Part 1 - General

1.1 CARE, OPERATION AND START-UP

.1 Refer to Section 26 05 01.

.2 Manufacturer's factory service representative to instruct:

.1 Maintenance personnel in the maintenance of system.

.2 Operating personnel in the use of system.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01300 - submittals.

.2 Include riser diagram and single line diagram.

1.4 MAINTENANCE AND OPERATION DATA

.1 Refer to Section 01 30 00 - submittals.

.2 Include description of system operation.

.3 Include parts list, using component identification numbers standard to the industry.

1.5 SERVICE

.1 The supplier of the system shall employ factory-certified technicians and maintain a 24 hour service organization. Including the ability to monitor the fire alarm system, in accordance with ULC-S527 central fire alarm station.

.2 Provide the City with a minimum of two (2) direct telephone numbers for "after hours" service.

.3 Provide the City with service within a reasonable time frame.

.4 Provide monitoring services meeting all applicable standards for the monitoring of a fire alarm system. The contractor shall install all required monitoring equipment required to meet the standards.

1.6 ON-SITE INSTRUCTIONS

.1 The system supplier shall provide four (4) hours of on-site instruction to familiarize personnel with operation of the system.

Part 2 Product

2.1 MATERIALS

.1 All wiring to be in conduit.

.2 Conductors to manufacturer's requirements.

2.2 CONTROL PANEL

.1 Control unit to have zones as required, and shall be expandable via 2-wire multiplex circuits to 128 zones. All detection zones to be programmable supervised and controlled by the micro-processor. Unit to be complete with EEPROM memory, entry/exit delay timers, tamperproof, lockable steel cabinet, standby batteries, power supply battery charger, and lightning protection.

.1 Entry/exit timers to be 0-4 minutes adjustable.

.2 Standby batteries to be sealed lead acid and maintenance free.

.3 Cabinet to be surface-type, located as indicated.

.4 1800 user codes with up to 100 security profiles.

.5 500 event memory, date and time stamped.

.6 Capacity for 24 doors of access control.

.7 50 time schedules with 20 time ranges each.

.8 Programmable logic control for as many as 32 outputs.

.9 DACT dialer.

.10 Alarm shall autodial an alarm on power failure.

.2 Approved manufacturer:

.1 Cambridge Security

.2 ADT

.3 Silent Knight

2.3 KEYPAD CONTROL STATION

.1 The L.C.D. keypad control station shall be used to control all user functions to the control panel. Up to 16 may be connected to the system.

.2 The keypad shall provide a 2-line English language display of the detection zones and status indicators for the system.

.3 The following functions shall be controlled from the keypad:

.1 Arming/disarming with L.C.D. display.

.2 Alarm memory with L.C.D. display.

.3 Zone by-passing.

.4 Trouble display.

.5 Automatic arm and disarm times.

.6 Daytime door sentry.

.7 Bell and walk test.

.8 1-800 user access codes.

.4 Provide keypad stations and locate as indicated on drawings. Each station shall be able to operate the system independently.

.5 Keypad stations to be commercial L.C.D. keypads.

.6 Keypad to sound during arm/disarm stage.

2.4 MOTION DETECTORS

.1 Motion detectors in rooms shall be C & K DT-450s (wall mounted), coverage pattern to be 15 x 15 m. Units to be dual technology sensors, combining microwave and passive infrared sensors. Units to have RFI protection, and multi-level beam pattern.

.2 Motion detectors in corridors shall be C & K Model #8410 (wall mounted) coverage pattern to be 36 x 3 m or Model #8420 (wall mount) coverage pattern to be 60 x 4.5 m. Units to be dual technology sensors combining microwave and passive infrared sensors. Units to have RFI protection, and multi-level beam pattern.

.3 Confirm all mounting heights and locations with system supplier.

2.5 CONTACT SWITCHES

.1 Contact switches for man doors to be concealed flush type, Sentrol #1078. Contacts to fit in a 25 mm pre-drilled hole.

