

## **Part 1 General**

### **1.1 REFERENCE STANDARDS**

- .1 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S301, Standard for Signal Receiving Centre Burglar Alarm System and Operations
  - .2 CAN/ULC-S302, Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults.
  - .3 CAN/ULC-S304, Signal Receiving Centre and Premise Burglar Alarm Control Units.
  - .4 ULC-S318, Standard for Power Supplies for Burglar Alarm Systems.
  - .5 ULC-C634, Guide for the Investigation of Connectors and Switches for Use with Burglar Alarm Systems.
- .2 Underwriters' Laboratories (UL)
  - .1 UL 294, Access Control System Units.
  - .2 UL 603, Power Supplies for Use with Burglar Alarm Systems.
  - .3 UL 681, Installation and Classification of Burglar and Holdup Alarm Systems.
  - .4 UL 827, Central-Station Alarm Services.
  - .5 UL 1023, Household Burglar Alarm System Units.
  - .6 UL 1076, Safety for Proprietary Burglar Alarm Units and Systems.
  - .7 UL 1641, Safety for Installation and Classification of Residential Burglar Alarm Systems.

### **1.2 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.

### **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance and Section 01 - Common Product Requirements and with the 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 indoors off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect access controls conduit and wire from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, pallets, crates, packaging materials in accordance with 01 74 19 - Waste Management and Disposal.

#### **1.4 DESCRIPTION OF WORK**

- .1 Contractor to install rough-in (conduit, junction boxes and wire) for system. System components supplied and installed by PTSS.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Provide home run conduits between field devices and head end control unit.
- .2 Provide system cables including coaxial cable, multi-conductor control cable, audio and AC power cable required.

### **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 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: BURGLAR ALARM SYSTEM**

- .1 Install burglar alarm system rough-in in accordance with UL 1641 CAN/ULC-S310.
- .2 Provide tamperproof unobtrusive dual gang receptacle back box with stainless steel cover plate where door release items installed in areas with suspended ceiling, fixed tile, plaster, or concrete walls, and/or metal door frames.
- .3 Fully enclose external cables in conduit or flexible protective armor, from activating unit location's enclosure receptacle back box to and above ceiling wall mounted junction box(es).
- .4 Provide tamperproof attachments for each activation unit cover plate to receptacle back box.

- .5 Enclose in conduit or flexible protective armor external cables for associated junction box to remaining system locations, from junction box to above ceiling mounted cable duct(s) or master conduit route(s).
- .6 Securely fasten all components to wall, ceiling, or other substrate or structure.

### **3.3 INSTALLATION: SECURITY ACCESS**

- .1 Install required boxes in inconspicuous accessible locations.
- .2 Conceal conduit and wiring.

### **3.4 SITE TEST AND INSPECTION**

- .1 Mechanical inspection:
  - .1 Departmental Representative and Contractor to tour areas to ensure 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 test(s):
    - .1 Electrical power circuits designated for system equipment are properly labelled, wired, phased, protected and grounded.
    - .2 Dust, debris, solder splatter, etc. are cleaned and removed from site.
    - .3 Equipment is properly labelled.

### **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 - Cleaning.
  - .1 Clean housings, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
  - .2 Clean components free from dirt and fingerprints.

### **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 1 General**

### **1.1 GENERAL REQUIREMENTS**

- .1 Wherever practical and reasonable, all cabinets and electrical boxes shall be installed in the locations shown on the attached floor plans.
- .2 Drawings show conduit connection requirements. Actual conduit runs shall run parallel to building lines.
- .3 Unless specified otherwise, all conduits shall be sized according to the number of cables in the run. Maximum conduit fill is 50%.
- .4 Unless specified otherwise, all junction boxes (J1, J2, J3, etc.) shall be steel and sized according to the number of conduits they must accommodate.
- .5 Unless noted otherwise, all cables pulled to an A1, A2, A3, A4, A5 or A6 backboard shall have no less than 4500mm of cable slack in the splitter trough.
- .6 Unless noted otherwise, all cables pulled to a 'T' Type cabinet (T1, T2, T3, T7, T9, etc.) shall have no less than 1800mm of cable slack in the 'T' cabinet.
- .7 Unless noted otherwise, all cables terminating in a device or outlet box shall have no less than 600mm of cable slack at the device/outlet box.
- .8 All cables terminating in a cabinet, a splitter trough, a device box, a utility box or an outlet box shall be labelled (at both ends of the cable).
- .9 The contractor shall test all cables installed as part of this contract for opens, grounds and shorts. The contractor shall replace any cables found to be defective by the owner.

