

**Part 1            General**

**1.1                RELATED WORK**

- .1      Refer to all sections of the specification for related work.
- .2      Automatic Sprinkler System-Mechanical.

**1.2                REFERENCES – LATEST VERSIONS**

- .1      CAN/ULC-S524 Installation of Fire Alarm Systems.
- .2      CAN/ULC-S525 Audible Signal Appliances, Fire Alarm.
- .3      CAN/ULC-S526 Visual Signal Appliances, Fire Alarm.
- .4      CAN/ULC-S527 Control Units, Fire Alarm.
- .5      CAN/ULC-S528 Manually Activated Signalling Boxes, Fire Alarm.
- .6      CAN/ULC-S529 Smoke Detectors, Fire Alarm.
- .7      CAN/ULC-S530 Heat Actuated Fire Detectors, Fire Alarm.
- .8      CAN/ULC-S536 Inspection and Testing of Fire Alarm Systems.
- .9      CAN/ULC-S537 Verification of Fire Alarm Systems.
- .10     CAN/ULC-S548 Alarm Initiating and Supervisory Devices for Water Type Extinguishing Systems
- .11     National Building Code of Canada (NBCC)
- .12     National Fire Protection Association (NFPA).

**1.3                SUMMARY**

- .1      This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- .2      Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.

#### **1.4 REQUIREMENTS OF REGULATORY AGENCIES**

- .1 System:
  - .1 To Authority Having Jurisdiction
  - .2 Subject to Consultant's approval

#### **1.5 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Section 26 05 00 Common Work Results - Electrical.
- .2 General:
  - .1 Submit the following according to Conditions of Contract and Division 1 Specification Sections.
    - .1 Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification.
    - .2 Wiring diagrams from manufacturer.
    - .3 Shop drawings showing system details including location of FACP, all devices, circuiting and details of graphic annunciator.
    - .4 System power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate per the prescribed backup time periods and under all voltage conditions per all applicable standards.
    - .5 System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of SLC, NAC, RAC, Sensor, and auxiliary control circuits.
    - .6 Operating instructions for FACP.
    - .7 Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
    - .8 Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
    - .9 Record of field tests of system.
    - .10 Remote annunciator.

- .2 Submission to Authority Having Jurisdiction:
  - .1 In addition to routine submission of the above material, make an identical submission to the Authority Having Jurisdiction through the Consultant. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval.
  - .2 Provide shop drawings to Consultant for submission to Fire Marshal's office for review and approval prior to commencement of installation.

## **1.6 OPERATION AND MAINTENANCE DATA**

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 26 05 00 Common Work Results – Electrical.
- .2 Operation and Maintenance manual to include:
  - .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.
  - .2 Technical data - illustrated parts lists with parts catalogue numbers.
  - .3 Copy of approved shop drawings.

## **1.7 QUALITY ASSURANCE**

- .1 Installer Qualifications:
  - .1 A factory-authorized installer is to perform the work of this section.
  - .2 Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories of Canada, Inc. (ULC), and shall bear the "ULC" label.
  - .3 Equipment and materials shall be provided by an experienced reputable manufacturer to ensure proper specification adherence, final connection, test, turnover, warranty compliance, and service. The manufacturer is required to have been in the fire alarm industry (service and installation) for a minimum of ten (10) years.

## **1.8 MAINTENANCE SERVICE**

- .1 Maintenance Service Contract:
  - .1 Provide maintenance of fire alarm systems and equipment for a period of 12 months, using factory-authorized service representatives.
- .2 Basic Services:
  - .1 Systematic, routine maintenance visits on an annual basis at times scheduled with the Engineer. In addition, respond to service calls within 24 hours of notification of system trouble. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.

- .3 Additional Services:
  - .1 Perform services within the above 12-month period not classified as routine maintenance or as warranty work when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services.
- .4 Renewal of Maintenance Service Contract:
  - .1 No later than 60 days prior to the expiration of the maintenance services contract, deliver to the Owner a proposal to provide contract maintenance and repair services for an additional one-year term. Owner will be under no obligation to accept maintenance service contract renewal proposal.
- .5 Fire Alarm / Life Safety System manufacturer shall supply a one (1) year warranty from date of verification for all control system, field devices, and appliances.
  - .1 Contractor shall warrant the installed system to be free from any defects of material and installation for a period of one (1) year from acceptance by the engineer. Any deficiencies shall be immediately corrected at no additional cost to the owner.

