

Part I General

I.1 REFERENCES

- .1 Abbreviations:
 - .1 Electronic Access Control (EAC): control of people through entrances and exits of controlled area. Security utilizing hardware systems and specialized procedures to control and monitor movements within a controlled area.
 - .2 CPVX: Central Station Burglar Alarm Systems.
 - .3 CVSG: Mercantile Burglar Alarm Systems.
 - .4 CVWX: Proprietary Burglar Alarm Systems.
 - .5 DRS: Door Release System.
 - .6 PIN: Personal Identification Number.
- .2 Reference Standards:
 - .1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S301-09, Standard for Signal Receiving Centre Burglar Alarm System and Operations
 - .2 CAN/ULC-S302-M91(R1999), Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults.
 - .3 CAN/ULC-S304-06, Signal Receiving Centre and Premise Burglar Alarm Control Units.
 - .4 CAN/ULC-S310-M91(R1999), Installation and Classification of Residential Burglar Alarm Systems.
 - .5 ULC-S318-96, Standard for Power Supplies for Burglar Alarm Systems.
 - .6 ULC-C634-86, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems.
 - .3 Underwriters' Laboratories (UL)
 - .1 UL 294-2009, Access Control System Units.
 - .2 UL 603-08, Power Supplies for Use with Burglar Alarm Systems.
 - .3 UL 681-1999, Installation and Classification of Burglar and Holdup Alarm Systems.
 - .4 UL 827-2008, Central-Station Alarm Services.
 - .5 UL 1023-2009, Household Burglar Alarm System Units.
 - .6 UL 1076-2005, Safety for Proprietary Burglar Alarm Units and Systems.
 - .7 UL 1641-1999, Safety for Installation and Classification of Residential Burglar Alarm Systems.

I.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for access controls and equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
 - .3 Submit:
 - .1 Functional description of equipment.
 - .2 Technical data for all devices.
 - .3 Device location plans and cable lists.
 - .4 Devices mounting location detail drawings.
 - .5 Typical devices connection detail drawings.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Manitoba, Canada.
 - .2 Shop drawings to indicate project layout, including details.
 - .1 Shop drawings to indicate, mounting heights and locations, wiring diagrams.
 - .2 Submit zone layout drawing indicating number and location of zones and areas covered.
 - .3 Submit wiring diagrams.
 - .4 Submit complete equipment list.
- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit 1 sample of each component proposed for inclusion into system. Components will be returned for incorporation into work.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .1 Submit ULC/UL Product Safety Certificates.
 - .2 Submit verification Certificate that service company is ULC/UL List alarm service company.
 - .3 Submit verification Certificate that security access system is "Certified alarm system".
- .6 Test and Evaluation Reports:

- .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .8 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.
- .9 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit Construction/Demolition Waste Management and Disposal in accordance with Section 01 74 21.

I.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for access controls and equipment for incorporation into manual.
 - .1 Include:
 - .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Instructions of operation of equipment.
 - .4 Illustrations and diagrams to supplement procedures.
 - .5 Operation instructions provided by manufacturer.
 - .6 Cleaning instructions.

I.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements [with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect access controls and equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of crates, padding, packaging materials as specified in Construction Waste Management Plan in

accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 WARRANTY

- .1 For Access control equipment and materials the 12 month warranty period.
- .2 Manufacturer's Warranty: submit, for Departmental Representative's acceptance, manufacturer's standard warranty document executed by authorized company official.

