Simplex 4100ESi
Fire Detection and Alarm System Engineer's Specification

A Fire detection and alarm system employing Advanced Analogue Addressable Detection Technology.

* *Optional: include, modify or delete as required.*

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0. ADVICE TO ENGINEERS ON SYSTEM CONSTRUCTION

0.1 GENERAL INFORMATION

This specification describes a highly programmable analogue addressable fire detection and alarm system (*FDAS*) that provides a cost effective and reliable means of detecting fires, displaying zones and associated addressable devices in alarm, initiating an occupant warning system or sound system and intercom system for emergency purposes (*s.s.i.s.e.p.* also known as *EWIS*), and signalling a monitoring service provider with an alarm signal to initiate a fire dispatch centre (Fire Brigade) call out, as well as signalling faults and *disabled* conditions (also known as *isolate*). It also provides both simple and complex ancillary control functions to mitigate the effects of fire. This system uses various fault tolerant communications facilities to minimise the effects of faults when monitoring inputs and controlling outputs.

System inputs (detectors, *MCPs*, flow switches etc.) and system outputs (visual warning devices, audible warning devices, interfaces to smoke management systems, etc.) are mainly wired as addressable devices on the addressable communications loops. Some primary inputs and outputs, such as the connection to alarm signalling equipment (*ASE*), are connected directly to the control and indicating equipment (*c.i.e.* also known as the *FIP*).

The *FDAS* described in this specification is mainly analogue addressable, but also may support collective (conventional) detector circuits using hardware cards or addressable zone modules.

Three-port short circuit isolator modules allow existing collective system wiring terminating at the c.i.e. to be reused as wiring for a star-wired addressable system.

The Simplex 4100ESi c.i.e. is a non-proprietary open market panel which has many features making it highly suitable for both new installations as well as for existing systems that are to be progressively upgraded from collective detection to analogue addressable detection.

An analogue addressable fire detection system makes use of detectors that incorporate fire sensors (smoke, carbon monoxide and/or heat) to return analogue values corresponding to the quantities of the fire by-products present in the immediate environment. Software algorithms are then employed to determine whether the values returned represent a valid fire condition that should be reported as an alarm (FastLogic). Although the fire detectors are wired on a common electrical circuit (*transmission path*), the addressable capabilities of the system enable analogue values from each sensor to be separately identified and evaluated and the status of each sensor to be individually displayed at the c.i.e.

The Simplex 4100ESi c.i.e. has a highly flexible mechanical design utilising a 15U, 19” rack construction for the base panel allowing various options to be fitted to the cabinet. Other cabinets and expansion options are available including 8U, 15U, 28U and 40U sizes.

The large 210mm x 160mm colour touch screen operator interface of the 4100ESi provides full display facilities of fire alarm conditions as well as many other system conditions and tests through a familiar tab-style interface for easy menu navigation. The LCD can control up to 500 zones in the standard setup and 1000 as a Network Display unit (NDU)

The LCD may be optionally supplemented with individual light emitting diode (LED) indicators and switches for AS 1668 fan controls; flow switches, pumps and other applications including zone alarm, fault and disabled indications. The indicators and switch controls are expandable in groups of four or eight (depending on the type required) to over a thousand controls and indications. It is recommended that for large systems the LCD is used for fire detection zones with the visual indicators used for specific purposes such as AS 1668 control or sprinkler flow switches.

The flexibility of this system and the range of options available require the specification for each project to be selected to suit the application. For this reason optional specification

* *Optional: Include, modify or delete as required.*

clauses are tagged with an asterisk* throughout this specification and can be deleted or inserted as required.

Appendix A is to be provided by the Engineer and should list each Air Conditioning System to be controlled and its type, i.e., Supply, Return, and Smoke Spill.

0.2 STANDARDS

The following standards are referred to in this Specification:

AS 1603	Automatic Fire Detection and Alarm Systems AS 1603.1 Part 1: Heat detectors AS 1603.2 Part 2: Point-type Smoke detectors AS 1603.5 Part 5: Manual call points AS 1603.14 Part 14: Point-type carbon Monoxide (CO) fire detectors
AS 1668	The use of ventilation and air-conditioning in buildings. AS 1668.1 Part 1: Fire and smoke control in multi-compartment buildings
AS 1670	Fire detection, warning control and intercom systems - System design, installation and commissioning AS 1670.1 Part 1: Fire AS 1670.4 Part 4: Sound systems and intercom systems for emergency purposes
AS 1851	Maintenance of fire protection systems and equipment.
AS 3000	SAA Wiring Rules
AS 3013	Electrical installations- Wiring systems for specific applications
AS 4428	Fire detection, warning, control and intercom systems - Control and indicating equipment AS 4428.1 Part 1: Fire AS 4428.3 2010 Part 3: Fire Brigade Panel AS 4428.5 Part 5: Power supply units AS 4428.6 Part 6: Alarm signalling equipment AS 4428.10 Part 10: Alarm investigation facility
AS/NZS CISPR22	Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
AS 7240	Fire detection and alarm systems AS 7240.2 Part 2 Control and indicating equipment AS 7240.4 Part 4 Power supply equipment AS 7240.5 Part 5 Point-type heat detectors AS 7240.6 Part 6 Carbon monoxide fire detectors using electro-chemical cells AS 7240.7 Part 7 Point-type smoke detectors using scattered light, transmitted light or ionization AS 7240.8 Part 8 Carbon monoxide fire detectors using an electro-chemical cell in combination with a heat sensor. AS 7240.11 Part 11 Manual call points
EN 54	Fire Detection and Alarm Systems EN 54 -11 Part 11 Manual call points
ISO 8201	Acoustics – Audible emergency evacuation signal
SITE COPY	Keep on the site a copy of AS 1670.1

* *Optional: include, modify or delete as required.*

1. GENERAL REQUIREMENTS

1.1 SCOPE - FIRE DETECTION

A fire detection and alarm system shall be installed throughout (ADD NAME OF PREMISES)*. The fire detection and alarm system shall be software programmable, device addressable, analogue sensing, using multiplex communication techniques with extra low voltage field wiring and modular construction in full compliance with all applicable Australian codes and standards.

The contractor shall provide, install, test and commission the fire detection and alarm system as specified herein and as shown on the tender drawings. The system shall include all required hardware, interconnecting wiring and site-specific data to accomplish the requirements of this specification and the tender drawings, whether itemised or not.

All equipment shall be new and shall be the products of a single company engaged in the manufacture and sale of analogue addressable fire detection systems.

1.2 MATERIALS & SERVICES

The system shall include, but not be limited to, the following elements:

- Control and indicating equipment as a main c.i.e.
- Control and indicating equipment as one or more sub-indicator panels in accordance with the schedule of equipment*
- Power supplies, batteries and battery chargers
- Collective (conventional) circuit interfaces*
- Equipment enclosures
- Control relays
- Firmware and hardware as required to provide a complete functioning system
- Site specific data as required to provide a complete functioning system.
- Analogue addressable multi-sensor photoelectric smoke and heat sensors*
- Analogue addressable heat and smoke detectors, input and output modules
- Sole occupant unit or apartment alarm acknowledgement facility (AAM)*
- Intrinsically safe conventional detectors and modules*
- Collective (conventional) heat, smoke and carbon monoxide/heat fire detectors*
- Other devices as required for compliance with this specification
- Occupant Warning System* OR Interface to the sound system and intercom system for emergency purposes*
- Mimic panels, where shown on drawings*
- Remote Fire Brigade Panel where shown on drawings*
- Fire Fan Control Panel*
- Wiring
- Installation, testing, commissioning and completion of installer's statement as per AS 1670.1.

