ANNEXURE D
DESCRIPTION OF SYSTEMS

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DESCRIPTION OF SYSTEM

1 SCOPE OF WORKS

1.1 General

1.1.1 Installation of new appropriate temperature rating sprinkler heads for sprinkler pump room
1.1.2 Installation of new quick response sprinkler heads to areas of Block A and B and under staircases as indicated on drawings
1.1.3 Installation of direct reading flow meter on sprinkler tank infill line
1.1.4 Installation of bleed-cocks to starting test arrangement in sprinkler pump room
1.1.5 Re-location of IDC 2 booster connection as per drawing to be provided
1.1.6 Installation of fire seals and doors as required
1.1.7 Installation, testing and commissioning of gaseous fire suppression systems to the following areas: Block A Server Room, Records Room, Nerve Centre.
1.1.8 Room integrity tests – Block A Server room, Records Room, Nerve Centre
1.1.9 Installation, testing and commissioning of upgrade to smoke detection system to the following areas – auditorium, cafeteria passage, gym, transformer room
1.1.10 Provision of all working drawings timeously.
1.1.11 Provision of all method statement documents timeously
1.1.12 Provision of all equipment submissions timeously.
1.1.13 Provision of builder's works drawings timeously.
1.1.14 Provision of all operating and maintenance manuals as defined.
1.1.15 Training of the Client's appointed representative in the maintenance and day to day operation of the systems as defined
1.1.16 Compliance with the client’s programmes.
1.1.17 Site establishment, storage of equipment and plant in location as directed by the client
1.1.18 Liaison and co-ordination with other trades
1.1.19 Programming of the services works, commissioning, and hand over to comply with the project programme
1.1.20 Hand over to the Client/User in 'as-new' working order
1.1.21 Provision of spare parts as defined in this document
1.1.22 Management of the works and subcontractors
1.1.23 Attendance of domestic subcontractors
1.1.24 Weatherproofing, of pipe penetrations through roof sheeting, roof slabs and walls where required
1.1.25 Hoisting, and rigging of equipment,
1.1.26 Receipt and off loading of equipment
1.1.27 Temporary protection of the services installation as required
1.1.28 Interfacing with the other trades and sub contractors as regards commissioning, and hand over
1.1.29 One year’s full comprehensive maintenance of the fire protection services installation, including consumables and spares. Submission of a programme, schedule of maintenance checks, log books and notification to the Maintenance Department when work is to be carried out for inspection purposes, after being witnessed as complete and accepted by the Principal Agent. (Applicable to new Gas Suppression Systems)

2 DESCRIPTION OF THE BUILDING

The IDC head office situated at 19 Fredman Drive in Sandton comprises of two adjacently located buildings i.e.IDC 1 (Kindoc) and IDC 2 (Dymson). The two buildings respectively have total floor areas of 23 400 m^2 and 3000 m^2.

The floors consist of open plan offices, meeting rooms, kitchens and toilet areas. IDC 1 has a fire detection system and a sprinkler system installed. The sprinkler system comprises a pump and tank room, 2 ICV chambers and 2200 sprinkler heads. IDC 2 has only a smoke detection system installed. The buildings also include server rooms protected by gaseous suppression systems.

The IDC has been audited by the Automatic Sprinkler Inspection Bureau (ASIB), the Fire System Inspection Bureau (FSIB) and an independent insurance company. Items were identified that need to be added to the systems to further enhance the operation of the systems and to comply with the latest regulations.

3 SPRINKLER INSTALLATION

The building is currently fitted with sprinkler protection. The pump room sprinklers are to be replaced with the proper required rating heads which are 141°C.

Old sprinklers in Block A & B and under staircases are to be replaced with new sprinkler heads of the same type as is installed throughout the building.

4 PROGRAMME

A programme of works shall be agreed with the Principal Contractor as expeditiously as possible to comply with the overall contract duration bearing in mind that time is of the essence and shall be of prime consideration when determining the required scope of work, lead-in times for drawings, equipment submissions, equipment deliveries etc.

4.1 Tender Drawings

The Tender Drawings are in the form of reflected ceiling layouts indicating all new sprinkler head positions.

The contractor is required to do the detailed engineering and co ordination based on these designs and based on the parameters as stated in this documents. The contractor shall be diligent in the system design and finite co ordination.

4.2 Basis Of Design

The sprinkler pipework shall be hydraulically calculated and designed to information and guidance provided by the SABS 0287.

The fire protection contractor, based on the following parameters, shall hydraulically do the

capacity calculation for all systems.

The following densities are incorporated:

	Occupancy	Density of discharge
1	Offices	5mm/min @ 140m²
2	All other areas	5mm/min @ 140m²

The above densities are based on fast response sprinklers and the latest 10th edition amendments
The pumped supply shall supply only the sprinkler systems.

For the sprinkler systems the furthest area on the top floor will be taken as the most remote area. The hydraulic most favourable shall be closest to the pump set. Based on these areas the required flow and pressure can be calculated as follows:

4.3 Installation Drawings and Calculations

The Fire Services Sub-contractor shall produce detailed as built drawings of the sprinkler main system, based on what exists on site.

