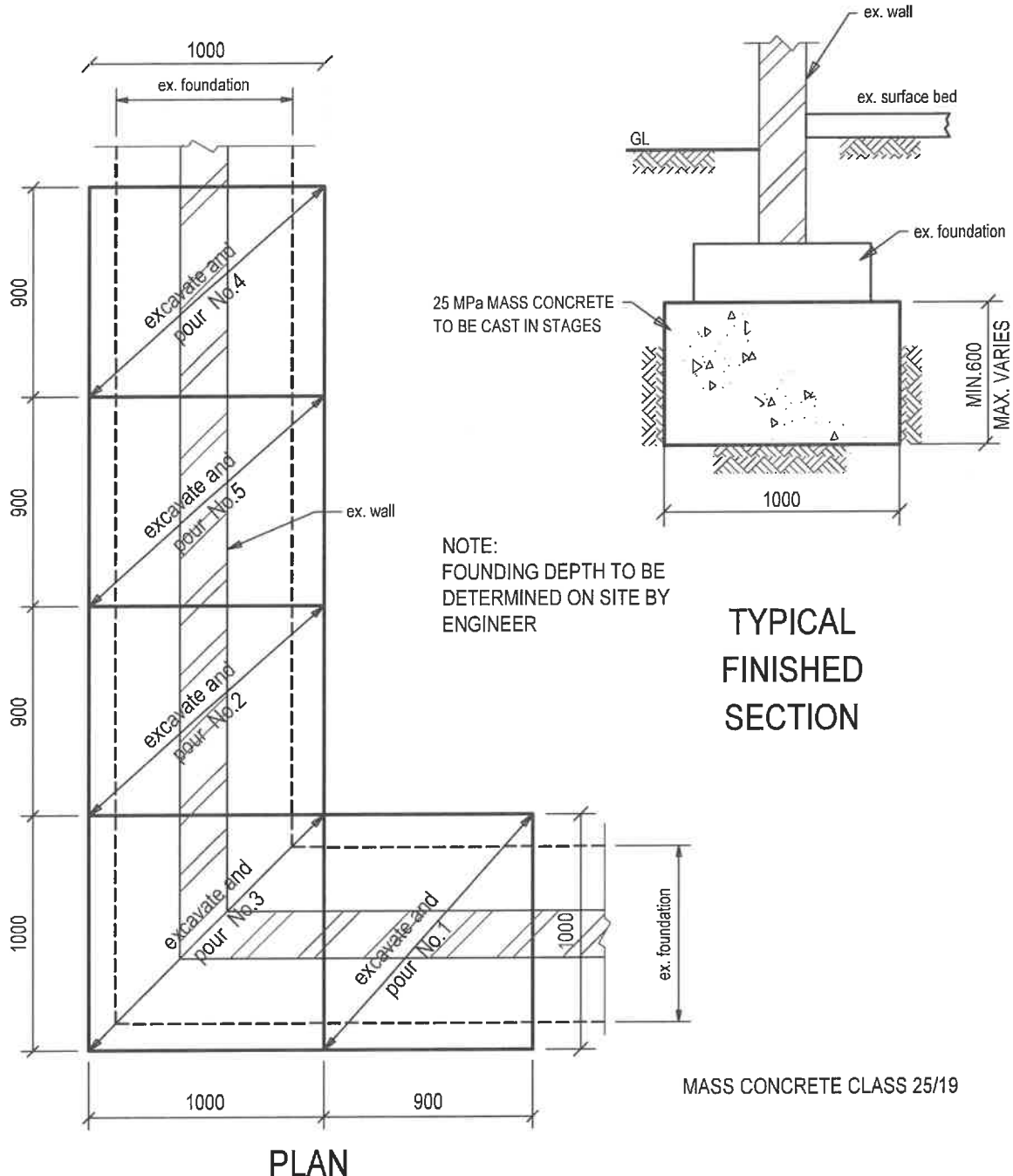
DETAILS:
TYPICAL CONTROL
JOINT DETAILS

DATE
2018.09.06

REVISION
P1

PROJ. No.
474

SKETCH No.
Sk 319



PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
TYPICAL UNDERPINNING
DETAILS

DATE
2018.09.06

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PROJ. No.
474

SKETCH No.
Sk 320



REPAIRS TO EXISTING CONCRETE SURFACE BED:

SURFACE PREPARATION :

- " REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
- " CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
- " HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
- " ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIRED CONCRETE IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
- " IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
- " ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF 'PRO-STRUCT 688': ZINC RICH PRIMER (OR EQUALLY APPROVED) @ 4m²/LT.
- " REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

TOLERANCES :

- " IF LOOSE MATERIAL EXCEEDS MORE THAN 20mm THICK, THE ENTIRE CONCRETE SLAB IS TO BE DEMOLISHED AND RE-CAST AS PER SKETCH 369/SK 304.

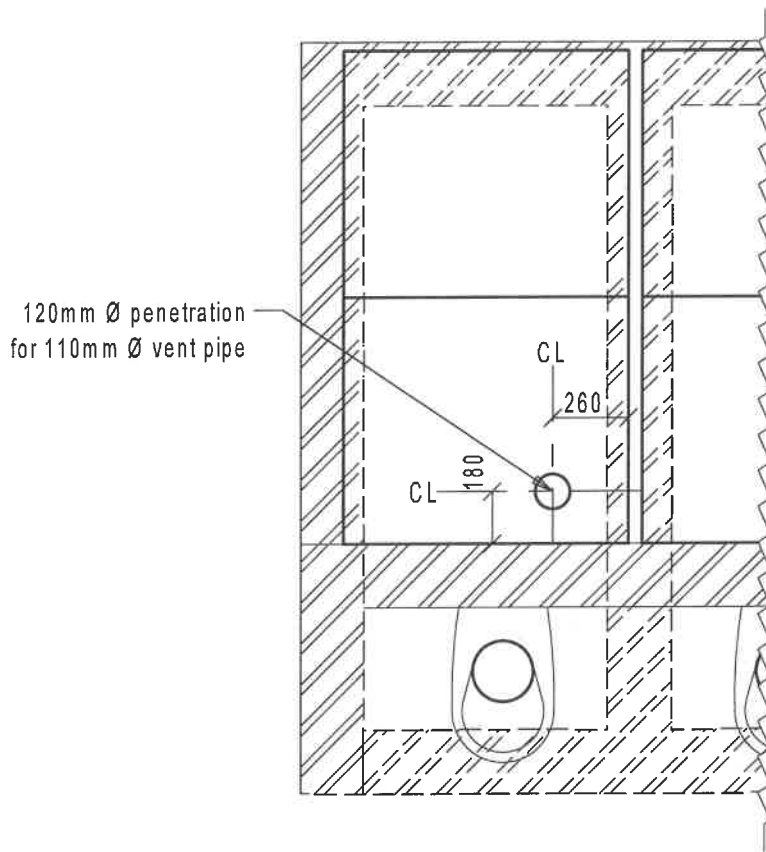
PRIMING :

- " PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

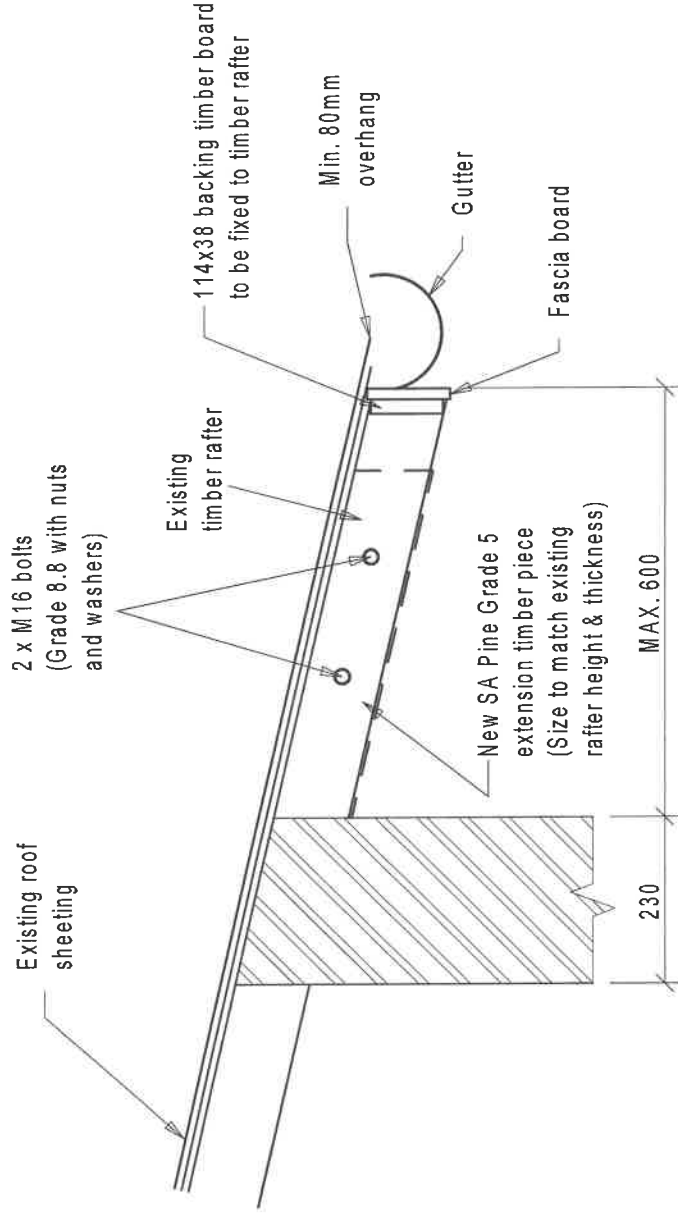
- " THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
- " DRAIN EXCESS WATER.
- " MIX 'PRO-STRUCT 617' WET TO DRY EPOXY GROUT (OR EQUALLY APPROVED AS PER DETAILED INSTRUCTIONS AND RE SCREED THE SURFACE BED.
- " REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS REPAIRS TO EXISTING CONCRETE SURFACE BED	DATE 2018.10.18	REVISION P2
		PROJECT No. 474	SKETCH No. SK 321