** Optional: Include, modify or delete as required.*

1.3 CERTIFICATION OF CONFORMITY (APPROVALS)

All fire detection and alarm system equipment shall be independently tested and certified to conform to the relevant standards listed in AS 1670.1.

All equipment shall be listed by the ActivFire Scheme or appropriate listing body where a relevant standard applies and/or otherwise shall be shown to be fit for purpose and compatible.

All equipment and detection devices shall have a valid RCM label.

The c.i.e. (FIP) shall comply with AS 7240.2, and all mimics, repeater panels and alarm signalling equipment shall comply with relevant parts of AS 7240 and/or AS 4428.

The c.i.e. shall have an integrated fire brigade panel complying with AS 4428.3 2010, with the option also available for a separately-mounted fire brigade panel, also complying with AS 4428.3 2010.

Power supplies/charger shall comply with AS 4428.5 as specified in AS 4428.1 or AS 7240.4.

All smoke detectors shall comply with AS 1603.2 or AS 7240.7.

All heat detectors shall comply with AS 1603.1 or AS 7240.5.

All fire alarm manual call points shall comply with AS 1603.5 or EN 54-11 Type A or AS 7240.11 Type A, and shall be coloured red.

Audible and visual (strobes) occupant warning shall produce the ISO 8201 T3 temporal pattern.

Detectors and devices for hazardous areas shall have IECEx certificates of conformity.

The tenderer shall provide copies of approvals for the equipment offered.

> Note: “comply” means to be certified to conform to all the requirements in the relevant standard.

1.4 INSTALLER'S QUALIFICATIONS

The installation of the system is to be carried out by trained personnel.

A technician trained by the manufacturer of the system shall approve all design drawings and be on hand to supervise the total installation. The technician shall supervise site-specific data documentation, adjustment, preliminary testing and final testing of the system and shall provide training and instruction on system operation and basic maintenance to the owner’s personnel.

All equipment furnished shall be new and state-of-the-art products of a manufacturer engaged in the manufacturing and installation of fire detection equipment. Experience of over ten years in this field is expected.

The manufacturer shall supply a reference list of installed systems in Australia using the same or equivalent equipment to be supplied for this project.

The manufacturer or an authorised distributor shall confirm that within reasonable distance of the project site there is an established agency which stocks a full complement of spare parts and offers 24 hour service on all equipment to be furnished

* *Optional: include, modify or delete as required.*

1.5 APPROVAL TO USE EQUIPMENT

When requested, the contractor shall supply for the engineer's approval, all relevant electrical specifications for all components of the fire detection system. -

> Note: Data describing more than one type of item shall be clearly marked to indicate the type the contractor intends to provide for a given application. All submittal material shall be complete. Partial submittal will not be accepted.

1.6 INSTALLER'S STATEMENT

REQUIREMENT: Before practical completion provide a copy of the commissioning test report and the completed installer's statement in the form set out in the current revision of AS 1670.1.

1.7 DRAWINGS & DIMENSIONS

DIAGRAMMATIC LAYOUTS: Drawings showing fire detector layouts are diagrammatic only. Before commencing work, determine the exact positions of the detectors in conjunction with the Engineer, having regard to building features, other services, and the requirements of regulatory authorities to ensure required separation and spacing can be achieved.

*1.8 FIRE MONITORING SERVICE CONNECTION**

REQUIREMENT: Connect the main c.i.e. to a monitoring service provider with a direct data link to a fire dispatch centre. The alarm signalling equipment used for this connection shall comply with AS 4428.6.*

The contractor shall pay all fees associated with the initial connection to the monitoring service provider. The principal shall pay the monitoring costs as they occur.

** Optional: Include, modify or delete as required.*

2. SYSTEM DESCRIPTION

2.1 GENERAL

The requirements of “Conditions of the Contract” apply to this work. This specification intends to describe an “on premises” fire detection and alarm system that is to be device addressable, analogue detecting, and modular. Intelligent smoke detection algorithms such as FastLogic shall be available to select to suit application conditions.

All reference to model numbers and other pertinent information herein is intended to establish minimum standards of performance, quality of construction, and equal in operation to the Simplex 4100ESi non-proprietary fire detection and alarm system. It is not the intent of these specifications to eliminate competitive equipment. Any equipment proposed as equal to that specified herein shall conform to the requirements herein.

Systems which do not meet the performance criteria of this specification will not be accepted.

The system as described shall be installed, tested and delivered to the owner in non-defective condition. The system shall include all required hardware, interconnecting wiring and software to meet the requirements of this specification and to meet the requirements of the contract drawings, whether itemised or not. The site-specific data configuration of the system, and its operation and annunciation of alarms shall be as described in this specification and as shown on the drawings.

Analogue addressable smoke detectors, multi-sensor combined smoke and heat detectors, manual call points and sprinkler flow switch inputs shall be supported by the system. In addition the system must be capable of performing the functions of an alarm acknowledgement facility (AAM), addressable devices for supervisory functions such as the monitoring of sprinkler valve tamper circuits and fire pumps, and AS 1668 control and interface with air conditioning systems shall be provided.

Comprehensive programming facilities shall be provided to enable output control logic functions to be performed and resulting outputs activated at any required location within the system.

2.2 SYSTEM COMMUNICATIONS

Detectors and other input and output devices shall be located within the protected premises at selected points. Communication between the devices and the c.i.e. (FIP) shall be by means of up to thirty fault-tolerant, data communications loops complying with the following criteria:

Support a combination of up to 250 addressable detectors and devices per loop;

Provide up to 500mA of loop power;

Provide short circuit isolation at every addressable detector so that a single short circuit does not prevent operation of more than 1 detector

Provide short circuit isolation of addressable field modules so a single short circuit shall not prevent operation of more than 1 detection zone or one output function.

A single open circuit shall not prevent the operation of any device;

Any fault shall be reported at the c.i.e.

* *Optional: include, modify or delete as required.*

2.3 ELECTRICAL ISOLATION

The fire detection and alarm system shall be connected to other systems using suitable electrical isolation such that there is no direct electrical connection between the fire detection and alarm system and the other systems, and such that any other system that is not already electrically connected to the fire detection and alarm system will not become connected. Examples of other systems are: s.s.i.s.e.p., mechanical ventilation systems and building management control systems. Exceptions are systems that are permitted to share the same power supply equipment by the relevant standards.

2.4 DEVICE WIRING

Analogue addressable devices shall generally be wired using two-wire loops. Where this is not practical, star connections and T-off spurs may be used provided that the requirements of section 1.2 are met, with the exception that it is permissible where star connections and T-off spurs are used, that a single open or short circuit on a spur may prevent operation of no more than 1 zone or output function on the same spur, provided the fault tolerance requirements of the relevant standards are met. Circuits required to be installed in this manner shall be detailed in the response to this specification.

All occupant warning system circuits (if used) shall be supervised for open and short circuits and these fault conditions shall be clearly indicated at the c.i.e.

If the occupant warning is provided by an s.s.i.s.e.p., the faults that are required to be supervised shall be indicated at least as a common s.s.i.s.e.p. fault at the c.i.e.