2.6 AUTOMATIC DIALER

.1 A dialer alarm communicator transmitter (DACT) module to transmit alarm, supervisory and trouble signals to a Central Monitoring Station (CMS). The DACT shall support dual telephones lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program using a touch tone phone and password.

2.7 WIRING

.1 Wiring for the intrusion alarm system to be installed in a separate independent conduit system.

.2 Wiring to infrared detectors, contact switches and keypad stations to be FT-4 rated, 4/c 18 AWG jacketted cable.

2.8 ZONING

.1 System to be zoned so that each device shall annunciate independently.

2.9 Lighting Controls

.1 Provide control relay contact from security panel to lighting contactors LC-A, B, C to enable contactors from security or fire alarm trouble.

Part 3 Execution

3.1 SECURITY SYSTEM

.1 Install all components for a complete operational system. Complete system tests and commission.

.2 Auto-Dialer System

.1 Provide alarm circuit wiring and terminate to alarm contacts and monitor the following building systems:

.1 Security control panel (alarm and trouble)

.2 Fire alarm panel (alarm and trouble)

.3 Building DDC panel (alarm and trouble)

.2 Program the auto-dialer to Cities requirements.

3.2 INSTALLATION

.1 Equipment to be supplied, wired and connected by an approved security subcontractor. Electrical subcontractor or alarm subcontractor to install conduit and backbones as required. Co-ordinate between trades.

.2 Provide a 21 mm conduit from intrusion alarm control panel to main telephone backboard.

.3 Provide a 21 mm conduit from intrusion alarm control panel to fire alarm control panel.

.4 All security wiring shall be run in conduit.

3.3 CERTIFICATION

.1 System to be tested under actual working conditions in the presence of, and to the satisfaction of, the Contract Administrator.

.2 System to be certified by manufacturer's approved representative. Submit certified test results in the Maintenance Manuals.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for fire alarm systems.

.2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general alarm, supervising system continuously, actuating zone annunciators, and initiating trouble signals.

.3 Trouble signal devices.

.4 Power supply facilities.

.5 Manual alarm stations.

.6 Automatic alarm initiating devices.

.7 Audible signal devices.

.8 End-of-line devices.

.9 Annunciators.

.10 Visual alarm signal devices.

.11 Ancillary devices.

.12 Sustainable requirements for construction and verification.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S524-2001, Standard for the Installation of Fire Alarm Systems.

.2 CAN/ULC-S525-1999, Audible Signal Device for Fire Alarm Systems.

.3 CAN/ULC-S526-2002, Visual Signal Devices for Fire Alarm Systems.

.4 CAN/ULC-S527-1999, Control Units.

.5 CAN/ULC-S528-1991, Manual Pull Stations for Fire Alarm Systems.CAN/ULC-S529-2002, Smoke Detectors for Fire Alarm Systems.

.6 CAN/ULC-S530-M1991, Heat Actuated Fire Detectors for Fire Alarm Systems.

.7 CAN/ULC-S531-2002, Standard for Smoke Alarms.

.8 CAN/ULC-S536-S537-2004, Burglar and Fire Alarm Systems and Components.

.3 National Fire Protection Agency

.1 NFPA 72-2002, National Fire Alarm Code.

.2 NFPA 90A-2002, Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include:

.1 Layout of equipment.

.2 Zoning.

.3 Complete wiring diagram, including schematics of modules.

.3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.3 Manufacturer's Field Reports: manufacturer's field reports specified.

.4 Closeout Submittals:

.1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

.2 Authority of Jurisdiction will delegate authority for review and approval of submittals required by this Section.

.3 Submit to Authority of Jurisdiction 2 sets of approved submittals and drawings immediately after approval but no later than 15 working days to prior to final inspection.

.4 Submit following:

.1 Manufacturer's Data for:

.1 Control panel and modules.

.2 Storage batteries.

.3 Battery charger.

.4 Manual pull stations.

.5 Heat detectors.

.6 Open-area smoke detectors.

.7 Duct smoke detectors.

.8 Alarm bells.

.9 Alarm horns.