## 1.9 VERIFICATION

- .1 The complete systems shall be tested and verified in accordance with Standard CAN/ULC-S537, Standard for the Verification of Fire Alarm System Installation.

## 1.10 DESCRIPTION OF SYSTEMS

- .1 Building:
  - .1 General:
    - .1 Provide a complete, multiplexed, zoned, non-coded, single stage, addressable, microprocessor-based fire alarm system in the new Building complete with initiating devices, notification appliances, and monitoring and control devices compatible to GE FireShield System in the existing facility.
    - .2 **If no matching fire alarm panel available in the market, provide a new panel to new Building and replace the existing panel to match new. Provide a separate pricing for this option.**
    - .3 Provide connection and reprogramming of the system to main existing GE FireShield panel.
    - .4 Fire alarm control panels shall be located as shown on the drawings.
    - .5 Main LCD annunciator will be located at the main entrance of the building.
    - .6 Manual pull stations shall be located as shown on the drawings.
    - .7 Area smoke detection shall be provided as shown on drawings.
    - .8 Area heat detection shall be provided as shown on drawings.
    - .9 Duct smoke detection shall be provided as shown on the drawings.
    - .10 Monitor the sprinkler system waterflow(s) and valve supervisory switch(s).

- .11 Provide audible/visual devices located throughout the building, as shown on the drawings.
- .12 Provide synchronized visual appliances located throughout the building, as shown on the drawings.
- .13 Provide fan shutdown controls.
- .14 Provide “trouble” connection(s).
- .15 Provide direct interface to building automation system.
- .20 Provide mag-lock key switch power capacity and connection to maglock power supply.
- .2 Software:
  - .1 The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of 100% on-site programming to accommodate system expansion and facilitate changes in operation. All programming shall be capable of being accomplished via the front panel and via a lap top computer. All software operations shall be stored in a non-volatile programmable memory within the FACP. Loss of primary and secondary power shall not erase the instructions stored in memory.
- .3 History Logs:
  - .1 The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. Separate alarm, supervisory and trouble logs shall be provided.
- .4 Recording of Events:
  - .1 Record all alarm, supervisory, and trouble events by means of remote printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.
- .5 Required Functions:
  - .1 The following are required system functions and operating features:
    - .1 Priority of Signals:
      - .1 Alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Supervisory and Trouble events have second-, and third-level priority respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.
    - .2 Non-interfering:
      - .1 The activation of an addressable device does not prevent the receipt of signals from subsequent activations.
    - .3 Annunciation:
      - .1 Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and existing central

- alarm control facility (CACF) indicating the location and type of device.
- .4 General Alarm:
    - .1 A system general alarm shall include:
      - .1 Indication of alarm condition at the FACP and any required remote annunciator(s).
      - .2 Identification of the device that is the source of the alarm at the FACP.
      - .3 Operation of audible and visible notification appliances throughout the building until silenced at FACP. Audible Alarm Notification shall operate Temporal Code.
      - .4 Unlocking designated doors.
      - .5 Shutting down supply and return fans serving zone where alarm is initiated.
    - .5 Alarm Silencing:
      - .1 If the "Alarm Silence" button is pressed, all audible signals shall cease operation.
    - .6 System Reset:
      - .1 The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-arming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
      - .2 Should an alarm condition continue, the system will remain in an alarmed state.

- .7 Drill:
  - .1 A manual evacuation (drill) switch shall be provided to initiate an alarm on the FACP.
- .8 Manual Control:
  - .1 Manual controls shall be supervised so that an "off normal" position of any switch shall cause an "off normal" system trouble. The "off normal" status shall be clearly identified in plain-language on the FACP alphanumeric display.
    - .1 Manual Bypass Control:
      - .1 The ability to perform a manual bypass of selected automatic functions shall be provided.
    - .2 Circuit Enable/Disable Control:
      - .1 The system shall have provisions for disabling and enabling each circuit individually for maintenance or testing purpose.
- .9 Walk Test:
  - .1 The system shall have a one person test feature. Enabling the one person test feature at the FACP shall activate the "One Person Testing" mode of the system as follows:

The city circuit connection and suppression release circuits shall be bypassed for the testing group.

    - .1 Control relay functions associated to the testing group shall be bypassed.
    - .2 The FACP shall indicate a trouble condition.
    - .3 The alarm activation of any initiation device in the testing group shall cause the audible notification appliances to sound a code to identify the device.
    - .4 The control panel shall automatically reset itself after signaling is complete.
    - .5 Any momentary opening of an initiating or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.