Where a separate 24 VDC supply is required for sounder bases, this supply shall be supervised for open and short circuit faults. Failure of a supply circuit shall indicate as a fault at the c.i.e. with identification of the supply affected.

Collective (conventional) devices (if used) shall be wired to hardware cards in the c.i.e or addressable zone modules all with end-of-line supervision.

Control devices (if used) shall be connected to analogue loop addressable output modules, or to ancillary outputs at the c.i.e. as appropriate. All required fire related output circuits shall be supervised for open and short circuits.

Where an addressable module requires a separate 24 VDC supply, the failure of this supply shall not result in more than one detection zone or output function being affected, regardless of the number of addressable modules employed, unless they are fitted within the c.i.e. enclosure. A failure of this supply shall be indicated as a fault at the c.i.e. giving the nature of the fault and the address of the module affected.

Where 24 VDC supplies are connected to wiring that is external to the c.i.e. that wiring shall have overload protection to prevent a short circuit from affecting any other part of the system.

2.5 POWER SUPPLY EQUIPMENT

Power supply equipment complying with the relevant standards shall power all the equipment detailed in this specification. Where a number of power supplies are used, a separate common fault indication for each power supply shall be the minimum indication provided to indicate faults detected by the required power supply fault monitoring.

Power supply equipment used for occupant warning systems (if used) shall meet the same standby requirement as the c.i.e. and be capable of supplying the full alarm load without dependence on the backup batteries.

** Optional: Include, modify or delete as required.*

The battery charging voltage shall be temperature compensated within the limits specified by the battery manufacturer.

The power supply equipment shall be suitable for connection to the Australian standard mains voltage which is 230VAC +/- 15% at 50 Hz unless otherwise specified.

The c.i.e. shall have an internal general purpose mains power outlet that allows the power supply to be removed for service and replaced without the need for a licensed electrician to disconnect mains power.

2.6 BATTERIES

Batteries shall be provided to operate the complete fire detection and occupant warning system during a mains failure. The capacity of the batteries shall be determined in accordance with AS 1670.1.

2.7 INPUT CONFIGURATION

Each addressable input device shall be able to be configured to suit different applications as required for the project.

The following input configurations shall be available as a minimum:

- Normal
- Alarm Verification Facility (AVF as described by AS 4428.1 or AS 7240.2, 7.12.1 Type A dependency)
- Supply air out of alarm delay 60 s
- Delay into alarm up to 60 s (for flow switch monitoring)
- Latching or non-latching operation.

Note: Alarm verification shall not cause a delay for inputs set for manual call point operation.

The primary functional unit of the c.i.e. is the zone (fire fighter search area), the status of which is dependent on the status of the input devices that are mapped to the zone by the site programmable configuration. The status type for each input device within a zone shall be selectable during the programming process from a list of device status options and shall include the following types:

- “Fire” (Fire alarm)
- “Supervisory” for Valve tamper alarm zone
- “Priority 2” alarm for alarms that do not call the Brigade dispatch centre
- “Trouble” (for fault monitoring)
- “Utility” for non-brigade or status indications
- “Water” for flow switch or sprinkler alarm valves
- Flow switch zone with remote solenoid test

Additional custom zone profiles shall be able to be configured for other functions such as

- Alarm investigation facility (AIF as described in AS 4428.10)

* *Optional: include, modify or delete as required.*

- Alarm acknowledgment facility (AAF as described in AS 7240.2)
- Residential mode (Used with combined smoke and heat detectors – local alarm only on smoke detection; general alarm on heat detection.)
- Day night Sensitivity changes

In addition to addressable fire detectors, manual call points and hard contact inputs; pseudo points shall be able to be mapped to customer control logic for special applications or cause and effect logic.

2.8 SYSTEM ZONING

The system shall be divided into zones as indicated on the drawings. An alphanumeric LCD (and individual visual indicators)* on the c.i.e. shall provide indication of the status of each zone.

The base system shall be capable of expanding to 500 zones and 2,000 addressable devices, wired on up to 30 analogue addressable loops, but shall have basic input and output capabilities beyond this provided by input and output devices with several inputs and/ or outputs addressable as sub-points.

The system shall be capable of further expansion using a Network Display Unit to 1000 zones for future site requirements.

The programming facilities of the system shall enable a zone to include any number of detection devices provided identity and the location of each detector in alarm is individually displayed at the c.i.e (as restricted by AS 1670.1 2015).

2.9 SYSTEM OPERATION

The operation of the system in response to the activation of input devices assigned to a zone shall be in accordance with the drawings, cause and effect diagrams and the general specification below.

Activation of any fire alarm initiating device shall cause the following actions and indications.

- Indicate a fire alarm condition at the c.i.e. (and at any remote indicator panels that are configured to display this alarm).*
- Display fire alarm information on the c.i.e. colour alphanumeric display, including the zone number of the operated zone, the zone text description, the device identifier and device text description where specified on the drawings or schedule of detectors and/ or devices. In addition the type of device shall be shown, e.g. smoke, heat, etc.

  The LCD shall be able to simultaneously display four zones in alarm, with the first zone in alarm remaining on the top lines of the display. Where more than four alarms exist, they shall be able to be scrolled into view by operation of a key designated “Next” on the touch screen display.

  Indicate the alarm on the relevant zone alarm LED where zones or groups of zones (such as floors levels) are specified to have individual LED zone indicators.*
- Operate the c.i.e. audible alarm indicators (sounder/buzzer) and the external fire alarm red strobe (if this is an upgrade project specify whether or not the existing bell shall remain or be removed)*.

* *Optional: Include, modify or delete as required.*

The c.i.e. sounder/buzzer shall be able to be silenced by operating the dedicated "Silence Alarm" touch screen key within the fire brigade panel interface.

The external alarm shall operate until the occupant warning system "Alarm Devices" is silenced.

- Log the alarm condition to the c.i.e. internal history file.
- Close all smoke doors and smoke dampers, if applicable, to prevent the spread of smoke.
- Operate air handling units and smoke removal fans as shown on the drawings.
- Operate air conditioning systems to AS 1670.1 or AS 1668.1 requirements as nominated on the drawings or the separate specification for AS 1668.1 smoke management.
- (Cause the building occupant warning system to operate as detailed in 5.2)* or (Communicate the zones in alarm to the sound system for emergency purposes (EWIS) as detailed in 5.3.)*
- (Provide relay contacts to transmit the alarm condition to the fire monitoring service provider if connected.)**

Activation of any supervisory circuit, supervised valve closure (valve tamper), air pressure abnormal, low temperature, and fire pump fault shown in the drawings shall cause the following actions and indications.

- (Indicate the supervisory condition at the c.i.e.)**
- (Activate the c.i.e. sounder until it is manually silenced (as for a fire alarm).**
- Log the activation to the c.i.e. internal history file (and to the printer if fitted).**
- (Transmit the active condition to the fire monitoring service provider.).**

The occurrence of a fault condition (e.g. open or shorted actuating circuit, supervised output, c.i.e. faults, open or shorted remote display communications wiring) shall cause the following actions and indications.