### **1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance and Section 01 - Common Product Requirements and with the 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 indoors off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect access controls conduit and wire from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, pallets, crates, packaging materials in accordance with 01 74 19 - Waste Management and Disposal.

### **1.3 DESCRIPTION OF WORK**

- .1 Contractor to install rough-in (conduit, junction boxes and wire) for system. System components supplied and installed by PTSS.

**Part 2 Products**

**2.1 CONDUIT**

- .1 Unless specified otherwise, all conduits shall be steel.

**2.2 JUNCTION, OUTLET AND PULL BOXES**

- .1 Unless specified otherwise, all outlet, device and pull boxes shall be steel.

**2.3 SPLITTER TROUGHS**

- .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

**2.4 GROUND BAR**

- .1 Hoffman ASG8

**2.5 CABLE**

- .1 All 4 pair Telephone Type (Cat3) cables shall be Belden DIW4, **24 AWG**, CMR, Category 3 solid copper with a grey jacket (or equivalent).
- .2 All Category 5e (Cat5e) cables shall be Belden 1583A cable (or equivalent).
- .3 All LVT cables shall be four (4) conductor #18 solid AWG Standard Control LVT cable.
- .4 All 8 conductor overall shielded cable shall be General/Carol C0764A cable or Provo 6708 or Belden 5506FE (or equivalent).

**2.6 PULL CORD/TAPE**

- .1 Polypropylene type, 200 lb tensile strength minimum. Provide home run conduits between field devices and head end control unit.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Drawings reference the following items for installation.

**3.2 A2 - Backboard**

- .1 Existing PTSS backboard with a splitter trough in an existing building.
- .2 **The plywood backboard space below the splitter trough is reserved for PTSS equipment. Do not run surface conduit in this area.**

**3.3 A4 - Backboard**

- .1 Supply and install a 2400H X 762W X19Dmm G1S plywood backboard.
- .2 Plywood backboard to be primed and painted to match adjacent walls.
- .3 Supply and install one Hoffman AST283R 610W X 152H X 114Dmm Splitter Trough centered 2300mm A.F.F. on this backboard.

- .4 Supply and install a Hoffman ASG8 Ground Bar near, but not inside, the splitter trough. Bond to main building ground with a #6 AWG stranded, bare copper conductor.
- .5 All conduits to the A4 backboard shall be connected to the splitter trough on the A4 backboard.
- .6 Supply and install one recessed duplex 120VAC receptacle mounted up 450mm in the bottom left hand corner of this backboard:
  - Do not run 120VAC inside the splitter trough.
  - This duplex receptacle shall be wired to a separate 120VAC circuit, on its own breaker, which is connected to emergency backup power (when available).
- .7 Supply and install **three** structured wiring/data outlets mounted 50mm below the splitter trough.
- .8 Provide structured cabling from the wiring/data outlets and terminate on a patch panel in the building's LAN rack/cabinet.
- .9 **The plywood backboard space below the splitter trough is reserved for PTSS equipment. Do not run surface conduit in this area.**

#### 3.4 T2 - "T" Cabinet (305H X 305W X 100D)

- .1 Supply and install one 305H X 305W X 100Dmm Type 1 Telephone cabinet with wood back (BEL Products TCFKO12124WB or equivalent) **mounted 150mm above the suspended ceiling on the protected side of the wall.** If the ceiling is finished, the cabinet should be recess mounted 225mm above the strike side of the frame on the protected side of the wall. Refer to details on drawings for Access Controlled doors.
- .2 **T2 cabinet must be accessible and serviceable.**
- .3 Supply and install conduit, sized to fit cables, from this cabinet to another T2 in the area **OR** to an X1 cabinet in the area **OR** to the splitter trough on an A2/A4 backboard (as per floor plans).
- .4 Supply, install and label **one** General C0764A cable (or equivalent) and **one** 4 conductor **18 AWG** solid copper LVT cable in the conduit from the T2 cabinet to an X1 cabinet in the area **OR** to the splitter trough on the A2/A4 backboard (as per floor plans).
- .5 Supply no less than 4500mm of cable slack at the X1 cabinet **OR** at the A2/A4 splitter trough.

#### 3.5 X1 - Cabinet

- .1 Existing PTSS equipment cabinet.

#### 3.6 12 - Square Outlet Box

- .1 Supply and have door-frame fabricator spot weld one 100H X 100W X **40D**mm square outlet box on top of the door frame as per details on drawing(s) for access controlled doors.
- .2 Drill a 19mm hole 75mm (center point) from the edge of the door casing to allow for door switch installation and access to frame mounted outlet box.
- .3 Supply and install conduit from the outlet box in the door frame to a T2 cabinet in the area (as per floor plan).

- .4 Supply, install and label one 4 pair telephone (Cat3) cable in the conduit from the outlet box in the door frame to the T2 cabinet.
- .5 The cable slack at the outlet box in the door frame shall be tucked into the outlet box to protect the cable from damage.

### **3.7 14 - Square Outlet Box**

- .1 Supply and have door-frame fabricator spot weld one 100H X 100W X 40Dmm square outlet box on top of the door frame as per details on drawing(s) for access controlled doors.
- .2 Drill a 19mm hole 75mm (center point) from the edge of the door casing to allow for door switch installation and access to frame mounted outlet box.
- .3 Supply and install conduit from the outlet box in the door frame to a T2 cabinet in the area (as per floor plan).
- .4 Supply, install and label one 4 pair telephone (Cat3) cable in the conduit from the outlet box in the door frame to the splitter trough on the A4 backboard.
- .5 Supply, install and label a second 4 pair telephone (Cat3) cable in the conduit from this outlet box in the door frame to the T2 cabinet.
- .6 The cable slack at the outlet box in the door frame shall be tucked into the outlet box to protect the cable from damage.

### **3.8 21 - Device Box**

- .1 Supply and install one recessed 76H X 150W X 63Dmm three gang device box c/w blank cover plate centered 1500mm A.F.F..
- .2 Supply and install conduit from this device box to another device/junction box in the area OR to the splitter trough on the A4 backboard (as per floor plans).
- .3 Supply, install and label one 4 pair telephone (Cat3) cable in the conduit from this device box to the splitter trough on the A4 backboard.

### **3.9 31 - Conduit to Electric Strike**

- .1 Supply and install conduit from a point 25mm above the strike plate inside the door frame to a T2 cabinet in the area (as per floor plans).
- .2 Supply, install and label one 4 pair telephone (Cat3) cable in the conduit from the door frame to the T2 cabinet.
- .3 Leave 610mm of cable slack inside the door frame.
- .4 For more information, see details on drawing(s) for access controlled doors.

### **3.10 33 - Device Box for Abloy EA281**

- .1 Supply and install one recessed 76H X 50W X 63Dmm single gang device box c/w blank cover plate centered 425mm A.F.F..
- .2 Supply and install conduit from this device box to a T2 cabinet in the area (as per floor plans).
- .3 Supply, install and label one 4 pair telephone (Cat3) cable in the conduit from this device box to the T2 cabinet.

- .4 For more information, see details on drawing(s) for access controlled doors.
- .5 The EA281 shall be supplied and installed by the door frame fabricator.
- .6 Information Sheets have been attached for the Abloy EA281 Power Transfer Lead Cover. These sheets have been provided for your information only.

### **3.11 44 - Device Box**

- .1 Supply and install one recessed 76H X 50W X 63Dmm single gang device box c/w blank cover plate centered 100mm above the top of the door frame on the **protected** side of the wall as per details on drawing(s) for access controlled doors.
- .2 Supply and install conduit from this device box to a T2 cabinet in the area (as per floor plans).
- .3 Supply, install and label **one** 4 pair telephone (Cat3) cable in the conduit from this device box **to the T2 cabinet**.
- .4 For more information, see details on drawing(s) for access controlled doors.

### **3.12 61 - Device Box**

- .1 Supply and install one recessed 76H X 50W X 63Dmm single gang device box c/w blank cover plate centered 1300mm A.F.F. on the **unprotected** side of the wall as per details on drawing(s) for access controlled doors.
- .2 Supply and install conduit from this device box to a T2 cabinet in the area (as per floor plans).
- .3 Supply, install and label **one** General C0764A cable (or equivalent) in the conduit from this device box **to the T2 cabinet**.
- .4 For more information, see details on drawing(s) for access control on doors with wall mounted readers.

### **3.13 SITE TEST AND INSPECTION**

- .1 Mechanical inspection:
  - .1 Departmental Representative and Contractor to tour areas to ensure 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 test(s):
    - .1 Electrical power circuits designated for system equipment are properly labelled, wired, phased, protected and grounded.
    - .2 Dust, debris, solder splatter, etc. are cleaned and removed from site.
    - .3 Equipment is properly labelled.

