37	Single 16A socket outlet flush (normal)	EA	3	
38	Single 16A socket outlet in watertight weatherbox	EA	1	
	SWITCHES / LUMINIARIES			
	LIGHT SWITCHES			
	Stainless steel / brush aluminium 100mm x 50mm with 2 x screws cover plate. Black socket trimming and switch. Complete with yoke and fixing material.			
39	Single lever 1 way light switch.	EA	5	
40	Rotary water tight light switch 1 way rated IP 65	EA	2	
41	10A Photoelectric outdoor lighting control switch installed on wall	EA	3	
	LUMINARIES			
	Supply and install luminaries fixed to structures e.g.: concrete ceiling; Rhino board ceiling and walls. Price shall include lamps and the connecting thereof. Luminaires with battery back-up must be supplied with an additional core (4 core).			
42	Bulkhead: square 274mm x 274mm x 104mm, 2 x PL18, 220V, matt white, electronic ballast, 1 x 18W battery back-up, surface mounted	EA	2	
	Carried to Collection			R

Section No. 4
Bill No. 4
NEW LIVING QUARTERS BLOCK B

43	Bulkhead: decorative round bulkhead, 2 x PL9 220V, matt white, electronic ballast, surface mounted - bathrooms	EA	3	
44	Bulkhead: round 280mm (d) x 104mm (h), 2 x PL9 220V, matt black, electronic ballast, outside, surface mounted	EA	3	
45	Bulkhead: rectangular 440mm (w) x 320mm (l) x 217mm (h), 125W mercury vapour, matt black complete with decorative skirt assembly, surface mounted	EA	4	
46	Bulkhead: decorative round 280mm (d) x 104mm (h), 2 x PL9 220V, matt black, electronic ballast, surface mounted	EA	4	
47	Emergency exit lighting: single sided illuminated with battery back up ceiling mounted bracket. (down arrow with man running) (dimensions: 330 x 145 x 46 mm)	m	1	
48	Emergency exit lighting: single sided illuminated with battery back up, surface mounted bracket. (horizontal arrow - right, man and stairs, green) (dimensions: 330 x 145 x 46mm)	m	1	
49	Fluorescent: 1.2m tube 2 x 36W, electronic ballast, surface mounted, with LBR Fitting	EA	3	

LIGHTNING PROTECTION

50	The building will be protected against lightning strikes according to SABS 0313. The successful contractor will use the building re enforce steel at distances not more than 20m apart and connect to the base prior to it being casted. Provide engineer with a compliance certificate.			
			SUM	
	Carried to Collection		R	

Section No. 4
Bill No. 4
NEW LIVING QUARTERS BLOCK B

51	Allow for Earth resistance tests and reports			SUM
	EARTHING AND BONDING			
52	Provide earthing and bonding in all ablution rooms, laundries and kitchens			SUM
	GEYSER/HYDROBOIL/HAND DRYERS			
53	Supply and install 150l geyser with all valves, piping, etc. to supply the kitchen and bathrooms. Water distribution to form part of the Architects Bill of Materials	EA	3	
	GENERAL / TESTING AND COMMISSIONING			
54	Allow for testing, balancing of Phases and commissioning of the whole electrical installation - lighting and power			SUM
55	Allow for providing detailed manuals and marked up drawings of the electrical services installation to the Engineer			SUM
56	Allow for Certificate of Compliance in terms of the Occupational and Health Safety Act, OSHACT of 1993.			SUM
57	Compliance with OH SACT : Compiling and implementing of Safety Plan and issuing of safety clothes, shoes, gloves etc, as required.			SUM
58	Labelling of all circuits and draw boxes with permanent screw on type labels as described in Project Detailed Specifications.			SUM
	Carried to Collection			R

Section No. 4
Bill No. 4
NEW LIVING QUARTERS BLOCK B

59	Supply and install 35mm locally manufactured padlocks and locking devices as well as master keys.(3 sets) with purpose-made pvc labels to lock and unlock all DB's, SDB's and lockable draw boxes.	SUM	
	Carried to Collection	R	

Section No. 4
Bill No. 4
NEW LIVING QUARTERS BLOCK B

Section No. 4

Bill No. 4

NEW LIVING QUARTERS BLOCK B

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	152	
	153	
	154	
	155	
	156	
	157	
	158	
	159	
	160	
	161	
	162	
Carried Forward to Summary of Section No. 4		R

Section No. 4
Bill No. 4
NEW LIVING QUARTERS BLOCK B

Item No		Quantity	Rate	Amount
	SECTION 4			
	BILL NO. 5			
	ELECTRICAL INSTALLATION			
	NOTE: Tenderers are advised to study the Model Preambles for Trades before pricing this bill			
	Tenderers are advised to study the Department of Public Works - Construction works: General Specification (PW371-A) and Construction works: Particular Specification (PW371-B) before pricing this bill			

	CONSTRUCTION OF NEW CELL BLOCK			
	Carried to Collection		R	

Section No. 4
Bill No. 5
NEW CELL BLOCK

PROJECT AND QUALITY SPECIFICATIONS

This Bill shall be read in conjunction with the Detailed ElectricalSpecification as well as the electrical drawings

The project comprises the supply, delivery, installation, testing and commissioning of all the electrical equipment together with other services as specified in the Detailed Specification.

The Tenderer shall be deemed to have perused the above mentioned document and considered fully conversant with the contents and allow for it in his price.

No allowance has been made in the measurement of conductors for additional lengths at connection points and prices for the measured conductors shall be deemed to be included

All DB's, Switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.

Conduits described as "fixed" shall be deemed to include for fixing to all types of surfaces, in chases or casting in or building into walls, etc, and prices shall include for the above

Price for cables shall be deemed to include installation as well as termination of all cables.

MAIN SUPPLY / DISTRIBUTION BOARDS

DISTRIBUTION BOARDS

Carried to Collection R

Section No. 4
Bill No. 5
NEW CELL BLOCK

	Supply and install a new distribution board, complete with sheet metal trays, frames, sub-frames, busbars, provision for future circuit breakers, legend card, circuit breakers, switches, relays, earth leakage units, etc. and as detailed on the schematic wiring diagrams. All DB's, switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.				
	MAIN SUPPLY / DISTRIBUTION BOARDS				
	DISTRIBUTION BOARDS				
	Supply and install a new distribution board, complete with sheet metal trays, frames, sub-frames, bus bars, provision for future circuit breakers, legend card, circuit breakers, switches, relays, earth leakage units, etc. and as detailed on the schematic wiring diagrams. All DB's, switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.				
	DB - Cells				
	Standby				
1	120A, 15kA, 3 Pole MCCB	EA	1		
2	80A, 6kA, 3 Pole MCB	EA	4		
3	60A, 6kA, 2 Pole Earth Leakage	EA	1		
4	40A, 6kA, 3 Pole MCB	EA	1		
5	30A, 6kA, 3 Pole MCB	EA	1		
	Carried to Collection			R	

Section No. 4
Bill No. 5
NEW CELL BLOCK

6	20A, 6kA, 3 Pole MCB	EA	1	
7	30A, 6kA, 2 Pole MCB	EA	4	
8	20A, 6kA, 1 Pole MCB	EA	6	
9	15A, 6kA, 1 Pole MCB	EA	21	
	Normal			
10	80A, 6kA, 3 Pole MCB	EA	1	
11	60A, 6kA, 3 Pole MCB	EA	2	
12	16A, 6kA, 2 Pole MCB	EA	12	
13	DB - Security	EA	1	
14	60A, 15kA, 3 Pole MCB	EA	1	
15	20A, 6kA, 1 Pole MCB	EA	4	
	ISOLATORS			
	Supply and install new isolators for air conditioning units, ventalation equipment, stove, geyser, etc. complete with flexible conduit, connectors , compression glands, brackets, etc.			
16	16A 2 pole isolator	EA	12	
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

17	30A 2 pole isolator	EA	4	
18	20A 3 pole isolator	EA	1	
19	60A 3 Pole isolator (UPS)	EA	2	

CABLES AND BUSBARS

Supply and install the following cables drawn through ducts or laid on cable trays. Note that all earth conductors shall be strapped to their respective supply cables at intervals not more than 1m apart.

LV CABLES

16mm² 4 Core Copper cable.

20	DB-Cell Normal to AC outdoor unit 1	m	30	
21	16mm² BCC Earth conductor for above	m	30	

10mm² 4 Core Copper cable.

22	DB-Cell Normal to Stove	m	40	
23	10mm² BCC Earth conductor for above	m	40	

6mm² 4 Core Copper cable.

24	DB-Cell Normal to Pot	m	40	

Carried to Collection R

Section No. 4
Bill No. 5
NEW CELL BLOCK

25	6mm² BCC Earth conductor for above 4mm² 4 Core Copper cable.	m	40	
26	DB-Cell Normal to Extract Canopy	m	40	
27	4mm² BCC Earth conductor for above	m	40	
	LV CABLE TERMINATIONS			
	Cable terminations to supply cables and earth continuity conductor, to include - cable glands, lugs and connections at Main DB and SDB's.			
28	16mm² 4 Core Cable (Indoor)	No	2	
29	10mm² 4 Core Cable (Indoor)	No	2	
30	6mm² 4 Core Cable (Indoor)	No	2	
31	4mm² 4 Core Cable (Indoor)	No	2	
32	16mm² BCC	No	2	
33	10mm² BCC	No	2	
34	6mm² BCC	No	60	
35	4mm² BCC	No	60	
	RETICULATION			
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

	CONDUIT			
	Supply and install Bosal conduit with support fixings (saddles/ couplings/adaptors), cast in concrete, surface bed or screed, fixed to wood, roof members, suspended ceiling, steel, etc., run in roof space, chased and/or fixed in brickwork including bends			
	20 mm diameter conduit			
36	Interior luminiare, communication and data circuits	m	50	
	25 mm diameter conduit			
37	Socket outlet, air conditioning and isolator circuits	m	50	
38	Exterior Luminiare circuits	m	80	
39	Fire detection	m	110	
	20 mm Diameter flexible conduit			
40	Supply and install 20mm diameter flexible conduit in 1m lengths with couplings complete.	EA	7	
	CONDUIT ACCESSORIES AND DRAW BOXES			
	Supply and install Bosal conduit accessories and outlet boxes and cover plate to suit number, size or type of entries, fixed onto conduit.			
41	100mm x 100mm x 50mm deep box	EA	8	
	Carried to Collection			R

42	100mm x 50mm x 50mm deep box	EA	15	
43	65 mm Diameter round boxes	EA	7	
	TRUNKING / CABLE RACKS / WIRE MESH			
	Supply and install trunking/cable racks/wire mesh installation complete with fixings, example hangers, caddy clips, nuts, washers, rivets, splices, Tee-pieces, 4 way cross overs, elbows, clamps, anchors, etc			
	TRUNKING: LIGHT CIRCUITS			
44	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid	m	20	
45	Galvanised ducting 76 x 51mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - T-Off	m	1	
46	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 4 Way	EA	1	
47	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees horizontal	EA	1	
48	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees vertical	EA	1	
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

TRUNKING: PLUG CIRCUITS

49	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid	m	80		
50	Galvanised ducting 76 x 51mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - T-Off	EA	2		
51	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 4 Way	EA	1		
52	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees horizontal	m	1		
53	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees vertical	EA	1		

WIRING

Supply and install wirng for all power and light circuits. All light circuits will be wired with 2.5mm², plug circuits with 4mm² and circuits feeding isolators with 4mm²

54	2,5mm² Wiring for light circuits (Red)	m	300		
55	2,5mm² Wiring for light circuits (Black)	m	300		
56	2,5mm² Wiring for light circuits (Copper)	m	300		

Carried to Collection R

Section No. 4
Bill No. 5
NEW CELL BLOCK

57	4mm² Wiring for plug circuits (Red)	m	80	
58	4mm² Wiring for plug circuits (Black)	m	80	
59	4mm² Wiring for plug circuits (Copper)	m	80	
60	6mm² Wiring for alternative circuits	m	20	
61	Draw wire	m	400	
	POWER SKIRTING			
62	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover.	m	20	
63	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. End cap	EA	4	
64	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. Wall entry	EA	1	
	TELEPHONE DISTRIBUTION BOARD			

Carried to Collection R

Section No. 4
Bill No. 5
NEW CELL BLOCK

	Supply, deliver, storage and installation of TELKOM and DATA approved type distribution board size 450 x 450 x 150mm deep to accommodate requirements as shown out in specification clause			
65	Telephone Distribution Board to be installed as per specifications	EA	1	
66	Data Distribution Board to be installed as shown as per specifications	EA	1	
	SOCKET OUTLETS / ISOLATORS / COMMUNICATION / DATA			
	SOCKET OUTLETS			
	Stainless steel / brush aluminium 100mm x 100mm with 2 x screws cover plate. Black socket trimming and switch. Complete with yoke and fixing material			
67	Double 16A socket outlet flush (normal)	EA	11	
68	Single 16A socket outlet flush (normal)	EA	6	
69	1 x Single 5A socket outlet flush.Non switchable (Install new complete with cover, round box, white with screws) Install in ceiling cavity for security circuits	EA	8	
70	Single 16A socket outlet in watertight weatherbox	EA	5	
	POWER SKIRTING ACCESSORIES			
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

	White to fit power skirting (except for dedicated outlets)			
71	Double 16A Socket outlet in power skirting (normal)	EA	2	
72	Single 16A socket outlet in power skirting (dedicated)	EA	2	
73	Telecommunication jack RJ11 in power skirting	EA	2	
74	Data jack RJ45 in power skirting	EA	2	
	SWITCHES / LUMINIARIES			
	LIGHT SWITCHES			
	Stainless steel / brush aluminium 100mm x 50mm with 2 x screws cover plate. Black socket trimming and switch. Complete with yoke and fixing material.			
75	Single lever 1 way light switch.	EA	16	
76	Single lever 2 way light switch.	EA	2	
77	Single lever 2 way dimmer light switch	EA	2	
78	Double lever 1 way light switch	EA	1	
79	Rotary water tight light switch 1 way rated IP 65	EA	7	
80	10A Photoelectric outdoor lighting controle switch installed on wall	EA	2	
	Carried to Collection			R

81	Rotary water tight light switch 2 way rated IP 65	EA	8	
	LUMINARIES			
	Supply and install luminaries fixed to structures e.g.: concrete ceiling; Rhino board ceiling and walls. Price shall include lamps and the connecting thereof. Luminaires with battery back-up must be supplied with an additional core (4 core).			
82	Fluorescent: 1.5m, double tube x 58W, open channel, electronic ballast, surface mounted with industrial wing (dimensions: 1531 x 73 x 87mm)	EA	6	
83	Fluorescent: 1.5m, double tube x 54W, vandal and tampered proof, electronic ballast, with a build in PL9 night lite, surface mounted, with 1 x 36W battery back-up (dimensions: 1531 x 73 x 87mm)	EA	15	
84	Fluorescent: 1.5m, double tube x 54W, vandal and tampered proof, electronic ballast, surface mounted, with 1 x 54W battery back-up (dimensions: 1531 x 73 x 87mm)	EA	7	
85	Fluorescent: 1.5m, double tube x 58W, waterproof IP65, electronic ballast, surface mounted (dimensions: 1570 x 160 x 110)	EA	3	
86	Bulkhead: rectangular 155mm (w) x 324mm (l) x 122mm (h), 2 x PL18 220V, matt white, electronic ballast, surface mounted	EA	5	
87	Floodlight: wide beam 400W mercury vapour, stirrup mounted, standard aluminuim complete with hot dipped galvanised mounting accessories for wall mounting and 5A circuit breaker (dimensions: 650 x 425 x 175mm)	EA	8	
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

88	Bulkhead: decorative round 280mm (d) x 104mm (h), 2 x PL9 220V,matt black, electronic ballast, surface mounted	EA	17	
89	Bulkhead: decorative round bulkhead, 2 x PL9 220V, matt white, electronic ballast, surface mounted - bathrooms	EA	4	
90	Fluorescent: 1.2m, double tube x 36W, waterproof IP65, TAMPERED proof electronic ballast, surface mounted (dimensions: 1200 x 160 x 110)	EA	2	
91	Bulkhead: rectangular 440mm (w) x 320mm (l) x 217mm (h), 2 x PL9, matt black , with wire guard, surface mounted	EA	16	
92	Emergency exit lighting: single sided illuminated with battery back up ceiling mounted bracket. (down arrow with man running) (dimensions: 330 x 145 x 46 mm)	EA	2	
93	Emergency exit lighting: single sided illuminated with battery back up, surface mounted bracket. (horizontal arrow - right, man and stairs, green) (dimensions: 330 x 145 x 46mm)	EA	1	
94	Down lighter: cut-outDia 170mm, 1 x 70W 220V, matt white, electronic ballast, flush mounted	EA	4	
	FIRE / SMOKE DETECTION			
95	Install fire / smoke detection in Existing Administration part building in all rooms as indicated in the drawings and specifications. 2 Loop system with 1 x break glass, 1 siren, 23 smoke detectors complete	EA	1	
96	PH30 cabling for above	m	110	
	Carried to Collection			R

Section No. 4
Bill No. 5
NEW CELL BLOCK

EARTHING AND BONDING

97 Provide earthing and bonding in all ablution rooms, laundries and kitchens — SUM

UN-INTERRUPTED POWER SUPPLY

98 Supply and install a new Theatre UPS, 20kVA complete with
accessories to provide emergency power during power cuts for computer, fire and other essential emergency systems — SUM

LIGHTNING PROTECTION

99 The building will be protected against lightning strikes according to SABS 0313. The successful contractor will use the building re-inforce steel at distances not more than 20m apart and connect to the base prior to it being casted. Provide engineer with a compliance certificate. — SUM

100 Allow for Earth resistance tests and reports — SUM

GENERAL / TESTING AND COMMISSIONING

101 Allow for testing, balancing of Phases and commissioning of the whole electrical installation - lighting and power — SUM

102 Allow for providing detailed manuals and marked up drawings of the
electrical services installation to the Engineer — SUM

Carried to Collection — R

Section No. 4
Bill No. 5
NEW CELL BLOCK

103	Allow for Certificate of Compliance in terms of the Occupational and Health Safety Act, OSHACT of 1993.		SUM
104	Compliance with OH SACT : Compiling and implementing of Safety Plan and issuing of safety clothes, shoes, gloves etc, as required.		SUM
105	Labelling of all circuits and draw boxes with permanent screw on type labels as described in Project Detailed Specifications.		SUM
106	Supply and install 35mm locally manufactured padlocks and locking devices as well as master keys.(3 sets) with purpose-made pvc labels to lock and unlock all DB's, SDB's and lockable draw boxes.		SUM
	Carried to Collection		R

Section No. 4
Bill No. 5
NEW CELL BLOCK

Section No. 4

Bill No. 5

NEW CELL BLOCK

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	164	
	165	
	166	
	167	
	168	
	169	
	170	
	171	
	172	
	173	
	174	
	175	
	176	
	177	
	178	
	179	
Carried Forward to Summary of Section No. 4		R

Section No. 4
Bill No. 5
NEW CELL BLOCK

Item No		Quantity	Rate	Amount

SECTION 4

BILL NO. 6

ELECTRICAL INSTALLATION

NOTE: Tenderers are advised to study the Model Preambles for Trades before pricing this bill

Tenderers are advised to study the Department of Public Works - Construction works: General Specification (PW371-A) and Construction works: Particular Specification (PW371-B) before pricing this bill

---

CONSTRUCTION OF NEW INVESTIGATION QUARTERS

Carried to Collection R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

PROJECT AND QUALITY SPECIFICATIONS

This Bill shall be read in conjunction with the Detailed ElectricalSpecification as well as the electrical drawings

The project comprises the supply, delivery, installation, testing and commissioning of all the electrical equipment together with other services as specified in the Detailed Specification.

The Tenderer shall be deemed to have perused the above mentioned document and considered fully conversant with the contents and allow for it in his price.

No allowance has been made in the measurement of conductors for additional lengths at connection points and prices for the measured conductors shall be deemed to be included

All DB's, Switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.

Conduits described as "fixed" shall be deemed to include for fixing to all types of surfaces, in chases or casting in or building into walls, etc, and prices shall include for the above

Price for cables shall be deemed to include installation as well as termination of all cables.

MAIN SUPPLY / DISTRIBUTION BOARDS

DISTRIBUTION BOARDS

Carried to Collection R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

Supply and install a new distribution board, complete with sheet metal trays, frames, sub-frames, busbars, provision for future circuit breakers, legend card, circuit breakers, switches, relays, earth leakage units, etc. and as detailed on the schematic wiring diagrams. All DB's, switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.

MAIN SUPPLY / DISTRIBUTION BOARDS

DISTRIBUTION BOARDS

Supply and install a new distribution board, complete with sheet metal trays, frames, sub-frames, bus bars, provision for future circuit breakers, legend card, circuit breakers, switches, relays, earth leakage units, etc. and as detailed on the schematic wiring diagrams. All DB's, switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.

DB - Ground

1	New Face plate complete with labeling etc	EA	1	
	Standby			
2	120A, 15kA, 3 Pole MCCB	EA	1	
3	100A, 15kA, 3 Pole MCCB	EA	1	
4	80A, 15kA, 3 Pole MCB	EA	2	
5	60A, 6kA, 3 Pole MCB	EA	1	

Carried to Collection R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

6	60A, 6kA, 2 Pole Earth Leakage	EA	3	
7	20A, 6kA, 1 Pole MCB	EA	17	
8	15A, 6kA, 1 Pole MCB	EA	17	
	Normal			
9	120A, 15kA, 3 Pole MCCB	EA	1	
10	80A, 6kA, 3 Pole MCB	EA	2	
11	60A, 6kA, 3 Pole MCB	EA	2	
12	30A, 6kA, 2 Pole MCB	EA	1	
13	20A, 6kA, 2 Pole MCB	EA	1	
14	16A, 6kA, 2 Pole MCB	EA	19	
	DB - First			
15	New Face plate complete with labeling etc	EA	1	
	Standby			
16	100A, 15kA, 3 Pole MCCB	EA	1	
17	80A, 6kA, 3 Pole MCB	EA	1	

Carried to Collection R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

18	60A, 6kA, 3 Pole MCB	EA	2	
19	60A, 6kA, 2 Pole Earth Leakage	EA	3	
20	20A, 6kA, 1 Pole MCB	EA	17	
21	15A, 6kA, 1 Pole MCB	EA	6	
	Normal			
22	80A, 15kA, 3 Pole MCB	EA	2	
23	30A, 6kA, 2 Pole MCB	EA	1	
24	16A, 6kA, 2 Pole MCB	EA	18	
25	DB - Security	EA	2	
26	60A, 6kA, 3 Pole MCB	EA	3	
27	20A, 6kA, 1 Pole MCB	EA	22	
	ISOLATORS			
	Supply and install new isolators for air conditioning units, ventilation equipment, stove, geyser, etc. complete with flexible conduit, connectors , compression glands, brackets, etc.			
28	16A 2 pole isolator	EA	37	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

29	20A 2 pole isolator	EA	1		
30	30A 2 pole isolator	EA	2		
31	60A 2 Pole isolator in watertight box	EA	2		
32	60A 3 Pole isolator (UPS)	EA	2		
	RETICULATION				
	CONDUIT				
	Supply and install Bosal conduit with support fixings (saddles/ couplings/adaptors), cast in concrete, surface bed or screed, fixed to wood, roof members, suspended ceiling, steel, etc., run in roof space, chased and/or fixed in brickwork including bends				
	20 mm diameter conduit				
33	Interior luminiare, communication and data circuits	m	80		
	25 mm diameter conduit				
34	Socket outlet, air conditioning and isolator circuits	m	40		
35	Exterior Luminiare circuits	m	40		
36	TV Circuits	m	5		
	Carried to Collection			R	

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

	20 mm Diameter flexible conduit			
37	Supply and install 20mm diameter flexible conduit in 1m lengths with couplings complete.	EA	15	
	CONDUIT ACCESSORIES AND DRAW BOXES			
	Supply and install Bosal conduit accessories and outlet boxes and cover plate to suit number, size or type of entries, fixed onto conduit.			
38	100mm x 100mm x 50mm deep box	EA	12	
39	100mm x 50mm x 50mm deep box	EA	5	
40	65 mm Diameter round boxes	EA	25	
	TRUNKING / CABLE RACKS / WIRE MESH			
	Supply and install trunking/cable racks/wire mesh installation complete with fixings, example hangers, caddy clips, nuts, washers, rivets, splices, Tee-pieces, 4 way cross overs, elbows, clamps, anchors, etc			
	TRUNKING: LIGHT CIRCUITS			
41	OL 8300 Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid	m	15	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

42	Galvanised ducting 76 x 51mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - T-Off	EA	2	
43	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 4 Way	EA	1	
44	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees horizontal	EA	1	
45	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees vertical	EA	1	
	TRUNKING: PLUG CIRCUITS			
46	OL 8000 Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid	m	15	
47	Galvanised ducting 76 x 51mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - T-Off	EA	1	
48	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 4 Way	EA	1	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

49	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees horizontal	EA	1	
50	Galvanised ducting 76 x 51 mm with 6 nockouts per length for 5A 3 pin socket with hanging holders and connectors complete with lid - 90 degrees vertical	EA	1	
	WIRE MESH CABLE TRAYS (200mm)			
51	Welded wire mesh cable tray (200mm wide) with joiner sets and suspending equipment complete	m	50	
52	Welded wire mesh cable tray (200mm wide) with joiner sets and suspending equipment complete - T-off	EA	1	
53	Welded wire mesh cable tray (200mm wide) with joiner sets and suspending equipment complete - 90 degrees horizontal	EA	2	
54	Welded wire mesh cable tray (200mm wide) with joiner sets and suspending equipment complete - 90 degrees vertical	EA	2	
	WIRING			
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

	Supply and install wirng for all power and light circuits. All light circuits will be wired with 2.5mm², plug circuits with 4mm² and circuits feeding isolators with 4mm²			
55	2,5mm² Wiring for light circuits (Red)	m	200	
56	2,5mm² Wiring for light circuits (Black)	m	200	
57	2,5mm² Wiring for light circuits (Copper)	m	200	
58	4mm² Wiring for plug circuits (Red)	m	180	
59	4mm² Wiring for plug circuits (Black)	m	180	
60	4mm² Wiring for plug circuits (Copper)	m	180	
61	6mm² Wiring for alternative circuits	m	50	
62	Draw wire	m	500	
	POWER SKIRTING			
63	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover.	m	100	
64	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. Internal 90 degree elbow	EA	12	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

65	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. External 90 degree elbow	EA	3	
66	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. End cap	EA	20	
67	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. Wall entry	EA	12	
68	Supply and install power skirting complete with covers, fixed to brickwork or concrete. Galvanized steel, powder coated, matt white, three channel, double cover. T-off	m	3	
	TELEPHONE DISTRIBUTION BOARD			
	Supply, deliver, storage and installation of TELKOM and DATA approved type distribution board size 450 x 450 x 150mm deep to accommodate requirements as shown out in specification clause			
69	Telephone Distribution Board to be installed as per specifications	EA	1	
70	Data Distribution Board to be installed as shown as per specifications	EA	1	
	SOCKET OUTLETS / ISOLATORS / COMMUNICATION / DATA			
	SOCKET OUTLETS			
	Carried to Collection			R

	Stainless steel / brush aluminium 100mm x 100mm with 2 x screws cover plate. Black socket trimming and switch. Complete with yoke and fixing material			
71	Double 16A socket outlet flush (normal)	EA	4	
72	Single 16A socket outlet flush (normal)	EA	2	
73	1 x Single 5A socket outlet flush.Non switchable (Install new complete with cover, round box, white with screws) Install in ceiling cavity for security circuits	EA	2	
74	Single 16A socket outlet in watertight weatherbox	EA	2	
	POWER SKIRTING ACCESSORIES			
	White to fit power skirting (except for dedicated outlets)			
75	Double 16A Socket outlet in power skirting (normal)	EA	15	
76	Single 16A socket outlet in power skirting (dedicated)	EA	20	
77	1 x Single 5A socket outlet flush.Non switchable (Install new complete with cover, round box, white with screws) Install in ceiling cavity for security circuits.	EA	5	
78	Telecommunication jack RJ11 in power skirting	EA	20	
79	Data jack RJ45 in power skirting	EA	20	
	SWITCHES / LUMINIARIES			
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

	LIGHT SWITCHES			
	Stainless steel / brush aluminium 100mm x 50mm with 2 x screws cover plate. Black socket trimming and switch. Complete with yoke and fixing material.			
80	Single lever 1 way light switch.	EA	3	
81	Single lever 2 way light switch.	EA	3	
82	Single lever 1 way dimmer light switch	EA	1	
83	Double lever 1 way light switch	EA	1	
84	Rotary water tight light switch 1 way rated IP 65	EA	1	
85	10A Photoelectric outdoor lighting controle switch installed on wall	EA	3	
	LUMINARIES			
	Supply and install luminaries fixed to structures e.g.: concrete ceiling; Rhino board ceiling and walls. Price shall include lamps and the connecting thereof. Luminaires with battery back-up must be supplied with an additional core (4 core).			
86	Fluorescent: 1.5m, double tube x 58W, open channel, electronic ballast, surface mounted with industrial wing (dimensions: 1531 x 73 x 87mm)	EA	2	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

87	Flourescent: 4 x 18W, double parabolic, dimmeble electronic ballast, recessed, flush mounted (dimensions: 595 x 595 x 90mm)	EA	3	
88	Fluorescent: 1.5m, double tube x 58W, waterproof IP65, electronic ballast, surface mounted (dimensions: 1570 x 160 x 110)	EA	1	
89	Bulkhead: rectangular 155mm (w) x 324mm (l) x 122mm (h), 2 x PL18 220V, matt white, electronic ballast, surface mounted	EA	5	
90	Fluorescent: 600mm x 600mm, 4 x 18W, double, electronic ballast,with 1x 18W battery back-up, flush mounted (dimensions: 595 x 595 x 90mm)	EA	6	
91	Bulkhead: decorative round bulkhead, 2 x PL9 220V, matt white, electronic ballast, surface mounted - bathrooms	EA	1	
92	Bulkhead: round 280mm (d) x 104mm (h), 2 x PL9 220V, matt black, electronic ballast, outside, surface mounted	EA	4	
93	Fluorescent: 1.2m, double tube x 36W, waterproof IP65, TAMPERED proof electronic ballast, surface mounted (dimensions: 1200 x 160 x 110)	EA	1	
94	Emergency exit lighting: single sided illuminated with battery back up ceiling mounted bracket. (down arrow with man running) (dimensions: 330 x 145 x 46 mm)	EA	1	
95	Emergency exit lighting: single sided illuminated with battery back up, surface mounted bracket. (horizontal arrow - right, man and stairs, green) (dimensions: 330 x 145 x 46mm)	EA	1	

Carried to Collection R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

96	Flourescent: 600mm x 600mm, three tube x 36W, double parabolic, electronic ballast, recessed, flush mounted (dimensions: 595 x 595 x 90mm)	EA	20	
97	Bulkhead: rectangular 155mm (w) x 324mm (l) x 122mm (h), 2 x PL18 220V, with battery back-up, matt white, electronic ballast, surface mounted	EA	6	
98	Down lighter: cut-out = 170mm, 1 x PL9, 220V, recessed	EA	20	
99	Bulkhead: square 274mm x 274mm x 104mm, 2 x PL18, 220V, matt white, electronic ballast, 1 x 18W battery back-up, surface mounted	EA	3	
	FIRE / SMOKE DETECTION			
100	Test and commission fire / smoke detection in all rooms for the existing system which includes. 3 Loop system with 2 x break glass, 1 siren, 28 smoke detectors complete			SUM
	AUDIO VISUAL SYSTEM			
	Conference room			
101	Ceiling Mount Speakers Coaxial with Back Box @ 10w	EA	3	
102	15m VGA Cable (Laptop to Projector)	EA	2	
103	20m Coax Cable (DVD to Projector)	EA	1	
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

104	F Connectors	EA	2	
105	Coax to RCA converters	EA	1	
106	Audio Connecting Cable	m	10	
107	Junction Box	EA	1	
108	Microphone complete with cables, connectors, etc	EA	1	
	LIGHTNING PROTECTION			
109	The building will be protected against lightning strikes according to SABS 0313. The successful contractor will use the building reinforce steel at distances not more than 20m apart and connect to the base prior to it being casted. Provide engineer with a compliance certificate.			SUM
110	Allow for Earth resistance tests and reports			SUM
	UN-INTERRUPTED POWER SUPPLY			
111	Supply and install a new MGE Galaxy 3500 UPS, 20kVA 400V in and 400V out complete with accessories and batteries to provide emergency power for at least 10 min during power cuts for computer, fire and other essential emergency systems			SUM
112	Allow for rigging to install UPS at First floor			SUM
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

	EARTHING AND BONDING			
113	Provide earthing and bonding in all ablution rooms, laundries and kitchens			SUM
	GEYSER/HYDROBOIL/HAND DRYERS			
114	Supply and install 150l geyser with all valves, piping, etc. to supply the kitchen and bathrooms. Water distribution to form part of the Architects Bill of Materials	EA	2	
115	Supply and install a under counter Hydroboil capable of supplying water for dishes only. Typical: K-prisma or better. All piping, supply stop valve/tap etc. to be included.			SUM
	GENERAL / TESTING AND COMMISSIONING			
116	Allow for testing, balancing of Phases and commissioning of the whole electrical installation - lighting and power			SUM
117	Allow for providing detailed manuals and marked up drawings of the electrical services installation to the Engineer			SUM
118	Allow for Certificate of Compliance in terms of the Occupational and Health Safety Act, OSHACT of 1993.			SUM
119	Compliance with OH SACT : Compiling and implementing of Safety Plan and issuing of safety clothes, shoes, gloves etc, as required.			SUM
	Carried to Collection			R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

120	Labelling of all circuits and draw boxes with permanent screw on type labels as described in Project Detailed Specifications.	SUM	
121	Supply and install 35mm locally manufactured padlocks and locking devices as well as master keys.(3 sets) with purpose-made pvc labels to lock and unlock all DB's, SDB's and lockable draw boxes.	SUM	
	Carried to Collection	R	

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

Section No. 4

Bill No. 6

NEW INVESTIGATING UNIT

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	181	
	182	
	183	
	184	
	185	
	186	
	187	
	188	
	189	
	190	
	191	
	192	
	193	
	194	
	195	
	196	
	197	
	198	
Carried Forward to Summary of Section No. 4		R

Section No. 4
Bill No. 6
NEW INVESTIGATING UNIT

Item No		Quantity	Rate	Amount

SECTION 4

BILL NO. 7

ELECTRICAL INSTALLATION

NOTE: Tenderers are advised to study the Model Preambles for Trades before pricing this bill

Tenderers are advised to study the Department of Public Works - Construction works: General Specification (PW371-A) and Construction works: Particular Specification (PW371-B) before pricing this bill

---

SECURITY AND DATA

Carried to Collection R

Section No. 4
Bill No. 7
DATA AND SECURITY

PROJECT AND QUALITY SPECIFICATIONS

This Bill shall be read in conjunction with the Detailed ElectricalSpecification as well as the electrical drawings

The project comprises the supply, delivery, installation, testing and commissioning of all the electrical equipment together with other services as specified in the Detailed Specification.

The Tenderer shall be deemed to have perused the above mentioned document and considered fully conversant with the contents and allow for it in his price.

No allowance has been made in the measurement of conductors for additional lengths at connection points and prices for the measured conductors shall be deemed to be included

All DB's, Switch control boxes and draw boxes shall be of 3CR12, 1.6mm thick construction.

Conduits described as "fixed" shall be deemed to include for fixing to all types of surfaces, in chases or casting in or building into walls, etc, and prices shall include for the above

Price for cables shall be deemed to include installation as well as termination of all cables.

DATA INSTALLATION

1	Supply and install 4 pair category 6, 100ohm UTP cable from switch to final data outlets. Complete with connection, glands etc.	m	900		
2	Molex UTP Cat 5e Data Point complete with flylead and patchlead	EA	130		
	Carried to Collection			R	

Section No. 4
Bill No. 7
DATA AND SECURITY

3	Molex UTP Cat 5e for biometric readers with patchlead	EA	18	
4	Molex UTP Cat 5e Camera Point complete with flylead and patchlead	EA	48	
5	UTP Labelling	P/H	392	
6	UTP Testing	P/H	196	
7	Punch Plate Dual for powerskirting (As per power skirting)	EA	28	
8	Labour or items deemed necessary to complete and commission data system			SUM
	FIBRE OPTIC INSTALLATION			
9	Multimode Heavy Duty Duct Cable 24f4e4t Hdd	m	400	
10	Midcouplers Multimode SC	EA	15	
11	Multimode 1m SC UNJACKETED PIGTAIL	EA	15	
12	Multimode 3m SC-LC PATCHCORD	EA	15	
13	PATCH PANEL 24WAY ST	EA	3	
14	ENTRY GLAND - Size 0	EA	3	
15	SPLICE CASSETTE - Plastic	EA	3	
	Carried to Collection			R

Section No. 4
Bill No. 7
DATA AND SECURITY

16	Splice Protectors 45mm - Clear	EA	15	
17	Splicing	EA	15	
18	Fibre testing	EA	15	
19	Fibre labeling	EA	15	
20	HP 8/24 SAN Fibre Optic Switch	EA	3	
21	Labour of all items deemed necessary to complete and commission fibre optic to main server room			SUM

SECURITY CAMERA INSTALLATION

Please note: Install price must consist of: delivery and site offloading, placing in position, erection, fixing, commissioning, testing and handover.

22	Hikvision 32 Channel Acusense 4K NVR pro series video recorder with display and playback in full resolution standalone embedded digital video recording unit with 7 days recording storage capacity and 1 x 55' LED monitor complete with anti-theft brackets.			SUM
23	PC for human interface with CCTV software, full loaded with all necessary original software, input devices such as key board and mouse as per specifications			SUM

Carried to Collection R

Section No. 4
Bill No. 7
DATA AND SECURITY

24	Hikvision 4MP IP ColorVu Fixed bullet network camera waterproof indoor/outdoor IR bullet camera with 2.8mm 50m IR range all cameras to support motion detection and be Power Over Ethernet (POE) supported complete with stainless steel 300mm x 200mm converter box mounted on pole	EA	26	
25	Hikvision 4MP IP ACUSENSE Fixed Dome network camera Water and dust resistent (IP67) and Vandal-resistant (IK10) indoor IR camera with 2.8mm all cameras to support motion detection and be Power Over Ethernet (POE) supported	EA	22	
26	Supply and install 4 pair category 6, 100ohm UTP cable from switch to final data outlets. Complete with connection, glands etc.	m	800	
27	2-core indoor fibre optic cable, including splicing etc..	m	2 800	
28	Allow for maintenance of the complete system for a period of 12 months after practical completion.	EA	3	
29	5,7m x 100mm x 100mm fibreglass pole completely installed with concrete base, all fixings, steel conduit, weather proof draw box and cap. Posts to be painted to architects specifications.	EA	18	
30	End User Training (Includes Operator Training; System Admin Training and Desktop Training)	EA	1	
31	Complete Installation and commissioning of security surveillance system. Provide for labor and additional material deemed necessary to complete system.	EA	1	
	Carried to Collection			R

Section No. 4
Bill No. 7
DATA AND SECURITY

ACCESS CONTROL INSTALLATION

32	Sagem MA520+D biometric fingerprint unit	EA	10	
33	Sagem OMA520D biometric fingerprint unit	EA	8	
34	Magnetic door lock (600kg) and ZL bracket	EA	21	
35	Industrial Request to exit (no touch sensor)	EA	18	
36	Access control break glass unit	EA	1	
37	Client / Workstation PC with 23" LCD monitor (Windows license)	EA	2	
38	Supply and install 4 pair category 6, 100ohm UTP cable from switch to final data outlets. Complete with connection, glands etc.	m	500	
39	Access control software compatible to Sagem biometric units	EA	1	
40	Sagem MSO300 USB take on reader with Morpho embedded software verification license	EA	1	
41	Logitech USB webcam for image capture	EA	1	
42	Labour or items deemed necessary to install and commission access control system	EA	1	

Carried to Collection R

Section No. 4
Bill No. 7
DATA AND SECURITY

TELEPHONE SYSTEM INSTALLATION

43	3300 SMALL BUSINESS - CX EXPANDED BRI (52002626)	EA	3		
44	3300 CX II Controller 50006093	EA	3		
45	3300 CX(i) II Controller 80G SATA HDD 50006294	EA	3		
46	QUAD BRI MMC 50004070	EA	3		
47	MCD Standard User License 54004976	EA	32		
48	5312 IP Phone 50005847	EA	60		
49	Small Business Package 54005092	EA	3		
50	MCD Mailbox license 54000297	EA	60		
51	Operator Console 5550 (Global) 50006490 smb	EA	2		
52	VSA RAMpage advance reporting call logger software for and licences for 40 users including a annual software update paid for the first year.	EA	2		
53	Plantronics CS 60 DECT Cordless Headset Only	EA	2		
54	Lightning Protection Unit for Basic Rate ISDN - 1 unit required per BRI unit 12-00700	EA	3		
55	BELL RINGER / TONE CALLER	EA	3		
	Carried to Collection			R	

Section No. 4
Bill No. 7
DATA AND SECURITY

56	Labour or items deemed necessary to install and commission telephone system			SUM
57	Supply and install 4 pair category 6, 100ohm UTP cable from switch to final data outlets. Complete with connection, glands etc.	m	1 000	
	INTERCOM			
58	Supply and install Alphacom Stentofon IP based intercom system with nesseasry software cabable of maximum 48 units. Include 12V DC supply.			SUM
59	Control Room Master IV part nu 1007006110 installed at prison guard desk (flush mounted).	EA	2	
60	Prison type tamper and vandal proof intercom station with 2.5 mm steel front. (128 X 264 X 51mm) Part number 1007061000	EA	12	
61	Supply and install wiring to connect intercom to master station.	m	200	
62	Provide for the installation and commissioning of the intercom system. Include cost to train personnel in the functioning of the system and support for three months into operation.			SUM
63	Supply and install 4 pair category 6, 100ohm UTP cable from switch to final data outlets. Complete with connection, glands etc.	m	200	
	Carried to Collection			R

Section No. 4
Bill No. 7
DATA AND SECURITY

Section No. 4

Bill No. 7

DATA AND SECURITY

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	200	
	201	
	202	
	203	
	204	
	205	
	206	
	207	
Carried Forward to Summary of Section No. 4		R

Section No. 4
Bill No. 7
DATA AND SECURITY

SECTION SUMMARY - ELECTRICAL INSTALLATION

Bill No		Page No	Amount
1	GENERAL: SITE	121	
2	EXISTING ADMINISTRATION BLOCK	139	
3	NEW LIVING QUARTERS BLOCK A	151	
4	NEW LIVING QUARTERS BLOCK B	163	
5	NEW CELL BLOCK	180	
6	NEW INVESTIGATING UNIT	199	
7	DATA AND SECURITY	208	

Carried to Final Summary R

Section No. 4

Item No		Quantity	Rate	Amount

SECTION 5

BILL NO. 1

MECHANICAL WORKS

NOTE: Tenderers are advised to study the Model Preambles for Trades before pricing this bill

Tenderers are advised to study the Department of Public Works - Construction works: General Specification (PW371-A) and Construction works: Particular Specification (PW371-B) before pricing this bill

---

REPAIR AND RENOVATIONS

Carried to Collection R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

PROJECT AND QUALITY SPECIFICATIONS

This Bill shall be read in conjunction with the Detailed Mechanical Specification as well as the mechanical drawings

The project comprises the supply, delivery, installation, testing and commissioning of all the mechanical equipment together with
other services as specified in the Detailed Specification.

The Tenderer shall be deemed to have perused the above mentioned document and considered fully conversant with the contents and allow for it in his price.

No allowance has been made in the measurement of conductors for additional lengths at connection points from the isolator, prices for the measured conductors shall be deemed to be included

Conduits described as "fixed" shall be deemed to include for fixing to all types of surfaces, in chases or casting in or building into walls, etc, and prices shall include for the above

Conduits described as "fixed" shall be deemed to include for fixing to all types of surfaces, in chases or casting in or building into walls, etc, and prices shall include for the above

Price for cables shall be deemed to include installation as well as termination of all cables.

Carried to Collection

R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

AIR CONDITIONING SYSTEM

1	VRV Mid-wall Indoor Unit (ACU Type 1) (2.6kW Heat Recovery Unit) Unit installed complete with: Indoor Fan Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	EA	12
2	VRV Ceiling Cassette Indoor Unit (ACU Type 2) (5kW Heat Recovery Unit) Unit installed complete with: Indoor Fan Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	EA	2
3	VRV Ceiling Cassette Indoor Unit (ACU Type 3) (10kW Heat Recovery Unit) Unit installed complete with: Indoor Fan Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	EA	2
4	VRV Mid Wall Indoor Unit (ACU Type 4) (3.6kW Heat Recovery Unit) Unit installed complete with: Indoor Fan Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	EA	12

Carried to Collection R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

5	Condensate pumps installed complete and connected to drain pipe. As per drawings	EA	24	
6	VRV Heat Recovery Outdoor Unit (ACU B and ACU C) (50kW Heat Recovery Unit) Unit installed complete with: Condensor Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	EA	1	
7	VRV Heat Recovery Outdoor Unit (ACU D) (55kW Heat Recovery Unit) Unit installed complete with: Condensor Unit Piping and Refrigerant Electrical Connections Condensate Drain Control Unit	m	1	
	FIRE PROTECTION			
8	FM200 Gas Suppression System for Archive complete with 3 Zone Fire Panel Smoke Detectors Bell, Strobe, Siren etc. Suitable for 125m3 room.	EA	1	
9	FM200 Gas Suppression System for Records complete with 3 Zone Fire Panel Smoke Detectors Bell, Strobe, Siren etc. Suitable for 32m3 room.	EA	1	
	Carried to Collection			R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

10	FM200 Gas Suppression System for Dockets complete with 3 Zone Fire Panel Smoke Detectors Bell, Strobe, Siren etc. Suitable for 45m3 room.	EA	1	
11	Fire Hose Reel installed complete with relevant signage and connection to fire main at exterior of building. To include complete reel, hose, sign and connection	EA	14	
12	9kg Dry Powder Handheld Fire Extinguisher installed complete with backing plate, holder, fixing, signage etc.	EA	24	
13	5kg CO2 Handheld Fire Extinguisher installed complete with backing plate, holder, fixing, signage etc.	EA	8	
	EXTRACTION AND VENTILATION			
14	Wall Mounted Extract Air Fan 80m3/hr installed complete in wall with louver, connection to isolator.	EA	28	
15	Ceiling Mounted Extract Air Fan for shower 90m3/hr installed complete in ceiling with grille, connection to isolator	EA	6	
16	Ceiling Mounted Extract Air Fan for kitchenette 100m3/hr installed complete in ceiling with grille, connection to isolator	EA	2	
17	Round Toilet Extract Grille to Engineers Specification installed complete with connection to duct, flexible ducting of min 1.5m length, connection to ceiling and making neat	EA	31	
	Carried to Collection			R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

	Extract Air Fan, installed complete with vibration dampening, connection to ducting, hangers, supports, electrical connections etc			
18	100l/s at 100Pa	EA	4	
19	150l/s at 150Pa	EA	1	
20	200l/s at 150Pa	EA	1	
	Galvanised Square Ducting, installed complete with hangers, connections, fixings and connection to fans and flexible ducting			
21	100mmx100mm	m	68	
22	150mmx150mm	m	25	
23	150mmx200mm	m	15	
24	200mmx250mm	m	20	
25	Provision and installation of diameter 50mm sleeves by 300mm long in concrete beams prior to casting	EA	10	
	EXISTING EQUIPMENT			
26	Test of existing VRF system in New crimes building for function and performance			SUM
	Carried to Collection			R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

27	Complete service of VRF system in New crimes building including all filters, new refrigerant and armourflex.			SUM
28	Repair of faulty HVAC equipment in the New crimes building			SUM
29	Test of existing VRF system in Cell Block for function and performance			SUM
30	Complete service of VRF system in Cell Block including all filters, new refrigerant and armourflex.			SUM
31	Repair of faulty HVAC equipment in Cell Block			SUM
32	Test of existing Heatpumps in Cell Block for function and performance	EA	4	
33	Complete service of Heatpumps in Cell Block including all filters, new refrigerant and armourflex.			SUM
34	Repair of faulty Hot water generation equipment in the Cell Block			SUM
	GENERAL / TESTING AND COMMISSIONING			
35	Allow for testing, commisioning, additional test by Engineer, etc.			SUM
36	Allow for providing detailed manuals and marked up drawings of the mechanical services installation to the Engineer			SUM
	Carried to Collection			R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

37	Allow for Certificate of Compliance in terms of the Occupational and Health Safety Act, OSHACT of 1993.		SUM
38	Compliance with OH SACT : Compiling and implementing of Safety Plan and issuing of safety clothes, shoes, gloves etc, as required.		SUM
	Carried to Collection		R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

Section No. 5

Bill No. 1

MECHANICAL INSTALLATION

COLLECTION

	Page No	Amount
Total Brought Forward from Page No.	210	
	211	
	212	
	213	
	214	
	215	
	216	
	217	
Carried to Final Summary		R

Section No. 5
Bill No. 1
MECHANICAL INSTALLATION

FINAL SUMMARY

Section No		Page No	Amount
1	PRELIMINARIES	32	
2	BUILDING WORKS	85	
3	EXTERNAL WORKS	106	
4	ELECTRICAL INSTALLATION	209	
5	MECHANICAL INSTALLATION	218	
	Sub Total B		R
	Add Value Added Tax		R
	Carried to Form of Tender		R

Part C3: Scope of Work

PG-01.2 (EC) SCOPE OF WORKS – JBCC 2000 PRINCIPAL BUILDING AGREEMENT (Edition 6.2 of May 2018)

Project title:	***MANKWENG SAPS – UPGRADING OF POLICE STATION, CONSTRUCTION OF 8 ADDITIONAL OFFICES, CELLS AND LIVING QUARTERS.***		
Tender / Quotation no:	*PLK24/05*	**Reference no:**	*6066/0006*

C3. Scope of Works

MANKWENG SAPS – UPGRADING OF POLICE STATION, CONSTRUCTION OF 8 ADDITIONAL OFFICES, CELLS AND LIVING QUARTERS.

The project has been done before and it was cancelled, so the remaining scope of works involve construction Block A, finalising of Block B, Cells Blocks, Community Service Centre, single quarters , paving around the buildings and installation of standby Generator.

C3.1 EXTENT OF THE WORKS

MANKWENG SAPS – UPGRADING OF POLICE STATION, CONSTRUCTION OF 8 ADDITIONAL OFFICES, CELLS AND LIVING QUARTERS.

C3.2 ORDER OF THE WORKS

MANKWENG SAPS – UPGRADING OF POLICE STATION, CONSTRUCTION OF 8 ADDITIONAL OFFICES, CELLS AND LIVING QUARTERS.

C3.3 BUILDINGS OCCUPIED

New detective offices are occupied by the client and used as a Community Service Centre.

C3.4 ACCESS

No restrictions

C3.5 STANDARD MINIMUM REQUIREMENTS

In terms of section 5(2) of the Construction Industry Development Board Act, 2000 (Act no. 38 of 2000) (the Act), the Construction Industry Development Board is empowered to establish and promote best practice standards, Standard Requirements and Guidelines which includes the following but not limited to:

C3.5.1 cidb Best Practice: Green Building Certification, No. 34158 Government Gazette, 1 April 2011

C3.5.2 cidb Standard for Developing Skills through Infrastructure Contracts, No. 36760 Government Gazette, 23 August 2013

C3.5.3 cidb Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, No 36190 Government Gazette, 25 February 2013

C3.5.4 cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts, No. 41237 Government Gazette,10 November 2017

C3.5.5 cidb Standard for Minimum Requirements for Engaging Contractors and Sub-Contractors on Construction Works Contracts, No. 41237 Government Gazette, 10 November 2017

C3.5.6 cidb Standard for Minimum Requirements for Engaging Contractors and Sub- Contractors on Construction Works Contracts, No. 42021 Government Gazette, 9 November 2018

C3.5.7 cidb Standard for Developing Skills through Infrastructure Contracts, No 48491 Government Gazette, 23 April 2023.

C3.6 CONTRACT PARTICIPATION GOALS AND CIDB BUILD PROGRAMME

Provision has been made within the Contract Participation Goal section in the Bill of Quantities for the respective CPGs. Prescribed Profit and Attendance percentages have been stipulated, all inclusive of associated costs to the contractor for implementation and allowance for submitting reports to the Employer's Representative on a monthly basis in terms of monthly and accumulative targets achieved with audited supporting documentation.

Monthly progressive reports to be submitted to the Employer's representative indicating the percentage targets achieved which must be reconciled upon completion of the project and to form part of the final account.

The contractor shall achieve in the performance of this contract the following Contract Participation Goals (CPGs) as indicated below.

C3.6.1 Minimum Targeted Local Material Manufacturer Contract Participation Goal

The Minimum Targeted Local Building Material Manufacturers CPG is *"not applicable"* to this project.

It is the requirement of the employer that the contractor enhances the use of local Small, Micro and Medium Enterprise Local Material Manufacturers (SMME's) in executing this contract, irrespective whether a minimum percentage Participation Goals is applicable or not.

The Minimum Targeted Local Manufacturers of Material Contract Participation Goal, in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020.

A Targeted Local Material Manufacturer is a targeted enterprise that operates or maintains a factory or establishment that produces on its premises materials or goods required by the principal contractor for the performance of the contract.
Note: Adapted from SANS 10845-7:2015, definition 2.13

Preference shall be given to the Targeted Local Material Manufacturer where feasible (**not applicable on this project**), and provided that:

(a) Such materials comply in all respects with the specific requirements of PW371 and SANS specifications,
(b) The non-availability of such materials shall not adversely affect the desired progress of the specific works,
(c) The use of such suppliers shall not constitute grounds for any claim for increased cost in respect thereof,
(d) Materials of at least (**not applicable on this project**) of the total value of materials purchased excluding VAT to be sourced from within (**not applicable on this project**) radius of the project site,
(e) Material of at least (**not applicable on this project**) of the total value of materials purchased excluding VAT to be sourced from within (**not applicable on this project**) **km** radius of the project site.

Failure to achieve the minimum specified value as indicated in the CPG Bill of Quantity Section for Targeted Local Material Manufacturer participation will result in a **thirty percent (30%) (not applicable on this project)** penalty of the prorate targeted value of materials not complied with unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

The contractor shall submit monthly reports in terms of monthly achievement and accumulative targets achieved including audited supporting documentation to the Employer's Representative.

C3.6.2 Minimum Targeted Local Building Material Suppliers Contract Participation Goal

The Minimum Targeted Local Building Material Suppliers CPG is *"not applicable"* to this project.

It is the requirement of the employer that the contractor enhances the use of local Small, Micro and Medium Enterprise Local Material Suppliers (SMME's) in executing this contract, irrespective whether a minimum percentage Participation Goals is applicable or not.

The Minimum Targeted Local Manufacturers of Material Contract Participation Goal shall be achieved in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract..

A targeted supplier is a targeted enterprise that

a) owns, operates or maintains a store, warehouse or other establishment in which goods are bought, kept in stock and regularly sold to wholesalers, retailers or the public in the usual course of business; and
b) engages, as its principal business and in its own name, in the purchase and sale of goods.

Note: Adapted from SANS 10845-7:2015, definition 2.14

Preference shall be given to the local material suppliers where feasible in the (**not applicable on this project**), and provided that:

(a) Such materials comply in all respects with the specific requirements of PW371 and SANS specifications,
(b) The none availability of such materials shall not adversely affect the desired progress of the specific works,
(c) The use of such suppliers shall not constitute grounds for any claim for increased cost in respect thereof,
(d) Materials of at least (**not applicable on this project**) of the total value of materials purchased excluding VAT to be sourced from within (**N/A on this project**) of the project site,
(e) Material of at least (**N/A on this project**) of the total value of materials purchased excluding VAT to be sourced from within (**N/A on this project**) of the project site.

Failure to achieve the minimum specified value as indicated in the CPG Bill of Quantity Section for Targeted Local Material Manufacturer participation will result in a **thirty percent (30%)** penalty of the prorate targeted value of materials not complied with, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

The bidder shall submit monthly reports in terms of monthly achievement and accumulative targets achieved including audited supporting documentation to the Employer's Representative.

C3.6.3 Minimum Targeted Local Labour Skills Development Contract Participation Goal

The Minimum Targeted Local Labour Skills Development CPG is *"not applicable"* to this project.

It is the requirement of the employer that the contractor enhances the use of local labour in executing this contract. This is required to be done through the use of both traditional building techniques and labour-intensive construction techniques careful and considered construction planning and implemented in the project irrespective whether a minimum percentage Participation Goal is applicable or not.

The Minimum Targeted Local Skills Development Contract Participation Goal shall be achieved in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract..

Targeted labour: individuals who:

a) are employed by the principal contractor, sub-contractor or targeted enterprises in the performance of the contract;
b) are defined as the target group in the targeting data; and
c) permanently reside in the target area or who are recognized as being residents of the target area on the basis of identification and association with and recognition by the residents of the target area.

Adapted from SANS 10845-7:2015, definition 2.12

Targeting of labour by skills categories is only permissible within categories of semi-skilled and unskilled labour.

Contract participation goals for semi-skilled and unskilled labour shall be limited to on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract and in a manner that does not compromise worker health and safety. In the case of targeted labour, the certification of records shall be in accordance with SANS 10845-8.

Beneficiaries will be sourced from the (**not applicable on this project**) for the full duration of the Construction Period, employed by either the principal contractor, sub-contractors or targeted enterprises. The total number of working days to complete the Works amount to (**not applicable on this project**) working days. The minimum CPG participation for Targeted Local Labour Skills Development is (**not applicable on this project**), expressed as a percentage of the total number of working days required to complete the Works. The contractor shall attain or exceed the CPG in the performance of the contract. Failure to achieve the minimum Targeted Local Labour Skills Development CPG will result in a payment reduction of **R 0.00** (Excluding VAT), per working day which training has not been provided to the workforce in attendance, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

The bidder shall submit monthly reports in terms of monthly achievement and accumulative targets achieved including audited supporting documentation to the Employer's Representative.

C3.6.4 CIDB BUILD PROGRAMME: Minimum Targeted Enterprise Development Contract Participation Goal

The Minimum Targeted Enterprise Development Contract Participation Goal is *"not applicable"* to this project.

The aim of this best practice standard for indirect targeting for enterprise development in accordance with the Standard for Indirect Targeting for Enterprise Development (published in Government Gazette 36190 of 25 February 2013), as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract. is to promote enterprise development by providing for a minimum Contract Participation Goal (CPG) of (**not applicable on this project**) of the contract amount as defined in the Standard (Tender amount, excluding allowances and VAT) on selected contracts to be undertaken by joint-venture partners or to be sub-

contracted to developing contractors that are also to be beneficiaries of enterprise development support from the main contractor.

The bidder shall submit monthly reports in terms of monthly achievement and accumulative targets achieved including audited supporting documentation to the Employer's Representative.

The lead partner or main contractor shall dedicate a **minimum (N/A on this project)** of the tender value at the time of award, excluding allowances and VAT, to provide developmental support to targeted subcontractor or joint venture partner applicable to contracts in Grades 7 to 9, General Building and Civil Engineering contracts. Preference will be given to (**not applicable on this project**).

Failing to achieve the targeted Contract Skills Development Goal will result in A) a thirty percent (30%) penalty of the value of the portion not achieved, excluding VAT, and B) the issuing of completion certificates only after the completion certificate of achieving the skills development goal, counter-signed by the relevant individuals has been submitted, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

C3.6.4.1 Criteria

The main or lead partner of the successful bidder shall:

(a) There must be a needs analysis for indirect targeting and development or skill standard and should be development in at least any two developmental areas namely;

- Administrative and cost control systems
- construction management systems and plans
- planning, tendering and programming
- business; technical; procurement skills
- legal compliance
- credit rating/history; financial loan capacity/history
- contractual knowledge

(b) The above needs analysis shall be mutually agreed upon between contractor and targeted enterprise

(c) The contractor shall appoint an enterprise development coordinator to:

- perform needs analysis on the targeted enterprise to identify developmental goals
- develop a project specific enterprise development plan to improve the targeted enterprise/s performance in the identified developmental areas
- provide internal mentorship support to improve the targeted enterprise/s performance
- monitor and submit to the employer's representative a monthly enterprise development report thereby reporting on the progress of the agreed development areas with the targeted enterprise/s
- submit a project completion report to the Employer's representative for each targeted enterprise.

C3.6.4.2 Management

The contractor shall provide a competent person/s to provide internal mentorship to the Targeted Enterprise/s in the two agreed developmental areas.

C3.6.4.3 Competence Criteria for an Enterprise Development Co-ordinator

The enterprise development co-ordinator shall have the following competencies:

- Minimum experience of 5 years in the construction industry at Managerial level as a Site Agent, Contracts Manager, Site Manager, Construction Manager, Business Development Manager or Enterprise Development Manager.
- Minimum experience of 2 years in training and development in Building or Construction; and
- National Diploma or B Degree in the Built Environment or Business Management

C3.6.4.4 Format of Communications

The contractor shall submit to the Employer's Representative:

- *Project interim reports* in the specified format **(ED105P)** detailing interim values of the CPG that was achieved together with an assessment of the enterprise development support provided should be tabled and discussed at least monthly at progress meetings between employer's representative and the contractor;
- *Project completion report* in the specified format **(ED101P)** to the Employer's Representative for acceptance within 15 days of achieving practical completion. The report shall include the value of the CPG that was certified in accordance with the contract, cidb registration numbers of each and every targeted enterprise, and the value of the subcontracted works or of the joint venture entered into; and the participation parameter
- *Enterprise development declaration (**ED104P**).*

C3.6.4.5 The Key Personal

The contractor shall appoint an Enterprise Development Co-ordinator and a competent person/s to provide internal mentorship.

C3.6.4.6 Management Meetings

The contractor shall report to the Employer's Representative on the implementation and progress of the targeted enterprise development and CPG at monthly progress site meetings.

C3.6.4.7 Forms for contract administration

The contractor shall submit to the Employer's Representative the following proformas:

- Form ED 105P Project Interim Report
- Form ED 104P Enterprise Development Declaration
- Form ED 101P Project Completion Report

C3.6.4.8 Records

The contractor shall:

- keep records of the targeted enterprise development
- keep records of the payments made to the targeted enterprises in relation to the CPG.
- ensure all the documentation required in terms of the Standard is provided with each monthly progress payment certificate and according to a prescribed format where applicable.

C3.6.4.9 Payment Certificates

The contractor shall:

- achieve the measurable CPG and providing enterprise development support to the targeted enterprise/s as per the Standard.
- submit payment certificates to the Employer Representative at intervals determined in the Contract.

C3.6.4.10 Compliance requirements

Non-compliance with the Best Practice Project Assessment Scheme

The wording of regulation 27A of the cidb regulations makes provision for the Board to enforce the cidb code of conduct in the event of clients being found to be in breach of the best practice project assessment scheme.

- Not including the requirements of the cidb standards in the conditions of tender
- Not registering the award of contract on the cidb Register of Projects (RoP)
- Not reporting practical completion on the cidb Register of Projects (RoP)

3.6.5 **CIDB BUILD PROGRAMME: Minimum Targeted Contract Skills Development Goal (CSDG)**

The Minimum Targeted Contract Skills Development CPG is *"not applicable"* to this project.

The contractor shall achieve or exceed in the performance of the contract the Contract Skills Development Goal (CSDG) established in the Standard for Developing Skills through Infrastructure Contracts (published in Government Gazette No 48491 of 23 April 2023 and the cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.

Failing to achieve the targeted Contract Skills Development Goal will result in A) a (0%) penalty of the value of the portion not achieved, excluding VAT, and B) the Issuing of completion certificates only after the completion certificate of achieving the skills development goal, counter-signed by the relevant individuals has been submitted, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

The contractor shall apportion the learners in the different construction activities based on the scope of work. The cost of accommodating learners will be determined by using Table 3 in the Standard and this cost will be used to determine the value in Rand and will be added to the provision for training as provided for in the Preliminary and General section in the Bill of Quantities/Pricing schedules/Activity schedule.

C3.6.5.1 Methodology

The contractor shall achieve the measurable contract skills development goal by providing opportunities to learners requiring structured workplace learning using one or a combination of any of the following in relation to work directly related to the contract or order:

Method 1: structured workplace learning opportunities for learners towards the attainment of a part or a full occupational qualification;

Method 2: structured workplace learning opportunities for apprentices or other artisan learners towards the attainment of a trade qualification leading to a listed trade (GG No. 35625, 31 August 2012) subject to at least sixty percent (60%) of the artisan learners being holders of public TVET college qualifications;

Method 3: work integrated learning opportunities for University of Technology or Comprehensive University students completing their national diplomas;

Method 4: structured workplace learning opportunities for candidates towards registration in a professional category by a statutory council.

The contract skills participation goals, expressed in Rand, shall not be less than the contract amount multiplied by a percentage (%) factor given in Table 1 in the Standard for the applicable class of onstruction works.

Table 1: Contracting skills development goals for different classes of engineering and construction works contracts

Class of construction works as identified in terms of Regulation 25 (3) of the Construction Industry Regulations 2004		Construction skills development goal (CSDG) (%)
Designation	**Description**	
CE	Civil Engineering	0.25
CE and GB	Civil engineering and General Building	0.375
EE	Electrical Engineering works (buildings)	0.25
EP	Electrical Engineering works (infrastructure)	0.25
GB	General Building	0.5
ME	Mechanical Engineering works	0.25
SB	Specialist	0.25

The contractor shall apportion the learners in the different construction activities based on the scope of work. The cost of accommodating learners will be determined by using Table 2 in the Standard and this cost will be used to determine the value in Rand and will be added to the provision for training as provided for in the Preliminary and General section in the Bill of Quantities/Pricing schedules/Activity schedule.

Table 2: Notional Cost of Training per Headcount
Source: cidb Standard for Skills Development

Type of Training Opportunity	Provision for stipends (Unemployed learners only)	Provisions for mentorship	Provisions for additional costs*	Total costs	
				Unemployed learners	Employed learners
Method 1					
Occupational qualification	**R7 000**	**R0**	**R9 000**	**R16 000**	**R9 000**
Method 2					
TVET College graduates	**R14 000**	**R0**	**R9 000**	**R23 000**	**N/A**
Apprenticeship	**R14 000**	**R0**	**R12 000**	**R26 000**	**R12 000**
Method 3					
P1 and P2 learners	**R24 000**	**R20 000**	**R4 500**	**R48 500**	**N/A**
Method 4					
Candidates with a 3 year diploma	**R37 000**	**R20 000**	**R4 500**	**R61 500**	**R20 000**
Candidates with 4 year qualification	**R47 000**	**R20 000**	**R4 500**	**R71 500**	**R20 000**

Note: the required CPG will be recalculated based on the awarded tender amount and "Contract amount" once the beneficiaries have been appointed and actual costs are known. The notional cost of providing training opportunities will increase by CPI on an annual basis based on April CPI. Should the rates increase after bid award or during construction the rates will be adjusted as a remeasuarble item.

(a) The successful contractor may employ part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates directly or through a Skills Development Agency (SDA), (A1 - List of cidb accredited SDAs).

(b) The successful contractor must employ at least sixty percent (60%) **(not applicable on this project)** of the learners from an FET / TVET college should the contractor select to have part/full occupational qualification learners and trade qualification learners contributing to the CSDG.

(c) The successful contractor shall employ at least **(0) percent** from eligible part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates in the employment of the employer.

(d) The successful contractor shall ensure that no single method shall contribute more than seventy five percent (75%) of the CSDG for the contract.

(e) The successful contractor may only place thirty three percent (33%) employed employees or that of his subcontractors contributing to the CSDG.

(f) The contractor shall employ at least sixty percent (60%) of the learners from a Public FET / TVET college should the contractor select to have trade qualification learners (Method 2) contributing to the CSDG.

(g) One of the objectives of the project is to train **(0) percent** Occupational qualifications, trade qualification, work integrated learners – P1 and P2 learners, professional candidates.

C3.6.5.2 Management

(a) The successful contractor must keep site records regarding the part/full occupational qualification learners', trade qualification learners', work integrated learners' or candidates' progress, site attendance, hours worked and other relevant information as required by the Standard.

(b) The successful contractor shall provide the required number of appropriately qualified mentors to the maximum number of part/full occupational qualification learners, trade qualification learners, work integrated learners in the proportion as specified in the Standard.

(c) The successful contractor shall provide a supervisor to manage the training of the part/full occupational qualification learners, trade qualification learners, work integrated learners, candidates.

(d) The successful contractor shall submit to the employer's representative a baseline training plan in the specified format (Pro-forma A2) for the part/full occupational qualification learners, trade qualification learners, work integrated learners, candidates within 30 days of start of the contract.

(e) The successful contractor shall submit to the employer's representative project interim report in the specified format (Pro-forma A3) on the progress of each of part/full occupational qualification learner, trade qualification learner, work integrated learner, candidate every three months.

(f) The successful contractor shall submit to the employer's representative the names and particulars in the specified format (Pro-forma A4) of the supervisor, mentors for the part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates within 30 days of start of the contract.

(g) The successful contractor shall keep a daily record of all the part/full occupational qualification learners, trade qualification learners, work integrated learners, candidates on site and their daily activities and shall be made available to the employer's representative on request.

(h) The successful contractor shall submit to the employer's representative the reports on the progress and status of the part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates with the monthly invoice for the payment certificate.

(i) The successful contractor shall have health and safety inductions for all part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates.

(j) The successful contractor shall conduct entry and exit medical tests of all part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates.

(k) The successful contractor shall provide personal protective equipment (PPE) to all part/full occupational qualification learners, trade qualification learners, work integrated learners or candidates at the start of their employment on site.

(l) Based on the agreed skills methods the contractor may employ part/full Occupational Qualification Learners and /or Trade Qualification Learners and/or Work Integrated Learners and/or Candidates directly or through a Skills Development Agency (SDA), training provider or skills development facilitator (Form A1 - List of cidb accredited SDAs). The contractor shall ensure that no more than one Method shall be applied to any individual concurrently in the calculation of the CSDG for the contract.

C3.6.6 NATIONAL YOUTH SERVICE TRAINING AND DEVELOPMENT PROGRAMME (NYS)

The National Youth Service Training and Development Programme is *"not applicable"* to this project.

The programme shall be implemented in terms of the Implementation of the National Youth Service Programme under the Expanded Public Works (EPWP) and shall be priced in the CPG section of the Bills of Quantities. Monthly reports are to be submitted to the Employer's Representative.

Failure by the contractors to achieve the specified number to be trained in the NYS section of the CPG section within the Bills of quantities will result in a Payment reduction as per bill of quantities per person, excluding VAT, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

C3.6.7 LABOUR-INTENSIVE WORKS

Labour Intensive Works is *"not applicable"* to this project.

Where labour intensive work is specified in the Bill of Qualities and specified by "LI" the contractor must price for and include in rates. Contractors are expected to use their initiative to identify additional activities that can be done labour-intensively to comply with the set minimum labour intensity target. Allowance must be made for submitting monthly reports illustrating the value of the works executed under Labour Intensive Works.

Failure by the contractor to achieve the specified value of the Labour Intensive Participation Goal as stipulated within the Bills of Quantities will result in a **(0%)** penalty of the value of the works not done by means of labour intensive methods, excluding VAT, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

Employer's objectives:
The employer's objectives are to deliver public infrastructure using labour-intensive methods in accordance with EPWP Guidelines.

Labour-intensive works:
Labour-intensive works shall be constructed/maintained using local workers who are temporarily employed in terms of the scope of work.

Labour-intensive competencies of supervisory and management staff:
Contractors shall only engage supervisory and management staff in labour-intensive works that have completed the skills programme including Foremen/ Supervisors at NQF level 4 "National Certificate:

Supervision of Civil Engineering Construction Processes" and Site Agent/ Manager at NQF level 5 "Manage Labour-Intensive Construction Processes" or equivalent QCTO qualifications (See Appendix C) at NQF outlined in Table 1

C3.6.7.1 GENERIC LABOUR-INTENSIVE SPECIFICATION

Contractors are referred to the Guidelines for the Implementation of Labour-intensive Infrastructure Projects under the Expanded Publics Works Programme (EPWP) for the generic labour-intensive specification applicable to the contract.

This specification establishes general requirements for activities which are to be executed by hand involving the following:

- trenches having a depth of less than 1.5 metres
- stormwater drainage
- roads
- sidewalks and non-motorised transport infrastructure
- water and sanitation

Precedence

Where this specification is in conflict with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail

Hand excavateable material

Hand excavateable material is:

a) granular materials:

i) whose consistency when profiled may in terms of Table 3 be classified as very loose, loose, medium dense, or dense; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) cohesive materials:

i) whose consistency when profiled may in terms of Table 3 be classified as very soft, soft, firm, stiff and stiff / very stiff; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note

1) A boulder is material with a particle size greater than 200mm, a cobble and gravel is material between 60 and 200mm.

2) A dynamic cone penetrometer is an instrument used to measure the in-situ shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60° with respect to the horizontal) into the material being used.

Table 3: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	**DESCRIPTION**	**CONSISTENCY**	**DESCRIPTION**
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.

Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in up to 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of a geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

Trench excavation
All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

Compaction of backfilling to trenches (areas not subject to traffic)
Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers;
a) to 90% Mod AASHTO;
b) such that in excess of 5 blows of a dynamic come penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or
c) such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

Excavation
All excavateable material including topsoil classified as hand excavateable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand. Any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

Clearing and grubbing
Grass and bushes shall be cleared by hand.

Shaping
All shaping shall be undertaken by hand.

Loading
All loading shall be done by hand. Haulage equipment should be selected in a manner that allows loading by hand to the greatest extent possible.

Haul
Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

Offloading
All material, however transported, is to be off-loaded by hand, unless tipper-trucks are utilised for haulage.

Spreading
All material shall be spread by hand.

Compaction
Small areas may be compacted by hand provided that the specified compaction is achieved. Appropriate rollers should be used where higher (than can be achieved by hand) levels of compaction are required or for large areas.

Grassing
All grassing shall be undertaking by sprigging, sodding, or seeding by hand.

Stone pitching and rubble concrete masonry
All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, must to be collected, loaded, off loaded and placed by hand.
Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.
Grout shall be mixed and placed by hand.

Manufactured Elements
Elements manufactured or supplied by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. Where the mass of an element exceeds 55 kg, consideration should be given to the size of the element relative to its total mass related to the number of workers who would be needed to lift such mass

C3.7 Submission of Accrual Reports

The Contractor shall submit accrual reports to the client representative at the end of March and September each year for the duration of the Service Contract period from the date of appointment up to and including project closeout. This is to ensure that PMTE complies with the accounting framework GRAP, which requires that PMTE disclose all its accruals as at the end of each reporting date.

C3.8 Submission of Monthly Local Material Utilisation Report (Local Content)

Submission of Monthly Local Material Utilisation Report (Local Content) *"not applicable"* to this project.

The Contractor shall when applicable to this project, be responsible for record keeping, documenting and submission of monthly local material utilization report with supporting documentation to the Employer's representative within 7 working days of the beginning of the successive month, in terms of DTI&C designated industry/sector/sub-sector schedule as per the PA36 and Annexures C attached to the tender document. The final percentage achievement to be reconciled upon completion of the project and form part of the final account.

Failure by the contractor to achieve the specified percentage of local content per designated industry/sector/sub-sector as listed will result in a thirty percent thirty percent (30%) penalty of the value not achieved, excluding VAT, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control.

Examples of calculating CPGs and related penalties

CPGs values are based on the Tender Amount at the time of the award. Determining the actual values is based either on the Tender Amount including allowances and Vat or the Tender Amount at the time of award excluding allowances and VAT, where Allowances include the following:

- Provisional amounts
- CPG allowances
- Nominated and/or selected subcontractors
- Contract price adjustment (Not provided for within the B of Q by NDPWI)
- Contingency amounts (Not provided for within the B of Q by NDPWI)

CPG values in the CPG Bill of Quantities Section will be recalculated based on the "Tender Amount" or the "Contract Amount" which ever applicable and the provisional amounts adjusted accordingly. Sanctions (penalties) are applicable to all CPGs where the contractor fails to achieve the minimum specified requirements, unless the contractor can prove to the Employer's satisfaction that the non-achievement was beyond his/her control. No penalties will be applied should the CPG value, based on the original "Tender Amount" or the "Contract Amount", has been achieved.

1.1 Targeted Local Building Material Manufacturers CPG

When applicable, the CPG is expressed as a percentage of the "Contract Amount", i.e. the Tender Amount at the time of award excluding allowances and VAT.

CPG calculation example:
"Tender Amount" = R150 Mil all inclusive of allowances and VAT
"Contract Amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
CPG to be achieved = 5% as specified in the Scope of Works (PG01.2)
CPG target value = R130 Mil x 5% = R 6,5 Mil (Value of material to be purchased from local manufacturers, excluding VAT)

Calculation of penalty:
Percentage penalty applicable = 10% as specified in the Scope of Works (PG01.2)
CPG target value = R6,5 Mil excluding VAT
CPG Achieved = R5,5 Mil (R1 Mil shortfall) excluding VAT
Penalty = R1 Mil x 10% = R100 000 excluding VAT

1.2 Targeted Local Building Material Suppliers CPG

When applicable, the CPG is expressed as a percentage of the "Contract Amount", i.e. the Tender Amount at the time of award excluding allowances and VAT.

CPG calculation example:
"Tender Amount" = R150 Mil all inclusive of allowances and VAT
"Contract Amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
CPG to be achieved = 5% as specified in the Scope of Works (PG01.2)
CPG target value = R130 Mil x 5% = R 6,5 Mil (Value of material to be purchased from local suppliers, excluding VAT)

Calculation of penalty:
Percentage penalty applicable = 20% as specified in the Scope of Works (PG01.2)
CPG target value = R6,5 Mil excluding VAT
CPG Achieved = R5,5 Mil (R1 Mil shortfall) excluding VAT
Penalty = R1 Mil x 20% = R200 000 excluding VAT

1.3 Targeted Local Labour Skills Development CPG

When applicable, the CPG is expressed as a percentage of the total number working days required to

complete the Works.

CPG calculation example:
"Tender Amount" = R150 Mil all inclusive of allowances and VAT
"Contract amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
Number of working days required to complete the Works based on the construction period = 600 days
CPG percentage participation to be achieved = 30% as specified in the Scope of Works (PG01.2)
Required number of working days training to be provided = 180 days (600 x 30%)

Calculation of penalty:
Payment reduction = R 5 000 per day for not providing training as specified in the Scope of Works (PG01.2)
CPG = 600 working days x 30% = 180 working days training to be provided
CPG Achieved = 160 days (20 days shortfall where no training was provided)
Penalty = 20 days x R5 000 payment reduction per day= R100 000 excluding VAT

1.4 Cidb BUILD Programme: Enterprise Development

When applicable, the Enterprise Development CPG expressed as a percentage of the "Contract amount" = Tender amount at the time of award excluding allowances and VAT. Failure to achieve the minimum Targeted Local Labour Skills Development CPG will result in a payment reduction of an amount specified in the Scope of Works (PG01.2) per working day where training was not provided.

The monetary value of training to be provided is stipulated in the CPG BoQ section. The number of beneficiaries to be trained is dependent on the "Contract Amount" as well the number of beneficiaries appointed which will generally resort under the Grade 1 and 2 cidb categories. The provisional amount will therefore be adjusted in terms of the "contract Amount", the number of beneficiaries to be trained and the actual cost for providing the training.

Part 1: Calculation of 5% CPG example:
"Tender Amount" = R150 Mil all inclusive of allowances and VAT
"Contract Amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
CPG percentage participation to be achieved = 5% as specified in the Scope of Works (PG01.2) CPG value = R6,5 Mil (Value of work to be subcontracted to emerging enterprises)

Calculation of penalty
Percentage penalty applicable = 30% as specified in the Scope of Works (PG01.2)
CPG Minimum 5% = R6,5 Mil
Achieved = R5,5 Mil (Only subcontracted work to the value of R5,5 Mil, i.e. R1 Mil shortfall)
Penalty = R1 Mil x 30% = R300 000 Excl. VAT

Part 2: Calculations in terms of training to be done:
The number of enterprises to be developed is subject to the contract amount and the apportionment of the work as per Example 1 below.
Number of enterprises to be trained = 6 x 1 GB subcontractors
Total cost for training = R 1 660 000

Calculation of penalty
Total number of enterprises to be trained = 6
Total number trained = 4 (2 Shortfall)
Training cost per beneficiary = R1 660 000 / 6 = R 276 666,67 per beneficiary
Penalty = R 276 666,67 x 2 x 30% = R166 000 Excl. VAT

B of Q Item	Description	Unit	Rate	Quantity	Amount (R)
5	**Enterprise Development**				
5.1	Enterprise Development of Targeted Enterprise or JV partners				
5.1.1	Appointment of training co-ordinator	Per Quarter	45 000	8	360 000
5.1.2	Appointment of Mentor /Training Service provider	Per Quarter	135 000	8	1 080 000

B of Q Item	Description	Unit	Rate	Quantity	Amount (R)
5.1.3	Needs Analysis and Enterprise Development Plan per Targeted Enterprise	No.	5 000	6	30 000
5.1.4	Monitoring and Interim reporting per targeted enterprise	Per Quarter	20 000	8	160 000
5.1.5	Project Completion report per Targeted Enterprise	No.	5 000	6	30 000
	Provisional Sum to be carried over to CPG bill of quantities				**1 660 000**
	"Contract amount" Tender amount excl. allowances and VAT.	130 000 000			
	CPG Monetary value (5%) to be subcontracted to beneficiaries for training	6 500 000			
	No of enterprises based on the CPG value	6	Grade 1 / 2 GB/CE,ETC.		
	Contract period (months)	24			
	Note: Rates to be determined by PQS and adjusted to accepted quotation amounts				

1.5 Cidb BUILD Programme: Skills Development (Principal contractor including subcontractors and consultants)

When applicable, the contract skills development participation goals, expressed in Rand, shall be no less than the "contract amount" multiplied by a percentage (%) factor for the applicable class of construction works.

The monetary value of training to be provided is stipulated in the CPG BoQ section. The number of beneficiaries to be trained is dependent on the "Contract Amount" as well the number of beneficiaries appointed which will generally resort under the Grade 1 and 2 cidb categories. The provisional amount will therefore be adjusted in terms of the "Contract Amount", the number of beneficiaries to be trained from which *Method* and the actual cost for providing the training.

CPG Calculation

Table 2: Contracting skills development goals for different classes of engineering and construction works contracts

Source: cidb Standard for Developing Skills through Infrastructure Contracts as published in the Government Gazette Notice No. 43495 of 3 July 2020 (Page 7)

Class of construction works as identified in terms of Regulation 25 (3) of the Construction Industry Regulations 2004		**Construction skills development goal (CSDG) (%)**
Designation	**Description**	
CE	Civil Engineering	0.25
CE and GB	Civil engineering and General Building	0.375
EE	Electrical Engineering works (buildings)	0.25
EP	Electrical Engineering works (infrastructure)	0.25
GB	General Building	0.5
ME	Mechanical Engineering works	0.25
SB	Specialist	0.25

"Contract amount" = Tender amount at the time of award excluding allowances and expenses, and VAT

Contractor CPG:

CPG calculation
"Contract amount" x factor from Table 3 above.

CPG calculation example:
"Tender Amount" = R150 Mil for GB, all inclusive of allowances and VAT
"Contract Amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
Factor for GB = 0,5% (as per Table 2 above)
CPG in R value = R130 Mil x 0,5% = R650 000 i.e. total notional cost of training to amount to R650 000

Calculation of penalty:
Percentage penalty applicable = 30% as specified in the Scope of Works (PG01.2)
CPG value = R650 000

Achieved = R550 000 = R100 000 Shortfall
Penalty = R100 000 x 30% = R30 000 Excl. VAT

Calculations based on "Contract Amount" after bid award and appointment of beneficiaries
Actual CPG training requirement value after award upon selecting method/s of training and appointment of beneficiaries = R676 000 (Table 4 below) and the provisional amount allowed for to be adjusted accordingly. The new monetary value of training required will then form the basis for determining penalties applicable. No penalties will be applied should the CPG value, based on the "Contract Amount" be achieved.

Table 4: Notional cost recalculation upon appointment of beneficiaries.
Source: cidb Standard for Developing Skills through Infrastructure Contracts as published in the Government Gazette Notice No. 43495 of 3 July 2020 (Page 10)

Skills Types	Number of learners	Notional Cost / Learner / Quarter	Notional cost / learner / year	Total Notional Cost over 12 months Contract
Method 2: Workplace learning opportunities, with unemployed TVET graduates	2	R23 000	R92 000	R184 000
Method 3: Candidacy for an unemployed learner with a 3-year qualification	2	R61 500	R246 000	R492 000
Total	4			R676 000

Note: the required CPG will be recalculated based on the awarded Tender amount and "Contract Amount" once the beneficiaries have been appointed and actual costs are known

Note: The notional cost of providing training opportunities will increase by CPI on an annual basis based on April CPI as published by Stats SA. The rates will be adjusted as an adjustment to the provisional amounts should the rates increase after bid award or during the construction period

1.6 National Youth Service Programme (NYS) CPG

When applicable, a separate NYS Bill of Quantities will be included in the tender documentation will indicate the number of beneficiaries to be trained.

Calculation of penalty:
Payment reduction per person not trained as stipulated in the NYS Bill of Quantities = R 2 500 per person.
Total number of NYS Beneficiaries as stipulated in the NYS Bill of Quantities = 25
Total Number of NYS beneficiaries trained = 20 (shortfall of 5 beneficiaries)
Penalty = 5 x R2 500 = R12 500 Excl. VAT

1.7 Labour Intensive Works CPG

When applicable, the work to be done by way of Labour intensive methods are specified in the Bills of Quantities with a "LI".

CPG calculation example:
"Tender Amount" = R150 Mil all inclusive of allowances and VAT
"Contract Amount" = R130 Mil (Tender Amount at the time of award excluding allowances and VAT)
CPG value = R10 Mil (Total value of labour-intensive works specified in the Bills of Quantities)

Calculation of penalty:
CPG value = R10 Mil
Percentage penalty applicable = 30% as specified in the Scope of Works (PG01.2)
CPG Achieved = 9 Mil (R1 Mil shortfall)
Penalty = R1 Mil x 30% = R300 000 Excl. VAT

Part C4: Site Information

PG-03.2 (EC) SITE INFORMATION – JBCC 2000 PRINCIPAL BUILDING AGREEMENT (EDITION 6.2 OF MAY 2018)

Project title:	*MANKWENG SAPS – UPGRADING OF POLICE STATION, CONSTRUCTION OF 8 ADDITIONAL OFFICES, CELLS AND LIVING QUARTERS.*				
Tender no:	*PLK24/05*	**WCS no:**	*014335*	**Reference no:**	*6066/0006*

C4 Site Information

Mankweng Police Station is situated at Turfloop Mankweng

- Municipality: Polokwane Local Municipality
- Province: Limpopo
- District: Capricorn District Municipality.

MANKWENG
POLICE STATION
MECHANICAL
SUPLEMENTARY TECHNICAL SPECIFICATION

1. GENERAL

This specification consisting of (12) pages numbered consecutively and is for the supply, delivery and installation of Air Conditioning and Ventilation Equipment and Fire Protection Equipment for Mankweng Police Station Centre and is to be read as forming part of the Department of Public Works Standard Specification for Air Conditioning and Ventilation Installations, Issue XI, 1998. The clauses referred to herein are clauses of the Standard Specification, relevant clauses not specifically mentioned shall also apply.

All equipment and installations detailed in the specification shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993.

The Department's Standard Specification for Electrical Installations and Electrical equipment pertaining to Mechanical Services, Issue IXa, December 1999, shall also apply to this contract.

Where conditions are at variance, this supplementary specification will have preference over both Standard Specification and drawings.

Copies of the Standard specifications are obtainable from the Director-General: Public Works, Private Bag X 65, Pretoria, 0001. All Standard Specifications are also available on the Department's Website [www.publicworks.gov.za].

2. PRINCIPAL ITEMS OF WORK

In general the air conditioning installation to the building will consist of the following:

2.1 VRV (Variable Refrigerant Volume) or VRF (Variable Refrigerant Flow) air-conditioning systems.

2.2 Integrated fire detection system

2.3 FM200 Gas suppression fire prevention system for the archives.

2.4 Making off in the switchboard of the main incoming cable reticulated by the site electrician, and the connection thereof.

2.5 Controls, switchgear and site wiring for the entire installation. Power supplies to small individual fans including their isolators will be provided by the site electrician. Making off inside isolators to be part of this contract.

2.6 All equipment base formers, pipe supports, vibration eliminators, spring hangers for piping, brackets and accessories to complete the installation as specified.

2.7 Hoisting of equipment on to or from roof slabs, if so required.

2.8 As built drawings

2.9 Detailed Operating and Maintenance Manuals.

2.10 Spares and tools as specified and where applicable, as provided with the equipment.

2.11 Maintenance and guarantee for 12 months after handing over and acceptance of the completed installations, in addition to any other requirements as detailed hereinafter.

2.12 Painting of all metal work including pipe hangers, steel structures, steel base formers, etc.

3. COMPREHENSIVE CONTRACTS

Only specialist sub-contractors who have previously successfully completed mechanical installations of the extent and type specified in this document should be considered.

NOTE: No changes in make, type or capacity of equipment specified in the schedule of particulars shall be allowed after acceptance of the tender without the written approval of the Department.

4. FINAL DELIVERY

Final delivery shall be as prescribed in clause 1.2 of PW 379.

5. PERIOD OF LIABILITY

The period of liability shall be as prescribed in clause 2.1 of PW 379.

6. MATERIAL AND WORKMANSHIP

All materials and equipment used shall be new, free from rust, defects, undamaged and be suitable for the purpose for which it will be used. Materials shall comply with the latest issue of the relevant SANS or BS specification where applicable.

If any material or workmanship is not to the satisfaction of the Department, it shall be rectified and/or replaced at the contractor's cost and all rejected material shall immediately be removed from site.

The contractor is responsible for the correct and complete erection of the installation and inspections executed by the Department do not exempt the contractor of this obligation.

(See clause 1.3.0)

7. MANUFACTURER'S RATINGS

All equipment shall be able to work within the rated capacity, as determined by the manufacturer. Any equipment offered for use out of these limits will not be considered.

Contractors shall hand in the rated capacities of all equipment as well as descriptive literature with the tender documents.

(See clause 1.8.0)

8. DRAWINGS

The drawings that accompany this specification (if any) are schematic and do not necessarily indicate the exact position, size or detail the construction of equipment. Tenderers must satisfy themselves that the equipment offered by them will fit into the available space and can be positioned so that access for maintenance, repair or removal is not encumbered.

NOTE: ***All final dimensions are to be verified on site prior to any equipment or material being ordered or manufactured.***

(See clause 1.4.0)

Drawing Index

Drawing Number	Description
05/ING/MAN/0018/XN-1D	Admin Building HVAC Layout
05/ING/MAN/0018/XN-3E	Crime Investigation HVAC Layout
05/ING/MAN/0018/XN-4D	Cell Block HVAC Layout

9. BUILDERS WORK

All building work such as cutting of openings, making good, bases for equipment, etc. shall be included for in this tender and tenderers must allow for it in their tender price.

10. PAINTING

All exposed steel surfaces, excluding new galvanized and stainless steel shall be painted. All steel surfaces to be painted shall be prepared according to SABS 064 (Code for the preparation of steel surfaces for painting). Thereafter the surfaces shall be painted with a zinc chromate primer to SABS 679 type 1, followed by one coat of universal undercoat and one final coat of high gloss enamel paint to SABS 630 Grade 1, the colour of which shall be determined by the Department's Representative.

(See clause 3.13.0)

11. MAINTENANCE AND SERVICING

(See clause2.0)

12. COMMISSIONING AND TESTING

(See clause 1.12.0)

13. DESIGN CONDITIONS

Ambient Conditions:

When tendering the units offered must be de-rated to allow for outside conditions, altitude etc. as set out below.

Location	-	Mankweng
Altitude	-	1000m ASL
Outside Summer Conditions	-	35°C db / 21.5°C wb, 50% RH
Outside Winter Conditions	-	5°C db, 40% RH

14. VRV TYPE UNITS

The VRV (variable Refrigerant Volume) or VRF (Variable Refrigerant Flow) system will be of the Heat Recovery type and will utilize R410 refrigerant.

Condensate from outdoor units shall be piped to drains. Condensate from indoor units shall be drained to the nearest drain point outside the building. Condensate pipes visible to the outside shall be copper piping. No PVC condensate piping will be allowed outside the building.

Both suction and liquid lines shall be insulated and vapor sealed to prevent dripping. Piping insulation joints shall be glued and taped. Where refrigerant piping is exposed the piping shall be installed in painted sheet metal trunking, compete with covers. Paint colour to be specified by architect.

All conduits shall be steel conduit. No PVC conduit will be allowed.

14.1 Indoor Units

Indoor units shall be finished in white.

Each indoor unit will have a separate remote control, hard wired, located 1800mm AFL. This remote control to be positioned next to the main light switch for the room. Wireless remote controllers will not be acceptable.

14.2 Outdoor units.

Outdoor units shall be finished in white, cream or off-white colour galvanized sheet. Placement of outdoor units to be verified on site with the architect to ensure minimal aesthetic disturbance.

15. ISOLATORS

Outside isolators to be of Lockable Rotary Type and Weatherproof. Isolators to be fitted on outside of building on condenser side of air conditioner unit.

Each indoor unit will be fitted with an isolator. Isolator to be placed in ceiling void within reach of unit.

16. FILTERS

Units to have permanent washable type filters. Disposable filters will not be accepted.

17. FIRE DETECTION AND PREVENTION EQUIPMENT

All fire protection equipment to have adequate fire protection signage as per National Building Regulations – SANS 0400

The installation includes an addressable fire detection system complete with addressable optical smoke detectors, control panel, break glass units and signage as indicated in the Bill of Quantities. The system must include REMRAD capability.

The installation also includes a FM200 gas suppression system for the archives. The system will be matched to the volume of the room. The system will be modular. The installation will be complete with bells, sirens, strobes, smoke detectors etc. **Provision to be made for the supply of a complete breathing apparatus for the archive**. The system must make provision to shut off the air-conditioning to the archive in event of a fire.

