ANNEXURE B
GENERAL TECHNICAL SPECIFICATION

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GENERAL TECHNICAL REQUIREMENTS

1 QUALITY AND SCOPE OF THE WORK

The contract works described herein shall consist of the supply, delivery, erection, testing, balancing and commissioning into service of the sprinkler, fire hose reel and fire hydrant installation for the building as described in “DESCRIPTION OF SYSTEMS”.

The Sub-contractor shall be responsible to select such equipment that will provide the performance as specified and to position it into the building spaces provided.

Where no specific kind or quality of material is mentioned in the specification, a standard article to the Engineer’s approval shall be supplied. All equipment shall be new and shall be kept in "as new" condition on site until take-over.

Equipment selected shall be of high quality material, design and manufacture and shall be suitable for the type of application and shall provide a reliable and trouble-free service without objectionable noises or vibration under continuous operating conditions.

Work associated with this contract, which does not fall within the scope of the work, is described under division of work in Part V

A detailed system description and work description is included in the similarly named section of the tender document.

2 COMPLIANCE WITH REGULATIONS AND STANDARDS

The Sub-contractor shall be responsible that all equipment and methods used in the installation shall comply with all relevant statutory regulations. Where specific equipment or methods of construction has been specified it is the responsibility of the engineer that such equipment and methods shall comply with the relevant statutory requirements.

<u>The latest amendments of the following shall be complied with:</u>

- SABS 0287: Automatic Sprinklers Installations for Fire Fighting.
- ASIB 10th Edition Rules for Sprinkler Installations
- SABS 0400: The application of the National Building Regulations :
  Part WW Fire Installation
- SABS 0252: Part 1: Water supply installations for buildings.
  Government Provincial and Local Authorities Ordinances, Regulations, By-Laws, Rules and other legal instructions.

Where a conflict between the above mentioned codes occurs, it shall be referred to the Engineer for a decision and mentioned in the tender covering letter. The more strict Specification shall in all instances take preference.

3 APPROVALS

Each system component must have proper listing and/or approval from the nationally recognized agency listed below.

All equipment used shall be listed by at least two of the following agencies.

- SABS – South Afircan Bureau of Standards.
- UL Underwriters Laboratories - USA
- FM Factory Mutual - USA
- VdS Verband der Saeliversicherer - West Germany
- AFNOR Association Francaise de Normalisation - France
- B.S. British Standards - Great Britain
- LPC Loss Prevention Council - Great Britain
- C.S.A. Canadian Standards Association - Canada
- ULC Underwriters Laboratories - Canada
- SAA Australian Standards - Australia

Any, deviation from these specifications must be approved, in writing, by the Engineer familiar with the project for which the Specification has been prepared and by the building's Operator / client's Director of Public Safety.

4 MATERIALS

Under normal conditions of use, all materials shall be free from defects, which are liable to cause undue deterioration or failure. Materials shall not shrink, warp or cause mould or odours and shall be resistant to attack by local vermin and destructive pests.

5 SUPPORTS

Approved methods of fixing to overhead construction shall be co-ordinated with the Engineer.

Where overhead construction is not suitable for fastening of supports additional framing shall be provided. This is of particular importance to cross bracing and anchor points for main and range pipes.

6 ACCESSIBILITY

All equipment shall be installed so as to be readily accessible for operation, maintenance and repair. Minor deviation from the drawings may be made to achieve this, however, change of magnitude or which involve extra costs shall not be made without the approval of the engineer.

Platforms and ladders shall be provided where required for access to equipment in accordance with the requirements of the authorities having jurisdiction.

7 PROTECTION AGAINST CORROSION

All steelwork shall be adequately protected against corrosion. Complete piping system shall be coated with 1 coat red oxide primer paint and two coats of Fire Engine red.

Surfaces shall be thoroughly cleaned by wire brush or sanding together with appropriate solvent cleaner. A red oxide coat shall then be applied.

Care shall be taken that the entire surface is covered to the same standard and where surfaces have been damaged during the installation, these shall be touched up to the same standard.

8 PAINTING

The complete piping installation is to be painted. Pipes shall be primed and painted prior to delivery to site. Two coats, Fire Engine red shall be applied, before delivery to site, on all exposed pipes. Once pipes are installed touching up shall be done to ensure a smooth and as new finish

Concealed piping shall only be primed.