## 1.11 OPERATIONS

### .1 Sequence of Operations

#### .1 Alarm Operation

- .1 Upon the alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:
  - .1 The internal audible device shall sound at the control panel.
  - .2 Display the alarm event on the firework graphical workstation
  - .3 The LCD display shall indicate all applicable information associated with the alarm condition including; zone, device type, device location and time/date.
  - .4 Remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.
  - .5 Activate audible appliances
  - .6 Activate visual strobes notification appliances.. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
  - .7 Shut-down ventilation systems
  - .8 Transmit a signal to the elevator controller. An alarm shall cause all elevators to return to the ground floor. Transmit signal to the building automation system.
  - .9 Transmit signal to central station with point identification
  - .10 All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
  - .11 All stairwell/exit doors shall unlock throughout the building.
  - .12 All self-closing fire/smoke doors held open shall be released.



- .13 System Reset
  - .1 It shall not be possible to reset the fire alarm system until all the alarm zones have been properly reset or cleared.
  - .2 When the system has been reset to normal, stagger the start up of air handling systems to insure that no more than 25% are started at the same time, in one minute increments. Co-ordinate operation with the mechanical engineer.
- .2 Duct Smoke Activation – Alarm
  - .1 Upon alarm activation of any duct smoke detector, the following functions shall automatically occur:
    - .1 The internal audible device shall sound at the control panel.
    - .2 Display the event on the graphical workstation and display a pictorial image.
    - .3 The LCD display shall indicate all applicable information associated with the alarm condition including; zone, device type, device location and time/date.
    - .4 All system activity/events shall be documented on the system printer.
    - .5 Any remote or local annunciator LED's associated with the alarm zone shall be illuminated.
    - .6 Shutdown the local air handling unit, fan shut down signal.
    - .7 Transmit signals to remote annunciator.
    - .8 Transmit signal to the building automation system.
    - .9 Transmit signal to the central station with point identification.
    - .10 Transmit alarm text messages to "alpha-numerical" display pagers.
- .3 Supervisory Operation
  - .1 Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
    - .1 The internal audible device shall sound at the control panel.
    - .2 Display the event on the graphical workstation and display a pictorial image.
    - .3 The LCD display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
    - .4 Any remote or local annunciator LCD/LED's associated with the supervisory zone shall be illuminated.
    - .5 Transmit signal to the central station with point identification.
- .4 Trouble Operation
  - .1 Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
    - .1 The internal audible device shall sound at the control.

- .2 Display the event on the graphical workstation and display a pictorial image.
  - .3 The LCD keypad display shall indicate all applicable information associated with the trouble condition including; zone, device type, device location and time/date.
  - .4 All system activity/events shall be documented on the system.
  - .5 Any LCD/LED's associated with the trouble zone shall be illuminated at the Fire Alarm Panel and Annunciator Panel.
  - .6 Transmit signal to the central station with point identification.
- .5 Monitor Activation
- .1 Upon activation of any device connected to a monitor circuit, the following functions shall automatically occur:
    - .1 The internal audible device shall sound at the control
    - .2 Display the event on the graphical workstation and display a pictorial image.
    - .3 The LCD display shall indicate all applicable information associated with the status condition including; zone, device type, device location and time/date.
    - .4 All system activity/events shall be documented on the system printer.
    - .5 Any remote or local annunciator LCD/LED's associated with the status zone shall be illuminated.

## 1.12 SYSTEM CONFIGURATION

- .1 General
  - .1 All Life Safety System equipment shall be arranged and programmed to provide the early detection of fire, the notification of building occupants, the automatic alarm to the switchboard, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
- .2 Power Supply
  - .1 Standby power supply shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system and auxiliary components for 120 minutes in the alarm mode at 100% load. The system shall include a charging circuit to automatically maintain the electrical charge of the battery. The system shall automatically adjust the charging of the battery to compensate for temperature.
  - .2 The control panel shall receive AC power via a dedicated circuit on emergency power. Circuit breaker shall be clearly identified, coloured red and lockable in the "ON" position.
  - .3 The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 30 minutes of alarm operation at the end of this period. The