VENT PIPE SETTING OUT
ON PRECAST PANEL FOR
ABLUTION PITS

PROJECT DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS TYPICAL VENT PIPE SETTING OUT ON PRECAST PANEL FOR ABLUTION PITS	DATE 2018.09.06	REVISION P1
		PROJECT No. 474	SKETCH No. SK 323



SPECIFICATION ON EXTENSION FOR TIMBER RAFTER

SCALE 1:10



PROJECT
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DATE
2018.06.06

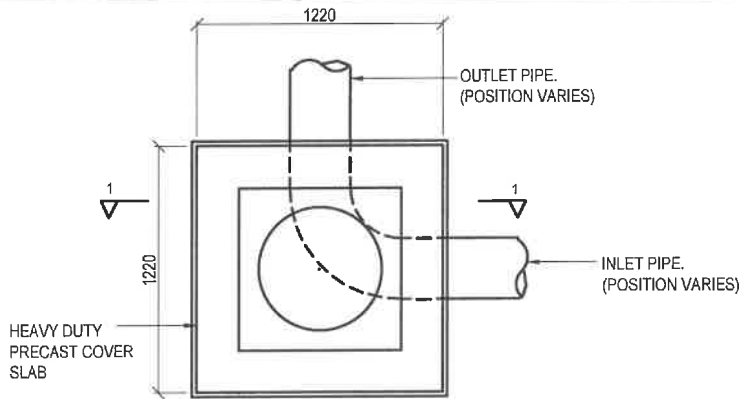
REVISION
P2

DETAILS
SPECIFICATION ON EXTENSION
FOR TIMBER RAFTER

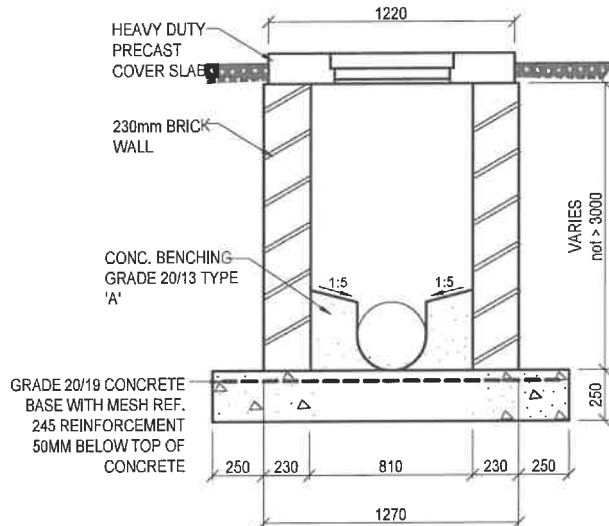
DRG. No.
474 / Sk 324



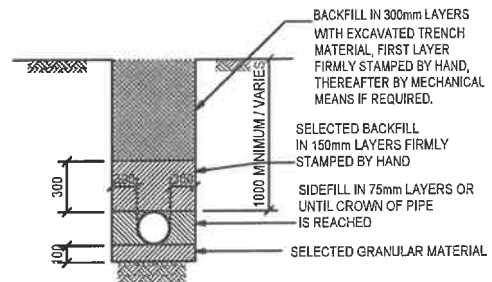
SECTION 3 CIVIL TYPICAL DETAILS AND SPECIFICATIONS



PLAN



SECTION 1 - 1



TYPICAL PIPE BEDDING DETAIL

N.T.S

TYPICAL MANHOLE DETAILS FOR DEPTHS NOT EXCEEDING 3000mm AND FOR PIPES SIZES NOT > 675mm Ø

N.T.S

NOTES

GENERAL

1. SETTING OUT TO ENGINEERS DETAILS.
2. PROVE ALL SERVICES PRIOR TO CONSTRUCTION.
3. ALL WORK AREAS TO BE REINSTATED (PREMIX, CONCRETE, ETC.)
4. SUPPLY AND INSTALLATION TO COMPLY WITH SANS 1200.
5. ALL LEVELS AND DIMENSIONS TO BE VERIFIED ON SITE.
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND MECHANICAL ENGINEERS DRAWINGS.

STORMWATER

1. THE INSITU GROUND MUST BE COMPACTED TO 95% MOD. A.A.S.H.T.O. PRIOR TO THE INLET BASE SLAB BEING CAST. IF THIS DENSITY CANNOT BE ATTAINED THE INSITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
2. BRICKS TO BE ENGINEERING UNITS (NXFE-14) AS PER SABS 227.
3. TYPE AND CLASS OF PIPE AS SPECIFIED ON SITE.
4. MANHOLE COVER AND FRAME TO BE SPECIFIED ON SITE.

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
TYPICAL STORMWATER
MANHOLE AND PIPE
BEDDING DETAILS

DATE
2018.09.06

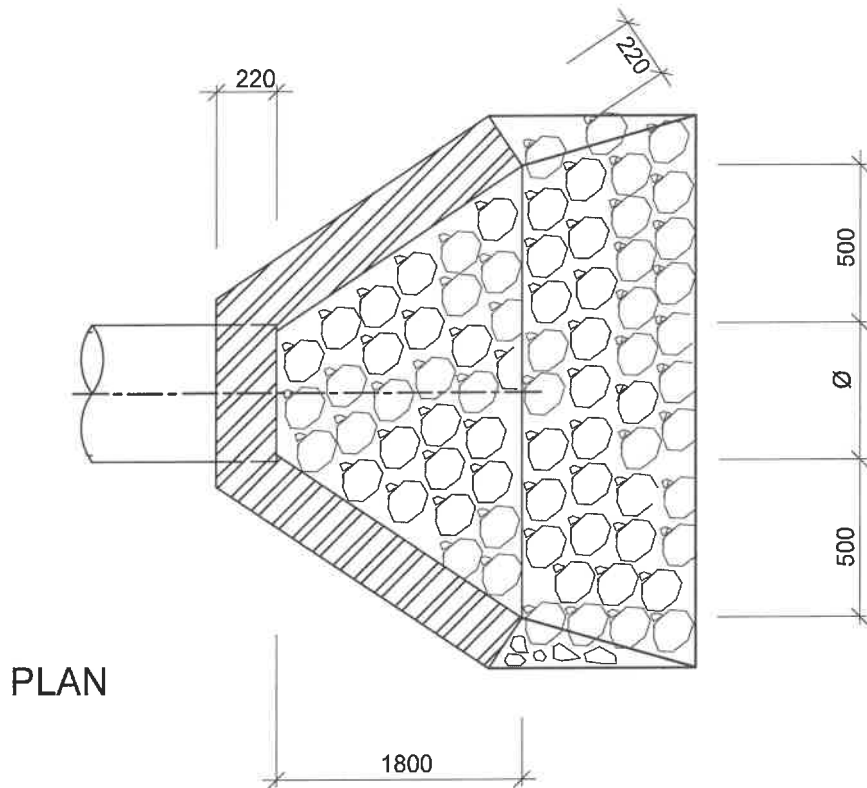
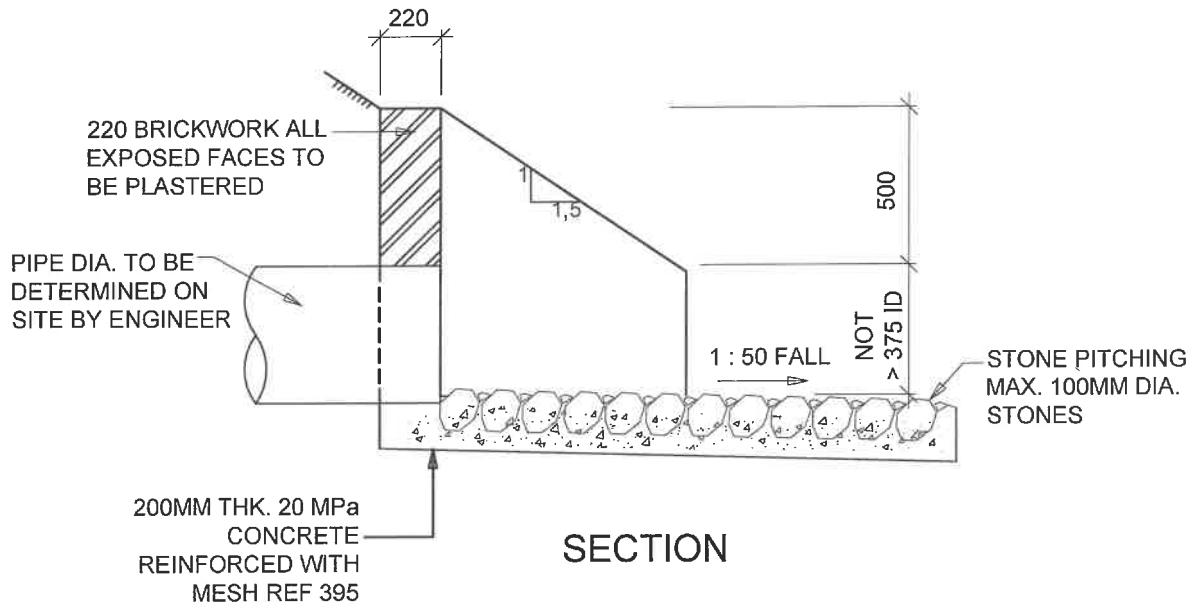
PROJ. No.
474