.10 Visible appliances.

.11 Main annunciator.

.12 Remote annunciator panel.

.13 Electro-magnetic door holder-releases.

.14 Valve tamper switches.

.15 Wiring.

.16 Ground rods.

.17 Conduit.

.18 Outlet boxes.

.19 Fittings for conduit and outlet boxes.

.20 Trouble buzzer.

.21 Surge suppression devices.

.22 Mark data which describe more than one type of item to indicate which type will be provided.

.23 Submit 1 original for each item and clear, legible, first-generation photocopies for remainder of specified copies.

.2 System wiring diagrams:

.1 Submit complete wiring diagrams of system showing points of connection and terminals used for electrical connections in the system.

.2 Show modules, relays, switches and lamps in control panel.

.3 Design data: Power Calculations:

.1 Submit design calculations new work specified to substantiate that battery capacity exceeds supervisory and alarm power requirements.

.2 Show comparison of detector power requirements per zone versus control panel smoke detector power output per zone in both standby and alarm modes.

.3 Show comparison of notification appliance circuit alarm power requirements with rated circuit power output.

.4 Schedules:

.1 Conductor wire marker schedule.

.5 Test Reports:

.1 Open-area 2-wire smoke detectors.

.2 Preliminary testing:

.1 Final acceptance testing.

.2 Submit for inspections and tests specified under Field Quality Control.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company or person specializing in fire alarm system installations with 10-years documented experience approved by manufacturer.

.2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.

.3 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.4 Maintenance Service:

.1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to Contract Administrator.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 In accordance with Waste Management and Disposal Clauses from Section 26 05 01 – Common Work Results – For Electrical.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

2.2 MATERIALS

.1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

.2 Power supply: to CAN/ULC-S524.

.3 Audible signal devices: to CAN/ULC-S525.

.4 Visual signal devices: to CAN/ULC-S526.

.5 Control unit: to CAN/ULC-S527.

.6 Manual pull stations: to CAN/ULC-S528.

.7 Thermal detectors: to CAN/ULC-S530.

.8 Smoke detectors: to CAN/ULC-S529.

.9 Smoke alarms: to CAN/ULC-S531.

2.3 SYSTEM OPERATION

.1 Provide complete, electrically supervised and automatic Fully Addressable, fire alarm system.

.2 Provide separate circuits from control panel to each zone of initiating devices. Transmission of signals from more than one zone over common circuit to control panel is prohibited.

.3 System shall be a Simplex 4100U or Chubb-Edwards EST3.

.4 Single stage operation. Operation to actuation following:

.1 Manual station.

.2 Heat detector.

.3 Smoke detector.

.4 Fire extinguishing system.

.5 Actuation of single operation device to initiate following:

.1 Building evacuation alarm devices to operate continuously.

.2 Transmit signal to fire department via monitoring station.

.3 Zone of alarm device to be indicated on control panel and remote annunciator.

.4 Fire doors, smoke control doors and smoke dampers if normally held open, to close automatically.

.5 Electro-magnetic door holders to de-energize.

.6 Operations to remain in alarm mode (except alarm notification appliances if manually silenced) until system is manually restored to normal.

.6 Capability to program smoke detector status change confirmation on any or zones in accordance with CAN/ULC-S527, Appendix C.

2.4 CONTROL PANEL

.1 Class B.

.2 Single stage operation.

.3 Zoned.

.4 Coded.

.5 Fully Digital addressable

.6 Enclosure:

.1 CSA Enclosure Sprinklerproof, c/w lockable concealed hinged door, full viewing window, flush lock and 2 keys.

.2 Provide modular type panel installed in surface mounted steel cabinet with hinged door and cylinder lock.

.3 Mount with panel centerline 1.5 m above finished floor elevation.

.4 Switches and other controls: not accessible without use of key.

.5 Design of control panel: neat, compact assembly containing parts and equipment required to provide specified operating and supervisory functions of system.

.6 Control panel components: CSA approved and approved by control panel manufacturer for use in control panel.