- system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
- .4 All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control panel.
  - .5 The incoming power to the system shall be supervised so that any power failure will be indicated at the control panel. A green "power on" LED shall be displayed continuously while incoming power is present.
  - .6 The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be indicated at the control panel.
  - .7 The system shall support 100% of addressable devices in alarm operated at the same time, under both primary (AC) and secondary (battery) power conditions.
  - .8 Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply
- .3 Display
- .1 The main display interface shall show the first and most recent highest priority system events without any operator intervention. All system events shall be directed to one of four message queues. Messages of different types shall never intermix to eliminate operator confusion. A "Details" switch shall provide additional information about any device highlighted by the operator.
- .4 Initiating Device Circuits
- .1 Initiating device circuits monitoring manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, shall be Class A.
- .5 Notification Appliance Circuits
- .1 All notification appliance circuits shall be Class A. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
- .6 Data Communications Link
- .1 When a data communications link (DCL) covers more than one fire/smoke compartment, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments. The DCL connecting network panel/nodes, annunciators shall be Redundant (DCLR)

## **Part 2 Products**

### **2.1 SYSTEM DESCRIPTION**

- .1 General: Provide a complete, non-coded addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings. Fire Alarm Panel to match the specified panel on Clause 1.10.1.1.1.2 for the new fire alarm control panels.
- .2 Power Requirements
  - .1 The control unit shall receive AC power via a dedicated fused disconnect circuit.

- .2 The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 60 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
  - .3 All circuits requiring system-operating power shall be 24 VDC nominal voltage and shall be individually fused at the control unit.
  - .4 The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.
  - .5 The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.
  - .6 The system shall support shutdown operation as defined by CAN/ULC-S527 standard after a Depleted Battery condition occurs.
  - .7 The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.
  - .8 Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.
- .3 Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary.
- .1 The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.
  - .2 All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
  - .3 Panels shall be capable of full system operation during new site specific configuration download, master exec downloads, and slave exec downloads.
  - .4 Remote panel site-specific software and executive firmware downloads shall be capable of being performed over proprietary fire alarm network communications
  - .5 Panels shall automatically store all program changes to the panel's non-volatile memory each time a new program is downloaded. Panels shall be capable of storing the active site-specific configuration program and no less than 9 previous revisions in reserve. A compare utility program shall also be available to authorized users to compare any two of the saved programs. The compare utility shall provide a deviation report highlighting the changes between the two compared programs.
  - .6 Panels shall provide electronic file storage with a means to retrieve a record copy of the site-specific software and up to 9 previous revisions. Sufficient file storage shall be provided for other related system documentation such as record drawings, record of completion, owner's manuals, testing and maintenance records, etc.
  - .7 The media used to store the record copy of site-specific software and other related system documentation shall be electrically supervised. If the media is removed a trouble shall be reported on the fire alarm control panel.

- .4 History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.
- .5 Recording of Events: The system shall be capable of recording all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout shall differentiate alarm signals from all other printed indications.
- .6 Wiring/Signal Transmission:
  - .1 Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.
  - .2 System connections for in/out circuits shall be Class B, Style 4, data communication links shall be Class A, Style A and signaling circuits shall be Class B, Style Y.
  - .3 Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.
  - .4 Constant Supervision Audio: When provided, audio notification appliance circuits shall be supervised during non-fire alarm audio use by monitoring for DC continuity to end-of-line resistors.
- .7 Supplemental Notification and Remote User Access (Fire Panel Internet Interface)
  - .1 Fire Alarm Control Panel (FACP) shall have the capability to provide supplemental notification and remote user access to the FACP using Ethernet and TCP/IP communications protocol compatible with IEEE Standard 802.3.
  - .2 A standard RJ-45 Ethernet connection shall connect to the owner's Ethernet network. Provisions for that connection must be provided at each fire alarm control panel as part of the contract.
  - .3 The means of providing supplemental email and SMS text messaging notification shall be agency listed for specific interfaces and for the purpose described in this section. The use of non-listed external third party products and interfaces are not acceptable.
  - .4 The fire panel internet interface shall be capable of sending automated notification of discrete system events via email and SMS text messaging to up to 50 individual user accounts and via email to up to 5 distribution lists.
  - .5 Each user account and distribution list shall be capable of being configurable for the specific type of events to be received. Each account shall be configurable to receive notification upon any combination of the following types of events:
    - .1 Fire Alarm
    - .2 Priority 2
    - .3 Supervisory
    - .4 Trouble
    - .5 Custom Action Messages