- Indicate the fault condition at the c.i.e.
- Activate the c.i.e. sounder until it is manually silenced.
- Indicate on the LCD that a fault is present and display a fault action message on the LCD to advise the system operator of the action to take to deal with the fault condition (ref. 2.3).
- Indicate the fault or disable condition on the relevant zone fault or disable LED where zones or groups of zones (such as floors levels) are specified to have individual LED zone indicators.
- Log the fault condition to the c.i.e. internal history file.
- Transmit the fault condition to the fire monitoring service provider.*
- If any alarm zone is disabled (isolated), then a disabled indication shall be displayed at the c.i.e. and a disabled (isolate) condition transmitted to the fire monitoring service provider*.

Where indicated on the drawings, multi-sensor detectors shall be configured such that each sensor (or sub-point) can be separately disabled either automatically or manually. When a sub-point is disabled this condition shall be indicated at the c.i.e. as a disabled condition.*

The occurrence of a condition that effectively totally disables the system (system power supply failure, and system processor failure) shall activate an output, which may be used to

transmit this condition to the fire monitoring service provider or be otherwise connected to meet local requirements.

Where the c.i.e. is shown on the drawings to be located in an area not normally occupied, an external c.i.e. sounder shall be provided in a normally occupied area.

Where an external c.i.e. sounder is required and a c.i.e. sounder silence switch is provided. the switch shall silence fault conditions only, not alarm conditions.

3. C.I.E. (FIRE INDICATOR PANEL)

3.1 GENERAL

Furnish and install a complete Fire Alarm System as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. Include sufficient control panel(s), annunciator(s), manual call points, automatic fire detectors, smoke detectors, alarm indicating appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.

The c.i.e. shall be a Simplex 4100ESi system or similar approved non-proprietary product and allow for:

Manufacturer support for forward compatible technology as available to ensure new developments and the latest system spare parts can be incorporated into the fire alarm system throughout the life of the building.

Loading and editing of special instructions and operating sequences as required. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.

All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel. This shall include at least 9 older versions of software loaded into the fire alarm panel so they can be recalled for comparison at any time.

Manuals for the c.i.e. and specific site data such as site installations drawings are to be stored in the c.i.e. memory card and accessible by fire service companies as required. Loss of primary and secondary power shall not erase any of the information stored in memory.

This system shall be capable of storing dual configuration programs with one active and one in reserve. The panel shall be capable of full system operation during a new configuration download.

Software downloading shall be done by way of direct Ethernet port connection. Remote service access for this purpose via the building LAN may also be provided. .

Full flexibility for selective input/output control functions based on Boolean operators: AND, OR, NOT, timers, counters and special coded operations shall also be incorporated in the resident software programming of the system.

The system shall have the capability of storing and recalling zone and or point alarms and fault conditions in chronological order for the purpose of recreating an event history. Uploading of the historical logs shall be done by way of direct Ethernet port connection.

The c.i.e. shall have the capability of uploading service reports of the installed devices; report upload is to be done via direct Ethernet port connection.

The c.i.e. shall have the capability of activating an “install” mode, to reduce the number of system faults shown on the Fire Panel display during commissioning.

** Optional: Include, modify or delete as required.*

Remote panel site-specific software and executive firmware downloads shall be capable of being performed over the fire alarm network communications and via Ethernet network communications. Ethernet access to any fire alarm panel shall be capable of providing access only to authenticated users.*

The c.i.e. shall have the capability to provide supplemental notification and remote user or service provider access using Ethernet and TCP/IP communications protocol.*

The fire panel internet interface shall be capable of sending automated notification of discrete system events via email and SMS text messaging to 50 individual user accounts and via email to 5 distribution lists or more.*

All panels and peripheral devices shall be the standard product of a quality manufacturer and shall display the manufacturer's name on each component. The catalogue numbers specified under this section are those of Simplex and constitute the type, product quality, material, and desired operating features.

If equipment of another manufacturer is submitted for approval, the contractor shall state how much is to be deducted from the base bid for the substitution, and also shall state what, if any, specific points of system operation differ from the specified points of the system operation in this document. This differentiation report must reference every paragraph of this specification.

3.2 C.I.E. ENCLOSURE

The enclosure shall be of 19 inch rack format, steel cabinet with a hinged protective door incorporating a viewing window. The door shall have cylinder type Lockwood 003 key operable lock.

The 28U and 40U enclosures shall be factory finished in baked epoxy powder coat Dulux Cream Ripple or equivalent.

The 8U and 15U enclosures shall be factory finished in baked epoxy powder coat Titania or equivalent.

A manual call point shall be mounted on the front of, or adjacent to, the cabinet. The wiring to this call point shall be supervised and shall be assigned to the same zone as the location of the c.i.e. with its device text description identifying it as the c.i.e. manual call point.

Where the ASE is mounted within the enclosure, a dedicated mounting bracket shall be provided such that the ASE indicators can be viewed through the window of the protective door.

3.3 CONTROLS & INDICATIONS

A large 210mm x 160mm colour touch screen operator interface shall be located behind the indicator viewing window and incorporate controls for silencing the c.i.e. audible alarm indicator (buzzer/ sounder), silencing alarm devices (occupant warning system), reset and disable. The panel shall be certified to comply with the AS 4428.3:2010 requirements for Fire Brigade Panels.

With no abnormal conditions present on the system, the alphanumeric display shall show the name of the system and the current date and time.

An alarm condition shall cause the information specified in Section 1.9 to be clearly indicated on the alphanumeric display.

* *Optional: include, modify or delete as required.*

When abnormal conditions exist, the alphanumeric display shall clearly show the nature and quantity of the conditions present, and shall provide the means to readily recall the conditions to the display. Other controls and indicators, clearly delineated from those for fire fighter use, shall be provided for other c.i.e. operating functions.

The Alarm panel shall incorporate:

- Colour touch screen operator interface encompassing
- Silence buzzer & Silence / Alarm buttons
- Next / Previous scrolling controls
- Reset and Disable buttons

The operator display shall incorporate secondary function tabs for

- Priority 2 alarms
- Monitor points
- Faults
- Disables
- Force Alarm test
- Service / diagnostics

The operator interface shall also have the facility for disabling of

- General alarm devices
- External Bell strobe
- Alarm devices
- Smoke control
- Fire protection
- Door holder

The SYSTEM RESET control shall only be operable after the Alarm Silence control has been pressed. System reset is used to return the system to its normal state after an alarm condition has been remedied. Messages, "SYSTEM RESET IN PROGRESS", shall be displayed first followed by the message "SYSTEM RESET COMPLETED", and finally, "SYSTEM IS NORMAL", should all alarm conditions be cleared.

Should an alarm condition continue to exist, the message "SYSTEM RESET IN PROGRESS" shall be followed by the message "SYSTEM RESET ABORTED" and the system shall remain in an abnormal state. System control relays shall not reset. The display shall indicate the total number of alarms and faults present in the system.

Additional function keys shall be provided to access status data for the following points:

- Ancillary control facilities
- Auxiliary relays
- Feedback points
- All other input/output points

The following status data shall be available:

- Primary State of point
- Zone and Card type information
- Disable/Enable status
- Verification tallies of initiating devices
- Automatic/Manual Control Status of output points
- Acknowledge status
- Relay status

** Optional: Include, modify or delete as required.*

3.4 HISTORY LOGGING

The c.i.e. shall be capable of logging and storing up to 1250 events in an alarm log and 1250 events in a fault log. These events shall be stored in a battery protected memory and be up-loadable via the panel's Ethernet port when required. Each recorded event shall include the time and date of that event's occurrence.

The following Historical Alarm Log events shall be stored:
- Alarms
- Alarm Silence
- System Reset -
- Alarm Historical log cleared

The following Historical Fault Log events shall be stored:
- Disable and Fault conditions
- Fault acknowledgment
- Alarm Verification tallies
- Alarm Historical log cleared
- Walk Test results

3.5 WALK TEST WITH HISTORY LGGING

The c.i.e. shall be capable of being tested by one person. While in testing mode, the alarm activation of an alarm circuit shall be silently logged as an alarm condition in the historical data file. The panel shall automatically reset the alarm.

The momentary disconnection of an alarm or ancillary circuit shall be silently logged as a fault condition in the historical data file. The c.i.e. shall be capable of supporting up to 8 separate testing groups whereby one group of points may be in a testing mode and the other (non-testing) groups may be active and operate as programmed per normal system operation.

After testing is considered complete, testing data may be retrieved from the system in chronological order to ensure device/circuit activation.

3.6 ACCESS LEVELS

There shall be four (4) access levels with level 4 being the highest level. Level 1 actions shall not require a passcode. Passcodes shall consist of up to ten (10) digits. Changes to passcodes shall only be made using offline programming software.

In order to maintain security when entering a passcode the digits entered shall not be displayed but a cursor shall move along filling the position with an X to indicate that the digit has been accepted. All key presses shall be acknowledged by a local audible sound.

When a correct passcode is entered, the message "Access Granted" shall be displayed. The new access level shall be in effect until the operator manually logs out or the keypad has been inactive for ten (10) minutes.

Should an invalid code be input, the operator shall be notified with the message "ERROR... INCORRECT PASSCODE" and shall be allowed up to three chances to enter a valid code. After three unsuccessful tries, the message "ACCESS DENIED" shall be displayed. The level shall not be altered, and the operator shall no longer be in the menu option.

Access to a level shall only allow the operator to perform all actions within that level plus all actions of lower levels, not higher levels.

* *Optional: include, modify or delete as required.*

The following keys/switches shall have access levels associated with them:

- Set Time/Date
- On/Off/Auto Control
- Disable/Enable
- Clear Historical Alarm Log
- Clear Historical Fault Log
- Walk Test
- Change Alarm Verification

3.7 INSTALL MODE

The c.i.e. shall have provide the capability to group all non-installed or commissioned points and devices into a single "Install Mode" fault condition allowing an operator to more clearly identify event activations from commissioned points and devices and in occupied areas.

It shall be possible to individually move points from Install Mode to normal operation as required for phased system commissioning.

It shall be possible to retrieve an Install Mode report listing all points currently assigned to Install Mode. Panels not having an install mode shall be reprogrammed to remove any non-commissioned points and devices.

3.8 SUPERVISION

There shall be independently supervised ancillary control facilities for alarm [horns] [bells] [strobes]. Fault conditions of any circuit shall not affect the operation of other circuits.

Each independently supervised circuit shall include a description that is displayed on the LCD to indicate fault conditions per circuit.

The incoming power to the system shall be supervised so that any power failure is audibly and visually indicated at the control panel. A green "power on" LED shall be displayed continuously while incoming power is present.

The c.i.e. batteries shall be supervised so that a fault battery condition or disconnection of the battery is audibly indicated at the control panel and displayed on the LCD.

The c.i.e. modules shall be electrically supervised for connection. Should a module become disconnected the system fault indicator shall illuminate and the audible fault signal shall sound and the module description shall be displayed on the LCD.

The c.i.e. [and graphics computer] shall have provisions for isolating and de-isolating all circuits individually for maintenance or testing purposes.

Wiring to a hardwired (non-serial) remote annunciator shall be supervised for open, short and ground conditions. A separate annunciator indicator must be provided. It shall illuminate and an audible fault signal shall sound at the c.i.e. upon the detection of a fault condition.

All slave module LEDs shall be supervised for burnout or incorrect connection. Should a problem occur the LCD shall display the module and LED location numbers to facilitate location of that LED.

** Optional: Include, modify or delete as required.*

3.9 POWER REQUIREMENTS

The c.i.e. shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 240 VAC power in a normal supervisory mode for a period of twenty-four (24) hours when brigade connected with thirty (30) minutes of alarm operation at the end of this period. Batteries are to be de-rated as per AS1670.1 .The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

All external circuits requiring system operating power shall be 24 VDC and shall be individually fused or power limited at the control panel.

4. REMOTE ANNUNCIATOR(S)

*4.1 REMOTE FIRE BRIGADE PANEL**

In addition to the AS 4428.3:2010-compliant control panel, the system shall support the connection of a remote Fire Brigade Panel to AS 4428.3:2010. The remote unit shall be 8U in size and encompass its own power supply and backup batteries and shall be flush/ surface* mounted in the position shown on the drawings. It shall incorporate all of the control and indication fire brigade facilities provided on the main panel, and shall operate separately, but in identical fashion to the fire brigade controls at the main panel.

*4.2 LCD MIMIC PANEL**

Where shown on the plans provide a NON fire Brigade operable LCD annunciator. The annunciator(s) shall have a beige enamel trim housing covering a membrane keypad complete with the following:

- Two line by 40 character LCD display.
- Control switches for system acknowledgments, alarm silence and system reset.
- Lamp/LCD test button.
- Backlit display.
- Four programmable control switches.
- Surface or flush mount on a standard 6-gang electrical box.
- Maximum size 300mm wide x 114mm high x 80mm deep.
- A key "Enable" switch shall be provided to activate or de-activate the control switches.
- Tone Alert - to duplicate the control panel tones during Alarm and Fault conditions.
- Led indications for Alarm, Isolate, Fault, Alarm Silence and Power.

The LCD mimic panel shall have the ability to scroll through the list of alarms, faults and isolates as per the c.i.e. the display shall provide clear English language information.

Information shall be transmitted over one twisted shielded pair of wire and operating power shall be 24 VDC and be fused or power limited at the control panel.

* *Optional: include, modify or delete as required.*

5. ANALOGUE ADDRESSABLE DEVICES

5.1 GENERAL

Analogue addressable fire detectors shall be furnished and installed where indicated on the specification drawings. The drawings shall also designate the type of detector to be utilised in each position. In order to speed service and minimise disruption to the occupants during service visits, all addressable detectors shall be two-part devices with a separate base and plug-in detector head. Detectors shall be of a low profile design, protruding no more than 60 mm from the installation surface when installed in the base (except where sounder bases are specified)*. All detector heads shall be capable of being locked to the base to prevent tampering or unauthorized removal.

The detectors shall operate as sensors of fire related phenomena and the level of this phenomena measured by the sensor shall be communicated to the c.i.e. as analogue information.

Self-contained fire detectors that make the alarm decision locally and transmit status only shall not be acceptable. The status of each detector shall be determined by field-upgradable c.i.e. firmware, and shall include specific algorithms to provide improved detection reliability and enhanced environmental performance (ref. 4.3.2). Self-test facilities or sensing element monitoring shall be incorporated into each detector so that they can be remotely tested or verified.

The sensing chambers within the detectors shall be protected against the ingress of dust and insects to critical parts of the detector assembly. All detector heads shall be enclosed at the back to prevent ingress of air producing a stack effect and to protect against ingress of water.