Part 2 Products

2.1 MATERIALS

- .1 Control Panel:
 - .1 Network Door Controller shall be an open, non-proprietary platform for access management that meets the requirements for advanced enterprise systems as well as smaller installations.
 - .2 Shall use IP, standard IT equipment and Application Programming Interface (API).
 - .3 Shall be scalable and future-proof solution that can easily integrate with other systems and components.
 - .4 Network Door Controller shall have a built-in software for basic access management and is open for third-party software, allowing the unit to be integrated with solutions provided by other manufacturers.
 - .5 The controller shall be a smart independent device that is installed by each door and data is automatically synchronized between the controllers in the system. It will continue its normal operation and buffer events locally if there is a network failure.
 - .6 Supports Power over Ethernet, which eliminates the need for separate power cables to do or accessories and other proprietary data cable.
 - .2 Include: equipment cabinet, equipment panels, system power supply and all the cables.
 - .3 Provide system cables including multi-conductor control cable and AC power cable as required.
 - .4 Up to 2 readers per controller (Wiegand, RS485 (OSDP)) with support for Indala Flexcard proximity card format.
 - .5 Doors: 1–2 doors per controller
 - .6 Credentials: Up to 15 000 with third-party access management software depending on server capacity
 - .7 Event history: 30 000 First In, First Out (FIFO) per controller
 - .8 Access schedules: Unlimited or third-party software dependent
 - .9 I/O interface Reader I/O: DC output: 2x 12 V DC output max 300 mA; 2x 4 configurable inputs/outputs, (Digital input: 0 to max 40 V DC, Digital output: 0 to max 40 V DC, Open drain, max 100 mA) Reader data: RS485 full duplex, RS485 half duplex, Wiegand Auxiliary: 1x 3.3 V DC output, max 100 mA 2x configurable inputs/output (Digital input: 0 to max 40 V DC, Digital output: 0 to

- max 40 V DC, Open drain, max 100 mA) Door connectors: 2x 2 input for door monitors and REX (Digital input: 0 to max 40 V DC)
 - .10 Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, Digest authentication, User access log
 - .11 Supported protocols
IPv4, HTTP, HTTPS, TLS, QoS, Layer 3 DiffServ, FTP, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS
 - .12 Software Configuration and basic access control management through Internet Explorer, Firefox, Chrome, or Safari Supported languages: English, French, Italian, German and Spanish
 - .13 Power Power in: 10–30 V DC, max 26 W or Power over Ethernet IEEE 802.3af/802.3at Type I Class 3 Power out & relay: 1x 12 V DC, max 500 mA 1x solid state relay 30 V DC, max 700 mA Power out lock: 2x 12 V DC, max 500 mA
 - .14 Approvals EN 55022 Class B, EN 50130-4, EN 61000-3-2, EN 61000-3-3, EN 55024, EN 61000-6-1, EN 61000-6-2, FCC Part 15 Subpart B Class B, ICES-003 Class B, C-tick AS/NZS CISPR 22 Class B, VCCI Class B, IEC/EN/UL 60950-1, UL 294, UL 2043, EN 50581
- .2 Card readers:
- .1 Type: Weigand proximity.
 - .2 Proximity technology.
 - .3 Communications: weigand/clock and data
 - .4 Fitted with LED indicator light.
 - .5 Reading distance 25 mm.
 - .6 Compatible with access card model FPCRD-SSSMW-0000.
 - .7 Card must be compatible with existing building card.
 - .8 Multi-Layered Security – Ensures data authenticity and privacy through the multilayered security of HID's SIO.
 - .9 EAL5+ Certified Secure Element Hardware – Provides tamper-proof protection of keys/cryptographic operations.
 - .10 SIO Data Binding – Inhibits data cloning by binding an object to a specific credential.
 - .11 Mobile device support using card emulation - Enables HID access control.
 - .12 SIO Portability – Provides technology independence and portability to other smart card technologies.
 - .13 Upgradeable Hardware Connection – Allows all Weigand-based communication readers to expand communication capabilities to OSDP, Hi-O and other bidirectional protocols.
 - .14 Field Programmable Readers – Provides secure upgrades for migration and extended lifecycle.

- .15 Customization and management from a central location – Enables organization to make changes and manage all attached OSDP readers over RS485 wiring.
 - .16 Simultaneous support for 125kHz HID Prox, Indala, AWID and EM4102.
 - .17 Allows for support of future technologies.
 - .18 Secured communications using OSDP with Secure Channel Protocol.
 - .19 Certification: UL294/cUL (US), FCC Certification (US), IC (Canada), CE (EU), C-tick (Australia, New Zealand), SRRC (China), MIC (Korea)4, NCC (Taiwan)4, iDA (Singapore)4, RoHS , FIPS-201 Transparent FASC-N Reader
 - .20 Provide 150 proximity cards, cards shall be Indala Flexcard proximity part # FPCRD-SSSMW-0000 with proprietary bit encryption format. Facility code shall be coordinated with Departmental Representative prior to ordering cards.
- .3 System Devices:
- .1 Door strike: latch monitor, UL approved complete with mounting hardware.
 - .2 Request to exit motion detector device:
 - .1 Infrared detection.
 - .2 Continuous low-voltage operation.
 - .3 Fitted with indicator light.
 - .4 Integrated with local audio alarm (electronic buzzer).
 - .5 Adjustable coverage.
 - .3 Power supplies:
 - .1 Continuous low-voltage operation output.
 - .2 Equipped with secondary protection for each output.
 - .3 Individual outputs for connection of devices.
 - .4 AC power failure output.
 - .5 DC power failure output and low battery output.
 - .6 Fitted with tamper contact.
 - .7 Wall mounted cabinet with locked door complete with 2 keys.
 - .8 Voltage: Shall be able to supply power for both access control panel and electric strike.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for access control system installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION: SECURITY ACCESS