- .6 Fire Panel Internet Interface Security Violations
- .6 Each user account and distribution list shall be capable of being configurable for the specific content to be received. Each account shall be configurable to receive any combination of the following message content:
  - .1 Summary
  - .2 Event Information
  - .3 Message
  - .4 Emergency Contacts
  - .5 Host Fire Alarm Control Panel Information
- .7 Each user account and distribution list shall be capable of being configurable for the type of Fire Alarm Control Panel Logs and Reports to be received. Each account shall be configurable to receive any combination of the following Logs and Reports via email:
  - .1 Alarm Log
  - .2 Trouble Log
  - .3 Analog Sensor Status Report
  - .4 Analog Sensor Service Report
  - .5 Almost Dirty, Dirty and Excessively Dirty Sensor Report
  - .6 CO Analog Sensor Service Report
  - .7 Appliance Candela Report
  - .8 Appliance Status Report
- .8 Each user account and distribution list shall be capable of receiving email distribution of Fire Alarm Control Panel Logs and Reports On-Demand or automatically on a Pre-Determined schedule. Receipt of Logs and Reports shall be capable of being scheduled as follows:
  - .1 Weekly, or
  - .2 Bi-weekly, or
  - .3 Monthly
- .9 The Fire Alarm Control Panel Logs and Reports shall be sent in CSV file format which can be imported into common database applications for viewing, sorting, and customization.
  - .1 Each user account shall be capable of being configured to receive system events via email and/or SMS text messaging.
  - .2 Each distribution list shall be capable of supporting up to 20 email address recipients.
- .10 The means to provide email notification shall be compatible with SMTP mail servers, ISP email services, and Internet email services. Communication with the email server shall be verified at selectable intervals of 5 to 30 minutes.
- .11 Email operation shall be capable of being disabled for service by the system administrator.
- .12 An email log shall be accessible to authorized users. The email log shall display the 25 most recent email notifications sent.
- .13 The fire panel internet interface for supplemental notification and remote user access shall support:

- .1 Secure HTTPS/SSL encrypted connections.
- .2 Up to 50 individual password protected user accounts.
- .3 Dynamic and Static IP addressing.
- .4 IP Address Blocking.
- .5 Restricted number of log-in attempts before lock-out configurable from 1 to 20.
- .6 Lock-out duration after unsuccessful log-in attempts configurable from 0 to 24 hours.
- .7 Email notification to Administrators of unsuccessful log-in attempts.
- .8 Automatic lock-out reset upon a new event.
- .9 Automatic inactivity logout configurable from 10 minutes to 24 hours.
- .10 Firmware updates over ethernet.
- .11 Set-up and configuration via Local Service Port or via Remote Services over LAN/WAN connection.
- .14 Authorized users shall be capable of accessing the fire alarm panel using a compatible web browser (Internet Explorer 6.0 or higher) and a secure HTTPS/SSL encrypted connection.
- .15 The fire panel internet interface shall support concurrent connections for up to 5 users plus 1 administrator.
- .16 Authorized users with remote access shall be capable of:
  - .1 Viewing the fire panel internet interface web home page.
    - .1 The fire panel internet interface home page shall display system status information and provide links to detailed status information and fire alarm panel reports and history logs.
    - .2 The web browser on the user's computer shall automatically refresh system status information upon a new event.
      - .1 Systems that require a manual refresh to acquire updated system status information shall not be accepted.
  - .2 Viewing the fire alarm panel detailed card status information.
  - .3 Viewing the fire alarm panel detailed point status information.
  - .4 Viewing the fire alarm panel reports and history logs.
  - .5 Viewing the fire panel internet interface email log.
  - .6 Viewing system summary information.
  - .7 Accessing Custom Hypertext Links.
- .17 The fire panel internet interface home page shall support customization to display the following information:
  - .1 Customer Name and Address.
  - .2 Fire Panel Location or Building Name.
  - .3 Up to 10 Custom Hypertext Links with Text Descriptions.
- .8 Remote Services Access:
  - .1 Fire Alarm Control Panel (FACP) shall have the capability to provide a remote service access feature using Ethernet and TCP/IP communications protocol