.7 Panel cabinet: finished on inside and outside with factory-applied enamel finish.

.8 Provide main annunciator located on exterior of cabinet door or visible through cabinet door.

.9 Provide audible trouble signal.

.10 Provide permanent engraved

.11 Provide 1 set of Form C dry alarm contacts per zone, common system Form C dry alarm contact, and common system Form C dry trouble contact.

.12 Permanently label switches.

.13 Provide panel with following switches:

.1 Trouble silencing switch which silences audible trouble signals without extinguishing trouble indicating lamp(s).

.1 For silencing switch of momentary action self-resetting type: trouble signal circuit automatically restored to normal upon correction of trouble condition.

.2 Evacuation alarm silencing switch which when activated will silence alarm notification appliances without resetting panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm to cause activation of notification appliances even with alarm silencing switch in "silenced" position.

.3 Individual zone disconnect switches which when operated will disable only their respective initiating circuit and cause operation of system and zone trouble signals.

.4 Reset switch which when activated will restore the system to normal standby status after cause of alarm has been corrected, and activated initiating devices reset.

.1 Operation of reset switch to restore activated smoke detectors to normal standby status.

.5 Lamp test switch.

.6 Drill switch which will enable test of notification appliances and restoration to normal without tripping master box. Master box disconnect switch which when activated will disconnect coded device and cause operation of system trouble signal.

.7 HVAC shutdown bypass switch. Operation of the switch to allow HVAC system to operate with detectors in alarm and cause operation of system trouble signals.

.7 Supervised, modular design with plug-in modules:

.1 Alarm receiver with trouble and alarm indications, for class A and B initiating circuits.

.2 Spare zones: compatible with smoke detectors and open circuit devices.

.3 Space for future modules.

.4 Latching type supervisory receiver circuits. Discrete indication for both off-normal and trouble.

.8 Components:

.1 Coded alarm receiver panel with trouble and alarm indications for class B initiating circuit.

.2 Single stage alarm pulse rate panels:

.1 Single stroke control type for output to signal control panel continuously.

.3 Two stage alarm pulse rate panel for single stroke output to signal control panel. First stage-20 strokes per minute, second stage continuous.

.4 Audible signal control panel with 10 control circuits complete with terminals for wiring and 10 plug-in modules for dc signals up to 2.0 A load with trouble indication with class B connections.

.5 Common control and power units:

.1 Control panel containing following indications and controls:

.1 "Power on" LED (green) to monitor primary source of power to system.

.2 "Power trouble" indication.

.3 "Ground trouble" indication.

.4 "Remote annunciator trouble" indication.

.5 "System trouble" indication.

.6 "System trouble" buzzer and silence switch c/w trouble resound feature.

.7 System reset switch.

.8 "LED test" switch if applicable.

.9 "Alarm silence" switch to silence signals manually. If new alarm occurs after signals have been silenced, signals to resound.

.10 "Signals silenced" indication.

.2 Master power supply panel to provide 24 V dc to system from 120 V ac, 60 Hz input.

.3 Fire department connections:

.1 Plug-in module for tripper or shunt type municipal box.

.2 Fire department bypass switch c/w indicator for trouble at panel.

.6 Auxiliary relays: plug-in type, dust cover, supervised against unauthorized removal by common trouble circuit.

.1 Contacts: 2.0 A, 120 V ac, for functions such as release of door holders or initiation of fan shut down.

.2 Contact terminal size: capable of accepting 22-12 AWG wire.

2.5 POWER SUPPLY

.1 120 V, ac, 60 Hz input, 24 V dc output from rectifier to operate alarm and signal circuits, with standby power of gel cell batteries minimum expected life of 4 years, sized in accordance with NBC.

2.6 MANUAL ALARM STATIONS

.1 Provide addressable single action type with mechanical reset features.

.2 Stations: semi-flush mounted and type as indicated.

.1 For surface mounting provide station manufacturer's approved back box.

.2 Back box finish to match station finish.

.3 Equip each station with terminal strip with contacts of proper number and type to perform functions required.