- .1 Install security access systems and components in accordance with CAN/ULC-S302 CAN/ULC-S310 .
- .2 Install components in accordance with manufacturer's written installation instructions to locations, heights and surfaces shown on reviewed shop drawings.
- .3 Install components secure to walls, ceilings or other substrates.
- .4 Install required boxes in inconspicuous accessible locations.
- .5 Conceal conduit and wiring.

3.3 SITE TEST AND INSPECTION

- .1 Perform verification inspections and test in presence of Consultant.
 - .1 Provide all necessary tools, ladders and equipment.
 - .2 Ensure appropriate subcontractors and manufacturer's representatives and security specialists are present for verification.
 - .3 Ensure that the system is configured through the building Access control system.
- .2 Performance testing:
 - .1 Test procedure: perform test on a "go-no-go" basis.
 - .1 Make only operator adjustments required to show proof of performance.
 - .2 Test to demonstrate and verify that installed system complies with installation and technical requirements of this specification under operating conditions.
 - .3 Test results to be evaluated by Consultant as either acceptable or unacceptable using following procedures.
 - .2 Documentation review:
 - .1 This review will determine if information provided is sufficient to meet requirements of this specification.
 - .2 Provide for review all System manuals, as installed drawings, pretest forms, equipment cabinet pictorial, video and audio equipment details.
 - .3 Mechanical inspection:
 - .1 Consultant and Contractor to tour areas to insure that Systems and Subsystems are installed in place for proof of performance testing.

- .2 Take system inventory at this time. Verify following items before beginning proof of performance tests:
 - .1 Dust, debris, etc. are cleaned and removed from site.
 - .2 Equipment is properly labelled.
 - .3 Equipment identified in system's equipment lists are in-place and properly installed.
 - .4 Each System ground method are installed in accordance with manufacturer's instructions and this specification.
- .3 Subsystem functional test:
 - .1 Conduct operational testing after review of documentation and mechanical inspection completed. Proceed as follows.
 - .1 Perform operational test of each Subsystem to verify that all equipment is properly connected, interfaced and is functionally operational to meet requirements of this specification.
 - .2 Distribution or interface system:
 - .1 Check each door utilizing a volt/ohm (or signal level) meter to confirm each function and to insure that system meets all performance requirements.
 - .3 Total system test:
 - .1 Proceed with testing when system and subsystems are functionally tested and accepted. Total system tests to verify that requirements have been met for DC sub carrier, and control signals in accordance with this specification.
 - .4 Safety:
 - .1 Demonstrate with documentation that access control system meets safety requirements specified in UL 294.
- .4 Visual verification: objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
 - .1 Sturdiness of equipment fastening.
 - .2 Non-existence of installation related damages.
 - .3 Compliance of device locations with reviewed shop drawings.
 - .4 Compatibility of equipment installation with physical environment.
 - .5 Inclusion of all accessories.
 - .6 Device and cabling identification.
 - .7 Application and location of ULC approval decals.
- .5 Technical verification: purpose to ensure that all systems and devices are properly installed and free of defects and damage. Technical verification includes:
 - .1 Validate sensitivity of readers and applicability and application of cards.
 - .2 Connecting joints and equipment fastening.

- .3 Compliance with manufacturer's specification, product literature and installation instructions.
- .6 Operational verification: purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
 - .1 Operation of each device individually and within its environment.
 - .2 Operation of each device in relation with programmable schedule and or/specific functions.

3.4 FIELD QUALITY CONTROL

- .1 Manufacturer Services:
 - .1 Manufacturer of products, supplied under this Section, to review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work with Contract.
 - .2 Manufacturer's Field Services:
 - .1 Obtain written reports from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product.
 - .2 Submit 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 Ensure manufacturer's representative is present before and during critical periods of installation and testing.
 - .4 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove protective coverings from accessories and components.
 - .2 Clean housings and system components, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
 - .3 Clean components free from dirt and fingerprints.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by access controls and equipment installation.