- compatible with IEEE Standard 802.3. The Remote Access feature shall provide automatic notification of system faults and remote diagnostics of system status for responding technicians prior to arrival on site.
- .2 A standard RJ-45 Ethernet connection shall connect to the owner's Ethernet network. Provisions for that connection must be provided at each fire alarm control panel as part of the contract.
  - .3 The Ethernet access feature shall be agency listed for specific interfaces and for the purpose described in this section. The use of non-listed external third party interfaces is not acceptable.
  - .4 The internet remote access service function shall provide automated real time off-site reporting of discrete system events to a remote service support center with details of internal FACP fault conditions allowing a pre-site visit analysis of repair requirements.
  - .5 Existing FACP controls shall be capable of retrofitting the Remote Service module as a plug-in upgrade feature.
  - .6 The remote service network shall work on the customers Ethernet infrastructure and be Fire-Wall friendly for two-way communications for off-site reporting. The feature shall be compatible with existing proxy servers and firewalls shall not require any special changes or modifications.
  - .7 The remote service system shall be able to connect to the remote service center without the need for a VPN account or similar tunnel.
  - .8 The remote service system shall be a non Windows based application to protect against conventional virus attacks.
  - .9 The remote service system shall support a secure connection with strong encryption, 128 bit or better, and an optional secondary encryption method if required.
  - .10 The remote service system shall be compatible with virtual LANS (VLAN).
  - .11 The remote service system shall work on an outbound communication premise (panel calls home) in order to eliminate the possibility of any inbound connection into the network (from trusted or non trusted sites).
  - .12 The remote service system shall provide an audit trail of all events and service connections.
  - .13 The Remote Service connection will provide access for panel software downloads and uploads for archiving job specific programs back at the enterprise server.
  - .14 The supplier shall provide a service contract for the Remote Service program that provides the following requirements:
    - .1 24/7 recording of FACP service activity.
    - .2 Off-site diagnostics by a technical specialist to provide repair and parts guidance to the service technician prior to a site visit.
- .9 Required Functions: The following are required system functions and operating features:
- .1 Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority, respectively. Signals of a higher-level priority take



- precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.
- .2 Noninterfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.
  - .3 Transmission to an approved Supervising Station: Automatically route alarm, supervisory, and trouble signals to an approved supervising station service provider, under another contract.
  - .4 Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote annunciator, indicating the type of device, the operational state of the device (i.e. alarm, trouble or supervisory) and shall display the custom label associated with the device.
  - .5 Selective Alarm: A system alarm shall include:
    - .1 Indication of alarm condition at the FACP and the annunciator(s).
    - .2 Identification of the device /zone that is the source of the alarm at the FACP and the annunciator(s).
    - .3 Operation of audible and visible notification appliances until silenced at FACP.
    - .4 Selectively closing doors normally held open by magnetic door holders on the fire floor, floor above and floor below.
    - .5 Unlocking designated doors.
    - .6 Shutting down supply and return fans serving zone where alarm is initiated.
    - .7 Transmission of signal to the supervising station.
    - .8 Initiation of elevator Phase I functions (recall, shunt trip, illumination of indicator in cab, etc.) in accordance with CSA standard B44, Safety Code for Elevators and Escalators, when specified detectors or sensors are activated, as appropriate.
  - .6 Supervisory Operations: Upon activation of a supervisory device such as a tamper switch, the system shall operate as follows:
    - .1 Activate the system supervisory service audible signal and illuminate the LED at the control unit and the remote annunciator.
    - .2 Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
    - .3 Record the event in the FACP historical log.
    - .4 Transmission of supervisory signal to the supervising station.
    - .5 Restoring the condition shall cause the Supervisory LED to clear and restore the system to normal.
  - .7 Alarm Silencing: If the "Alarm Silence" button is pressed, all audible and visible alarm signals shall cease operation.
  - .8 System Reset

- .1 The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-alarmed the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
- .2 Should an alarm condition continue, the system will remain in an alarmed state.
- .9 A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.
- .10 WALKTEST: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:
  - .1 The city circuit connection and any suppression release circuits shall be bypassed for the testing group.
  - .2 Control relay functions associated with one of the 8 testing groups shall be bypassed.
  - .3 The control unit shall indicate a trouble condition.
  - .4 The alarm activation of any initiating device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device or zone.
  - .5 The unit shall automatically reset itself after signaling is complete.
  - .6 Any opening of an initiating device or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.
- .11 Install Mode: The system shall provide the capability to group all non-verified points and devices into a single "Install Mode" trouble condition allowing an operator to clearly identify event activations from verified points and devices in occupied areas.
  - .1 It shall be possible to individually remove points from Install Mode as required for phased system verification.
  - .2 It shall be possible to retrieve an Install Mode report listing that includes a list of all points assigned to the Install Mode. Panels not having an install mode shall be reprogrammed to remove any non-verified points and devices.
- .12 Module Distribution:
  - .1 The fire alarm control panel shall be capable of allowing remote location of the following modules; interface of such modules shall be through a Class A supervised data communications link (dcl):
    - .1 Initiating Device Circuits
    - .2 Notification Appliance Circuits
    - .3 Auxiliary Control Circuits

- .10 Integrated Systems
  - .1 Security Integration
    - .1 The FA System shall provide the means to be integrated directly to a Software House C•Cure 9000 or 800 Security Management System (SMS) via a software interface for the purpose of communicating fire alarm events directly to the security system.
    - .2 Communication between the FA System and SMS shall be accomplished using Computer Port Protocol (CPP).
      - .1 The FA and the C•Cure SMS shall be connected via a local or network serial port server based RS-232 serial port connection.
    - .3 The CPP shall consist of a bi-directional serial protocol capable of accessing most of the Fire Alarm Control panel (FACP) diagnostic features.
    - .4 The interface shall provide the means to communicate the following information to the C•Cure SMS:
      - .1 Device/Point status changes (e.g., Fire, Trouble, Disabled)
      - .2 Panel event status (e.g. Number of Unacknowledged Fire Alarms, Card Failure Troubles, etc.)
      - .3 Panel health status (e.g., AC power, battery status)
    - .5 Interface software shall include a data acquisition function that provides the following:
      - .1 Establishes and maintains a supervised serial link
      - .2 Extraction of the point database from the FACP
      - .3 Merges the FACP database into the C•Cure SMS database
    - .6 The software interface shall not allow system control functionality from the C•Cure SMS to the FA System.
    - .7 The installation, programming and maintenance of the FA/C•Cure integration software interface shall be conducted by factory trained certified technicians.
  - .2 Building Automation and Control Network (BACnet) Integration
    - .1 The fire alarm control unit shall be capable of providing a one-way communications interface between the fire alarm control unit and an industry-standard Building Automation and Control Network (BACnet) using ASHRAE® BACnet® IP (internet protocol) compliant with ANSI/ASHRAE Standard 135.
    - .2 The BACnet communications module shall be agency listed to.
    - .3 The fire alarm control unit shall be capable of communicating up to 1000 status changes to the building automation system.
    - .4 MS/TP Master and MS/TP Slave data link layer options communicating at baud rates up to 76,800 bps shall be supported.
    - .5 The interface shall be capable of supporting ANSI X3.4, ISO 10656 (ICS-4), ISO 10656 (UCS-2), ISO 8859-1, or IBM/Microsoft DBCS character sets.

- .6 A standard RJ-45 Ethernet connection to the Building Automation System Ethernet network shall be provided at the fire alarm control unit as part of the contract.
- .11 Addressable Notification Appliances:
  - .1 Monitoring: The FACP shall monitor individual addressable notification appliances for status, condition, type of appliance, and configured appliance settings. A fault in any individual appliance shall automatically report a trouble condition on the FACP.
  - .2 Individual Appliance Custom Label: Each addressable appliance shall have its own 40 character custom label to identify the location of the appliance and to aid in troubleshooting fault conditions.
  - .3 Individual Appliance Information Display:
    - .1 The FACP shall be capable of calling up detailed information for each addressable appliance including the appliance location, status, condition, type of appliance, and configured appliance settings.
    - .2 Notification appliances that are not capable of communicating and reporting their individual location, status, condition, type of appliance, and configured appliance settings to the FACP shall not be accepted.
  - .4 Programmable Appliance Settings:
    - .1 The selectable operation of each addressable notification appliance shall be capable of being configured by the FACP without having to replace or remove the appliance from the wall or ceiling.
      - .1 Programmable appliance settings for applicable addressable notification appliances shall include:
        - .1 Operation:
          - .1 General EVAC
          - .2 Alert
          - .3 User Defined
        - .2 Style:
          - .1 Indoor
          - .2 UL Weatherproof
          - .3 ULC Weatherproof
        - .3 Candela Selections:
          - .1 Indoor: 15, 30, 75, 110, 135, or 185cd
          - .2 UL Weatherproof: 15 or 17cd (per UL1971), and 75 or 185cd (per UL1638)
          - .3 ULC Weatherproof: 20, 30, or 75 cd (per ULC-S526)
        - .4 Horn Volume:
          - .1 High
          - .2 Low
        - .5 Horn Cadence:
          - .1 Temporal 3