Each detector shall incorporate an integral red alarm indicator, which shall be controllable in the programmer to either “pulse” in normal state or be “off” in “normal state. The LED shall be turned on steady when the c.i.e. determines that the analogue values returned from the detector represent an alarm condition. The LED shall indicate yellow for fault conditions with the head or if the integral isolator has activated. The alarm indication shall be able to be extended to a remote position by suitable wiring to the detector base.

A technician-activated diagnostic function at the c.i.e. shall be provided to enable the detector indicator to flash to indicate the operation of communications between the detector and the c.i.e. and assist in determining the location of a detector with a specific address.

5.2 CONNECTION OF ANALOGUE ADDRESSABLE DEVICES

Analogue addressable devices shall communicate with the c.i.e. over a two-wire circuit configured as an “addressable loop”. Each addressable loop shall be capable of supporting up to 250 addressable devices (detectors or input/ output devices), with each loop capable of supplying up to 500mA of loop current to power the devices. The loops shall be installed with a minimum of 10% spare capacity to allow for future extensions. Alternatively the detector wiring may be connected as separate detection lines, each isolated so that a short circuit on one line will not affect the operation of any other line as permitted by section 1.4. Each line shall support a maximum of 1 zone of detectors (as limited by AS 1670.1). A software package, as provided by the system supplier, shall be used to verify that each loop, and the total system design complies with the design criteria of the system manufacturer and the relevant system design requirements AS 1670.1.

** Optional: Include, modify or delete as required.*

5.3 ANALOGUE ADDRESSABLE DETECTORS

5.3.1 Detector types

Analogue addressable multi-sensor detectors shall normally incorporate dual internal sensors, consisting of a photoelectric (scattered light) sensor and a heat sensor. The best detection mode for a wide variety of situations shall be able to be selected in the site specific data without having to physically change the detector.

Detection modes shall be selectable on a device-by-device basis and shall include smoke/ heat enhanced smoke and smoke only or heat only.

Although detectors incorporating dual internal sensors shall generally be installed, detectors incorporating a heat or photoelectric smoke sensor only may be installed as shown on the drawing, subject to approval, where dual sensor devices can be shown to offer no overall advantage.

Generally where ionisation smoke detectors have been used in the past to more rapidly detect flaming fires, this project shall require combined photoelectric smoke and heat detectors.

Each heat detector shall be programmable to be able to function as combined rate of rise and fixed temperature operation or fixed temperature operation only, and shall be certified to comply with the relevant standards as A2R, A2S, CR, and CS. The type proposed to be used in each location shall be specified by the tenderer.

Analogue addressable detector types provided shall be the same as, or equivalent to those listed below:

Photoelectric and heat multisensor	Simplex 4098-6251
Heat only	Simplex 4098-6253
Photoelectric only	Simplex 4098-6252

IECEx certified intrinsically safe conventional detectors connected to an addressable interface such as a Dual Detector Input module and suitable intrinsically safe barrier or similar shall be available for installation in hazardous areas.

5.3.2 Detection Algorithms

Detection algorithms shall be incorporated into the system firmware to determine the Normal, Pre-alarm, Alarm, Fault and Dirty conditions for each analogue detector and to compensate for ambient conditions which may affect detector operation.

The algorithms shall be certified to meet the requirements of the relevant standard and shall evaluate the smoke and heat values received and perform the following functions:

For photoelectric smoke detection an algorithm like Fastlogic shall be selectable for all detectors on a circuit to reduce false alarms. The algorithm shall take into account the pattern of smoke build up over time and apply fuzzy logic to calculate the level of risk.

5.3.3 Detector Sensitivity

All standard detectors shall be listed by ActivFire or appropriate approval authority to certify compliance with the relevant standards as applicable and referenced in AS 1670.1, and shall be set at their certified compliant sensitivity taking into account the environmental conditions at the location and the performance required (Ref. AS 1670.1 Appendix B).

The sensitivity settings of analogue addressable photo detectors shall be changeable from normal, high or low to suit the environment they are installed in. The photoelectric detectors shall have an Extended Service Life feature to ensure the alarm threshold required of the

detector is maintained as the device ages. When the Extended Service Life feature can no longer maintain the alarm threshold required the detector shall flag a fault at the CIE.

5.3.4 Detector Addressing

Detectors shall use the addresses indicated on the drawings supplied. Address assignments for each addressable detector shall be able to be programmed via an infrared link to the programming tool or pre-programmed off-line using an auto address sequencing programming tool. Detector addresses shall not change from that specified on the drawings even if additional addressable devices are added. Additional addressable devices shall be able to be added between installed devices without any changes being necessary to the addresses of previously installed devices. To prevent detector heads being inserted into the wrong base, all detector bases shall display the detector address. The address flag shall be clearly visible from floor level whether the detector is fitted or not.

5.3.5 Detector Colours

It shall be possible to change the detector colour by removing the clip on cover and base and replacing it with a coloured cover and base. The coloured covers shall not be painted but must be injection moulded as part of the manufacturing process so the detector cover or base will not chip or scratch. The covers and bases shall be available in any pantone colour to match the interior décor as required.

5.3.6 Detector Programming Tool

A portable handheld device shall be capable of interrogating each detector via a wireless in link or when a detector is plugged in and displaying the following minimum information:

- Current temperature, smoke level or level according to detector type
- Detector type, serial number, and date of manufacture
- Detector current status (temperature, smoke level, dirtiness).
- Detector address.

The handheld device shall also allow the following tests to be carried out as a minimum:

- Instruct the detector to go into alarm condition
- Test remote indicator output
- Test detector sounder/relay base control output
- Test the detector integral indicator.
- Verify/change the detector's address
- Set the detector to blink on poll (or not)

5.4 ANALOGUE ADDRESSABLE DETECTOR BASES

A range of analogue addressable detector bases shall be available to support addressable loop continuity for detectors with inbuilt isolators, remote indicators, relay contact outputs, and integral sounders in addition to the plug-in detector. Detector bases shall be designed to ensure loop integrity is maintained if a detector head is removed. Each detector base shall not occupy any address on the analogue addressable loop; however bases for audio visual devices that may be remotely controlled to produce different signals may occupy an address.

** Optional: Include, modify or delete as required.*

5.5 ADDRESSABLE SOUNDERS

Addressable sounders or sounder bases shall be installed for residential alerting in nominated areas where designated on the drawings. Sounders shall be installed to provide local audible warning complying with the ISO 8201 T3 temporal pattern. The sounder bases can be loop-powered or use external power to achieve higher noise levels. The volume of the audible signal from each device shall be adjustable at each base.*

*5.6 ADDRESSABLE LED BEACON**

Addressable LED flashing beacons shall be installed for residential alerting in nominated areas where designated on the drawings. The beacons shall derive their power directly from the addressable loop.

5.7 DUCT SMOKE SENSORS

Photoelectric detectors, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions shall be used where applied.

The detector shall provide on-board sensitivity drift compensation and dirt accumulation tracking.

Compact Duct Housing shall have a transparent cover to monitor for the presence of smoke.

Duct Housing shall provide a test Port for measuring airflow and for testing. The port shall allow aerosol injection in order to test the activation of the duct smoke detector.

For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover

5.8 SHORT CIRCUIT ISOLATOR DEVICES

Short circuit isolators shall be built into each photoelectric, heat or combined photoelectric/heat detector to ensure no single short will affect more than 1 detector. Short circuit isolator devices shall be built into the addressable modules or be available as a separate device to ensure no single short will affect more than 1 zone of modules. The short circuit isolators shall not occupy an address on the addressable loop.