END OF SECTION

Part I General

I.1 REFERENCES

- .1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S304-06, Signal Receiving Centre and Premise Burglar Alarm Control Units.
 - .2 CAN/ULC-S306-03, Intrusion Detection Units.
 - .3 ULC-S318-96, Standard for Power Supplies for Burglar Alarm Systems.
 - .4 ULC-C634-M1986, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems.
- .3 Underwriters' Laboratories (UL)
 - .1 UL 603-08, Power Supplies For Use With Burglar-Alarm Systems.

I.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for control panels, keypad, sensors and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
 - .3 Submit:
 - .1 Functional description of equipment.
 - .2 Technical data for devices.
 - .3 Device location plans and cable lists.
 - .4 Devices mounting location detail drawings.
 - .5 Typical devices connection detail drawings.
- .3 Shop Drawings:
 - .1 Shop drawings to indicate project layout, mounting heights and locations, wiring diagrams, detection device coverage patterns, contact operating gaps, etc.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .1 Submit UL Product Safety Certificates.
 - .2 Submit verification Certificate that service company is ULC/UL List alarm service company.

- .3 Submit verification Certificate that intrusion alarm system is Certified Alarm System.
- .5 Test and Evaluation Reports:
 - .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .7 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

I.3 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .1 Include:
 - .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Instructions of operation of equipment.
 - .4 Illustrations and diagrams to supplement procedures.
 - .5 Operation instructions provided by manufacturer.
 - .6 Cleaning instructions.

I.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect intrusion detection from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

I.5 WARRANTY

- .1 Manufacturer's Warranty: submit, for Departmental Representative's acceptance, manufacturer's standard warranty document executed by authorized company official.

- .1 Include manufacturer/dealer recommendations, information and support services for 1 year.

Part 2 Products

2.1 MATERIALS

- .1 Design Criteria:
 - .1 Design intrusion detection system using only ULC/UL listed products.
 - .2 Design intrusion detection system using alarm service company specializing in intrusion detection systems.
 - .3 Design intrusion detection system as a ULC/UL certified alarm system.
 - .1 Annunciating undesirable, abnormal or dangerous condition.
 - .2 Prioritizing alarms by alarm type; i.e. panic/duress, intrusion and tamper.
 - .3 Determining zone where alarm occurred.
 - .4 Annunciating power failure and power restoration.
 - .5 Annunciating low battery condition.
 - .6 Operate continuously for minimum period of 4 hours in the event of a power failure.
 - .4 Use existing Alarm control panel located in 2nd floor East Electrical room coordinate exact location of alarm panel with Departmental Representative..
 - .5 Relocate existing keypad, wireless transceiver and extend wiring to new location as indicated in the plan.
 - .6 Keypad located in the main floor security area shall be kept connected to the alarm panel and operational.
- .2 Control Panel: ULC approved, expandable and designed for multiplexed expansion.
 - .1 Use existing Alarm Panel located in 2nd floor East Electrical room
- .3 Detection Accessories:
 - .1 Passive Infrared Detectors/Microwave (PIR's): ULC approved, digital.
 - .1 Coverage pattern: minimum 18m, 90 degrees.
 - .2 Temperature requirement: 0 – 40 degrees Celsius.
 - .3 Tamper switch.
 - .4 Mounting: wall and ceiling.
 - .2 Glass break detector: ULC approved, complete with tamperproof switch and be designed to meet temperature and mounting requirements of project.
 - .1 Acceptable sensor based on “Tru Dual” Technology, superior combination of acoustic and seismic detection.
 - .2 Coverage pattern: 7.5m omnidirectional. Range is adjustable; no minimum range.
 - .3 Alarm Relay: Form C, 125mA max, 25VDC max