- .2 Temporal 4
- .3 March Time 20 BPM
- .4 March Time 60 BPM
- .5 March Time 120 BPM
- .6 Steady
- .6 Horn Tone:
  - .1 520 HZ
  - .2 Bell
  - .3 Slow Whoop
  - .4 Siren
  - .5 High/Low
- .2 Systems that require replacement or removal of the appliances from the wall or ceiling to change their applicable operation or settings shall not be accepted.
- .5 Programmable Notification Zones:
  - .1 Changing the notification zone assigned to a notification appliance shall be configurable by the FACP and shall not require additional circuits or wiring.
  - .2 Systems that require additional circuits and wiring to change the notification zone assigned to a notification appliance shall not be accepted.
- .6 Other Emergency and Non Emergency Notification:
  - .1 Where required, notification appliances for purposes not related to fire alarm shall be capable of:
    - .1 being connected to the same circuit as the fire alarm appliances, and
    - .2 being individually configured for their intended use without requiring additional circuits or wiring.
  - .2 Systems that require separate circuits and wiring for other Emergency and Non-Emergency notification shall not be accepted.
- .7 Addressable Appliance Reports: The FACP shall maintain reports that include the Status and Candela for each applicable addressable notification appliance.
  - .1 Reports shall be capable of being printed for viewing and record keeping.
  - .2 Where required, reports shall be accessible remotely through:
    - .1 A Fire Panel Internet Interface using Ethernet and TCP/IP communications protocol compatible with IEEE Standard 802.3. The Fire Panel Internet Interface shall be capable of automatically scheduling email reports to individual user accounts on a weekly, bi-weekly, or monthly schedule.
    - .2 A PC Annunciator using an RS232-C connection to the FACP or a PC Annunciator Client using a TCP/IP communications protocol connection to the PC Annunciator server compatible with IEEE Standard 802.3.

- .8 Magnet Test: When the control panel is in diagnostic mode, the appliances shall be capable of being tested with a magnet. The magnet diagnostics shall:
  - .1 Pulse the appliance LED to indicate the appliance address.
  - .2 Briefly sound the individual horn to confirm the audible appliance operation.
  - .3 Briefly flash the individual strobe to confirm visible appliance operation.
- .12 Fire Suppression Monitoring:
  - .1 Water flow: Activation of a water flow switch shall initiate general alarm operations.
  - .2 Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.
  - .3 WSO: Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.
- .13 Audible Alarm Notification: By horns in areas as indicated on drawings.
- .14 Network Communication:
  - .1 Network node communication shall be through a token ring, hub, or star topology configuration, or combination thereof.

## **2.2 PASSIVE GRAPHIC DISPLAY**

- .1 Graphic display to be sized to suit building footprint at 1:200 scale.
- .2 Locate graphic display behind a plexiglass door, hinged on one side, complete with lockable front.
- .3 graphic with colour on white photo paper.
- .4 Graphic to include all floor plans, stairs, corridors and exits.
- .5 Graphic to include north arrow, all fire alarm zones.; fire alarm zones to be indicated in red. Red “You Are Here”, fire alarm devices, company logo, exit locations, room names/numbers.
- .6 Graphic text to be English.
- .7 Locate adjacent to annunciator in main vestibule.
- .8 Include with shop drawing submission, one full size colour proof.
- .9 AutoCAD drawing file can be obtained from Consultant.

**Part 3 Execution**

**3.1 INSTALLATION – GENERAL**

- .1 Install system components and all associated devices in accordance with applicable CAN/ULC Standards and manufacturer's recommendations.
- .2 Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
  - .1 Factory trained and certified personnel.
  - .2 Canadian Fire Alarm Association (CFAA) fire alarm certified personnel.
  - .3 Personnel licensed or certified by provincial or local authority.
- .3 Provide on-off locking device for circuit breaker.
- .4 Paint circuit breaker red.

**3.2 EQUIPMENT INSTALLATION**

- .1 Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.
- .2 Water-Flow and Valve Supervisory Switches:
  - .1 Connect for each sprinkler valve required to be supervised.
- .3 Device Location-Indicating Lights:
  - .1 Locate in the public space immediately adjacent to the device they monitor.

**3.3 WIRING INSTALLATION**

- .1 Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AHJ) and shall be installed in accordance with the appropriate articles from the current approved edition of the Canadian Electric Code (CEC).
- .2 Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- .3 Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

- .4 The joints in junction boxes are to be labeled.
- .5 No circuit is to be loaded to more than 60% capacity.
- .6 All conduit to be Red in color.

### **3.4 CLEANING AND ADJUSTING**

- .1 Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
- .2 When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

### **3.5 TRAINING**

- .1 Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.
  - .1 Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours' training.
  - .2 Schedule training with the Engineer at least seven days in advance.

**END OF SECTION**