4.4 Information to be supplied:

The under noted information shall be supplied in addition to that required by SANS 10287.

4.5 Documents

All documents submitted for checking shall be identified as follows:

4.5.1 Drawing or document number or reference.
4.5.2 Issue number
4.5.3 Date of issue.
4.5.4 Name of project.
4.5.5 Drawing or document title.
4.5.6 Installation number or reference
4.5.7 Reference for assumed maximum areas of operation under consideration.
4.5.8 Name of designer.
4.5.9 Name of competent person and certificate number who should not be the designer.

The Subcontractor's representative shall check and verify and sign all submittals.

5 ENVIRONMENTAL DESIGN CRITERIA

The tender for the nominated Fire Services Sub-contract works has been based on the following design criteria:

5.1 Indoor environmental conditions

Area	Summer(°C db/RH)	Winter (°C db/RH)
Offices, Conference rooms,	23.0/Air Conditioned	21.0/Uncontrolled
Public areas (corridors and stairwells, restaurants)	23.0/Air Conditioned	21.0/Uncontrolled
Basements	See outdoor	See outdoor

5.2 Outdoor conditions

The following external conditions have been applied in the design of systems:

Location ..... Johannesburg, Gauteng
Altitude above sea level ..... 1700 m

Summer (°C db/°C wb) 30/20
Winter (°C db) 5

In addition the specified equipment and plant have been selected to function under the following extremes of external conditions without failure:

Highest maximum ambient ..... 40.0°C db
Lowest minimum ambient ..... -2°C db

These temperature and humidity conditions shall be rigidly adhered to by the sub-contractor in his functional design and in the implementation of the tender scheme.

5.3 Emergency Directional and Escape Signage

Emergency lighting is provided by the electrical contractor to the feeder, all escape routes, toilets, plant rooms and offices. The duration will be 2 hours minimum.

5.4 Fire detection and alarm system

There are various areas where the smoke detection coverage was found to be inadequate or

non-existent.

These areas include the following but will also be detailed on design drawings and Bills of Quantities for tender – Auditorium, Canteen passage, Block A lift lobbies, various passages and top of stairwells.

There are also some other areas throughout the building where a few additional detectors are required in order to provide full coverage to all areas. This will be detailed in design drawings. The interface with the voice evacuation system needs to be installed/programmed to be activated automatically by the smoke detection system.

Some additional detectors are also required in the transformer rooms and some rerouting of wiring will be required.
Some additional Manual Call Points are also required which will be detailed on drawings.
Once the extra detectors have been installed the system will be re-tested.

The server room in Block A will be made a fire rated compartment and a new system will be designed to protect this volume.

The nerve centre is also to be provided with a gas suppression system and sprinklers in this area are to be blanked-off as per request by the client.

The new designs will ensure compliance of the systems with current regulations and standards – items for attention are listed in the responsibility matrix. New design drawings and Bills of quantities will be provided.

5.5 Interface

Volt-free contacts shall be provided to shut down the A/C plant, return the lifts to the parking level at ground floor, to disengage the magnetic release locks to close the smoke doors and to open security doors with electromechanical locks.

All monitored valves, flow switches, as well as pump system shall be interfaced with the detection system.

5.6 Pump Room Automatic Sprinkler Installation

The Fire pump room shall be protected against fire by a fully automatic sprinkler system.

Sprinkler heads shall be strategically positioned throughout the Fire pump room connected into the basement sprinkler system complete with a separate water flow switch installed on the branch serving this area. A remote test valve shall be provided.

<u>The sprinkler head type shall be as follows:</u>

Location	Size of head	Pattern	Temp. rating (°C)
Fire pump room	15 Upright	Upright spray	141

6 ELECTRICAL CABLE WAYS

6.1 General

An integrated network of cableways shall be provided:

- Power cables
- Power cableways

Low voltage cableways shall generally comprise perforated trays and, where appropriate, ladders interlinked to form a network of lateral and vertical paths for power cables. The power cableways shall interlink the substation with the electrical riser shafts, the rooftop plant areas of the building and the plant rooms.

Power cables shall be laterally run at high level inside the pump room to the electrical loads.

Protective covers shall be provided to lateral cable tray routes in basement car parking areas and at the rooftop plant areas.

6.2 Cableways for Fire Control Wiring System

Cableways for fire control wiring systems and other electronic systems shall comprise a mix of conduits and light duty galvanised cable trays. The conduit wireways shall be provided for use in situations where the cables are required to be concealed in wall chases or to be cast in situ. The vertical riser sections of the network shall contain cable trays with proprietary cable fixings designed to support the cables.

7 SPRINKLERS

7.1 General

Sprinklers shall be provided throughout the building as part of the overall fire protection services. In accordance with ASIB 10th Edition rules and SABS 0287 the sprinkler installation shall be Ordinary Hazard Class covering all areas, except for the following:

- Stairways - other than at doorways entering into stairs
- Fire safe shafts
- Electrical plant rooms

All of these areas will have walls with a suitable fire rating, which extend from floor level to the underside on the floor slab above. The interface between the wall and the soffit shall be suitably constructed to provide a fire seal of equal resistance to the wall it serves.