Pipe thread seal (hemp) shall be properly cut back prior to painting.

9 TESTING, BALANCING AND COMMISSIONING DURING ERECTION

Preliminary testing, balancing and commissioning shall be done as systems are installed and consist of the following:

- Flushing of all new pipe installations.
- Filling the system and pressure testing to 15 Bar. Testing shall be done in sections as completed.
- All pump flow and commissioning tests

All testing operations shall be witnessed and approved by the engineer, all flushing and pressure tests shall be documented.

10 PLANT ROOM INSTRUCTIONS

Plant room instructions shall consist of:

- Notices, certificates, diagrams, etc., and all notices as required by the factory inspector and as required by relevant codes.
- A block plan indicating area protected and position of sprinkler valves are to be provided, framed and mounted to the wall next to the valve sets. Operating instructions are also to be mounted in a frame against the wall adjacent to the valves.

A further schematic layout showing all supervised valves and flow switches logically numbered shall be framed and mounted in the fire control room, and a further unit mounted in the

sprinkler pump room.

Pump operation procedure and brief maintenance prescriptions shall be framed in the pump room (applicable to the diesel fire pump and jockey pump installations).

11 TEST FOR SYSTEM ACCEPTANCE

Provide the services of a competent, factory trained engineer or technician, to technically supervise and participate during all of the adjustments and tests for the fire suppression system.

When the systems have been completed and prior to the final inspection, perform the following tests in the presence of the engineer.

Perform the following tests again in the presence of the engineer and duly designated representative of the client at the final inspection:

- Before charging the system with water, ensure that all sections of the system have been pressure tested and flushed, and that certification for pressure testing and flushing is available. A compressed air leak test shall precede the water pressure test
- Fill the fire suppression system with water, and pressurize the system to its working pressure.
- Energize the power supply to the pressure maintenance pump and ensure that system pressure is maintained with only intermittent on/off operation of the pressure maintenance pump.
- Energize the power supply to the main fire pump controllers.
- Test all operational functions, visual and audible indications of both fire pump sets and their associated controllers.
- Utilizing the fire pump test arrangement and flow measuring device, conduct fire pump performance testing to ensure that the fire pumps provide their rated performance from shut off pressure. Check the results with the fire pump manufacturers performance curves.
- Test all fire pump status, trouble, pump running and power failure signals are correctly transmitted and displayed correctly on the central fire alarm control panel.
- Operate every control valve installed with a supervisory switch, and ensure that correct trouble (fault) indications are transmitted and displayed correctly on the central fire alarm control panel. Check that all control valves are returned to their correct operating open positions.
- Using the zone control valve (where provided) with water flow switch and test arrangement, check the time delay period and ensure that the devices provide a fire alarm signal which is transmitted and displayed correctly on the central fire alarm control panel.
- Using hoses to provide a water flow, check all other system connected water flow detectors as stated above.
- Operate all other devices such as pressure switches and float switches to check their correct setting, and operation, and that they transmit the required system trouble (fault) signals to the central fire control panel.

- Test all mechanical water motor alarm devices.
- Conduct trip test of dry pipe sprinkler systems.

The Sub-contractor's material and test certificates must be completed and presented to the engineer.

The Sub-contractor must also provide all necessary instruction manuals for the Inspection, Testing, and Maintenance of all Fire Protection Systems.

12 FINAL INSPECTION

At the final inspection a trained representative of the Sub-contractor shall perform the tests. In addition, the representative shall demonstrate that the systems function properly in every respect. The demonstration shall be made in the presence of the engineer and duly designated representative of the client.

13 IDENTIFICATION SIGNS AND OPERATING INSTRUCTIONS:

The following fire suppression system identification signs shall be provided and displayed in prominent positions:

- Fire department connection - A sign having raised letters painted white, at least (25mm) in size cast on a plate painted red, reading "HYDRANT BOOSTER”.
- On the entrance door into the fire pump room - A sign having raised letters painted white, at least 25mm in size cast on a plate painted red, reading "FIRE PUMPS".
- On all sprinkler system control valves, or internally at the base of the riser - A nameplate stating that the system is hydraulically designed and indicating the locations, and the basis of design.
- On diesel engine drive controllers a sign shall be affixed by the manufacturer stating "DIESEL ENGINE FIRE PUMP CONTROLLER", the sign shall also contain the manufacturer's name, identifying designation and electrical rating.
- On electric motor drive controllers a sign shall be affixed by the manufacturer stating "ELECTRIC FIRE PUMP CONTROLLER", the sign shall also contain the manufacturer's name, identifying designation and electrical rating.
- On Jockey pump motor drive controllers a sign shall be affixed by the manufacturer stating "JOCKEY PUMP CONTROLLER", the sign shall also contain the manufacturer's name, identifying designation and electrical rating.
- Clear and precise operating instructions shall be provided on a label attached to all portable fire extinguishers.
- A label providing clear and precise operating instructions shall be attached to all hose reels.
- Fire sprinkler mains shall be clearly labelled for flow direction and area served. Control valves shall also be labelled. Example “ ICV 1 GROUND AND FIRST FLOOR” Lettering shall be white on a black background and lettering shall be 50 mm high. Marking shall be on the valve position, as well as at all changes in direction and on horizontal piping at every 20 meters.
- Fire hydrant and hose reel mains shall be marked with flow direction arrows and labelling as for sprinkler mains.

14 COMMUNICATION AND CURRENCY

All correspondence will be conducted in English.

15 METHOD STATEMENT

Within three weeks after notification of the tender has been awarded, the Subcontractor shall submit to the Engineer a full set of Method Statement documents, equipment submissions, catalogues etc, in the format as specified by the Engineer for approval.

16 OPERATING AND MAINTENANCE MANUALS

<u>The manuals shall contain the following information and shall be comprehensively indexed:</u>

a) Description of system

b) Equipment data:

- manufacturer and model numbers
- size and rating

- pressure speed and temperature limitations

c) Operating procedures:

- starting and stopping procedures
- abnormal and emergency operating procedures
- adjustment and regulations
- safety devices and settings

d) Maintenance:

- routine maintenance schedule and calendar
- procedures
- trouble shooting charts

e) Spares:

- list of spares and model numbers
- address of suppliers

f) Maintenance and service contract:

- maintenance contract and price
- escalation formula

17 DEFINITIONS AND ABBREVIATIONS

Definitions and abbreviations used in this document shall mean:

"Approved"; "Satisfactory"; "Accepted"; or "Directed":

As approved, satisfactory, accepted or directed by or to the Engineer.

"Balancing":

Work, adjustments and checks necessary to proportion the flow within the distribution system (sub-mains, branches, terminals) in accordance with specified design quantities.

"Commissioning":

Work necessary to place the installation and work covered by this specification into normal operating condition.

"Concealed":

Embedded in masonry or other construction, installed in furred spaces within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

"Exposed":

Not installed underground or concealed as defined above.

"Indicated"; "Shown"; or "Noted":

As indicated, shown or noted on drawings and/or specifications.

"Install":

To erect, mount and connect complete with all related accessories.

"Provide":

To supply, install and connect up complete and ready for safe regular operation particular work referred to.

"Proof":

Submit documentary proof through either controlled test in their laboratory or from an approved independent testing body such as the SABS.

"Similar" or "Equal":

Of approved manufacture equal in materials, weight, size, design and efficiency of performance to product specified by name.

"Supply":

To purchase, procure, acquire and deliver complete with all related accessories.

"Testing":

Work and checks necessary to determine quantitative performance of equipment, installation and workmanship.

"Wiring":

Conduit, fittings, wire, junction and outlet boxes, switches, cutouts and socket outlets and all related items.

"Works":

All labour, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation

Abbreviations :

AC	-	Air Conditioning
AFFL	-	Above finished floor level

ASA	-	American Standards Association
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
BS	-	British Standards Specifications on Institute
BS CP	-	British Standards Code of Practice
DIN	-	Deutsche Industrie Normal
EL	-	Elevation
FM	-	Factory Mutual Engineering Corporation
HVCA	-	Heating and Ventilating Contractor's Association (UK)
MCC	-	Motor Control Centre
NBFU	-	National Board of Fire Underwriters (USA)
NBS	-	National Bureau of Standards (USA)
NEMA	-	National Electrical Manufacturers Association (USA)
NFPA	-	National Fire Protection Association (USA)
SABS	-	South African Bureau of Standards
SMACNA	-	Sheet Metal and Air Conditioning Contractor's National Association, Inc. (USA)
UL	-	Underwriters Laboratories
WBGT	-	Wet Bulb Globe Thermometer Index