.4 Station colour: red.-Fire,

.5 Provide station with visible indication of operation.

.6 Restoration to require use of key.

.1 Keys: identical throughout system for stations and control panel(s).

.7 Mount stations with operating lever not more than 1.2 m above finished floor.

.8 Supply with clear, tamperproof polycarbonate shield and frame with integral horn that fits over manual pullstation. When lifted to gain access to the actual alarm a minimum 105dB warning horn is sounded. c/w Lifetime guarantee against breakage and battery.

2.7 AUTOMATIC ALARM INITIATING DEVICES

.1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature rate-of-rise principle.

.2 Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): designed for semi-flush outlet box mounting and supported independently of conduit, tubing or wiring connections.

.1 Contacts: self-resetting after response to rate-of-rise actuation

.2 Operation under fixed temperature actuation to result in external indication.

.3 Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes to operate on fixed temperature principle only.

.3 Rate Compensating Detector (Spot Type): designed for flush and surface outlet box mounting and supported independently of conduit, tubing or wiring connections.

.1 Detectors: hermetically sealed and automatically resetting type which will operate when ambient air temperature reaches detector setting regardless of rate of temperature rise.

.2 Detector operation: not be subject to thermal time lag.

.4 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by photoelectric principle.

.1 Detectors: addressable type.

.2 Provide necessary control and power modules required for operation integral with control panel.

.3 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.

.4 Malfunction of electrical circuits to detector or its control or power units to result in operation of system trouble signals.

.5 Equip each detector with visible indicator lamp that will flash when detector is in normal standby mode and glow continuously when detector is activated.

.6 Provide remote indicator lamps for each detector that is located beneath raised floors.

.7 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.

.8 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.

.9 Screen each detector to prevent entrance of insects into detection chamber(s).

.5 Photoelectric Detectors: operate on light scattering principle using LED light source.

.1 Detector: respond to both flaming and smouldering fires.

.6 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72 and CAN/ULC s524, except provide at least 2 detectors in rooms of 54 square meters or larger in area where detectors are required.

.7 Mount detectors at underside of ceiling or deck above unless otherwise indicated.

.1 For mounting heights greater than 3 m above floor level, reduce actual detector linear spacing from listed spacing as required by NFPA 72 and CAN/ULC s524.

.8 Temperature rating of detectors: in accordance with NFPA 72.

.9 Locate detectors minimum 300 mm to lighting fixtures and not closer than 600 mm to air supply or return diffuser.

.10 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, are approved for such locations.

.11 Provide detectors with terminal screw type connections.

.12 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

2.8 AUDIBLE SIGNAL DEVICES

.1 Provide remote system trouble buzzer arranged to operate in conjunction with panel's integral trouble signal.

.2 Audible device(s):

.1 Horns: 95 db, semi-flush mounting, 24 V dc. Provide complete with strobes.

2.9 END-OF-LINE DEVICES

.1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel and remotely as indicated.

2.10 REMOTE ANNUNCIATOR PANELS

.1 Provide panels where indicated mounted 1.5 m above finished floor elevation.

.2 Panels: duplicate requirements for control panel annunciator, with exception of individual trouble lamps are not required.

.3 LED type with designation cards to indicate zone.

.4 LCD based text annunciation.

.5 LEDs to annunciate alarm and trouble.

.6 Wired in multiple with main control panel.

.7 Supervised, including trouble signal for open circuit.

.8 LED test button.

2.11 VISUAL ALARM SIGNAL DEVICES

.1 Flush-mounted assembly of stroboscopic type suitable for use in electrically supervised circuit and powered from notification appliance circuits.

.2 Appliances: minimum of 110 candela measured as approved by ULC.

.3 Protect lamps with thermoplastic lens and labelled "FIRE" in letters at least 12 mm high.

.4 Provide visible appliances within 300 mm of each audible appliance as indicated.

.5 Visible appliances may be part of audio-visual assembly, where more than two appliances are located in same room or corridor.