- .4 Tamper Switch: Combination cover/wall tamper 25mA max, 24VDC max
- .5 Alarm Duration: Five seconds (unaffected by alarm LED latching)
- .6 ESD Immunity: 10kV discharges of either polarity to exposed surfaces
- .7 Power Requirements: 6 - 18VDC, 12mA typical at 12VDC; 22mA max (Latched LED) AC ripple: 4V peak-to-peak at nominal 12VDC
- .8 RFI Immunity: 30V/m, 10MHz - 1000MHz
- .9 Operating Temperature: -10° to 50° C
- .10 Approvals and Listings
- .11 FCC and IC verified
- .12 CE
- .13 C-Tick
- .14 UL/ULC Listed.
- .3 Door Contacts : ULC approved.
 - .1 Mounting: concealed.
 - .2 Mounting locations: door.
 - .3 Operating gap: 25 mm.
 - .4 Security level: high security
 - .5 Type: magnetic balanced.
 - .6 Colour identical throughout the installation.
 - .7 Provide separate and independent contacts for intrusion
 - .8 Sensors shall be installed as close as possible to the leading edge of the door, as a minimum an alarm shall be generated when door movement exceeds 25mm
 - .9 UL/ULC approved
- .4 DURESS PUSH BUTTON
 - .1 The unit consists of a housing that contains the electrical circuitry and magnetic reed contacts, a cover plate to protect the internal electronics and an actuating lever with an Alnico V magnet installed in a cradle in the lever. When the lever is fully closed, the magnet — in proximity to the reed — triggers the circuit. The alarm occurs when the actuating lever is moved 20° to 45° past the fully closed position (approximately 1" from the fully closed position). On the latching models, an LED on the unit flashes and latches when the lever is opened. It can be reset only at the alarm panel.
 - .2 Nominal Voltage: 12 V DC @ 6 mA
 - .3 Current: Max 8 mA
 - .4 Operational Voltage: 7 V DC to 15 V DC
 - .5 Temperature Range: 0° to 110°F (-17.8°C to 43.3°C)
 - .6 Dimensions: 1.77" W x 2.90" L x 0.76" H (4.50 cm W x 7.37 cm L x 1.93 cm H)
 - .7 Weight: 1.5 oz.
 - .8 Housing Material: ABS plastic

- .9 Form C: Voltage: 30 V
 - .10 DC max.Current:. 0.25 A max.
 - .11 Power: 3 W m
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- .5 Communications: use existing telephone system.
 - .6 Connectors and switches: to ULC-C634.
 - .7 Power supplies: to ULC-S318 UL 603.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for intrusion detection installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

- .1 Install panels, intrusion detection system and components in accordance with manufacturer's written installation instructions to locations, heights and surfaces shown on reviewed shop drawings.
- .2 Install panels, intrusion detection system and components secure to walls, ceilings or other substrates.
- .3 Install required boxes in inconspicuous accessible locations.
- .4 Conceal conduit and wiring.

3.3 SITE TEST AND INSPECTION

- .1 Perform verification inspections and test in the presence of Departmental Representative and Consultant.
 - .1 Provide necessary tools, ladders and equipment.
 - .2 Ensure appropriate subcontractors , and manufacturer's representatives and security specialists are present for verification.
- .2 Visual verification: objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
 - .1 Sturdiness of equipment fastening.
 - .2 Non-existence of installation related damages.

- .3 Compliance of device locations with reviewed shop drawings.
- .4 Compatibility of equipment installation with physical environment.
- .5 Inclusion of all accessories.
- .6 Device and cabling identification.
- .7 Application and location of ULC approval decals.
- .3 Technical verification: purpose to ensure that all systems and devices are properly install and free of defects and damage. Technical verification includes:
 - .1 Measurements of coverage patterns
 - .2 Connecting joints and equipment fastening.
 - .3 Compliance with manufacturer's specification, product literature and installation instructions.
- .4 Operational verification: purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
 - .1 Operation of each device individually and within its environment.
 - .2 Operation of each device in relation with programmable schedule and or/specific functions.

3.4 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written reports from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product.
 - .2 Submit 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 Ensure manufacturer's representative is present before and during testing.
 - .4 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

3.5 ADJUSTING

- .1 Adjust all components for correct function.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .1 Remove protective coverings from accessories and components.
- .2 Clean housings and system components, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by intrusion detection installation.

END OF SECTION

Part I General

I.1 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 ULC-S317-1996, Installation and Classification of Closed Circuit Video Equipment (CCVE) Systems for Institutional and Commercial Security Systems.