The loop termination facilities at the control panel shall incorporate built-in short circuit isolators to limit the short circuit current sourced from the control panel such that separate short circuit isolators shall be unnecessary.

5.9 ANALOGUE ADDRESSABLE MANUAL CALL POINTS

Analogue addressable indoor and outdoor manual call points shall be furnished and installed where indicated on the drawings. The manual call points shall be analogue addressable, compatible with other devices on the same analogue addressable loop, and shall meet the requirements of AS 1603.5, EN 54 part 11 or AS/ISO 7240.11 of a type A direct operation type.

A visual indicator on the front face of the manual call point shall provide positive indication of operation and shall also be able to be used to confirm communication with the c.i.e. as for the integral indicator on the analogue detectors.

* *Optional: include, modify or delete as required.*

*5.10 DUAL MONITOR ZAM **

Collective detector interface modules shall be wired to the addressable loop where designated on the drawings. Each detector interface module shall be capable of monitoring two independent collective circuits and signal to the c.i.e. the status of the existing* collective detectors located in the area. Each module shall be capable of monitoring alarm, open-circuit fault, short-circuit fault and power supply fault status of a circuit interconnecting at least 20 detectors and shall provide integral red visual indication when in the alarm state.

The detector interface module shall derive its operating power from the addressable loop, or optionally be able to be powered from a supervised 24 VDC power supply wired to meet the requirements of AS 1670.1. An open or short circuit of the 24 VDC supply shall not disable the operation of more than one detection zone or one output function.

5.11 RELAY IAM MODULES

Addressable relay output module(s) shall be installed as necessary to provide control output contacts for external equipment. Each module shall provide a voltage free changeover relay contact operated by command via the addressable loop from the c.i.e. The contacts shall be rated at a minimum of 1 Amp at 30 VDC for single relays. Each relay module shall provide a LED indication that the relay has operated. Each module shall only take up 1 address on the loop and shall derive operating power from the addressable loop.

5.12 SIGNAL NAC MODULES

Addressable relay output module(s) shall be provided where necessary to provide supervision of output wiring to remote devices to meet the requirements of this specification. The output shall be rated at 2A and capable of driving a remote beacon or a warning system circuit. The output shall be powered from a supervised 24 VDC power supply, wired to meet the requirements of AS 1670.1. The module shall only take up 1 address on the loop.

The module shall be capable of supervising the wiring to the load for open or short-circuit faults and the power supply for failure. It shall transmit the resulting fault signal back to the c.i.e.

The module shall provide an LED visual indication that the output has been actuated.

5.13 MINI & DUAL IAM MODULE

Addressable contact monitoring module(s) shall be provided where designated on the drawings to provide monitoring of the status of switched input signals. The module shall be capable of monitoring either normally open or normally closed contacts, and shall derive its power directly from the addressable loop.

5.14 MULTI INPUT OUTPUT MODULES

Addressable three input two output multi I/O modules shall be provided where necessary to interface multiple circuits at one location. The module shall provide supervised inputs which can monitor normally open or normally closed contacts and voltage free changeover relay outputs operated by command via the addressable loop from the c.i.e. The output contacts shall be rated at a minimum of 2A Amp at 30 VDC and show an LED indication that the relay

** Optional: Include, modify or delete as required.*

has operated. The module shall only take up 1 address on the loop with sub points used to reference each input or control each output relay.

The Multi I/O modules shall derive their operating power from the addressable loop.

6. OCCUPANT WARNING SYSTEM

The contractor shall provide an occupant warning system in accordance with the option below or a combination of the options as indicated on the drawings.

6.1 TONE GENERATOR

[USE TEXT BELOW FOR OCCUPANT WARNING SYSTEM OPTION 1]

The contractor shall supply, install and wire an occupant warning system to meet the requirements AS 1670.1 using a tone generator and amplifier capable of producing the ISO 8201 T3 temporal pattern. Speakers shall be installed in the positions shown on the drawings. The wiring to the speakers shall operate at industry standard 100 volt line levels and shall be supervised for open and short circuit fault conditions. A fault condition on the speaker wiring shall cause the c.i.e. to register a fault condition.

The verbal evacuation message shall be interspersed in the 1.5 second gap of the T3 pattern.

The power output of the tone generator system shall be able to be readily increased by adding further tone generator modules to accommodate future expansion in system size.

(The occupant warning system shall provide emergency public address throughout the building by means of a paging microphone installed within or near the c.i.e. The emergency public address system shall be activated when the “push to talk” switch on the paging microphone is activated and shall broadcast speech from the microphone throughout the building, while the switch remains activated. Release of the “push to talk” switch shall cause the occupant warning system to revert to its previous state.)*

6.2 ADDRESSABLE SOUNDERS

[USE TEXT BELOW FOR OCCUPANT WARNING SYSTEM OPTION 2]

The contractor shall supply, install and wire an occupant warning system to meet the requirements of AS 1670.1 using sounder detector bases capable of producing the ISO 8201 T3 temporal pattern in the designated areas shown on the drawings.

Where zoned activation of the sounder bases is specified, the whole addressable loop shall be protected to level WS52W of AS/NZs 3103.

7. EWIS INTERFACE*

The contractor shall provide an interface for the connection of the fire detection and alarm system to a sound system and intercom system for emergency purposes (or EWIS) in accordance with AS 1670.4 and the separate specification [insert specification number]. The

* *Optional: include, modify or delete as required.*

interface shall be supervised for any fault that will affect the signalling of zoned alarms to the EWIS. The interface shall also receive at least one common fault signal from the EWIS.

8. MAGNETIC DOOR HOLD-OPEN DEVICES*

The contractor shall supply and install all necessary power supplies, ancillary control circuits, magnetic hold-open devices and release switches to automatically release all fire doors as marked on the drawings.

Flush and surface door holder mounts shall be available and flush units shall be installed where the wall construction permits. The door holder magnet shall include a release switch built into the face plate of the unit.

9. FLOW SWITCHES*

The contractor shall connect the fire detection and alarm system to sprinkler flow switches and flow switch test valves where shown on the drawings. The sprinkler flow switch circuits shall be supervised and all flow switches shall be able to be individually identified at the c.i.e. using addressable device input units if necessary.

Each sprinkler flow switch shall have an associated control relay output from the fire detection and alarm system. The control relay output shall be connected to an electrically operated, 24 volt flow switch test valve adjacent to each flow switch to facilitate remote flow switch testing. The 24 volt supply for operating the flow switch test valve shall not be taken from the analogue addressable loop or line, but shall be wired separately from the c.i.e. or from a separate, monitored supply.

10. SPRINKLER ANTI-TAMPER SWITCHES*

The contractor shall connect the fire detection and alarm system to approved sprinkler anti-tamper switches which shall be able to be individually identified at the c.i.e. The anti-tamper switches shall be supplied by the sprinkler contractor, and shall be located where shown on the drawings.

11. Fire Alarm Network

The FIP shall be capable of operating as a stand alone system with data communication to a higher order Central Processing Unit (Main FIP). The Main FIP shall display all alarms and faults from each sub FIP.

The system shall be configured for peer to peer control where the remote FIP control themselves and pass monitoring and control data directly to other panels to maximize system functionality in the event of Main FIP failure.