Generally the following sprinkler types shall be used:

Location	Size	Pattern	Temp. rating (°C)
Exhaust hoods and ducts	15mm	Medium velocity sealed units	200
All public areas	15mm	Pendant / upright spray, epoxy coated white with matching rosette	68 Fast response
Basements and Below concrete slabs (e.g. no ceiling and above ceilings)	15mm	Pendant / upright spray, polished brass and standard brass	68 Fast response
Below steelwork	15mm	Conventional, polished brass or standard brass	68 Fast response

7.2 Sprinkler Water Reticulation

Water supply for the sprinkler installation serving the building is fed from a dedicated pump and a storage tank.

The sprinkler water mains shall be pressurised to the required pressure as stipulated by ASIB 10th Edition Rules and SABS 2087.

A duty diesel pump facility is provided.

The pump shall be diesel engine driven and only operate in the event of the sprinklers activated. The sprinkler reticulation main shall be maintained at the required pressure by an electric jockey pump.

7.3 Sprinkler Installation

The overall sprinkler system contains three existing sprinkler installations.

This location allows easy access for the fire brigade it also allow for easy access for maintenance personnel, who need to use the test pipe facility on each control valve set. The test pipes shall be piped to a drain in the ICV chamber.

The mains from each sprinkler control valve set exists and pass back into the floor and then follow designated routes to rise up the building levels.

7.4 Main Risers

The main risers exist and are primarily of welded construction with mechanical joints in straight pipe sections.

A new feed main to the valves shall be installed under this contract.

7.5 Final Design Provision Interior Decorator

7.5.1 Layout of piping and sprinkler heads in areas where ceilings are installed.

The system shall be so designed so that each sprinkler head below a false ceiling is fed by 25 NB drop pipe connected to a 32 mm N.B. swivel arm pipe. The arm pipes are in turn connected onto the system range pipes.

The sockets on the main distribution pipes are 50mm N.B. and are reduced down to the required size by the insertion of reducing bushes. The piping exists and this contract calls for retaining the mains and redoing the range pipes to suit. Where acceptable, range pipes can be used and adapted to suit.

7.5.2 Offices, meeting rooms, conference rooms, lift lobbies and corridors areas etc.

Generally all areas shall be provided with under-ceiling, spray type heads, complete with a matching rosette. The ceilings in the offices and support facility areas are generally 1 200 x 600 mm lay in type ceiling tiles, however those curved or irregular shaped area of the building or those containing feature ceilings, e.g lift lobbies etc. are formed from plasterboard and have restricted access.

To prevent unnecessary leaks and damage to ceilings all pipework will undergo pressure tests prior to any ceiling being erected. Generally all sprinkler heads shall be located in the centre of a 1200x 600 mm ceiling tile

Any damage caused by leaks etc. shall be borne by the Fire Services Sub contractor.

7.5.3 Ceiling voids

Generally throughout the building, the ceiling voids depth is less than 800 mm deep. All voids in excess of 800 mm are already sprinkler protected.

8 WET RISER, HOSE REELS AND FIRE HYDRANT SYSTEM

Water supply for the fire extinguishing installation both inside and outside of the building exists and is fed from a 150 mm dia firewater reticulation main fed from the municipal mains.

8.1 Feed Main and Risers

All feed mains exist. A new pump set (For hose reel supply) shall be installed and piped to the existing system.

Piping shall be galvanized steel.

8.2 External Hydrants

The external hydrants are on the Municipal feed and exist (Street Hydrants)

8.3 Wet Riser (Internal Hydrants)

All exists

8.4 Fire Hose Reels

Generally all areas will be within the reach of a 30m long fire hose reel. All hose reels shall bear the SABS mark

The fire hose reels are generally situated near the fire escape stairs in the building and at the lift core giving adequate coverage of all floor areas.

A quantity of Fire hose reels are listed in the Bills to cater for changes in office layouts

8.5 Fireman's Booster Point

A double fire brigade booster point is already provided on the fire main serving the hydrant system, which shall be located immediately outside the executive parking area, to allow boosting of this installation from the fire engine. IDC 2 booster connection will be relocated

9 MANUAL FIRE EXTINGUISHERS

9.1 Portable Fire Extinguishers

Generally all extinguishers shall comply with SABS Specifications as required by the application, and bear the SABS mark of approval

Typically 2 No. 4.5 kg dry powder portable fire extinguishers shall be provided adjacent to each fire hose reel/internal hydrant valve in public areas to allow ease of handling in the event of a fire.

<u>The accommodation of additional fire extinguishers shall be as follows:</u>

9.1.1	Kitchens	4.5 kg wet chemical (Ansul wet chemical and NOT foam extinguishers are required)
9.1.2	Computer rooms	5 kg CO2
9.1.3	Outside mechanical or electrical plant rooms	5 kg CO2
9.1.4	Roof & ground plant areas…….....	5 kg CO2

The quantities to be supplied depends on the situation. A number is listed in the Bills of quanities and contractors will be directed on the installation. Should the extinguishers and fire hose reels not be needed, these will be omitted from the contract by means of a variation order.