REVISION

P1

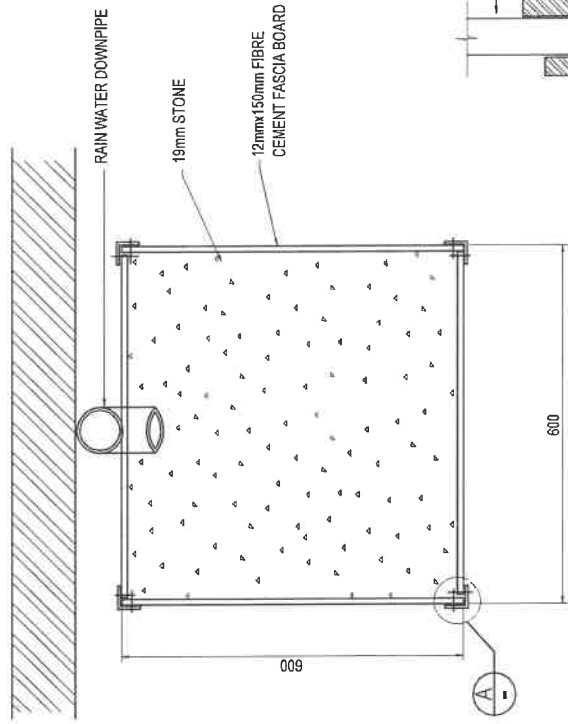
SKETCH No.

Sk 900

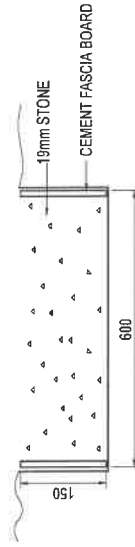


STORMWATER HEADWALL DETAILS

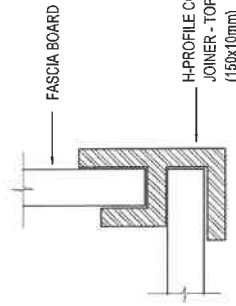
PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: TYPICAL STORMWATER HEADWALL DETAILS ; BRICK AND STONE PITCHED	DATE 2018.10.18	REVISION P2
		PROJ. No. 474	SKETCH No. Sk 901



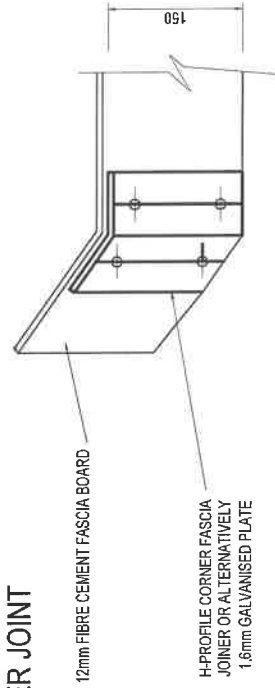
PLAN



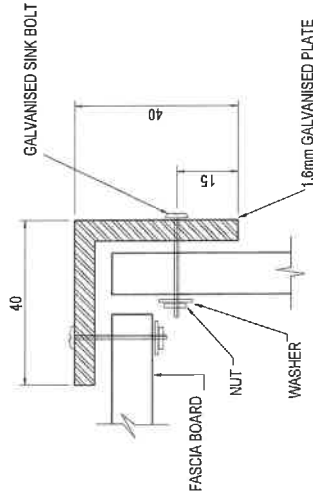
SECTION



H - PROFILE CORNER JOINT

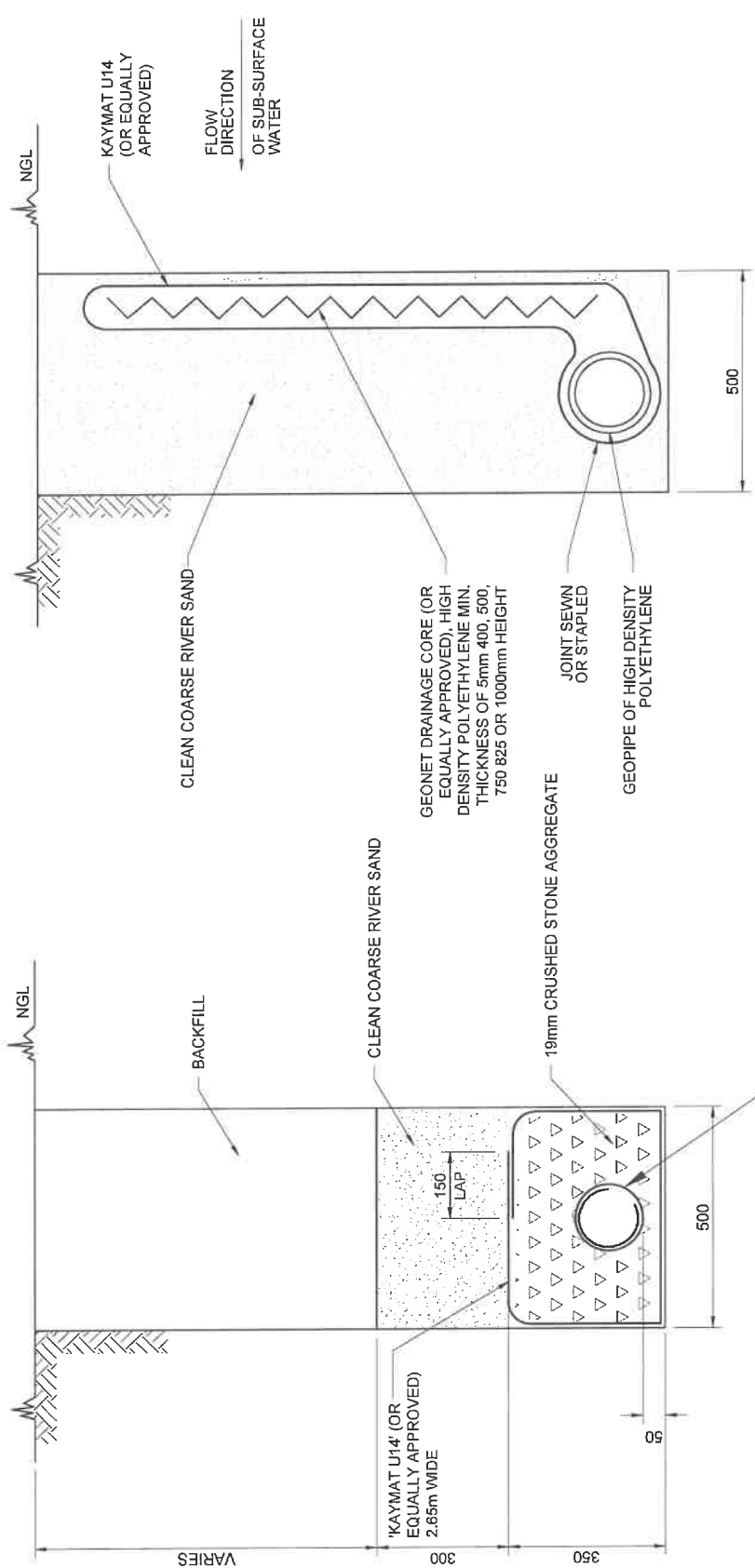


CORNER JOINT



DETAIL A
(NB. ALTERNATIVE METHOD)

 <p>LDM Solutions For The Built Environment WWW.LDM.CO.ZA</p>	 <p>MAP AFRICA CONSULTING ENGINEERS</p>	<p>PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16</p>		<p>DETAILS: TYPICAL DETAILS: SCOUR PROTECTION AT RWDP OUTLET</p>	
		<p>DATE 2018.09.06</p>	<p>REVISION P1</p>	<p>PROJ. No. 474</p>	<p>SKETCH No. SK 902</p>



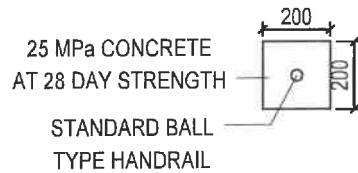
COMPOSITE DRAIN

50, 65, 80, 100 OR 150mm dia. - GEOPIPE
 OR
 110 OR 160mm dia. uPVC PIPES CLASS 4 (SABS 966) SLOTTED
 OR
 VITRIFIED CLAY PIPES CLASS II (SABS 559) WITH
 VITRO SUBSOIL DRAINAGE COUPLINGS
 WITH TAPERED DRIVE JOINTS
 OR
 uPVC CORDRAIN (DIN 1187)
 65, 90, 110 OR 160mm dia.