** Optional: Include, modify or delete as required.*

All data communication shall be cabled in accordance with the manufacture's specifications and wiring between the network cards shall be supervised for opens, shorts and grounds. A single open, ground or short on the network communication loop shall not degrade network communications.

Network data communications shall be via two paths. Each path shall be cabled with [shielded twisted pair] [multimode optical fiber] [single mode optic fibre]. Systems requiring 4 core network loop cabling will not be accepted.

Data communications shall be directly from panel to panel in a ring configuration. Systems that require a centralized hub or additional equipment to function will not be acceptable.

Data communications shall be capable of being transmitted up to 3000 meters between EACH FIP using copper or multimode fibre or up to 30,000 meters between EACH FIP using single mode fibre. The network shall be support up to 99 nodes connected to a single data loop.

Data communications may be split into several network rings with up to 7 networks being connected to central graphics for site wide control.

The FIP shall support the addition of a building network interface card to enable a secure Ethernet connection to each network panel, enabling program downloads to occur through the buildings LAN / WAN.

12. GRAPHICS WORKSTATION*

The Simplex True Site Workstation graphics or similar shall operate by receiving system events and displaying specified graphic representations of the building(s) and system devices.

The colour graphics shall be a fully functional Network Node communicating on the fire network. Systems that require connection to a Fire Panel or other intermediate equipment will not be acceptable.

The Graphics Workstation shall cause a "Fault" condition on other Network Nodes to indicate its off-line condition.

When no alarms or troubles are present, the workstation monitor shall display a graphics screen menu used to access other graphic screens. Each screen shall also display current time and date, system status, and present operator name and access level.

Upon activation of any alarm and on request by the operator, the monitor shall display the floor plan of the floor in alarm with all devices shown. The device in alarm shall flash until acknowledged. The device in alarm shall then become steady until cleared.

If a second alarm is registered prior to the first being cleared, the second shall be identified by flashing, pending alarm indication. Touching the pending alarm area shall transfer the display to the second alarm point graphic screen. All subsequent alarms shall be displayed as indicated above.

Capacity shall be provided to annunciate 50,000 network point and/or point lists and historical event logs shall maintain up to 500,000 system events.

Built-in diagnostics shall provide graphical views of the network topology and status. Network communication breaks or inactive nodes shall be clearly indicated as a guide in returning the system to normal.

The Graphics Workstation shall consist of:

- Personal Computer with detachable keyboard.

* *Optional: include, modify or delete as required.*

- Hard Drive greater than 40 Gigabyte capacity
- [17][21]-inch high-resolution color monitor
- DVD read /write drive
- Not less than 4 Gigabyte total RAM
- SVGA Port with not less than 16 Megabyte VRAM
- Microsoft Windows® 7 32-Bit

The monitor shall be touch sensitive or mouse operated and serves as the interactive interface between the operator and the network system. Using the touch screen or mouse the operator shall be able to perform the following tasks:

- Acknowledge all alarm, fault and isolate conditions
- Reset system
- Display list menus
- Select the individual message screens
- Perform manual operation of system(s) control points
- Request the "HELP" menu
- Perform operator login / logout
- Connect (Set Host) to other nodes
- Perform graphic editing functions
- Set the system time and date

The Graphics Workstation shall have the following editing functions:

- Message Editor - System shall have the capability of on-site adding, changing, deleting or assigning of message screens.
- List Editor - System shall have the capability of on-site editing of customer user lists.
- Graphics Editor - System shall have the capability of on-site editing of graphics screens. Graphics editor shall have the capability of changing background graphics and adding or deleting point symbols. Capacity to create and edit up to 25,000 Graphic Screens.

12.1 CLIENT SERVER / ADDITIONAL GRAPHICS

The graphics workstation shall have the capability of operating in a client server arrangement, allowing extra client PCs to be added to the main workstation over a LAN or WAN. Up to 10 x client PCs shall be supported with programmable access and control capabilities.

12.2 MOBILE CLIENT

The graphics workstation shall have the capability of sending real time notification of Alarm, Priority 2, Supervisory and/or Fault conditions to mobile devices such as an iPhone, iPad, iPod touch, or Google Android tablet or mobile device. The mobile client shall provide fire alarm network annunciation access with restricted features similar to a PC based Client. The app required for the mobile device to operate must be downloadable from the Apple App store or the Google Play Store for each Mobile Client for Free.

** Optional: Include, modify or delete as required.*

13. HIGH LEVEL INTERFACING

13.1 INTERFACE TO BUILDING MANAGEMENT SYSTEMS.

The c.i.e shall be capable of reporting alarms, isolations & faults to third party Building Management Systems. Output shall be ASCII from an EIA RS-232-C connection with pre-programmed baud rates. Communications Protocol shall be Simplex Computer Port Protocol format

13.2 BACnet INTERFACE.

The c.i.e shall be capable of interfacing to a building management system supporting BACnet. Interface is to be via Ethernet connection and is to report as a minimum the required alarms, isolations & faults. Fire Alarm Control panel shall recognize up to 1000 BACnet status points.

13.3 INTERNET INTERFACE.

The c.i.e shall support connection to the internet via an Ethernet LAN. Interface shall provide single user access for up to 20 different user accounts and shall be compatible with Internet Explorer reporting Alarm, Isolation and Fault counts and status messages. Additional information available shall be:

- Detailed point information accessible similar to that available at the panel
- detector status including both status reports and service reports
- Alarm and Fault log information
- Built-in e-mail feature shall automatically notify user accounts of individually selected status changes:
- Information can be alarm, isolation, fault; or smoke sensor status of dirty or excessively dirty.

13.4 MODBUS INTERFACE.

The c.i.e shall be capable of communicating to a MODBUS slave or MODBUS master:

- The Modbus slave shall pass device status information received from the panel to one or more Modbus Masters. The c.i.e. shall be capable of sending up to 24000 network points or conditions (alarm, trouble, etc.) to a MODBUS Master.
- The Modbus Master shall be capable of polling a 3rd party interface such as a Linear Heat Detector (LHD) via Modbus/TCP and using the LHD information to update points in the c.i.e. The state of up to 2993 coils in the slave LHD shall be configurable in the c.i.e.

Both functions shall have the ability to be active at the same time.

13.5 VESDA INTERFACE

The c.i.e shall be capable of communicating to VESDA (Very Early Smoke Detection Apparatus) detectors such as the VESDA Laser plus, Scanner, Compact and Focus.

* *Optional: include, modify or delete as required.*

The c.i.e shall be capable of monitoring each VESDA detector for:

• Device threshold levels

• Device sensitivity

• Detector chamber voltage

• Detector head status

• Detector air flow status

Information from up to 30 VESDA detectors connected over VESDAnet shall be gathered via one HLI interface.

Each VESDA detector shall be configurable into zones on the c.i.e. for correct alarm management and disable / enable control.

The c.i.e. shall be capable of latching all alarms on the c.i.e regardless if the VESDA detector is set to have latching or non-latching alarm conditions. All VESDA detectors shall be capable of being reset via the operator interface “RESET” key.

13.6 SERVICE GATEWAY:

The c.i.e shall be capable of running a Service Gateway software application that allows an authorized service person to remotely query panel status during testing, commissioning, and service, using a laptop type PC and mobile phone gateway, without the need to return to the panel.

** Optional: Include, modify or delete as required.*