I.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for video surveillance equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit:
 - .1 Functional description of equipment.
 - .2 Technical data sheets of all devices.
 - .3 Device location plans and cable lists.
 - .4 Video camera surveillance chart.
 - .5 Video interconnection detail drawings.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate project layout, camera locations, point-to-point diagrams, cable schematics, risers, mounting details and identification labeling scheme.
- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit 1 sample of each camera selected complete with housing, brackets and mounting hardware.
 - .4 Camera will be returned for incorporation into work as appropriate.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .1 Submit UL Product safety Certificates.
 - .2 Submit verification Certificate that service company is "UL List alarm service company".
 - .3 Submit verification Certificate that monitoring facility is "UL Listed central station".
 - .4 Submit verification Certificate that video surveillance system is "Certified alarm system".

- .6 Test and Evaluation Reports:
 - .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .8 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.
- .9 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

I.3 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals. Include following:
 - .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Manufacturer's Instructions for operation, adjustment and cleaning.
 - .4 Illustrations and diagrams to supplement procedures.

I.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect video surveillance materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

I.5 WARRANTY

- .1 Manufacturer's Warranty: submit, for Departmental Representative's acceptance, manufacturer's standard warranty document executed by authorized company official.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Wire and connect video surveillance camera to existing network switch and existing network video recording equipment. Provide all the required cabling.
- .2 The existing analog video surveillance for the building is to be upgraded to Internet Protocol based system, but upto this time it is still in the design stage.
- .3 Overall control of Video Surveillance provided through software control, which provides complete integration of security components.
- .4 Environment: design video components and systems to operate with specified requirements under following ambient temperatures:
 - .1 Indoor installations:
 - .1 Temperature: 0 degrees C to 30 degrees C.
 - .2 Humidity: 10 to 90%.

2.2 CHARACTERISTICS

- .1 Internet Protocol (IP) Video Camera:
 - .1 Lens: Megapixel resolution P-Iris minimum 80° horizontal field of view
 - .2 Minimum Illumination: Colour- 0.1 lux, B/W- 0.022 lux
 - .3 Resolution: 1280 x 960 (IMP)
 - .4 Frame rate: 25/30fps
 - .5 Video streaming: Multiple, individually configurable streams in H.264/Motion JPEG, Controllable frame rate and bandwidth VBR H.264.
 - .6 Image sensor: Progressive scan RGB CMOS 1/3" Environment: indoor.
 - .7 Security: Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, Digest authentication, User access log, Centralized Certificate Management.
 - .8 Supported protocols: IPv4/v6, HTTP, HTTPS, SSL/TLS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH
 - .9 Analytics: Video motion detection, Active tampering alarm, Audio detection Cross Line Detection, Digital Auto tracking and third-party applications.
 - .10 Mounting: Dome type ceiling mounted
 - .11 Lens functions: fixed auto iris.
 - .12 Additional features: remote back focus capability, backlight compensation, day/night functionality, low light technology, multiple H.264 video streams.
 - .13 Operational voltage: standard 24 AC, 12 DC, PoE
 - .14 Video camera to match newly upgraded video surveillance system for the entire building. Coordinate with Departmental Representative.
- .2 Recording:

- .1 Use existing video surveillance recorder.

2.3 CAMERA POWER SUPPLY

- .1 Power supply: custom designed for all cameras requiring 24 VAC power or Power over Ethernet (PoE) located inside equipment cabinet; fused (each input and output); capable of providing correct voltage to overcome real and circulated system power loss for 2 cameras and to provide future expansion of 25%. Permanently mount power supply. PoE mid-span power supply

2.4 JUNCTION BOX

- .1 Metal, sized to handle all system conduit interconnections with appropriate expansion.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for video surveillance installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheet.
- .2 Install video surveillance equipment and components in accordance with ULC-S317.
- .3 Install cable, boxes, mounting hardware, brackets, video cameras and system components in accordance with manufacturer's written installation instructions.
- .4 Install components secure, properly aligned and in locations shown on reviewed shop drawings.
- .5 Connect cameras to cabling in accordance with installation instructions.
- .6 Install ULC labels where required.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:

- .1 Obtain written reports verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product.
- .2 Submit 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 at stages listed:
 - .1 Upon completion of Work, after cleaning is carried out.