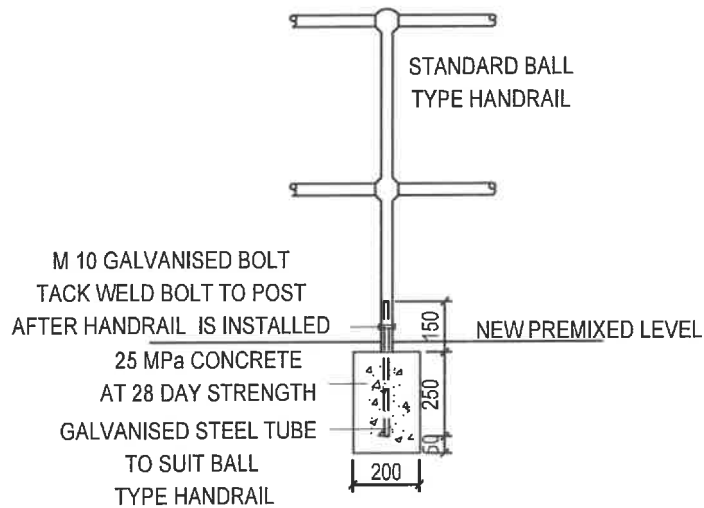
AGGREGATE DRAIN

- NOTES :**
1. HOLES OR SLOTS TO BE LOCATED TOWARDS 4 & 8 O'CLOCK
 2. ENGINEER TO ADVISE ON LEVELS AND POSITION ON SITE

		PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16		DETAILS: TYPICAL SUB-SURFACE DRAINAGE DETAILS	
		DATE 2018.10.18	REVISION P2	PROJ. No. 474	SKETCH No. Sk 903



PLAN ON CONCRETE BASE
N.T.S



FIXING DETAIL FOR HANDRAIL
N.T.S

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

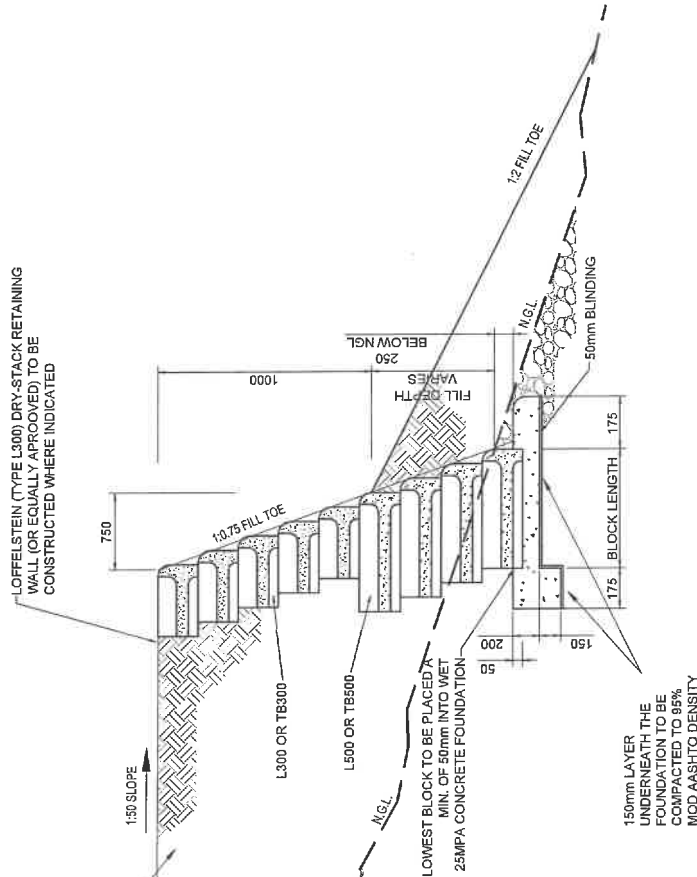
DETAILS:
TYPICAL HAND RAIL
DETAILS

DATE
2018.09.06

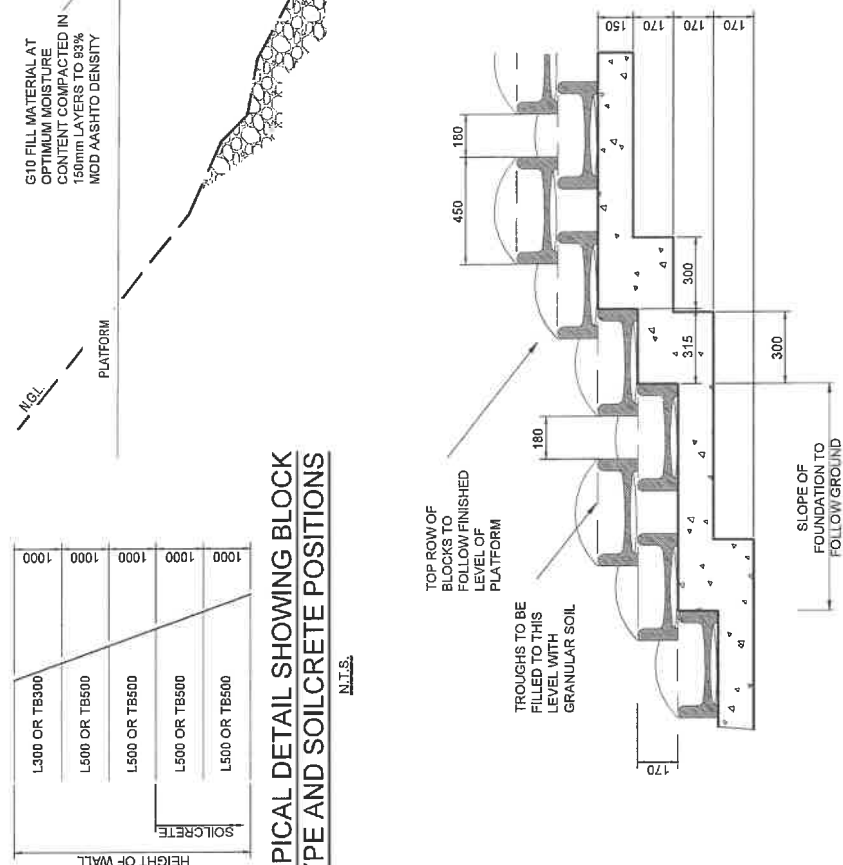
PROJ. No.
474

REVISION
P1

SKETCH No.
Sk 904



TYPICAL SECTION THROUGH WALL



TYPICAL SIDE VIEW

TYPICAL DETAIL SHOWING BLOCK TYPE AND SOILCRETE POSITIONS

N.T.S.

L300 OR TB300	1000
L500 OR TB500	1000
L500 OR TB500	1000
L500 OR TB500	1000
L500 OR TB500	1000
L500 OR TB500	1000
SOILCRETE	
HEIGHT OF WALL	

NOTE:
WHERE FILL DEPTH EXCEEDS 2.0m THEN USE SOILCRETE WITH 5% CEMENT. AT OPTIMUM MOISTURE CONTENT, COMPACTED BY HAND AS FILL MATERIAL BETWEEN AND BEHIND BLOCKS BELOW THIS POINT. (500mm BEHIND BLOCK AND 300mm INTO BLOCK)

LOWEST BLOCK TO BE PLACED A MIN. OF 50mm INTO WET 25MPA CONCRETE FOUNDATION

150mm LAYER UNDERNEATH THE FOUNDATION TO BE COMPACTED TO 95% MOD AASHTO DENSITY

LOFFELSTEIN (TYPE L300) DRY-STACK RETAINING WALL (OR EQUALLY APPROVED) TO BE CONSTRUCTED WHERE INDICATED

G10 FILL MATERIAL AT OPTIMUM MOISTURE CONTENT COMPACTED IN 150mm LAYERS TO 95% MOD AASHTO DENSITY

1:0.75 SLOPE

PLATFORM

N.G.L.

250 BELOW N.G.L.

FILL DEPTH VARIES

N.G.L.

180

TROUGHS TO BE FILLED TO THIS LEVEL WITH GRANULAR SOIL

180

300

315

300

SLOPE OF FOUNDATION TO FOLLOW GROUND LEVEL

450

180

150

170

170

170

150

TOP ROW OF BLOCKS TO FOLLOW FINISHED LEVEL OF PLATFORM

175

175

175

175

175

175

175

175

175

175

175

175

175

175

175

		PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: TYPICAL DRY-STACK RETAINING WALL DETAILS	DATE 2018.10.18	REVISOR P2
		PROJ. No. 474	SKETCH No. SK 905		