### **3.14 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 - Cleaning.



- .1 Clean housings, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.
- .2 Clean components free from dirt and fingerprints.

**3.15 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 Canadian Electrical Code.

**1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and with Section 01 61 00 - Common Product Requirements.
- .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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect security door systems from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, pallets, packaging materials, crates, in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.3 DESCRIPTION OF WORK**

- .1 Contractor to install rough-in (conduit, junction boxes and wire) for system. System to consist of alarm control panel, motion detectors and intrusion switches located at doors to be supervised. System components supplied and installed by PTSS.

**Part 2 Products**

**2.1 NOT APPLICABLE**

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for security door system 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**

- .1 Install required boxes in inconspicuous accessible locations.
- .2 Conceal conduit and wiring.

### **3.3 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.

### **3.4 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 Codes shall include but not be limited to the following:
  - .1 Local Building Code.
  - .2 Canadian Electrical Code, Part 1 CSA Standard C22.1, particularly Section 32 - Fire Alarm Systems.
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S524-14, Installation of Fire Alarm Systems.
  - .2 ULC-S525, Audible Signal Appliances for Fire Alarm.
  - .3 CAN/ULC-S526, Visual Signal Appliances, Fire Alarm.
  - .4 CAN/ULC-S527, Control Units, Fire Alarm.
  - .5 CAN/ULC-S528, Manual Pull Stations.
  - .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-S537-14, Verification of Fire Alarm Systems

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for fire alarm panels, detection accessory devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Indicate on shop drawings details for added devices.

**1.3 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 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 with corrections completed and marks removed except review stamps.
    - .4 List of recommended spare parts for system.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .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 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 pallets, packaging materials, crates, padding, in accordance with Section 01 74 19 - Waste Management and Disposal.

#### **1.5 WARRANTY**

- .1 Manufacturer's Warranty: submit, for Departmental Representative acceptance, manufacturer's standard warranty document executed by authorized company official.
  - .1 Include manufacturer/dealer recommendations, information and support services for 1 years.

### **Part 2 Products**

#### **2.1 DESCRIPTION**

- .1 Each building on the project site is fitted with an independent fire alarm system. This project is to provide a new fire alarm signalling device connected to the local system and be located in the tunnel near each building access point. The tunnel signalling device will indicate the alarm status of the building above.
- .2 The contractor is to audit the model and manufacture of each system and provide a compatible and matching signalling device, connected to the nearest local signalling circuit.

#### **2.2 ALARM OUTPUT CIRCUITS**

- .1 Alarm output circuit: connected to signals, wired in class A or class B configuration to central control unit. Wiring class to match existing system wiring.
  - .1 Signal circuits' operation to follow system programming; capable of sounding horns in temporal pattern. Each signal circuit: rated at 2 A, 24 VDC; fuse-protected from overloading/overcurrent.
  - .2 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's common control.
  - .3 All output circuits to provide subsequent trouble feature. Subsequent trouble from another circuit will reactivate trouble sequence.

## **2.3 WIRING**

- .1 Copper conductors.
- .2 Initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 Signal circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.
- .4 Control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

## **2.4 AUDIBLE SIGNAL DEVICES**

- .1 Horn/Strobes: Surface mounted Horn/Strobe Combination units, red color, 24 VDC operation, 90 dB sound output rating, 15.0 candela strobe.
- .2 New devices shall be installed on manufacturer supplied backbox specifically sized to accommodate new device.

## **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**

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 Install horns and visual signal devices and connect to signalling circuits.
- .3 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and central control unit, as required by equipment manufacturer.
- .4 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .5 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.
- .6 Provide line isolation modules at all locations identified and as required by code.
- .7 Install required boxes in inconspicuous accessible locations.

- .8 Conceal conduit and wiring.

### **3.3 SITE TEST AND INSPECTION**

- .1 Perform verification inspections and test in the presence of Departmental Representative.
  - .1 Provide necessary tools, ladders and equipment.
  - .2 Ensure appropriate subcontractors, and/or manufacturer's representatives, and/or 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 cUL 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 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 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 system to ensure the horn/strobe device initiates as required.
  - .2 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.
  - .3 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.
- .4 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.
- .3 Provide final PROM program re-burn for each system to Departmental Representative incorporating program changes made during construction.

### **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 reuse and recycling in accordance with Section 01 74 19 - 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 fire alarm system installation.

**END OF SECTION**