3.4 **SYSTEM STARTUP**

- .1 Perform verification inspections and test in the presence of Consultant.
 - .1 Provide all necessary tools, ladders and equipment.
 - .2 Ensure appropriate subcontractors and security specialists are present for verification.
- .2 Visual verification: objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
 - .1 Sturdiness of equipment fastening.
 - .2 Non-existence of installation related damages.
 - .3 Compliance of device locations with reviewed shop drawings.
 - .4 Compatibility of equipment installation with physical environment.
 - .5 Inclusion of all accessories.
 - .6 Device and cabling identification.
 - .7 Application and location of ULC approval decals.
- .3 Technical verification: purpose to ensure that all systems and devices are properly installed and free of defects and damage. Technical verification includes:
 - .1 Measurements of tension and power.
 - .2 Connecting joints and equipment fastening.
 - .3 Measurements of signals (dB, lux, baud rate, etc).
 - .4 Compliance with manufacturer's specification, product literature and installation instructions.
- .4 Operational verification: purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
 - .1 Operation of each device individually and within its environment.
 - .2 Operation of each device in relation with programmable schedule and or/specific functions.
 - .3 Operation control of camera lens, pan, tilt and zoom.
 - .4 Switching of camera to any monitor.
 - .5 Switching of system video recorder to selective monitor.
 - .6 Set dwell times.
 - .7 Demonstrate:

- .1 Sequence viewing of cameras on each monitor.
- .2 Bypass capability.
- .3 Display of stored image to cardholder.

3.5 ADJUSTING

- .1 Remove protective coverings from cameras and components.
- .2 Adjust cameras for correct function.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean camera housing, system components and lens, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by video surveillance installation.

END OF SECTION

Part I General

I.1 RELATED REQUIREMENTS

- .1 Refer to all sections of the specification for related work.

I.2 REFERENCES

- .1 Treasury Board of Canada Secretariat (TBS), Occupational Safety and Health (OSH)
 - .1 Fire Protection Standard-10.
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S526-07, Visible Signal Devices for Fire Alarm Systems, Including Accessories.
 - .3 CAN/ULC-S527-99, Standard for Control Units for Fire Alarm Systems.
 - .4 CAN/ULC-S528-05, Manual Stations for Fire Alarm Systems, Including Accessories.
 - .5 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems.
 - .6 CAN/ULC-S530-91(R1999), Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S531-02, Standard for Smoke Alarms.
 - .8 CAN/ULC-S537-04, Standard for the Verification of Fire Alarm Systems.

I.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for fire alarm system devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate on shop drawings:
 - .1 Detail assembly and wiring diagrams
 - .2 Details for devices.

I.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for fire alarm system for incorporation into manual.
- .3 Include:
 - .1 Technical data - illustrated parts lists with parts catalogue numbers.

- .2 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
- .3 List of recommended spare parts for system.

I.5 MAINTENANCE MATERIAL SUBMITTALS

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

I.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESCRIPTION

- .1 Existing Fire Alarm Panel is Notifier NFS2-3030
- .2 System to include:
 - .1 Initiating/input circuits.
 - .2 Output circuits.
 - .3 Auxiliary circuits.
 - .4 Wiring.
 - .5 Manual and automatic initiating devices.
 - .6 Audible and visual signalling devices.
 - .7 End-of-line resistors.
- .3 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .4 Audible signal devices: to CAN/ULC-S524.
- .5 Visual signal devices: to CAN/ULC-S526.
- .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.

- .10 Regulatory Requirements:
 - .1 To TBS Fire Protection Standard.
 - .2 Subject to Fire Commissioner of Canada (FC) approval.
 - .3 Subject to FC inspection for final acceptance.
 - .4 System components: listed by ULC and comply with applicable provisions of NBC, Local, Provincial Building Code and meet requirements of local authority having jurisdiction.