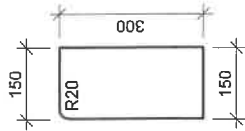


FIG. 1 RECTANGULAR KERBS

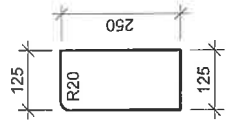


FIG. 2 HALF-ROUND RECTANGULAR KERBS

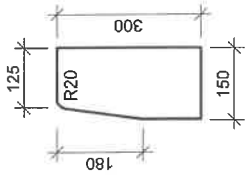


FIG. 3 RECTANGULAR KERBS

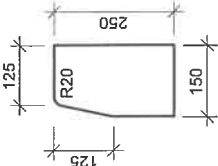


FIG. 4 HALF-BATTERED KERBS

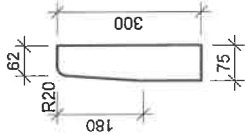


FIG. 5 BATTERED KERBS

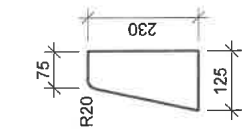


FIG. 6 BATTERED KERBS

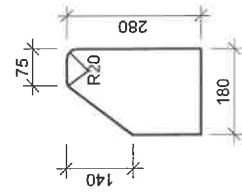


FIG. 7 BATTERED KERBS

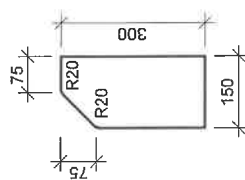


FIG. 9 MOUNTABLE KERBS

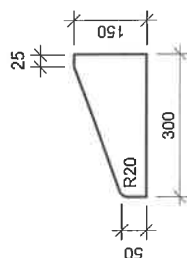


FIG. 8 MOUNTABLE KERBS

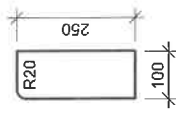


FIG. 10 RECTANGULAR EDGINGS

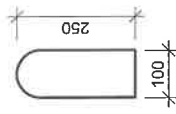


FIG. 11 HALF-ROUND RECTANGULAR EDGINGS

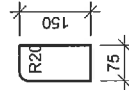


FIG. 12 RECTANGULAR KERBS

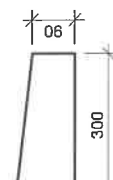


FIG. 13 RECTANGULAR CHANNELS

FIG. 14 TAPERED CHANNELS

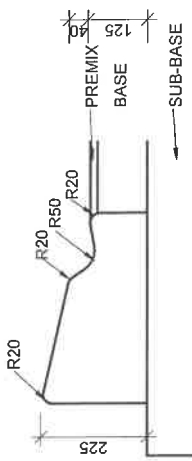


FIG. 7 IN-SITU MOUNTABLE KERB WITH GULLEY

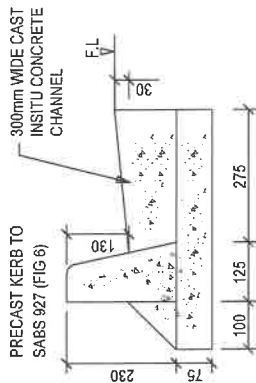


FIG. 6 KERB DETAIL - WITH CHANNEL

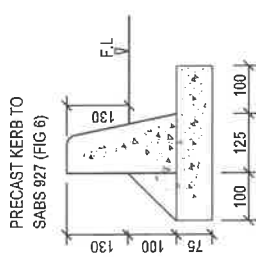


FIG. 6 KERB DETAIL - NO CHANNEL

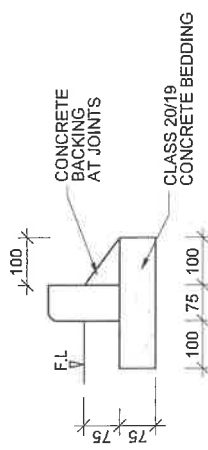


FIG. 12 KERB DETAILS

NOTE

EXPANSION JOINTS OF 12mm WIDTH AT 20m INTERVALS AS PER CLAUSE 5.7 OF SABS 1200 M/C
 MASS CONCRETE BACKING AT ALL JOINTS



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PROJECT:
 DEPARTMENT OF EDUCATION
 STORM DAMAGED DISASTER
 PROGRAMME PHASE 16

TITLE:
 TYPICAL KERBING
 DETAILS

DATE
 2015.09.06

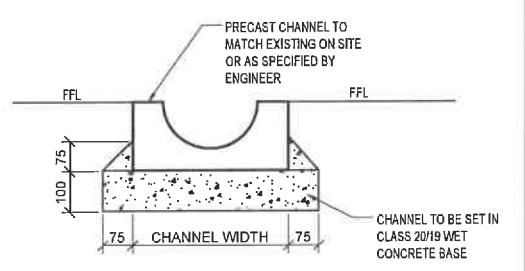
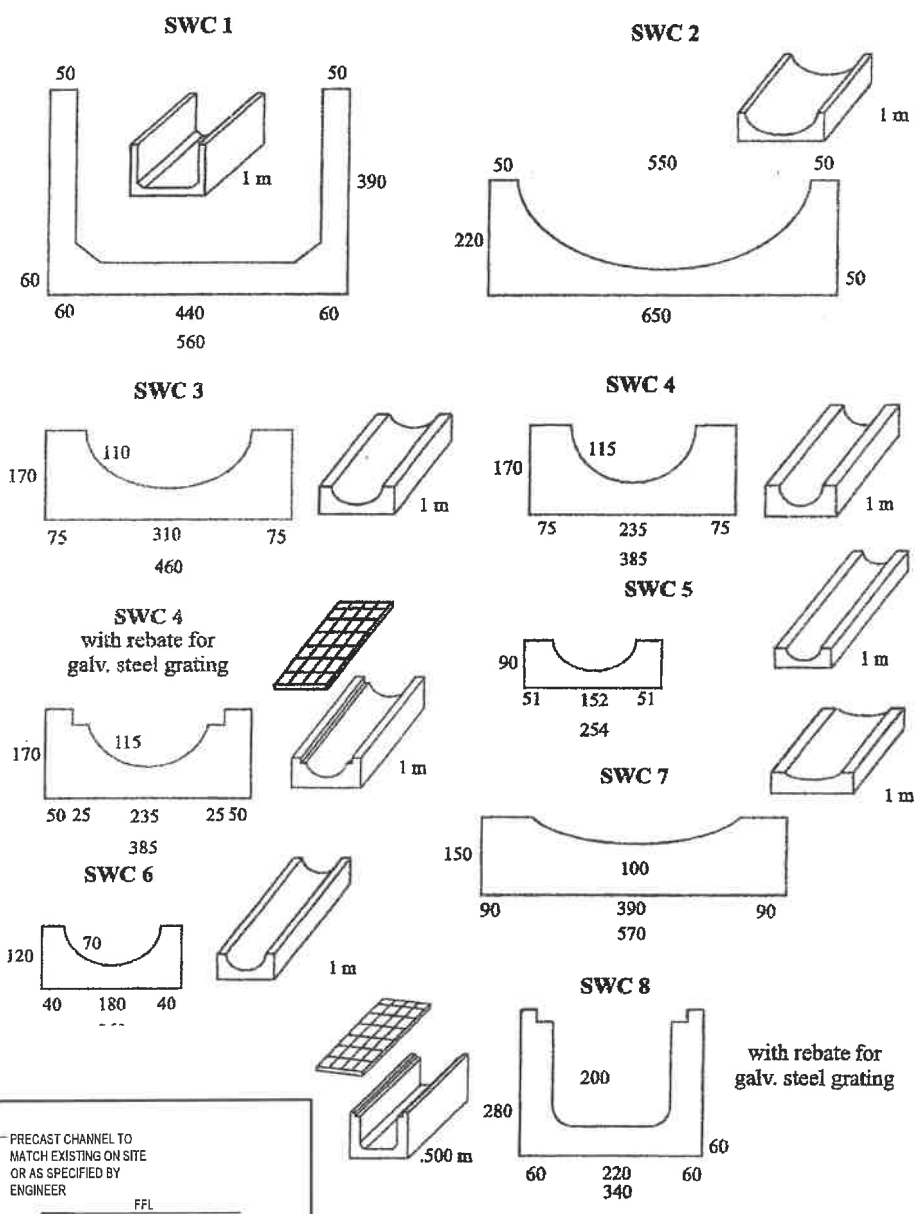
REVISION
 P1

PRCJ. No.
 474

SKETCH No.
 Sk 906

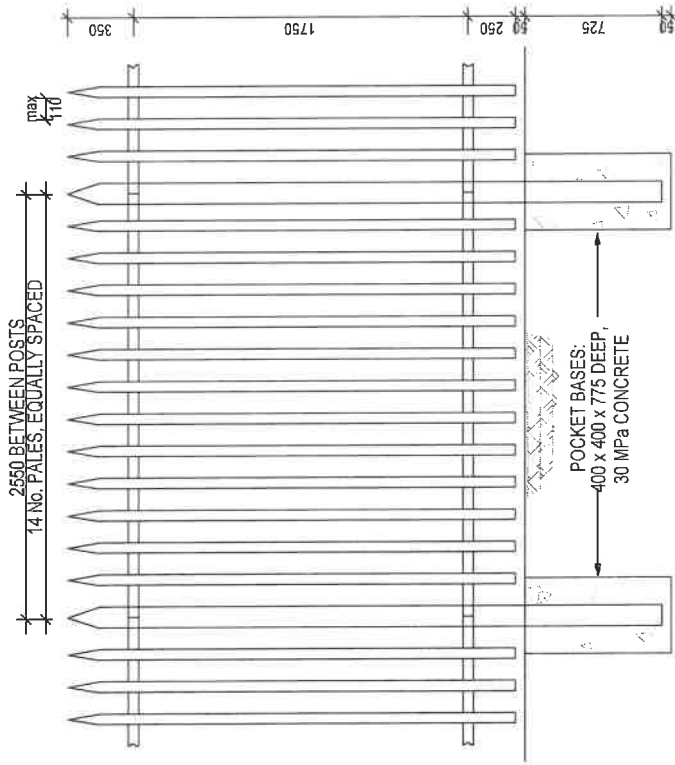


SURFACE WATER CHANNELS



TYPICAL INSTALLATION DETAILS FOR PRECAST CONCRETE SURFACE WATER CHANNELS
N.T.S

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: TYPICAL STORMWATER SURFACE CHANNEL TYPES AND INSTALLATION DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No. 474	SKETCH No. Sk 907