18. EQUIPMENT SCHEDULES

18.1 Indoor Units

Item	Location	Type	Outdoor unit	Cooling Capacity
ACU1/1	Investigating Officer 15&16	Mid Wall Type	ACU A	2.6kW
ACU1/2	Investigating Officer 17&18	Mid Wall Type	ACU A	2.6kW
ACU1/3	Investigating Officer 19&20	Mid Wall Type	ACU A	2.6kW
ACU1/4	Investigating Officer 21&22	Mid Wall Type	ACU A	2.6kW
ACU1/5	Investigating Officer 23&24	Mid Wall Type	ACU A	2.6kW
ACU1/6	Investigating Officer 25&26	Mid Wall Type	ACU A	2.6kW
ACU1/7	Investigating Officer 27&28	Mid Wall Type	ACU A	2.6kW
ACU1/8	Investigating Officer 29&30	Mid Wall Type	ACU A	2.6kW
ACU1/9	Investigating Officer 31&32	Mid Wall Type	ACU A	2.6kW
ACU1/10	Investigating Officer 33&34	Mid Wall Type	ACU A	2.6kW
ACU1/19	Administration	Mid Wall Type	ACU A	2.6kW
ACU1/20	Data Typist 1	Mid Wall Type	ACU A	2.6kW
ACU1/21	Data Typist 2	Mid Wall Type	ACU A	2.6kW
ACU1/22	Captain 1	Mid Wall Type	ACU A	2.6kW
ACU1/23	Captain 2	Mid Wall Type	ACU A	2.6kW
ACU1/24	Investigating Officer 1&2	Mid Wall Type	ACU A	2.6kW
ACU1/25	Investigating Officer 3&4	Mid Wall Type	ACU A	2.6kW
ACU1/26	Investigating Officer 5&6	Mid Wall Type	ACU A	2.6kW
ACU1/27	Investigating Officer 7&8	Mid Wall Type	ACU A	2.6kW

ACU3/1	Reception	Ceiling Cassette	ACU A	10kW
ACU1/11	Investigating Officer 35&36	Mid Wall Type	ACU B	2.6kW
ACU1/12	Investigating Officer 37&38	Mid Wall Type	ACU B	2.6kW
ACU1/13	Investigating Officer 39&40	Mid Wall Type	ACU B	2.6kW
ACU1/14	Investigating Officer 41&42	Mid Wall Type	ACU B	2.6kW
ACU1/15	Investigating Officer 43&44	Mid Wall Type	ACU B	2.6kW
ACU1/16	Investigating Officer 45&46	Mid Wall Type	ACU B	2.6kW
ACU1/17	Investigating Officer 47&48	Mid Wall Type	ACU B	2.6kW
ACU1/18	Investigating Officer 49&50	Mid Wall Type	ACU B	2.6kW
ACU1/32	Commander	Mid Wall Type	ACU B	2.6kW
ACU1/31	Interrogation Room	Mid Wall Type	ACU B	2.6kW
ACU1/16	Investigating Officer 9&10	Mid Wall Type	ACU B	2.6kW
ACU1/17	Investigating Officer 11&12	Mid Wall Type	ACU B	2.6kW
ACU1/18	Investigating Officer 13&14	Mid Wall Type	ACU B	2.6kW
ACU2/1	Lecture Room/ Tea Room	Ceiling Cassette	ACU B	5kW
ACU2/12	Lecture Room/ Tea Room	Ceiling Cassette	ACU B	5kW
ACU2/13	Lecture Room/ Tea Room	Ceiling Cassette	ACU B	5kW
ACU4/20	New Office	Mid Wall Type	ACU C	3.6kW
ACU4/18	Office	Mid Wall Type	ACU C	3.6kW
ACU4/19	Office	Mid Wall Type	ACU C	3.6kW
ACU4/1	Office	Mid Wall Type	ACU C	3.6kW
ACU1/44	Exhibit Clerk	Mid Wall Type	ACU C	2.6kW
ACU4/2	Office 1	Mid Wall Type	ACU C	3.6kW
ACU4/3	Office 2	Mid Wall Type	ACU C	3.6kW
ACU1/36	Office 3	Mid Wall Type	ACU C	2.6kW
ACU1/37	Office 4	Mid Wall Type	ACU C	2.6kW
ACU1/38	Office 5	Mid Wall Type	ACU C	2.6kW
ACU4/21	CAS Office	Mid Wall Type	ACU C	3.6kW
ACU4/6	Radio Room	Mid Wall Type	ACU C	3.6kW
ACU3/4	Rest Room/ Shift Change	Ceiling Cassette	ACU C	10kW
ACU4/23	Station Commander	Mid Wall Type	ACU D	3.6kW
ACU4/4	Existing Office 1	Mid Wall Type	ACU D	3.6kW
ACU4/5	Existing Office 2	Mid Wall Type	ACU D	3.6kW
ACU1/39	Existing Office 3	Mid Wall Type	ACU D	2.6kW
ACU1/40	Existing Office 4	Mid Wall Type	ACU D	2.6kW
ACU1/41	Existing Office 5	Mid Wall Type	ACU D	2.6kW
ACU4/6	Existing Office 6	Mid Wall Type	ACU D	3.6kW
ACU4/7	Existing Crime Office	Mid Wall Type	ACU D	3.6kW

ACU2/4	Statements	Ceiling Cassette	ACU D	5kW
ACU2/5	Statements	Ceiling Cassette	ACU D	5kW
ACU4/25	CSC Commander	Mid Wall Type	ACU D	3.6kW
ACU1/40	Sensitive Statements	Mid Wall Type	ACU D	2.6kW
ACU4/8	Parade Room	Mid Wall Type	ACU D	3.6kW
ACU3/3	Victim Support	Ceiling Cassette	ACU D	10kW
ACU4/9	Waiting Room 1	Mid Wall Type	ACU E	3.6kW
ACU4/10	Waiting Room 2	Mid Wall Type	ACU E	3.6kW
ACU4/13	Room	Mid Wall Type	ACU E	3.6kW
ACU4/12	Visitors	Mid Wall Type	ACU E	3.6kW
ACU4/14	Search Room	Mid Wall Type	ACU E	3.6kW
ACU1/43	Statements	Mid Wall Type	ACU E	2.6kW
ACU4/11	Cell Guard	Mid Wall Type	ACU E	3.6kW
ACU2/6	Finger Print	Ceiling Cassette	ACU E	5kW
ACU2/5	Viewing Room	Ceiling Cassette	ACU E	5kW

18.2 Outdoor Units				
ACU A	Outside	Heat Recovery		60kW
ACU B	Outside	Heat Recovery		50kW
ACU C	Outside	Heat Recovery		50kW
ACU D	Outside	Heat Recovery		55kW
ACU E	Outside	Heat Recovery		34kW

19. SCHEDULES OF PARTICULARS AND INFORMATION

All schedules which accompany the mechanical work specification form an integral part of it and shall be duly completed in every detail: FAILING which, the tender in question may be rendered ineligible for consideration.

Under no circumstances will statements such as:

- See attached pamphlets
- Refer to catalogue
- Data to follow
- As given by the supplier, etc. be acceptable to the Department.

The principal contractor shall ensure that the equipment offered and listed on the schedules shall be capable of performing the specified duties and complying with the Specification requirements in all respects: SHOULD it transpire that such equipment, even when offered by make, model and/or type, is unsuitable or incapable of meeting,

or performing in accordance with the specification requirements in any respect, the Principle Contractor shall nevertheless be responsible for any additional costs incurred in providing the suitable equipment.

Whenever a specific make, model or type of equipment has been prescribed in the specification and the tenderer offers an alternative or equal make or type of equipment in his tender, the Department will on acceptance of such a tender inform the prospective contractor in writing as to the make, and/or type of equipment accepted. HOWEVER, it should be noted that the use of words "OR EQUAL" by the tender is to be discouraged and could lead to the disqualification of the tender.

Schedule of Particulars

Item	Particulars		
1.1	**VRV Mid Wall Type Indoor Unit 2.6kW**		
1.1.1	Manufacturer		
1.1.2	Country of Origin		
1.1.3	Number of Units		
1.1.4	Size and Model Number		
1.1.5	Cooling Capacity at Specified Conditions	kW	
1.1.6	Heating Capacity at Specified Conditions	kW	
1.1.7	Noise Level	NC	
1.1.8	Refrigerant	Type	
1.2	**VRV Mid Wall Type Indoor Unit 3.6kW**		
1.2.1	Manufacturer		
1.2.2	Country of Origin		
1.2.3	Number of Units		
1.2.4	Size and Model Number		
1.2.	Cooling Capacity at Specified Conditions	kW	
1.2.6	Heating Capacity at Specified Conditions	kW	
1.2.7	Noise Level	NC	
1.2.8	Refrigerant	Type	
1.3	**VRV Ceiling Cassette Type Indoor Unit 5kW**		
1.3.1	Manufacturer		
1.3.2	Country of Origin		
1.3.3	Number of Units		
1.3.4	Size and Model Number		
1.3.5	Cooling Capacity at Specified Conditions	kW	
1.3.6	Heating Capacity at Specified Conditions	kW	
1.3.7	Noise Level	NC	
1.3.8	Refrigerant	Type	

1.4	**VRV Ceiling Cassette Type Indoor Unit 10kW**		
1.4.1	Manufacturer		
1.4.2	Country of Origin		
1.4.3	Number of Units		
1.4.4	Size and Model Number		
1.4.5	Cooling Capacity at Specified Conditions	kW	
1.4.6	Heating Capacity at Specified Conditions	kW	
1.4.7	Noise Level	NC	
1.4.8	Refrigerant	Type	
1.5	**VRV System - Outdoor Unit**		**60kW**
1.5.1	Manufacturer		
1.5.2	Country of Origin		
1.5.3	Number of Units		
1.5.4	Size and Model Number		
1.5.5	Cooling Capacity at Specified Conditions	kW	
1.5.6	Heating Capacity at Specified Conditions	kW	
1.5.7	Noise Level	NC	
1.5.8	Refrigerant	Type	
1.6	**VRV System - Outdoor Unit**		**50kW**
1.6.1	Manufacturer		
1.6.2	Country of Origin		
1.6.3	Number of Units		
1.6.4	Size and Model Number		
1.6.5	Cooling Capacity at Specified Conditions	kW	
1.6.6	Heating Capacity at Specified Conditions	kW	
1.6.7	Noise Level	NC	
1.6.8	Refrigerant	Type	
1.7	**VRV System - Outdoor Unit**		**55kW**
1.7.1	Manufacturer		
1.7.2	Country of Origin		
1.7.3	Number of Units		
1.7.4	Size and Model Number		
1.7.5	Cooling Capacity at Specified Conditions	kW	
1.7.6	Heating Capacity at Specified Conditions	kW	
1.7.7	Noise Level	NC	

1.7.8	Refrigerant	Type	
1.8	**VRV System - Outdoor Unit**		**34kW**
1.8.1	Manufacturer		
1.8.2	Country of Origin		
1.8.3	Number of Units		
1.8.4	Size and Model Number		
1.8.5	Cooling Capacity at Specified Conditions	kW	
1.8.6	Heating Capacity at Specified Conditions	kW	
1.8.7	Noise Level	NC	
1.8.8	Refrigerant	Type	

PART B

ELECTRICAL PROJECT SPECIFICATIONS

1. SCOPE OF WORKS

This specification covers the contract engineering, manufacture, supply, delivery, erection, wiring, commissioning, testing and handing over in complete working order for immediate use. **Guarantee for twelve months will be applicable** on all equipment and workmanship, calculated from the final completion date, for the following:

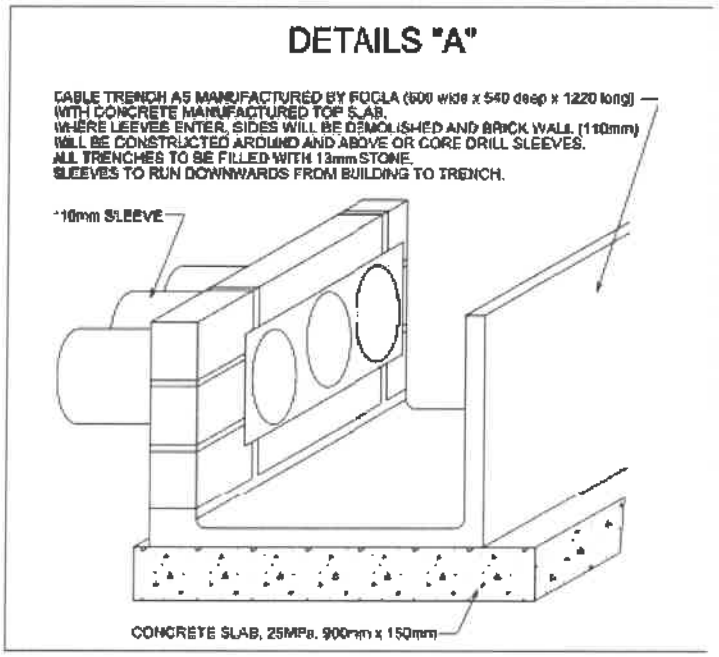
- The installation of the distribution boards with circuit beakers as specified;
- install all luminaries and socket outlets as specified and indicated on the drawings;
- complete all 2.5- and 4mm² wiring in 20- and 25mm conduit.;
- install cable racks and cables as specified;
- conduct tests and supply all paperwork as required and
- remove all redundant material from site.

2. TEMPORARY BUILDERS SUPPLY

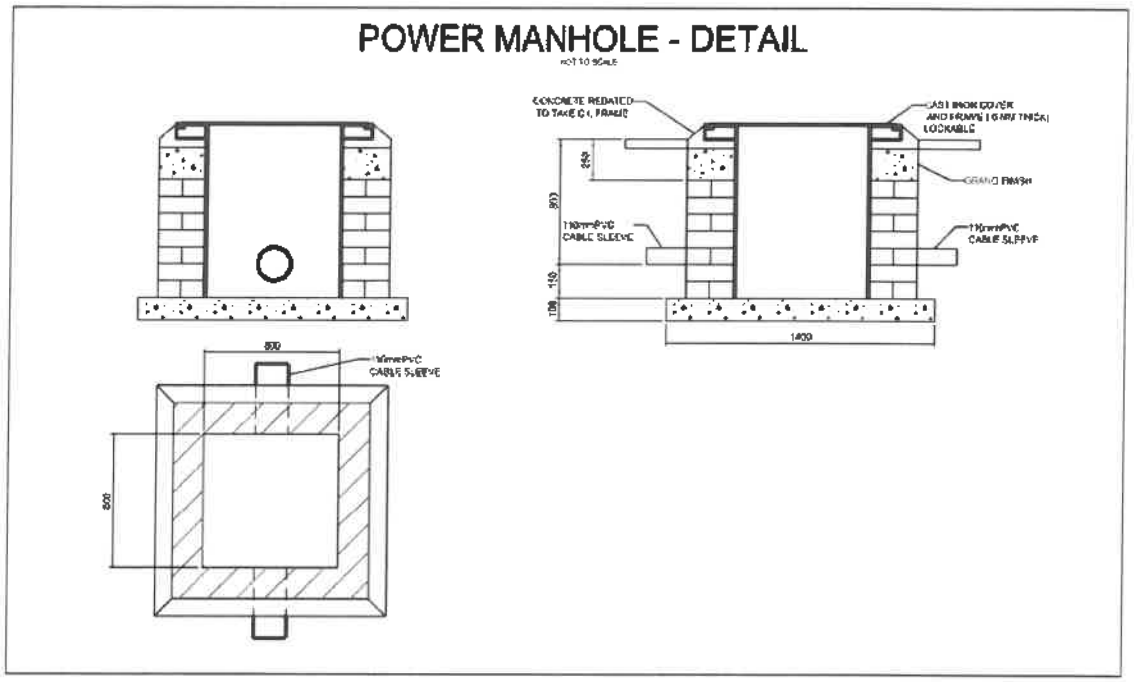
The Contractor will allow for his own Builder's Supply and will connect from an existing power source on the station. The contractor will ensure that the electrical works are properly earthed and safe. A Certificate of Compliance will be issue for the distribution board.

3. BULK SUPPLY

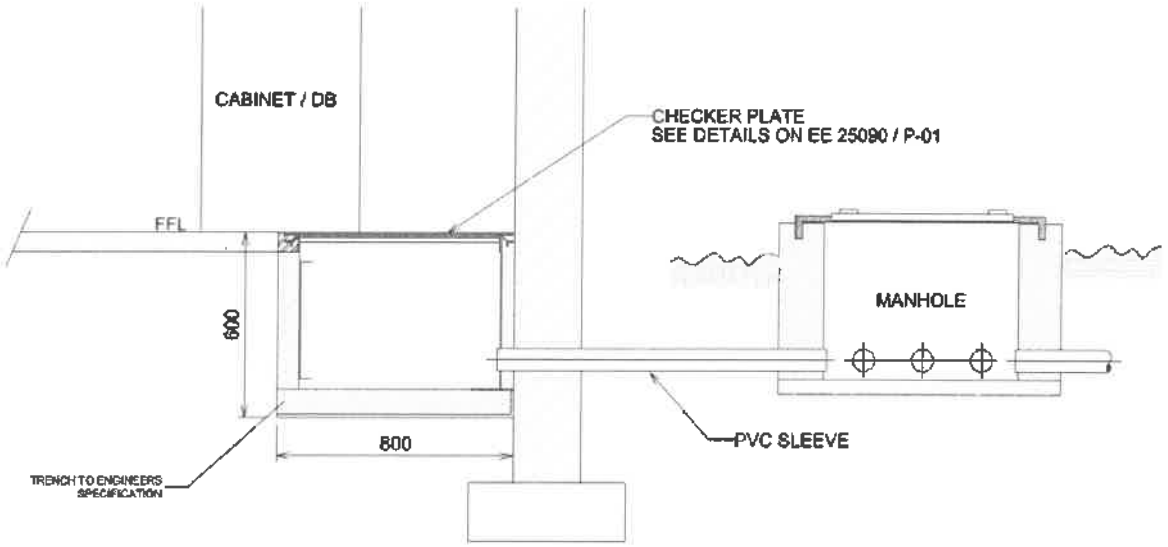
The bulk supply cable will be obtained from a New 500kVa transformer in the vicinity of the building. All the required cost should be provided for by the contractor. The cable will be connected and routed underground in a 110mm sleeve and manhole and cable trench arrangement to the building.



POWER MANHOLE - DETAIL



DETAILS FOR ALL ENTRIES OF SECURITY AND POWER INTO BUILDINGS



4. EARTH MAT

A new separate earth mat will be installed at the building edge below natural ground level (1.5m). The earth mat will consist of 70mm² round solid copper bars and will cover and area of at least 4m x 4m. The copper earth bars will form a grid of 400mm x 400mm. All connections will be cad-welded. Two round solid copper bars of 70mm² (the tails) from the mat will be connected to the Main DB earth bars. The tails will be connected at separate positions on the mat with a distance more than 1m apart. The tails will be connected into a separate York box at the mat and connected to a 70mm² single core cable to the Main DB.

5. TRANSFORMERS

NA

6. STANDBY GENERATOR AND CONTROL PANEL

6.1 GENERAL

This Specification covers the supply, delivery, factory testing and complete installation and re-testing on site and handover in full working order of the equipment and all associated equipment.

Full particulars, performance curves and illustrations of the equipment offered must be submitted with the tender. Contractors may quote for their standard equipment, complying as closely as possible with this Specification, but any deviations from the Specification must be fully detailed.

The questionnaire following this Specification must be completed by contractors in all respects.

The Employer reserves the right not to bind itself to accept the lowest or any tender.

Each diesel alternator set called for in this Specification will be used as a Standby Unit for the continuity of electrical power supply to emergency services.

The standby generator will be equal or better to CATTERPILLAR standard.

The following are a summary of the requirements and are additional to the Department of Public Works' standards:

Standby Capacity	: 250 kVA
Generator Type Brushless	: Self excited, static regulated
IP rating	: Drip proof IP 22
Over speed capacity	: 50%

Voltage regulation	: ½% Steady state
	: 1% No Load to Full Load
Time	: Maximum time to "full on load" from time of mains failure: 15 Seconds (70% load) and 19 Seconds (Full load).
Frequency	: 50Hz
Voltage MV	: 11kV, 3 Phase
Voltage LV	: 400V, 3 Phase
Fuel tank	: Install a new free standing fuel tank with a capacity to feed the standby generator for a period of 16 hours at full load. The contractor will be responsible to supply and install new fuel line between the tank and the Standby Generator. The fuel line will be of adequate approved material, diameter and be installed with brackets as required by the generator manufacturers. Automatic fuel cut-off must be installed during fault and emergency situations according to ISO3046/1, AS2789, DIN6271 and BS5514.
	The contractor to supply enough fuel for commissioning tests (At least 3 hours running time) and the re-filling of the fuel tank to full capacity after commissioning.

Additional equipment	:	Heavy duty air cleaner
	:	Air pre-cleaner
	:	Battery chargers
	:	Battery racks
	:	Charging alternators
	:	A single set of chop-over contactors (1 x N/O & 1 x N/C) and coupler contactor (1 x N/C) each rated at 800 Amps and installed in the newly supplied standby generator panel.
	:	The following Circuit Breakers feed the Low voltage.
Standby Panel	:	Main feed to Standby Panel : 800A

6.2 REQUIREMENTS

The set shall be fully automatic, i.e. it shall start when any one phase of the main supply fails, and shall shut down when the normal supply is re-established. The set shall be capable of delivering the specified output continuously under the site conditions mentioned below, without overheating. The engine shall be capable of delivering an output of 100% of the specified output for 2 hour in any period of 3 hours consecutive running.

6.3 BASE REQUIREMENTS

The engine and alternator of the set shall be built together on a common Simplex type frame, which will have anti-vibration mountings/pads between the frame and concrete floor. The set shall be placed direct on a concrete floor.

6.4 OUTPUT AND VOLTAGE

Output voltage	: 400/231V
Frequency	: 50 Hz

6.5 DERATING

The engine must be de-rated for the site conditions as set out.

The de-rating of the engine for site conditions shall be strictly in accordance with B.S.S. 5514 of 1977 as amended to date. Any other methods of de-rating must have the approval of the Engineer and must be motivated in detail. Such de-rating must be guaranteed in writing and proved by the successful contractor at the site test.

6.6 DELIVERY & REMOVAL OF EQUIPMENT

Deliver to site and install. The generators must be lifted with a crane over a 2.4m high wall into a space in front of the generator room of 4.5 x 4.0 m approximate. It must be then moved into the generator room with dimensions of 4.5m x 6m approximate. The existing door opening is 1.5m wide x 2.1m high approximate.

6.7 ENGINE

The engine shall be a four stroke, full compression ignition, direct injection and of the readily available type industrial rated type diesel engine.

The engine shall comply with the requirements laid down in B.S.S. 5514 and must be of the direct injection, compression ignition type, running at a speed not exceeding 1 500 r.p.m.

The engine shall be amply rated for the required electrical output of the set when running under the above mentioned site conditions. The starting period for either manual or automatic switching-on until the taking over by the generating set, in one step, on a load equal to the specified site electrical output, shall not exceed 15 seconds.

6.8 STARTING AND STOPPING

The engine shall be easily started from cold, without the use of any special ignition devices, under summer as well as winter conditions, against full load.

Contractors must state what arrangements are provided to ensure easy starting in cold weather. Full details of this equipment must be submitted. In the case of water-cooled engines, any electric heaters shall be thermostatically controlled. The electrical circuit for such heaters shall be taken from the control panel, and must be protected by a suitable circuit breaker.

An electric starter motor must be fitted to the engine.

Besides the automatic starting and stopping, provision must be made on the control board for manual starting and stopping of the set.

The automatic control shall make provision for three consecutive starting attempts. Thereafter the set must be switched off, and the start failure relay on the switchboard must give a visible and audible indication of the fault.

3.9 STARTER BATTERY

The set must be supplied with a fully charged "Lead Acid" type battery, complete with the necessary electrolyte. The battery must have sufficient capacity to provide the starting torque stipulated by the engine makers, and for at least six consecutive starting attempts.

The batteries will form an integral part of the generator or will be in separate panels that are of same external appearance as the main panel.

3.10 COOLING

The engine must be water-cooled type, a built-on heavy duty, tropical type pressurized radiator must be fitted.

All water cooled engines shall be equipped with a centrifugal pump to circulate the water through the engine and radiators. The radiator and engine cooling system shall be filled with a rust inhibitor solution.

Protection must be provided against running at excessive temperatures. The operation of this protective device must give a visual and audible indication on the switchboard. All air ducts for the cooling of the engines are to be allowed for. An air duct shall be supplied from the radiator face to the air outlet louver.

The radiator will be installed flush to the wall in the position as indicated on drawing 10/ING/HPC/0031/XS – A Generator Room Details. A grid of the same size as the radiator will be installed in the new opening. The existing opening will be closed and make neat. The grid will allow for sufficient air intake and manufactured from minimum 1.5mm steel and powder coated. No pests, insects or birds will be able to enter the grid.

Where louvers are to be fitted to accommodate the cooling system, such louvers shall be sized according to the requirements of the manufacturer of the Standby Alternator set.

Lubrication of the main bearing and other important moving parts shall be by forced feed system. An automatic low oil pressure cut-out must be fitted, operating the stop solenoid on the engine, and giving a visible and audible indication.

3.11 FUEL PUMP AND FUEL

Fuel injection equipment must be suitable for operation with the commercial brands of diesel fuel normally available locally.

3.12 FUEL TANK

A new fuel tank should be provided. Also see details described under 3.1 above. Additional to the above the following will apply:

Should the fuel tank require a fuel cooler this must be fitted.

The tank shall be fitted with a breather, a Rochester type fuel gauge, and a low level alarm, giving an audible and visible signal on the switchboard and on the outside of the building via a siren and red rotating signal light. A by-pass switch must be installed on the panel. A low level will be at 20% of the total fuel capacity.

An electric pump, fitted with a suitable length of oil-resistant hose, must be supplied, for filling the fuel tank from 200 liter drums placed at ground level or from a tanker at a distance of not less than 15m from the tank.

An electrical supply point must be installed at the electric pump of 16A and must consist of a watertight socket outlet unit. It will be supplied with a cable of 10mm^2 2 Core Armored dimensions. The supply point must be fed from the Standby Generator Panel via a 20A single phase Circuit Breaker. The cable will be installed via a brick wall (the hole will be properly sealed around the cable) and saddled against the wall at spacing not more than 300mm apart.

Construct a bund wall either from brick or steel to house at least 20% of the tank capacity should leakage occur.

3.13 GOVERNOR

The speed of the engine shall be controlled by an ELECTRONIC governor in accordance with Class A0 of BSS.5514.

When full load is suddenly switched off or on, the temporary speed variation shall not exceed 2%. The permanent speed variation shall not exceed +/- 0.8% of the nominal engine speed. External facilities must be provided on the engine to adjust the nominal speed setting.

3.14 FLYWHEEL

A suitable flywheel must be fitted, so that lights fed from the set will be free from any visible flicker.

The cyclic irregularity of the set must be within the limit laid down in B.S.S.5514 of 1958.

3.15 EXHAUST SYSTEM

SILENCERS

It is essential to keep the noise level as low as possible. An effective exhaust silencing system of the residential type is also to be provided, as specified in SABS 0103-1983, as amended.

The exhaust pipe shall be installed in such a way that the expelled exhaust fumes will not cause discomfort to the public. The exhaust pipe must be flexibly connected to the engine to take up vibrations transmitted from the engine, which may cause breakage.

Contractors shall quote for the supply & installation of silencers and baffles to ensure that the environment around the canopy is suitable for day to day work, without exceeding acceptable daily noise levels as applicable to a residential environment. The muffler and piping shall be manufactured from 3CR12

ATTENUATION

Sound attenuation must be provided to ensure that the maximum sound level generated by the unit when measured at a height of 1.2 meters at a distance of 7 meters in any direction from the outside of the unit must not exceed 65 dB when the plant is running at full load. All sound attenuation material must be of a non-flammable type

3.16 ACCESSORIES

The engine must be supplied complete with all accessories, instruction manuals, spare parts lists, etc. A spare set of fuel filters is to be supplied with the necessary tools for removal and refitting.

3.17 SAFETY NOTICES

All safety notices as specified in the OHS Act must be fitted to the container and a suitable 9kg dry powder fire extinguisher must be provided adjacent to the personnel access door.

A set of Laminated drawings of the switchboard/control panel must be affixed to the inside wall of the container adjacent to the switchboard.

3.18 ALTERNATOR

The alternator shall be of the self excited brushless type, with enclosed ventilated drip-proof housing, and must be capable of supplying the specified output continuously with a temperature rise not exceeding the limits laid down in **B.S.S. 2613 for rotor and starter windings with Class F or H insulation.**

Both windings must be fully impregnated for tropical climate and must have an oil resisting varnish finish.

3.19 RATING

Unless stated to the contrary, the alternator shall generate the specified voltages on three-phase and at 50 Hz. The alternator shall be rated for the specified output and power factor as detailed.

The alternator may be of the two bearing or single bearing type equipped with ball or roller bearings. The bearings must be pre-lubricated to ensure long service periods without attention.
The alternator must be equipped with damper windings, enabling the unit to accommodate an unbalanced load of at least 25% of full load at any load and at the normal operating conditions without incurring any damage.

The alternator shall be rated for 300kVA

3.20 CONSTRUCTION

The rotor shall be dynamically balanced and all the windings and rotating components shall be suitable to withstand an over speed of 50%.

3.21 Excitation

The excitation system shall be designed to promote rapid voltage recovery, following the sudden application of the full load. The voltage shall recover to within 2,5% of the steady state voltage within 0,3 seconds following the application of full load and the transient voltage dip shall not exceed 10%.

3.22 WAVE FORM

The voltage wave form of the alternator shall be such that the total voltage of the harmonic frequencies shall not exceed 5% of the voltage of the fundamental frequency over the range from no load to full load.

3.23 RADIO INTERFERANCE

The alternator shall be suppressed to comply fully with the requirements of BS 800 as revised, as well as with all South African Department of Posts and Telegraph requirements.

3.24 REGULATION

The alternator must be self regulated, the inherent voltage regulation not exceeding plus or minus 2.5% of the nominal voltage specified above, at all loads with the power factor between unity and 0,8 and within the driving speed variations of 4.5% between no-load and full load.

3.25 PERFORAMNCE

The excitation system shall be designed to promote rapid voltage recovery following the sudden application of the full load. The voltage shall recover to within 2.½% of the steady state within 300 milli-seconds following the application of full load and the transient voltage dip shall not exceed 10%.

3.26 COUPLING

The engine and alternator must be directly coupled by means of a first class quality flexible coupling, or acceptable disc drive coupling.

3.27 AUTOMATIC CONTROL CUBICLE

A set mounted automatic control cubicle shall be supplied, the cubicle to incorporate all equipment necessary for the control and protection of the generating set, the automatic change-over, and the battery charging.

The cubicle shall be a totally enclosed free standing unit, and shall consist of steel panels, carried on a substantial angle iron framework or pressed steel panels welded.

The cubicle shall be flush fronted; all equipment shall be mounted on the back of the front plate on suitable supports.

All equipment, connections and terminals shall be easily accessible. The front panels shall be hinged, with square key locking. Self tapping screws shall not be used in the construction of the cubicle. The ironwork of the cubicle shall be thoroughly de-rusted, primed with zinc-chromate, and finished with two coats of first class red enamel, or powder coated in Signal Red.

Suitably rated terminals shall be provided for all main circuits and for the control and protection circuits. Where cable lugs are used, these shall be crimped on the cable. All terminals shall be clearly marked.

For the fine wiring, each wire shall be fitted with a cable or wire marker of approved type, and the numbering of these markers shall be shown on the wiring diagram of the switchboard.

All equipment on the cubicle, such as contactors, isolators, bus-bars, etc., shall have ample current carrying capacity to handle the full load alternator current, as well as the rated fault current of the L V Panel.

3.28 SWITCHBOARD/CONTROL PANEL

A switchboard/control panel using a PLC type controller in preference to a Proprietary controller shall be used. Note; Relay logic panels are not acceptable. The switchboard will be positioned in the plant room and the following switchgear rated for a 25kA fault levem must be provided.

800 Amp triple pole drawout motorised isolator for isolation of the normal mains supply.

800 Amp triple pole draw-out motorized circuit breaker with overload and short circuit protection suitable for switching and protection of the generator output.

Note: the above switches shall perform the changeover and must be electrically and mechanically interlocked.

The following alarm circuits with the necessary sensors must be provided on the

control panel.

- START FAILURE
- LOW OIL PRESSURE
- HIGH ENGINE TEMPERATURE
- OVERSPEED
- UNDERSPEED
- LOW RADIATOR WATER LEVEL
- ABNORMAL GENERATOR VOLTAGE (± 10% OF NORMAL)
- LOW DAY TANK FUEL LEVEL
- UNIT NOT ON AUTO
- BATTERY CHARGE FAILURE

In addition to the above supervisory indication lamps for MAINS-LOAD and GENERATOR-LOAD to indicate which system is supplying the load must be provided.

Controls must be provided in the control panel to control the fuel replenishment pump

3.29 EARTHING

An earth bar shall be fitted in the control panel.

The neutral point of the system must be solidly connected to the earth of the control panel.

Suitable terminals must be provided on the earth bar for connection of the main earth conductors, which will be supplied and installed by others.

3.30 OPERATIONAL REQUIREMENTS

An automatic changeover with electrical and mechanical interlocking shall be provided installed in an approved position in the control cubicle. This changeover switches shall open when the normal "supply" voltage is interrupted, and will automatically close when the terminal voltage of the alternator reaches it's nominal voltage, thereby connecting the alternator on load.

Voltage and frequency monitor shall be installed to monitor the normal "supply".

The starting cycle shall consist of three time relays, with two relays which will be adjustable between 0- 30 seconds. The two time relays shall perform the starting cycle. The starting cycle shall actuate the first time relay, which will energize the starter motor of the engine for the preset time. The second time relay shall perform the "wait period" before the second and third starting attempt has been actuated.

After three unsuccessful starting cycles the third time relay shall be actuated to

interrupt any further starting cycles and give an alarm "Start Failure". The third time relay shall have an adjustable time range of not less than 60 seconds.

When the alternator output voltage reaches the nominal value, the changeover contactor shall be activated to transfer load to the alternator.

A time delay shall be actuated when the supply network voltage is restored. This delay shall be adjustable between 0 - 10 minutes, and shall actuate the changeover contactor to connect the load on back to the supply network.

After the load has been re-established to the supply network, the alternator set shall be switched off, by means of a run down time, which will be adjustable between 0 - 10 minutes.

Should any of the above mentioned control circuits or relays fail, the load shall be transferred automatically from the alternator to the supply network.

A siren must be of the continuous duty type or must be connected to an intermittent duty time relay.

A switch must be installed in the hooter circuit, to stop the audible signal. This switch shall be inside the cubicle with a suitable notice on the exterior.

The output terminals from the alarms in the AMF panel shall be wired to terminals in a flush mounted white 300 x 300, flush mount enclosure in the "manager's" office (maximum 300m from the generator room) indicating the following:

- Common Alarm
- Low fuel alarm
- Generator on Load indicator lamp.
- Mains on Load indicator lamp.
- Audible common alarm with cancel push button.

All indicator lamps shall be of the LED type or suitable connections for connecting to a building management system.

A stop delay with timer is required for the set, to keep the set running for an adjustable period of one to fifteen minutes after the return of the mains supply, before changing back to that supply and keep the set running for a further adjustable cooling period at no-load before stopping.

A four-position selector must be provided on the control panel, marked "Auto", "manual", "test" and "off".

With the selector on "auto", the set shall automatically start and stop, according to the mains supply being available or not.

With the selector on "test" it shall only be possible to start and stop the set with the push buttons, but the running set shall not be switched to the load.

With the selector on "manual", the set must take the load when started with the push button, but it must not be possible to switch the set on to the mains, or the mains on to the running set.

With the selector on "off", the set shall be completely disconnected from the automatic controls, for cleaning and maintenance of the engine.

3.31 BATTERY INSTALLATION

The starting batteries shall be adequately rated to suit the equipment provided. Battery terminals shall be coated with "Copraslip" or equivalent conductive grease. The battery shall preferably be mounted adjacent to the equipment.

Where electric starting is employed, the combination engine generator set shall be equipped with a fully charged lead-acid battery with the following requirements:

The battery shall have ample capacity for providing the starting torque stipulated by the engine manufacturer, and capacity for 3 such starts in a five minute period.

The battery shall be supplied with a charger unit as described below.

3.32 BATTERY CHARGER

The switchboard detailed below shall contain facilities for charging the batteries from the mains.

The battery charger shall be of the fully automatic type and shall consist of an air cooled transformer, silicon bridge rectifier, fuses and switching arrangement. All equipment shall be suitably rated and designed to automatically deliver a trickle or boost charge as determined by the battery voltage. The boost charge in amps shall not exceed 20% of the rated battery capacity.

A constant trickle charge facility is not acceptable. The charger shall switch off automatically when the battery is fully charged.

The charger must be provided with a Voltmeter and charge ammeter. These instruments must be mounted on the control panel door.

3.33 SWITCHBOARD/CONTROL PANEL

A switchboard / control panel must be provided for the control, metering and switching of the diesel alternator set.

Fault Level - The board and its equipment shall be rated at not less than the 380V asymmetrical prospective fault level specified in the detailed specification of the Electrical Installation, minimum 30 kA.

3.34 EQUIPMENT IN SWITCHBOARD

The following equipment is required on the board:

One flush 96 mm square dial voltmeter, scaled 0 - 500V, reading the alternator voltage.

One flush voltmeter selector switch with three metering and one off position, connecting the voltmeter between phases and neutral.

One flush 96mm square dial indicating type frequency meter, indicating the alternator frequency.

One hour meter with cyclometer counter, reading the number of hours the plant has been operating. The smallest figure on this meter is to read 1/10th hours.

One set of fuses or m.c.b.'s for potential circuits of the meters.

Three flush 96mm square dial ammeters for measuring the alternator current, scaled to suit, complete with the necessary current transformer - **combined instantaneous and maximum demand meters are required.**

- One triple pole circuit breaker for mains isolation.
- One set triple pole automatic change-over equipment with voltage and time delay relays, fitted with mechanical interlocks.
- One triple pole circuit breaker for alternator protection against overload and short circuit conditions.
- One four position operation selector switch, as specified.
- Two push buttons or one switch marked "START" and "STOP" for manual starting and stopping the set.
- One battery charger as specified, complete with flush ammeter and voltmeter.
- One stop delay as specified.

- Relays with reset push buttons as specified, for engine protection.
- Two low fuel level alarm devices.
- One warning hooter and one siren.
- One low battery voltage alarm device.
- Suitable terminals for incoming main and alternator cables, for the outgoing feeder, and for the earth connection.
- Any other equipment necessary for the correct and safe operation of the installation.
- A "General Alarm" output contact which will be in fail safe position, and will initiate general alarm should any one of the above mentioned alarms be initiated.
- Panel lights to indicate: 1) Mains - Load; 2) Generator Load, to indicate which system is supplying the load.

The IP65 siren shall be wired to a point outside the plant room door.

3.35 MARKINGS

All labels, markings or instructions on the switchgear shall be as per the section on Coding, Labelling and Notices.

All timers or adjustable controls within the control panel shall be clearly labeled. A label indicating the settings of all adjustable controls shall be fitted inside the control panel.

3.36 INSTALLATION

Except for the supply and connection of the incoming main and outgoing feeder cables, tenderers must include for the complete installation and wiring of the plant in running order.

The installation must comply with the regulations of the "Factories, Machinery and Building Works Act" of 1941, as amended to date, and with the "Standard Regulations for the Wiring of Premises" second edition as amended, as well as the General Specification for Electrical Installations appended hereto, or available on request.

For the alternator circuit P V C SWA PVC sheathed cable shall be used. For the control circuits either multi-core P V C cable OR PVC insulated wires in conduit may be used. The neutral of the system must be solidly earthed.

Additional to the above, "Moving Machinery", "Noise" and "Danger" signs must be installed.

3.37 OCCUPATIONAL HEALTH &SAFETY ACT (OHSACT)

This installation shall comply in it's entirety with the Occupational Health & Safety Act, and its amendments to date, and with all other regulations and specifications governing the works.

WARNING NOTICES

In the plant room, a clearly legible and indelible warning notice shall be mounted in a conspicuous position. The notice shall be made of non-corrodible and non-deteriorating material, preferably plastic, and must read as follows:

This engine will start without notice. Turn selector switch on control board to "OFF" before working on the plant. Do not work on this plant without checking the status of the UPS and notifying the Main Control Room.

3.38 DRAWINGS

The successful tenderer will submit for approval within four weeks after adjudication of the Tender, three paper copies of the following drawings:

Complete detailed general layout drawing.
Working drawings of the cooling and exhaust systems.
Complete detailed and dimensional drawings of the alternator set with all auxiliary equipment.
Wiring diagrams of the control protection and alarm circuitries.
Detailed layout of the equipment to be installed on the control panel.

All drawings shall be drawn on CAD (Caddie) and shall meet the requirements of SABS 0111-1980 as amended and SABS-1980 as amended, where applicable.

3.39 INFORMATION REQUIRED

Tenderers must furnish detailed descriptions and illustrations of the equipment offered, and must complete the questionnaire following this specification. Failure to submit any of the information asked for may disqualify the tender.

3.40 GUARANTEE

The successful tenderer will be required to guarantee the complete plant for a period of 12 months from the date it has been taken over by the client, in running order.

If during this period the plant is not in working order, or not working satisfactorily owing to faulty material, design, or workmanship, the contractor shall be notified, and immediate steps shall be taken by him to rectify the defects and/or replace the affected parts on site, at his own expense.

3.41 MAINTENANCE

The successful tenderer shall be required to maintain the plant in good running condition to the approval of the Engineer for a period of 12 months after the plant has been taken over by the Client.

The cost of this maintenance must be excluded from the tender price of the Contractor, but shall be noted clearly on the form of tender.

All rates shall be as specified on the form of tender.

3.42 INSTRUCTION OF OPERATOR

After completion of the installation, and when the plant is in running order, the successful tenderer will be required to instruct an attendant in the operation of the plant, until he is fully conversant with the equipment and the handling thereof.

Three copies of maintenance, fault-localizing and operating manual are to be handed over to the representative on site.

One set of manuals with all drawings shall be fixed in a plastic jacket inside the panel.

3.43 INTERNAL LABELLING

An "Ozakling" type label showing the part number, description and setting of all removal relays, monitors and timers shall be affixed to the inside of the panel. Typical timer settings shall be noted.

All removable items shall be labeled both on the item, and on or adjacent to the plug-in base on the panel.

A full set of drawings, including schematics and general arrangement drawings shall be framed and mounted on the plant room wall behind a Perspex cover.

3.44 TESTS

The following tests are to be carried out:

At the supplier's premises, before the generating set will be delivered to site. The Engineers may be present during the test to satisfy themselves that the generating set complies with the specification and delivers the specified output. The test must be carried out in accordance with B.S.S. 5514. The Engineer must be advised in time of the date of the test at least seven days prior to the test.

At the site after completion of the installation, all the instruments which may be required for the tests have to be provided by the successful tenderer.

Note that it will be necessary to conduct tests on load banks on site. On site tests shall be carried out for one hour on full load and one hour at 10% overload.

Test reports of both tests as specified under (a) and (b) are to be submitted to the Engineer.

3.45 LOCATION OF PLANTROOM

The location of the plant room is as per the Architect's Drawings. The successful tenderer shall be responsible for lifting the set onto this plant room and positioning the set in the standby plant room.

The door of the generator room will be replaced if required with a new double door of adequate size to allow easy generator access and enough air flow for the generator according to the supplier's specifications. The door will be lockable, manufactured from at least 1.5mm steel and powder coated.

3.46 MANUALS

Three copies of the complete set of manuals shall be provided to the full approval of the Engineer. A set of manuals shall consist of the following:

The contract shall be deemed as "Incomplete" until all manuals, drawings and descriptive literature are received and approved by the Engineer, and will result in a minimum of 10% of the contract moneys being withheld.

3.47 COMPLIANCE WITH SPECIFICATION

Tenderers are to provide a clause by clause written confirmation that their offer complies with the clauses of this document. Where their offer does not comply, it is to be clearly indicated in the compliance schedule.

3.48 SIGNAGE

All signage as required to comply with local Fire Regulations, as well as SABS-0142 & SABS 0400 shall be supplied and fitted both inside and outside the plant room.

7. CABLE SLEEVE PIPES

Where cables cross under roadways, other services and where cables enter buildings, the cables shall be installed in asbestos-cement pipes or earthenware pipes. When otherwise specified or agreed upon, PVC sleeves maybe approved.

The electrical contractor will be responsible for all excavations, installation of sleeves, backfill and making neat of all.

The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

8. NOTICES

The Contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster-General, S.A. Transport Services, Provincial of National Road authorities and other Authorities as may be required with respect to the installation. The Contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and will be responsible for the cost of repairs.

9. ELECTRICAL EQUIPMENT

All equipment and fittings supplied must be in accordance with the approved quality specification, suitable for the relevant supply voltage and frequency and must be approved by the Consultant's representative.

10. DRAWINGS

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

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

The contractor will supply a complete set of "As Built" drawings at completion of the contract. This will be handed in with the Operational and Maintenance manuals.

11. BALANCING OF LOAD

The Electrical Contractor is required to balance the load as equally as possible over the multiphase supply. When Balancing of lads are not required, the specific phase to which a load must be connected will be indicated on the drawings.

12. WORK SEQUENCE

The sequence, in which the work must be carried out, must be established in consultation with the Department's representative.

13. SUPERVISION

The work shall at all times, for the duration of the contract be carried out under the supervision of a skilled and competent representative of the contractor, who will be able and authorised to receive and carry out instructions on behalf of the contractor. A sufficient number of workmen shall be employed at all times to ensure satisfactory progress of the work.

14. SUPPLY OF MATERIAL

The contractor shall be responsible to supply all the required material for the complete installation.

15. SERVICE CONDITIONS

All plant shall be designed for the climatic conditions appertaining to the service.

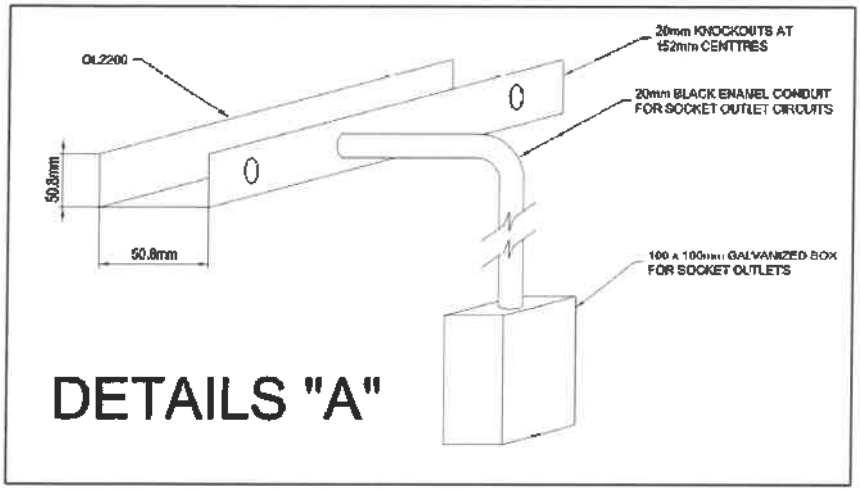
16. SWITCHES AND SOCKET OUTLETS

All switches will be supplied with a metal cover plate with brush aluminium or stainless steel finishing unless other wise specified in the Bill of Materials.