2.2 **SYSTEM OPERATION: SINGLE STAGE (EXISTING)**

- .1 Actuation of any alarm initiating device to:
 - .1 Cause electronic latch to lock-in alarm state at central control unit and data gathering panel/transponder.
 - .2 Indicate zone of alarm at central control unit and at remote annunciator display.
 - .3 For low rise buildings:
 - .1 Cause audible devices throughout building to sound at 20 strokes per minute.
 - .2 Cause audible devices in zone of alarm to sound continuously while other audible devices throughout building sound at 20 strokes per minute.
 - .4 Cause audible signalling devices to sound in alarm tone throughout building.
- .2 Acknowledging alarm: indicated at central control unit.
- .3 Ensure that it is possible to silence signals by "alarm silence" switch at central control unit, after 60 seconds period of operation.
- .4 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
- .5 Actuation of any supervisory device to:
 - .1 Cause electronic latch to lock-in supervisory state at central control unit and data gathering panel/transponder.
 - .2 Indicate respective supervisory zone at central control unit and remote annunciator display.
 - .3 Cause audible signal at central control unit to sound.
 - .4 Activate common supervisory sequence.
- .6 Trouble on system to:
 - .1 Indicate circuit in trouble at central control unit.
 - .2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; visual indication to remain until trouble is cleared and system is back to normal.
- .7 Troubles on system: suppressed during course of alarm.
- .8 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 CONTROL PANEL (EXISTING)

2.4 INITIATING/INPUT CIRCUITS (TO MATCH EXISTING)

2.5 AUXILIARY CIRCUITS (TO MATCH EXISTING)

2.6 WIRING

- .1 Twisted copper conductors: rated 300V.
- .2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 To signal circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

2.7 MANUAL ALARM STATIONS

- .1 Manual alarm stations: pull lever, wall mounted semi-flush or surface type, and general alarm key switch for two stage system bilingual English French signage.

2.8 AUTOMATIC ALARM INITIATING DEVICES

- .1 Heat detectors, fixed temperature, non- restorable, rated 57 degrees C.
- .2 Thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57 degrees C, rate of rise 8.3 degrees C per minute.
- .3 Smoke detector: ionization type air duct type with sampling tubes with protective housing.
 - .1 Twistlock Plug-in type with fixed base.
 - .2 Wire-in base assembly with integral red alarm LED, and terminals for remote relay alarm LED.
- .4 Addressable smoke detector.
 - .1 Ionization type.
 - .2 Electronics to communicate detector's status to addressable module/transponder.
 - .3 Detector address to be set on detector base head in field.

2.9 AUDIBLE SIGNAL DEVICES

- .1 Bells: surface mounted, single stroke, polarized, 24 V dc, 150 mm, 98db.
- .2 Bells: to match existing type, gongs of special alloy steel, 24 V dc, 150mm, 98db.

2.10 VISUAL ALARM SIGNAL DEVICES

- .1 Strobe type: to match existing, red, 24 V dc.

- .2 Designed for surface mounting on walls

2.11 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.

2.12 AS-BUILT RISER DIAGRAM

- .1 Provide Fire alarm system riser diagram for the renovation area

2.13 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for fire alarm installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION/SCOPE OF WORK

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 Install manual alarm stations and connect to alarm circuit wiring.
- .3 Locate and install detectors and connect to alarm circuit wiring. Mount detectors more than 1 m from 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.
- .4 Connect alarm circuits to main control panel.
- .5 Install signal and visual signal devices and connect to signalling circuits.
- .6 Connect signalling circuits to main control panel.
- .7 Install end-of-line devices at end of alarm and signalling circuits.
- .8 Install remote relay units to control fan shut down.
- .9 Sprinkler system: wire alarm and supervisory switches and connect to control panel.
- .10 Room detection system.

- .1 Install detectors. Make necessary connections between room detection panel and main fire alarm panel.
- .2 Locate and install audible signals, visual alarms.
- .11 Splices are not permitted.
- .12 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.
- .13 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .14 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.

3.3 FIELD QUALITY CONTROL

- .1 Perform testing and verification of all new and relocated devices in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.
- .2 Note: Existing devices on existing circuits and zones are generally not shown on the drawings. It is the Contractor's responsibility to determine the locations of all existing devices to verify.
- .3 Fire alarm system:
 - .1 Test such device and alarm circuit to ensure manual stations, thermal, smoke detectors, sprinkler system transmit alarm to control panel and actuate first stage alarm general alarm ancillary devices.
 - .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 systems.
 - .4 Addressable circuits system style DCLA:
 - .1 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
 - .2 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
 - .5 Addressable circuits system style DCLB:
 - .1 Test each conductor on all DCLB addressable links for capability of providing 3 or more subsequent alarm signals on line side of single open-circuit fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

- .2 Test each conductor on all DCLB addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
- .4 Provide final PROM program re-burn for system Departmental Representative incorporating program changes made during construction.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by fire alarm system installation.

3.6 CLOSEOUT ACTIVITIES

- .1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

END OF SECTION