NOTES:

1. POSTS : IPE 100 x 55 (8.1 kg/m), RAILS: 60 x 60 x 5 ANGLES AND PALES: 40 x 40 x 5mm
2. PALES TO BE WELDED TO RAILS AND ALL WELDS TO BE 5mm CFW
3. ALL STEELWORK TO BE HOT-DIPPED GALVANISED TO SANS 763 STANDARDS
4. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION
5. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE BEING CAST

STEEL PALISADE FENCE – SPECIFICATION NO. 278/SPF SPECIFICATION FOR THE FABRICATION AND INSTALLATION OF STEEL PALISADE FENCING

1 DIMENSIONS AND GENERAL CHARACTERISTICS

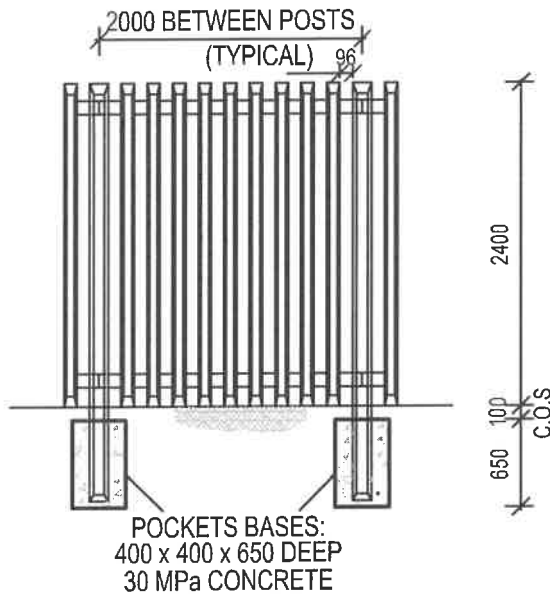
- 1.1 MAIN POSTS
SHAPED IPE 100 SECTIONS. 100 X 55 X 8.1 kg/m. GRADE 300 W, HOT-ROLLED SECTIONS. SLOTTED TO RECEIVE FISH PLATES TOP AND BOTTOM.
- 1.2 RAILS
TOP AND BOTTOM RAIL : 60 X 60 X 5 ANGLES. GRADE 300W, HOT-ROLLED SECTIONS.
- 1.3 PALES
40 X 40 X 5 ANGLES. GRADE 300W, HOT ROLLED SECTIONS.
- 1.4 FISH PLATES
140 X 50 X 8 mm FLAT BAR
- 1.5 FIXINGS
PALES TO RAIL : WELDING TO SABS STANDARDS RAILS TO FISH PLATE: M12
'ANT-VANDAL' SHEAR FIXINGS, TOP AND BOTTOM GRADE 8.8
2. CONSTRUCTION
2.1 POSTS SHALL BE PROVIDED AT 2.55m CENTRE TO CENTRE, SHAPED TO A POINT AT THE TOP. POST TO BE EMBEDDED IN 30 MPa CONCRETE POCKET BASE (MIN. 400 X 400 X 800 DEEP) TO A MINIMUM DEPTH OF 725mm.
- 2.2 POSTS TO RAILS CONNECTIONS
RAILS SHALL BE SECURED TO POSTS WITH CONNECTOR PLATES OR 'FISH PLATES', BOLTED TO THE VERTICAL LEG OF THE RAIL.
- 2.3 PROTECTIVE TREATMENT
AFTER THE FABRICATION OF FENCING COMPONENTS, INCLUDING THE PUNCHING OR DRILLING OF ANY HOLES, THE FENCING SHALL BE HOT-DIPPED GALVANIZED TO SANS 763 STANDARDS.
- 2.4 GENERAL
ALL FOUNDING CONDITIONS TO BE INSPECTED BY THE ENGINEER PRIOR TO CONCRETE BEING CAST. MAP AFRICA CONSULTING ENGINEERS TO APPROVE ALL SHOP DRAWINGS PRIOR TO FABRICATION OF THE STEEL PALISADE FENCE.

TYPICAL SECTION ON STEEL PALISADE FENCE

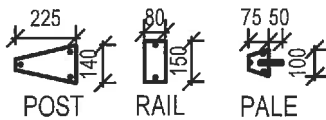
		<p>PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16</p>		<p>DETAILS: TYPICAL GALVANISED STEEL PALISADE FENCING DETAILS</p>	
		<p>DATE 2018.09.08</p>	<p>REVISION P1</p>	<p>PROJ. No. 474</p>	<p>SKETCH No. Sk 908</p>



1. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND/ OR CONSTRUCTION.
3. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE.



TYPICAL ELEVATION ON CONCRETE PALISADE FENCE
SCALE 1 : 50

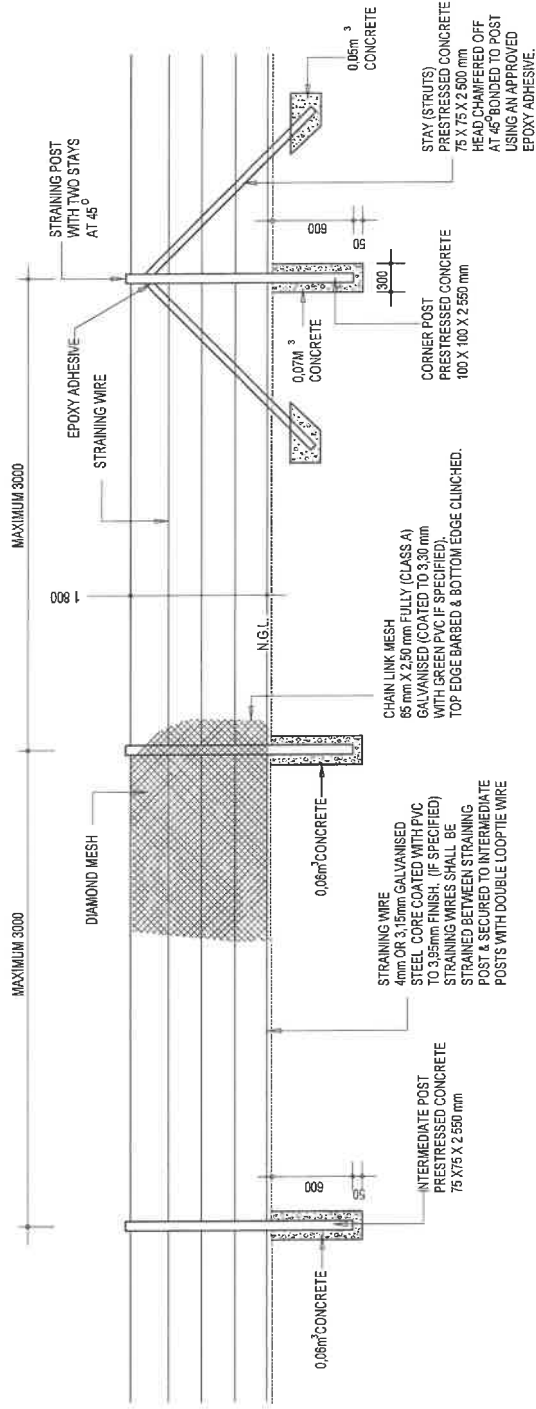


SECTIONAL DETAILS
SCALE 1 : 50

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: TYPICAL PRECAST CONCRETE PALISADE FENCING DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No. 474	SKETCH No. Sk 909

NOTES:

1. ALL POSTS, DROPPERS AND STANDARDS TO BE ON THE INSIDE OF FENCE.
2. STRAINING POSTS TO BE USED AT EVERY CHANGE OF VERTICAL AND HORIZONTAL DIRECTION WITH A MAXIMUM SPACING OF 30 METRES.
3. INTERMEDIATE POSTS TO BE USED AT A MAXIMUM SPACING OF 3 METRES.
4. CONCERTINA GATES TO BE USED WHERE SPECIFIED.
5. SPECIFICATION FOR CORROSION PROTECTION FOR GATE TO BE SPECIFIED WHEN ORDERING.
6. SPECIFICATION FOR GATE HINGES TO BE SPECIFIED WHEN ORDERING. (EG. HOLE TYPE OR BRACKET TYPE).

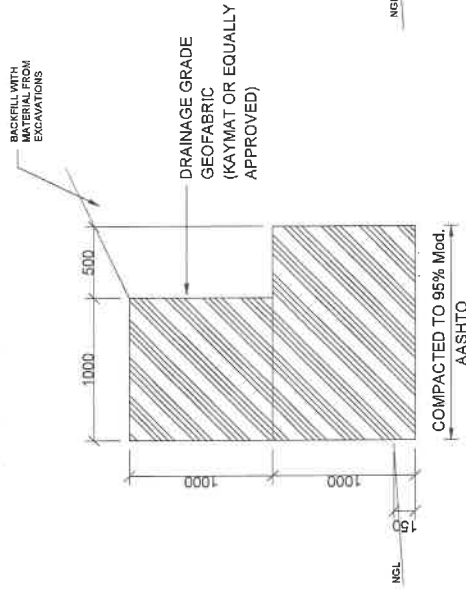


CONCRETE FENCE SUPPORTS WITH CHAIN LINK MESH

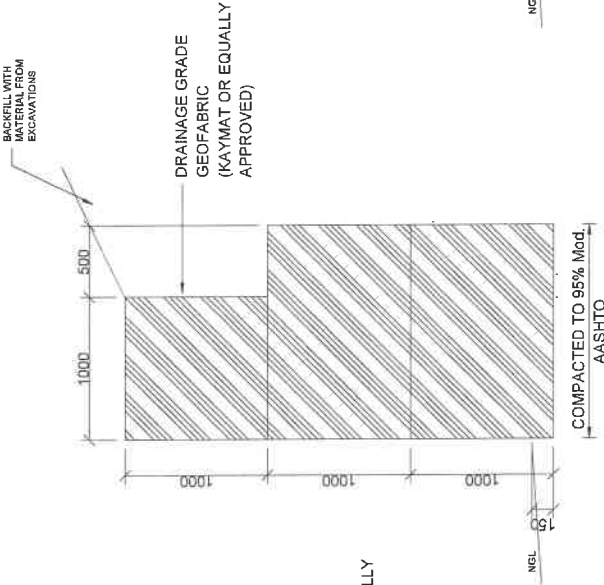
N.T.S

 <p>LDM Solutions For The Built Environment WWW.LDM.CO.ZA</p>	 <p>MAP AFRICA CONSULTING ENGINEERS</p>	<p>PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16</p>		<p>DETAILS: TYPICAL WIRE MESH FENCING DETAILS</p>	
		<p>DATE 2018.09.06</p>	<p>REVISION P1</p>	<p>PROJ. No. 474</p>	<p>SKETCH No. Sk 910</p>

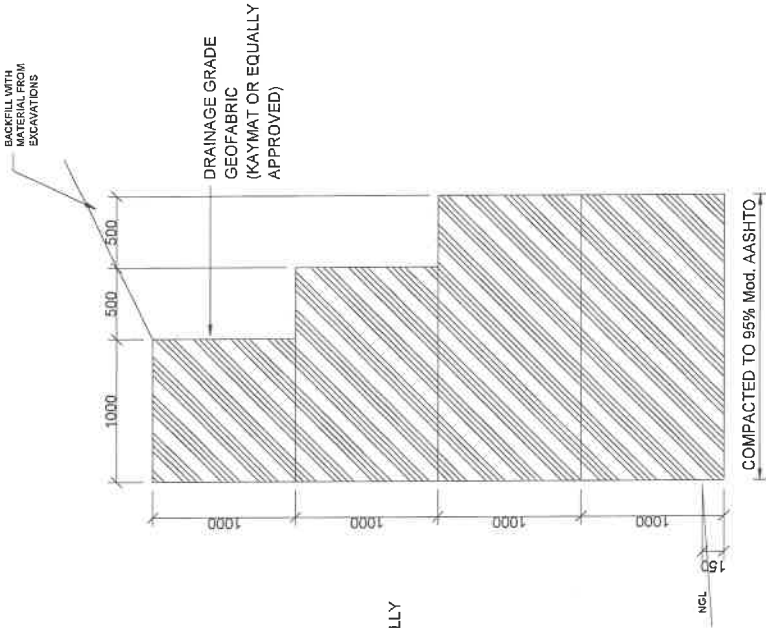
- NOTES:
- FOUNDATIONS TO BE STEPPED AND PREPARED AS INSTRUCTED BY THE ENGINEER. ALL FOUNDATIONS TO BE APPROVED AS INSTRUCTED BY THE ENGINEER.
 - ALL WIRE USED IN THE MAKING OF GABIONS SHALL BE GALVANISED IN ACCORDANCE WITH THE PROVISIONS S.A.B.S. WIRE FOR CLASS A HEAVY GALVANISED MILD-STEEL WIRE.
 - THE STANDARD SIZES OF GABIONS ARE AS FOLLOWS :
LENGTH : 1.0m, 2.0m, 3.0m & 4.0m
HEIGHT : 0.5m, 1.0m & 1.5m
DIAPHRAGM SPACING: 1.0m
 - LACING AND BRACING TO BE DONE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.



TYPICAL 2,0m
HIGH WALL



TYPICAL 3,0m
HIGH WALL



TYPICAL 4,0m
HIGH WALL

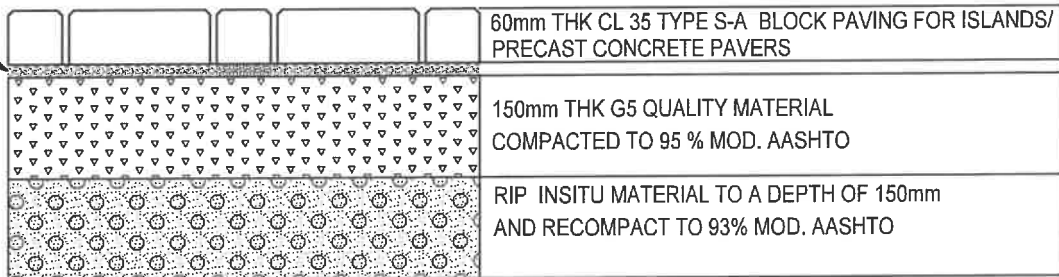
TYPICAL DETAILS OF GABION RETAINING WALLS OF VARIOUS HEIGHTS

N.T.S

 <p>LDM Solutions For The Built Environment WWW.LDM.CO.ZA</p>	 <p>MAP AFRICA CONSULTING ENGINEERS</p>	<p>PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16</p>		<p>DETAILS: TYPICAL GABION RETAINING WALL DETAILS</p>	
		<p>DATE 2016.10.18</p>	<p>REVISION P2</p>	<p>PROJ. No. 474</p>	<p>SKETCH No. Sk 911</p>



20mm COARSE
RIVER SAND



**TYPICAL BRICK PAVING/ PRECAST CONCTETE PAVING
LAYERWORK DETAILS**
N.T.S

PROJECT: DEPARTMENT OF EDUCATION STORM DAMAGED DISASTER PROGRAMME PHASE 16	DETAILS: TYPICAL BLOCK PAVING/ PRECAST CONCRETE PAVING LAYERWORK DETAILS	DATE 2018.09.06	REVISION P1
		PROJ. No. 474	SKETCH No. Sk 912

PROPERTY	G1	G2	G3	G4	G5	G6	G7
MAX DIAMETER (mm)	37.5	37.5	37.5	50.0	63.0	63.0	100.0
GRADING MODULUS BEFORE TREATMENT	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	>= 1.50	>= 1.20	>= 0.75
LIQUID LIMIT (MAX) (%)	25	25	25	25	30	-	-
PLASTICITY INDEX (MAX) (%)	4	6	6	6	10	12	12
10% FACT (MIN) (kN)	110	110	N.A.	N.A.	N.A.	N.A.	N.A.
LINEAR SHRINKAGE (%) (MAX)	2	3	3	3	5	6	6
ACV (MAX) (%)	29	29	N.A.	N.A.	N.A.	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.	N.A.	N.A.	N.A.
MIN. CBR %	N.A.	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	45 @ 95% MOD AASHTO	25 @ 93% MOD AASHTO	15 @ 93% MOD AASHTO
SWELL (MAX) % AT 100% MOD	N.A.	0.2	0.2	0.2	0.5	1.0	1.5
SOLUBLE SALTS (%)	< 0.2%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MgSO ₄ + Na ₂ O ₄ (%)	< 0.05%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

MATERIAL PROPERTIES FOR :
CRUSHED STONE (G1, G2, G3)
NATURAL GRAVEL (G4, G5, G6)
GRAVEL SOIL (G7)

PROPERTY	G8	G9	G10	SELECTED FILL
GRADING MODULUS	NO REQUIREMENTS	NO REQUIREMENTS	NO REQUIREMENTS	0.75
MIN CBR%	10	7	3	10
AT IN-SITU DENSITY	1.5	1.5	1.5	1.5
LIQUID LIMIT (MAX) (%)	N.A.	N.A.	N.A.	40
PLASTICITY INDEX (MAX) (%)	N.A.	N.A.	N.A.	18

MATERIAL PROPERTIES FOR
GRAVEL - SOIL AND SELECTED FILL

PROPERTY	C1	C2	C3	C4
MAX DIAMETER (mm)	37.5	37.5	63.0	63.0
GRADING MODULUS BEFORE TREATMENT	>= 1.50	>= 1.50	>= 1.50	>= 1.50
LIQUID LIMIT (MAX) BEFORE (%)	25	25	30	45
PLASTICITY INDEX (MAX) BEFORE (%)	6	6	10	10
PLASTICITY INDEX (MAX) AFTER (%)	N.A.	N.A.	6	6
10% FACT (MIN) kN	110	110	N.A.	N.A.
ACV (MAX) (%)	29.0	29.0	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.
SAND ADDED EQUIVALENT (%)	>= 30.0	>= 30.0	N.A.	N.A.
UCS 100% MOD AASHTO (MPa)	> 6.0 < 12.0	> 3.0 < 6.0	> 1.5 < 3.0	> 0.75 < 1.5

MATERIAL PROPERTIES FOR
CEMENTED CRUSHED STONE OR NATURAL GRAVEL

SIEVE SIZE	% PASSING	
	G1,C1,C2	G2,G3,C1,C2
53.0mm	100	100
37.5mm	100	100
26.5mm	84-84	100
19.0mm	71-84	85-95
13.2mm	59-75	71-84
4.75mm	36-53	42-60
2.00mm	23-40	27-45
0.425mm	11-24	13-27
0.075mm	4-12	5-12

GRADING ENVELOPE

- NOTES:**
1. TYPE AND PERCENTAGE OF STABILIZATION TO BE DETERMINED BY LABORATORY
 2. MATERIAL PROPERTIES DERIVED FROM TRH 14 & SABS. 1200



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MAP AFRICA
 CONSULTING ENGINEERS

PROJECT:
 DEPARTMENT OF EDUCATION
 STORM DAMAGED DISASTER
 PROGRAMME PHASE 16

DETAILS:
 MATERIAL PROPERTIES
 FOR LAYERWORKS

DATE
 2018.09.06

REVISION
 P1

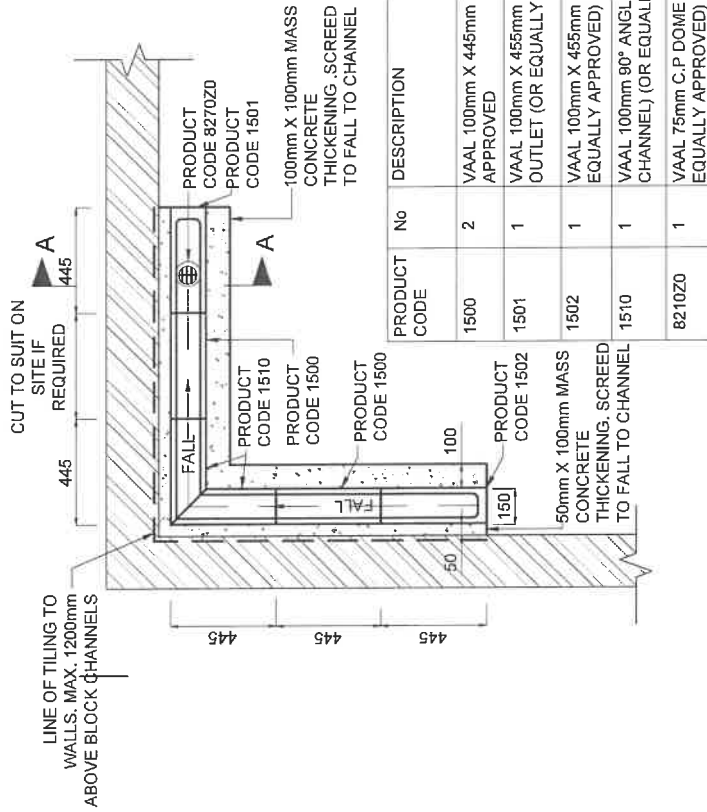
PROJ. No.
 474

SKETCH No.

Sk 913

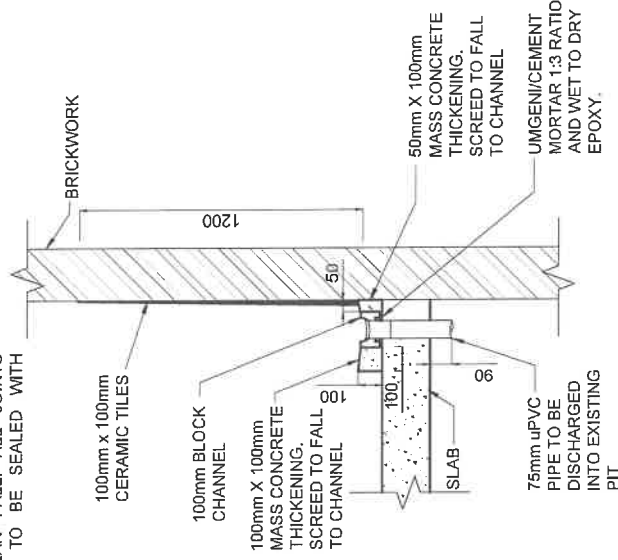
NOTE:

THE CHANNELS ARE TO BE FIXED TO THE SURFACE BED WITH UMGENI/CEMENT MORTAR 1:3 RATIO AND WET TO DRY EPOXY.THE SURFACE BED IS TO BE SCABBLED PRIOR TO APPLICATION OF MORTAR.THE CHANNEL IS TO BE LAID AS PER PLAN FALL. ALL JOINTS BETWEEN CHANNELS TO BE SEALED WITH WATERPROOF GROUT.



PLAN
SCALE 1:20

PRODUCT CODE	No	DESCRIPTION
1500	2	VAAL 100mm X 445mm PLAIN (OR EQUALLY APPROVED)
1501	1	VAAL 100mm X 455mm WITH 75mm CENTRE OUTLET (OR EQUALLY APPROVED)
1502	1	VAAL 100mm X 455mm STOREND (OR EQUALLY APPROVED)
1510	1	VAAL 100mm 90° ANGLE (TWO MITRED 150 CHANNEL) (OR EQUALLY APPROVED)
821020	1	VAAL 75mm C.P DOME GRATING (OR EQUALLY APPROVED)



SECTION A-A
SCALE 1:20

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16



REVISION
P2

DATE
2018.10.18

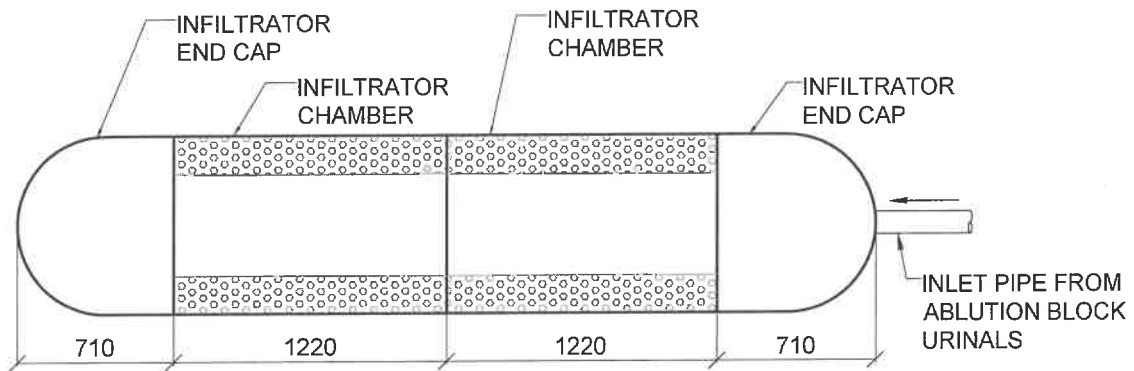
PRDJ. No.
474

SKETCH No.
Sk 915

DETAILS:
PLAN AND SECTION
SHOWING URINAL TO
BOYS ABLUTION

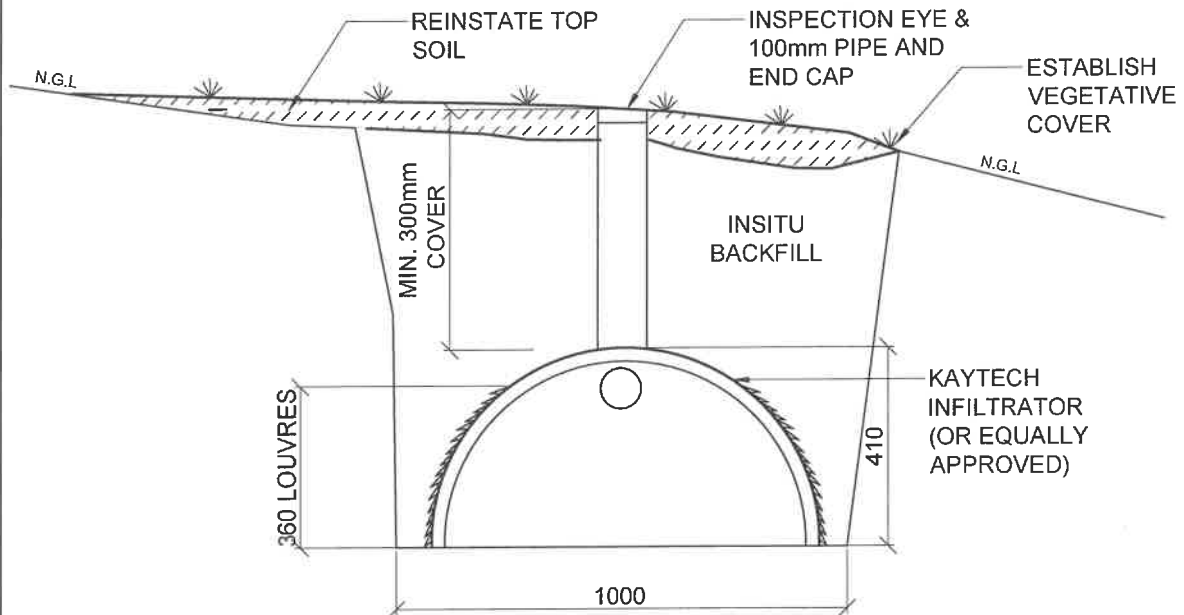






PLAN

SCALE 1:30



SECTION

SCALE 1:15

**TYPICAL SECTION THROUGH
INFILTRATOR SOAKAWAY**

PROJECT:
DEPARTMENT OF EDUCATION
STORM DAMAGED DISASTER
PROGRAMME PHASE 16

DETAILS:
TYPICAL INFILTRATOR
SOAKAWAY DETAIL FOR
URINALS

DATE
2018.10.18
PROJ. No.
474

REVISION
P2
SKETCH No.
Sk 916