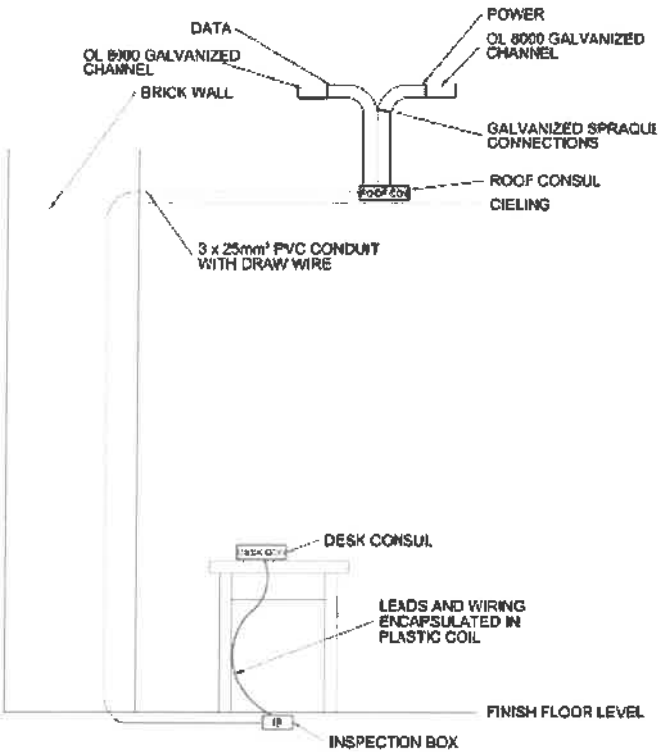
The following descriptions are as supplied in the table below:

BR	100 x 50mm Galvanized steel box, flush for biometric reader, to be installed as per drawing.
ML	65mm diameter galvanized round box for magnetic lock, to be installed as per drawing.
ACC	100 x 100mm Galvanized steel box, flush for air conditioner control unit, to be installed as per drawing.
ROOF CON	Roof consul consisting of dedicated 15A power socket outlet, composite video outlet (RCA), video outlet (15pin) and Usb port and 2 x data outlets. Typical housing Oline Double FFD3.. All switches and outlets to b ULTI as supplied by Schneider.
DESK CON	Desk consul consisting of dedicated 15A power outlet, composite video outlet (RCA), video outlet (15pin), Usb port and 2 x data outlets. Typical housing Oline Double FFD3 All switches and outlets to b ULTI as supplied by Schneider.
IB	Inspection box to be installed underneath desks at lecture halls to connect the desk and roof consuls. To be galvanized steel 210 x 285 x 80mm, with lid. Typical: O-Line Power box.
//	Double channel power skirting, 165 x 55mm. Metal with 2 covers, light hammer tone grey. Typical: O-Line MS2.
F	Fire detection sensor
BG	Break glass

Wiring will be done in trays and connections to socket outlets as in detail below. Provide the necessary glands for entry to trays.

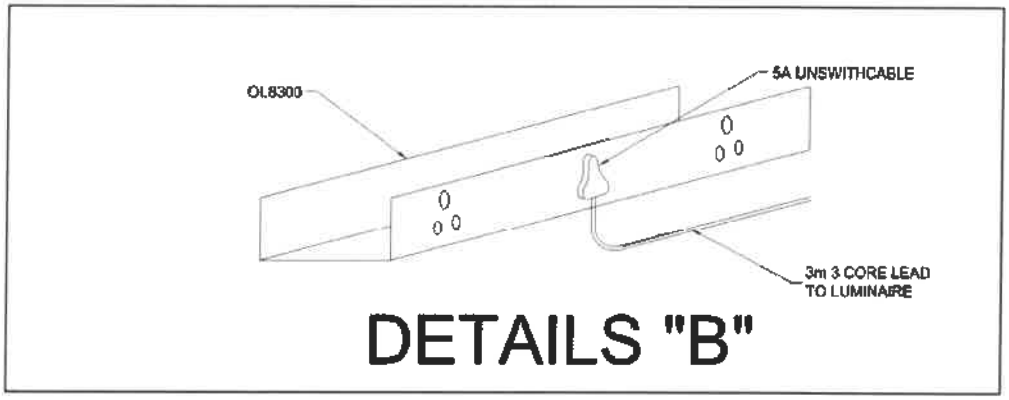


The detail for the installation of the roof and desk consoles is given in the picture below.



17. LIGHT FITTINGS AND LAMPS

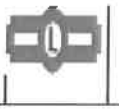
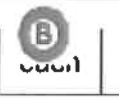
Light circuits will be wired in channels as per the following detail.



The minimum 80 lux for all levels of the car park, 300 lux for the store areas and an average of 500 lux for the office areas will be adhered to.

All fittings to be supplied by the electrical contractor shall have the approval of the Department. Incandescent lamps shall bear the approved mark of the S.A.B.S. and shall have the British light centre length.

The following fittings will be supplied and installed as per the Bills of Materials:

Fluorescent: 1.5m, double tube x 58W, open channel, electronic ballast, surface mounted with industrial wing (dimensions: 1531 x 73 x 87mm)	
Fluorescent: 1.5m, double tube x 36W, vandal and tampered proof, electronic ballast, with a build in FL9 night lite, surface mounted, with 1 x 36W battery back-up (dimensions: 1531 x 73 x 87mm)	
Fluorescent: 1.5m, double tube x 36W, vandal and tampered proof, electronic ballast, surface mounted, with 1 x 36W battery back-up (dimensions: 1531 x 73 x 87mm)	
Fluorescent: 1.5m, double tube x 58W, waterproof IP65, electronic ballast, surface mounted (dimensions: 1570 x 160 x 110)	
Bulkhead: rectangular 155mm (w) x 324mm (l) x 122mm (h), 2 x PL18 220V, matt white, electronic ballast, surface mounted	
Floodlight: wide beam 400W mercury vapour, stirrup mounted, standard aluminuim complete with hot dipped galvanished mounting accessories for wall mounting and 5A circuit breaker (dimensions: 650 x 425 x 175mm)	
Bulkhead: decorative round 280mm (d) x 104mm (h), 2 x PL9 220V, matt black, electronic ballast, surface mounted	
Bulkhead: decorative round bulkhead, 2 x PL9 220V, matt white, electronic ballast, surface mounted - bathrooms	
Fluorescent: 1.2m, double tube x 36W, waterproof IP65, TAMPERED proof electronic ballast, surface mounted (dimensions: 1200 x 160 x 110)	
Bulkhead: rectangular 440mm (w) x 320mm (l) x 217mm (h), 2 x PL9, matt black , with wire guard, surface mounted	
Emergency exit lighting: single sided illuminated with battery back up ceiling mounted bracket. (down arrow with man running) (dimensions: 330 x 145 x 46 mm)	

Emergency exit lighting: single sided illuminated with battery back up, surface mounted bracket. (horizontal arrow - right, man and stairs, green) (dimensions: 330 x 145 x 46mm)	
Down lighter: cut-out = 170mm, 1 x 70W 220V, matt white, electronic ballast, flush mounted	

17.1 TUBULAR FLUORESCENT LAMP LUMINARIES

17.1.1 SCOPE

This specification covers the requirements for fluorescent luminaries using tubular fluorescent lamps for general indoor use. The type of luminaries covered is open-channel, industrial, decorative and recessed types and includes luminaries with one or more lamps with standard wattage ratings as specified in the Bills of Materials.

17.1.2 GENERAL

Luminaries, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective cover. Lamps shall be delivered separately.

17.1.3 STANDARDS

The following standard specifications of SABS shall apply to the luminaries' specifications:

SANS 1119	Interior Luminaries for fluorescent lamps.
SANS 1250	Capacitors for use with fluorescent and other discharge lamp ballast's
SANS 890	Ballast's for fluorescent lamps
SANS 1464	Safety of Luminaries
SANS 1479	Glow starters for fluorescent lamps
SANS IEC 400	Lamp holders for tubular fluorescent lamps
SANS 1041	Tubular fluorescent lamps for general service
SANS 1247	Coatings applied by the powder-coating process
SANS 783	Baked enamels
SANS 0142	Wiring of premises
SANS 1464	Safety
SANS 890	Noise levels
SANS 1222	Protection

17.1.4 FIXING

The luminaries shall be suitable for mounting in or against ceilings as described below:

All holdings will be galvanized, cadmium plated or stainless steel and completely corrosion proof.

The holding screws will not be longer than 30mm and not shorter than 20mm.

At least four fixing screws per luminaries will be supplied and installed.

The position of any other equipment or material that could be damaged when fixing luminaries must be established prior to fixing any luminaries.

Luminaries will be installed completely parallel, straight or/and horizontal at all times.

17.1.5 ENVIRONMENTAL

The luminaries will be suitable to operate in ambient temperatures between -10°C and +40°C.

17.1.6 SAFETY

The luminaries will bear the SANS 1464 safety mark.

17.1.7 NOISE

Noisy ballasts will not be accepted and shall be replaced at no cost. All ballasts shall comply with the requirements of the latest edition of SANS 890, Part 1.

17.1.8 GENERAL TECHNICAL REQUIREMENTS

GENERAL

Tubular fluorescent lamp luminaries shall comply fully with SANS 1119 and all amendments as well as the additional requirements of the specification. Luminaries shall bear the SABS mark.

The client reserves the right to have samples of luminaries offered tested by the SABS for compliance with SANS 1119. If sample luminaries are found not to comply with SANS 1119 the cost of such tests shall be borne by the tenderer.

CONSTRUCTION

Luminaries shall consist of a ventilated body manufactured of either cold rolled sheet steel not less than 0.8mm thick or injection moulded flame retardant GRP, suitably braced or stiffened to prevent distortion. The body shall be of sufficient strength for the mounting of the entire luminaries.

The luminaries shall be designed to accommodate the control gear, wiring, lamp holders and where applicable, the diffuser and reflectors. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaries.

Except for mounting holes and/or slots and the required openings in air-return luminaries, the back of the body channel shall be closed over the full length of the luminaries.

Suitable knockouts shall be provided in the rear or both ends of the luminaries body for wire entry.

All components, including screws, bolts and nuts utilised in the construction of the luminaries or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.

The lamp compartment and body will have a degree of IP 65 protection as per SANS 1222.

INTERNAL WIRING

Luminaries shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body.

The wiring shall be totally enclosed to prevent any possible contact with live components while changing lamps.

The conductor insulation shall be rated to withstand the temperature inside the luminaries body without deterioration.

The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires.

Terminal where screws bear down directly on wires will not be acceptable.

An earth terminal, welded to the luminaries body, shall be provided where applicable. To ensure good earth continuity the earth terminal shall not by spray painted. The earth conductor shall be connected to this terminal by means of a crimped lug.

LAMP HOLDERS

Lamp holders shall preferably be of twist-lock type. The mounting of the holders shall be able to accommodate the tolerances experienced in the length of lamps and in the manufacture of luminaries.

CONTROL GEAR

The control fear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted. All luminaries shall operate on a switch-start basis.

Ballasts shall comply with SANS 890 and SANS 891, suitable for operation on 220V to 250V 50Hz supplies.

Ballasts shall further be suitable for the particular luminaries to ensure that the thermal limits specified in paragraph 3.5 of SANS 1119 are not exceeded.

Starters shall comply with SANS 1479 or with BS 3772 if it is not covered by SANS 1479. Starters with metal cans shall contain integral earthing facilities to earth the can upon insertion.

Starters shall be accessible from the outside of the luminaries, and the replacement of the starter shall not necessitate the removal of lamps.

Capacitors shall comply with SANS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

LAMPS

Fluorescent lamps shall be suitable for the control circuitry used. Lamps shall comply with SANS 1041.

Only Osram & Philips branded lamps will be accepted on this project.

If no colour is specified, the light colour shall correspond to colour 2 (4 300K) of SANS 1041.

Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost.

PHOTOMETRIC DATA

Photometric data sheets of the luminaries as prepared by a laboratory, that complies with SABS requirements, shall be submitted with the luminaries.

TECHNICAL INFORMATION

The tenderer shall include full technical particulars regarding the luminaries offered with the tender.

RECESSED LUMINARIES

Recessed luminaries shall be suitable for mounting in the ceiling structure specified in the project specification.

The diffuser or reflector shall fit flush with the ceiling and the only visible portion shall be the reflector of diffuser.

Should the luminaries be so designed that a surrounding frame is visible, then this frame shall be manufactured of anodized aluminium. The frame shall form a neat trim with the ceiling. The corners of the surrounding frame shall be mitered and reinforced.

LOW- BRIGHTNESS LUMINARIES

The luminaries shall be provided with an aluminium louvre with V- shaped longitudinal vanes and extruded stepped cross-shielding plates.

Louvres shall be constructed from high purity aluminium (99,98%), chemically brightened and anodized.

The total Light Output Ratio (LOR) shall be 62% or better. In the plane between 60 and 90 from the vertical, the LOR shall be below 3%.

LOW GLARE LUMINARIES

The luminaries shall be provided with a die-formed, bright-anodized high-purity aluminium (99.98%) louver with parabolic reflecting surfaces in both directions.

The total LOR shall be 62% or better. In the plane between 60 and 90 from the vertical, the LOR shall be less than 1.3%.

LUMINARIES FOR USE IN AREAS WITH VISUAL DISPLAY TERMINALS

The luminaries shall have anodized specular louvers to provide the brightness control required for this type of application.

At angles between 60 and 90 from the vertical the luminance shall not exceed 200cd/m2.

At above angles the LOR shall be less than 0.6%. At angle between the vertical and 60 the LOR shall be 61% or better.

17.2 BULKHEAD LIGHT FITTINGS

17.2.1 SCOPE

The specification is for all bulkhead fittings to be used on this project.

17.2.2 GENERAL

Luminaries, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective cover. Lamps shall be delivered separately.

17.2.3 STANDARDS

The following standard specifications of the South-Africa Bureau of Standards shall apply to this luminary's specification:

SANS 1119	Interior Luminaries for fluorescent lamps.
SANS 1250	Capacitors for use with fluorescent and other discharge lamp ballast's
SANS 890	Ballast's for fluorescent lamps
SANS 1464	Safety of Luminaries
SANS 1479	Glow starters for fluorescent lamps
SANS IEC 400	Lamp holders for tubular fluorescent lamps
SANS 1041	Tubular fluorescent lamps for general service
SANS 1247	Coatings applied by the powder-coating process
SANS 783	Baked enamels
SANS 0142	Wiring of premises
SANS 1464	Safety
SANS 890	Noise levels
SANS 1222	Protection

17.2.4 PHYSICAL AND ENVIRONMENTAL REQUIREMENTS

N/A

17.2.5 AREAS OF APPLICATION

The luminaries are attended for outdoor as well as indoor use.

17.2.6 FIXING

The luminaries shall be suitable for mounting in or against ceilings as described below:

All holding screws will be galvanised, cadmium plated or stainless steel and completely corrosion proof.

The holding screws will not be longer than 30mm and not shorter than 20mm.

At least four fixing points per luminaries must be established.

The position of any other equipment of material that could be damaged when fixing luminaries must be established prior to fixing any luminary.

17.2.7 ENVIROMENTAL

The luminaries shall be suitable for operation in ambient temperatures between -10 C and +45 C.

17.2.8 SAFETY

The luminary shall bear the SANS 1464 safety mark.

17.2.9 NOISE

Noisy ballasts will not be accepted and shall be replaced at no cost. All ballasts shall comply with the requirements of the latest edition of SANS 890, Part 1.

17.2.10 GENERAL TECHNICAL REQUIREMENTS

GENERAL

The bulkhead luminaries shall be suitable for surface mounting on a ceiling or wall and shall allow for surface conduits to enter on all sides.

CONSTRUCTION

The luminaries shall consist of a high-pressure die cast aluminium base and a structured opaque high impact acrylic diffuser.

It shall be rectangular in shape and shall be designed to operate compact fluorescent lamps up to 2 x 26W (staircases) or shaped as per the attached pamphlets for outside and bathroom lighting.

The diffuser shall be fixed to the body by four stainless steel Allen head screws. A silicon sponge gasket shall be fitted into a groove on the diffuser.

Four mounting holes shall be provided in the base for securing the diffuser onto the base.

All internal wiring shall be Teflon coated with protective sleeving to prevent damage by possible abrasion.

Main connections shall be by means of a suitable screw terminal block with a wire clamping contact.

All screws, bolts and metals shall be stainless steel or of non-corrosive material.

A luminary shall consist of a ventilated body manufactured of either cold rolled sheet steel not less then 0.8mm thick or injection moulded flame retardant GRP, suitably braced or stiffened to prevent distortion. The body shall be of sufficient strength for the mounting of the entire luminary

LAMP HOLDERS

Lamp holders shall preferably be of twist-lock type. The mounting of the holders shall be able to accommodate the tolerances experienced in the length of lamps and in the manufacture of luminaries.

CONTROL GEAR

The control gear shall be incorporated inside the separate control gear compartment and be mounted on a removable gear tray.

It shall be suitable for operation with the specified rating of the lamp on a 230V + 3%-10% 50Hz single-phase system.

All control gear components shall be removable and bear the relevant SABS mark.

The luminaries shall be power factor corrected to a minimum of 0.85.

Ignitors, where applicable, shall be of the superposed pulse type.

The luminaries shall be able to withstand ambient temperatures of at least 45 C. without resulting in any electrical or mechanical component exceeding its maximum allowed operating temperature.

The lamp compartment and body will have a degree of IP 65 protection as per SANS 1222.

LAMPS

Only Osram & Philips branded lamps will be accepted on this project.

If no colour is specified, the light colour shall correspond to colour 2 (4 300K) of SANS 1041.

Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost.

TECHNICAL INFORMATION

The Tenderer shall include full technical particulars regarding the luminaries offered with the tender.

EMERGENCY EXIT INDICATORS

Except for the following changes, all emergency exits will be indicated with the same Bulkhead fitting as specified above:

The high impact acrylic diffuser will be white.

The word "EXIT" will be indicated on the front of the diffuser and will be at least 60mm in height.

The colour of the script will be signal red.

The quality of the script will be such that it is engraved and will not be of the sticker type.

BATTERY BACK-UP UNITS

Where indicated on the attached drawings, bulkhead fittings will be fitted with battery back-up units with the following specifications:

The units must have self-testing facilities on a weekly basis and full functional test on a monthly basis.

It must have a one-hour standby facility with at least 18% of the normal light output.

It will have an external lamp, indicating the following:

Mains on and system in working order.
Battery voltage low.
Battery voltage too high.
Low capacity battery.
Bad lamps.
No mains.

18. EARTHING AND BONDING

The Contractor will be responsible for all earthing and bonding of the building and installation; the earthing and bonding is to be carried out strictly to the specification and to the satisfaction of the Department's representative.

Connection from the main earth bar on the main board must be made to the cold water main, the incoming service earth conductor, if any and the earth mat or other local electrode by means of 12mm x 1,6mm solid copper strapping of 16mm^2 stranded (not solid) bare copper wire or such conductor as the Department's representative may direct. Main earth copper strapping where installed below 3m from ground level, must be run in 20mm diameter conduit securely fixed to the walls.

All other hot and cold water pipes shall be connected with 12mm x 0,8mm perforated for solid copper strapping (not conductors) to the nearest switchboard. The strapping shall be fixed to the pipe work with brass nuts and bolts and against walls with brass screws at 150mm centers. In all cases where metal water pipe, down pipes, flues, etc., is positioned within 1,6m of switchboards an earth connection consisting of copper strapping shall be installed between the pipe work and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10 mm^2 copper conductor shall be installed over the full length of the ceiling void, fixed to the top purloin and connected to the main earth conductor and each switchboard. The roof and gutters shall be connected at 15 m intervals to this conductor by means of 12 mm x 0,8 mm copper strapping (not conductors) and galvanized bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.

A separate earth connection shall be supplied between the earth bush-bar in each sub-distribution board and the earth bush-bar in the Main Switchboard. These connections shall consist of bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively armored cables with earth continuity conductors included in the armoring may be utilized where specified or approved.

An earth conductor shall be installed in all non-metal flexible conduit. This earth conductor shall not be installed externally to the flexible conduit but within the conduit with the other conductors. The earth conductor shall be connected to the earth terminals at both ends of the circuit.

Where non-metallic conduit is specified or allowed, the installation shall comply with the Department's standard quality specification for "conduit and conduit accessories."

Standard copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including metal switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaries, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

19. INTERRUPTIONS OF ELECTRICAL SUPPLY

All interruptions of the electrical supply that may be necessary for the execution of the work will be subject to prior arrangement between the Contractor and the University.

20. REGULATIONS AND CODES

The complete electrical installation shall be carried out in full compliance with the Wiring Code and with any Regulations or Codes of Practice in force or adopted in the area in which the contract is to be carried out. Tenderers shall familiarize themselves with all such Regulations or Codes before finalizing their prices; no price variations to the contract based on lack of knowledge or such Regulations or Codes will be allowed.

21. CONDUIT AND WIRING

Conduit will be PVC 20mm or 25mm with SABS markings. Conduit will be fixed with raised saddles to ensure that the conduit is horizontal at the roof at all times and does not lift at entry level. Saddles will be installed at not more than 1000mm apart

22. CABLE TRAYS

Cable ladder" cable trays shall be used for all new cables in the ceiling void and service ducting. Typical OL55 and OL76 as per request

- Refer to Bill of quantities for detail on withs.

22.1 SUSPENSION HANGERS SHALL BE AS FOLLOWS:

All cable trays shall be suspended at intervals of not more than 800mm apart, from the existing roof structure by means of a 300mm or 400mm long P1000 channel, complete with 2 x 1m x 6mm galvanised threaded rods and 2 x pre-formed hold down saddles, per suspension hanger.

22.2 EACH MACHINE SUPPLY POINT SHALL CONSIST OF THE FOLLOWING:

N/A

23. CABLES

Note: All LV regularly used cables will be XLPE Insulated PVC bedded SWA PVC sheathed 600/1000V manufactured to SANS 1507-4.

This contract will require the use of temporally cables from the main DB to the three level DB's that will be 4 Core Rubber insulated trailing cables.

The electrical contractor shall allow for the supply and complete installation of all distribution cables as indicated on the drawings, and listed in the Schedule of Cables.

Tenderers must base their tender on the amounts of cable, including earth conductors, as indicated in the Bill of Quantities. During the course of the work the actual lengths will be measured on site and adjustments will be made according to the price per metre length as inserted by the tenderer for the particular cable size concerned.

Tenderers must base their cost for trenching in earth; hard rock on the total quantities as indicated in the Bill of Quantities. The actual quantities, based on the dimensions as specified below for trenches for the applicable number of cables to be laid, will be measured on site during the course of the service and adjustments made according to the price per cubic meter as inserted by the tenderer. Payment for cable trenching having a greater volume than that specified for the purpose will not be considered except where extra excavations are necessary to by-pass obstacles such as water pipes, drains, large boulders etc. In all such instances the amount of the extra excavations must be agreed upon on site between the Engineer and the contractor.

Cables in soil will be buried 1,5m underground. Cables that are attached to roofs or walls will be tied with aluminum strapping (25mm) every 400mm to 100mm cable racks.

The storage, transportation, handling and laying of the cables shall be according to first class practice, and the contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operations.

The cable-trenches shall be excavated to a depth of 0,6m deep below ground level and shall be 450mm wide for one to three cables, and the width shall be increased where more than three cables are laid together so that the cables may be placed at least two cable diameters apart throughout the run. The bottom of the trench shall be level and clear and the bottom and sides free from rocks or stones liable to cause damage to the cable.

The contractor must take all necessary precautions to prevent the trenching work being in any way a hazard to the personnel and public and to safeguard all structures, roads, sewage works or other property on the site from any risk of subsidence and damage.

In the trenches made in soft and hard rock the cables shall be laid on a 75mm thick bed of earth and be covered with a 150mm layer of earth before the trench is filled in.

No joints will be allowed in cables.

The laying of cables shall not be commenced until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused and must be adequately supported at 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 drawing in of the cables.

Backfilling (after bedding) of the trenches 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 150mm. The surface is to be made good as required.

On each completed section of the laid and jointed cable, the insulation resistance shall be tested to approval with an approved "Megger" type instrument of not less than 500 V for low tension cables.

Earth continuity conductors are to be run with all underground cables constituting part of a low tension distribution system. Such continuity conductors are to be stranded bare copper of a cross-sectional area equal to at least half that of one live conductor of the cable, but shall not be less than 4mm^2 or more than 70mm^2 . A single earth wire may be used as earth continuity conductor for two or more cables run together, branch earth wires being brazed on where required.

24. LAYING, JOINTING AND MAKING OFF OF ELECTRICAL CABLES

NB : The requirements specified hereafter, are aimed essentially at high tension cable but are also valid for low tension cable, where applicable.

24.1 The use of the term "Inspector", includes the engineer or inspector of the Department or an empowered person of the concerned supervising consulting engineer's firm.

24.2 No cable is to be laid before the cable trench is approved and the soil qualification of the excavation is agreed upon by the contractor and inspector.

24.3 After the cable has been laid and before the cable trench is backfilled the inspector must ensure that the cable is properly bedded and that there is no undesirable material included in the bedding layer.

24.4 All cable jointing and the making off of the cables must only be carried out by qualified experienced cable jointers. Helpers of the jointers may not saw, strip, cut, solder, etc. The cable and other work undertaken by them must be carried out under the strict and constant supervision of the jointer.

24.5 Before the contractor allows the jointer to commence with the jointing work or making off of the cable (making off is recognized as half a joint) he must take care and ensure:

that he has adequate and suitable material available to complete the joint properly and efficiently. Special attention must be given to ensure the cable ferrules and cable lugs are of tinned copper and of sufficient size. The length of the jointing lugs must be at least six times the diameter of the conductor,

that the joint pit is dry and that all loose stones and material are removed,

that the walls and banks of the joint pit are reasonably firm and free from loose material which can fall into the pit,

that the necessary coffer-dams or retaining walls are made to stop the flow of water into the joint pit,

that the joint pit is provided with suitable groundsheets so that the jointing work is carried out in clean conditions,

that the necessary tents or sails are installed over the joint pit to effectively avert unexpected rainfall and that sufficient light or lighting is provided,

that the necessary means are available to efficiently seal the jointing or cable end when an unexpected storm or cloudburst occurs, regardless of how far the work has progressed,

that the cables and other materials are dry, undamaged and in all respects are suitable for the joint work or making off,

that the heating of cable oil, cable compound, plumbers metal and solder is arranged that they are at the correct temperature when required so that the cable is not unnecessary exposed to the atmosphere and consequently the ingress of moisture (care must be taken of overheating)

24.6 Before the paper insulated cables are joined, they must be tested for the presence of moisture by the cable jointers test. This consists of the insertion of a piece of unhandled insulated impregnated paper tape in warm cable oil heated to a temperature of 130 ± 5□ C. Froth on the surface of the oil is an indication that moisture is present in the impregnated insulation and the amount of the froth gives an indication of the moisture present.

24.7 If the cable contains moisture or is found to be otherwise unsuitable for jointing or making off the inspector is to be notified immediately and he will issue the necessary instruction to cope with the situation.

24.8 The joint or making off of paper insulated cables must not be commenced during rainy weather.

24.9 Once a joint is in progress the jointer must proceed with the joint until it is complete and before he leaves the site.

24.10 After the individual cores have been insulated they must be well basted with hot cable oil and again after the applicable separator and/or belt insulation tape is applied before the lead joint sleeve is placed in position.

24.11 The lead joint sleeve must be thoroughly cleaned and prepared before it is placed on the cable and must be kept clean during the whole jointing process. Seal the filling apertures of the sleeve with tape until the sleeve is ready for compound filling.

24.12 The plumbing joints employed to solder the joint sleeve to the cable sheath, must be cooled off with tallow and the joint sleeve is to be filled with compound while it is still warm. Top up continuously until the joint is completely filled to compensate for the compound shrinkage.

24.13 The outer joint box must be clean and free from corrosion. After it has been placed in position it must be slightly heated before being filled with compound. Top up until completely full.

24.14 As far as cable end boxes are concerned the requirements as set out above are valid where applicable.

25. DISTRIBUTION BOARDS AND CIRCUIT BREAKERS

The electrical contractor shall supply and install the distribution boards as indicated on the drawings. All distribution boards shall comply with the quality specification, and be approved by the Engineer or by the Department's representative.

All DB's as well as both ends of cables will be marked with engraving on aluminum plate.

All distribution boards shall be manufactured according to the detail specifications and drawings, and shall be inspected and **approved** by the Engineer before installation.

The Engineer shall first approve any other type of distribution board, which may be submitted as an alternative.

All bus bars and lugs shall be insulated, and wiring shall enter the switch gear from the back of the distribution board.

All circuit breakers will be the quality of **CBI** or better.

Quality Specification and Manufacturers:

All switchgear and equipment shall comply with the specification in the document.

Wiring:

The manufacturers shall internally wire all distribution boards. Wiring between switchgear and busbars shall be done by means of PVC insulated stranded copper conductors, fixed to the busbars with copper lugs, and brass bolts.

Only color coded wiring shall be accepted, e.g.: Red, yellow and blue for phases, and black for neutral.

Wiring colored by means of PVC insulated tape shall not be accepted.

Wiring shall be neatly strapped in a vertical and horizontal manner. All instrument and control wiring shall be 2,5mm² PVC insulated copper conductors, and shall be numbered for ease of tracing circuits.

Color:

The color of all distribution boards shall be light stone and all painting shall be done in accordance with the standard paint specifications in part 3 of this specification.

Doors:

Where specified, doors shall be of the removable type.

Separate Compartments:

Where distribution boards have separate compartments, they shall be separated by means of a metal dividing section, and be equipped with individual removable circuit breaker covers.

Legend Cards:

Legend cards covered by removable glass or 1.6mm transparent acrylic plastic shall be fitted to the inside of the door of the distribution board and circuits shall be noted on this legend card. Legend cards shall be as follow, for example:

Main	-	Main Isolator Switch **OR** Local Isolator Switch (As case may be).		
L1	-	Lights	;	Bedroom 1, Bedroom 2 & Kitchen.
P1	-	Plugs	;	Bedroom 1, Bedroom 2 & Kitchen.
ELU1	-	Earth leakage unit for plug circuits 1, 2 & 3.		

The AS-Build diagrams will be updated and laminated. The laminated prints will be attached at each DB for future use of the client.

26. BILLS OF MATERIALS

26.1 This Bill of Quantities forms part of, and must be read in conjunction with the specification.

26.2 No alteration, erasure or addition is to be made in the text of the Bill of Quantities. Should any alteration, erasure of addition be made it will not be recognized but the original wording of the Bill of Quantities will be adhered to.

26.3 The Client will check the completed Bill of Quantities and reserves the right to adjust any individual price and to rectify any discrepancy whilst the total tender price as quoted remains unaltered.

26.4 The quantities given in the Bill for cable, cable markers, earth wire laid with cable, overhead conductors, overhead earth wire and excavations cannot be regarded as exact and are subject to measurement on site after completion of the service and adjustments will be made according to the unit rates given in the Bill.

All other quantities will not be measured on site.

In the event of discrepancies between the drawings, specifications and Bill of Quantities the Client shall decide whether the work as executed shall be re-measured on site or whether re-measurement shall be effected from the working drawings only.

NOTE:

Checking of Cable and Overhead Conductor Lengths

Notwithstanding the fact that the lengths of cables and overhead conductors as given in the Bills of Quantities have been measured from scaled drawings, the contractor shall check such lengths on site before ordering the cable as he will not be paid for excess cable after the completion of the service. Any allowance for off-cuts shall be made in the unit rates. The final measurements shall be based on the nett route length of the cables and overhead lines concerned.

26.5 Where alternative prices for gear of different manufacture are quoted the lowest alternative price for gear to specification must be quoted against the relevant item in the Bill of quantities. The remaining alternative prices must be furnished separately.

26.6 The unit prices quoted in the Bill of Quantities must include for such small Installation materials as are required for the complete installation in accordance with the specification.

27. X-RAY EQUIPMENT

N/A

28. LIFT INSTALLATION

N/A

29 FIRE & SMOKE DETECTION

1 Extent of Work

This specification includes the fire & smoke detection system for the complete building

The fire detection system shall be utilized for the control of the automatic gas extinguishing system installed in several areas and the detection of fire in non protected areas.

The Fire Detection system will comply with the SANS 10139-2005 and the BS6266 as amended.

Disaster Recovery Areas will have a stand alone detection panel that will be linked to the master or other detection panels in the building.

The information on the panels will be made available on the MTN corporate LAN.

2 Special Notes to Tenderers

The fire detection system specified below and shown on the drawings has been designed with the following assumptions:

All detection loops shall be capable of supporting ±100 addressable devices including detectors, sirens, break glass units, isolators, I/O units etc. The conduit layout shall be designed according to these criteria. Should the system offered by the tenderer support more or less devices per loop this should be indicated on the accompanying drawings and the effect thereof clearly stated and included in the tender price.

All sirens will be addressable and will be powered by the system. Thus no provision will be made for separate power supplies or address units to the sirens. Should the items offered require any additional equipment, it should be clearly stated and included in the tender price.

Tenderers shall submit with their tenders all the requirements regarding temperature and humidity control required for the master and remote fire panels, if special environmental conditions are required. Should no special conditions be required, the tenderer shall clearly state this in the covering letter.

Tenderers are allowed to propose alternative designs or technologies than what is described in this specification. These alternatives must however incorporate the design philosophy described in the specification and accompanying drawings.

Tenderers must provide full details, design calculations and the advantages and disadvantages of their alternative proposals with their tender. A detail bill of quantities must also accompany their proposal.

Alternatives will be evaluated at the discretion of the engineer and aspects such as price, technical capabilities etc. will be considered.

3 Detection System

3.1 General Description

The smoke detection system shall consist of a central control unit (main fire panel) connected to field devices such as control units, detectors, break glass units and fire sirens. All of the above shall be of the analogue addressable type. The high sensitivity aspirating smoke detection systems will be linked to the loop via Input/Output units to ensure that it is addressable. The I/O units for these shall not be measured separately and is seen as part of each HSSD system.

The panel shall be selected at 80% of its capacity in terms of devices for future expansion. The panel will be a 2, 4, 6 or 8 loop panel, depending on the amount of detectors needed.

The main fire panel shall continuously monitor the analogue state of the sensing devices and make all decisions regarding the state of the system. The system shall incorporate self-monitoring and sensor self-test facilities, which will report immediately if any part of the system does not respond correctly.

Alarm management of the system shall be field programmable to enable specific customer requirements to be met. This configuration shall be maintained under power failure conditions for at least 24 hrs.

The main fire panel shall have a front panel consisting of indication LED's, display unit and a control keyboard from which all alarms and programming can be viewed and controlled.

The system shall be of a modular design and shall be able to operate as a stand-alone unit or part of a network if required.

The system shall endeavor to prevent false alarms by using a floating background with automatic level compensation, day/night sensitivity setting and a coincidence mode within and between zones. A soak test facility shall also be available to follow up suspect devices.

4 Standards

All materials, components and equipment used shall be new and of professional quality and shall comply with the requirements of the relevant SANS, BS, DIN or IES specifications.

The latest issues of the following standards form part of this specification:

□□SANS 10139: Code of practice for the prevention, automatic detection and extinguishing of fires in buildings.
□□BS 5839: Code of practice for the installation and servicing of fire detection and alarm systems in buildings.
□□BS 6266: Code of practice for fire protection for electronic data processing installations.
□□SANS 10142: Code of practice for the wiring of premises.

Any conflict between the requirements of this specification and any of the above standards shall be referred to the Engineer for a ruling.

Equipment shall be standardized throughout the installation and the number of different assemblies used shall be limited to a minimum. Replacement of assemblies and units on a plug-in basis is regarded as essential to facilitate maintenance and to enable staff to do repairs. It will thus be preferred if the address of all the devices are situated in the base and not the head of the detectors.

All materials and equipment shall be suitable for the conditions on site. These conditions shall include weather conditions as well as conditions under which the materials are installed and used. Should the materials or components not be suitable for use under temporary site conditions then the subcontractor shall, at his own expense, provide protection until these unfavorable site conditions cease to exist.

Samples of all equipment shall, upon request of the Engineer, be submitted for approval before installation is commenced with. All such samples may be retained until completion of the contract.

5 System operation

The system shall be designed to operate with the minimum of operator training. Basic fire alarm functions shall be self-explanatory and the occurrence of a fire or fault alarm shall indicate all relevant information without operator intervention.

In the event of a fire being detected or a break glass unit being activated or upon any other alarm input, an alarm signal shall be raised at the main fire panel. This shall be accomplished by displaying 40 characters of user programmable text, the type of device, zone number, loop number, device number and time and date on the display unit. Audible alarms shall also be activated in the affected fire zones only, programmed relays shall be triggered to turn air conditioning unit off after the second knock, to activate evacuation notices and to release extinguishing gas as required. These controlled outputs shall originate from the main fire panel and shall activate automatically under emergency conditions.

The main fire panel shall be of the analogue addressable type and shall be fully microprocessor controlled. This panel shall be housed in a suitably ventilated, aesthetically pleasing enclosure complete with a key, lock and tamper monitor.

A faulty device, or a detector already in an alarm state, shall not inhibit other detectors in the same zone or line from reporting faults or alarms.

The alarm line shall be monitored for short-circuit, earth fault and open circuit conditions and all faults shall be reported. Alarm indications shall be differentiated from line fault conditions.

The following device states shall be recognized by the fire panel:

Normal conditions;
maintenance alarm caused by performance deterioration of the detector due to contamination;
fire state and
fault state.

A fault alarm shall cause the master panel to identify the fault fully by displaying 40 characters of user programmable text, the type of device, zone number, loop number, device number and time and date on the display unit.

If a detector head is removed from the base it shall generate a fault alarm on the panel which can only be reset by replacing the missing device. Removal of a unit shall not restrict the normal operation of the rest of the panel.

Should a detector become contaminated, a maintenance alarm shall be indicated and logged as follows:

The maintenance alarm LED shall be illuminated;
the LCD display shall indicate at least the following information: Type of alarm, Zone number, Device number, Type of device, Time and date, 40 characters of user

programmable text;
the panel buzzer shall be activated;
it shall be possible to isolate a zone or a device from the fire panel without affecting any of the other zones or devices of the system. Isolation of devices shall be under software control;

All loop lines shall be provided with suitable surge protection equipment;
the panel shall be equipped with a keypad to enable control and programming of the panel and
this keypad shall normally be disabled and access to this facility shall be protected by means of a software access code.

Indicators LED's to be provided on the faceplate shall, amongst others
indicate the following:

Fire conditions;
Maintenance alarms;
Faults on the normal power supply to the panel;
Power supply to the panel healthy;
Processor fault;
System fault;
An alarm has been silenced and
A device has been isolate.

It shall be possible to determine the state of each device from the main fire panel.

The main fire panel shall be equipped with backup batteries to maintain the smoke detection system in a fully operational state in the event of a power failure.

The backup batteries shall form an integral part of the main fire panel and it shall be rated to supply emergency power to the system for a continuous period of at least 24 hours.

The main fire panel shall also be equipped with a suitable battery charging circuit to continually maintain the batteries in a fully charged state.

6 Detectors, Manual Alarms and Audible & Visual Alarms

General

All detectors, break glass units and fire sirens required for this installation shall be of the analogue addressable type. Detectors used shall be approved by at least two of the following internationally recognized laboratories:

Underwriters Laboratories (UL)
Verband der Schass Versekerer, Germany VDS
British Standards, Great Britian (BS)
Underwriters Laboratories, Canada (ULC)
Factory Mutual (FM)

6 Multi-sensor detectors

All point type detectors shall be of the multi-sensor type incorporating at least two fire sensing elements (optical and heat). Inputs from both sensing elements shall be used and analyzed by the detector's microprocessor with respect to time. On board algorithms should compare historical time readings, time patterns and known fire characteristics to make an alarm decision.

The detector shall continually monitor any changes in sensitivity due to environmental affects of dirt, smoke, temperature, aging and humidity. It shall also be possible to adjust the sensitivity level of each individual detector to suit environmental needs.

The detector shall be equipped with indication LED's which will discriminate between when the detector is in monitoring state (LED flashing). Detectors shall be installed so that the LED is visible from the main entrance to the room or office.

All detectors shall be complete with the necessary communications circuitry required for communication with the master fire panel. The communications circuitry shall form an integral part of the detector and shall be factory fitted by the original manufacturer of the detector.

Each detector shall be supplied with a separate base, which will allow for the removal of the detectors head for maintenance purposes.

The unique address of each detector shall be set by means of a coded plastic card fitted to the detector base or DIP switches in the detector head. Preference shall however be given to detectors that are software programmable.

The detector shall be suitable for operation within the following minimum conditions:

Temperature : -10 to +60 □C
Humidity : 0% to 95% RH
Wind resistance : Up to 10 meters per second

The detector and detector base shall be constructed from white, self extinguishing polycarbonate plastic and all smoke entry points must be protected against dust and insect ingress by means of corrosion resistant gauze.

7 Break Glass Units

These units shall be manufactured from red self-extinguishing polycarbonate plastic and shall be suitable for surface mounting over flush mounted round conduit boxes.

These units shall be addressable and shall be complete with the necessary

communications module and an indication LED, which will illuminate when the unit is activated. Means shall be provided to test the individual units without removing the glass front cover of the unit.
The break glass units shall be equipped with a normal open soft contact with a mounting plate and a glass front. The words "IN CASE OF FIRE BREAK GLASS" or any other similar wording approved by the engineer must be clearly marked on front of the unit.

To avoid accidental operation the break glass unit must be fitted with a clear plastic cover. This cover shall be hinged at the top and has to be raised before operation is possible.

8 Audible Alarms

Fire sirens shall comprise an audio frequency generator, an amplifier and a pressure chamber loudspeaker. The unit shall be suitable for surface mounting and shall comply with the following:

Operating voltage: To suit control panel output
Sound level at 1 meter: 100dBA
Duty cycle: 100%
Permissible temperature: -15□C to +50□C
Frequency: Auto switching between high and low tone in
frequencies of 2500 – 3000 Hz
Alarm bells shall be provided in the gas-protected areas as indicated on the tender drawings. Bell alarms shall be 150mm in diameter and shall be installed on a height of 500mm below ceiling level.

9 Visual alarms

Evacuation signs shall be provided and installed above, or if this is not possible, next to the doors leading out of the gas protected areas, as indicated on the drawing. These signs must not be legible under normal circumstances, but on receipt of the first fire detection signals the sign shall become legible illuminated by a flashing light. The light shall illuminate the sign permanently upon the receipt of the second fire detection signal.

The lettering of the sign shall be at least 40mm in height and the wording shall be as indicated on the drawing.

10 Gas control units (status panels)

These addressable gas control units shall provide the interface between the smoke detection system and the gas extinguishing system.

Each self-contained unit shall have key switches for manual or automatic selection as well as an isolate switch for maintenance. Dual LED's shall indicate automatic or manual mode, gas discharge, isolate, reset and fault statuses.

The control unit shall provide the outputs for the gas release valves, audible and visible alarms.

The control units shall be screened sufficiently for external electrical and electromagnetic interference.

Gas control units shall be incorporated with break glass units in the same panel and will be installed outside the risk area next to the entrance/exit door.

The status of the gas control unit will be relayed to the main control panel.

Warning notices

Warning notices shall be provided on the doors leading into the respective gas protected areas, as indicated on the drawing. The notices shall have legible white lettering at least 40mm high, on a red background and the wording shall be as indicated on the drawing. The "Door Caution" Label will read: "THIS IS A FM200 PROTECTED AREA". The label will be on a yellow plastic panel or an anodized aluminum panel.

An Illuminated sign will be visible displayed inside the room. It will read: "FM200 EVACUATE".

Fire Detection Zones

4.4.1 The system shall be configured to allow separate fire zones with multi sensors for each of the areas as shown on the drawings:

11 Interface to other Systems

The smoke detection system shall provide the control for the gas extinguishing system,

disabling of the air-conditioning system, opening and closing of pressure relief dampers and opening of fire dampers. This interfacing shall be done by means of analogue addressable relays. The system shall also provides 3 sets of dry contacts to the BMS system for a Fire Alarm, Fire Panel alarm and a FM200 discharge Alarm.

12 Control Procedures

Zones with FM200

With the Gas Control Unit in Automatic Mode the release of gas in these areas will work on a *double knock* basis. The VESDA detectors will not be used to trigger any knocks – only as an early warning system to switch off the fresh air units and to trigger alarms. Knocks shall be triggered according to the following procedure:

First knock: First multi-sensor detector detects a fire.

Step 1: Activate alarm bells (inside and outside room) – alert tone.
Step 2: Activate the evacuation warning in a flashing mode inside the affected area.

Second knock: Second multi-sensor detector detects a fire.

Step 3: Activate alarm bells (inside and outside room) – evacuation tone.
Step 4: Activate evacuation signs – flashing mode.
Step 5: Close fire dampers (fresh air).
Step 6: Activate pre-release timer adjustable from 20 to 120 seconds, : After pre-release period.
Step 7: Switch the evacuation warning to steady mode.
Step 8: Open gas release valve.

Gas Control Unit Switched to Manual Mode:

First Knock: With one detector activated

Step 1: Sound the alarm bell inside the affected area.
Step 2: Activate the evacuation warning in a flashing mode inside the protected area.

Second Knock : With a second detector activated (second knock)
Step 1: Stop the alarm bell and activate the alarm sirens inside and outside the protected area switch the evacuation warning to steady mode. NO GAS RELEASE SHALL TAKE PLACE IN THIS MODE. Gas release in this mode shall only be activated by either switching to the automatic mode or by activating the break glass unit on the gas control unit.

Break Glass Unit Activated

Activation of the break glass unit located on the gas control unit (status panel) shall directly start the steps subsequent to the Second knock of the extinguishing cycle. Manual release of the extinguishing gas shall always be possible by operation of the break glass unit on the gas control unit, regardless of the mode selected (manual or

automatic). All alarms shall be reported to the main fire panel.

Zones in areas without FM200 gas:

Should a fire be detected in any of these zones alarm sirens will be set off and the alarms reported at the main fire panel.

12 Testing and training of the end-user

Training of end-user:

The contractor shall be responsible to train 3 operators per site. The operators shall be trained to operate the system, to configure the system, to program the fire panels and any other functions required to enable independent operation of the system in all respects.

Three sets of operating and instruction manuals shall be supplied as part of this contract. These manuals shall contain a complete set of as-built drawings shall contain scanned images of the system with detailed descriptions of the operating thereof.

13 Testing and Maintenance:

The installation shall be completely tested in accordance with the requirements of NFPA2001.

The engineer shall do spot checks on the performance of the system.

The assistance of the SANS will be obtained when any dispute arises as to the interpretation of results.

The successful tenderer shall be required to supply all equipment and material to test the smoke detection system in its entirety.

Smoke detection system shall be done with the gas control unit in manual mode.

All pages will be laminated and contained in a 4-lever file.

14 Cabling, Wiring and Conduit

Unless otherwise specified, wiring shall be carried in conduit throughout. All conduits for the fire detection system shall be provided and installed by the tenderer according to the attached drawings and bill of quantities.

The loop-in system shall be followed throughout and no joints of any description will be permitted.

All cabling between panels and devices will be fire retardant (FR 20) and will be of the multi strand type at least 0.8mm2. The cabling will be adequately sized to ensure the minimum power loss in the cable. Cabling between panels and network points will be Fire retardant CAT 5 cable.

15 SCHEDULE OF TECHNICAL INFORMATION

The tenderer is required to fill in the information as requested below. Incomplete schedules will render the tender non responsive.

Fire Protection System: _____
Commercial Name of Gas System:_____
Authorised by: _____
Design Concentration of gas:_____
The complete installation will comply with NFPA 2001_____ Yes/No
Fire Detection System:_____
Type of system: _____
Type of detectors to be used:_____.Heat/Ionisation/Multi/Optical
Loop system to be used:_____Class A/Class B
Detectors individually addressable: _____ Yes/No
Fire Detection Panel:_____
Gas Control Units: _____
Cabling:_____

30. DATA CABLING SPECIFICATION

1 GENERAL

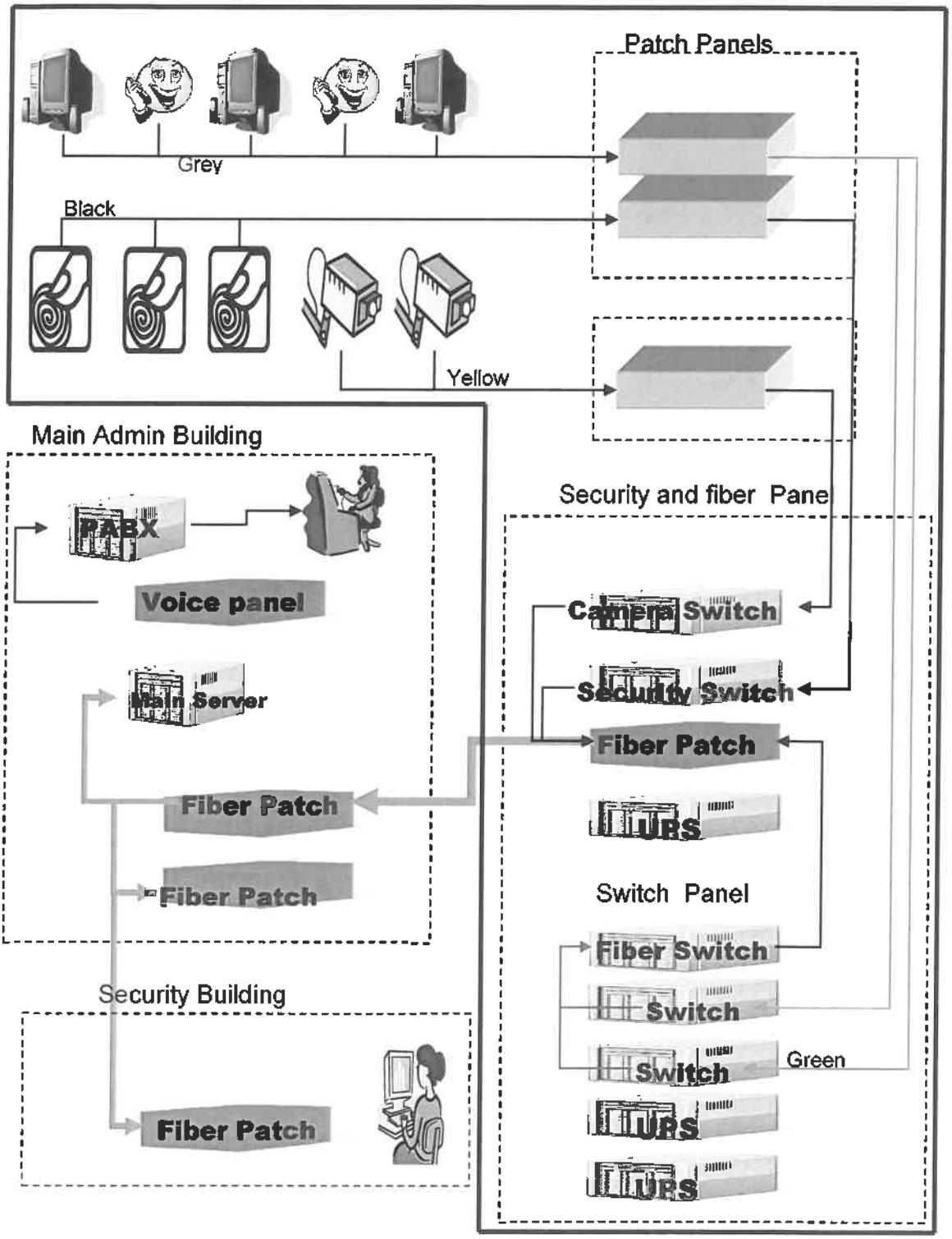
This specification covers the supply, delivery, installation, testing, commissioning and maintenance during the guarantee period of the Data Cabling Installation covered under the scope of works for the Proposed New Development for the above mentioned building

2 SCOPE OF WORKS

DATA

This specification covers the supply, delivery, installation, testing, commissioning and maintenance during the guarantee period of the Data Installation, described below, for the Proposed New Development for the above mentioned building.

1. Backbone infrastructure in the form of fibre optic cabling to be able to provide the bandwidth specified;
2. Backbone telecommunication infrastructure in the form of 100 pair telephone cable cabling to the main administration building;
3. Fiber Optic cabling in to the main administration building.
4. 42U racks as specified;
5. Cat 5e cabling between workstations and patch panels including terminations and plugs in power skirting.
6. Patch panels as specified;
7. Patch leads to switches
8. Labeling as specified.
9. Backbone cabling for the security system. (Camera's and readers)


Patch Panels
Grey
Black
Yellow
Main Admin Building
PABX
Voice panel
Main Server
Fiber Patch
Fiber Patch
Fiber Patch
Security Building
Fiber Patch
Security and fiber Pane
Camera Switch
Security Switch
Fiber Patch
UPS
Switch Panel
Fiber Switch
Switch
Switch
Green
UPS
UPS

3 MEASUREMENT

The attached Bill of quantities will be a guideline based on this specification and the accompanying drawings. The tenderer is to measure off the drawings for tender purposes, however, on award of contract the contractor shall measure on site quantities needed for installation. The tenderer is to provide a breakdown of his tender on the tender schedule page. The quantities provided can be adjusted and are for information only.

4 FORM OF CONTRACT

NA

5 RELATED WORK BY OTHERS

N/A

6 STRUCTURED CABLING REQUIREMENTS GUIDELINE

6.1 COMPLIANCE

Compliance with the requirements of Molex 25 year System Performance Warranty as well as any additional requirements by Ingcali Consulting Engineers and the owners of the supplied Structured Cabling System, namely.

The acceptance requirements as outlined in this document are mandatory. No variation will be tolerated nor accepted.

The design of the Structured Cabling System shall comply with the requirements of ISO 11801: 2002, and TIA 568-B.

Copper transmission performance shall exceed the specification for a Category 5e link as defined by the above standards.

The Quality Assurance provisions applied to the installation shall be compliant with BS EN 50174-1 and the Molex Premise Networks Global Warranty requirements.

Installation practices shall be compliant with ANSI/NECA/BICSI-568-2006, Standard for Installing Commercial Building Telecommunications Cabling and shall be wholly compliant with the installation practices laid down by Molex Premise Networks.

Installation practices shall also meet all applicable local and national codes, standards and ordinances. Where a conflict exists between these standards, it is the responsibility of the contractor to detail these

conflicts to the client prior to installation commencing.

6.2 DOCUMENT SCOPE

This document is intended as a guideline and therefore does not supersede the International Standards on which it is based. The purpose of the document is to provide the contractor with information specific to the implementation of Standards based generic structured cabling as per the requirements of the University Network environment and the support/maintenance thereof.

6.3 CONTRACTOR MINIMUM QUALIFICATIONS REQUIREMENTS

1. The contractor shall be Molex certified and posses a valid, authenticated Molex Certified Installer or Molex Business Partner certificate in order that the final installation be certified in accordance with the Molex Global Warranty program requirements.

2. The contractor shall provide only skilled labour to complete work within the agreed upon time frame.

3. The contractor is responsible for the provision of all tools required to full fill his installation obligations in accordance with task at hand at his cost. This includes specialist tools such as core drills etc.

4. By means of the submittal of a quotation and the acceptance of the relevant order number, the contractor is solely responsible for the successful delivery of all documentation pertaining to installed components. E.g. Floor plans , excel sheets and test results to Ingcali Consulting engineers

5. The contractor is solely responsible for the thorough pre-quotation inspection and installation evaluation of any given project for which a quotation is submitted. Any over-sites on the part of the contractor are for his account.

6.4 100 OHM UTP STRUCTURED CABLING SYSTEMS (SCS) GENERAL PRODUCT CONFORMANCE REQUIREMENTS

1. The minimum acceptable cable performance category to be installed on University premises shall be ANSI/TIA/EIA-568-B Category 5e / ISO 11801 Class E (2002) compliant.

2. Only cable and connecting hardware specified for the Molex Premise Networks Structured Cabling Solution shall be used.

3. All installed components shall be new, complete, in good condition and unused albeit for demonstration purposes.

4. All cable reels are to be visually inspected for damage incurred during shipping and transit prior to installation.

5. Cable and connecting components found to be damaged or defective prior and during the installation process are to be removed immediately and returned to the supplier at no additional cost to the University.

6.5 GENERAL PRODUCT PERFORMANCE REQUIREMENTS

The supplied product shall, once installed, conform to ISO 11801 Class E -2002 electrical characteristics for the purposes of Vendor warranty.

It is expected that installed products be capable of supporting voice and data communications applications and protocols from baseline 56Kbps to ISDN PRI for Analogue and Digital Voice and 10Base T to 1000 Base T for data as per the supported applications of ISO 11801 Class E (2002).

The project will be completed and signed off in 7 different phases by the Contractor and Ingcali Project Manager:

Phase 1: Category 5e Data cable Installation:

This comprises the horizontal cabling, extending from the patch panel in the rack or cabinet to the consolidation point if applicable and extending to the telecommunications outlet in the work area. This is the part of the horizontal cabling referred to by the standards as the Permanent Link. Both ends of the cable must be terminated to specification and labelled at both ends by means of a legible, permanent label. Where applicable, the portion of the horizontal cable

extending from the patch panel in the cabinet to a consolidation point, intended for future extension to the telecommunications outlet, will be accepted.

Installation	Color of Cat5e
Data	Grey
Telephone	Grey
Camera	Yellow
Biometric readers	Black

Phase 2: Category 5e Patch leads:

Provide patch leads from the patch panels to the switches and panels

Installation	Color of Cat5e/6
Data	Green

Telephone	Blue
Camera	Yellow
Biometric readers	Black
Special	Red

Phase 3: The Main Fibre optic Installation :

The installation of a 24 Fiber Single or Multi Mode Heavy Duty Duct Cable cabling, extending from the patch panel in the rack or cabinet to the patch panel in the cabinet in the main administration building.

The installation of a 12 Fiber Single Mode Heavy Duty Duct Cable cabling, extending from the patch panel in the rack in the main administration building to the patch panel in the cabinet in security building.

.

Phase 4: The Main Telephone cable Installation :

VOIP system to be integrated with network

Phase 5: Testing and Labelling:

All outlets will be tested using the appropriate Level 3 test equipment, set to the ISO 11801 Class E Permanent Link setting. All links shall be permanently labelled at both ends of the cable, on the telecommunications outlet fascia and directly above or under the patch panel port as per the labelling requirements set out as specifications in this tender document.

Phase 6: Warranties:

All test results and floor plans will be submitted to Molex Premise Networks' INSIGHT on-line warranty registration program in electronic format for Warranty purposes. The contractor must furnish the INSIGHT reference number to the Ingcali Project Manager.

Phase 7: Final Handover:

The contractor will hand over all documentation, including, updated floor plans (as installed), test results and authenticated 25 year Molex System Performance Warranty Certificate to the INGCALI Project Manager, who will then sign off the installation.

6.6 GENERAL INSTALLATION PRACTICE REQUIREMENTS

1. During the cable installation process, the manufacturer's maximum tensile load recommendations may not be exceeded. This is typically specified as 110N, but should be verified with the manufacturer.

2. Cable being pulled in should be handled by no less than two individuals at all times in order to avoid damage to the cable by means of kinks, twisting along its own axis, getting snagged etc. It is recommended that three installers co-operate in the pulling in of any given cable run, one on each end and another in the middle or positioned near any obstructions to feed slack and thus avoid undue stress on the cable.

3. Whenever possible cable should be placed into pathways rather than be pulled in under tension.

4. Care should be taken not to score conductors during the removal of the outer insulating sleeve of the cable when preparing to terminate pairs.

5. Cables should not be subjected to a bend radius of less than 50mm when under tension (during installation) and the bend radius should not be less than 25mm when once installed.

6. During the installation process, installers are required to visually inspect cable and connecting hardware components for damage. If such damage is found, e.g. tears in the outer jacket of the cable, severe kinks as identified by white/grey bands of discoloration on cable jacket, these components are to be replaced immediately.

7. The installer is to make use of best practices when handling unjacketed conductors. Care is to be taken as not to create pair spread, pair wrapping, pair separation and the re-twisting of pairs.

8. Pair twists must be maintained up to the point of termination. Under no circumstances may pair untwist of more that 6 mm be allowed. The sheath should be trimmed such that no more than 25mm of wire may be exposed after termination.

9. All cabling shall be clearly labelled at both ends to the rear of the point of termination no more than 100mm from such a termination point.

10. All patch panel ports and workstation outlets shall be clearly labelled by means of appropriately secured printed labels (hand written labels are not acceptable).

11. All patch and workstation outlet cables shall be clearly labelled by means of an appropriately secured printed label.

12. All labeling schemes shall be confirmed with the appropriate representative of Ingcali/Project Manager before being applied.

13. The maximum number of screws or bolts as provided for by the design of connecting hardware or SCS components and accessories are to be used without exception.

6.7 DUCTING AND SUPPORTING STRUCTURES

1. Where support structures are used, such structures are to provide support at a maximum of 1.5 meters along the length of the run as to avoid cable tension as a result of the cumulative weight of such cable acting upon itself at the next point of support.

2. The surface of such support structures e.g. Cable hangers will not pose a risk of damaging cable due to sharp edges or angular surfaces which would act against the symmetry of wire pairs within the cable or a risk to installers e.g. Cuts.

3. Where cable ties are used, they are to be securely fastened but still permit for cable movement if tugged upon making use of reasonable force.

4. Cable ties are to be used at set intervals of 300mm for all cable bundles where exposed to present a uniform appearance. In concealed spaces, the bundles may be tied at nominal 1m intervals.

5. Under no circumstances shall any cable/s hang unsupported, vertical runs are to be supported are no greater than 300mm intervals.

6. When cable ties are cut; once appropriately fastened around cable bundles, in order to remove protrusions beyond the buckle, the installer will ensure that such a cut is clean and that no sharp edges are created which would damage other cable being pulled past it or injure installers and support staff.

7. Cable shall under no circumstances be strapped to PVC electrical conduit or any structures belonging to an unrelated functional unit such as an air conditioning drain pipe as future maintenance by associated maintenance staff may result in damage or removal in order to facilitate
work.

8. Where purpose-installed conduits are to be used for structured cabling, such conduits may never be filled beyond 40% of capacity and should bend at a radius of no less than 6 times the outside diameter of such conduit, nor shall more than two 90 degree bends along the total span of such a conduit. No continuous conduit run may exceed 15 meters without an appropriate draw box.

9. Cable is at no point to be placed directly on top of suspended ceiling tiles.
10. Contractors are to ensure that cable is not installed in areas such as roof spaces or in direct sunlight where temperature ranges might exceed the manufactures operating temperate specifications (typically not in spaces where temperatures exceed 60 degrees Celsius.)

11. All metallic support structures, be it conduit, ducting or trays, shall be grounded in accordance with national electric regulations.

12. Ducting systems shall be securely fastened to walls by means of the appropriate fixing hardware so as to ensure a sound and durable installation.

13. Ducting system covers are to be fitted securely and any portion of the ducting system found to be cracked or damaged is to be immediately replaced.

6.8 POWER AND EMI SOURCE SEPARATION

1. Cable may be laid adjacent to sources of interference such as 240V electrical branch circuits with a minimum separation 75mm where:
   a. A continuous grounded metallic barrier exists between electric cable and structured cabling.
   b. A durable non-metallic insulation exists, other than the insulation material of the cable.

2. At no point may data cabling cross the path of any power or broadband cable, fluorescent lighting unit (where suspension is used as a means of separation) at an angle less or greater than 90 degrees.

3. The installer is to ensure that electrostatic devices such as photocopiers and sources of radiation such as x-ray devices, radio transmitters, their antennae and associated broadband cables are to be
   avoided when routing cable.

6.9 POST-INSTALLATION TEST AND CERTIFICATION

General Requirements

1. Every cabling link is to be tested and must meet with the requirements of ISO 11801 Class E (2002) Permanent Link model across the full length of the link.

2. Test requirements are as per Permanent Link certification requirement for which the appropriate test adapters are to be used.

3. The contractor will ensure that the full plot data is stored for each and every test.

4. The test results shall also be in in the test equipment native software format (eg. Fluke Networks Linkware format (.flw)).

5. Test results are to be stored and provided to Ingcali/Project Manager staff in electronic format in .csv and .flw . When submitting to Molex Premise Networks, the test results must be in the test equipment's native software format.

6. Only Fluke DTX series testers will be used to certify University SCS's or their subcomponents running the current firmware.

7. The test equipment is to be well maintained and in good working order. Ingcali/Project Manager staff reserves the right to insist on an annual factory calibration certificate for the instrument to be used for testing.

8. Ingcali/Project Manager staff further reserves the right to insist on being present during the self-calibration of the test unit and the instruments initial configuration prior to test and during the test process itself.

9. The contractor is to advise Ingcali/Project Manager staff within 3 working days of intent to commence testing in order that such a staff member may make himself available to attend testing procedures.

10. The contractor is required to make available the test equipment and necessary personnel at no extra cost should a member of Ingcali/Project Manager wish to perform random acceptance testing
    on approximately 10% of the installed cabling infrastructure.

11. Ingcali/Project Manager staff reserves the right to decline acceptance of marginal performing cables irrespective of their having passed testing based on risk of future degradation over the life span of the installed product.

12. Where it is found that the random tests do not match those presented, Ingcali/Project Manager staff reserves the right to insist on a supervised re-test of any or all installed cables prior to acceptance.

13. It is the sole responsibility of the contractor to ensure that the appropriate Vendor test and documentation requirements are met in order that Ingcali/Project Manager be provided with a warranty certificate issued by the SCS Vendor.

14. Any contention regarding Vendor warranty requirements is to be resolved between the Vendor and the contractor and has thus no bearing on Ingcali's requirements as outlined here.

15. Documentation is to conform to the guidelines of EIA/TIA 606-A and provided in 4 parts:
    a. An excel sheet indicating cable label, location of work area and Telecommunications closet termination points etc in electronic format.

b. Detailed test results in .flw (Fluke Networks Linkware) or similar native software format inclusive of all plot data.

c. A floor plan or site diagram reflecting the routes taken to and location of all installed cables in electronic format.

d. Laminated A3 sheets showing the floor plans for the area covered per rack and labeled voice & data points, to be placed inside each rack.

7 INTERCONNECTING BANDWIDTH

Backbone connectivity

The minimum bandwidth specification will cope with an Ethernet backbone operating at 10 GB/s as per the IEEE 802.ae specification. OS1 Single mode Fibre of appropriate physical construction suitable for the intended environment may be used.

8 INTERCONNECTIONS

Sites

All buildings will be provided with a 12 pair, 24 cores fiber optical cable from the Building to the main admin building

A dedicated fibre 6 pair, 12 cores link will be installed from the Main Admin Building to the security building.

Users

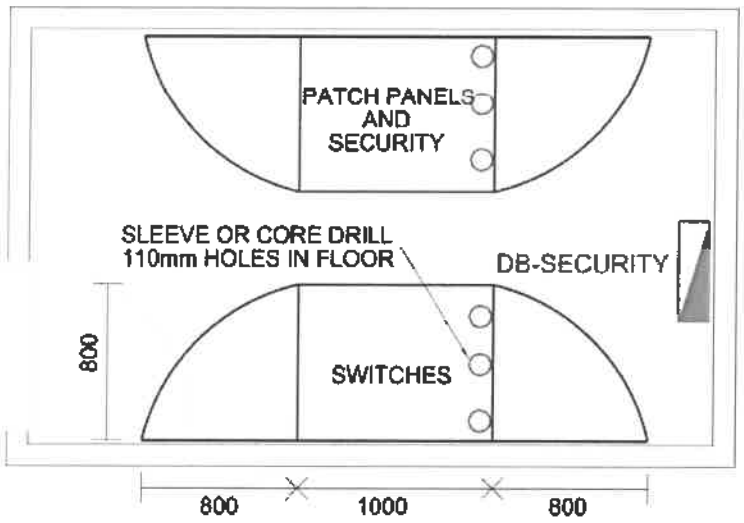
The maximum length from the patch panel in a distribution centre to the user wall socket will be 85 meters.

9 GENERAL

3 X 42 U rack will be provided. This rack will contain two 5 kVA rack mount UPS modules as well as the switches and interconnection to cope with voice and telephony requirements for the users. Each rack will have two separate, i.e. fed from different phase, 5 kVA UPS backed power supplies that provides 220V, 50 Hz, sine wave power with a 5% tolerance on the stated measures.

Each rack will have the power connections from the top of the rack and the data connections will come from behind and the bottom. Cabinets will be fitted with a plinth of not less than 150mm in height to enable cable entry in the event that raised flooring is not available.

There will be walkway of 800 mm width in front and behind the cabinet(s) as depicted in figure 1 below.



10 RACK SPECIFICATIONS

- 42u x 1000mm deep
- 1 x 4-Way extractor fan tray mounted to the top of the rack
- 2 x 5-way dedicated Power Distribution Units (PDUs) mounted inside the racks
- Solid lockable doors on the back and sides, and lockable glass door on the front
- Standard colour rack – goose grey

11 CABLE COLOURS

- The horizontal Data cables must be Standard RAL grey colour PVC
- The horizontal camera cables must be Standard RAL yellow colour PVC
- The horizontal Biometric cables must be Standard RAL Black colour PVC
-
- Patch leads
    - Must be in standard length of 2.5 metres
    - Blue for voice points
    - Green for data points
    - Yellow for camera
    - Black for biometric readers
- Fly leads
    - 3m standard length
    - Grey for all data points

12 FIBRE

- SC duplex connectors on all fibre trays
- 3m SC to LC fibre patch leads to be provided

13 PATCH PANELS

- Only Molex 1U 24-port Harmonica patch panels to be used.
- All the cables will be patched in separate panel. Switches will be installed in separate panel and connected with patch leads

14 LABELLING OF DATA, VOICE & FIBRE POINTS

- First patch panel begins with letter A, Points 1-24
- Second patch panel begins with letter B, Points 1-24
- Continues to Z, Points 1-24
- Then starts with AA, Points 1-24

- Next panel is AB, Points 1-24

15 SCHEDULE OF DATA/TELEPHONE OUTLETS
CAT 5e/6 CABLING

See Bill of Quantities

16 FIBRE OPTIC CABLING

- The different buildings to be connected by 24 core fibre link to the main building

31. SECURITY

31 ACCESS CONTROL SYSTEM

31.1 BIOMETRIC (FINGERPRINT) READER

Biometric Readers shall be used by authorized personnel for access control. Biometric matching shall have a verification (1:1) accuracy of 99% or higher. The biometric Equal Error Rate (EER) shall not be more than 1% for verification.

Fingerprint biometric technology shall be capable of template creation from a single image capture. Fingerprint reader image resolution shall be 500 dpi or higher. When a reference or operational biometric verification (1:1) is initiated, the correct result (accept or decline) shall be accomplished on the first attempt at least 90% of the time. Biometric devices shall offer liveness detection as a manufacturer's option.

The Reader must satisfy the following requirements:

- Capacity for at least 500 users.
- Must support Ethernet and serial communications to polling PC,
- Ethernet port must be at least 10 Base-T with RJ-45 terminal,
- Serial connection must be capable of supporting communications at a minimum of 40 meters,
- Reader should be capable of functioning independent of polling software,
- In the event of failure of communications between the readers and the polling software, the readers must continue to accept punches as before,
- Reader must be capable of retaining the information after repeated power cycles for up to 5 days minimum,
- The readers must support both AC and DC power source.

31.2 Controllers

The Controllers shall provide a single board solution for interfacing 1 or 2 doors to the access control system. In addition, other I/O and reader interface modules can be added on the Intelligent Reader Controller's downstream port to expand its capabilities. The Controllers shall be scalable.

The Controllers shall provide power and functionality. In the event of loss of connectivity, the full controller functionality and database of the Controllers shall allow nearly all local functionality to continue unimpaired until the server connection is restored.

The Controllers shall store up to 350,000 cardholders in non-volatile flash memory, and support selective download for larger cardholder databases. The downstream RS-485 2-wire port shall be used to connect up to 31 devices.

The Controllers shall support up to eight different card formats. The Controllers shall include eight inputs that support normally open, normally closed, supervised, and non-supervised circuits. In addition, four output relays shall support fail-safe or fail-secure operation.

The Controllers shall have the following features:

- 8 MB of available on-board non-volatile Flash memory.
- 512 KB available RAM for event memory, Lithium battery backup.
- Firmware stored in Flash memory, background download of firmware updates supported.
- Support up to 16 different formats (8 card formats and 8 asset formats).
- Biometric template storage support.
- Enhanced anti-passback capabilities.
- Up to 32,000 access level permissions.
- 255 holidays with grouping, 255 timezones, each with 6 intervals.
- Elevator control support for up to 64 floors.
- Individual extended held open and strike times (ADA required).
- Up to 9-digit user pin codes.
- 20 Status LEDs.

Reader Interface Functionality:

- Shall support Data1/Data0, Clock/Data and compatible RS-485 readers and keypads.
- Four Form-C 5 A at 30 VDC relay outputs.
- Door contact supervision (open/closed) and push-button monitor for each door.
- Strike control and auxiliary output for each door.
- Bicolor reader status LED support plus beeper control, or 2-wire LED
support.
- Onboard regulator shall allow 12 VDC reader power from 24 VDC power source.

Other Features & Functionality:

- Two dedicated inputs for tamper and power failure status.
- 12 VDC or 24 VDC input power.

5.3 ELECTRO – MAGNETIC LOCKING DEVICE (MAGLOCK)

Maglocks shall conform to the following specification:

- Locks shall be capable of holding a 600-kilogram pulling force per door leaf.
- The units shall operate on 12 VDC.

- The lock housing shall be constructed to allow connection of all power and control wiring within the removable housing cover.
- The unit shall be no larger than 2" by 1 13/16" by 23"overall.
- All units shall be supplied with a bi-colour LED to indicate lock status
- Furnish a factory installed door position switch concealed within the housing.
- Supply units with magnetic bond sensors for each door leaf to detect an insufficient holding force on the lock armature.
- "TJ" locks (top jamb mounted units) shall be supplied with "Z" brackets for in swinging doors where scheduled.
- Lock housings and mounting hardware (filler plates and angle adapters) shall be standard US28 clear satin anodized aluminium except where special finished hardware is required
- The maglock shall be remotely controlled from the control room.
- All EM locks must have their own PSU per lock. No other devices shall be powered from this power supply.
- All PSU units will be housed in the control room.
- PSU units must be sized by the contractor and must have at least 33% safety margin at all times. EM power supply unit must be connected to the UPS line.
- Cable used to EM lock must be at least 1.5 mm Sq multi-core type (rip cord will not be allowed).

For additional security the electromagnetic locks shall be supplied with the options: (or as scheduled)

- Edit, or include schedule showing required locations.
- All above units shall be supplied with a cover tamper switch to detect unauthorized removal of the housing and tamper proof cover screws to deter tamper attempts.
- To alert persons when the door is unlocked for access, a

sounder shall be mounted in the lock housing. This audible alert shall activate on door unlock and cease upon door opening or re-locking of the door. Shall be externally powered.

- For aesthetic design consideration and additional security all above units shall be supplied with "guard housings" to conceal the normally exposed (bottom) edge of the door armature.
- Provide extra length lock housing covers to extend across the full width of opening, or where locks are scheduled to be mounted vertically, from finished floor to door stop or underside of header.

On doors where emergency exit is required, only power-locked devices will be installed and these will be wired in series with an emergency release mechanism such as a break-glass unit or a fire-panel relay.

5.4 Client Workstation

Client Workstation should be a Windows based PC with 23" LCD monitor. All necessary software should be legally installed and paid for. The web cam is to be mounted for easy and effective enrolment of people.

5.5 Commissioning

Access control system should fully functional and integrated with the LAN. Cat 5e/6 data point for each biometric reader forms part of data scope of work.

31. CCTV

The CCTV should be fully functional with a 400 frames per second real display and 400 frames per second storage. The Equipment in the bill of quantities is the minimum requirements. Add the cost of the equipment and items needed to provide functional system.

32. INTERCOM

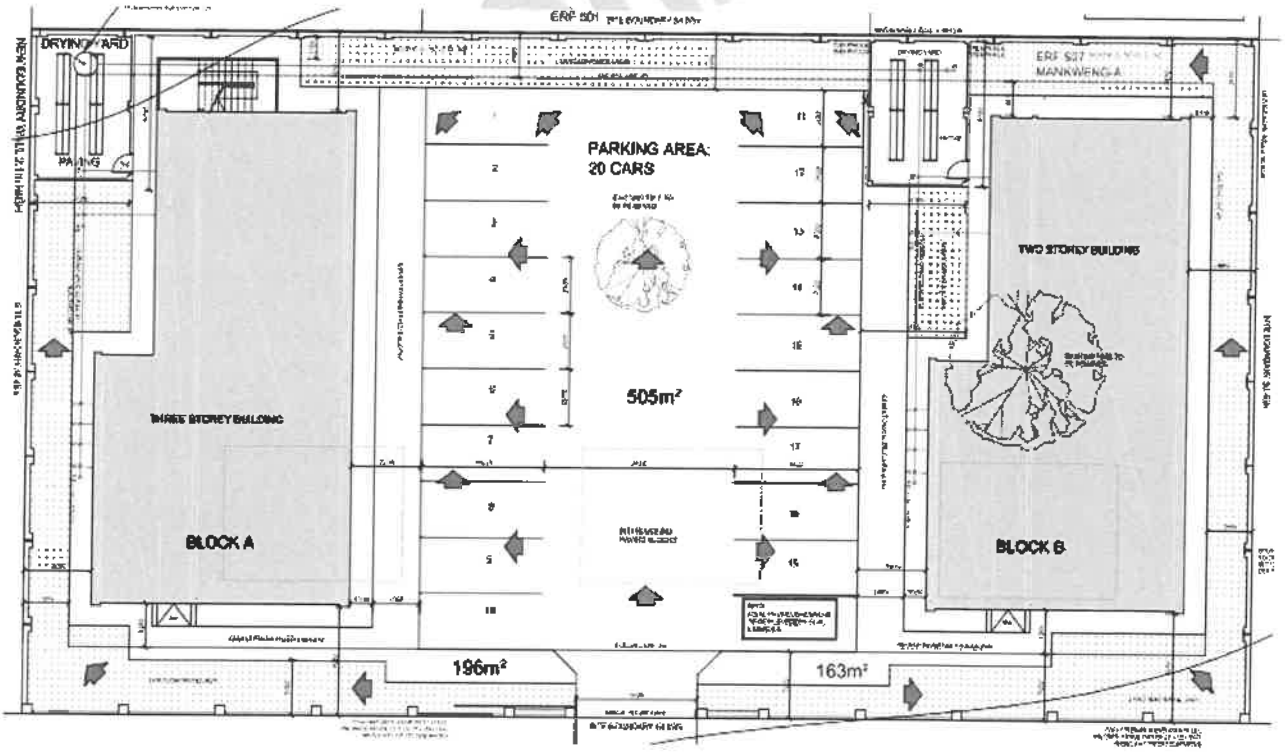
The intercom system is to be installed in the guard room from where the different stations at the cells can communicate to. The guard can then open the certain doors through the access control system to allow the flow of wardens and prisoners in and out of the building.

CLIENT
Coherent Health & Safety Specifications

public works & infrastructure

Department:
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

CONSTRUCTION:
SAPS Mankweng



CONTROL SHEET:

Declaration

This original document has been prepared, reviewed by the undersigned:

Prepared by: Riscon Consultants
Name: J. Heyneke
Date: 20 Feb 2024

Received by:

NAME AND SURNAME	DESIGNATION	DATE	SIGNATURE
Johan Heyneke	CLIENTS OHS AGENT	20 Feb 2024	
	DESIGNER		
	CLIENT		
	PRINCIPAL CONTRACTOR		

This control sheet must be signed and mailed back to riscon09@gmail.com**. Each page shall be signed at the bottom right corner of each page.**

Foreword

These Coherent Health & Safety specifications for SAPS Mankweng has been compiled by using the Occupational Health & Safety Act. no 85 of 1993 and the Construction regulations as amended on 7 Feb 2014. This document has been drawn up to assist the Principal contractor and the contractors to comply with the Act and the applicable regulations.

Should there be any contradiction between this document and the Act, the Act must take preference except where explicitly stated. Similarly, where this document does not address a certain topic / task the act and applicable regulations must be used as the minimum requirement.

Should you be unclear about anything set out in this document, please contact this office.
These specifications are site specific and include all works to be done by the principal contractor. The principal contractor will be responsible for all the work on site.

Every endeavour has been made to address the most critical aspects relating to Health and Safety issues in order to assist contractors in adequately providing for Health and Safety of employees on site. However, the Principal Contractor is required to ensure they stay compliant with statutory requirements and construction programs and processes and include such aspects in their Health and Safety file.

These health and safety specifications was prepared by J.Heyneke registered at the South African Council for the Project and Construction Management Professions (SACPCMP) as an Candidate Construction Health and Safety Agent (CanCHSA/204/2022)

Communication channel

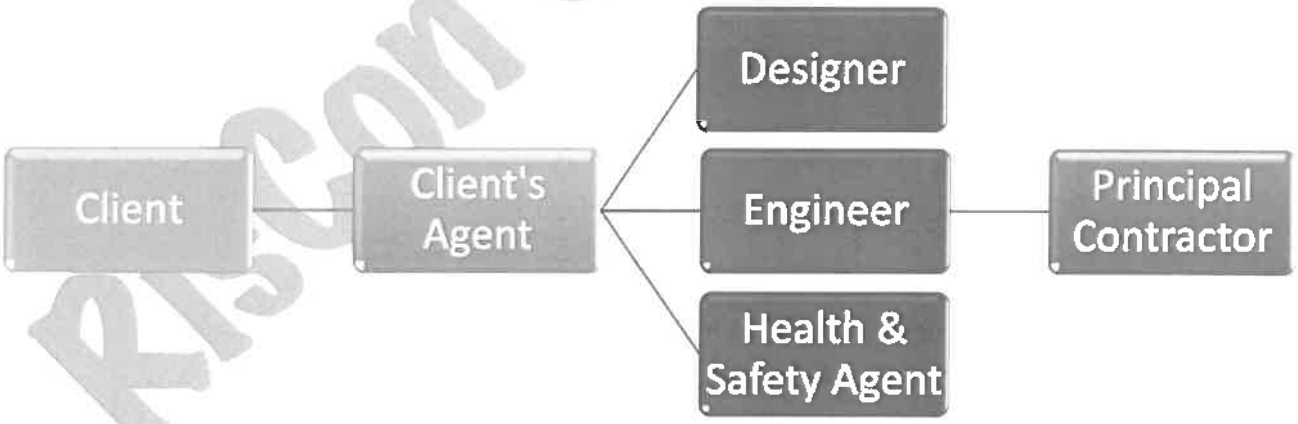


Table of Contents

1. Introduction

1. Background to the coherent health & safety specifications

The Construction regulations (7 Feb 2014) places the Onus on the CLIENT to prepare coherent health & safety specification, highlighting risks not successfully eliminated during design. The client (Naam) also has the opportunity to set the tone and standard of occupational health & safety on the construction site.

2. Responsibility & Accountability

It is imperative to understand the process of determining legal accountability, as the OHS Act is the only criminal Act still administered by the Department of Labour. It *assumes* that the CEO is overall accountable even though he may delegate some of his responsibilities. This principle is entrenched in Section 37(1) of the Act. This is generally referred to as the REASONABLE MAN TEST.
SECTION 37: Acts or omissions by employees or Mandatories

3. Purpose of the Health and Safety Specifications

The purpose of this specification document is to provide the relevant Principal Contractor) and contractor with any information other than the standard conditions about construction sites that might affect the health and safety of persons at work and of persons in connection with the use of plant and machinery during Construction work.

4. Implementation of the Health and Safety Specifications

To brief the Principal and Contractor on the project's significant health and safety requirements and aspects. This shall include the provision of the following information and requirements, namely:

a) safety considerations affecting the site of the project and its environment.
b) health and safety aspects of the associated structures and equipment.
c) required submissions on health and safety matters from the Principal Contractor (and Sub Contractor).
d) the Principal Contractor's (Sub - Contractors) health and safety plan.

To serve to ensure that the Principal Contractor (Contractors) is fully aware of what is expected from them with regards to the Occupational Health and Safety Act, 85 of 1993 and the Regulations made there-under including the applicable safety standards, and in terms of Section 8 and 44 of the Act.

To inform the Principal Contractor that the Occupational Health and Safety Act, 85 of 1993 in its entirety shall apply to the contract to which this specification document applies. The Construction Regulations promulgated on 7 February 2014 and incorporated into the above Act by Government Notice R 84, published in Government Gazette 37305, shall specifically apply to all persons involved in the construction work about this project.

"Purpose of the Act" –To provide for the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected in addition to that.
"Agent" –means a competent person who acts as a representative for a client.
"Client" –means any person for whom construction work is performed.
"Construction manager" means a competent person responsible for the management of the physical construction processes and the coordination, administration, and management of resources on a construction site.
"Construction site" means a workplace where construction work is being performed.
"Construction supervisor" means a competent person responsible for supervising construction activities on a construction site.
"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 6
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.

"Contractor" means an employer who performs construction work.

"Designer" means-

a) A competent person who-
Prepares a design;
Checks and approves a design;
Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
Designs temporary work, including its components;
b) An architect or engineer contributing to, or having overall responsibility for a design;
c) A building services engineer designing details for a fixed plant;
d) A surveyor specifying articles or drawing up specifications;
e) A contractor carrying out design work as part of a design and building project; or an interior designer, shop-fitter, or landscape architect;

"Health and Safety File" –means a file, or other record containing the information by the Construction Regulations;
"Health and Safety Plan" –means a site, activity, or project-specific documented plan in accordance with Mercurius Motor's health and safety specification;
"Health and Safety Specification" –means a site, activity, or project-specific document prepared by the Department of Public works & infrastructure pertaining to all health and safety requirements related to construction work;
"Method Statement" –means a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;
"Principal contractor" means an employer appointed by the Department of Public works & infrastructure to perform construction work;
"Risk Assessment" –means a program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard.

5. Abbreviations

GMR:	General Machinery Regulations
OHS Act:	Occupational Health & Safety Act. Act 85 of 1993
Constr Reg:	Construction Regulation 2014
ORHVS:	Operating Regulations for High Voltage Systems
PPE:	Personal Protective Equipment
GAR:	General Administrative regulations
DMA:	Disaster Management Act
QS:	Quantity Surveyor
GSR:	General Safety regulations
EXP Reg:	Explosive Regulation
ERW:	Environmental regulations for workplaces
FR:	Facilities Regulations
HCS:	Hazardous Chemical Substance Regulations
NIHLR:	Noise Induced Hearing Loss Regulation
DMR:	Driven Machinery Regulation
EIR:	Electrical Installations Regulation
EMR:	Electrical Machinery Regulation

RN:	Road Note 13
NT:	National Road Traffic Act
AR:	Asbestos Regulation
NEMA:	National Environmental Management Act
SANS:	South Africa National Standards
MSDS:	Material Safety Data Sheets

2. Occupational Health & safety management

1. Roles

Client/ Agent

a) Prepare a baseline risk assessment and issue a health and safety specification to the Principal Contractor, Designer and include the specification in tender documentation.
b) Department of Public works & infrastructure or the appointed Client Agent will appoint each Principal Contractor for this project or phase/section of the project in writing for assuming the role of Principal Contractor as intended by the Construction Regulations.
c) Department of Public works & infrastructure or the appointed Client Agent shall discuss, negotiate, and approve the contents of the specified project health and safety plan submitted by the Principal and Sub Contractor.
d) Department of Public works & infrastructure or his Agent will take reasonable steps to ensure that the health and safety plan of the Principle and Sub Contractor is correctly implemented and maintained. Monthly audits shall be conducted to monitor the compliance.
e) In the event of design changes Department of Public works & infrastructure or the appointed Agent on his behalf will ensure that enough resources will be provided to implement the work safely.
f) Department of Public works & infrastructure or his appointed Agent on his behalf, will prevent the Principal Contractor and/or the Contractor from commencing or continuing with construction work should the Principal Contractor and/or the Contractor at any stage in the execution of the works be found to:
have failed to have complied with any of the administrative measures required by the Construction Regulations in preparation for the construction project or any physical preparations necessary in terms of the Act;
have failed to implement or maintain their health and safety plan;
have executed construction work which is not in accordance with their health and safety plan;
have acted in any way which may pose a threat to the health and safety of any person(s) present on the site of the works or in its vicinity, irrespective of him/them being employed or legitimately on the site of the works or in its vicinity.

Designer

- Must take into account the health and safety specifications of Department of Public works & infrastructure .
- Before the tender process, the designer must make available a report to Department of Public works & infrastructure about :
    - All the relevant health and safety information about the design of the relevant structure that might affect the pricing of the construction work.
    - The geotechnical –science aspects, where appropriate.
    - The loading that the structure is design to withstand.
- Inform Department of Public works & infrastructure in writing of any known or anticipated dangers or hazards related to the project.

- Make available all relevant information required for the safe execution of the work upon being designed or when the design is subsequently altered.
- During the design take into account the hazards relating to any subsequent maintenance to be performed with the minimum risk.
- During the design stage cognizance of ergonomic design, principles must be applied in order to minimize ergonomic-related hazards in all phases of the life cycle of a structure.

Quantity surveyor

The Quantity surveyor shall ensure that the contractor has made sufficient provision for all health & safety costs. The quantity surveyor shall ensure that the contractor had in a bill of quantities for health & safety. The QS takes full responsibility if the contractor does not have a sufficient budget to cater to all Health & safety needs.

Construction Health & Safety Officer Duties

A *full-time* construction health and safety Officer (in terms of Construction Regulation 8) will be required for this project. **The Construction Health and Safety Officer must be registered with SACPCMP on at least a Construction Health and Safety Officer level and proof of the appointee letter of good standing is compulsory before any work can commence. The safety officer need to be fully registered and not a Candidate safety officer. Can.CHSO will not be accepted.**

The construction safety officer will be required to carry out at least the following duties:

Before commencement and during the construction phase of the project you shall:

- Assist with the preparation of a construction health and safety plan
- Confirm necessary documentation was submitted to the relevant authorities
- Attend project planning meetings
- Assist with the assessments and approval of subcontractor(s) health and safety plans
- Attend the site handover
- Attend regular site, technical and progress meetings
- Facilitate health and safety site meetings
- Participate in the Identification of the hazards and risks relevant to the construction project through regular coordinated site inspections
- Establish and maintain health and safety communication structures and systems, distribution of health and safety-specific documents to sub-contractors
- Compiling project-specific emergency response and preparedness plans
- Testing the effectiveness of the emergency response plans
- Conduct site safety inductions
- Monitor, measure, and report on health and safety system performance by performing monthly health and safety audits
- Evaluate the levels of compliance of subcontractors to the project-specific health and safety plan and client specifications
- Oversee the reporting and investigation of project-related incidents
- Manage to report of non-compliance issues and take appropriate corrective and preventative action
- Oversee the maintenance of all records
- Incorporation of changes into a health and safety management system
- Review and update the health and safety plan

At the close out of the project, you shall:

- Review, discuss and approve the health and safety file with the contractor(s) and manage site health and safety during the defects liability period
- Prepare the consolidated project health and safety file for the client
- After the project the Principal Contractor will hand over the file Riscon to cancel certain documents. The fille will then be scanned in by the Principal Contractor according to annexure I that is attached and will be handed over to the client on a USB

In addition to the above, it is also your duty to:

- Enforce such measure as may be necessary in the interest of health and safety;
- That all employees are informed regarding the scope of their authority as contemplated in Section 37.1.b of the Act;
- That all necessary measures are taken to ensure that the requirements of the Act and its regulations are complied with by every person employed at Principal Contractor
- Ensure that the required training and knowledge is provided regarding the terms of the Act and regulations.
- Provide all employees and contractors with access to the Occupational Health and Safety Act as well as the organization's SHEQ program documentation and information as is necessary and where required.
- You are charged with reporting on the following issues, trends and other relevant information to myself:
- Deviations and areas of non-compliance (which you cannot rectify) – Immediately.
- Submitting a monthly report

The monthly report shall consist of the following information and shall be submitted in the approved format of trends, graphs, completion and databases:

- Site Inspections.
- Internal Inspections/Audits.
- Planned Task Observations.
- Task Analysis.
- Continuous Risk Assessments.
- Performance Measurement of Employees.
- Incidents (Near misses, Accidents, Illnesses, First Aid Treatments)
- Investigations
- Tool box talks
- Medicals (New employees, Scheduled medicals)
- Competency information (Drivers, First Aiders, Fire Fighters, HS Representatives etc)

Construction Manager Duties

In terms of this appointment, you are personally accountable and responsible for the overall management of the site. If the project is a construction work permit project, the Construction manager shall be registered with SACPCMP as a PR.CM category or must have a valid SAQA recognized formal qualification on NQF level 7.In addition thereto, you are also responsible for ensuring compliance with the requirements in terms of Health and Safety on these sites.To this end, you are to ensure that the following documented procedures are adhered to at all times:

- The Health& Safety Specification for the project,
- The Approved Health & safety Plan for the project issued by our company,
- The Approved Health & safety Plan of each contractor appointed for the project.

You are required to appoint Assistant Construction Managers to assist you in performing your duties, but under no circumstances may you manage any other projects other than the one to which this appointment refers.

You are required to appoint Construction Supervisors for various sections of the Site to assist in the implementation and enforcement of the health & safety procedures detailed in the Health & Safety Plans.

You are required to report to me on the following issues every month:

Examples:

- Health and Safety Representative Inspections.
- Internal Inspections/Audits.
- Planned Task Observations.
- Task Analysis.
- Continuous Risk Assessments.
- Performance Measurement of Employees.
- Incidents (Near misses, Accidents, Illnesses, First Aid Treatments)
- Investigations
- Medicals (New employees, Scheduled medicals)
- Competency information (Operators, Drivers, First Aiders, Fire Fighters, HS Representatives etc.)

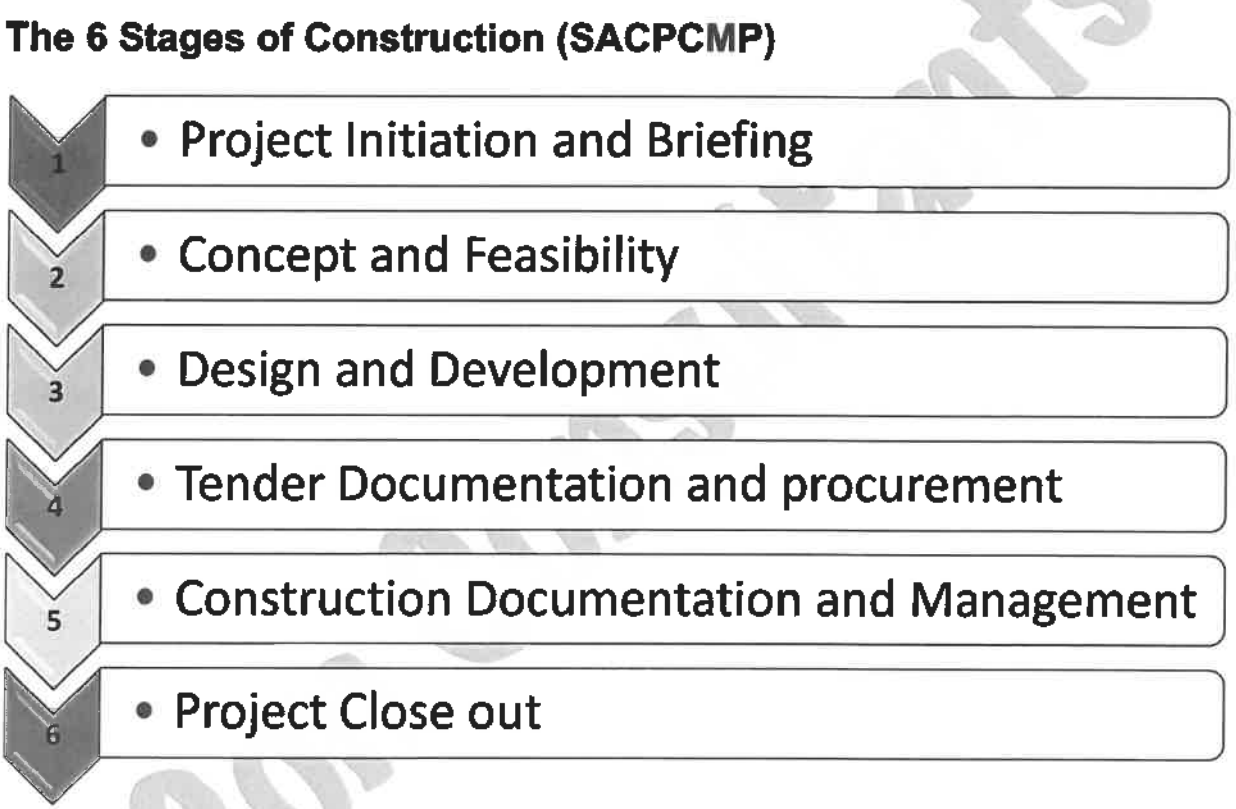
2. Implementation of the Health and Safety Specifications (Drafting of the coherent Health & Safety Plan)

These health & safety specifications document forms an integral part of the contract, and the Principal Contractor is expected to use it when compiling its project-specific coherent health & safety plan. The Principal Contractor must forward a copy of these specifications to all Contractors at their bidding stage so that they can in turn prepare coherent health & safety plans relating to their operations. This Specification can be revised during the construction process as new risk and hazards arises or in the case of a scope change

3. Occupational Health & Safety Management

1. Scope of the project

These Specifications set out the requirements for eliminating or if this is not possible, for minimising as far as reasonably practicable, the risk of incidents and injuries occurring at Client. This document covers work to be undertaken of the project and sets out the rules and procedures for engagement on the project. The scope also addresses legal compliance, Client standards, hazard identification and risk assessment, risk control, and the promotion of a health and safety culture amongst those working on the project. The health & safety specifications also make provision for the protection of those persons other than employees



2. The extent of the works

The Project Comprises the construction of the following:

- The living quarters are basically complete and only minor finishing required.
- The police station: The cell block kitchen and generator room to be completed including a concrete slab over certain areas. Block B (bottom left on site plan) must still be re-built after demolition of original building, including concrete slabs over certain areas. See item on page 5 of report and drawing.
- The balance of the works are just completion of items – refer to outstanding work report attached.

3. Interpretations

Application

This specification is compiled with reference of South African legal requirements. and the client's specifications. The PC is reminded that if any additional guidelines are required, the construction manager has to contact the client or representative directly to prepare and issue updated guidelines. The definitions as listed in the Occupational Health & Safety Act 85/1993 and Construction Regulations (February 2014) apply throughout this document.

Definitions

The definitions as listed in the OHS Act 85/1993 and Construction Regulations (2014)

- - CHSA = Construction Health & Safety Agent
- - Contractor includes a Principal Contractor / Direct / Sub-contractors.
- - Contractor's Construction Manager as defined in the Construction Regulations 2014 [CR 8(1)] as the Construction Manager. This is not the Client's Project Construction Manager / site representative.
- - Directs – Any Contractor appointed directly by the construction Client.
- - Principal Agent = P/Agent = Client Representative.
- - Principal Contractor will include any Contractor appointed directly by the Client on the project.
- - Where the term Principal Contractors (plural) is used this refers to all Directs appointed on the project, which Directs are all Principal Contractors in their own right.

4. Minimum Administrative Requirements

Notification of construction

Notification of construction. (CR 4) PC will submit the notification to the Provincial Director of the Department of Labour in writing of the intent of construction work 7 days before commencing the work. A copy of this notification and proof that it was faxed to the department must be available in the file on-site. (CR 4 Feb 2014). Owing to the construction permit issued, it is not necessary to notify the Provincial Director of the Department of Labour of the construction. (CR 4 Feb 2014)

Principal Contractor (CR 5)

The client selected and direct appointed contractor's will work directly under supervision of the appointed Principal Contractor. The PC will issue the specification or applicable section thereof to the contractor. The client appointed **Principal Contractor** with the responsibility to carryout and supervise the required construction, own selected and client direct appointed contractor's. The client and designers issued the principal contractor (PC) with the following documents:

- CR 5 Appointment
- Mandatory agreement
- Project baseline risk assessment
- Project site specification
- Project design and drawings
- Demolition permit

The PC shall comply with the clients specification and appoint a fulltime qualified, registered SACPCMP safety officer for the project to support the project construction manager, managing project safety Further:

The safety officer/manager will be responsible to carryout general safety officers duties, specifically

- Audit contractors SHE plan and project file 7 days before the start of the contract.
- Record all appointed contractors audit scores on the register attached. **(Appendix A)**
- Forward the reports required by this specification to the project safety agent on the 25 the day of the monthly.
- To keep an updated project risk register (PC and contractor task risk assessments)
- The PC will ensure that project H&S file and all contractor files will consist of the following:
- Updated index or content register
- Client mandatory agreement and CR5 appointment
- A company project HS&E policy
- A company project HS&E plan which shall display be written using the Coherent health & safety specification a standard
- A detailed organogram that display all the appointments that will be made for the project that includes contractors that will be appointed.
- All appointments accompanied by the members ID, competencies and medicals
- The risk assessment methodology, method statements or procedures and risk assessments for all tasks and activities.
- Specific tasks required detailed operational plans or method statements, This will be supported by task and PPE assessments.
- The PC's incident and accident plan and methodology of reporting incidents with supported registers and documentation e.g. Incident report, Annexure 1, WCL2 and investigation proforma.
- Fall protection plan specific developed for the task and hazards, identified.
- Copies of registers and inspection sheets.
- MSDS'e for all hazardous chemicals on site

Before the PC appoints a contractor, the PC must ensure that the contractor is competent for the task, is in good standing with the compensation commissioner and has the resources to execute the task safely. Refer CR 7(1)(c). The PC to ensure that:

- The contractor is register and in good standing with the workman's compensation commissioner, if not, the PC must register the C, and pay the levies required. (COID Act 89)
- The PC will issue applicable sections of the project specification and sections of its own SHE plan as safety guidelines to each contractor to ensure work on-site is done according the required standard.
- The contractor appointed a qualified health & safety representative that will assist the supervisor in doing the applicable registers & checklists.
- The project PC will be responsible to approve the appointed contractor safety files
- The project PC will assess and audit the (sub) contractor file before allowing the contractor starting on the project.
- The project PC will do monthly audits on the (sub) contractors and send the audits on a monthly basis before 25th of each month
- The project PC safety officer will carry PTW (permit to work) to ensure the (sub) contractor conduct the task to meet the project standard.

The PC will keep an updated register with relevant data of all contractors appointed for the project. The register must contain the date of appointment, the status of the file audit, reference to legal documentation (mandatory agreement and appointment). This register must kept on-site for inspection. That the PC project file is developed, kept updated and available on-site for the duration of the project. That all employees registered to work on-site receive site safety induction, are medically fit and in procession of an updated medical fit certificate. Members scheduled to work at heights, medical certificates must Indicate that the member was tested and fit to conduct work at heights. That own- (PC's) and contractor files will be audited on a monthly basis and that Non-compliance reports are forwarded to the clients agent. Prove that the Non-compliances are eliminated must be available in the file. When practical completion of the contract is obtained and issued to the client, the PC/safety officer will:

- cancel all appointed contractors, agreements and appointment
- ensure that new agreements are signed with the maintenance team, that the maintenance team SHE plan and file is assessed and that the team is controlled by a competent supervisor.
- ensure that the project SHE file will be updated for handover to the client

Notice Board

The PC is required to erect a noticeboard on-site to display the following :

- The PC company's Health and Safety Policy signed
- List of the emergency numbers
- The emergency and evacuation plan (map/diagram)
- The PC will display a safety organogram (in the safety file) indicating the health and safety appointments for the project. The structure will also be available on the noticeboard.
- A copy of the construction permit /Notification of construction
- COVID 19 Policy
- Letter of good standing
- Public liability
- Site safety rules

COVID 19 - Risk Assessment

- Contractor need to review their existing Risk Assessment (existing vs additional controls for COVID-19). Clients Agent will provide revised Baseline R/A.
- Additional controls in R/A to cover e.g.: adequate supply of wash basins; cleaning materials; disinfecting work areas with hand sanitisers; access control; PPE requirements; meeting requirements; COVID-19 training; emergency planning; hygiene; meals; breaks etc.
- There should also be a separate Health Risk Assessment in place.
- The R/A should address specific HIGH RISK areas and describing the type of PPE to be worn, as required by task

General Record Keeping

The Principal Contractor and all Contractors must keep and maintain all the necessary Health and Safety records to demonstrate compliance with these Coherent Specifications, the OHS Act 85/1993, and the Construction Regulations (February 2014). The Principal Contractor must also ensure that all records of incidents/injuries, emergency procedures, training, planned maintenance inspections, monthly contractor audits, etc. are kept in the health & safety file(s) held in the site office. The Principal Contractor must ensure that every Contractor keeps its own health & safety file, maintains the file and makes it available on request (the file must include the Contractor's health & safety plan and all relevant records). Such 'Contractor safety files' must be audited by the Principal Contractor on a monthly basis with audit reports kept as proof.

Offences and penalties

Fines may be imposed on the Principal Contractor and Contractors for ongoing non-compliance with the provisions of the Client's Coherent Health & Safety Specifications, the Principal Contractor's Coherent Health & Safety Plan. Non- compliances identified during safety agent audits and visits will be categorized into one of three levels based on severity. These will be as follows:

- - Life threatening situation - an explanation in an audit report. This activity must be seized immediately and corrective measures taken.
- - Serious injury possible – a non-compliance will be issued with a time frame for compliance stipulated.
- - Minor or no injury may result – an improvement notice will be issued.

Safety Non-conformance penalty/fines description:

Category	Non- compliance	Penalty Amount
High Risk	Unsafe working at heights	R 10 000
	Contractor not complying with the OHS spec as issued & signed	R 10 000
	Safety officer not on site as required (mentioned in Spec)	R 10 000
	Contractor performing construction without a file approval letter from Riscon Consultants	R 10 000
	No fall arrest equipment being used	R 5 000
	Contractor preforming construction without a construction permit or construction notification stamped from department of employment and labour	R 10 000
	Working at night without any notification to Riscon	R 10 000
	No supervision available on site (according to appointments in file)	R 10 000
	Alcohol & Drug abuse	R 4 000
	Speeding on site (exceeding 40 km p/h)	R 4 000
	Working on heights without approved fall protection plan in place	R 4 000
	Unsafe scaffolding being used	R 5 000
	Working in Unsafe Excavations	R 4 000
Medium Risk	Workers not wearing Compulsory PPE for task preformed	R 2 500
	Contractor not reporting incident and accidents within 24 hours to Riscon Consultants	R 2 500
	Unsafe electrical work being preformed	R 2 500
	Medicals not in place	R 3 500
	No competent first aider & Fire fighter on site	R 3 500
	Operator of machinery operating without applicable competency	R 2 500
Low Risk	Applicable signage is not displayed	R 1 500
	Employees driving plant & Construction vehicles while talking on the cellphone	R 1 500
	Poor housekeeping	R 1 500
	Employees not making use of the ablution facilities available	R 1 500
	Making use of unsafe ladders	R 1 500
	Environmental Spillages	R 1 500
	Employees using unsafe electrical equipment	R 1 500

The client's safety agent has the right to impose fines as described above for non-compliances as set out in the categories. The non-compliance will be issued in to the contractor and the client. The Fines will be imposed with the idea that when a contractor receives a fine they should prove to the clients OHS agent and to the client in 7 working days how they spend that fine amount towards that specific non-compliance if possible otherwise towards any safety on site. In the case of repeated contraventions , the clients OHS agent shall recommended to stop the work to the client or the clients agent. These fines will be imposed by the Clients OHS agent with the 3rd Non-compliance

5. Principal Contractors, Contractors and Sub-Contractors

Principal Contractor's and Contractors' Requirements

The Principal Contractor must ensure that all Contractors appointed by them comply with these Specifications, the Principal coherent health & safety plan as well as the OHS Act, Construction Regulations (February 2014), and other relevant legislation that may relate to the activities directly or indirectly. A Contractor, when appointing other Contractors as 'Sub-contractors', shall mutatis mutandis ensure compliance as if it was the Principal Contractor.

The Principal Contractor may only allow a Contractor to begin work on site after receiving a coherent health & safety plan which must include a project specific hazard identification, risk assessments and safety measures. The Principal Contractor must test competency and finally approve his sub – contractor coherent site specific health and safety plan. The Principal Contractor must audit each of its contractors on a monthly basis, with audit reports kept in the health & safety file on site. The audit must include an administrative assessment as well as a physical inspection of the contractor's site activities. *The Principal Contractor must stop any Contractor from carrying out construction work that is not in accordance with the Principal Contractor's and/or Contractor's health & safety plan or if there is an immediate threat to the health and safety of persons.*

The Principal Contractor shall take all reasonable steps necessary to ensure co-operation between all contractors to enable each of those contractors to comply with the provisions of the Construction Regulations;

The Principal Contractor shall take all reasonable steps to ensure that each contractor's coherent health and safety plan is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed upon between the Principal Contractor and contractors, but at least once every month;

The Principal Contractor must ensure that where changes are brought about to the design and construction, that sufficient health and safety information and appropriate resources are made available to contractors so as to allow them to execute the work safely;

The Principal Contractor must ensure that every contractor is registered and in good standing with a recognised compensation fund or with a licensed compensation insurer prior to work commencing on site;

The Principal Contractor must ensure that potential contractors submitting tenders have made provision for the cost of health and safety measures during the construction process;

The Principal Contractor shall discuss and negotiate with the contractor the contents of the coherent health and safety plan and shall finally approve that plan for implementation;

The Principal Contractor shall hand over a consolidated health and safety file to Department of Public works & infrastructure upon completion of the construction work and shall include a record of all drawings, designs, materials used and other similar information concerning the completed structure;

The Principal Contractor may only appoint a contractor to perform construction work when such Principal Contractor is reasonably satisfied that the contractor he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely and that the contractor is an approved Client contractor.

The Principal contractor will ensure that with all the necessary safety equipment that will be required that one of the Items will be a wind meter that will be on site at all times.

The principal contractor must ensure that all employee shall have an induction sticker on their hard hat to show they have received induction with the date and site name, see example bellow:

The Principal contractor will ensure that every employee on site will have a valid ID copy available in the safety file.

After the project the Principal Contractor will hand over the file Riscon to cancel certain documents. The fille will then be scanned in by the Principal Contractor according to annexure I that is attached and will be handed over to the client on a USB

Principal Contractor / Contractor Competency Assessment

The Principal Contractor must be reasonably satisfied that the contractors it intends to appoint have the necessary competencies and resources to safely conduct the work they will be appointed for. This should be established at tender stage and before appointments are made. One of the preferred ways of determining whether a contractor is competent is to make sure the contractor is an accredited contractor for Client. Once the contractor is appointed, but before it begins work on site a site- specific safety plan must be discussed and negotiated with the Principal Contractor. Such safety plan must be approved for implementation by the Principal Contractor.

The Principal Contractor and Contractors should submit the following documentation for perusal and verification by Department of Public works & Infrastructure and Principal Contractor respectively:

- Coherent health & safety plan as compiled for this project; (including Risk assessments, safe work procedures, fall protection plan
- Management Structure as envisaged at tender (organogram);
- Letter of Good Standing with the Compensation Commissioner or FEM;
- Proof of health & safety training and other related training; (CV and certificates) Legislative appointment letters
- Medical certificates of employees that will be working on site on annexure 3 format stamped by occupation health practitioner.
- Notification of Construction work; (proof notification was done)

Pricing for Occupational Health & Safety Compliance

All parties bidding to do work on this construction project must ensure that they have made provision for the cost of complying with this Specifications document as well as with the OHS Act and incorporated Regulations as a minimum requirement in their tender documentation. It must also be taken into consideration that time is money, which implies that sufficient time must be allowed for the implementation of the minimum OHS standards. No additional claims will be entertained at a later stage should a compliance requirement be prescribed in the OHS Act, incorporated regulations or in this Specifications document due to design changes which would require additional resources. The professional quantity surveyors must develop a strategy in this regard to ensure that H&S costs have received sufficient consideration. Contractors must make use of Annexure 'H' herein below as a guide when pricing health & safety on this project. Health & safety costs must be clearly set out in the tender submission by each and every contractor. The contractors shall also make provision for COVID 19. This provision need to be approved by the client or clients agent. All items must be looked into depth to ensure every step and cost of the task is accounted for. Example temporary

works, Temp Designer, Temp supervisor, scaffolding hire, scaffold training, working at height training, fall protection plan developer & edge barricading needs to be covered in the cost for temporary works.

Contractors' Coherent Health & Safety Plans [Construction Regulations 7]

Introduction:

The Construction Regulations (2014) aims to improve overall management and co-ordination of Health, Safety and Welfare throughout the Construction Phase and reduce the large number of serious and fatal injuries and cases of ill health, which occur every year in the Construction Industry.

In terms of the Construction Regulations (2014), the Principal Contractor is required to develop a Health and Safety Plan before work commences on site and review it throughout the Construction Phase. The degree of detail required in the Health and Safety Plan and the time and effort in preparing it should be in proportion to the nature, size and level of Health and Safety risks involved in the project. Projects involving minimal risks will call for simple, straightforward plans. Large projects or those involving significant risks such as this project will need much more detail.

What should the construction health & safety plan cover?

The Construction Health and Safety Plan should set out the arrangements for ensuring the Health and Safety of everyone carrying out the construction work as well as all other persons who may be affected by it. The index of this plan must be in line with Annexure A

Communication and Management of the work

The Principal Contractor must indicate in its health and safety management plan that it has made provision for the following:

- Management structure and responsibilities
- Health and Safety goals for the project and arrangements for monitoring and review of Health and Safety performance i.e. safety meetings; contractor meetings; risk assessment review, etc.
- Site specific rules and procedures.
- Arrangement for:

  i. Regular liaison between parties on site i.e. meetings
  ii. Consultation with the work force i.e. toolbox talks
  iii. The exchange of design information between Department of Public works & infrastructure , designers, and Contractors on site
  iv. Selection and control of Contractors i.e. selection criteria; inspections; audits, etc.
  v. Site health & safety Induction and onsite training i.e. toolbox talks
  vi. Welfare facilities, first aid, emergency planning and fire prevention strategy
  vii. The reporting and investigation of injuries and incidents including near misses what the intended system will be
  viii. The production, approval and review of risk assessments, safe work procedures and method statements and how does the company's risk assessment system work.

6. Client identified hazards and potentially hazardous situations

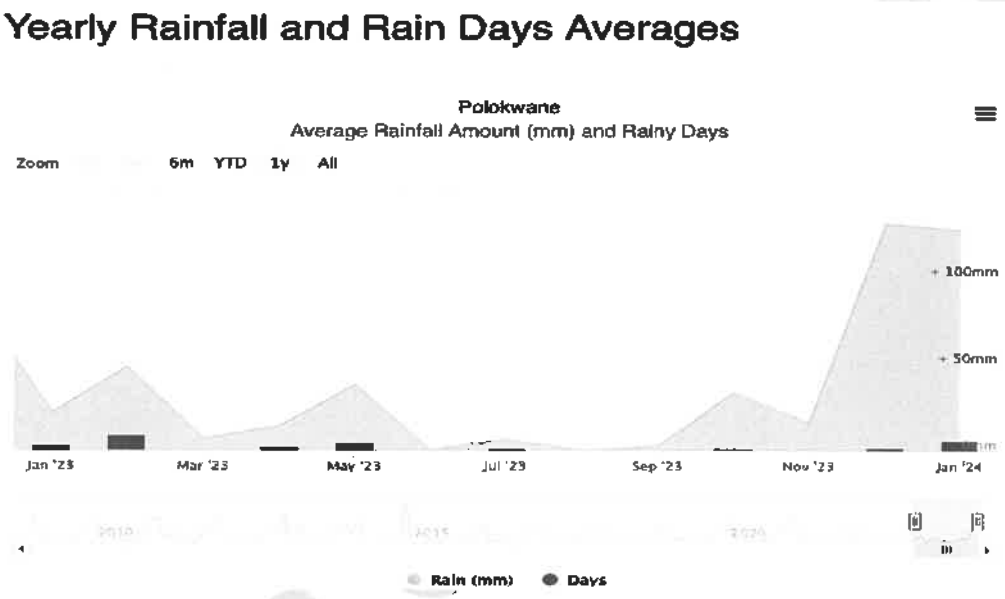
OHS Agent risks identified

- Existing services
- Interface with the public
- Hazardous chemical such as solvents, cleaning agents, cement, fuels, oils, epoxies, etc.
- Site security and access control issues
- Relocation and protection of existing services
- Finishing trades

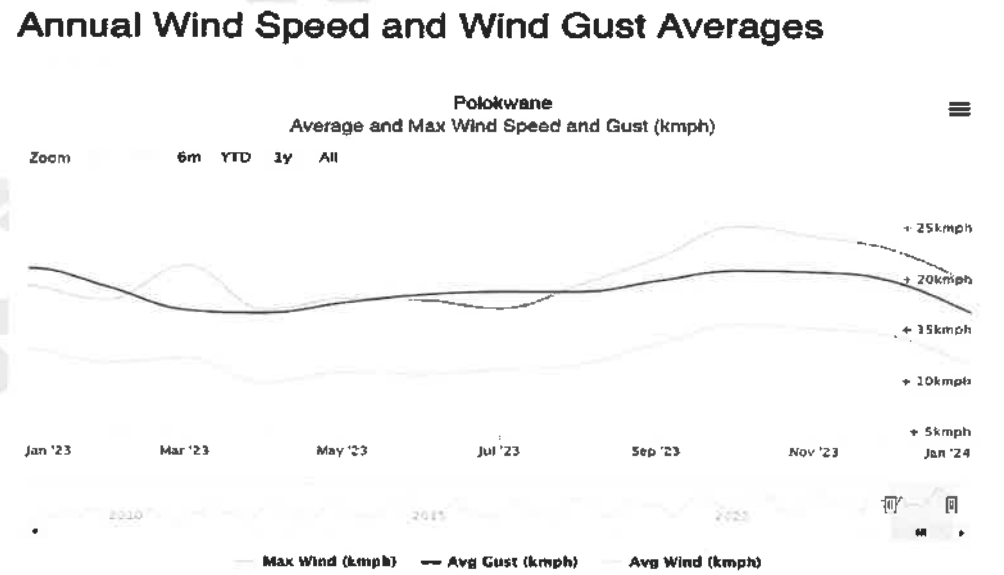
Local weather

The bellow graph shows the rainfall & wind for the last year. This gives the contractor an indication of a possible delay in time as well as hazards that could come into play

Rainfall



Wind



Unforeseeable Hazards

The Principal Contractor must immediately notify Contractors as well as Department of Public works & infrastructure , in writing, of any hazardous or potentially hazardous situations that may arise during the performance of construction activities so that the necessary precautions may be taken before such work begins.

7. Site operational Requirements

1. Health and Safety Representative

The Principal Contractor and all Contractors must ensure that Health and Safety Representative(s) are appointed under consultation with the employees. The H&S representatives must be competent to carry out their functions. The appointments must be in writing. The Health and Safety Representatives should carry out monthly inspections, keep records of the inspections and report all findings to the Responsible Person or safety officer forthwith and at monthly health & safety committee meetings. At least one Health & safety representatives is required by all Employers on site.

The Principal contractor must ensure for every 1 – 20 employees at least one Health and safety representative is appointed. Every specific section must have a health and safety representative for example wet works, roof work, ceilings, electrical etc. The solution will be that every contractor appointed will have their own health and safety representative that has knowledge in that specific section.

2. Health and safety committees

The Principal Contractor must ensure that project health and safety committee meetings are held monthly with minutes kept. Meetings must be chaired by the Principal Contractor's Responsible Person [CR 7(1) person]. All Contractors' Responsible Persons and Health & Safety Representatives must attend the Principal Contractor's monthly health & safety meetings. The Principal Contractor's appointed supervisors must also attend health & safety meetings. The following topics must be tabled at meetings: management appointments and risk management portfolios; sub-contractor legal compliance issues; injuries and incidents; hazards and risk assessments (present and foreseen); safety procedures; method statements for upcoming activities; planned inspections and registers/record keeping, etc. The committee chairperson must sign off and date the minutes.

3. Health and safety training

Induction

The principal contractor will ensure that all the employees, contractors, professional team members and visitors received site specific safety induction. Record of attendance will be kept in the health and safety file. (OHS Act sec 13). A record of attendance must be kept in the health & safety file. Workers must carry proof of inductions on their person while on site. Employees shall have induction stickers as displayed above in the spec that will be issued by the safety officer on site.

Awareness

The Principal Contractor will ensure that on-site toolbox talks/safety talks are scheduled for once a week. These talks will conducted by a senior member or the safety officer of the company and focusses on topics relevant the task, the hazards of the activities identified for the weeks programme. A documented record of attendance will be kept in the health and safety file. The toolbox talks will not replace any certified training or a DSTI. All contractors' employees must attend

safety awareness toolbox talks carried out by their supervisors, the attendance registers must be copied to the Principal Contractor together with information on the information discussed at the session.

Competence

Competency training is the training conducted where the course is developed to a SAQA standard or tertiary education/qualification. All competent persons must have the knowledge, experience, training, and qualifications specific to the work they have been appointed to supervise, control and/or carry out. This must be assessed on a regular basis e.g. training, evaluation, and periodic audits by Department of Public works & infrastructure , progress meetings, etc. The Principal Contractor is responsible to ensure that Competent Contractors are appointed to carry out construction work on site. If the unforeseen training has arisen then the matter can be resolved with the clients OHS agent appointed for the project. Act "General duties of employers to their employees". Sub- paragraph (e) of sub-section 2 requires inter alia the training of the employee to ensure as far as is reasonably practicable the health and safety at work of the employee. This means that internal training will be discussed in certain events but will also be approved in writing by the clients OHS agent before internal training can commence.

4. **Health & safety audits, monitoring and reporting.**

The Clients OHS Agent shall conduct at least one legal audit a month. This audit will be to audit the systems and processes put in place by the principal contractor. The Clients OHS Agent will also conduct at least once a site visit to inspect the physical aspects. The audit will be send to the client within 48 hours from the time of the audit. Note that this audit will happen at any time during working hours and that the OHS agent does not need to make and arrangement to conduct the audit. The principal contractor shall do an audit close-out within 3 days from receiving the audit.

The Principal contractor will be required to do a monthly audit on all contractors and send the audits to the OHS agent before the 25th of each month.

5. **Emergency procedures**

The procedure must detail the response procedures including the following key elements:

- List of key competent personnel
- Details of emergency services
- Actions or steps to be taken in the event of the specific types of emergencies
- Evacuation procedures: including routes and exits to be available on a drawing.
- Emergency procedure(s) must include, but shall not be limited to: fire; spills; injury to employees; damage to material / equipment / plant; use of hazardous substances; bomb threats; major incidents/injuries; evacuation; etc.
- The Principal Contractor must advise Department of Public works & infrastructure in writing forthwith, of any emergency situations, together with a record of action taken/action to be taken.
- A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and made available to site personnel.
- The emergency plan will need to be reviewed from time to time as conditions/environment changes i.e. as building work increases in extent.
- A emergency map layout that clearly shows where is the emergency assembly points is with all the fire fighting equipment
- Emergency plan shall include community unrest and what to do during this hazard

An emergency drill shall be done in the first quarter of the construction phase. The principal contractor shall have footages available as well as attendance register to have proof of the drill.

6. **Medicals certificate of fitness**

The Construction regulation 7.8 requires that all employees on site shall have a valid medical certificate of fitness. The medical shall be done by a registered occupational health & safety medical practitioner. The construction regulation of 2014 requires that every medical certificate shall be recorded on an annexure 3 format to ensure that the medical is done for the task specific. The nurse that does the testing bust be an occupational health nurse or must be busy with the course. The Dr or the institution must issue each worker with a medical fitness certificate that identifies how long the medical is valid for. Construction regulations definitions with comments explains the following: Medical fitness certificate : (b) Regulations 7(1)(g); 7(8); 17(12)(a); 10(2)(b); 22(1)(f) and 23 (1)(d)(ii) – A risk based approach should be applied when considering the method and frequency of periodic medical surveillance.

7. **First aid boxes and first aid equipment**

The Principal Contractor and all Contractors must appoint First Aider(s) in writing.. The Principal Contractor must appoint at least one First Aider to start with, which first aider must be certificated. Copies of valid certificates are to be kept on site. The Principal Contractor must provide at least 1 (one) first aid box, adequately stocked at all times. Due to the nature of this project i.e. satellite work stations/areas, further first aid boxes must be provided close to the various work stations to allow for quick, effective treatment of injured persons. As the work progresses and the structure increases in height, extra first aid.

8. **Personal protective equipment (PPE) and Clothing (PPC)**

The Contractor must ensure that all site workers are issued with and wear the appropriate PPE as indicated in their risk assessments. The Contractors must make provision and keep adequate quantities of SANS approved PPE on site at all times according to their risk assessments. Safety harnesses are mandatory wherever work takes place in an elevated area where safe working platforms or ladders are not possible. Overalls clearly indicating the Contractor's logo must be worn and all sub-contractors must conform to this requirement. Eye protection must be worn by those working grinders, skill saws, and high pressure water cleaners. Even those workers in close proximity to these operations will also be required to wear such eye protection. The COVID 19 regulations requires that the principal contractor shall issue each employee with at least 2 overalls. Each employees shall receive 2 cloth masks free of charge. Employees must wash the cloth mask after each day of work and use the clean one the next day. No bump caps will be allowed on site. According to DEL directive 3 no General Fabric Masks with breathing valves and Fabric Neck Buffs will be allowed on site. The principal contractor shall have visitors PPE available at the site office should site visitors not have the compulsory PPE to access the site. No bump cap shall be allowed on site.

9. **Occupational Health and Safety signages**

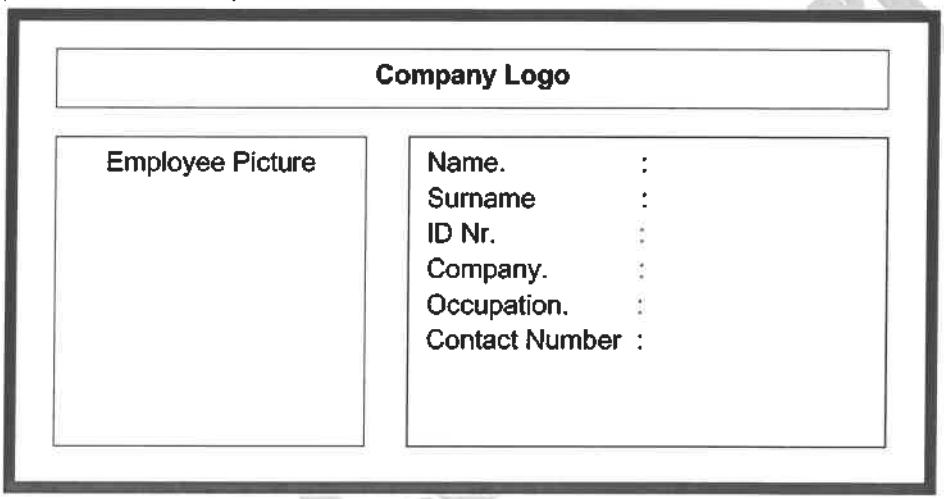
The Principal Contractor must provide adequate on-site OHS signage.
Including but not limited to: 'construction work - no unauthorised entry', 'beware of overhead work', 'hard hat area', first aid – to be posted up at all work areas/zones.

Signage must also be posted up at strategic locations to warn the public of diversions, alternative through ways and other irregularities caused by construction work (pedestrians and motorists)Signs are also required as per law e.g. scaffolding and other potential risk areas/operations such as exposed edges and openings and trenches / excavations where persons are at work. Safety signs and awareness posters will also be required in strategic locations on site such as frequently used access routes, stairways and entrances to structures and buildings where the workers will continuously be made aware of health & safety. Health & safety signage must be well maintained including weekly inspections, cleaning, replacement and repair. COVID 19 awareness posters shall be posted all over site by the principal contractor to ensure that the employees stay aware and stay safe.

10. Site hording & Access control

All construction work must be fenced off with controlled access points provided (this means locked access gates and access control personnel to be located at entrances to the construction work areas), preventing access to unauthorised persons. Where fencing is necessary, such fencing must be at least 1.8m high, erected and adequately secured from displacement. It is further required that the fencing is fitted with shade cloth to assist with dust containment.

Contractor access to the construction work areas will be limited to the specified access routes as agreed with the Client and must be strictly enforced by the Principal Contractor. Contractor employees will be required to carry ID tags and hard hat stickers (must display name of person, company name, ID number, and photo) indicating their authority to enter the construction zone. Such access tags/stickers must also serve as proof of H&S induction attendance – no tag/sticker, no entry. All visitor shall report to site office first for site visitors induction.



All access points to site must carry the necessary signage and site manager's (and safety officer) contact numbers.

COVID 19 procedure need to be followed with each person entering the site: Scan, Sanitize, Access control personnel complete sign in register, Access control personnel complete COVID 19 medical questionnaire. NO MASK NO ENTERY

11. Night Work (After Hours)

No night work will be allowed within the hazardous zone on this project without prior approval from Client / Client's Agent and the Construction Health and Safety Agent. If the Night work has been approved by the client and the client's agent additional documents will need to be in place for example: Employees medicals on annexure 3 must specify that they are fit for night work, sufficient illumination etc. Principal contractor must ask permission 5 working days in advance when they are planning to working at night. Principal contractor & Contractor will only be allowed to commence with night work once the documents has been approved by the clients OHS agent.

12. Transport of workers

The principal contractor will shall not be allowed to transport any workers with tools or material in the same compartment. Separated compartment for tools must be available to prevent that no tools & material fall on employees in case of an accident. No employee will be allowed to be transported if he/she is not seated in a proper seat with a seatbelt approved & tested by the road department.

Persons together with goods or tools unless there is an appropriate area or section to store the tools or equipment; Contractors must adhere to the National Road Traffic Act.

13. Wind

All roof work and Crane work & working at heights will be reconsidered when wind becomes a factor. The principal contractor will ensure that at all times there will be a wind meter on site.

- No roof sheeting will take place if the wind is above 20 KM per/hour.
- No crane work will take place if the wind is above 30 KM per/hour on at the area where the material, load must be placed with the crane

If Crane work is being done on site a wind meter shall be available on site at all times. If wind becomes a concern then the Safety officer or construction manager shall take the meter readings on an hourly basis to ensure that the tasks is being performed in safe conditions. See attached **annexure G** for record keeping purposes.

14. Drones

Riscon Consultants will make use of a drone to take progress pictures as well as to assist with hard to reach areas during construction

All employees on site must be aware that the operator of the drone will fly with caution and stay a safe distance away from any employee

If the construction site is within a restricted flight zone the operator of the employee will make use of the self-unlocking fly zone on the DJI website in order for him/her to have permission to fly in that specific area.

15. Fatigue management

The first step in risk management process is to identify all reasonably foreseeable factors which could contribute to and increase the risk of fatigue. The principal contractor shall have a site specific fatigue management plan available on file. Fatigue is often caused by a number of inter-related factors which can be cumulative. Common factors that may contribute to fatigue are:

- Work schedules which limit the time workers can physically and mentally recover from work
- This may include workers who undertake shift work, night work, work extended hours or are not able to take regular breaks
- Sleep, including the length of sleep time, the quality of sleep and the time since sleep
- Environmental conditions, such as exposure to heat, cold, vibration or noise, can make workers tire quicker and may impair performance
- No-work related factors, such as a worker's lifestyle, family responsibilities or health may all increase the risk of fatigue

Methods that managers may utilize to identify whether there are any of the above risk factors affecting the workers include:

- Consulting with workers
- Examining work practices and systems of work
- Incident data and the findings of incident investigations
- Seeking advice and information from the Team or other relevant experts

16. Illumination

Illumination on a construction is critical. The principal contractor shall ensure that the employees have a safe workplace to work to with sufficient illumination. No employee will be allowed to work in a part of a building if sufficient lighting is not available. Poor lighting is not just only a hazard but the quality of work can also be influenced.

The contractor shall at all times comply with the environmental regulation for workplaces. The regulation states exactly what the sufficient lux is for the specific workplace.

8. Physical Requirements

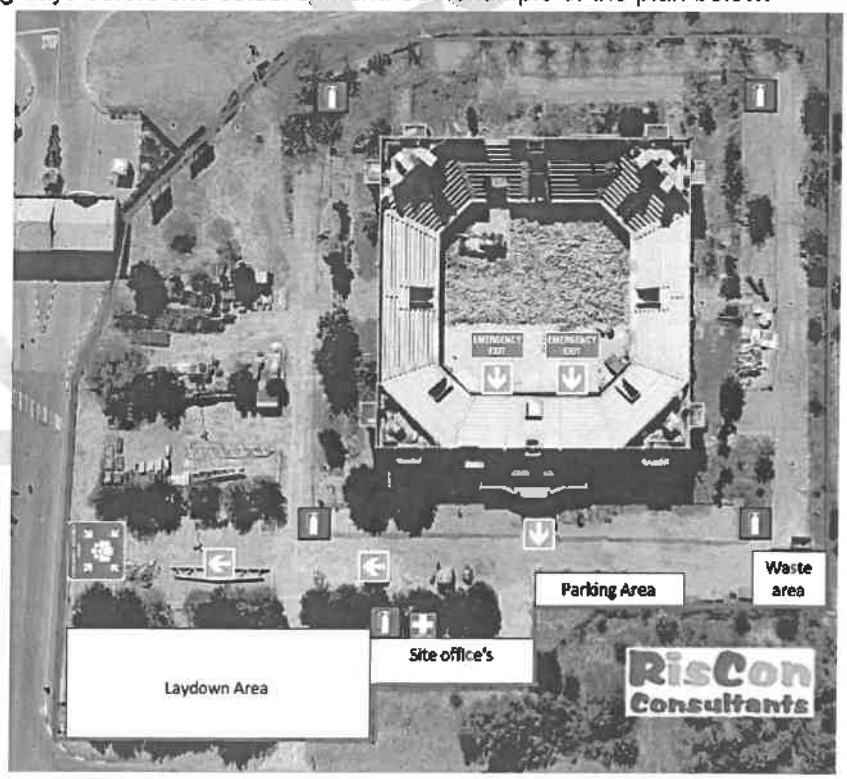
1. Site establishment

Access control to the site, including notices of "construction-site " or "be aware of constructions activities" and "visitors to report to the site office" to be installed. COVID-19 access to be implemented, no screening, recording - no access
Identify a safe laydown area and layout of the contractor's containers/sheds to ensure the safety of tools, material and equipment. Display of evacuation signage to point out the route to the assembly.
Effective barricading of engulfment areas, and installation of the appropriate signage.
Also ensure that laydown areas:

- Are equipped with correct serviceable fire extinguishers and signage.
- The safety and safe keeping of contractor's equipment, tools and materials remain the responsibility of the contractor.
- The PC and contractors to apply sound and good housekeeping principles for the duration of the project.

Physical site security, security lighting and guards to be considered and applied or implemented.

Laydown plan need to be submitted to the clients agent and to the clients OHS agent for approval 5 working days before site establishment. See example of the plan below:



2. Principal Contractor Construction board

The Principal contractor shall place a construction notice board at the site access road. If the site is not camped off then the board will be placed at the site office or the most used road on the construction site. The contractor shall display the major hazards on the board as well as the construction manager, construction supervisor and the safety officer cell numbers. This will assist the public that if an emergency happens that they will be able to make contact with site management. The construction board shall be at 1,2m by 1,2 m on cromadec or ABS sheet. Below is an example of a contractor board that is explained above:

3. Existing structures CR 11

The PC will ensure that the provisions of the regulation CR 11:2014 are met and record is kept of inspections carried out by a competent person of the integrity of the structure and the following: The drawings pertaining to the design of the structure are kept on-site and are available on request of an inspector, client or representative and employees. That project drawing issued comply with the requirements as displayed in SANS 10400 Part A e.g. displaying the required signage, notes, dated and signed by the draftsman and responsible person and stamped "issued for construction. That the structure is inspected and any signs of damaged reported to the structural engineer. The construction manager must ensure that no structure or part of a structure is loaded in a manner which would pose a risk of collapse. Records of all inspections must be kept in a register onsite . Before demolishing of a structure, that the structural engineers method statement is received and studied to ensure the support. Structures supervisor shall be appointed in writing with CV and proof of qualifications attached.

4. Underground and internal services

The P/Contractor must ensure that all existing internal and underground services are known before starting any demolitions work on site. Where Way Leaves are required, they must be applied for by the P/Contractor and will serve as indications of the relevant services. Should the location of services (electrical, water, gas, sewer, etc.) not be known, are deemed to be inaccurate, or if it is suspected that services might be present, the Client must mandate the Contractor to make use of the necessary detection equipment in order to accurately. When possible drawings of services shall be obtained by the principal contractor from the local municipality.

5. Demolition CR 14

Any Contractor carrying out demolition work must ensure that prior to any such work being carried out, and in order also to ascertain the method of demolition to be used, a structural engineering survey of the structure to be demolished must be carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed. It is required that a detailed demolitions method statement be included as a tender returnable document for assessment by the consulting structural engineer and clients OHS agent appointed to the project.

In addition to CR14 the following measures must also be adhered to:

- The Contractor must appoint a competent person in writing to supervise and control all demolition work on site;
- No demolition work may be carried out until the risk of injury and property damage has been identified, assessed for risk, and such risk of injuries and property damage has been eliminated, and proven to the consulting structural engineer and/or similar engineer i.e. appointed by the demolitions contractor;
- The Contractor must ensure that any partly demolished structure does not pose a safety risk to workers or members of the public;
- Should the Contractor be in doubt about the safety of a partly standing structure, the structure must be demarcated at a reasonable distance and sign posted, warning persons of the risk until such structure is made safe;
- The Contractor must ensure that no persons work, move or stand under any partly demolished overhanging material, which has not been adequately shored, braced or supported;
- Any support work must be designed to withstand the load being imposed on it, the design must be held on site;
- Where the stability of an adjoining structure, building or road may be negatively impacted, the Contractor must take all necessary steps to ensure the stability thereof;
- The Contractor must ascertain the location and nature of electricity, water, gas or other similar services, which may be affected by the work being performed. A safe method of removal or work around these services must be drawn up;
- Safe and convenient access must be provided to all work areas – scaffolding, ladders, etc.;
- While demolition is taking place, all unauthorised persons must be kept well away from the operations;
- The Demolition Contractor's safety plan must include what applicable personal protective equipment and clothing is required. The minimum being leather gloves; steel toecap boots; eye protection where the risk of eye injury exists i.e. cutting, grinding, hot work, impact work; hearing protection for operators and other workers exposed to noise over 85dB(A); and fall prevention and/or arrest equipment when the risk of falling exists.
- The suppression of noise and dust is important due to worker exposure as well as sensitivity to neighbouring premises.

Demolition must take place in Chronological sequence :

- Planning and hording of demolition site
- Demolishing and striping by hand example: removing all no structural items (soft stripping)
- Demolition of brick walls and structures
- Remove rebar from building rubble before removing to a registered dumping site

6. Earthworks (Civil works) CR 13

The PC will ensure that the provisions of the regulation CR 13 are met and ensure that earthworks and are carried out as per the design . Further that:

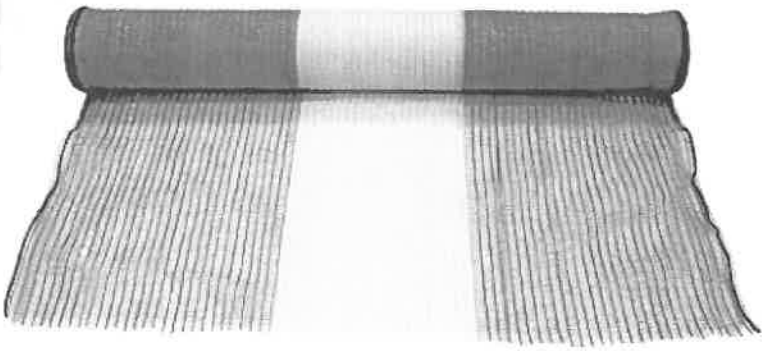
- Before conducting any earthworks ensure that wayleaves is obtained and taken into consideration for the protections of services, further that:
- The project area is secured, fenced and warning signs of construction activities, installed. Other access routes to be clearly marked with signage indicating "Construction No Access"
- That the construction board is installed at the entrance displaying the PPE requirements with clear route to the site office.
- That land clearance and ripping is done following the design drawing and rubble kept in a area assessed as laydown area.
- That surveyor pegs and benchmarks are clearly marked and protected to prevent the accidental removing and clearing of land between incorrect coordinates.
- That when squatters or CLO are met site, to report the situation directly to the client.
- That the PC assess wild animals and take the necessary precautions to ensure the safety of the employees.
- That the PC ensure the appoint a security company to react on civil unrest or criminal activity onsite.
- That the PC will assess and take preventative action to protect water environment, wetland, rivers or stormwater inlets.
- That the PC will remove trees as per agreements and with the authorization of the client.

Retaining walls

- Retaining wall shored/braced and secured as per assessment of dangerous works Retaining walls and brick work secured on firm foundation
- Retaining walls and soil to meet the required compaction requirements
- Retaining walls to be secured with solid barricading to prevent accidents

7. Excavations CR13

Once the Principal contractors starts with excavations & trenches and these is deeper than 500 the excavation shall be barricaded with barrier netting example is visible below. If the excavation is deeper that 1,2 M every 6 M from the employees there shall be means of access & egress. No Danger tape will be allowed on site.



The Principal Contractor and relevant Contractors must make provision in their tender for the shoring of excavations where the soil conditions warrant it or if this is not possible batter back such excavations to a safe angle, termed the safe angle of repose.

The Principal Contractor has the following options: shore or brace the excavation, should this not be practical then such excavation must be battered back to the safe angle of repose from the engineers recommendation , should the first two options not be deemed necessary by the contractor, then permission must be given in writing by the appointed competent excavation supervisor. Where uncertainty pertaining to the stability of the soil exists, the decision of a professional engineer or professional technologist competent in excavations shall be decisive. Such permission must be in writing.

The following requirements must be adhered to:

- Excavations/trenches are inspected before every shift and a record of these inspections is kept;
- Safe work procedures have been communicated to the workers;
- The safe work procedures are enforced and maintained by the Principal Contractor's and Contractors' responsible persons at all times;
- Excavations next to permanent or temporary roadways - ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endangering the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;
- Ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, steps are taken that may be necessary to ensure the stability of such building, structure or road as well as the safety of persons;
- Cause convenient and safe means of access to be provided into every excavation in which persons are required to work and such access shall not be further than 6m from the point where any worker within the excavation is working;
- Ascertain the location and nature of electricity, water, or other services which may in any way be affected by the work to be performed. The necessary steps must then be taken to render the circumstances safe for all persons involved. Should you as the contractor not be sure of the exact location of electrical services, detection equipment must be used as well as a system of hand excavation as per a written risk assessment and method statement;
- Cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or where the safety of persons may be endangered, to be-

(i) adequately protected by a barrier or fence of at least one meter in height and as close to the excavation as is practicable; and

(ii) provided with warning illuminates or any other clearly visible boundary indicators at night or when visibility is poor;

- Cause warning signs to be positioned next to an excavation within which persons are working or carrying out inspections or tests

8. Heritage and Archaeological sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Employer Agent of such discovery. The South African Heritage Research Agency (SAHRA) is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist. (Read with COLTO General Condition of Contract Sub clause 4.24 as amended by Particular Condition).

The demolition of heritage structures (buildings 650 year old or of specific historical value) requires specific authority before it may be demolished. The following procedure to be followed:

- The appointed contractor for the demolition will apply for the permit.
- Where the portion of historical value is required to be protected, the structural engineer will be informed to conduct an survey and prepare and issue a structural report to protect the specific area of the building.
- The contractor will implement the structural engineers report for approval before demolishing the building connected to the historical part or section.

9. Graves & Middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the Employer Agent informed of the discovery. SAHRA should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The Employer will be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred. (Read with COLTO General Conditions of Contract Sub clause 4.24 as amended by Particular Condition).

10. Ladders GSR 13

All ladders shall be inspected on a monthly basis and shall be recorded on a ladder register. Ladder inspector shall be appointed in writing to carry out these inspection.

Extension ladders

- Extension or single ladders should be used only as a means of access or egress from a working area.
- They should not be used as working platforms,
- Any portable ladder used at the workplace should be set up on a solid surface that is stable and set up to prevent the ladder from slipping.
- Extension ladders must exceed the platform with 900mm
- All ladders must be numbered and recorded on a register
- Placing a ladder at 75 degrees angle securing single and extension ladders at both the top and bottom.

A frame ladders

- Timber portable ladders should not be painted (this can hide cracks and other defects in the timber)
- Metal portable ladders should not be used when carrying out work on electrical equipment.
- They should also not be painted as this can hide defects in the welds.
- Stepladders should be used only in their fully open position, and a person should not carry out work from a stepladder if they are standing higher than the 3rd rung from the top.

Ladder Duty Ratings		
Grade	**Type**	**Duty Rating**
Household	III	90 Kg
Commercial	II	100 Kg
Industrial Heavy Duty	I	115 Kg
Industrial Extra Heavy Duty	IA	136 Kg
Duty Rating represents maximum weight of fully clothed user plus tools and materials		

11. Scaffolding CR 16

All scaffolding will comply to the SANS 10085-1:2004 standard as well as with the section 16 in the construction regulation of 2014.

The following appointments shall be done if scaffolding is being done on site:

- Scaffolding erectors
- Scaffolding inspectors
- Scaffolding supervisor

All scaffolding will have a safe to use or not safe to use sign visible on the scaffolding to ensure compliance. Example of signs below:

Safe to use **Not safe to use**

Scaffolding will at all times have double side rails on platform area. Platform shall be fully boarded with scaffolding hook on boards & not with wooden planks. All scaffolding will have safe access the employees can use to get to desired platform. Access on scaffolding can be with scaffolding stairs or with scaffolding access ladders

According to SANS 10085-1:2004 section 3.21 No work will be allowed on scaffolding if the wind is greater than 40 km per/hour

Each scaffolding shall be on a register and on a weekly basis and immediately after inclement weather or alterations has been made.

The Principal contractor's safety officer and construction manager will ensure that the base jacks of the scaffolding shall not be jacked more than 2/3 of the full length.

All employees working on scaffolding without double hand rail and toe boards shall wear a double lanyard safety harness with scaffolding hooks. All erectors & dismantlers shall wear double lanyard safety harness with scaffolding hooks that will be hooked on all the time to prevent falling while erecting or dismantling the scaffolding.

Mobile scaffolding will be allowed on site if it complies to the SANS 10085. All mobile scaffolding shall have a break on each wheel that will be used while working on the scaffolding. No mobile scaffolding will be allowed to be moved while employees is on top of the scaffolding.

12. Trestles SANS 10085

Trestles Shall not be allowed on site of the clients OHS agent did not approve it in writing. No timber trestles will be allowed on site

When approved then the following will be the requirements to make use of the trestles :

SANS 10085 10.16:

- The minimum width of the trestle legs when opened and locked in position shall be 780 mm.
- Trestles shall not be used on slopes exceeding 1:12.
- The platform supported by the trestles shall be level within 1:50 in all directions.

All trestles shall have a double hand rail to prevent the employee from falling off the elevated platform. Safe access shall be provided for employees working on the trestles. Trestles will be inspected before each shift/day with a specific trestle checklist and after inclement weather or alterations. The platform will be packed fully with steel scaffolding platform boards and will hook onto the trestle steel frame and not exceed the length.

(b) Adjustable folding trestle (steel type)

13. Fall protection - Fall Risk positions CR 10

A Contractor must—

- Designate a competent person to be responsible for the preparation of a fall protection plan; ensure that the fall protection plan contemplated in paragraph (a) is implemented, amended where and when necessary and maintained as required; and take steps to ensure continued adherence to the fall protection plan.

- A fall protection plan contemplated in sub regulation (1), must include—
- A Risk Assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location;
- The processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof;
- A program for the training of employees working from a fall risk position and the records thereof;
- The procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
- A rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.

A Contractor must ensure that a construction manager appointed under regulation 10(1) is in possession of the most recently updated version of the Fall and Rescue Protection Plan.
Fall prevention and fall arrest equipment are —

- Approved as suitable and of sufficient strength for the purpose for which they are being used, having regard to the work being carried out and the load, including any person, they are intended to bear; and
- Securely attached to a structure or plant, and the structure or plant and the means of attachment thereto is suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and any person who could fall; and
- Fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.

Fall Elimination –
The first step in work at height control is to assess the workplace and the work itself in the earliest design/ engineering stages of the project/ site and during the planned stages of all work so that potential fall hazards can be eliminated at an early stage. By doing so employees are not exposed to these potential fall hazards at any stage and work can be conducted with little exposure to fall risks and hazards.

The benefit of identifying these hazards allows for them to be included in the building phase of the job so that prevention measures are included during the construction and maintenance processes involved in the project.

Fall Prevention –
The second outlook is to assess the scope of work and potential conditions using collective protective measures. If fall hazards cannot be completely eliminated during the first step, management must take a proactive approach to the prevention of falls by improving the workplace and its conditions. In this step any hazards that arise outside of the design phase of a project are identified. This is achieved by assessing the work place and its conditions using a work at height risk assessment with the idea of implementing fall prevention measures such as guardrails, edge protection, hand rails and so forth. In this way all hazards that were not dealt with in the design phase can be addressed and a safe working environment will be achieved through the implementation of these systems.

Fall Arrest –
This is the last resort in preventing falls and individual prevention measures are assessed and implemented. In this step the condition or type of work conducted at height cannot be addressed at a design level or prevention level. In this step preventing the employee from hitting the ground is the aim, whereby systems and fall arrest equipment are used to prevent this from occurring. Equipment such as harnesses, lanyards, shock absorbers, fall arresters, lifelines, anchorage points, and safety nets can reduce the risk of injury if a fall occurs.

Life lines –

- The lifeline shall be of no less than 12.5 millimetres steel cable, able to withstand a 2.250 kg drop maintains tensile strength integrity of the material. Where steel cable cannot be used adequate lifelines in the form of ropes are to be used in accordance with manufacturing specifications able to support the above mentioned force. If a fall is expected while attached to lifeline, that line shall be replaced.
- The lifeline shall be installed in a length not to exceed 60 meters. The lifeline ends should be attached in such a manner that the ends are wrapped around a fixture so that it is facing the work area. As it is wrapped, a softener shall be installed to keep the cable from being marred or kinked.
- The cable shall be wrapped no less than one complete wrap around a beam or fixture and secured with no less than three (3) cable clamps of suitable strength. It shall be pulled to at least 45 torque kilograms.
- During installation, and as the cable is passed through each bay, it shall be attached/ supported in increments of no more than 15 meter runs. To maintain the intended height and elevate sag, the supporting material must be affixed in such a manner to be immobile.
- The supporting material must be of at least 75 x 75 mm angle iron/ steel. Holes may be tapped through the material as long as it is evenly centred, and the inside diameter edges are smooth and rounded.
- When working on elevation where there is no means for overhead attachment, supporting material shall be attached from the same elevation in an upright manner and attached.

Safety Harnesses

- Engineering contractor and all contractors/ subcontractors will provide full body harnesses meeting SABS standards. Safety belts are not allowed for fall protection.
- Standard full body harnesses are not designed for a combined personnel and tool weight in excess of 137 kg. Personnel weight more than 137 kg, with tools, must consult project/ site SHE coordinator prior to using fall arresting equipment
- All Safety harnesses are to be stored in cool dry areas and inspected on a monthly basis. Any cuts, snags abrasions are to be reported to the site supervisor and the harness discarded immediately
- Harnesses and lanyards must be checked for the following, but this the check points are not limited to this list:
- Beginning at one end, 15 cm to 20 cm of the harness/ lanyard must be bent into a U shape. This helps reveal worn, cut, frayed, burned, or damaged fibres. Both splices and all straps along the entire length must be checked.
- Webbing must be carefully checked at attachment points to buckles and "D" rings.
- The shock-absorbing section of the lanyard must be checked for ripped stitches.
- The harness/ lanyard must be checked for broken/ frayed strands.
- Checks for rough, sharp edges; corrosion; dents or distortion; freely moving parts.

Lifeline Hooks

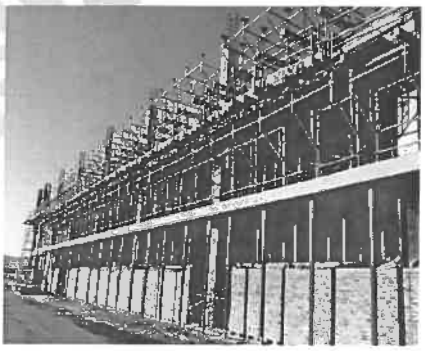
Scaffolding Hooks

14. Edge protection, Barricading and Penetrations

A Contractor must ensure that—

- All unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling through such openings;
- No person is required to work in a fall risk position, unless such work is performed safely as contemplated in sub-regulation (2);
- A detailed Fall Arrest and Rescue Plan will be drafted and implemented on site.
- The above mentioned plan will be demonstrated on instruction of Department of Public works & infrastructure 's Agent.
- Rebar that is exposed will be made safe by placing a rebar cap on, to prevent the rebar from penetrating an employee or damaging equipment

Examples of edge protection:



15. Roof work CR 10

A Fall protection plan must be compiled by the roof work contractors (roof structure contractor and roof covering contractor) prior to such work being undertaken. This plan must be forwarded to the H&S Agent at least two weeks before the roof supporting structural steel work is programmed to begin. External scaffolding needs to be erected and remain in position to above roof height until completion of the roof work and associated activities so as to ensure elimination of fall risks (objects and equipment falling onto members of the public).
Life line systems during roof work must be designed and fitted.
A part-time safety officer must be designated by the roof work contractor

The Fall protection plan must include the following:

- How the roof work is planned to be erected or worked on;
- What hazards (tasks and tools) are associated with the work;
- That the roof workers are competent (trained, experienced, knowledgeable);
- That no work is carried during inclement weather or where conditions are hazardous to workers;
- That fragile material/areas are demarcated and sign posted;

- ♣ That suitable platforms are provided where fragile materials exist;
- ♣ Safe access systems/procedures;
- ♣ Public protection safety measures and fall prevention (objects and equipment);
- ♣ The safety and health measures that will be implemented to ensure the safety and health of roof workers as well as persons working below the roof work i.e. fall prevention systems.

A fall prevention strategy must be implemented and enforced which must include a combination of safety harnesses, life lines, specified attachment points, safe access, competent personnel, supervision, tool/equipment drop prevention.

16. Temporary works CR 12

The PC will ensure that the provisions of the regulation CR 12:2014 are taken into consideration and appoint a temporary works designer to design to design and inspect form- and support work:

The temporary works drawing must display the design, braces, edge barricading and special safety arrangements to prevent that any part of the staging, shutter boards accidently can be dislodge and blown over the edge in gale force winds. That the temporary works designer or formwork contractor appoints a competent temporary works supervisor that will supervise the erection of support work and covering of the deck e.g. staging or Perri system The supervisor will be in possession of a printed, approved design drawing at the point where the deck is erected. The supervisor will be in possession of an inspection document to be completed and signed by the PC supervisor accepting the deck before loading it with rebar.

- The temporary work supervisor will ensure that support work is erected in accordance with the design, that bracing and intermediate props are installed.
- That the deck is fully boarded, that boards are secured to prevent accidental dislodge incidents and all lose material is removed from the deck.
- That safe access and edge barricading are installed.
- That all safety measures to ensure shutter board (when used) are secured to prevent dislodge in gale forces wind.

Steel fixing and shuttering activities:

- Steel fixing are done under supervision of a competent supervisor following the approved bending schedule.
- Employees fixing steel close to unprotected edges must wear a safety harness connected to a safe anchor point.
- The installation of shutter boards or panels must be secured to prevent concrete spill or be accidental dislodged in gale force winds.
- Installation of rebar structures for columns and shutter panels by mobile crane must be done in conjunction of a competent banksman.
- Installation of rebar structures for columns and shutter panels by mobile crane must be done in conjunction of a competent banksman.
- Where scaffold is used for the installation of column rebar and shutter panels, the scaffold must be erected in accordance of SANS 10085

Premix concrete delivery and casting on site

The area where the concrete pump will be positioned with outriggers extended, must be demarcated and barricaded:

- The safety of public to be considered and where applicable, flagman posted The pump and delivery pipes to be connected and secured correctly
- Sufficient space to allow delivery trucks to stop and que for delivery of premix
- Preventative measures taken to prevent concrete spill on the road service or into the stormwater system

Casting concrete with concrete bucket

- The area where the concrete bucket is filled directly from delivery truck, must be barricaded.
- All the principles applicable to crane operations e.g. safe connections, lifting and banksman duties are valid and needed to be applied during this operation.
- A concrete bag to be installed around bucket outlet to prevent dripping spillage during transit of the concrete.
- All safety whistles and signs applied, the bucket may not be moved over a public road of walkway.
- The supervisor for the concrete pour must ensure that the bucket is empty and the safety cover is inserted over the opening before returning it for refilling.
- The PC must ensure that the concrete bucket is cleaned daily after concrete pour to prevent concrete to set in or on the bucket to prevent it from falling when accidently dislodged.

- may be installed directly over a public road

17. Traffic and pedestrian accommodation

The Principal Contractor must ensure that all the necessary traffic/vehicle and pedestrian accommodation safety measures are taken into account to ensure the safety of personnel and members of the public (including site visitors) both on site and adjacent to site. Such measures must be in accordance with recognised practises and to the approval of the Client and the local municipality and traffic authority. The Principal Contractor must place the necessary emphasis on safe pedestrian walkways and routings throughout the construction stage. Traffic and pedestrian accommodation drawings must be available on site as a source of reference and to assist with daily inspections and enforcement and inclusive of vehicle and pedestrian movement/management.

The principal contractor shall compile a traffic management plan to the client OHS agent & clients Agent for approval before the start of traffic accommodation. The traffic accommodation should include a sketch or a picture t explain where what signs would be displayed and to indicated detours should it be applicable. All signs need to comply to the National Road Safety Act.

18. Confined Spaces

Confined space is a space of any volume which, a person may at any time enter or be allowed to enter and which:

The atmosphere is liable to be contaminated at any time by dust, fumes, mist, vapor, flammable or toxic gases or other harmful substances

- The atmosphere is liable at any time to be oxygen deficient or excess
- The area is not intended to be regular workplace
- The area has restricted means of entry and exit
- The area may be subjected to engulfment
- The area is an atmospheric pressure during occupancy

Areas not normally regarded as confined spaces can become one depending on the conditions or presence of hazards.

Entry into a confined space shall not be permitted until the atmosphere has been tested to ensure safety of all personnel.

Retesting or continuous monitoring may be required because of the potential for the release of hazardous material during welding or other processes. The release of hazardous substances depends on the type of work currently being carried out, type of previous contaminant and the presence of residual chemicals. Provision should be made to continuously monitor or regularly retest the atmosphere within a confined space.

If entry is required then:

- Notify all personnel of how the task will be performed
- Ensure that lockout, tag and isolation procedures are in place
- Hazards which are involved in working in a confined space should be minimised at the design stage and during the initial installation of equipment
- An employer must ensure that before carrying out work involving entry into a confined space that a written assessment (confined space permit is carried out by a responsible person and determines the following

  - The work to be carried out
  - Is necessary to enter the confined space
  - The method by which the work can be carried out
  - The hazards involved
  - The actual method and plant proposed
  - Safety equipment required
  - Emergency and rescue procedure
  - Gas monitoring and detection necessary
  - PPE
  - Number of personnel to carry out the task
  - Number of standby personnel required

19. Deliveries, Waste removal , Stacking/Storage of materials

The Principal Contractor and other relevant contractors must ensure that there is an appointed stacking supervisor and all materials, formwork and all equipment is stacked and stored safely, on level, compact ground, out of access ways and no more than three times the minimum base width in height. Pallets of bricks may not be stacked more than two above each other and must be on timber pallets. No construction materials or equipment may be stacked or stored in public areas unless authorised by Department of Public works & infrastructure and fenced off as per Department of Public works & infrastructure 's requirements. Waste materials must be kept within designated construction zones. The Principal Contractor will be responsible for co-ordinating and managing this function.

20. Fire extinguishers and firefighting equipment

The Principal Contractor and relevant Contractors shall provide adequate, regularly serviced firefighting equipment located at strategic points on site, specific to the classes of fire likely to occur. The appropriate notices and signs must be posted up as required. A minimum of four 9 kg dry chemical powder fire extinguishers must be available in and around the site office establishment and stores. Fire extinguishers must also be placed at all work zones/areas, in strategic locations. Wherever *'hot work' is taking place, additional fire extinguishers must be on hand. Contractors are responsible for ensuring compliance with hot work procedures and must be in possession of method statements detailing the safe working procedures. *'Hot work' includes all work that generates a spark or flame and may therefore result in a fire.
Further, during the finishing stages of the construction phase when the finishing trades are on site, fire extinguishers will be required at strategic locations within the work areas – to be supplied and managed by the Principal Contractor.

21. Designated smoking area

The principal contractor will ensure that a designated smoking area will be established on site at a safe location away of chemicals or any other fire hazard, at least one fire extinguisher will be close (not further than 10 M) to the designated smoking area.

22. Thunder & Lighting

The management and safety personnel of the Principal Contractor shall download the lightning Alarm app from Istore or google play store. The site location must be set on the app to inform the management and the safety personnel when lightning is 30 km away from the site. When the notification is received on their phones all employees (PC, Contractors & sub-contractors) working at heights must get down as fast possible. The employees are only allowed back on heights when the app has not notifies the team about lightning for at least 15 Min from the last notification.

23. Concrete work

As with many other materials, there are potential risks involved in handling or working with cement or mixes made using cement.

The composition of cement is such that when dry cement is exposed to water a chemical reaction called hydration takes place, releasing a very strongly alkaline (and caustic) fluid. This can cause alkali burns and safety measures should be observed. Appropriate precautions are advised to prevent tissue damage when handling fresh mixes containing water and cement.

Cement dust, dusts from handling aggregates and from cutting concrete are easily inhaled. Prolonged or regular exposure to these dusts should be avoided.

Cement is a complex combination of compounds that includes minute quantities of trace elements. Although South African cements typically contain less than two parts per million of Hexavalent Chrome (widely regarded as a safe level), it may serve as an aggravating factor in cases of exposure to alkaline fluids. There have been some reports of allergic dermatitis after exposure to these fluids.

When fresh concrete or its bleed water comes into contact with human skin, the alkalis react with the oils and fats in the skin as well as the proteins in the skin itself causing tissue damage. Other organic tissue (e.g. mucous membrane) can also be attacked by strong alkalies leading to burns that can sometimes be severe, and users should try to avoid all unnecessary contact with these fluids. Where such contact is unavoidable, suitable precautions should be taken.

Roughness and dryness of the hands after working with concrete is a typical consequence of loss of these oils and fats. More prolonged exposure could result in irritant dermatitis. It is possible that the effects of trace elements may aggravate the condition and lead to an allergic dermatitis. To safeguard against accidental exposure, appropriate protective equipment is strongly recommended.

Impermeable gauntlet type rubber gloves and high length rubber boots should be worn to prevent direct contact with skin. Trousers should overlap the boots rather than be tucked into them. Hydrophobic alkali-resistant barrier creams should be applied to hands and any areas of skin likely to be in contact with fresh concrete. Ordinary barrier creams are likely to be inadequate.

These precautions may be ineffective if the skin itself is not clean and free of concrete residue. Even a tiny trace of cement dust remaining in contact with wet skin will raise the pH significantly.

Regularly wash (at least daily) protective clothing and keep it clean and free of concrete and wash any areas that have been accidentally splashed with wet concrete as soon as possible with large quantities of clean water. Ensure that normal and protective clothing does not become soaked with wet concrete or concrete fluids as this could result in exposure over an extended period, resulting in tissue damage.

Cement is an abrasive fine powder, and when handled, some dust may become suspended in the air in the working area. Users should avoid inhaling cement dust as this may cause irritation of the nose and throat. Cement dust may also cause irritation of the eyes. This will occur because of the chemical reaction of the suspended dust with the moist mucous membranes. Airborne cement dust should be kept to a minimum to avoid these problems. Should this be impractical, then the use of goggles and dust masks is strongly recommended.

Many of the aggregates used in concrete have high silica contents. The fine silica dusts created when crushing or handling these aggregates could cause lung problems, and precautions should be observed to avoid breathing in such dusts.

Dust from demolishing or cutting hardened concrete may contain un hydrated cement and could cause respiratory problems as outlined above. In addition, if the coarse or fine aggregate used in making the concrete contains crystalline silica, then inhalation of these fine silica particles could expose workers to the risk of developing silicosis. A concerted effort should be made to avoid generating such dusts. If this is not possible, the use of suitable respiratory protective equipment is recommended.

Site workers should also not kneel on fresh concrete during placing, compacting and finishing operations. If kneeling is unavoidable, thick waterproof kneepads should be worn with a kneeling board to prevent the pads sinking into the fresh concrete. In severe cases of alkali burns, a medical practitioner should be consulted as soon as possible

24. Brickwork

Brick work goes hand in hand with other section discussed in this coherent specification for example : Scaffolding, Concrete work, Hand tools, stacking and storage & barricading.

The bricks shall be stacked on pallets in a dedicated area. The bricks shall not be double stacked. The double stacking poses a risk for falling over on employees, plant or cause damage to the property.

Brick work on scaffolding is a high risk and the necessary precautions need to be taken to ensure that scaffolding platform is not overloaded. The scaffolding that will be used shall comply to the relevant regulations and act as well as the scaffolding section in this coherent OHS specification.

All employees shall wear the compulsory PPE (overall, safety boots, gloves, hard hat). It will not be allowed to throw bricks from on level to another. Bricks that needs to be cut must be done with a brick cutter or with a grinder. If employee uses these methods then the process shall be discussed in a risk assessment to ensure safe work and proper PPE is being worn.

9. Plant, equipment and machinery

1. Construction Vehicles & Mobile plant CR 23

Construction Plant" includes all types of plant including but not limited to, cranes, piling rigs, excavators, construction vehicles, compaction plant and lifting equipment.

The Principal Contractor must ensure that such plant complies with the requirements of the OHS Act, Construction Regulations (Feb 2014) and any manufacturers specifications. The Principal Contractor and all relevant contractors must inspect and keep records of inspections on construction vehicles and mobile plant used on site. Only authorised/competent persons in the possession of the necessary training certificates and in possession of a certificate of medical fitness may operate construction vehicles and mobile plant. Should any operator be caught making use of a cell phone while driving he will be given a written warning as well as when the operator do not wear the safety belt. All construction vehicles & mobile plant shall be fitted with rotating light (visitors included). Lockout procedure shall be written and implemented to ensure that no plant will be left unattended while idling and to ensure that plant will be locked out at the end of shift.

2. Hired plant and machinery

The Principal Contractor must ensure that any hired plant and machinery used on site is safe for use and complies with the minimum legislated requirements. The necessary requirements as stipulated by the OHS Act and Construction Regulations shall apply. The Principal Contractor shall ensure that operators hired with machinery are competent and that competency and medical certificates are kept on site in the health & safety file. Any load test requirements and inspections in terms of legislation must be complied with and copies of load test certificates and inspections must be kept in the health & safety file. All relevant contractors

3. Cranes and lifting equipment

Cranes and Lifting Equipment must be designed and constructed in accordance with generally accepted technical standards and operated, used, inspected and maintained in accordance with the requirements of Driven Machinery Regulation 8 of the OHSAct:

- To be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the table should be used by the driver/operator
- Each winch on a lifting machine must at all-time have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit
- Fitted with a brake or other device capable of holding the MML. This brake or device to automatically prevent the downward movement of the load when the lifting power is interrupted
- Fitted with a load limiting device that automatically arrest the lift when
- The load reaches its highest safe position or
- When the mass of the load is greater that the MML
- Every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety must be:

    - Chains 4 (four)
    - Steel wire ropes 5 (five)
    - Fibre ropes 10 (ten)

- Every hook or load attaching device must be designed such or fitted with a device that will prevent the load form slipping off or disconnecting
- In addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person
- All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book.
- No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by the inspector or the Department of Labour.
- A clearly marked drop zone of 5 M around the crane will be identified with cones and barrier netting to keep people away from under the load

Lifting tackle:

- To be manufactured of sound material, well-constructed and free form patent defects
- To be clearly and conspicuously marked with id and MML
- Factor of safety:

    - Natural fibre ropes - 10 (ten)
    - Man-made fibre ropes & woven webbing - 06 (six)
    - Steel wire ropes – single rope - 06 (six)
    - Steel wire ropes – combination slings - 08 (eight)

- Mild steel chains - 05 (five)
- High tensile/alloy steel chains - 04 (four)

- Steel wire roes must be discarded (not used any further or lifting purposes) when excessive wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded.

Lifting Machine Operators

- Every lifting machine operator must be trained specifically for the type of lifting machine that he/she is operating

4. Explosive actuated fastening devices

The PC will ensure that the provisions of the regulation CR 21:2014 are met and ensures that explosive actuated fastening device operations including devices operated with compressed air, gas cartridge, pneumatic tools, complies to the following:

- That a competent person is appointed in writing to:
- Issue explosive actuated fastening device
- Issue explosive actuated fastening cartridges and nails (shots & pins)
- Inspect the explosive actuated fastening device before issue and on return
- Clean and maintain the explosive power actuated fastening device
- Explosive actuated device to be inspected daily before use and records to be kept
- Explosive cartridges and nails to be recorded when issued and when returned
- Explosive actuated device, cartridges and nails to be locked securely
- Explosive actuated device to be fitted with a muzzle on the end to control debris
- Only a competent appointed user my operate the explosive power actuated device

5. Electrical Installation and portable electrical Tools

The consulting engineers will ensure as far as possible that the principal contractor is made aware of the positions of all electrical installations and other services. The Principal Contractor must notify the engineer concerned should it not be sure of the location of any particular service. This is especially pertinent to the Demolitions Contractor who will need to ensure that all electrical installations are 'made safe' before demolition work begins. An installation electrician will need to prove this by means of the necessary documentation and written lock-out procedures, tags, and the like.

The Principal Contractor and contractors must comply with the Electrical Installation Regulations, the Electrical Machinery Regulations and the Construction Regulations.

The Principal Contractor must keep a copy of the Certificate of Compliance (CoC) for its temporary electrical power supply and installation. A revised CoC is required whenever the installation is altered or changed in any way. All temporary electrical installations must be inspected at least weekly by a competent person appointed in writing with records kept.

The testing and commissioning of the permanent electrical installation must be done under the management of a written method statement and detailed set of safety requirements and must only be put into use after a CoC has been issued to the principal contractor for that section/area.

Portable electrical tools and equipment must be visually inspected daily by a competent person (trained by an electrician or suitable person to carry out visual inspections on electrical tools and extension leads) before use, with records kept as proof.

6. General Machinery

The Principal Contractor and relevant contractors must ensure compliance with the Driven Machinery Regulations, which includes carrying out risk assessments on the machines, inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE and relevant clothing, and training those who use machinery.

10. Occupational Health

1. Industrial Hygiene

Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction. Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. Prevent inhalation, ingestion, and adsorption through the skin of hazardous chemical substances.

- Noise induced hearing loss is a highly underrated occupational condition. Occupational noise emitted by construction machinery and power tools must be controlled as far as possible by implementing engineering solutions such as noise dampening, regular maintenance, servicing and inspection, screening off the noise, and reducing the number of persons exposed. Personal protective equipment such as earmuffs and earplugs must also be used in conjunction with engineering controls so as to reduce noise exposure to below the acceptable levels.
- Heat stress is a major hazard in South Africa. The principal contractor must ensure that there is clean drink water available on site at all times and in extremes heat conditions must ensure that employees consume 600ml water an hour to prevent dehydration.

2. Hazardous Chemical Substance (HCS)

The Principal Contractor and other relevant contractors must provide the necessary training and information as far as the use, transport, and storage of HCS. The Principal Contractor must ensure that the use, transport, and storage of HCS are carried out as prescribed in the HCS Regulations. The Principal Contractor and contractors must ensure that all hazardous chemicals on site have Material Safety Data Sheets (MSDS) on site and the users are made aware of the hazards and precautions that need to be taken when using the chemicals. The First Aiders must be made aware of the MSDS's and how to treat HCS incidents appropriately. Copies of the MSDS's must be kept in the first aid box and in the store. All containers must be clearly labelled. Flammable substances must be stored separately, away from other materials, and in a well-ventilated area (appropriate cross ventilation). A competent person should be appointed to be in control of this portfolio. Stores must be well ventilated, preventing the build-up of flammable and toxic gases/vapours. Should fuel storage containers be used, they must conform to the general environmental legislation and Environmental Management Plan (if a requirement on this site). The necessary safety signage must to be posted up – 'no naked flames', 'no smoking'. Two 9 kg DCP fire extinguishers must be placed near to the fuel containers, but not within 5 m of the containers. These extinguishers are over and above the minimum four required for the offices and stores.

3. Alcohol and other drugs

No alcohol and/or 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 prescription medication must inform his/her superior, who shall in turn report this to the Principal Contractor forthwith. Any person suffering from any illness/condition that may have a negative effect on his/her /anyone else's health or safety performance must report this to his/her superior, who shall in turn report this to the

Principal Contractor forthwith. Any person suspected of being under the influence of alcohol or other drugs must be sent home immediately, to report back the next day for a preliminary inquiry. The Contractor concerned must follow a full disciplinary procedure and a copy of the disciplinary action must be forwarded to the Principal Contractor for its records.

4. Medical certificate of fitness

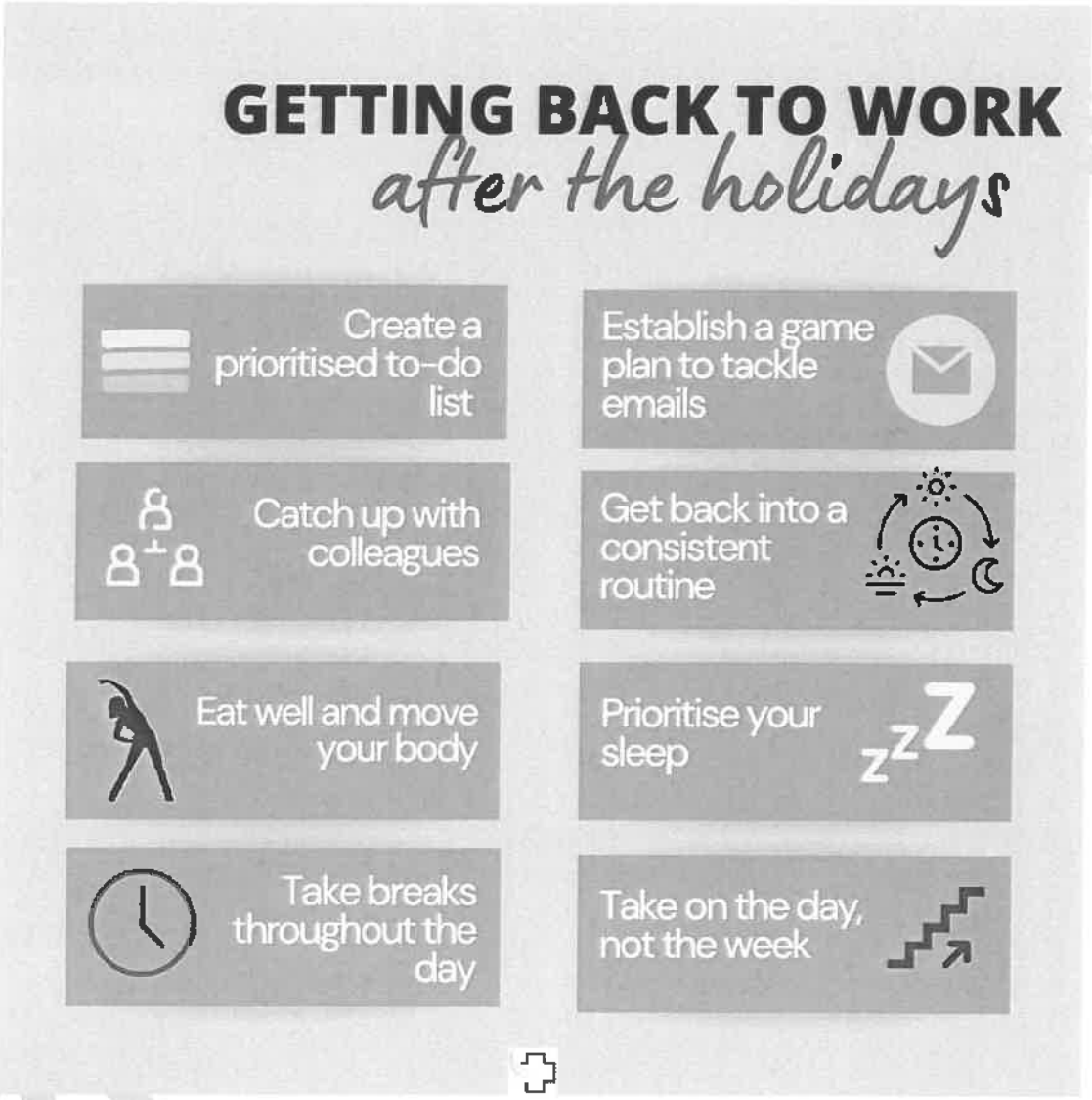
A contractor must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an Occupational Health Practitioner in the form of **Annexure 3** of the construction regulations. IN this section of the safety file the principal contractor shall ensure that in front of the medicals of all the employees there will be a medicals register. All employees' medicals must be listed on this form, see attached annexure H. This annexure shall only be TYPED.

5. Welfare Facilities

The Principal Contractor will be using chemical toilets that will be strategically placed on site. The ratio is for every 30 workers on site there will be 1 chemical toilet, When females is working on site there will be 2 toilets for every 30 workers (one for each gender). Waste bins must be strategically placed around site and emptied regularly. Shaded eating area shall be available for employees with seating and tables. The eating area shall have sufficient waste bins.

6. Ergonomics

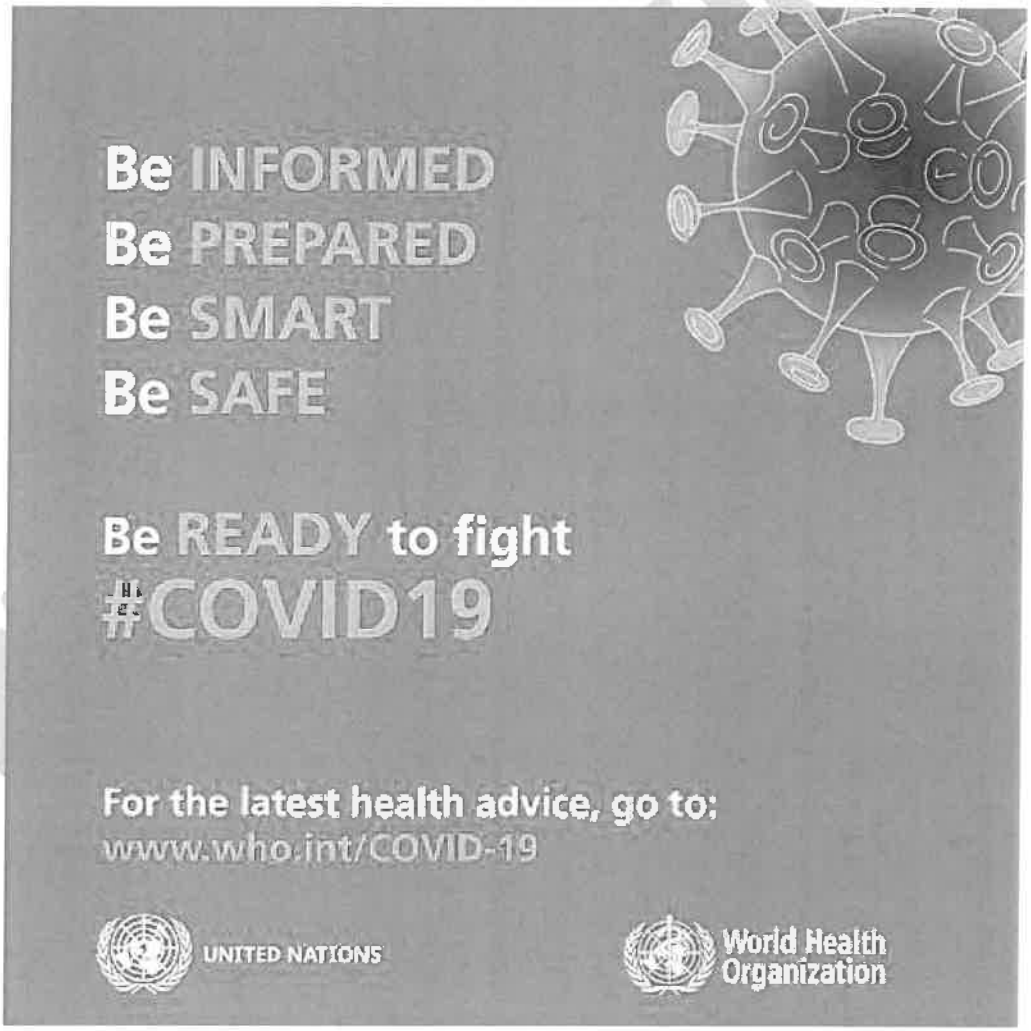
Ergonomics is the study of how workers relate to their workstations. We advise the Principal Contractor and Contractors to take this into consideration when conducting risk assessments, thereby improving the worker-task relationship, which will in turn improve productivity and reduce chronic conditions such as back strains, joint problems and mental fatigue, amongst others. Ergonomic risk assessor shall be appointed in appointed writing and shall have the competency to perform this task.



7. COVID 19

The COVID 19 is an international disaster. This is a pandemic that needs to be managed and to ensure that all our employees and visitors is safe. All precaution measures must be in place to ensure that the spread of the virus does not happen during construction. The following will shall be in place to prevent the COVID 19 virus from spreading:

- Each employee and visitor hands will be sanitised when entering the site and exiting the
- Lunch breaks will be rotated to ensure that at all times a social distance of 1 M shall be possible between employees
- COVID 19 site rules shall be displayed at every notice board
- Notice boards shall be available at the following places: Site entrance, toilets, site offices, storerooms, eating areas, hand washing stations
- PPE issue register will be available to ensure that all employees have been issued with masks or face shields and gloves where applicable
- All hand sanitizer that is being used on site must have at least 70% alcohol and a certificate needs to be available on site
- A COVID 19 Guideline / procedure and Baseline risk assessment shall be in file and discussed with employees
- Emergency plan shall be changed to cover COVID 19 and to ensure that assembly points is big enough to ensure a 1 M social distancing at all times



Omissions from the Site-Specific Health and Safety Specifications

Every endeavor has been made to address the most critical aspects relating to Health and Safety issues in order to assist the contractor in adequately providing for the Health and Safety of employees on site. However, the Principal Contractor is required to ensure they stay compliant with statutory requirements and construction programs and processes and include such aspects in their Health and Safety File.

PRIMARY HEALTH AND SAFETY COMPLIANCE

Project:

The Principal Contractor and Contractors must submit compliance with Annexure 'A' before commencing on work on site. **Compliance with Annexure 'A' must be maintained and proven to the Safety Agent at audits.**

	Appointment Letter from Client				
	Copy of public liability				
	Tools & Machinery list				
	Baseline Risk Assessments				
	Medical certificates				
	Section 37.2 agreement				
	Fall Protection plan				
	Incident / Accident management Control				

NO	Document	YES	NO	N/A	COMMENTS
19.	Traffic Management Plan				
20.	Sample of all registers				
21.	Occupational Health and safety Consultant CV and Company profile				
22.	Construction building plans				
23.	Occupational Health & safety Act				
24.	Construction Regulations 2014				
25.	Toolbox talks topics				
26.	Client Health & Safety specs				
27.	Sub-Contractor Control				
28.	Environmental management				
29.	Hazardous chemical substance list & MSDS's				
30.	Example of OHS report				
31.	Organogram				
NO	**Appointment**	**YES**	**NO**	**N/A**	**COMMENTS**
32.1	16.2				
32.2	Delegation of duties				
32.3	Construction manager CR 8(1)				
32.4	Ass Construction Manager CR 8(2)				
32.5	Construction supervisor CR 8(7)				
32.5	Ass Construction Supervisor CR8(8)				
32.6	Health & Safety officer CR 8(5)				
32.7	Risk Assessor CR 9(1)				
32.8	Incident / Accident Investigator GAR 9(2)				

NO	Appointment	YES	NO	N/A	COMMENTS
32.9	Contractor (sub) CR 7(2)(c)(v)				
32.10	Excavation Inspector CR 13(2)(h)				
32.11	Excavation Supervisor CR 13(1)(a)				
32.12	Fall Protection Plan Developer CR 10(1)				
32.13	Fire Equipment Inspector CR 29(h)				
32.14	Scaffold Erector CR 16(1)				
32.15	Scaffold Inspector CR 16(1)				
32.16	Scaffold Supervisor CR 16(1)				
32.17	Stacking & storage supervisor CR 28(a)				
32.18	Crane Supervisor CR 22(a)				
32.19	SHE Rep OHSACT 17(1)				
32.20	First Aider GSR 3				
32.21	Crane Operator CR 22				
32.22	Crane Supervisor CR 22				
32.23	Construction Vehicle operator CR 23				
32.24	Construction Vehicle Supervisor CR 23				
32.25	Lifting Equipment inspector Reg 18(5)				
32.26	Electrical Installation Supervisor CR 24				

NO	COVID Documents	YES	NO	COMMENTS
33.	COVID 19 Risk Assessment			
34.	COVID 19 SWP			
35.	COVID 19 Policy			
36	COVID 19 Intergraded into all plans and policies			

OCCUPATIONAL HEALTH & SAFETY – HEALTH & SAFETY COSTS TO BE INCLUDED IN THE PRINCIPAL CONTRACTOR'S / CONTRACTORS' PRICE

Project:

In terms of the Construction Regulations (2014), it is Department of Public works & infrastructure 's duty to ensure that the cost for health & safety has been provided for by the Principal Contractor, before appointment.
Acting on behalf of our Client, we require the following health & safety costs to be included by the Principal Contractor. It must be made very clear that these are just some of the health & safety costs to be included in your tender price. It is the duty of the Principal Contractor and Contractors to ensure that all aspects of the Occupational Health & safety Act 85/1993 and Construction Regulations are catered for.
Pricing for Occupational Health and Safety measures should include the following if applicable:

	Steel toe capped safety boots
	Dust masks
	Supply and provision of Equipment for working at Heights & ensure use thereof for full compliance
	Scaffolding access ladders/toe boards/hand rails
	Barricading: Supply & install, including removal upon completion to ensure full compliance to legislation
	Any other: Principal Contractor to specify :
	Emergency Rescue training(Height)

4.6	Construction Plant Training
4.7	Legal Liability(OHSACT) Training
4.8	COID ACT Training
4.9	Scaffold Erector and Inspector Training
4.10	Induction stickers for employees to place on hard hats
4.11	Any other: Contractor to specify : Working at elevated
5	Occupational Health and Safety Administration
5.1	Develop of a Site Specific Health and Safety Plan and Hazard and Risk Assessment by Competent person.
5.2	Develop of Fall Protection and Rescue Plan by a Competent Fall Protection Plan Developer.
5.3	Competent Occupational Health and Safety Officer/Consultant.
6	Medical Surveillance
6.1	Medical Certificates of fitness for all Employees by an Occupational Health Practitioner.
6.2	Medical Certificates of fitness for all EPWP Employees by an Occupational Practitioner during the duration of the Construction Project.
7	Facilities and Equipment
7.1	Sanitary facility for each sex and for every 30 workers.
7.2	Changing facilities for each sex.
7.3	Sheltered eating areas
7.4	First aid boxes
7.5	Fire extinguishers
7.6	Waste bins
8	Safety Signage
8.1	Sufficient and adequate safety signage on constructions site and at all flammable stores.
9	COVID 19
9.1	Signages
9.2	Sanitizer
9.3	Disinfectant
9.4	Thermometers
9.5	Masks / Face shields
9.6	Isolation Room
9.7	Waste bins
9.8	Safety transport for COVID 19

The Occupational health and Safety File must consist out of the following documentation:
INDEX

File 1(Legal file)

1. Client Mandatory Agreement & PC Appointment
2. Dept. Labour & Employment Documentation (COID) / UIF
3. Client Specifications
4. Scope of Work
5. Tools & Machinery List
6. HIRA Guide & Procedure
7. Client Baseline Risk Assessment
8. Medical Certificates
9. Health and Safety Related Policy's
10. Sub-Contractor Management
11. Emergency Preparedness and Emergency Numbers
12. Fall protection & Rescue Plan
13. Health and Safety Plan
14. Reporting of Injuries and Incidents
15. Environmental management
16. Occupational Health and Safety Organogram
17. Occupational Health and Safety Appointments
18. Employee Id Copies
19. Employee Particulars
20. Certificates of all lifting equipment

File 2 (Work File)

1. Toolbox Talks
2. Registers & Checklists
3. Induction Training
4. Safe Work Procedures (SWP'S)
5. Issue based Risk Assessments
6. Method statements
7. COVID 19 workplace management plan
8. COVID 19 Baseline Risk Assessment & SWP
9. Emergency Numbers
10. Material safety data sheets (MSDS's)
11. Baseline Risk Assessments
12. OHS Reports
13. SHE committee meeting minutes
14. Occupational health & safety Act
15. Construction regulations 2014

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993
(Regulation 4 of the Construction Regulations. 2014)

NOTIFICATION OF CONSTRUCTION WORK

1. (a) Name and postal address of principal contractor:

_____

(b) Name and tel. No of principal contractor's contact person:

_____

2. Principal contractor's compensation registration number:

_____

3. (a) Name and postal address of client:

_____

(b) Name and tel. No of client's contact person or agent:

_____

4. (a) Name and postal address of designer(s) for the project:

_____

(b) Name and tel. No of designer(s) contact person:

_____

5. Name and telephone number of principal contractor's construction supervisor on site appointed in terms of regulation 8(1).

_____

6. Name/s of principal contractor's sub-ordinate supervisors on site appointed in terms of regulation 8(2).

_____

7. Exact physical address of the construction site or site office:

_____

8. Nature of the construction work:

_____

_____

_____

9. Expected commencement date: _____

10. Expected completion date: _____

11. Estimated maximum number of persons on the construction site.

    Total: _____ Male: _____ Female: _____

12. Planned number of contractors on the construction site accountable to principal

    Contractor: _____

13. Name(s) of contractors already selected.

_____

_____

_____

_____ _____

Principal Contractor Date

_____ _____

Client's Agent (where applicable) Date

_____ _____

Client Date

- THIS DOCUMENT IS TO BE FORWARDED TO THE OFFICE OF THE DEPARTMENT OF LABOUR **PRIOR TO COMMENCEMENT** OF WORK ON SITE.
-

Copies:

1. Original to **Department of Labour**
2. Copy on Health and Safety File

Wind record register

			Date	Time	

Medical fitness Register (TYPED ONLY)

Name	Surname	te of medic done	Date that medical expires	Signatur

ANNEXURE G

Project Closeout documents that need to be scanned

The H&S files for the Principal Contractors and all Contractors require closure and handover to the Client at the completion of the project. The following list is an example of what should be included, but is not exhaustive. The OHS Agent or the Client may require further information at the time of completion and the Principal Contractor is to ensure that all instructions are met. Documentation would include all records from the start of the project. Daily or monthly plant inspection records are not required unless they are related to an accident. All records to be in electronic format (scanned) and submitted to the OHS agent for approval in adequately formatted lists and folders.

Health and Safety close out file requirements include:

a) Client H&S Specification
b) Principal Contractor's OHS Plan
c) Organograms
d) Legal Appointments
e) Notification to Department of Labour of commencement of work
f) Letters of Good Standing for the Project
g) Incident Records
h) Non- Conformance records
i) Agent's Audits
j) Method Statements
k) Risk assessments
l) Safe work procedures
m) Medical surveillance certificates of fitness. Medical records are to be kept according to the OH&S Act as amended.
n) All drawings for temporary structures (suspended beams/scaffolds etc)
o) Copies of test results, policies and procedures for environmental monitoring (silica, noise, dusts etc.)

Defect and Liability Period

The H&S files are to be kept 'live' for the defect and liability period by the Principal Contractor. Any work required during the defect and liability period will require an assessment of the H&S file by the OH&S Agent prior to any work commencing.

RisCon Consultants

PO Box 3158
Polokwane
0700
Mobile: 083 286 7692
E-Mail: riscon09@gmail.com

BASELINE HAZARD IDENTIFICATION AND RISK ASSESSMENT

1. Construction
2. Methodology
3. HIRA
4. Risk Assessment

Configuration Management			
Prepared By	Riscon Consultants	Register Number	RC 21022024
Approved By	J. Heyneke Can.CHSA/204/2022	Revision	21/02/2025
Issue Date	21/02/2024	Project	Mankweng SAPS
Approval by Client		Date	
Acceptance by PC		Date	

2. Methodology

BASELINE RISK MATRIX		HAZARD EFFECT / CONSEQUENCE				
Loss Type		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
Timeline		No impact on overall project timeline	May result in overall project timeline overrun of less than 5%	May result in overall project timeline overrun of between 5% and less than 20%	May result in overall project timeline overrun of between 20% and less than 50%	May result in overall project timeline overrun of 50% or more
Budget		No impact on the budget of the project	May result in overall project budget overrun of less than 5%	May result in overall project budget overrun of between 5% and less than 20%	May result in overall project budget overrun of between 20% and less than 50%	May result in overall project budget overrun of 50% or more
Investment Return – NPV loss		Less than R5m	R5m to less than R50m	R50M to less than R500m	R500m to R5b	R5b or more
Quality		No impact on quality	Minimal quality issues that can be addressed in a short timeframe with minimal interactions	Some quality issues that require immediate management action	Significant quality issues that require senior project management interaction	Significant quality issues that require sponsorship intervention with significant resource and cost implications for rework
Safety / Health		First aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Single fatality or loss of quality of life / Irreversible impact on health	Multiple fatalities / Impact on health ultimately fatal
Environment		Minimal environmental harm – L1 incident	Material environmental harm – L2 incident remediable short term	Serious environmental harm – L2 incident remediable within LOM	Major environmental harm – L2 incident remediable post LOM	Extreme environmental harm – L3 incident irreversible
Legal & Regulatory		No legal impact	Minor legal concerns with minor impact	Some legal concerns with manageable level of impact	Serious legal concerns and significant impact on operations	Legal non-compliance with risk of shutdown of operations with significant cost impacts
Reputation / Social / Community		Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	National impact - national public concern	International impact - international public attention
LIKELIHOOD		**RISK RATING**				
5 Almost Certain	The unwanted event has occurred frequently; has a 90% and higher probability of reoccurring	**11 Medium**	**16 Significant**	**20 Significant**	**23 High**	**25 High**
4 Likely	The unwanted event has a probability of between 60% and less than 90% of occurring	**7 Medium**	**12 Medium**	**17 Significant**	**21 High**	**24 High**
3 Possible	The unwanted event has a probability of between 30% and less than 60% of occurring	**4 Low**	**8 Medium**	**13 Significant**	**18 Significant**	**22 High**
2 Unlikely	The unwanted event has a probability of between 1% and less than 30% of occurring	**2 Low**	**5 Low**	**9 Medium**	**14 Significant**	**19 Significant**
1 Rare	The unwanted event has never occurred, has a probability of less than 1% of occurring	**1 Low**	**3 Low**	**6 Medium**	**10 Medium**	**15 Significant**

3. Hazard Identification, Risk Assessment and determining controls.

The organization shall establish, implement and maintain a procedure(s) for the on-going hazard identification, risk assessment, and determination of necessary controls.
The procedure(s) for hazard identification and risk assessment shall consider:

a) routine and non-routine activities;
b) activities of all persons having access to the workplace (including contractors and visitors);
c) human behaviour, capabilities and other human factors;
d) identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of the organization within the workplace;
e) hazards created in the vicinity of the workplace by work-related activities under the control of the organization;
f) infrastructure, equipment and materials at the workplace, whether provided by the organization or others;
g) changes or proposed changes in the organization, its activities, or materials;
h) modifications to the OH&S management system, including temporary changes, and their impacts on operations, processes, and activities;
i) any applicable legal obligations relating to risk assessment and implementation of necessary controls;
j) the design of work areas, processes, installations, machinery/equipment, operating procedures and work organization, including their adaptation to human capabilities;

The organization's methodology for hazard identification and risk assessment shall:

a) be defined with respect to its scope, nature and timing to ensure it is proactive rather than reactive; and
b) Provide for the identification, prioritization and documentation of risks, and the application of controls, as appropriate.

For the management of change, the organization shall identify the OH&S hazards and OH&S risks associated with changes in the organization, the OH&S management system, or its activities, prior to the introduction of such changes.

When determining controls, or considering changes to existing controls, consideration shall be given to reducing the risks according to the following hierarchy:

4. Hazard Identification, Risk Assessment and Controls

Before construction start, the Baseline Risk Assessment is a theoretical assessment before the construction start in order to highlight the foreseen hazards, but this is not intended to be seen as an absolute 100% of hazards that may occur.

The Principal Contractor of their appointed Contractor should take this and whatever hazards that may be presented, due to the unique process which get used to execute the specific construction activity.

BASELINE RISK ASSESSMENT

This Baseline Risk Assessment provides recommendations regarding the control measures, it is however the Principal Contractors duties to ensure that detailed control measures are addressed in the applicable unique Risk Assessment by the Principal Contractor or their appointed Contractors. The risk rating is deliberately rated high because there are no controls in this and without the required controls the possibility of the potential risk is extremely high, as indicated.

NO	HAZARD/ITEM	RISK ASSOCIATED WITH HAZARD	CONSEQUENCES	RR	HOW IS HAZARD TO BE DEALT	BY WHOM	BY WHEN
1	PRE-CONSTRUCTION						
1(a)	FILE APPROVAL AND ADMINISTRATIVE REQUIREMENTS						
	No file approval as per OHS requirements and Client specifications	• Work commencing prior to file being available and approved. • No valid registration with COID • Expired documentation (e.g., competencies, equipment load test, medicals) • Documentation not available or approved as per required Client Spec and OHS Act and Regulations	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • No work commencement until approval has been signed off. • Client Health and Safety Specification • Baseline Risk Assessment • Site conditions evaluation.	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site
	Legal appointments and competency	• Employees appointed not in possession of required or valid competencies as per Client Spec and the OHS Act and Regulations	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • No work commencement until approval has been signed off. • Client Health and Safety Specification • Baseline Risk Assessment	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site

		• Appointment not as per legal requirements • Lack of experience for appointed positions					
	Required legal documentation as per OHS Act and Regulations	• Documentation does not site specific. • Policies and procedure not in place and approved. • Employees not trained in policies and procedures and legal requirements	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • No work commencement until approval has been signed off. • Client Health and Safety Specification • Baseline Risk Assessment • Training needs analysis to be conducted by contractors. • Communication of required documentation	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site
	Risk identification	• Method of works not site specific. • Risk identification not in place or conducted. • Risk identification does not site specific. • Risk controls not sufficient • Risk assessor not competent	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • No work commencement until approval has been signed off. • Client Health and Safety Specification • Baseline Risk Assessment • Method statement of tasks • Site conditions evaluation	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor – Competent risk assessor	Before Principal Contractor establish site

		• Continuous risk evaluation not conducted					
	Induction and medical certificate of fitness	• Employees entering the site not being inducted. • Visitors entering site not being inducted / signing visitors' induction form. • Induction being conducted on employees without them being in possession of a valid medical certificate of fitness in form of annexure 3. The medical must be conducted by a register Occupational Health Practitioner • Construction vehicles and mobile plant operators entering the site without being inducted. • Driver or delivery vehicles not made aware of the specific site conditions. • Employees being inducted without valid work permits / certified ID copies.	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • Site induction can only be done with an employee if the required up to date medical is presented at the induction. • Medical fitness certificates must be validated by the principal contractor to ensure adherence to minimum requirements and validity of the document. • Each person's ID or valid work permit must be inspected before induction can be allowed on site for the individual.	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site

	List of employees and contractors	• Number of employees on site not listed on employee lists. • Number of contractors on site not listed on contractor list. • Employee and contractor list not being updated as required.	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • Record all employees working on site on the employee list. • Record all contractors on site on an updated contractor list. • Enter new employees and contractors on the list as soon as they have received the site induction.	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site
	Notification of construction work- DOL	• Construction work commencing without an approved notification. • Notification application not submitted to DOL within the prescribed timeframe	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • The Client cannot allow any work to commence without a valid (stamp) notification of construction work in place.	– Client – Project Manager – Appointed OHS Consultant – Principal Contractor	Before Principal Contractor establish site
	Client and Designer duties	• Client not following requirements as stipulated in the regulations. • Designers not appointed in writing and not made aware of their duties. • Designers not following their legal	• Construction delays • Penalties • Contravention notice from DOL	21	Riscon Recommendation • Client to follow legal requirements as stipulated in the regulations before and during the construction process. • Designers on the project to sign	– Client – Project Manager – Appointed OHS Consultant – Appointed Designer.	Before Principal Contractor establish site

		duties throughout the project			agreement in acknowledgement of their duties on the project. • Designers to conduct the required inspections and review the required documentation as stipulated in the regulations		
1(b)	SITE ESTABLISHMENT						
	Fencing construction site	• The erector must follow the specific position as required. • When digging for fence poles, services can be damage. • When post get knocked in it can damage services • Ergonomics	• Hand and back injuries • Physical injuries • Incorrect manual handling • Lost time injuries • Medical treatment cases • Interruption of services	13	Riscon Recommendation • The site fence must be a minimum of 1.8 m high. • Fence installation areas to be demarcated with netting when post and fence is being installed • Employees must not lift more that ¾ of their weight alone	– Construction Manager – Project Manager – Contractor Safety Officer.	During the erection of fence
	Security	• No security in place at entrances to construction site	• Unauthorized entry to site • Injuries to unauthorized people on site • Theft of materials and equipment	13	Riscon Recommendation • The principal contractor must appoint full time security personnel to control the access onto the site at all times.	– Construction Manager – Project Manager	Duration of construction phase

					• Dedicated access control sign books to be available for visitors sign ins.		
	Temporary water supply	• No proper water supplies available on site	• Hygiene related diseases	13	Riscon Recommendation • Only clean water may be used for human consumption and must be marked as safe to be used. • Contaminated water areas to be indicated as unsafe for used.	– Construction Manager – Project Manager	Duration of construction phase
	Temporary power supply	• No COC available for temporary electrical connection used on site. • Temporary DB not installed in accordance with legal requirements	• Loss of production time • Fatality due to electrical • Damage of equipment • Fire	13	Riscon Recommendation • Electrical installations can only be utilized once COC is issued. • Electrical installations must be inspected weakly. • Electrical installations must only be done by appointed electrical contractor	– Construction Manager – Project Manager – Contractor Safety Officer	
	Labour control	• Ensure a proper labour contract is signed with all temporary labourers.	• Legal disputes and strikes. • Persons remaining on	13	• Signed copies of labour contracts are kept on file in the site office.	– Construction Manager – CLO – OHS Officer	Before construction commences

		• Sub-standard time keeping and attendance records. • All staff employed on site must have a medical fitness certificate	site after the official end of shift time could be injured. • Medically unfit persons deployed illness / heart attacks / fatality		• Attendance registers are kept at the main offices. • Copies of medical certificates kept on file in site office		
	Incompetent persons Uncontrolled site establishment activities Incorrect stacking procedures	• Injuries during off loading • Damage to property and or vehicles • Cuts and burns. • Rushed activities. • Incorrect supervision • Management team not identifying existing services. • Trip and fall. • Cuts • Collapsing of stacks • Incorrect manual handling – back injuries	• Hand and back injuries • Dropping of equipment • Physical injuries • Incorrect manual handling • Potentially fatal accidents • Loss of limbs • Lost time injuries • Medical treatment cases • Financial claims	12	Riscon Recommendation • The principal contractor must ensure that site is established at the correct location as identified by the Client. • Principal contractor's OHS file must be approved prior to site establishment begins – aligned to New Construction Regulation 2014 • All workers on site must be declared medically fit by an Occupational Health Practitioner. (Annexure 3) • Site –induction must be given to all employees to make them aware of the specific hazards.	– Construction Manager – Contractor Safety Officer – Construction Manager	Before construction commences

					• Proof of this should be placed on the OHS File. • Before the commencement of this phase a site-specific risk assessment must be conducted by a competent risk assessor. • All the employees involved must be inducted on the risks; proof of this would be signing off on these risks. • Site specific safe work procedures must be followed during these activities. • Relevant toolbox talks must also be held with employees. • The contractor must ensure that the correct serviceable tools are available during this phase. • Employees must be issued with correct PPE before works begin.		

	Offloading heavy equipment and containers with mobile cranes.	• Defective mobile crane can cause accidents. • Damage lifting tackle. • Unsecure offloading area could cause accidents. • Damage to property	• Serious injury and fatalities • Standing time • Lost time injuries • 1st Aid medical treatment cases • Financial implications	13	Riscon Recommendation • All lifting equipment including the mobile crane must be checked before allowed on site. • Ensure that the correct mobile crane to be used for the offloading process. • Safe Working Load must be clearly displayed on the crane. • Load test certificate will be submitted to the client. • Rope and or sling certificates must be submitted to the client. • Only competent operators will be allowed to operate the mobile crane. • Daily checks as per checklist by operator. • Should a service provider be used these documentations must be approved by the principal contractor's OHS Officer.	– Construction Supervisor – Lifting tackle Inspector – Construction OHS officer	During site establishment

					• Copies must be put on the OHS file. • Lifting tackle to be inspected daily. • Material to be stacked on firm and level ground. • Stacking to be supervised by a competent supervisor. • Adequate storage area to be provided. • All unstable stacks to be dismantled and stacked over, in pre-determined area		
	Housekeeping:	• Inadequate storing facilities. • Damage to material and equipment. • Accumulation of waste. • Environment pollution. • Facilities for employees. • Electrical installations	• Serious injuries • Electrocution • Environmental impact • Personal injuries • Lost time in production • Damage to equipment and material. • Injuries to occupants and visitors	9	Riscon Recommendation • Use site establishment checklist to ensure compliance with all items. • Toilet facilities & staff welfare as per Construction Reg 2014 • Toilets 1:30(regular service) • Correct storing facilities for hazardous chemicals. • Correct signage for all storage of hazardous materials	– Construction Supervisor – Staff Welfare Inspector – Safety Officer – Qualified Electrician.	During Site Establishment/ Ongoing

					• Proper storing facilities for tool and equipment. • Adequate waste bins available. • Regular cleaning of these bins • Waste recycling is encouraged. • A COC certificate for temporary electrical installations by a register competent electrician.		
2. CIVILS WORKS							
NO	**HAZARD/ITEM**	**RISK ASSOCIATED WITH HAZARD**	**CONSEQUENCES**	**RR**	**HOW IS HAZARD TO BE DEALT**	**BY WHOM**	**BY WHEN**
1.	ESTABLISH TEMPORARY PARKING AREA	• Offloading machinery could lead to damage to property and equipment • Falling machinery from lowbed Workers hit by machinery	• Serious injury • Fatality • Lost time injury First aid treatment cases	21	• Method statement • Issue base risk assessments • Offloading procedures • Qualified operators • Check operator's medicals • Pre- start checklist • Supervision Correct PPE	– Construction Supervisor Construction OHS Officer	
2.	USING MOTOR GRADER; TLB; EXCAVATOR; WATER TRUCK; ROLLER COMPACTOR; TIPPER TRUCS	• Employees hit with machinery • Breakdowns • Oil spillage • Poor workmanship • Poor visibility due to dust	• Fatalities • Lost time injuries • Serious injuries • First aid treatment cases Production time lost	21	• Method Statements • Issue base risk assessments • Induction all employees • Medicals of operators	– Construction Supervisor – Construction OHS Officer Qualified operators.	

		• Ergonomics			• Qualified operators • Pre- start checklist of machinery • Identify lay-down area • Supervision • Plant seats need to be maintained		
3.	INSTALLATION OF STORM WATER DRAINAGE	• Trip and fall into excavations • Falling concrete pipes while offloading • Poor quality workmanship • Employees buried in trenches	• Fatalities • Serious injuries • Lost times injuries • Standing time due to poor workmanship and work to repeat.	19	• Method statements • Issue base risk assessments • Employees must be visible always • Direct supervision.	– Construction Supervisor – Construction OHS Officer – Qualified operators.	
4.	DEEP EXCAVATIONS AND TRENCHES	• Excavate with excavator to the specific level • Trip and fall • Collapsing soil • Machine struck employees • Hand injuries by excavation by hand • Incorrect manual handling • Ergonomics	• Fatalities • Serious injuries • Lost times injuries • Accidents due to defective machines • Damaging services • Over excavation • Dust • Electrocution when damaging electrical services • Damage to services • Employees not visible to	13	• Method statements • Issue base risk assessments • Employees must be visible always • Direct supervision. • Well trained operators • Level on survey profiles clearly indicated • Proper communication between supervisor and operators • Induct employees on safe working procedures	– Construction Supervisor – Excavation Supervisor Construction OHS Officer	

			machine operator • Material falling in excavations while employees are working in excavations • Inadequate access and exit points Employees may strain muscles to get into or out of excavations		• All excavations must be inspected daily • Provide ladders ever 6 m for access in and out of excavations deeper than 1.5 m • Excavated material to be placed away from side of excavation • Sides of excavation to be shored (if necessary) and barricaded immediately • Excavations should be backfilled as soon as possible after excavation • Keep area barricaded with hard barricading until backfill is done • Employees must not work in bended (unnatural posture) for prolong times		
3. CONSTRUCTION							
NO	**HAZARD/ITEM**	**RISK ASSOCIATED WITH HAZARD**	**CONSEQUENCES**	**RR**	**HOW IS HAZARD TO BE DEALT**	**BY WHOM**	**BY WHEN**
1.	REINFORCING CONCREATE	• Filling material • Concrete dust inhalation	• Cuts; bruises; hand injuries due to steel work activities	**13**	• Quailed steel fixers • Induct workers on MSDS for concrete dust	- Construction supervisor - Construction OHS Officer	

		• Skin irritation (dermatitis) • Unsecure retaining wall • Sharp edges • Ergonomics	• Medical treatment cases • Serious injuries to back due to inadequate manual handling procedures • Lost time injuries • First aid treatment cases.		• Correct PPE for task • Correct gloves for steel fixing • Toolbox talks • Direct supervision • Correct tools for the task. • Employees shall as far as possible fix steel in a lifted position to limit the bending over to work	- Excavation Supervisor - Hazardous Chemical Supervisor	
2.	FORMWORK AND SHUTTERING	• Concrete in contact with skin • Sharp edges could cut body parts • Heavy rebar could have potential back Injuries •	• Dermatitis • Lost time injuries	9	• Method statements • Issue base risk assessments • Toll box talks • Proper induction in task • Supervision	- Health and Safety representative - Construction Supervisor - Construction OHS officer	
3.	Delivery of material	• Speed of delivery vehicles • Dumping at the wrong place • No pointer/banks man to assist when vehicle is reversing	• Damage to equipment and or property • Production loss • Injuries and possible fatal incidents to employees.	18	• Proper supervision when deliveries take place. • Ensure that assistance is given to driver when reversing and or dumping materials.	- Construction Manager - Health and Safety Officer	During all deliveries.
4.	Demolition Work	• Falling Materials • Premature collapse of Structure	• LTI • Medical Cases / 1st Aid Cases • May result in overall project overrun.	18	• Demolition current method statement • Ensure all emergency procedures are in place and all details are displayed.	• Demolition Supervisor - Construction Manager	During Demolition work

			• Trip slip and falls. • Serious injuries or possible fatalities		• Ensure that structure demolition has been approved by designer and Construction Manager. • All personnel must have the necessary competencies. • Ensure at all times there is a safe means of access and egress. • Barricades are, no unauthorised entry. • All employees must wear the relevant PPE		
5.	Excavation filling Trenches	• Hard rock material • Risk of collapsing excavations • Seepage of subterranean water • Employees inhaling dangerous fumes. • Skin contacts with hazardous substances	• Manual handling injuries • Lost time injuries • First aid treatments	18	• Method statements • Issue base risk assessments • Inspections by excavation supervisor • Proper train operators • Location of services •	- Construction supervisor - Construction OHS Officer - Excavation Supervisor - Civil Engineer • Hazardous Chemical Supervisor	Before and During task
6.	Plumbing works	• Poor housekeeping • Falling of objects • Hand Injuries • Back Injuries • Strains • Damage to property / Equipment	• LTI • Medical Cases / 1st Aid Cases • May result in overall project overrun. • Trip slip and falls	9	• Ensure measurements are correct. • Supervisor to supervise. • Proof of all workers medically fit	• Site Supervisor • Safety Rep • Team • Competent Plumber	Before and During task

					• Ensure all workers are trained on the specific task to prevent damage. • Toolbox talks to be held on job specific		
7.	Tiling	• Tiling not done according to the drawing / design • Tiling in public areas not completed creating a tripping hazard where there is a difference in floor level. • Employee using tile cutter sustaining injuries due to not wearing correct PPE. • Employees sustaining hand injuries while handling tiles	• LTI • Medical Cases / 1st Aid Cases • May result in overall project overrun. • Trip slip and falls	9	• Employees must be provided with the PPE as determined in task risk assessment. • Must be done under constant supervision. • Must be done in line with task risk assessment to ensure the safety of employees	• Construction supervisor • Health and Safety Officer.	Before and During task
8.	Regulating traffic – flagmen operations:	• Serious injuries/ fatalities • Heat exposure to workers • Hit & run accidents. • Flying objects form loose stones. • Damage to construction vehicles • Damage to traffic signage •	• Poor visibility could lead to vehicles ignoring traffic signs. • Poor lay-out of signs could lead to traffic accidents (major) or fatalities. • Standing time • Flagmen ran over by speeding	21	• Installation of road traffic signs & regulating according to installation inventory. • Trained flagmen • Flagmen working in shifts. • Insure good visibility at all times. • Radio communication between flagmen • Implement: Advance warning	• Construction Supervisor • Flagmen: Qualified • Traffic control officer • 1st Aider • Emergency Coordinator	Before and During task.

			traffic could lead to fatality		are, transition area; buffer zone; work zone termination area • Correct high visibility vests & PPE. • Correct symbolic signage. • Certificate of compliance for flagmen • Correct appointments • Traffic Control Officer • Direct supervision • Planned Job Observations • Daily start-up procedures & closure • Replacement of broken traffic signs & traffic cones		
9.	Laying of Kerbs	• Offloading of kerbs • Obstruction in road reserve / side walks • Wrong placement of kerbs	• Damage to vehicles • Inhalation of dry cement and silica dust • Hand and foot injuries • Manual handling injuries	18	• Placement of kerbs close as possible to needed area. • Proper pvc gloves • Steel toe – capped safety shoes • Proper induction on lifting methods • Dust mask to be wear when any dust is visible.	• Construction Supervisor • Health and safety officer	During the task

10.	Stabilization with cement	• Cement powder • Working in vicinity of plant • Public transport	• Occupational illness – respiratory system & skin • Injuries • Obstruct &/or Collision	20	• Wear correct PPE. • Deviations & correct prominent signage	• Construction Supervisor • Health and Safety Officer	During task
12.	Fire Protection	• Inadequate and wrongly placed fire equipment can cause delay in dealing with fire should it occur. • Poor housekeeping • Falling objects • Hand Injuries • Back Injuries • Strains • Non-availability of fire equipment's • Untrained personnel using wrong type of equipment to extinguish the fire delays in searching for fire extinguisher. • Fire alarm not functional or inaudible • Access blocked and people trapped inside, firefighting team not able to obtain access. • Shortage or non-operation of firefighting equipment • Overcrowding an exit point during fire	• LTI • Medical Cases / 1st Aid Cases • May result in overall project overrun. • Trip slip and falls. • Serious injuries or possible fatalities when fire gets out of control. • Damage to property • Medical treatment • Bruises, cuts, broken limb • 1st aid case treatment • Loss of life	18	Riscon Recommendation • Adequate fire equipment to be provided and placed at suitable location. • Monthly checklist of all fire equipment's • Provide training and have fire drills periodically. • Store material in demarcated areas • Cigarettes to be extinguished properly and thrown into rubbish bins. • Ashtrays and waste bins to be emptied daily. • Fire escape routes and assembly points to be determined and clearly marked. • All workers must use appropriate PPE, • Close supervision • Discuss risk assessment with workers.	– Construction Supervisor – Foreman – Fire Fighting Team – First Aider – Fire prevention supervisor	Ongoing

					• Induction training • Toolbox talks training		
13.	Working at heights (general)	• Fatalities • Serious injuries • Damage to equipment and material. • Production lost. • No barricading at drop zone •	• Serious injuries when falling from one level to another level. • Equipment and material could be damage when dropped from a height. • Public and employees could be affected should they enter the drop zone. • Non- adherence to FPP could lead to major and serious injuries. • Employees not trained to work at heights. •	**21**	• A site and task specific fall protection plan including rescue plan must be in place. • This fall protection plan must be drawn up by a competent appointed Fall Protection Plan Developer. • The Clients Agent must approve the fall protection plan. • The fall protection plan must be inducted to all employees working at heights. • All employees working at heights should have working at heights training. • All the necessary registers and inspection checklist must be in place and checked regularly. • All employees working at height should have a valid	• Construction Manager • Scaffold Inspector – Health and safety Officer	Ongoing

					working at height medical in place. • All employees working at height must wear the correct specific for task personal protective clothing. • All hard hats of employees working at height must have chin straps. • Proper procedures must be in place to gain access to tools and materials. • No tools and material may be dropped from any height. • Adequate area identified for a drop zone. This drop zone must be properly barricaded with all the necessary warning signs.		
14.	Scaffolding	• Scaffolding not being erected in accordance with SANS 10085 standards. • Employees working at heights not certified to work at heights in accordance with the SAQA requirements	• Serious injuries when falling from one level to another level. • Equipment and material could be damage when dropped from a height.	21	• Must be designed and inspected by a competent appointed person as per specification requirements. • Must be inspected daily.	• Construction Manager • Scaffold Inspector – Health and safety Officer	Ongoing

		for working at heights training. • Employees allowed to work at heights who is not medical fit and not in possession of a valid medical certificate of fitness. • No rescue plan in place for employees working at heights. • Scaffold erected on uneven ground level. • No sole boards installed underneath scaffold base jacks when erected on soil surface. • Scaffolding not inspected daily by competent, appointed scaffold inspector. • No sign on scaffolding indicating safe / unsafe for use. • No design available for special scaffolding • Area below scaffolding not barricaded off when being dismantled. • Materials not being lowered to ground level correctly while scaffolding are being dismantled.	• Public and employees could be affected should they enter the drop zone. •		• Must be erected by competent scaffold erectors. Must be signed off as safe for use with signage clearly displayed before employees may commence with scaffold work		

		• Scaffold not sufficiently tied into existing building / structure when required.					
15.	Carpentry	• Working in bending positions • Ergonomic hazards to employees • Use of sharp hand tools. • Cut related injuries. • Unskilled workers	• Cuts to hands leading to minor to serious injuries. • Back injuries due to working in a bending position. • Material waste due to unskilled workers.	13	• Proper planning • Ensure sufficient rest periods. • Only used skilled employees. • Ensure tools and equipment is inspected before shift commence. Inspection registers must be completed and kept up to date.	• Site supervisor • OHS Officer – Health and Safety Reps	Ongoing
16.	Electrical Installations	• Falling from ladder, back injuries • Hand injuries • Electrical burns • Electrocution • Fire from incompetent electrical when misconnecting cables etc	• LTI • 1st Aid Cases / Medical treatment • Serious injuries from falling. • Back injuries from falling. • Possibility of budget overrun on project. • May result in project time overrun	13	• Ensure power is off and isolate. • All workers must wear PPE to prevent injuries. • Trained and qualified electrician to complete task • Proper supervision from Supervisor • Toolbox Talks to be conducted on electrical tasks. • Always have a Fire extinguisher at job task • All tools and equipment must be inspected.	• Site Supervisor • OHS Officer – Competent Electrician	Ongoing

					• Fire extinguishers must be available and serviced. • Proper supervision must be applied from Supervisor. • Correct tools and equipment must be used. • All workers must wear correct and sufficient PPE as required. • Toolboxes talk on Power tools. Ensure Electricity is isolated and locked out / switched off		
17.	Ergonomic	• Repetition movements resulting in MSD'S. • Grip force with hands, wrist, arms resulting in muscle fatigue and inflammation of the muscles and tendons. • Lift /lower force activities that could result in lower back injuries. • Working in awkward positions • Extreme temperatures • Activities that result in hand arm vibration that could result in	• Lost time injury • Medical treatment incidents • Body injuries • Heat exhaustion	18	Riscon Recommendation • Employees trained to recognise MSD symptoms. • Encourage early reporting of MSD symptoms. • Re-evaluate work procedures. • Ensure regular resting periods. • Employees need proper training in lifting practises. • Job task observations • Mechanical lifting where possible	– Construction Supervisor – Construction OHS Officer – All employees – First aider	Ongoing

		MSD and white finger syndrome.			• Redesigned tasks • Trained first aider. • Sufficient fresh water hourly (600 ml) • Sunscreen should also be available. • Equipment with lowest vibration be used. • Proper maintenance schedules must be in place. • Proper medical surveillance program in place • Vibrating reducing hand gloves must be used.		
18.	COVID-19	• Public/Professional Team and employees expose to COVID – 19 Virus	• Fever • Tiredness • Dry Cough • Runny nose • Sore Throat • Aches and Panes • Business interruption • Financial loss	22	• COVID-19 Management plan • COVID-19 policy in place • All the new works areas must be disinfected and recorded. • MSDS must be available of the disinfection chemicals used. • All employees must be issued with 2 cloth face masks. • All employees must be trained and	– COVID – 19 Compliance officers – Construction Manager – Health and Safety Officer – All Employees	Ongoing

					inducted in terms of COVID-19. • Sufficient posters and information displayed at the workplace. • Adequate hand wash stations with soap and water and paper towels. • In areas where hand wash stations are not possible, hand sanitation stations should be available. • Sanitation chemicals should have an alcohol content of 70% • MSDS must be available of these sanitation chemicals. • All employees must be screened (body temperature) before and after each shift. • This must be recorded. • Hands must be sanitised when arriving at work. • All visitors to the site must also be screened and sanitised. • This must also be recorded.		

					• The Principal Contractor must have a dedicated isolation room/area when needed. • The principal of no mask, no entry must always apply. • Social distancing of at least 1.5m must always be applied where possible. • Eating facilities must also arrange in such manner that 1.5m can be applied. A sufficient daily cleaning schedule should be implemented and maintained.		

PW 1544

DEPARTMENT OF PUBLIC WORKS

HIV/AIDS

SPECIFICATION

OCTOBER 2004

SECTION

HIV/AIDS SPECIFICATION

HIV/AIDS REQUIREMENTS

1 SCOPE

This specification contains all requirements applicable to the Contractor for creating HIV/AIDS awareness amongst all of the Workers involved in this project for the duration of the construction period, through the following strategies:

- Raising awareness about HIV/AIDS through education and information on the nature of the disease, how it is transmitted, safe sexual behaviour, attitudes towards people affected and people living with HIV/AIDS, how to live a healthy lifestyle with HIV/AIDS, the importance of voluntary testing and counselling, the diagnosis and treatment of Sexually Transmitted Infections and the closest health Service Providers;
- Informing Workers of their rights with regard to HIV/AIDS in the workplace;
- Providing Workers with access to condoms and other awareness material that will enable them to make informed decisions about sexual practices.

2 DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

Service Provider: The natural or juristic person recognised and approved by the Department of Public Works as a specialist in conducting HIV/AIDS awareness programmes.

Service Provider Workshop Plan: A plan outlining the content, process and schedule of the training and education workshops, presented by a Service Provider which has been approved by the Representative/Agent.

Worker: Person in the employ of the Contractor or under the direction or supervision of the Contractor or any of his Sub-contractors, who is on site for a minimum period of 30 days in all.

2.2 Abbreviations

HIV : Human Immunodeficiency Virus.

AIDS : Acquired Immune Deficiency Syndrome.

STI : Sexually Transmitted Infection.

3 BASIC METHOD REQUIREMENT

3.1 The Contractor shall, through a Service Provider, conduct onsite workshops with the Workers.

The Service Provider shall develop and compile a Service Provider Workshop Plan to be presented at the workshops and which will be best suited for this project to achieve the specified objectives with regard to HIV/AIDS awareness.

The Service Provider Workshop Plan shall be based on the following information provided by the Contractor:

- Number of Workers and Sub-contractors on site;
- When new Workers or Sub-contractors will join the construction project;
- Duration of Workers and Sub-contractors on site;
- How the maximum number of Workers can be targeted with workshops;
- How the Contractor prefers workshops to be scheduled, e.g. three hourly sessions per Worker, or one 2.5 hour workshop per Worker;
- Profile of Workers, including educational level, age and gender (if available);
- Preferred time of day or month to conduct workshops;
- A Gantt chart reflecting the construction programme, for scheduling of workshops;
- Suitable venues for workshops.

The Contractor shall submit the Service Provider Workshop Plan for approval within 21 days after the tender acceptance date. After approval by the Representative/Agent, the Contractor shall make available a suitable venue that will be conducive to education and training.

3.2 The Service Provider Workshop Plan shall address, but will not be limited to the following:

3.2.1 The nature of the disease;
3.2.2 How it is transmitted;
3.2.3 Safe sexual behaviour;
3.2.4 Post exposure services such as voluntary counselling and testing (VCT) and nutritional plans for people living with HIV/AIDS;
3.2.5 Attitudes towards other people with HIV/AIDS;
3.2.6 Rights of the Worker in the workplace;
3.2.7 How the Awareness Champion will be equipped prior to commencement of the HIV/AIDS awareness programme with basic HIV/AIDS information and the necessary skills to handle questions regarding the HIV/AIDS awareness programme on site sensitively and confidentially;
3.2.8 How the Service Provider will support the Awareness Champion;
3.2.9 Location and contact numbers of the closest clinics, VCT facilities, counselling services and referral systems;
3.2.10 How the workshops will be presented, including frequency and duration;
3.2.11 How the workshops will fit in with the construction programme;
3.2.12 How the Service Provider will assess the knowledge and attitude levels of attendees to structure workshops accordingly;
3.2.13 How the video will be used;
3.2.14 How the Service Provider will elicit maximum participation from the Workers;
3.2.15 A questions and answers slot (interactive session).

The Service Provider Workshop Plan shall encompass the Specific Learning Outcomes (SLO) as stipulated.

4 HIV/ AIDS AWARENESS EDUCATION AND TRAINING

4.1 Workshops

The Contractor shall ensure that all Workers attend the workshops.

The workshops shall adequately deal with all the aspects contained in the Service Provider Workshop Plan. A video of HIV/AIDS in the construction industry, which can be obtained from all Regional Offices of the Department of Public Works, is to be screened to Workers at workshops. In order to enhance the

learning experience, groups of not exceeding 25 people shall attend the interactive sessions of the workshops.

4.2 Recommended practice

4.2.1 Workshop Schedule

Presenting information contained in the Service Provider Workshop Plan can be divided in as many workshop sessions as deemed practicable by the Contractor, provided that all Workers are exposed to all aspects of the workshops as outlined in the Service Provider Workshop Plan.

Breaking down the content of information to be presented to Workers into more than one workshop session however, has the added advantage that messages are reinforced over time while providing opportunity between workshop sessions for Workers to reflect and test information. Workers will also have an opportunity to ask questions at a following session.

4.2.2 Service Providers

A database of recommended Service Providers is available from all Regional Offices of the Department of Public Works.

4.2.3 HIV/AIDS Specific Learning Outcomes and Assessment Criteria

Workers shall be exposed to workshops for a minimum duration of two-and-a-half hours. In order to set a minimum standard requirement, the following specific learning outcomes and assessment criteria shall be met.

4.2.3.1 UNIT 1: The nature of HIV/AIDS

After studying and understanding this unit, the Worker will be able to differentiate between HIV and AIDS and comprehend whether or not it is curable. The Worker will also be able to explain how the HI virus operates once a person is infected and identify the symptoms associated with the progression of HIV/AIDS.

Assessment Criteria:
1. Define and describe HIV and AIDS;
2. List and describe the progression of HIV/AIDS.

4.2.3.2 UNIT 2: Transmission of the HI virus

After studying and understanding this unit, the Worker will be able to identify bodily fluids that carry the HI virus. The Worker will be able to recognise how HIV/AIDS is transmitted and how it is not transmitted.

Assessment Criteria:
1. Record in what bodily fluids the HI virus can be found;
2. Describe how HIV/AIDS can be transmitted;
3. Demonstrate the ability to distinguish between how HIV/AIDS is transmitted and misconceptions around transmittance of HIV/AIDS.

4.2.3.3 UNIT 3: HIV/AIDS preventative measures

After studying and understanding this unit, the Worker will comprehend how to act in a way that would minimise the risk of HIV/AIDS infection and to use measures to prevent the HI virus from entering the bloodstream.

Assessment Criteria:
1. Report on how to minimise the risk of HIV/AIDS infection;
2. Report on precautions that can be taken to prevent HIV/AIDS infection;
3. Explain or demonstrate how to use a male and female condom;
4. List the factors that could jeopardize the safety of condoms provided against HIV/AIDS Transmission.

4.2.3.4 UNIT 4: Voluntary HIV/AIDS counselling and testing

After studying and understanding this unit, the Worker will be able to recognise methods of testing for HIV/AIDS infection. The Worker will be able to understand the purpose of voluntary HIV/AIDS testing and pre- and post-test counseling.

Assessment Criteria:
1. Describe methods of testing for HIV/AIDS infection;
2. Report on why voluntary testing is important;
3. Report on why pre- and post-test counselling is important.

4.2.3.5 UNIT 5: Living with HIV/AIDS

After studying and understanding this unit, the Worker will be able to recognise the importance of caring for people living with HIV/AIDS and be able to manage HIV/AIDS.

Assessment Criteria:
1. List and describe ways to manage HIV/AIDS;
2. Describe nutritional needs of people living with HIV/AIDS;
3. Describe ways to embrace a healthy lifestyle as a person living with HIV/AIDS;
4. Explain the need for counselling and support to people living with HIV/AIDS.

4.2.3.6 UNIT 6: Treatment options for people with HIV/AIDS

After studying and understanding this unit, the Worker will be familiar with the various treatments available to HIV/AIDS infected or potentially HIV/AIDS infected people.

Assessment Criteria:
1. Discuss anti-retroviral therapy;
2. List methods of treatment to prevent HIV/AIDS transmission from mother-to-child;
3. Describe the need for treatment of opportunistic diseases for people living with HIV/AIDS;
4. Describe post exposure prophylactics.

4.2.3.7 UNIT 7: The rights and responsibilities of Workers in the workplace with regard to HIV/AIDS

After studying and understanding this unit, the Worker will be able to identify the rights and responsibilities of the Worker living with HIV/AIDS in the workplace. The Worker will recognise the importance of accepting colleagues living with HIV/AIDS and treating them in a non-discriminative way.

Assessment Criteria:
1. Discuss the rights of a person living with HIV/AIDS in the workplace;
2. Discuss the responsibilities of a person living with HIV/AIDS in the workplace;
3. Report on why acceptance and non-discrimination of colleagues living with HIV/AIDS is important.

4.3 Displaying of plastic laminated posters and distribution of information booklets

The Contractor shall obtain a set of four laminated posters conveying different key messages and information booklets. The contractor should include the costs of posters and information booklets in his/her tender price.

The above-mentioned posters and information booklets have been prepared to raise awareness and to share information about HIV/AIDS and STI's.

Posters or display stands shall be displayed on site as soon as possible, but not later than 14 days after the date of site handover.

Posters shall be displayed in areas highly trafficked by Workers, including toilets, rest areas, the site office and compounds.

The posters on display must always be intact, clear and readable.

Information booklets must be distributed to all Workers as soon as possible, but not later than 14 days after site handover, or as soon as the Worker joins the site.

5 PROVIDING WORKERS WITH ACCESS TO CONDOMS

The Contractor shall provide and maintain condom dispensers and make both male and female condoms, complying with the requirements of SABS ISO 4074, available at all times to all Workers at readily accessible points on site, for the duration of the contract. The Contractor may obtain condom dispensers from the Department of Health and condoms may be obtained from the Local Clinic or the Department of Health.

At least one male and one female condom dispenser and a sufficient supply of condoms, all to the approval of the Representative/Agent, shall be made available on site within 14 days of site hand over. Contractors should note that arrangements to obtain condoms from the Department of Health Clinics prior to site hand over may be necessary, to ensure that condoms are available within 14 days of site handover.

Condoms shall be made available in areas highly trafficked by Workers, including toilets, the site office and compounds.

6 ENSURING ACCESS TO HIV/AIDS TESTING AND COUNSELLING FACILITIES AND TREATMENT OF SEXUALLY TRANSMITTED INFECTIONS (STI)

The Contractor shall provide Workers with the names of the closest Service Providers that provide HIV/AIDS testing and counselling and Clinics providing Sexually Transmitted Infection (STI) diagnosis and treatment. Information on these Service Providers and Clinics must be displayed on a poster of a size not smaller than A1 in an area highly trafficked by Workers.

7 APPOINTMENT OF AN HIV/AIDS AWARENESS CHAMPION

7.1 Within 14 days of site handover the Contractor shall appoint an Awareness Champion from amongst the Workers, who speaks, reads and writes English, who speaks and understands all the local languages spoken by the Workers and who shall be on site during all stages of the construction period. The Contractor shall ensure that the Awareness Champion has been trained by the Service Provider on basic HIV/AIDS information, the support services available and the necessary skills to handle questions regarding the HIV/AIDS programme in a sensitive and confidential manner.

7.2 The Awareness Champion shall be responsible for:

7.2.1 Liasing with the Service Provider on organising awareness workshops;
7.2.2 Filling condom dispensers and monitoring condom distribution;
7.2.3 Handing out information booklets;
7.2.4 Placing and maintaining posters.

8 MONITORING

The Contractor shall grant to the Representative/Agent reasonable access to the construction site, in order to establish that the Contractor complies with his obligations regarding HIV/AIDS awareness under this contract.

The Contractor must report problems experienced in implementing the HIV/AIDS requirements to the Representative/Agent.

The attached SITE CHECKLIST (SCHEDULE A) shall be completed and submitted at every construction progress inspection to the Representative/Agent.

The attached SERVICE PROVIDER REPORT (SCHEDULE B) shall be completed and submitted on a monthly basis to the Department's Project Manager, through the Representative/Agent.

The attached CONTRACTOR HIV/AIDS PROGRAMME REPORT (SCHEDULE C), a close out programme report, shall be completed by the Contractor at the end of the contract.

SCHEDULE A

HIV/AIDS PROGRAMME: SITE CHECKLIST

When did construction commence: _____

Name of Departmental Project Manager: _____

Please refer to HIV/AIDS Programme activities during the reporting period

Tick the block if Contractor satisfactorily complied with specifications																												
DATE	**PI**				**PI**				**PI**				**PI**				**PI**				**PI**				**PI**			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Programme implemented within 14 days of site handover																												
Awareness champion on site																												
HIV/AIDS awareness service provider report																												
Male condom dispenser																												
Sufficient male condoms available																												
Male condom dispenser in a highly trafficked area																												
Female condom dispenser																												
Sufficient female condoms available																												
Female condom dispenser in a highly trafficked area																												
All four types of posters displayed																												
Posters in a good condition																												
Posters in a highly trafficked area																												
Posters displayed on local support services: clinic & VCT centre																												
Support service poster/s in highly trafficked area																												
Support service poster/s in a good condition																												

Please indicate the applicable number for the reporting period							
Workers on payroll (at PI)							
Sub-Contractors who will be on site for longer than 30 days (at PI)							
Workshop attendees							
Number of workshops held							
Scheduled workshops according to approved workshop plan							
Booklets distributed							
Male condoms distributed							
Female condoms distributed							

Representative/Agent

Date

Contractor

Date

Date of progress inspection: (ccyy/mm/dd)

Reporting period: (ccyy/mm/dd) _____ to (ccyy/mm/dd) _____

Deviations from HIV/AIDS awareness programme plan:

Corrective actions:

Representative/Agent

Date

Departmental Project Manager

Date

SCHEDULE B

HIV/AIDS AWARENESS PROGRAMME: SERVICE PROVIDER REPORT

Reporting period: (ccyy/mm/dd) _____ to (ccyy/mm/dd) _____

Number of workshops conducted in reporting period: _____

Number of scheduled workshops according to approved workshop plan: _____

Deviations from workshop plan:

State reasons for deviating from workshop plan:

Corrective actions:

_____ _____

Service Provider

_____ _____

Date Date

HIV/AIDS AWARENESS PROGRAMME : WORKSHOP CONTENT ADDRESSED

Fill in the applicable information with regard to each workshop conducted																												
DATE	**W/S**				**W/S**				**W/S**				**W/S**				**W/S**				**W/S**				**W/S**			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Content of workshop: (Mark the content included)																												
SLO1																												
SLO2																												
SLO3																												
SLO4																												
SLO5																												
SLO6																												
SLO7																												
HIV/AIDS in construction video																												
Indicate the duration of the workshop in hours																												
Total number of Workers																												
Indicate workshop venue																												

HIV/AIDS AWARENESS PROGRAMME: ATTENDANCE REGISTER

Fill in your name and indicate attendance by ticking the appropriate date

DATE		W/S				W/S				W/S				W/S				W/S				W/S				W/S			
		D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
No	**NAMES**																												

SCHEDULE B

SCHEDULE C

CONTRACTOR HIV/AIDS PROGRAMME REPORT

Project name: _____

Project Location: _____

Contract value of project: R_____

Department of Public Works Project Manager: _____

HIV/AIDS Programme duration: (ccyy/mm/dd) _____ to (ccyy/mm/dd) _____

AWARENESS MATERIAL

Describe location of posters displayed during the programme: _____

_____

Comments on posters: _____

Indicate total number of booklets distributed: _____

Comments on booklets: _____

_____

CONDOMS

Indicate total number of male condoms distributed: _____

Indicate total number of female condoms distributed: _____

Describe where male condom dispenser was placed: _____

Describe where female condom dispenser was placed: _____

HIV/AIDS WORKSHOPS

Indicate the total number of HIV/AIDS workshops conducted: _____

Indicate the duration of workshops: _____

Indicate the total number of Workers that participated in the HIV/AIDS workshops: _____

Indicate the total number of Workers that were exposed to the video on HIV/AIDS in the Construction Industry:

_____

Comments on HIV/AIDS workshops on site: _____

_____

GENERAL

Briefly describe programme activities and satisfaction with outcome: _____

_____

_____

Additional comments, suggestions or needs with regard to the HIV/AIDS awareness programmes on site:

_____

_____

_____

Please indicate if your company has a formal HIV/AIDS policy focussing on HIV/AIDS awareness raising and care and support of HIV/AIDS Workers:	Yes	No	Currently developing one

Please indicate if, to your knowledge, you have lost any workers during the duration of the project to HIV/AIDS related sicknesses. One or more of the following might indicate an HIV/AIDS related death:

Excessive weight loss	Coughing or chest pain	Vomiting
Reactive TB	Pain when swallowing	Meningitis
Hair loss	Persistent fever	Memory loss
Severe tiredness	Diarrhoea	Pneumonia

Number of HIV/AIDS-related deaths: _____

_____ _____

Contractor **Date**

_____ _____

Departmental Project Manager **Date**