2.12 VALVE TAMPER SWITCHES

.1 Provide switches to monitor range hood suppression system.

.2 Switch contacts to transfer from normal position to off-normal position during first two revolutions of hand wheel or when stem of valve has moved not more than one-fifth of distance from its normal position.

.3 Provide switch with tamper resistant cover.

.4 Removal of the cover to cause switch to operate into off-normal position.

2.13 OFF-PREMISES FIRE ALARM

.1 Provide auxiliary connection to base fire alarm system in accordance with NFPA 72, except as specified.

.2 Existing Fire Alarm System Installed by Superior Safety. Ensure Maintenance of system and warranty.

2.14 WIRING

.1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor. Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor

.2 Wire to remote annunciators: No. 18 AWG minimum solid copper conductor.

.3 Wire for connection to base telegraphic alarm loop: No. 12 AWG minimum solid copper conductor.

.4 Insulation 75 degrees C minimum with nylon jacket.

.5 Colour code wiring.

2.15 SURGE SUPPRESSION

.1 Provide line voltage surge suppression devices to suppress voltage transients which might damage control panel components.

2.16 LINE VOLTAGE SURGE SUPPRESSOR

.1 Suppressor : ULC approved with maximum 330 volt clamping level and maximum response time of 5 nanoseconds.

.2 Suppressor: multi-stage construction which includes inductors and silicon avalanche zener diodes.

.3 Equip suppressor with light emitting diode which extinguishes upon failure of protection components.

.4 Fuses: externally accessible.

.5 Wire in series with incoming power source to protected equipment using screw terminations.

.6 Provide surge suppression for circuits which leave building shell.

.7 When circuits interconnect 2 or more buildings, provide arrestor at circuit entrance to each building.

.8 Suppressor: UL 497B listed with maximum 30 volt clamping level and maximum response time of 5 nanoseconds.

.9 Suppressor: multi-stage construction and both differential and common mode protection.

2.17 AS-BUILT RISER DIAGRAM

.1 Fire alarm system riser diagram: in glazed frame, minimum size 600 x 600 mm.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install systems in accordance with CAN/ULC-S524

.2 Install main control panel and connect to ac power supply.

.3 Panel to be compatible with existing fire alarm system panel and interconnected as required to provide annunciation in both directions.

.4 Locate and install manual alarm stations and connect to alarm circuit wiring.

.5 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.

.6 Connect alarm circuits to main control panel.

.7 Locate and install horn/strobes and connect to signalling circuits.

.8 Connect signalling circuits to main control panel.

.9 Install end-of-line devices at end of alarm and signalling circuits.

.10 Install remote annunciator panels and connect to annunciator circuit wiring.

.11 Locate and install door releasing devices.

.12 Locate and install remote relay units to control fan shut down. Sprinkler system: wire alarm and supervisory switches and connect to control panel.

.13 Connect fire suppression systems to control panel.

3.3 FIELD QUALITY CONTROL

.1 Site Tests:

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - for Electrical and CAN/ULC-S537.

.2 Fire alarm system:

.1 Test each device and alarm circuit to ensure manual stations, thermal and smoke detectors and sprinkler systems transmit alarm to control panel and general alarm.

.2 Check annunciator panels to ensure zones are shown correctly.

.3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of system.

.4 Class B circuits.

.1 Test each conductor on circuits for capability of providing alarm signal on line side of single open-circuit fault condition imposed at electrically most remote device on circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.

.2 Test each conductor on circuits for capability of providing alarm signal during ground-fault condition imposed at electrically most remote device on circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.

.5 Audibility levels of alarm system to be confirmed post occupancy. A proper audiometric report shall be prepared with a calibrated instrument.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

.3 Verification requirements in accordance with Section 01 47 17 - Sustainable Requirements: Contractor's Verification include:

.1 Materials and resources.

.2 Storage and collection of recyclables.

.3 Construction waste management.

.4 Resource reuse.

.5 Recycled content.

.6 Local/regional materials.

.7 Low-emitting materials.

3.4 TRAINING

.1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION